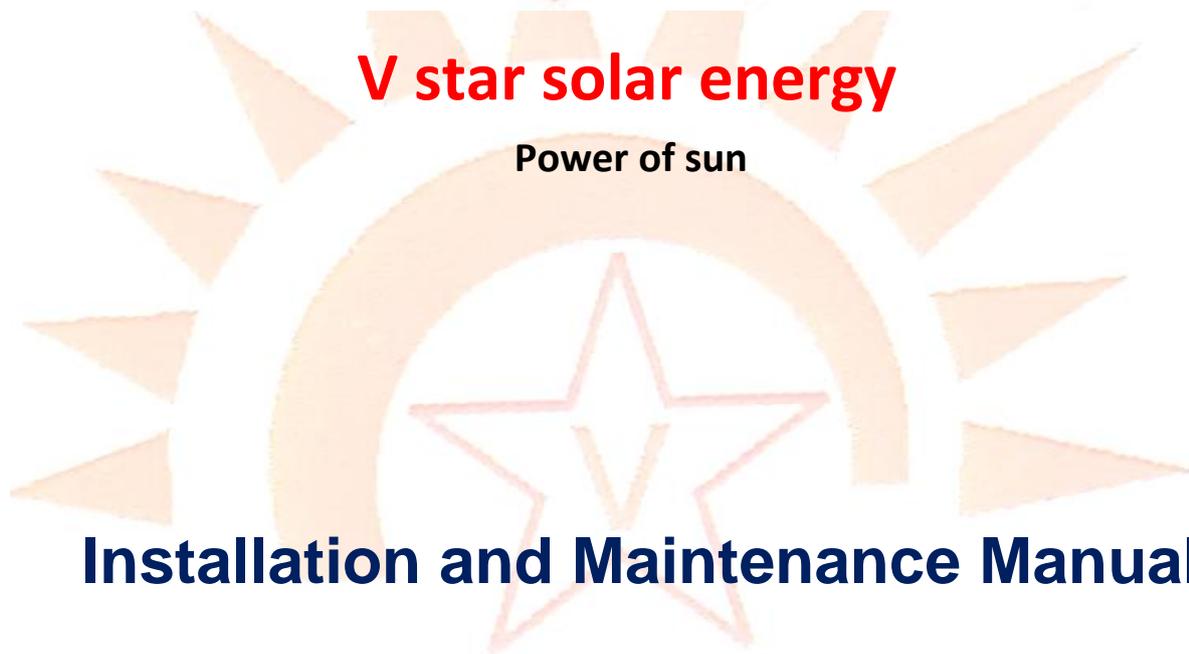




V star solar energy

Power of sun



Installation and Maintenance Manual

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Disclaimer

This manual is the proprietary information of v star solar energy. This manual make to self uses not any certified manual. will not assume liability for damage arising from improper use, wrong assembly, operation and maintenance. V star solar energy reserves the right to make amendments to the contents of this document without prior notice.

GENERAL INFORMATION

This general manual provides important safety information relating to the installation, maintenance and handling of general-series solar modules. Professional installer must read these guidelines carefully and strictly follow these instructions. Please share this manual with the installer/operator and keep it for future reference TO ALL RELEVANT LOCAL AND NATIONAL LAWS, REGULATIONS AND CODES WHEN INSTALLING, WIRING, OPERATING AND MAINTAINING SF PV MODULES.

SAFETY PRECAUTIONS



Warning

Before attempting to install, wire, operate and / or service the module and other electrical equipment, all instructions should be read and understood. PV module connectors pass direct current (DC) when exposed to sunlight or other light sources. Contact with electrically active parts of the module, such as terminals, can result in injury or death, irrespective of whether or not the module and the other electrical equipment have been connected.

❖ GENERAL SAFETY



1. All installation work must comply with applicable regional and local regulations or other national or international electrical standards. Protective clothing (non-slip gloves, clothes, etc.) must be worn during installation to prevent direct contact with 30 V DC or greater, and to protect your hands against sharp edges.



