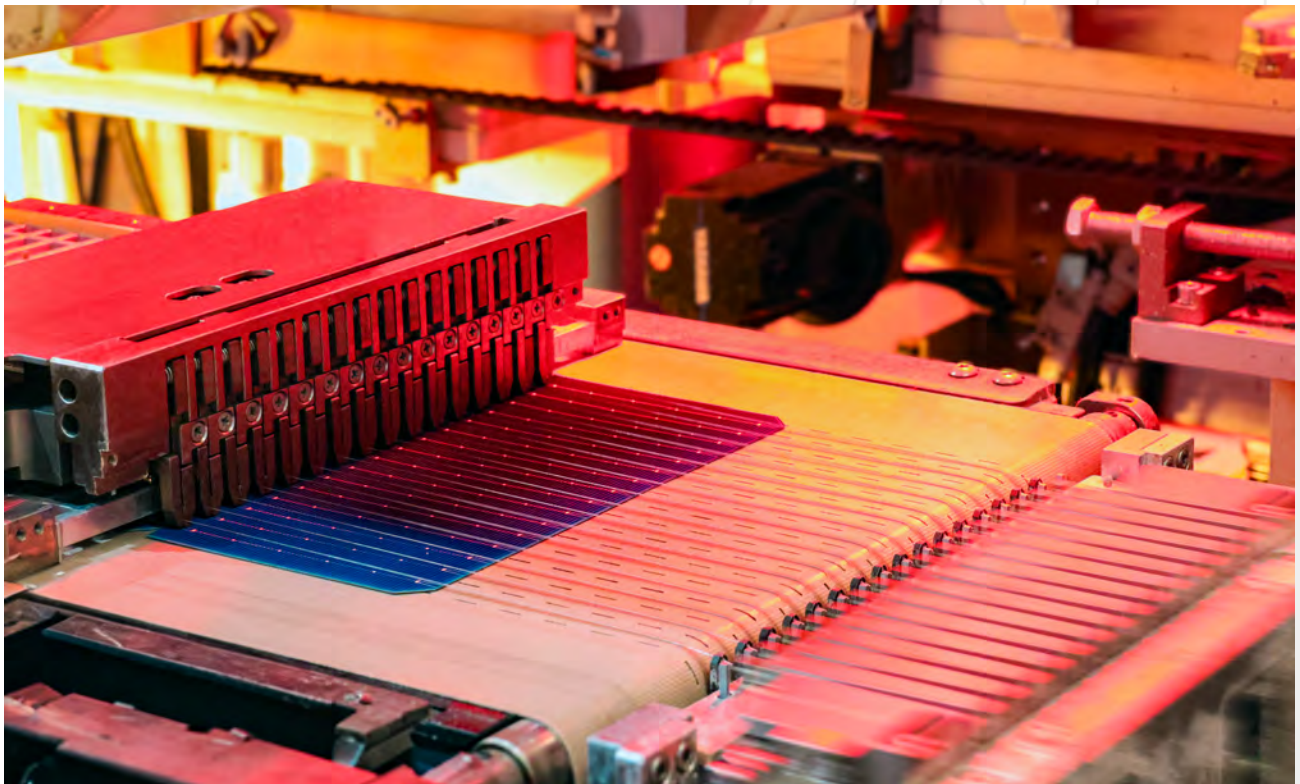


INSTALLATION GUIDE FOR CRYSTAL PV MODULES



TS EN 61215, TS EN 61730
IEC 61215, IEC 61730, IEC 62804 (PID FREE)
ISO 9001:2015, ISO 14001:2015, ISO 45001: 2018, ISO 27001:2013, ISO 10002:2004
UL 61730-1, UL 61730-2

1 PURPOSE OF THIS GUIDE

Thanks for choosing SIRIUS Photovoltaic Modules (hereafter referred to as “PV Module”), This Guide is to give information on how to apply SIRIUS PV modules properly. Installers must read and understand this Guide prior to installation. For any questions, please contact our technical department (info@siriuspv.com) for further information. Installers should follow all safety precautions described in this Guide as well as local codes when installing a module. Keep this Guide in a safe place for future reference (care and maintenance) and in case of sale or disposal of the PV modules

