



上海超日太阳能科技股份有限公司

Shanghai Chaori Solar Energy Science & Technology Co., Ltd

**Shanghai Chaori Solar Limited Installation Manual for
Photovoltaic (PV) Modules**




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1. Introduction

This guide contains information regarding the installation and safe handling of Shanghai Chaori Solar Energy Science & Technology Co., Ltd. Module (hereafter is referred to as “module”). Shanghai Chaori Solar Energy Science & Technology Co., Ltd. is referred to as “Chaori” hereafter. All instructions should be read and understood before attempting to install. If there are any questions, please contact our market department for further explanation. Please read this manual completely before installing or using Chaori modules. Local codes should also be followed in such installations.

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 future reference (care and maintenance) and in case of sale or disposal of the module at the end of its useful life.

2. Disclaimer of Liability

Chaori does not assume responsibility and expressly disclaims liability for loss, damage, or expense caused by out of or in any way connected with such installation. Any operation or maintenance shall be strictly executed through this manual. Chaori assumes no responsibility for any infringement of patents or other rights of third parties, which may result from use of the module. No license is granted by implication or under any patent or patent rights. The information in this manual is believed to be reliable, but does not constitute an expressed and implied warranty. Chaori reserves the right to make changes to the product, specifications, or manual without prior notice.

3. Climate Condition


Install the Chaori Solar Crystalline series modules in the following conditions:

Ambient temperature:	-20°C to +40°C.
Operating temperature:	-40°C to +85°C.
Humidity:	below 85RH%
Heavy snow load:	5400Pa

In addition, local experts should be consulted for the installation conditions.

4. General

1. Artificially concentrated sunlight shall not be directed on the module.
2. Installing solar photovoltaic systems may require specialized skills and knowledge. Installation should be performed only by qualified persons.
3. The installer should assume the risk of all injury that might occur during installation, including, without limitation, the risk of electric shock.
4. To avoid the hazard of electric shock, work only under dry conditions, with dry module and tools.
5. One individual module may generate DC voltages greater than 30 volts when exposed to direct sunlight. Contact

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with a DC voltage of 30V or more is potentially hazardous.


6. 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. Therefore, be extremely careful!
7. 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, vehicles or boats. Proper design of support structures is the responsibility of the system designer and installer.
8. Not attempt to disassemble the module, and do not remove any attached nameplates or components.
9. Do not use mirrors or other magnifiers to artificially concentrate sunlight on the module.
10. When installing the system abide with all local, regional and national statutory regulations. Obtain a building permit where necessary. Abide with any local and National regulations when mounting on vehicles or boats.
11. Under standard test conditions, The electrical characteristics are within ± 10 percent of the indicated values of I_{sc} and V_{oc} , within $0/+3\%$ percent of the indicated values of P_{max} . (irradiance of $1000W/m^2$, AM 1.5 spectrum, cell temperature $25^{\circ}C$ ($77^{\circ}F$))

4.1 Handling safety

1. Do not lift the module by grasping the module's junction box or electrical leads.
2. Do not stand or step on the module.
3. Never leave a module unsupported or unsecured. Do not drop module and do not allow objects to fall on module to avoid the hazard of injury or any troubles in modules, which it may cause.
4. To avoid glass breakage, do not place any heavy objects on the module.
5. Do not treat the back sheet and front surface with paint or adhesives to avoid any troubles.
6. Inappropriate transport and installation may break the module.
7. Do not drill holes in the frame. This may compromise the frame strength and cause corrosion of the frame.
8. To avoid damage to the backsheet, do not scratch or hit the backsheet.
9. Do not scratch the anodized coating of the frame (except for grounding connection). It may cause corrosion of the frame or compromise the frame strength.
10. Be careful when setting the panel down onto a surface, particularly when placing it on a corner.
11. A panel with broken glass or torn backsheet cannot be repaired and must not be used since contact with any panel surface or the frame can cause a electric shock.
12. Do not handle panels when they are wet unless wearing appropriate protective equipment.
13. When storing uninstalled panels outdoors for any period of time, always cover the panels and ensure that the glass faces down to stop water from collecting inside the panel and causing damage to exposed connectors.

4.2 Installation safety

1. Never open electrical connections or unplug connectors while the circuit is under load.
2. Contact with electrically charged parts of the panels, such as terminals, can result in burns, sparks and lethal shock

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whether or not the panel is connected.