2. Prior to installation, remove all metallic jewelry to prevent accidental exposure to live circuits. When installing modules in light rain, morning dew, take appropriate measures to avoid water permeate.



3. When installing modules in light rain, morning dew, take appropriate measures to avoid water permeate into the connector. **Do not** allow children or unauthorized persons near the installation site or storage area of modules.



Do not allow children or unauthorized persons near the installation site or storage area of modules. When installing modules in strong wind, take appropriate safety measures to avoid damage to the modules or injuries to people. Use electrically insulated tools to reduce the risk of electric shock.

If the disconnects and Over Current Protection Device (OCPD)'s cannot be opened or the inverter cannot be powered down, cover the fronts of modules in the PV array with an opaque material to stop the production of electricity when installing or working on a module or wiring.

- **Do not** use or install broken modules.
- Contact with module surfaces or frames may cause electric shock if the front glass is broken or the back sheet is torn.
- The PV module does not contain any serviceable parts so Do not attempt to repair any part of the module.
- Keep the junction box cover closed at all times.
- **Do not** disassemble a module or remove any module part
- **Do not** artificially concentrate sunlight on a module.
- **Do not** connect or disconnect modules when current from the modules or an external source is present.

STORAGE AND TRANSPORT

Please follow the instructions on the module packaging when storing and transporting PV modules. Ensure that each module is adequately supported and always stored in dry conditions. The module packaging is not waterproof material. Keep the junction box and the module connector away from any liquids when storing and transporting PV modules. PV modules should be kept in the original packaging until final installation. Small amounts of white powder from packaging material may adhere to the modules. This may safely be ignored and has no affect on performance.



MECHANICAL INSTALLATION

❖ Mechanical Installation Cautions

Observe all applicable health and safety regulations when installing PV module.

Observe all applicable health and safety regulations when installing PV

Fall protection equipment must be used

Installation in windy or wet conditions may require additional precaution.

Keep the junction box and the module connector away from any liquids until connectors are mated. Failure to do this may cause faulty wiring

Keep PV modules out of reach of children

❖ **Site Location**

Ensure that the maximum wind and snow loads in local conditions do not exceed the PV module maximum load ratings.

Avoid installing PV modules in areas exposed to oil vapor and /or corrosive gas.

Avoid accumulation of grit or dust on the PV modules as it may influence the output yield. Do not expose PV modules to sulphurous atmospheres.

Do not install PV modules in locations where flammable gases accumulate or flow as there is a risk of sparks from PV modules.

Do not install PV modules near fire.

Avoid installing PV modules in locations where they may be permanently covered by shadows. This may adversely affect their performance.

Do not install PV modules in locations where temperatures exceed the temperature range indicated in the module's technical specifications

❖ **Module Handling Instructions**

Do not disassemble or modify PV modules. This may result in an electric shock, fire or other accidents. Solar Frontier cannot be held responsible for any loss or damage caused by unauthorized disassembling, modification or misuse of PV modules.

Do not drill additional mounting holes into the aluminium frame. Only pre-drilled holes should be used.

Avoid placing any stress onto the PV modules, cables or connectors. (Minimum bending radius of 39mm or 1.54in for module cables is recommended)

Do not stand or step on PV modules. This may result damage to the module and/or bodily injury by falling.

Do not drop PV modules or drop objects onto them. Both sides of the module (the glass surface and the back sheet) are fragile.

Do not strike the terminal box or pull the cables. The terminal box can crack and break, while the output cable may unplug and cause electricity leakage or an electric shock

Do not scratch the back sheet or cables of the PV modules. Rubbing or scratching may result in an electric shock, electric leakage or an accident.

Do not scratch the insulation coating of the frame (except for the grounding connection). This may weaken the strength of the frame or cause corrosion.

Do not cover the water drain holes of the frame. Doing so may cause frost damage.

