



UL Installation Manual

For Eoply New Energy Technology Photovoltaic Module

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Purpose of this guide

This guide contains information regarding the installation and safe handling of photovoltaic modules made by Eoply New Energy Technology Co.,LTD (hereafter referred to as “modules”). All instructions should be read and understood before installation commences. If there are any questions, please contact our sales department for further assistance. The installer should conform to all the safety precautions in the guide when installing the module. Local standards should also be followed in such installations.

Before installing a solar photovoltaic system, the installer should become familiar with the mechanical and electrical requirements for such a system. Keep this guide in a safe place for future reference (maintenance) and in case of disposal of the module.

General

- Installation of solar photovoltaic systems may require specialized skills and knowledge. Installation should be performed only by qualified persons.
- All modules come with a permanently attached junction box (IP65 rated or above) with MC-4 compatible connectors.
- The installer assumes all risk of injury that might occur during installation, including, but not limited to, the risk of electric shock.
- One individual module may generate DC voltages greater than 30 volts when exposed to direct sunlight. Contact with a DC voltage of 30V or more is potentially hazardous.
- When disconnecting wires connected to a photovoltaic module that is exposed to sunlight, an electric arc may result. Such arcs may cause burns, may start fires and may otherwise create problems. Do Not Disconnect Under Load.
- Photovoltaic solar modules change light energy to direct-current electrical energy. They are designed for outdoor use. Modules may be ground mounted, mounted on rooftops. Proper design of support structures are the responsibility of the system designer and installer.
- Do not attempt to disassemble the module, and do not remove any attached nameplates or components.



- Do not apply paint or adhesive to the top surface of modules.
- Do not use mirrors or other magnification device to artificially concentrate sunlight onto the modules.



- Do not touch terminals while module is exposed to light or during installation. Provide suitable guards to prevent contact with 30VDC or greater. As an added precaution, use properly insulated tools only.



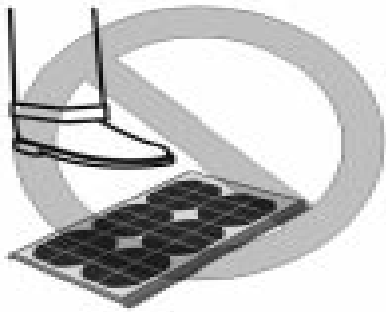
- When installing or working with module or wiring, cover module face completely with opaque material to halt production of electricity.



- Work only under dry conditions, with a dry module and tools.



- Do not stand or step on module.



- Do not drop module or allow objects to fall on module.



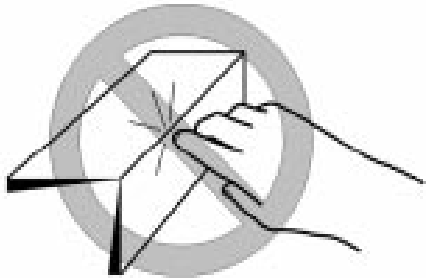
- Never leave a module unsupported or unsecured. If a module should fall, the glass can break. A module with broken glass cannot be repaired and must not be used.



- Keep back surface free from foreign objects.



- Avoid sharp edges.



- When installing the system, abide with all local, regional and national statutory regulations. Obtain a building permit where necessary.
- Do not lift the module by grasping the module's junction box or electrical leads.
- Do not set the module down hard on any surface.
- Inappropriate transport and installation may break the glass portion of the module.

Safety precautions for installation of solar photovoltaic systems

- Solar modules produce electrical energy when light shines on their front surface. The DC voltage may exceed 30V. If modules are connected in series, the total voltage is equal to the sum of the individual module voltage. If modules are connected in parallel, the total current is equal to the sum of individual module current.
- Keep children well away from the system while transporting and installing mechanical and electrical components.
- Completely cover the module with an opaque material during installation to keep electricity from being generated.
- Do not wear metallic rings, watchbands, ear, nose, lip rings or other metallic devices while

installing or troubleshooting photovoltaic systems.



- Only use approved insulated tools for electrical installation work.



