

## INSTALLATION MANUAL

### General Use

1. The operator shall foresee the injury risk during the process of installation, debugging and maintenance of modules. Therefore, the professionals with appropriate qualifications shall accomplish these processes.
2. Do not dismantle the Modules or tear up any labels.
3. Mating connector pairs with the same brand and type is recommended.
4. Do not touch the exposed cables or connectors.
5. After opening the packing, an opaque cloth or other materials shall be used to cover the frontage of the modules for the reason that monolithic module may produce potentially fatal current or voltage in the direct sunlight.
6. System designers and installers shall design a reasonable bracket. Fix the module on the bracket according to the recommended method.
7. The installation, debugging and maintenance etc. must be complied with all electrical engineer safety regulations.
8. In the standard test condition (the standard test condition is: irradiance of  $1000\text{W}/\text{m}^2$ , temperature of  $25^\circ\text{C}$  and spectrum of AM 1.5), the electrical performance parameters of the Modules, such as  $I_{sc}$ ,  $V_{oc}$ , and  $P_{max}$  have a  $\pm 10\%$  deviation with the nominal value.
9. Do not trample or strike on the Module.
10. Do not spray the chemical non-validated or paints on the modules.
11. When operating the charge of any module or in case of maintenance, please take necessary actions to avoid the possible electrical injuries.

### INSTALLATION

1. Installers must be qualified engineers and familiar with electrical and its applications.
2. Do not use damaged modules. Damaged module may carry fire or electrical shock; both the two results could cause the death of the user or installer.
3. Do not disconnect the cable under load circumstance.
4. Under normal conditions, a Photovoltaic module may be able to produce voltage and current higher than in standard test condition. Accordingly when determining component rating voltage, conductor ampacities, fuse current and size of controls connected to the PV output, the short circuit current and open circuit voltage value marked on this module shall be multiplied by a factor of 1.25.
5. The module shall be installed in the position of the sun exposures fully and to ensure that not to be shaded by trees, buildings or something other surrounding, such as in the northern

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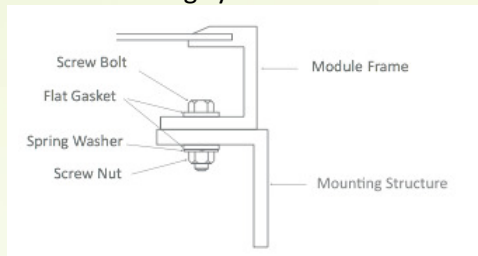
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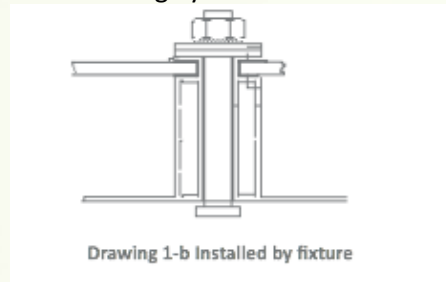
hemisphere installed towards the south and in the southern hemisphere installed towards the north.

6. Use the bracket structure that could withstand the pressure of high winds or heavy snow according to the practical installation condition. The bracket structure must be made of durable, corrosion resistant, UV resistant materials.
7. Registered professional engineers must design the installation structure, and installation design and procedures shall be consistent with the local relevant provisions.
8. You could chose either fixing method mentioned below per the actual conditions: -

a. Screw fixing system



b. Fixture Fixing System



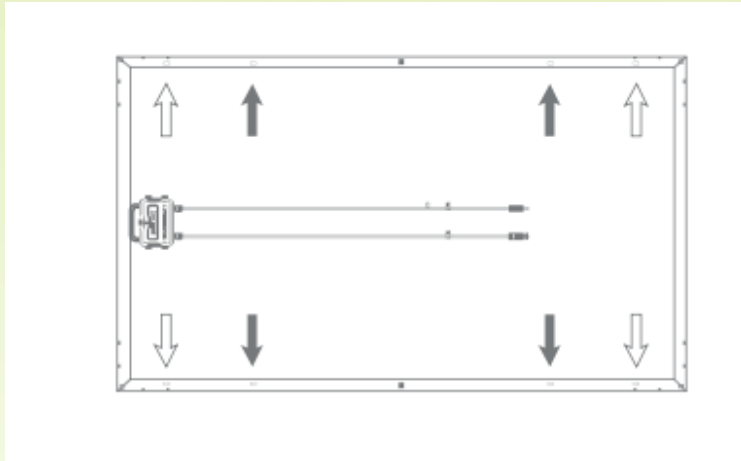
9. Installation method and location  
Screw Fixing: fix the modules on bracket at pre-fabricated installation holes