Do not use glue when closing the cover of the junction box. Similarly, do not use a sealant to bond the junction box lid to its base.

❖ **Module Mounting Instructions**

Pay attention to the electrochemical series when selecting support structure material to avoid galvanic corrosion. Fasten and lock bolts completely. Inadequate mounting may result in PV modules to falling or other accidents.

Ensure that the PV modules are securely fastened to the mounting support structure that is durable, made of corrosion and UV resistant material, and follow the applicable local and civil codes.

Ensure that your mounting support structure is designed to withstand the SF PV module design snow and wind loads applicable for your chosen site. Solar Frontier will not be responsible if the SF PV modules are damage due to the durability of the mounting support structure. Consult your mounting structure manufacturer for an appropriate mounting design.

❖ **Mounting the Solar Modules**

PV modules should typically face South in the Northern Hemisphere and North in the Southern Hemisphere for optimal power production.

Modules can be installed horizontally (landscape) or vertically (portrait). When installing, allow for 2mm or greater spacing between modules.

Maintain a space between PV modules and the roof. This will allow air to circulate, cooling the module, and allowing condensation to dissipate. Solar Frontier recommends a distance of at least 100mm (3.94 in).

PV modules should be installed over a fire-resistant roof covering.

Mounting with Screws

modules should be fastened to the support structure using the mounting holes on the frame. The support structure should be securely fastened to a non-corrosive roof.

Mounting with Inner Holes

Each module will require four M6 (or 1/4 in) bolts with washers, lock washers and nuts. Tighten the screws with an adequate torque value. UL: Recommended tightening torque is 8 N-m (70.8 lb-in) minimum

Mounting with Outer Holes

Each module will require four M8 (or 5/16 in) bolts with washers, lock washers and nuts. Tighten the screws with an adequate torque value. UL: Recommended tightening torque is 15 N-m (132.8 lb-in) minimum.

