
Solar Module Installation Manual

PATANJALI RENEWABLE ENERGY PVT LTD

**Plot No. D83,84,85, EPIP Site V UPSIDC, Industrial Area, Kasana, Gautam
Buddha Nagar, Uttar Pradesh-201310**

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1. DISCLAIMER OF LIABILITY

- We instruct you to follow this manual for the installation, handling, and use of Patanjali Modules. We do not assume any responsibility for loss, damage, injury, or expense resulting from improper installation, handling, use, or maintenance.
- Modules or used product specifications in this manual are subject to change without prior notice.

2. SAFETY PRECAUTIONS.



1. Potentially DC Voltage can be generated whenever PV modules are exposed to light sources. Therefore, avoid contact with electrically active parts and be sure to isolate live circuits before attempting to make or break any connections.
2. Work on the module or solar system should be performed by authorized or trained personnel only. Always wear rubber gloves and boots with a maximum working voltage not lower than 1000V DC.
3. When working on electrical connections, remove all metallic jewelry, use properly insulated tools, and wear appropriate equipment required for safety to reduce the risk of electric shock.
4. DO NOT stand or step on, damage, or scratch the front or back side of the module.

5. DO NOT try to repair any broken module or contact with any module surface or frame can lead to electrical shock.
6. All installations must be performed in compliance with all applicable regional and local codes or other national or international electrical standards.
7. Cover the front of the module in the PV array with an opaque material to halt the production of electricity when installing or working with a module or wiring.
8. Do not install or handle the module during rain or during high wind speed.
9. Do not artificially concentrate sunlight on a module.

3.UNPACKING AND STORAGE



1. At the time of receipt, verify that the product delivered is the same as the product ordered. The product name and serial no. of each laminate are clearly mentioned on the outside of each packing box.
2. Do not carry a module by its wires or junction box. Carry a module by its frame with two people.
3. Store the packed modules in a clean and dry area with relative humidity below 85%. Ambient temperature ranges between -20° to 50°C.
4. Do not use a knife to cut the strip ties, but use wire cutting pliers.
5. Do not place modules directly on top of each other.
6. Do not change the wiring of the bypass diode.
7. Do not stack more than the maximum amount of allowable pallets on top of each other.

8. Keep all electrical contacts clean and dry.
9. Do not carry the module on your head.

3.1 PRODUCT IDENTIFICATION

Each module has a unique serial number laminated behind the glass and another permanently attached to the back sheet of the module on the back sheet. Note all serial numbers in an installation for your future records.

4. RECOMMENDATION FOR SITE SELECTION

1. Patanjali solar modules can be mounted in any orientation (portrait or landscape) however the impact of dirt shading the solar cell can be minimized by orienting the product in landscape.
2. Solar module is recommended to be installed at an optimized tilt angle to maximize the energy output. It is roughly equal to the latitude of the project site as a rule of thumb, facing to equator. But always design based on local situations to find out the optimum one.
3. During installation on the roof always leave a safe working area between the edge of the roof and the external edge of the solar array.
4. In case of residential installation on the ground, modules shall be installed following local regulations, e.g. fence
5. Do not install the PV module in a location where there is continuous exposure to water or the module is immersed in water for any possible reason.
6. Avoid using a mounting method that will block the drainage holes in the module frame.

7. When all solar modules are mounted in the same plane and orientation then all can be expected to have similar performance throughout the day and can be connected together to the same inverter channel.

5. MOUNTING INSTRUCTIONS



5.1 MOUNTING METHODS

Corrosion-proof M6 bolts are to be used on the PV module mounting holes, which are on the rear side of the module. PV modules can be fixed either by the bolt method or by the clamp method. Regardless of the mounting method, the modules should ensure that:

- 120 mm clearance is provided between module frames and the surface of the roof or the wall
- Minimum distance of 10.50mm between 2 modules
- Drainage holes are not blocked under any circumstances

PV modules are not to be subjected to wind or snow loads exceeding the maximum permissible loads, and should not be subjected to excessive forces due to thermal expansion of support structures. When modules are ground mounted, select the height of the mounting system in such a way as to prevent the lowest edge of the module from being covered by snow for a long time in winter in areas that experience severe snowfall. If snow settles on the PV modules regular cleaning of snow and other foreign particles is highly recommended for the long-term reliability of the PV modules, failure to comply may result in damage to the module resulting in deformation and not covered under warranty

The minimum mechanical means is to be used for securement of the module or panel to the roof as per the instructions below, for a non-integral module or panel, the assembly is to be mounted over

a fire-resistant roof covering rated for the application

A. MOUNTING WITH FRAME BOLT HOLES

The frames of each module have 8 holes (8 mm*12 mm) mounting holes. Patanjali Solar strongly recommends the use of corrosion proof (stainless steel) fixings. The modules to be secured with a

M6 - Grade 8.8 (1/4"-20 Grade B7) coarse thread bolt, two flat washers, spring washer and a nut the assembly should be tightened to a torque of minimum 9-12 Nm.

B. MOUNTING WITH CLAMP FIXING

- Patanjali Solar has tested modules with a number of clamps and suggests to use clamps which has an EPDM or any other insulating washer
- To fix the modules on the mounting rail, a minimum of 4 clamps need to be fixed
- The clamps should never touch the glass and cause any breakage and also clamps should not cause any shadow effects on the module
- The customer should not do any modification to the frame under any circumstances
- When modules are mounted using clamp mounting method at least 4 clamps need to be used. Two clamps on each of the long sides of the module and 2 clamps on each of the short sides of the module.