3. Do not touch the PV module unnecessarily during installation. The glass surface and the frame may be hot; there is a risk of burns and electric shock.
4. Do not work in the rain, snow or in windy conditions.
5. Avoid exposing cables to direct sunlight in order to prevent their degradation.
6. Keep children well away from the system while transporting and installing mechanical and electrical components.
7. Completely cover the module with an opaque material during installation to prevent electricity from being generated.
8. Do not wear metallic rings, watchbands, ear, nose, lip rings or other metallic objects while installing or troubleshooting photovoltaic systems.
9. Use only insulated tools that are approved for working on electrical installations. Follow the safety regulations for all other system components, including wires and cables, connectors, charging regulators, inverters, storage batteries, rechargeable batteries, etc. Always use the same type of module within a particular photovoltaic System.
10. Under normal outdoor conditions the current and voltage generated by the system will differ from those listed on the datasheet. Datasheet values are the values measured under standard test conditions. Accordingly, during system design, values of short-circuit current (I_{sc}) and open-circuit voltage (V_{oc}) should be multiplied by a factor of 125 percent which maybe applicable when determining component voltage ratings, conductor opacity, fuse sizes and size of controls connected to the module or system output.


4.3 Fire Safety

1. Consult your local authority for guidelines and requirements for building or structural fire safety.
2. For roof mounting applications the assembly is to be mounted over a fire resistant roof covering rated for the application.
3. Use components such as ground fault circuit breakers and fuses as required by local authority.
4. Do not use panels near equipment or in places where flammable gases may be generated.
5. The modules have been rated Fire Class C, and are suitable for mounting onto a Class A roof.
6. The Maximum Series Fuse Rating is 15A.

5. Product identification

Each module has three labels providing the following information:

1. Nameplate: describes the product type; rated power, rated current, rated voltage, open circuit voltage, short circuit current, all as measured under standard test conditions; weight, dimensions, maximum system voltage etc..
2. Quality label: "Pass" assures that the module has passed the quality control examination.
3. Barcode: each individual module has a unique serial number. The serial number has 14 digits. The "CR" represents Chaori, "M" represents the module. The 4th and 5th are year code, the 6th and 7th are month code, the 8th and 9th are date code. For example, CRM110329-xxxxx means the module was made in the Mar. 29th 2011. The number after

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the Horizontal line represents serial number of module. There is interior of the module visible when viewing from the front of the module. This bar code is inserted at the beginning of laminating.



Do not remove any label. If the label is removed, the product warranty will no longer be honored by Chaori.


6. Mechanical Installation

6.1 Selecting the location

1. Select a suitable location for installing the modules.
2. The modules should be facing south in northern latitudes and north in southern latitudes.
3. For detailed information on the best installation angle, refer to standard solar photovoltaic installation guides or consult a reputable solar installer or systems integrator.
4. The module should not be shaded at any time.
5. Do not use modules near equipment or in locations where flammable gases may be generated or collected.

6.2 General Installation

1. In some cases, a special support frame may be necessary.
2. Modules must be securely attached to the mounting structure.
3. The module mounting structure must be made of durable, corrosion-resistant and UV-resistant material.
4. In regions with heavy snowfall in winter, select the height of the mounting system so that the lowest edge of the module is not covered by snow for any length of time. In addition, ensure that the lowest portion of the module is placed high enough so that it is not shaded by plants or trees or damaged by flying sand.
5. Always observe the instructions and safety precautions included with the module support frames.
6. Do not attempt to drill holes in the glass surface of the modules as this will void the warranty.
7. Do not drill additional mounting holes in the module frames of the modules as this will void the warranty.
8. When installing a module on a pole, choose a pole and module mounting structure that will withstand the anticipated winds for the area.
9. Dust building up on the surface of the module can impair with module performance. Chaori recommends installing the modules with a tilt angle of at least 15 degrees, making it easier for dust to be washed off by rain.
10. Observe the linear thermal expansion of the module frames (the recommended minimum distance between two modules is 2 cm).
11. 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.
12. When installing a module on a roof or building, ensure that it is securely fastened and cannot fall as a result of wind or snow loads.

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13. When installing module on a roof, ensure that the roof construction is suitable. In addition, any roof penetration required to mount the module must be properly sealed to prevent leaks.
14. Provide adequate ventilation under the modules in conformity to your local regulations. A minimum distance of 20 cm between the roof plane and the frame of the module is generally recommended.
15. When installing the module on a roof or building, do so in calm winds. Installing a module during strong winds may cause accidents.
16. The roof installation of solar modules may affect the fireproofing of the house construction.

6.3 Installation methods

There are two installation methods in the Installation Manual.

Modules can be installed on the frame using mounting holes or clamps system. Module can be installed in both landscape and portrait modes.