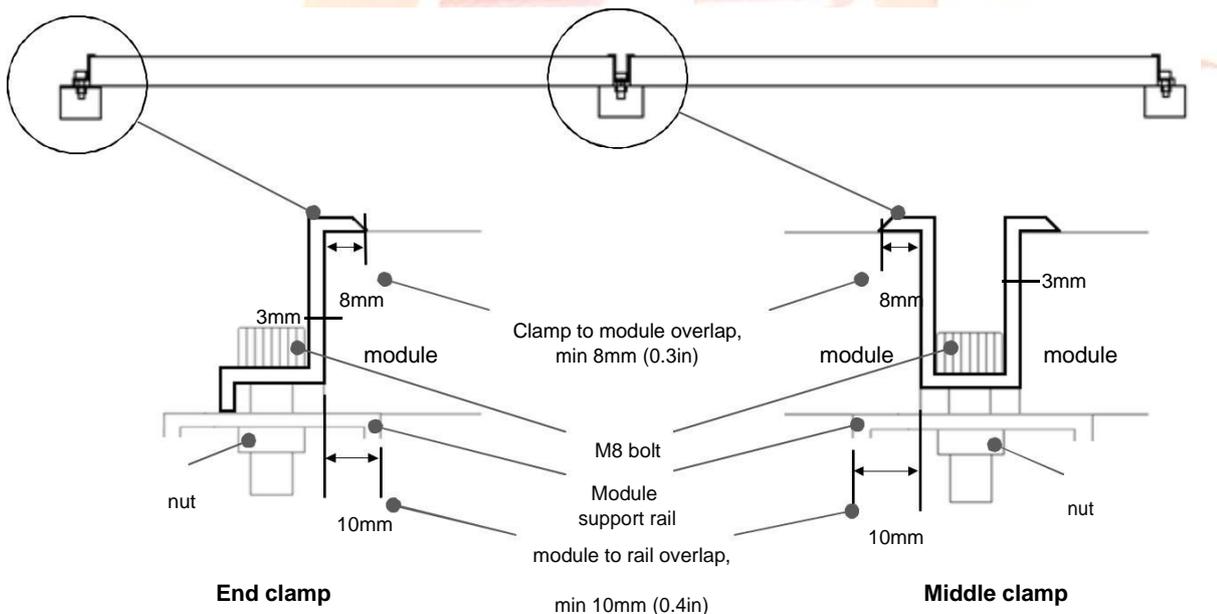
Mounting with Clamps

Four or more rust-proof aluminium clamps should be used to fasten PV modules to the support structure. Centre-line of the clamps shall be secured within the indicated clamping zone ($256\text{mm} \pm 75\text{mm}$) from the corners of the longer module frame using stainless-steel M8 bolts with a minimum length of 20mm. Tighten the clamps with an adequate torque value. UL: Recommended tightening torque is 15 N-m (132.8 lb-in) minimum.

All selected module clamps must be at least 30mm long, 3mm thick in case of Aluminium material, and overlaps the module frame by 8mm or more.

Clamps must not create shadow nor cover the front glass and shall not deform the module frames during installation.

Module Perpendicular to Support Rails



ELECTRICAL INSTALLATION

Electrical Wiring Safety Precautions

The sum of Voc of modules in series must not exceed the maximum system voltage of the module under any condition. Reverse current applied to the modules must not exceed 7A.

Do not touch or handle the PV module, terminal box or the end of output cables with bare hands.

Do not carry out installation when PV modules, installation tools or installation area are exposed to water.

Ensure that the connection parts between SF PV modules and power receiving devices are isolated and waterproof. Using SF PV modules with insufficient isolation and waterproofing could result in an electric shock, an electric leak or an accident.

Keep the junction box and the module connector away from any liquids until connectors are mated. Failure to do this may cause faulty wiring.

Components interconnecting the modules must be compatible with the connectors, and must provide proper system operation and fault protection.

Inverters must meet the technical requirements of SF modules.

Do not connect the PV modules directly to loads such as motors. Variation in output power may damage the motor. Observe and understand the safety instructions of batteries. Their misuse can result in serious bodily injury due to high electrical current. Cables should be adequately protected from damage by wildlife.

❖ Grounding

Grounding Cautions

Be aware of the necessary grounding requirements prior to installation. Your local authorities can help you further. Install arrestors, surge absorbers or any other appropriate lightning protection tools as needed.

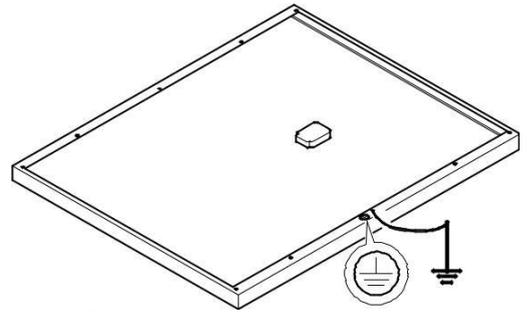
Module frames, mountings, connection boxes and metal conduits should be connected to an earth ground for lightning protection, in accordance with local, regional and national standards and regulations.

Grounding holes ($\Phi 4\text{mm}$) on the aluminium frame of the PV modules are provided to accommodate grounding. Use a grounding wire made of copper, not smaller than 2mm sq (14AWG). Temperature rating of the conductors must be between -40°C to 85°C . Ensure that the crimping terminal is tightly tied to the module frame with a rolling thread screw and a lock washer to ensure electrical contact.

