

Installation Instruction for DMEGC Photovoltaic Module

Content

1. PURPOSE	1
1.1 GENERAL TERM	1
2. SAFETY PRECAUTIONS FOR SOLAR PV SYSTEM INSTALLATION	3
3. INSTALLATION CONDITION.....	4
3.1 INSTALLATION LOCATION AND WORKING CONDITIONS.....	4
3.2 SELECTION OF INSTALLATION SLOPE ANGLE	4
4. MECHANICAL INSTALLATION	5
4.1 FIX MODULES WITH BOLT	5
4.2 INSTALL MODULES WITH FIXTURE	6
4.3 INSTRUCTIONS FOR FIXING LOCATION	8
5. ELECTRICAL GROUNDING INSTALLATION	10
5.1 INSTALLATION METHOD	10
6. MAINTENANCE	12
7. DISCLAIMER OF LIABILITY.....	13

1. Purpose

This guide contains information regarding the installation and safety handling of Hengdian Group DMEGC Magnetics Co., Ltd (hereinafter called “DMEGC”) photovoltaic modules (hereinafter called “Module”).

All instructions should be read and understood before attempting to install. If there are any questions, please contact our sales department for further explanation. The installer should conform to all the safety precautions in the guide when installing the module. Local codes should also be followed in such installation.

Before installing a solar photovoltaic system, the installer should be familiar with the mechanical and electrical requirement for such a system. Keep this guide in a safe place for further reference and maintenance and in case of sale or disposal of the module.

1.1 General term

- Installing solar photovoltaic systems requires specialized knowledge and appropriate technical skills. Therefore installation should be performed only by qualified technician.
- Every module is connected with a junction box eternally.
- The installer should realize the risk of all 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.
- Please never disconnect or connected the wire when the module is exposed to sunlight, an electric arc may result in fire or other serious problem.
- Photovoltaic solar modules transfer light energy into direct-current electrical energy. They are designed for outdoor use like ground mounting or rooftop mounting. Proper design of support structures is the responsibility of the system designer and installer. Use of mounting holes suggested in a following paragraph.
- Do not attempt to disassemble the module, and do not remove any attached labels or components.



Figure 1- 1

- Do not apply paint or adhesive to the module top surface.
- Do not use mirrors or other magnifiers to artificially concentrate sunlight on the module. Do not expose the back side of module directly under sunshine.



Figure 1- 2

- When installing the system, abide by all local, regional and national statutory regulations. Obtain a building permit where necessary.
- It's prohibited to step on modules.

2. Safety precautions for solar PV system installation

When sunlight irradiates on their front surface, the DC voltage may exceed 30 V. If modules are connected in series, the total voltage is equal to the sum of the individual module voltages. If modules are connected in parallel, the total current is equal to the sum of individual module currents.

- Keep children well away from the modules and the system during transportation and installation.
- 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.



Figure 2- 1

- Use only insulated tools that are approved for working on electrical installations.



Figure 2- 2

- Abide the safety regulations for all other components used in the system, including wiring cables, connectors, charging regulators, inverters, storage batteries and rechargeable batteries, etc. Use only equipments, connectors, wiring and support frames suitable for use in a solar electric system. Try the best to use the same type of module within a particular photovoltaic system.
- The indicated nominal parameters on the label are obtained under the standard test condition (irradiance of $1000\text{W}/\text{m}^2$, AM 1.5 spectrum, and a cell temperature of 25°C). The parameters on the label are just for reference. In actual appliance, there maybe difference with the module electric parameters as I_{sc} , V_{oc} and P_{max} between actual results and the nominal values.