- Abide with the safety regulations for all other components used in the system, including wiring and cables, connectors, charging regulators, inverters, storage batteries and rechargeable batteries, etc.
- Use only equipment, connectors, wiring and support frames suitable for use in a solar electric system. Always use the same type of module within a particular photovoltaic system.
- Rated electrical characteristics are within ± 3 percent of the indicated values of I_{sc} , V_{oc} under standard test conditions (irradiance of $100\text{mW}/\text{cm}^2$, AM 1.5 spectrums and a cell temperature of 77°F).
- Under normal outdoor conditions, the module will produce current and voltages that are different than those listed in the data sheet. All values from the datasheet are from standard test conditions. Accordingly, during system design, values of short-circuit current and open-circuit voltage marked on UL-listed modules should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor ampacity, fuse sizes and size of controls connected to the module or system output.
- Fire Class C
Modules rated for use in this application class may be used in systems operating at greater than 50 V DC or 200W, where general contact access is anticipated. Modules have been rated Fire Class C, and are suitable for mounting on to a Class A roof. Consult your local authority for guidelines and requirements for building or structural fire safety.

Mechanical Installation

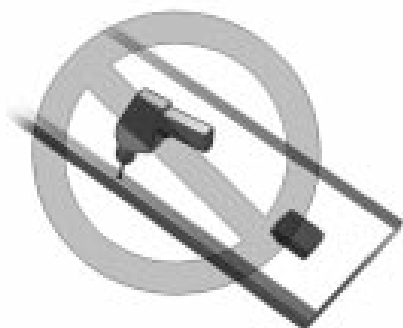
Selecting the location

- Select a suitable location for installation the module.
- The module must be facing true south in northern latitudes and true north in southern latitudes.
- For detailed information on the best elevation tilt angle for the installation, refer to standard solar photovoltaic installation guides or a reputable solar installer or systems integrator.
- The module should not be shaded at any time of the day.
- Do not use module near equipment or in locations where flammable gases can be generated or collected.



Selecting the proper support frame

- Always observe the instructions and safety precautions included with the support frame to be used with the module.
- No attempt must be made to drill holes in the modules. To do so will void the warranty.

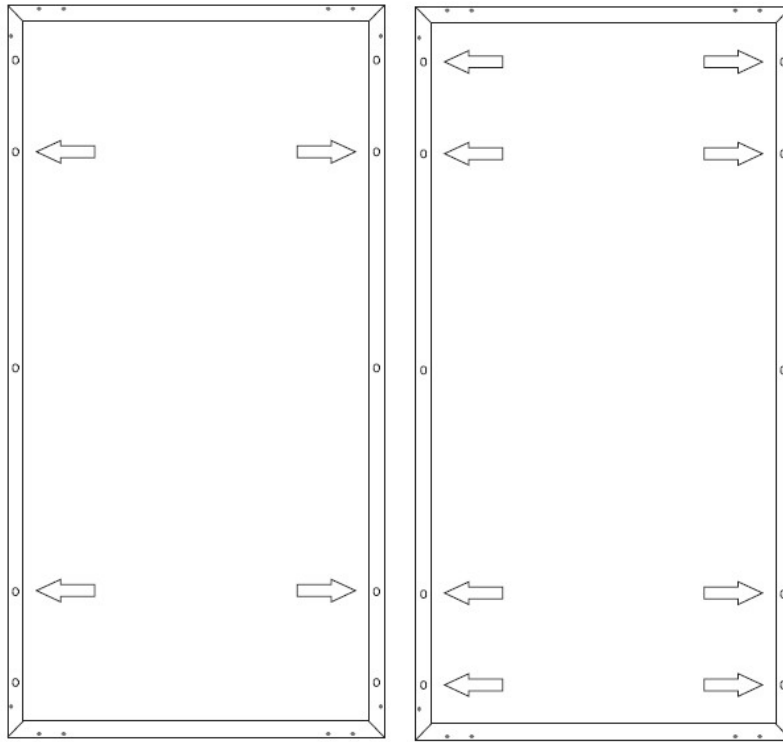


- Do not drill additional mounting holes in the glass surface of the module or in the frame of the module. Doing so will void the warranty.