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10. When installing the modules on the roof, ensure there is an appropriate structure, and a suitable seal shall be made between the modules and the bracket to prevent leaking.
11. Installing the modules on the roof may affect the fire rating of the house, which requires the construction organization to make more accurate assessment.
12. Grounding
  - a. Recommend grounding of module frame and negative of the inverter.
  - b. Grounding method shall be consistent with the local standard and regulations.
  - c. In case of electrochemical corrosion, the materials, which would contact with module frames, should be properly selected.
  - d. Grounding wire shall be the bare copper wire with simple surface treatment and no insulation sleeve.
13. When the connecting wire of the modules cannot meet system design requirements, a proper commercial cable that could endure long term outdoor use and assorted connector could be used to extend the connecting wire.
14. The minimum separation between two modules shall be more than 10 mm; when installation on the roof, the minimum separation between the modules and mounting surface shall be more than 150 mm and when installing on the ground more than 450 mm.
15. It is always better to use the modules with same configuration in a series connection system.
16. Artificially concentrated sunlight shall not be directed on the module.
17. The modules should not be installed at the place, which is less than 100 meters from the seashore. If the distance of the seashore and the project site is 100~1000 meters, anti-corrosion application should be taken during the installation and grounding process.

#### MAINTENANCE

1. Do not touch the live part of the wire cable and the connector. When touching, use the safety equipment (insulating tool, insulating gloves etc.)

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2. When maintaining the modules, use opaque cloth or other materials to cover the frontage of modules. Exposed sunlight, the Photovoltaic modules may produce high voltage, which is a potential danger.
3. Cleaning Instruction:
  - a. Periodic cleaning is necessary for solar modules, which could reduce the loss due to dust and is recommended. The professionals with appropriate qualifications should accomplish the cleaning process. When cleaning the module surface,
    - i. Rule shown as below must be followed: -
      - Only at low irradiance, the cleaning process should be applied.
      - Only soft cloth or sponge should be used to clean the glass surface.
      - Only clean water should be used as the cleaning solvent.
      - The discrepancy between the water temperature and module temperature should be in the range of -5 °C and +10 °C.
      - Water pressure should be less than 1000 Pa.
      - Necessary electrical protection should be taken.
    - ii. Following notes should be taken into account:
      - No other chemical could be used in cleaning process.
      - No aggressive tool or coarse material is permitted
      - Do not trample or strike on modules.
      - In cleaning process, the modules must not be under a load circumstance.
      - Do not touch exposed cables or connectors.
      - Forbidden to remove dust in a dry way.
      - Forbidden to clean modules before cooling down.

#### ANNUAL INSPECTION

1. Check if nuts, bolts of mounting structure are secure and not loose. Tighten the loose component again, if required.
2. Check the water resistance of the connecting cables, grounding cables and connectors and the performance of the ground resistance.
3. Check all electrical and mechanical connections from freedom of corrosion.
4. Check the ground resistance of metal parts such as the module frames and the mounting structure.

#### DISCLAIMER OF LIABILITY

1. The use of this manual and installation, handling, maintenance and use of modules are beyond manufacturer's control, and the manufacturer does not assume and responsibility for loss, damage, injury or expense resulting from such installation, handling use or maintenance.

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2. The manufacturer assumes no responsibility for any infringement of intellectual property right (including without limitation patent, copyright and trademark) or other rights of third parties that may result from use of modules. No license in connection with intellectual property right (including without limitation patent, copyright and trademark) or other rights of manufacturer, whether expressly or impliedly, is granted to the customer because of the use of modules.
3. All information stated in this manual is based on the manufacturer's knowledge and experience, but no warranty about such information (including module specifications) is made by manufacturer, whether expressly or impliedly. The manufacturer reserves the right to update this manual, module specifications or relevant information without prior notice.

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