3. Installation condition

3.1 Installation location and working conditions

- Modules are only allowed to be used on the earth and not allowed to be used in space.
- When modules used in severe conditions such as heavy snow, extremely cold, strong wind, close to island with salty fog or desert, please take proper protective measures of reliability and safety.
- DMEGC modules are only allowed to be installed on the proper buildings or other places suitable for module installation (such as ground, garage, outside wall of buildings, roofs, PV tracking system). Modules are not allowed to be installed on any type of mobile vehicles.
- Don't install modules in places which will be possibly flooded.
- The ambient temperature should be from -20°C to 46°C when the module is operating. The working temperature range is from -40°C to 85°C .
- Make sure that the wind or snow load on the modules will not exceed the allowed values.
- Modules should be installed where there is no shading. Make sure there are no objects that will block the sun irradiation on the module at installation site.
- It's necessary to take measures of lightning protection in PV installation.
- Don't install modules in places where the flammable gas may exist nearby.
- Don't install modules in places with strong corrosive substances such as salt, salty water or others, which will affect the safety or performance of the modules.

3.2 Selection of installation slope angle

- Slope angle of the module: The angle between the module surface and horizontal plane. When the module is facing vertically toward sun irradiation, modules will give out maximum power output.
- When modules are installed in the northern hemisphere, it's suggested to install modules facing the south. And when modules are installed in the southern hemisphere, it's suggested to install modules facing the north.
- Regarding the detail installation angle, please follow the proposal raised in this installation instruction. When modules are installed on the roof, the slope angle should not be lower than $127\text{ mm}/305\text{ mm}$ in order to maintain the relative fire proof grade. DMEGC modules' fireproof grade is Class C.

4. Mechanical Installation

Make sure the module installation method and mounting system is strong enough to support the designed load condition on modules and this is the necessary guarantee that the mounting system suppliers should provide. The mounting system should pass the inspection and tests by a third party with capability of static mechanical analysis. Module mounting system should be made up of durable, anti-corrosion and anti-UV materials. Modules should be well fixed on the mounting stand.

In heavy snow areas in winter, please select the high mounting stand. Thus, the lowest point of the module will not be covered by snow for long time. Besides, the lowest point of the module should be high enough to avoid being blocked by plants and trees or damaged by the moving sand or stones in windy weather. When modules are installed on the mounting stands parallel to the roofs or the mounting system on the wall, the distance between the module frame and the roof/wall should be at least 10cm for air circulation in order to prevent the module temperature from rising. Do not drill additional holes in glass or frame. Doing so will void the warranty. Before installing module on the roof, please make sure the building is suitable for roof installation. What's more, any leaking points in the roof should be properly sealed in order to avoid leakage. When dust falling on the surface of module, it will affect the power output of modules and DMEGC proposes that the slope angle should be larger than 10°. If so, the dust can be easily washed away by the rain. There is thermal expansion and contraction property with the module frame and it's proposed that the minimum distance between two installed modules should be 1cm. Make sure the backsheet of modules will not be touched by the mounting stand or building structures, especially when there is outside force on the modules. The max static load is 2400Pa on the back side to simulated wind load, and 5400Pa or 2400Pa on the front side, to simulate snow load and wind load. The load resistivity depends on the module installation method (please refer to 5.3 mounting detail). DMEGC modules can be installed either vertically or horizontally.

The mounting holes on the frame, clips or embedded system can be used to fix the modules on the mounting stands. The module installation must be carried out as per the following examples. If the installation does not follow the requirements below, it may lead to the void of DMEGC warranty.

4.1 Fix modules with bolt

- For standard installation, fix the module on mounting stand with the four holes on the module frame.
- In areas with strong wind or heavy snow, please also use the outer holes to fix the module frame in order to strengthen the fixture.
- The schematic drawings of the installation are shown in Figure 4-1.
- It's recommended to install modules at least 10cm above the ground.
- It's recommended to use torque wrench to install modules.
- In the process of tightening, the torque is recommended to be with 15-20N.m. (only stainless steel M8 bolt is allowed to be used)
- Stainless steel M8 nut
- spring gasket

