# Installation manual for semi-flexible solar panels

For professional use only

## 1.0 Generalization

This manual provides important safety instructions for the installation, maintenance and use of semi-flexible solar modules. Users and installers must read carefully and strictly abide by it. Failure to follow these safety guidelines may result in personal injury or death or property damage. Installing and operating solar modules requires professional skills, and only professionals can do this work. Please read the safety and installation instructions before using and operating the components. The installer must inform the end customer (or consumer) of the above matters accordingly.

The "module" in this specification refers to one or more FLEX series solar modules. Please keep this manual for future reference.

## 1.1 Disclaimer

Sungold reserves the right to change this installation manual without prior notice. Sungold does not make any guarantee for any express or implied information contained in this manual. Failure of the customer to follow the requirements listed in this manual during the installation of the components will result in the invalidation of the limited product warranty provided to the customer.

## 1.2 Limitation of Liability

Sungold is not responsible for any form of injury, including but not limited to component operation, system installation, and physical injury, injury, and property damage caused by whether or not the instructions in this manual are followed.

## 2.0 Safety precautions

Warning: Read and understand all safety rules before installing, wiring,operating and/or maintaining components. When the component is exposed to sunlight or other light sources, direct current is generated. Regardless of whether the module is connected or not, diredcontact with the live parts of the module, such as wiring terminals, may cause casualties.

General safety rules

· All installation work must fully comply with local and local regulations and corresponding domestic or international electrical standards.

Please use insulated tools to reduce the risk of electric shock

Use appropriate protective measures (non-slip gloves, work clothes, etc.) to avoid direct contact with 30V DC or higher voltage.

Please do not wear metal ornaments when installing, so as not to puncture the components and cause electric shock.

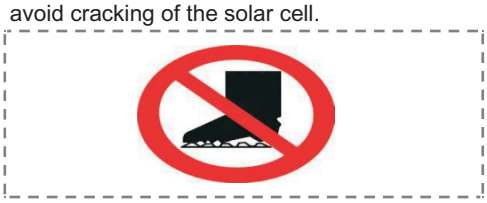
If you install or operate the module in rainy, strong wind or morning with dew, you need to take appropriate protective measures to avoid damage to the module and personnel.

Do not allow children or unauthorized persons to approach the installation area or module storage area.

During component installation or wiring, if the circuit breaker and overcurrent protection circuit breaker cannot be opened, or the controller cannot be turned off, use an opaque material to cover the array components to stop the power outp

· Do not use or install damaged components.

·During or after the installation of the photovoltaic module, please do not step on or place heavy objects on the surface of the module to avoid cracking of the solar cell.



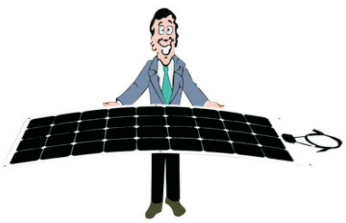
Do not try to repair any part of the module, there are no user-available components in the module.

·The cover of the junction box should always be kept closed.

·Do not split the component or move any part of the component.

· When the module has current or external current appears, do not connect or disconnect the module.

When picking up the photovoltaic module, please do not pick up the edge of the module with both hands. So as not to damage th e battery.



## 3.0
## Mechanical properties/Electrical properties

The rated electrical performance data of the modules are measured under standard test conditions (STC) with an irradiance of 1kw/m2, AM1.5, and a cell temperature of 25°. The specific electrical performance parameters of PhotonicUniverse solar modules are in Appendix A of this installation manual. The main electrical performance parameters under STC conditions are also marked on the nameplate of each component.

In some cases, the current or voltage generated by the component may be greater than the optimal operating current or voltage of its standard test environment (STC). When determining the component rating and load value, the component open circuit voltage and short circuit current under STC should be multiplied by 1.25. When determining the appropriate wire and fuse specifications, it is necessary to multiply the short-circuit current by 1.25 and the open-circuit voltage by the correction factor according to local regulations.