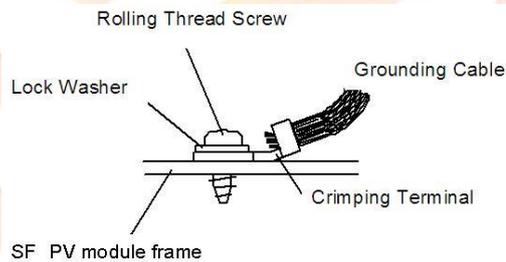
Grounding devices such as module clamps with an integrated grounding pin, serrated washers, grounding clips or lugs, designed for bonding photovoltaic modules to the mounting structures may also be used for grounding as described in National Electrical Code Section 250. These grounding devices shall be made in conformance with the grounding device manufacturer instructions. Consult with the grounding device manufacturer to identify the appropriate grounding and bonding device for your mounting structure or design.

Grounding Image:

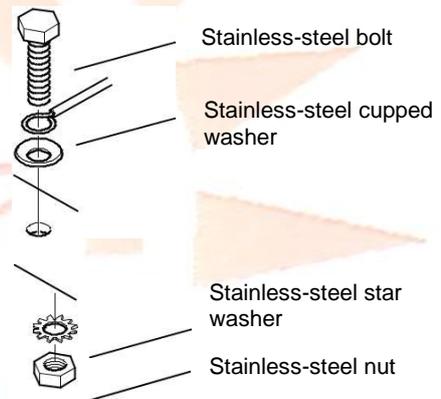
Connect to earth ground from where the grounding sign  is indicated.



Grounding (IEC)



Grounding with washer (UL)



Use M4 bolt or standard gauge size #6 bolt. Tighten the bolts or screw with an adequate torque value. Please refer to further instructions provided by the screw or bolt manufacturer.

Electrical Wiring

A set of cables with a plastic connector for each polarity is supplied with SF PV modules. Use these to connect modules.

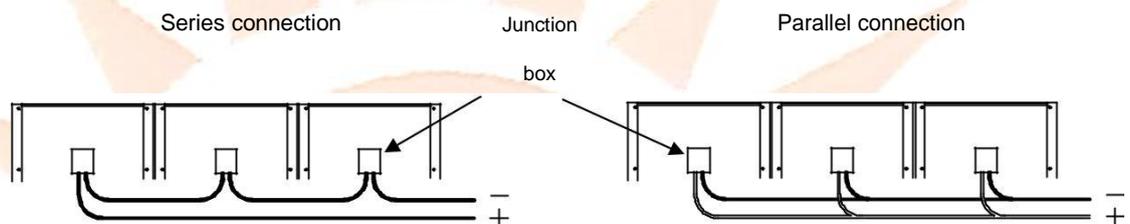
Do not open the junction box on the back side of the module

Fasten the module cable to the frame or to the mounting system in order to avoid any stress to the connector. Cables drooping from the terminal box are hazardous and must be avoided.

Cables should be secured so they are not exposed to direct sunlight (such as behind the module).

The sum of Voc of modules in series must not exceed the maximum system voltage rating of the module under any condition, even at low temperature.

Reverse current applied to the modules should not exceed 7A under any condition. Minimum cable diameter: 2.5mm sq



Operation

Prior to connecting the PV system to the grid, make sure the entire system has been checked, tested and approved in accordance with the applicable regulations.

Maintenance

Depending on local regulations and utility policies, connection to the grid and start up of the PV system may only be performed by authorized personnel.

A monthly visual check is highly recommended in order to maintain the efficiency of PV modules and the security of the mounting.

Remove any dirt, fallen leaves or bird droppings from the surface, and check that there is no damage to the surface. Do not use detergent or chemicals for cleaning dirt off PV modules as it may damage the modules and result in degradation of insulation.

Do not use hard brushes or any other hard materials; use only soft cloths or sponges for removing dirt from the PV modules surface.

When replacement parts are required, be sure the installer/servicer uses parts specified by the manufacturer with the same characteristics as the original parts. Unauthorized substitutions may result in fire, electric shock, or other hazard.

Stop using PV modules when any damage or unusual phenomena are observed. Have them immediately replaced or removed by a qualified technician.