- Stainless steel T-head M8 bolt

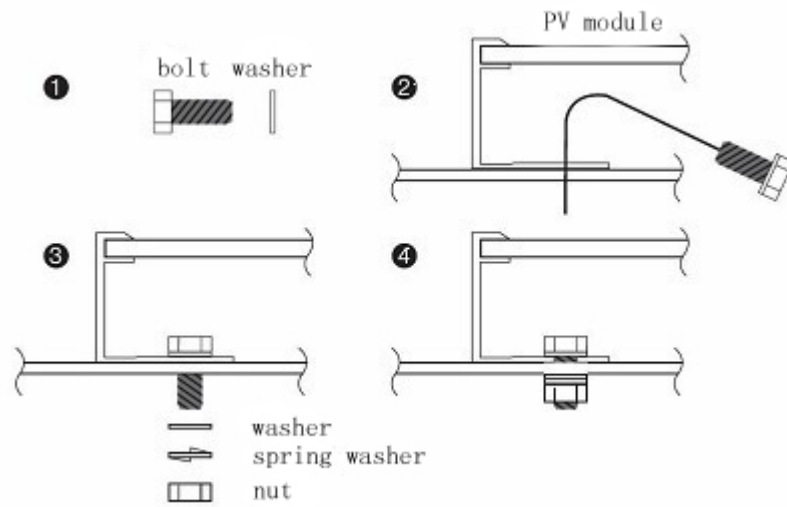


Figure 4- 1 Installation method of bolt

4.2 Install modules with fixture

- It's allowed to install modules with special fixture as figure 4-2.
- It's necessary to fix modules onto the mounting stand with metal fixtures recommended below or the installation fixtures approved by mounting system supplier.
- Width: Larger than or equal to 38mm; Thickness: Larger than or equal to 3mm; Material: Aluminum alloy; Bolt: M8
- The recommended torque range for tightening the screw is 18-24N.m.
- The front side of the fixture is not allowed to exceed the frame and press on the module glass or cause the deformation of module. Meanwhile, the fixtures are not allowed to affect the normal performance of modules. For example, either the drainage holes or the grounding holes shouldn't be blocked.