2 SAFETY

2.1 GENERAL SAFETY

- The PV modules are qualified for application class A, which may be used in systems operating at greater than 50 V DC or 240 W, where general contact access is anticipated. PV modules qualified for safety through this part of IEC61730 and IEC 61730-2 and within this application class are considered to meet the requirements for safety class II.
- The PV modules shall be properly grounded in accordance with the instructions in this Guide or the requirements of the National Electrical Code.
- Installing PV modules requires specialized skills and knowledge. Installation should only be performed by qualified personnel, electrical connections requires a licensed electrician, where applicable according to local code and law (i.e. the NEC for the USA and CEC for Canada).
- Installers should assume all risks of injury that might occur during installation, including, but not limited to, the risk of electric shock.
- One single PV module may generate more than 30V DC when exposed to direct sunlight. Access to a DC voltage of 30V or more is potentially hazardous.
- PV modules convert light energy into DC electrical energy and are designed for outdoor use. They can be mounted on the ground, rooftops, vehicles, boats, etc. The proper design of support structures falls within the responsibility of the system designers and installers.
- Do not use mirrors or other magnifiers to concentrate sunlight on to the PV modules.
- When installing the PV modules, abide to all local, regional and national statutory regulations. Obtain a building permit if necessary.
- Only use equipment, connectors, wiring and support frames compatible with the PV modules.
- Do not clean the modules with chemicals.

2.2 HANDLING SAFETY

- Do not lift the PV module by grasping the module's junction box or electrical leads.
- Do not stand or step on the PV modules or place heavy objects on to it.
- Do not drop the PV module or allow objects to fall on the PV module.
- Do handle with care when move, transport and install the PV modules.
- Do not attempt to disassemble the PV modules, and do not remove any attached nameplates or components from the PV modules.
- Do not apply paint or adhesive to the PV module top surface.
- Do not scratch or hit the back sheet.
- Do not drill holes in the frame. This may reduce the frame mechanical strength and cause cells to crack due to vibration.
- Do not break the anodized coating of the frame (except for grounding connection), this may cause corrosion of the frame.
- Do not use PV modules with broken glass or a torn back sheet, as they pose a danger of electrical shock.
- Do not handle panels in wet conditions, unless you have appropriate protection.
- Do not expose the PV module to sunlight until it is installed to avoid unnecessary degradation..
- During all transportation, please ensure that there is no strenuous vibration on the module, as it may cause cell microcracks or damage the module.

2.3 INSTALLATION SAFETY

- Installation shall be in conformity with IEC standard, Safety Standard for Electrical Installations.
- Do not disconnect under load.
- Do not touch conductive parts of PV modules, such as terminals which can result in burns, sparks and lethal shock whether or not the PV module is connected.
- Do not touch the PV module unnecessarily during installation.
- Do not work in rainy, snowy, or windy conditions.

- Do not expose the PV modules to artificial sunlight. Cover the PV module completely with an opaque material during installation to prevent electricity generation.
- Do not wear metallic rings, watchbands, or other metallic objects such as ear, nose, and lip rings while installing or troubleshooting.
- Only use insulated tools that are qualified 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.
- Under normal outdoor conditions, the current and voltage generated will differ from those listed on the datasheet. When designing systems, the current and short-circuit current should be multiplied by a factor of 1.25 to determine component ratings.
- Only use connectors compatible with the PV module connectors. Removing the connectors without prior authorization will invalidate the warranty.
- Disassembly/dismantling/removal of installed modules without permission will void the warranty.
- Do not dismantle installed modules to another project, which may invalidate the warranty.
- Do not install modules within 50m of the shoreline.

2.4 FIRE SAFETY

- The fire rating of this module is valid only if this Guide is followed.
- Consult your local authority for Guidelines and requirements for building or structural fire safety.
- Do not use PV modules near equipment or in places where flammable gases may be generated.
- Follow local codes and laws when installing the modules.

3 PRODUCT IDENTIFICATION

Each module has three barcode stickers, all containing the same unique serial number for each module, and one label sticker:

Barcode 1: Laminated onto the PV modules.