Installation using mounting holes

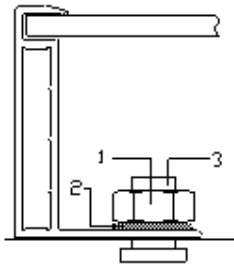
- Modules must be securely attached to the mounting structure using four mounting points for normal installation. If additional wind or snow loads are anticipated for this installation, ALTERNATE mounting points are also used. For details, please see the diagram below.

Load calculations shall be done by the system designer or installer.



- i. Mounting holes for normal installation (Four mounting holes) to grant 2400Pa Wind Load and 2400Pa Snow Load
- ii. For 2400Pa wind and 5400Pa Snow Load, Eight mounting holes must also be used

- Using one bolt, spring washer and nut on each hole for mounting, applied torque is about 8 N*M.



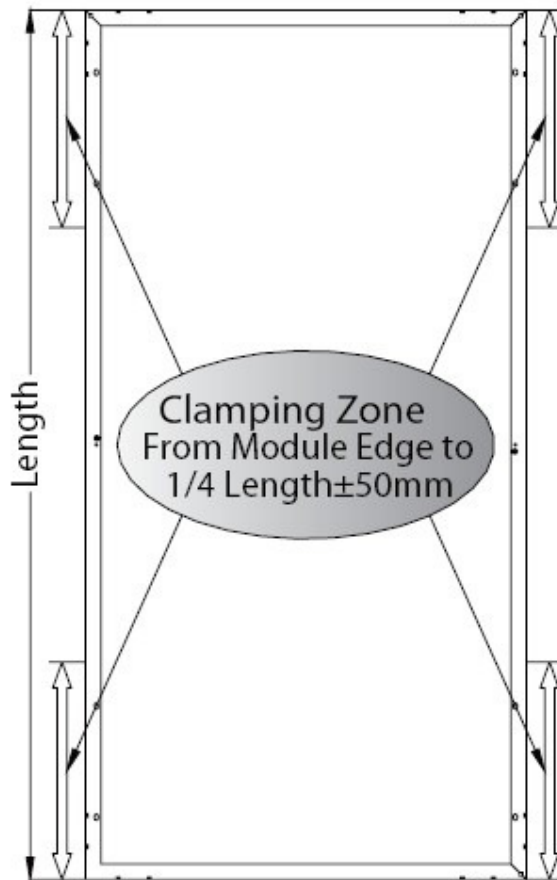
- 1 Stainless steel M6 nut
- 2 Stainless steel M6 spring washer
- 3 Stainless steel M6 t-head bolt (recommending using stainless steel or PVC to avoid the galvanic corrosion between racking system and frame, frame and fixed screw with washer).

Installation using Clamp System

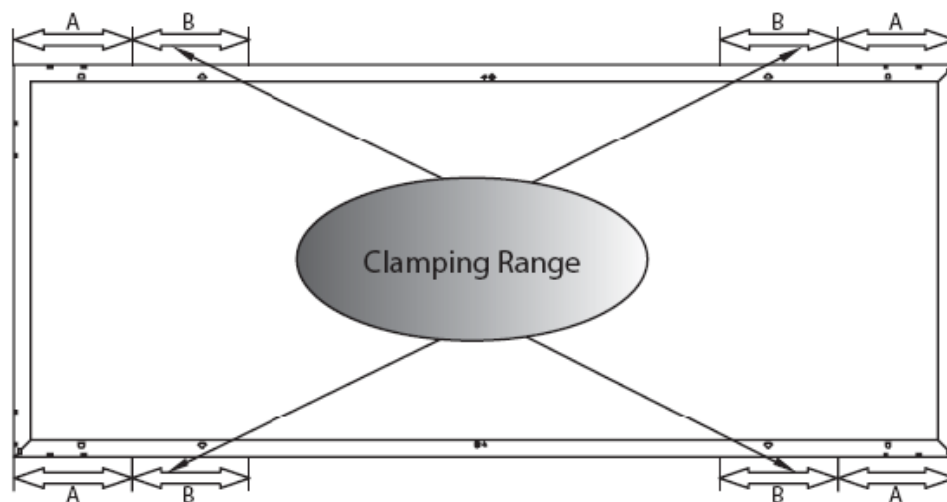
- Modules could use the clamps as the follow picture, the clamps must have enough intensity

to fix up modules (recommending using stainless steel), and their structure couldn't shelter the cells.