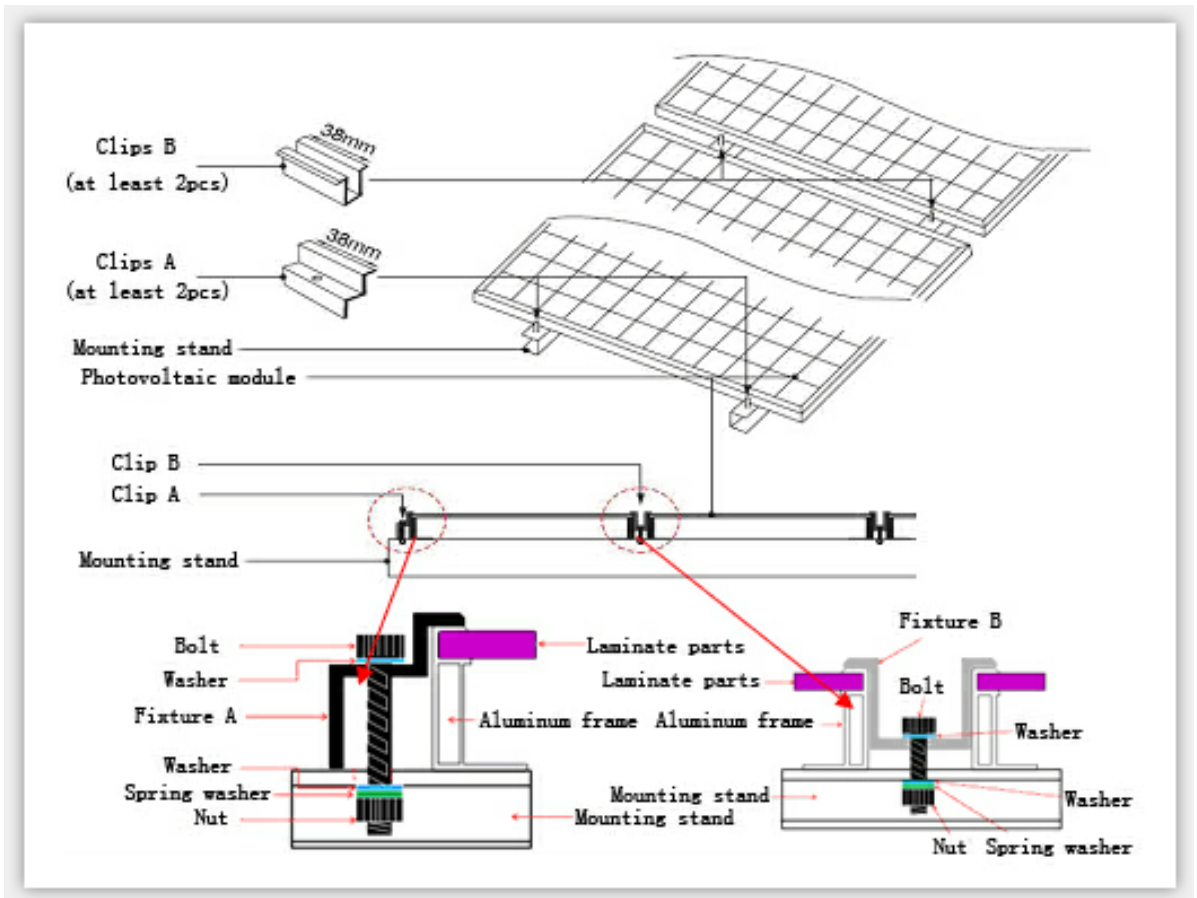


Figure 4- 2 Diagram of fixture installation

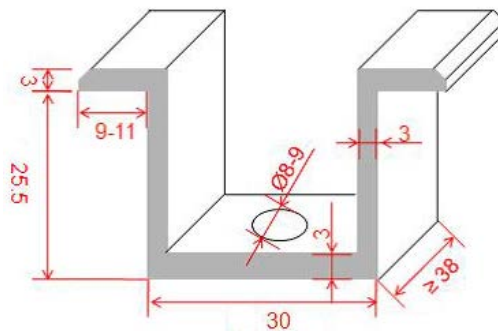


Figure 4- 3 Fixture used between modules (X= thickness of module frame)

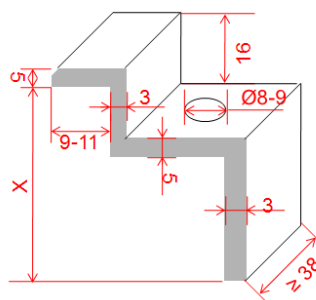
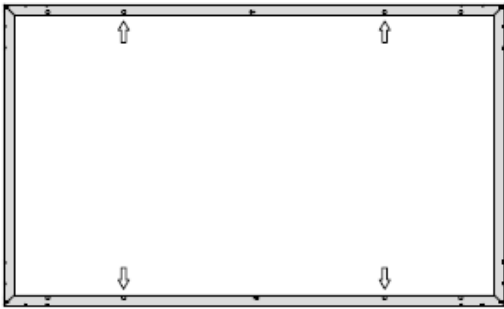
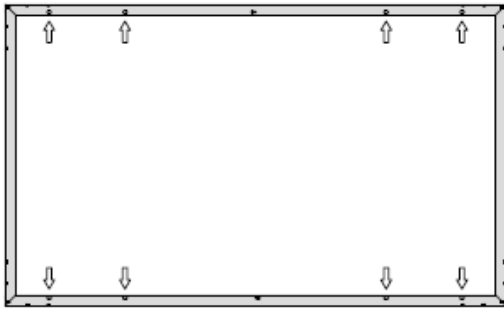
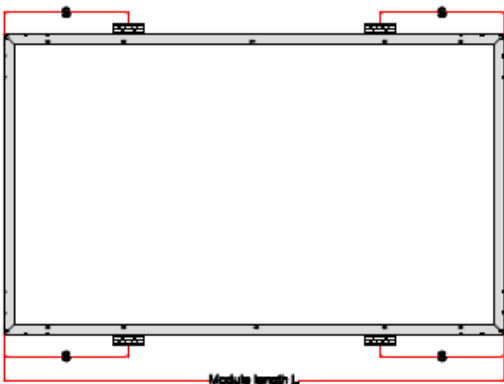
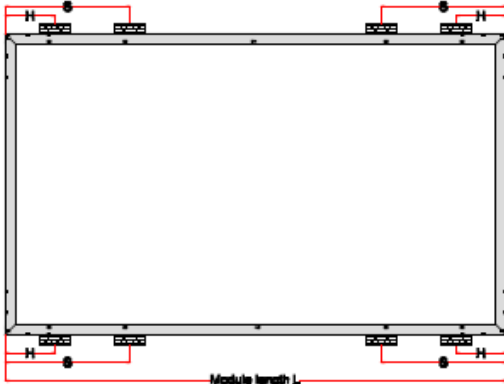