Barcode 2: Stuck on the backside of the PV modules.

Barcode 3: Stuck in the middle location on the long frame side.

Label: Stuck on the backside of the PV modules, containing the characteristic parameters of the modules.

Check the serial number on the barcode against the packing list when unpacking. Provide the PV module's serial number when you need support from 'SIRIUS' for specific PV modules.

4 MECHANICAL INSTALLATION

4.1 GENERAL INSTALLATION PRINCIPLE

- The module can be installed in both landscape and portrait modes.
- It is recommended to install modules of the same size and type in one PV array.
- The PV modules should be installed high enough to avoid potential shading, flying sand, snow, and water.
- It is recommended to install the PV modules at least 30 cm above the ground to ensure proper ventilation.
- Appropriate installation structures should be chosen to meet the required mechanical load.
- It is recommended to install the PV modules at a minimum angle of 10 degrees to facilitate the washing off of dust.
- It is recommended to maintain a minimum gap of 10 mm between PV modules for thermal expansion of materials.
- Install PV modules appropriately according to the corresponding mechanical load requirements.

4.2 LOCATION AND ANGLE SELECTION

It is recommended to install PV modules in areas with excellent sunlight resources. In the Northern Hemisphere, the modules should typically face south, while in the Southern Hemisphere, they should typically face north. The most optimal installation angle varies according to different latitudes and longitudes; please consult experts with the appropriate knowledge background when determining the installation locations and angles.

When choosing a site, avoid trees, buildings, or other obstructions that could cast shadows on the solar photovoltaic modules. Shading can cause hotspots and loss of output, although the factory-fitted bypass diodes in the PV module will minimize this effect.

Do not install the PV module near naked flames or flammable materials.

Do not install the PV module in locations where it would be immersed in water or constantly exposed to water from a sprinkler, fountain, etc.

4.3 SCREW INSTALLATION

Each PV module has eight mounting holes (as shown in Figure 1-1). The downward mechanical load resistance of the module varies according to the installation holes used (as shown in Table 1-1). Please use all eight holes to secure the modules to the support structure. The module frame must be attached to a mounting rail using M8 corrosion-resistant screws, along with spring washers and flat washers, in eight symmetrical locations on the PV module. The applied torque should be sufficient to ensure steady fixation. The reference torque value for an M8 screw is 16-20 N*m.

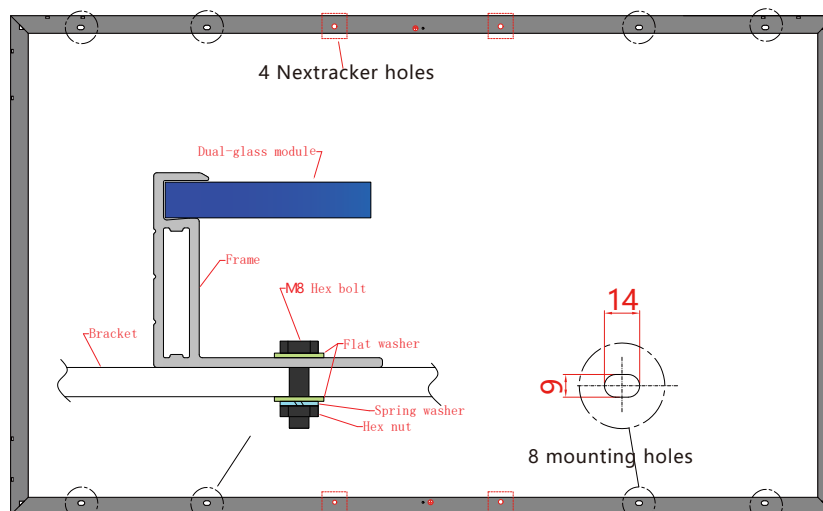


FIGURE 1-1

INSTALLED HOLES USED	MECHANICAL LOAD
8 Installation Holes (Suitable for frame with 8 mounting holes design)	5400Pa
4 Installation Holes (Inner ones)	2400Pa
4 Nextacker Holes	2400Pa

TABLE 2-1

For the 210 and 182-BMA modules, four mounting holes in the frame are commonly used as an industry standard to facilitate customer installation. We have incorporated four mounting holes in the frame of the 210 and 182-BMA modules, as shown in Figure 1-2.