- Installation clamping methods on long frame as below:

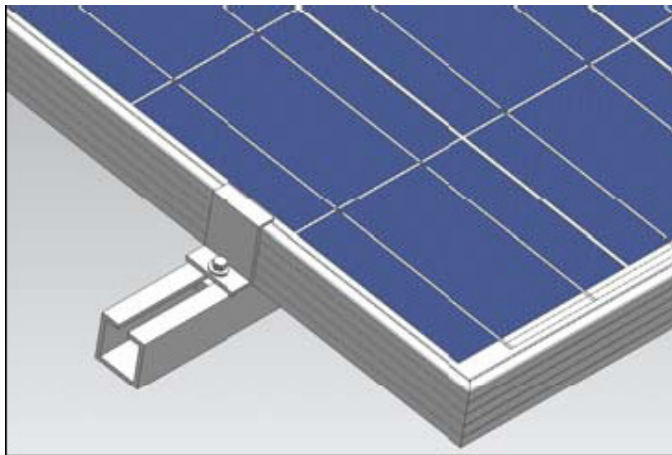


For 2400Pa Wind Load and 2400Pa Snow Load, using four clamps on a long frame

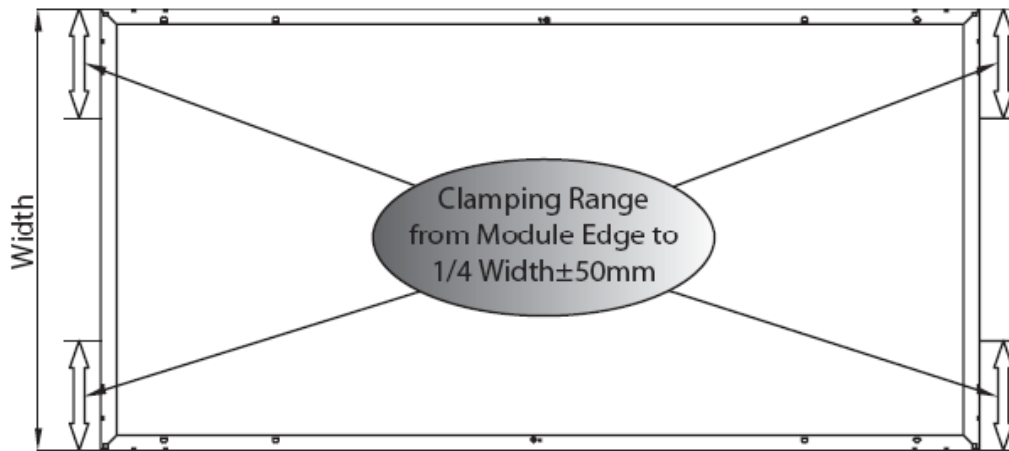


For 2400Pa Wind Load and 5400Pa Snow Load, using four clamps in Zone B on long frame.

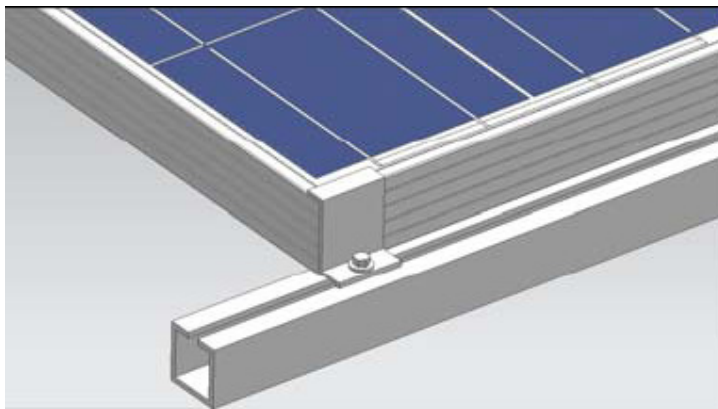
	125M/72	156M(P)/60	156M(P)/72
A(distance from module edge to clamping center)	103	108	127
B(clamping range)	300	300	300