Figure 4- 4 Fixture for the end modules

4.3 Instructions for fixing location

- For low/ normal level of mechanical loads, the installation methods are applicable to usual environmental conditions: maximum static load on the back of the module is 2400Pa (equivalent to wind loads), maximum static load on the front of the module is 2400Pa (equivalently to wind loads and snow loads).
- For high loading condition, the installation is applicable to the rigorous environment: maximum tested loads on the back of the module is 2400Pa (to simulate wind load), maximum tested loads on the front of the module is 5400Pa (to simulate high wind load and snow load), as requested in the IEC standard.
- 2400Pa corresponds to a wind pressure of 130km.h⁻¹ (approximately ±800Pa) with a safety factor of 3

	Low/ normal level of mechanical load, applicable to usual environmental conditions	High load, applicable to the rigorous conditions, such as storm, heavy snow and so on
Install through mounting holes with screws	<p>• Mounting hole</p>  <p>Use 4 mounting holes</p>	<p>• Mounting hole</p>  <p>Use 8 mounting holes</p>
Install module on the long side with clips	<p>▣ Permitted fixing position range for clips $(\frac{1}{4}L-50) < S < (\frac{1}{4}L+50)$</p>  <p>Module length L</p>	<p>▣ Permitted fixing position range for clips $(\frac{1}{4}L-50) < S < (\frac{1}{4}L+50)$ $(\frac{1}{10}L-50) < H < (\frac{1}{10}L+50)$</p>  <p>Module length L</p>