## 4.0
## Storage and unpacking

Precautions and general safety rules

· The modules should be stored in a dry and ventilated environment.

·The modules must be transported in the packaging box provided by sungold, and should be stored in the original packaging box before installation. Please protect the packaging from damage. Follow the recommended unpacking steps to unpack the modules. Care must be taken during unpacking, transportation and storage.

· It is forbidden to apply excessive loads on the components or twist the modules.

· It is forbidden to carry the module through its wire or junction box. When moving the module, two or more people should hold the module.

Do not carry overhead modules.

· It is forbidden to stack modules exceeding 10 layers.

·It is forbidden to grab the junction box or wire to pick up the entire assembly.

Before installing photovoltaic modules, check whether the modules have been damaged during transportation. Do not install damaged photovoltaic modules. If you find that the photovoltaic module is damaged, please contact sungold company to obtain the information you need to complain about the defective photovoltaic module.

The surface of the photovoltaic module is easily damaged, and the damaged photovoltaic module may affect its performance and safety; do not damage or scratch the surface of the photovoltaic module. For your safety, please do not disassemble or modify the muduels in any way. Doing so may affect the performance and safety of the modules, or even cause irreparable damage, and invalidate any trial warranty.

## 5.0
## Module installation

Modules must not be installed near flames or combustible objects.

·The modules must not be immersed in water (pure water or salt water) or long-term exposure to water (pure water or salt water) (such as fountains, waves, etc.).

Do not drop or stack objects (such as installation tools) on the module.

·Ensure that the modules meet the overall technical requirements of the system.

It is allowed to connect components in series to increase voltage or to increase current in parallel. When connected in series, the positive pole of the module is connected to the next negative pole. When connected in parallel, the anode of the module is connected to the anode of the next module.

·The number of bypass diodes provided varies depending on the module model.

· If the overcurrent protection device (fuse) is not used in series in each series of components, at most two series of components can be connected in parallel. If each string of components is connected in series with an appropriate proven overcurrent protection device, three or more strings can be connected in parallel.

## Avoid shadows

·Even a small amount of shadows (such as dust, bird droppings, tree branches) can cause a drop in power generation. If all surfaces of the module are unobstructed throughout the year, then the module can be considered "no shadow". It is guaranteed that even on the shortest day of the year, sunlight can still shine on the modules. When the module is installed on the RV, avoid shadows from buildings and trees when parking.

·The frequent occlusion of the module will cause the EVA to age and the continuous heating of the battery may cause the module to be damaged and cannot be used.

## 5.1
## Module wiring

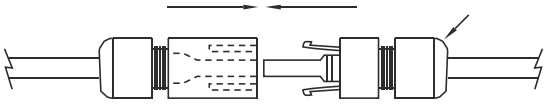
Correctly connect electrical wiring

·Before starting the system, check whether the wiring is correct. If the measured open circuit voltage (Voc) and short circuit current (Isc) are inconsistent with the specifications provided, there may be a wiring fault.

Correct connection of electric plug

· Make sure the connector is tight and connected correctly. Connectors must not withstand external pressure. Connectors can only be used for circuit connection functions, and cannot be used to open and close circuits

· The connector connection should be kept dry and clean to prevent rain and moisture. Avoid direct sunlight and water soaking of the connector.



Connection of MC4 male connector and female connector

## 5.2
## Ground connection

· Equipment grounding: semi- flexible components have no exposed conductors, so they do not need to be grounded in accordance with NEC regulations

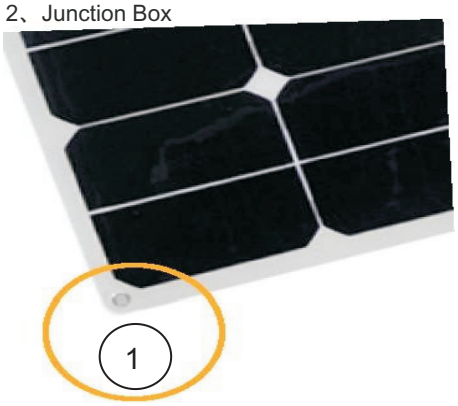
· The mounting bracket needs to be grounded because it is a conductor. Please ensure that the entire system installation meets local electrical codes and regulations.