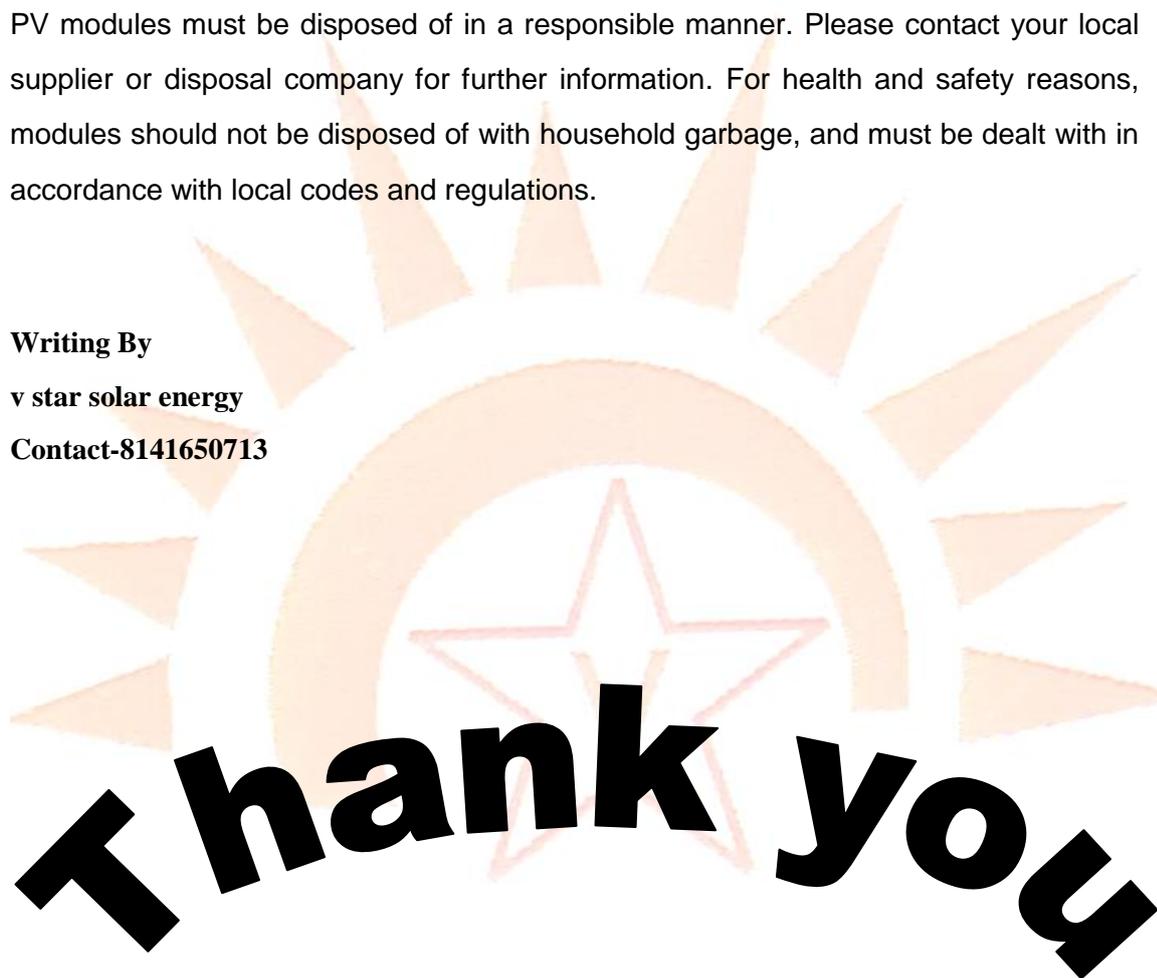
Disposal

PV modules must be disposed of in a responsible manner. Please contact your local supplier or disposal company for further information. For health and safety reasons, modules should not be disposed of with household garbage, and must be dealt with in accordance with local codes and regulations.

Writing By

v star solar energy

Contact-8141650713



Thank you