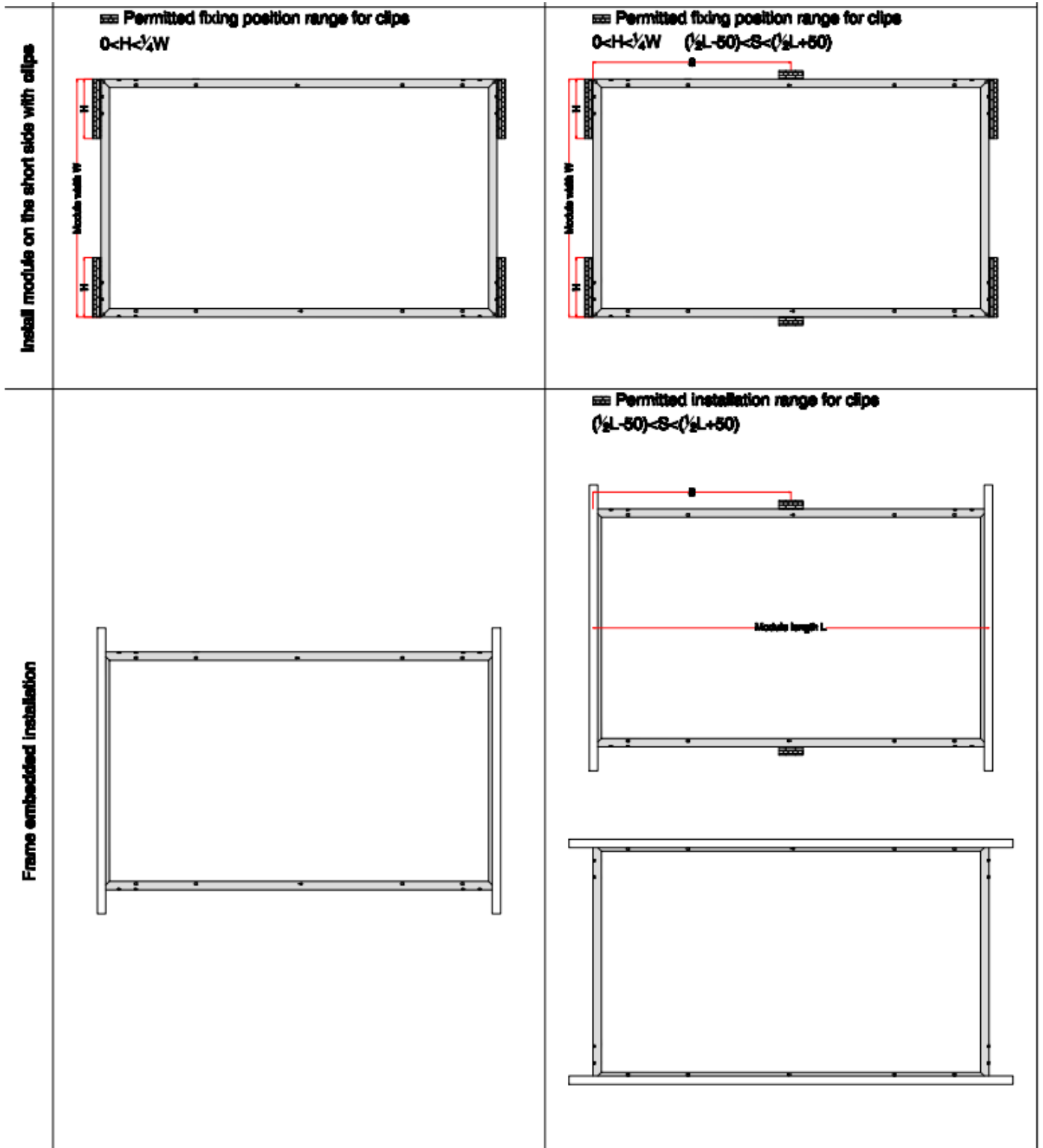


Figure 4- 5 Installation instruction

5. Electrical grounding installation

We recommend customers to use SolKlip (model 1954381) for grounding clip. For the sake of safety, the grounding parts are applicable to PV modules with metal frames.

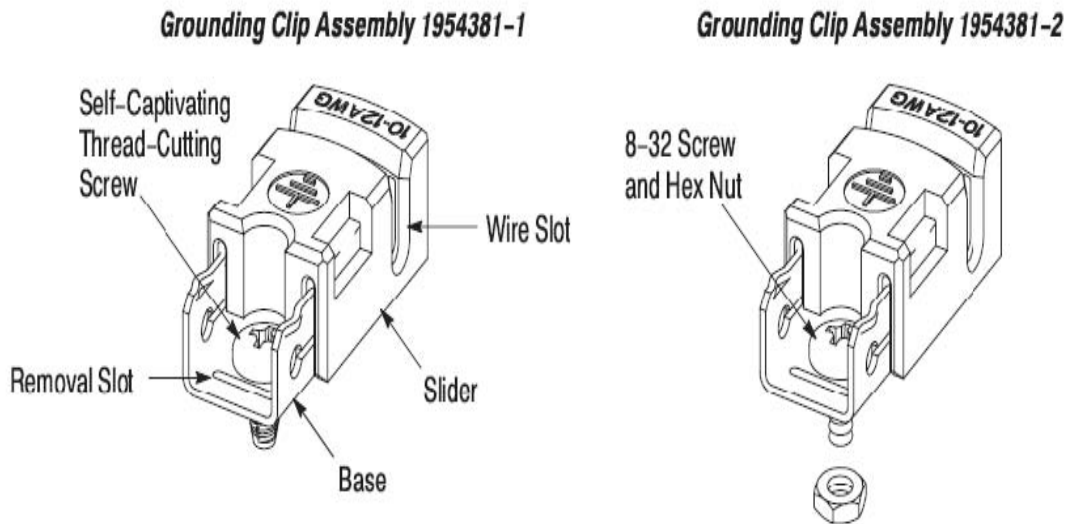


Figure 5- 1 Grounding Clip

Grounding clip consist of a slider, a base and a self-captivating Thread-Cutting Screw or 8-32 bolt and hex nut. Grounding clip can accommodate bare copper wire spec of 10-12AWG.