## 6.0
## Installation guide

In order to understand the structure of semi-flexible components more intuitively, please refer to the following component diagram:

1、Eyelet

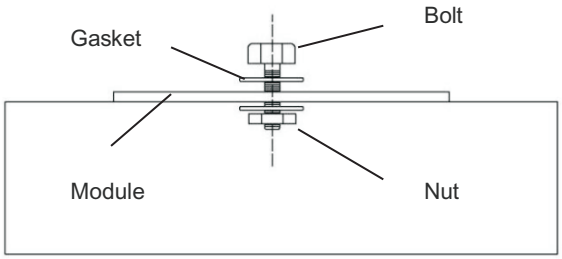
2、Junction Box





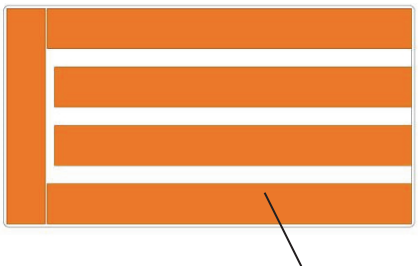
Each component needs to be fastened by at least 4 points on the two long sides.

·Use appropriate fasteners with corrosion resistance. All fasteners (Such as bolts, elastic washers, flat washers, nuts, etc.) need to be stainless steel

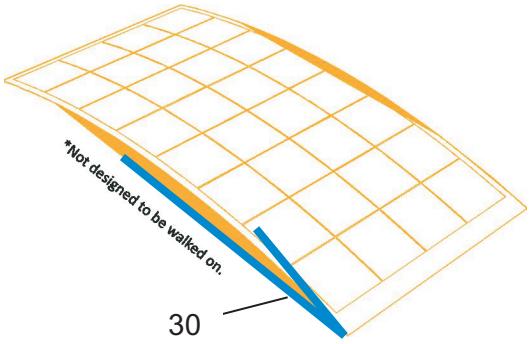



Installation method B:

Use double-sided adhesive bonding to bond the flexible component and the mounting surface. 3MVHB series model is recommended: 4991 thickness 2.3mm



Double-sided tape




When installed on a curved surface, the bending angle of the module should not exceed 30 degrees. When the angle is greater than this angle, it may cause the cell to crack.

## 7.0
## Maintenance

- Do not replace components (diodes, junction boxes, connectors, etc.) without authorization.
- Routine maintenance measures should be taken to keep the components free of snow, bird droppings, seeds, pollen, leaves, branches, dust, stains, etc.
- If the module has a sufficient tilt angle (at least 15°, it is usually not necessary to clean the module (ETFE rain will have a self-cleaning effect). If there is a lot of dirt on the surface of the component, use water without detergent and a gentle cleaning tool (sponge) to rinse the component array when it is cool throughout the day. Do not scratch or wipe the dust when it is dry, otherwise it will cause tiny scratches.
- If there is snow or dust, you can use a brush with soft bristles to clean the surface of the module.
- The system should be checked regularly to ensure that the wiring and supporting structure are intact.
- If you need inspection or maintenance of electrical or mechanical performance, it is recommended that the inspection or maintenance be carried out by a certified and approved professional to avoid electric shock or personal injury.

## 8.0
## Limited warranty and scope of responsibility

This product will enjoy a one-year warranty on materials and workmanship from the date of purchase, but this warranty does not cover diode breakdown, or environmental abnormalities due to accidents, human negligence,abuse, transformation, pollution, lightning strikes, hail, etc. And the damage formed. This warranty is the only warranty for which you can get compensation. In addition, there is no warranty for special purpose, and SUNGOLD is not responsible for any special, indirect, incidental, concurrent damage or various losses. Because some countries do not allow the exclusion or limitation of implied warranties or incidental and concurrent damages, the above limitation of liability may not apply to you.