- Installation clamping methods on a short frame as below :

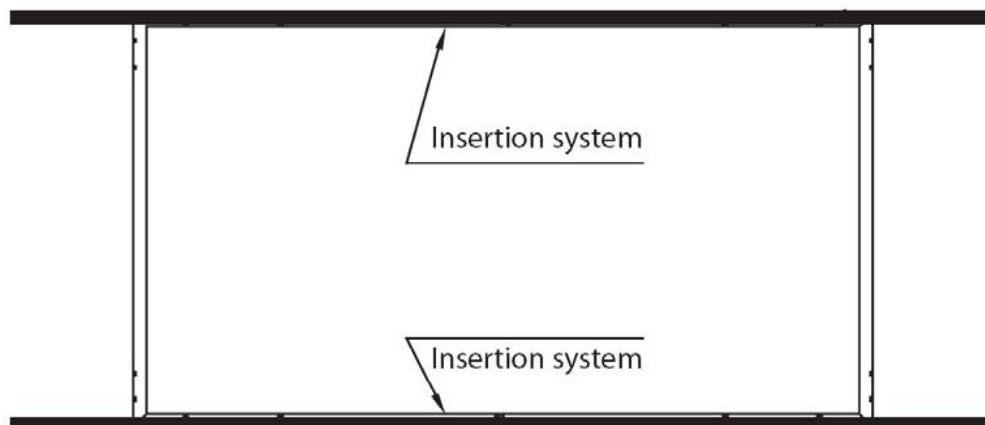


For 2400Pa Wind Load and 2400Pa Snow Load, using four clamps on a short frame

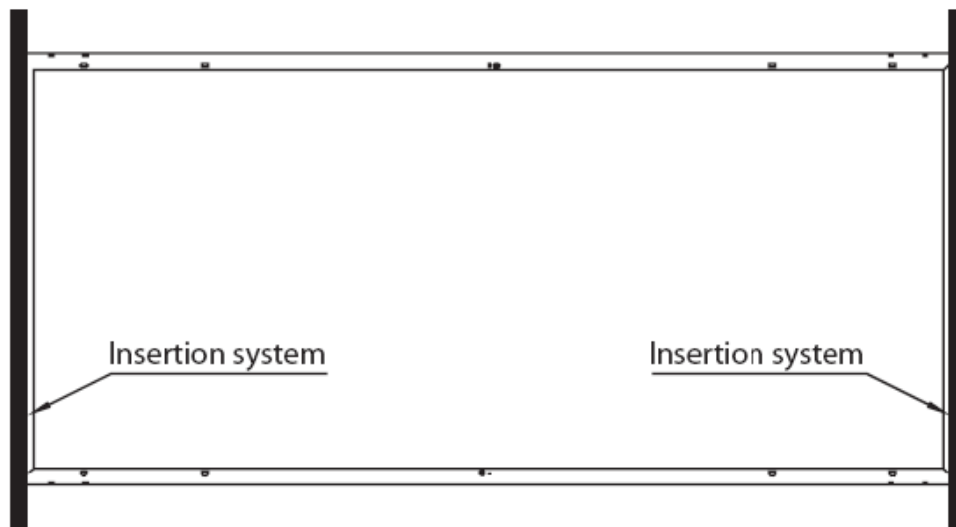


Installation using Insertion System

- Modules could use insertion system as the following picture shows, and the insertion system must have enough intensity to fix up modules, such as stainless steel and other appropriate metal to support PV module. When insertion system install on a long frame, the insertion system should not shelter the grounding holes.