5.1 Installation Method

- The grounding clamp is positioned on the frame; screw aligns to the grounding hole. Use No.2 cross screwdriver to tighten the screws until the screw and base align to the frame, then screw 1/4 to 1/2 ring more. The recommended torque is maintained with 15-20 N.m.(133-177in.lbs)
- Use 3/8 inch wrench to tighten 8-32 bolts and hex nuts.
- Insert copper wires into the gap of the grounding clip and press both sides of the copper wires (copper wires will be slightly bended after being inserted into the gap).
- Use hands or pliers to push the slider to bottom of the cover.

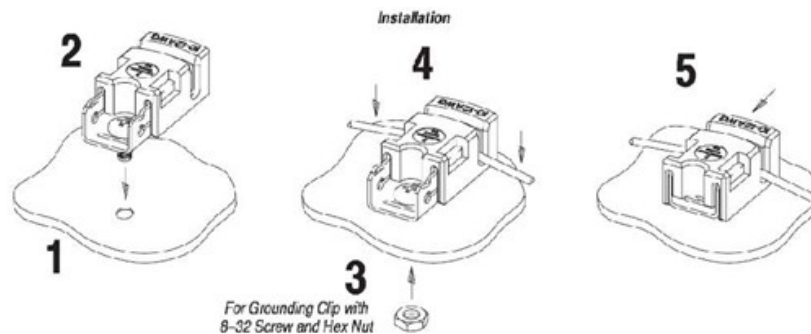


Figure 5- 2 Installation Method

- Try the best to use the same type of modules in one PV system.
- Modules are first connected in series to be strings, then strings are parallel connected into

one PV array. This is especially suitable for high voltage applications.

- Total voltage equals to the sum of each module's voltage if the modules are connected in series.
- If high current is required in the system, modules can be connected in parallel and the total current equals to the sum of each module's current.
- Technical requirements for cables used for modules: diameter is 12AWG, the cross-sectional area should not be less than 4mm², and the rated temperature should not be less than 90 °C.
- Wires and junction box may be overheated because of excessive current. Therefore, the rated current must be greater than the 1.25 times maximum short-circuit current.
- PV modules require at least 15Amp DC overload protection

6. Maintenance

- DMEGC recommend the following maintenance to ensure the best performance of the modules:
- Clean the surface of the glass if necessary. Cleaning by soft sponges or clothes with water.
- It's recommended to use mild, non-abrasive cleaning detergent to remove stain.
- Regular mechanical and electrical inspection in every 6 months to ensure that the module connectors clean and the connection is reliable.
- If anything unsure, please ask qualified personnel to check it.
- Please note: always comply with the maintenance instructions for the use of all the components in the system including stands, charging rectifiers, inverters, batteries and so on.

7. Disclaimer of liability

Owing to the ways of using this manual and the methods or conditions for installation, operation, using and maintaining photovoltaic (PV) products are out the control of DMEGC, DMEGC will not take responsibilities for any loses, damages, cost which are related to these installation, operation, using and maintaining.

The infringement of patents or other rights of third parties due to the usage of the PV products is not under DMEGC's responsibility. The customers will never acquire any patents or the use authorization of patent by using DMEGC products in any instance, no matter it's instructed clearly or implied.

The information of this manual is based on the knowledge and reliable experience of DMEGC. However, the information and advice including product specifications will not lead to any warranty in any instance. DMEGC reserves the right to amend this manual, PV products, specification or product information without prior notice.