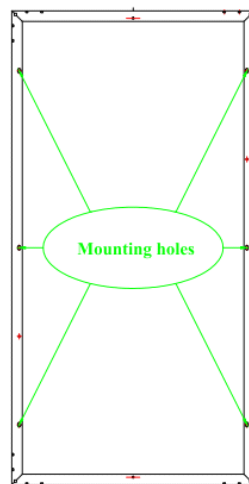
The modules must be properly secured to their support so that they can withstand live load conditions, including wind uplift, to the pressure they have been certified for.

It is the installer's responsibility to insure that the clamps used to secure the modules are strong enough.


In addition, other installation methods need abide with all local, regional and national statutory installation methods.

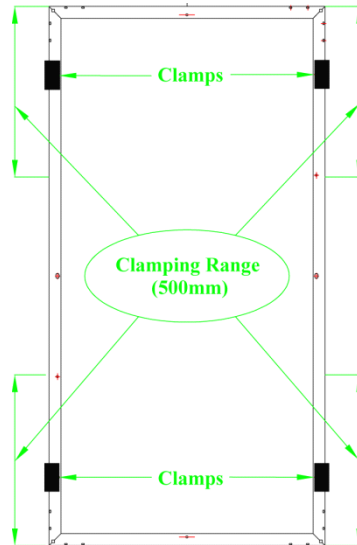


Mounting system:

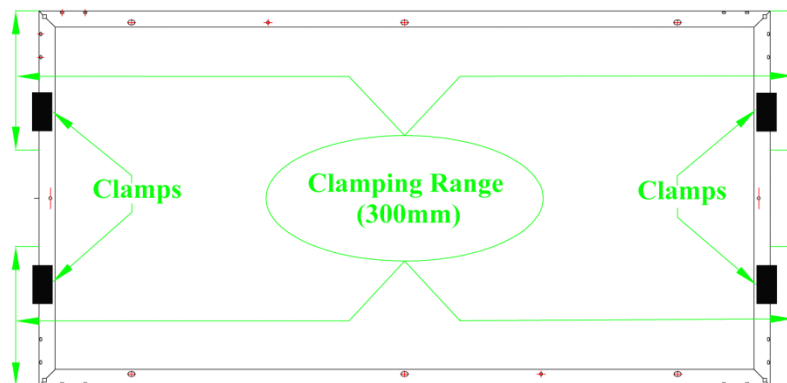


Clamping system (Attachment to the long frame) :

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Clamping system (Attachment to the short frame) :




Note:

1. Nut and plug are stainless steel. The material of Clamps is aluminium alloy.
2. The module clamps must not come into contact with the front glass or deform the frame in any way. Avoid shading effects from the module clamps and insertion systems. Drainage holes in the module frame must not be closed or obscured by the clamps.

7. Electrical Installation

7.1 General installation

1. Any hardware used must be compatible with the mounting structure material to avoid galvanic corrosion.
2. It is not recommended to use modules with different configurations (grounding, wiring) in the same system.
3. For applications requiring a high operating voltage several modules can be connected in series to form a string of modules; the system voltage is then equal to the sum of the voltage of each module.
4. For applications requiring high operating currents several strings of modules can be connected in parallel; the system current is then equal to the sum of the current of each string of modules.
5. Our modules are supplied with connectors to be used for system electrical connections.

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6. The maximum number of series connected modules depends on system design, the type of inverter used and environmental conditions.
7. There is no limitation on the number of modules that can be connected in parallel, the number of modules is determined by system design parameters such as current or power output.
8. Please refer to local regulations to determine the system wires size, type and temperature. To prevent the cables and the connectors from overheating, the cross section of the cables and the capacity of the connectors must be selected to suit the maximum system short circuit current (The recommended cable cross section is 4mm² for a single module and if rated current of a connector is higher than 10A). Please note that the upper limit temperature of cable is 90°C, and that of the connector is 85°C.
9. The DC current generated by photovoltaic systems can be converted into AC and fed into a public grid. As local utilities' policies on connecting renewable energy systems to their grids vary from region to region. A qualified system designer or integrator should always be consulted. Building permits, inspections and approvals by the local utility are generally required.

7.2 Grounding

1. For grounding and bonding requirements, please refer to regional and national safety and electricity standards. If grounding is required, use a recommended connector type, or an equivalent, for the grounding wire.
2. If grounding is required, the grounding wire must be properly fastened to the module frame to assure adequate electrical connection.

8. Maintenance

Some maintenance is recommended to maintain optimal output performance of solar cell modules, as follow:

If the module surface becomes dirty, it may cause reduction of output power. It is recommended to clean the surface with water and soft cloth or sponge. A mild non-abrasive detergent may be applied for the persistent dirt.

It is also recommended to inspect the electrical and mechanical connections annually. If you need electrical and mechanical inspection or maintenance, it is recommended to have the authorized professional carry out the inspection or maintenance to avoid the hazards of electric shock or injury.