For 2400Pa Wind Load and 5400Pa Snow Load, using an insertion system on the long frames

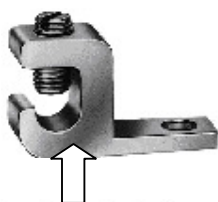


For 2400Pa Wind Load and 2400Pa Snow Load, using an insertion system on the short frame

Electrical Installation

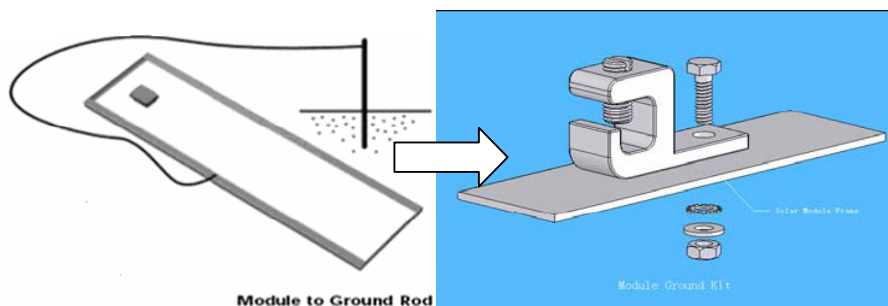
Grounding

- The module frame must be properly grounded (refer to NEC clause 250). The grounding wire must be properly connected to the module frame to ensure good electrical contact. Use the recommended type, or an equivalent, connectors for this wire.
- For metal support frames, the surface of the frame must be electroplated and have excellent conductivity.
- Eoply recommend the lay-in lugs (Cat. No. GBL-4DB; rated for 600Volts; company: ILSCO; UL number is E34440) when grounding.
- Taking care to avoid nicking or cutting the conductors, then insert the wire to the base of the lug (see the picture), and screw down the slotted screw.



Insert ground wire here

Insert the stainless steel bolt (M3, or equivalent, is recommended by Eoply) into the hole of the lug, the grounding hole on the frame, the toothed washer, the stainless steel flat washer and the stainless steel nut as shown in the illustration below. The toothed washer is required in order to prevent loosening of the screw over time.



- Grounding bolts, screws and ground-hole mounting hole must be distinguished separately to use.
- Alternate means of grounding which are certified to UL standards such as W.E.E.B are accepted.

General installation

- Do not use modules of different configurations in the same system.
- Always keep the backsheet of the panel free from foreign objects or structural elements, which could come into contact with the panel, especially when the panel is under mechanical load.
- Provide adequate ventilation under the modules in conformity to your local regulations. A minimum distance of 10 cm between the roof plane and the frame of the module is generally recommended.

- Modules are supplied with MC-4 compatible connectors to use for system electrical connections. Use the National Electric Code(United States) or equivalent local wiring regulations to determine system wiring size (refer to NEC clause 310), type and temperature rating of conductors to be connected to the module's connectors. Wiring connected to the module's should be #12 AWG(minimum) and must be temperature rated at 185°F (minimum), and connector must be temperature rated at 221°F (minimum).
- The cross sectional area of the cable and the capacity of the connector must be selected to suit the maximum system short circuit current, otherwise the cable and connector will be overheated under large current. Refer to NEC for details.
- The junction box has a breather port. The breather port must be mounted facing down and must not be exposed to the rain. Therefore, the junction box should be on the higher side of the module when it is mounted.

Maintenance

Eoply recommends the following maintenance measures in order to ensure optimum performance of the module:

- Clean the glass surface of the module when necessary. Always use water and a soft sponge or cloth for cleaning. A mild, non-abrasive cleaning agent can be used to remove stubborn dirt.
- Check the electrical and mechanical connections every six months to verify that they are clean, secure and undamaged.
- If any problem arises, have them investigated by a competent specialist.

In addition, the maintenance instructions for all other components used in the system, such as support frames, charging regulators, inverters, batteries etc. should be followed accordingly.

Disclaimer of liability

Because the use of this manual and the conditions or methods of installation, operation, use and maintenance of photovoltaic (PV) product are beyond Eoply's control, Eoply does not accept responsibility and expressly disclaims liability for loss, damage, or expense arising out of or in any way connected with such installation, operation, use or maintenance.

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