5.2 GROUNDING



- All module frames and mounting racks must be properly grounded in accordance with appropriate respective National Electrical Code. "A module with exposed conductive parts is electrically grounded in accordance with the instructions presented below and the requirements of the National Electrical Code".
- Proper grounding is achieved by bonding the module frame(s) and all metallic structural members together continuously using a suitable grounding conductor. Grounding conductor or strap may be copper, copper alloy, or other material acceptable for use as an electrical conductor per respective National Electrical Codes. The grounding conductor must then make a connection to earth using a suitable earth ground electrode
- Patanjali Solar modules can be installed with the use of third party listed grounding devices for grounding the metallic frames of PV modules. The devices have to be installed in accordance with the grounding device manufacturer's specified instructions
- We also recommend using the following methods to ground properly:

METHOD 1: GROUNDING BOLT # 2058729-1:

01) Wire bolt and slot 04) 4 to 16 mm² cable

02) Mounting wash hex nut 05) HEX nut

03) Aluminum frame

- Tyco grounding hardware comes in a package that includes the grounding bolt, mounting and grounding hex nut
- Electrical contact is made by penetrating the anodized coating of the aluminum frame, and tightening the mounting
- Grounding wire size (6 to 12 AWG solid bare copper) should be selected and installed underneath the wire binding bolt
- The wire binding bolt should be tightened to the proper torque of 45 in lb.

METHOD 2: GROUNDING BOLT #1954381-2:

01) Wire slot (available for 4-6 mm² cable)

02) Slider

03) Bolt 04) Base

05) Nut

- Tyco grounding hardware comes in a package that includes the grounding bolt, mounting and grounding hex nut
- Electrical contact is made by penetrating the anodized coating of the aluminum frame, and tightening the mounting hex nut (come with the star washer) to the proper torque of 25 in lb.
- Grounding wire size (6 to 12 AWG solid bare copper) should be selected and installed underneath the wire binding bolt
- The wire binding bolt should be tightened to the proper torque of 45 in lb.

METHOD 3: ERICO GROUNDING BOLT # EL6CS14-6

01) Machine bolt A 02) Machine bolt B

03) Belleville washer 04) Flat washer

05) Clearance hole for #10[M5] machine bolt 06) Aluminium frame

07) Machine bolt hex nut with lock washer 08) Grounding bolt

- The lug should be installed on a surface that is larger than the bottom surface of the lug
- The lug should be installed in the grounding holes provided on the PV module
- Machine bolt A should be torqued to 35 in lb, to secure the grounding bolt to module frame
- The grounding bolt is only listed for use with 6-12 AWG bare solid copper wire
- For proper wire binding, machine bolt B should be torqued to 35 in lb.

Where common grounding hardware [nuts, bolts, star washers, split-ring lock washers, flat washers and the like] is used to attach a listed grounding/bonding device, the attachment must be made in conformance with the grounding device manufacturer's instructions. Common hardware items such as nuts, bolts, star

washers, lock washers and the like have not been evaluated for electrical conductivity or for use as a grounding device and should be used only for maintaining mechanical connections and holding electrical grounding devices in the proper position for electrical conductivity. Such devices, where supplied with the module and evaluated through the requirement in UL 1703, may be used for grounding connections in accordance with the instructions provided with the module.

6. MAINTENANCE AND CARE



Well-designed PV Plant requires minimum maintenance but however, but with further maintenance, the performance and reliability of the system can be improved

- Yearly maintenance by a trained professional is usually advised
- Check that the mounting structures are properly laid the modules are held tightly and are in accordance with the mounting instructions given above
- Ensure no part of the light-falling area of the module is shaded, any leaves/trees or any object that causes shading has to be removed accordingly
- Ensure all the cable assembly is tight and no part of cable assembly will be exposed to waterlogging
- Check that the string fuses in each non/earthed pole are in operation
- It is recommended to check the TDS of the cleaning water on a regular basis. TDS should be maintained below 500 mg/L & total hardness shall be less than 75 mg/L
- For cleaning the solar PV modules, clean the modules using a soft module cleaning kit. A soft cloth with mild soft detergent can be used as an alternative.

Use water only with the same temperature as of the module else thermal shocks can be created and can damage the module

- Do not open the junction box to change the diodes even if they are defective. Please contact with PV module manufacturer in case of known or suspected diode failure
- Ensure the module is cleaned without causing any damage like micro-crack, etc. to the module
- Cover the front surface of modules by an opaque material when repairing. Modules when exposed to sunlight generate high voltage and are dangerous
- Always recommended to have the module clean and tidy for maximum power generation from the solar PV module
- The back surface of the solar module doesn't require any specific cleaning unless any dirt or debris is stuck on the back sheet. While cleaning the dirt on the back sheet avoid any sharp objects, which can damage the substrate material and cause a slit
- Do not open the junction box to change the diodes even if they are defective. Please contact with PV module installer in case of known or suspected diode failure

7. WARNING



While performing any electrical maintenance, the system must be completely shut down and should be performed by experts. Failure to comply with norms may result in lethal shocks, burns, and sometimes even death.