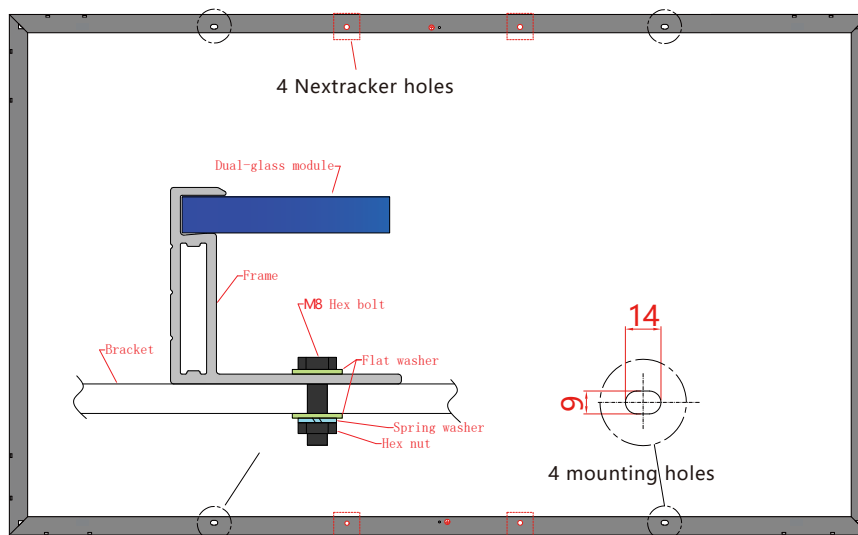


FIGURE 1-2

INSTALLED HOLES USED	MECHANICAL LOAD
4 Installation Holes (Suitable for frame with 4 mounting holes design)	5400Pa
4 Nextrack Holes	2400Pa

TABLE 2-1

4.4 CLAMP INSTALLATION

The modules can be fixed on both the long and short sides within the constraints shown in Figures 2 and 3, using a minimum of four clamps. The modules are designed to withstand a downward force of up to 5400 Pa (550 kg/m²) or 2400 Pa (244 kg/m²), depending on where they are clamped (as shown in Tables 2 and 3). Site-specific loads, such as wind or snow, which may exert forces differently, need to be considered to ensure these limits are not exceeded for each respective mounting option.

4.4.1. Install module with clamps at long sides of frames;

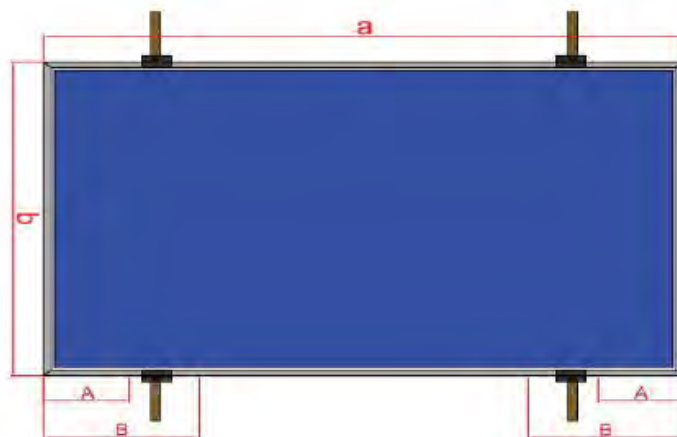


FIGURE 2-1

TABLE 2-1

a(mm)	b(mm)	Clamps length	A(mm)	B(mm)	Loads (Pa)
1985/ 1970/1956	992/1002	≥ 50mm	380	580	5400
			50	580	2400
1665/ 1650/1640	992/1002	≥ 50mm	300	500	5400
			50	500	2400
2180/2465	1002/1134	≥ 50mm / ≥ 80mm	380/600	580/700	5400
			50/100	580/650	2400
2288/2256 /2279/2278	1134/1133 /1134/1134	≥ 50mm	380	580	5400
2094	1038		380	580	5400
1996/2015	992/1002	≥ 50mm	380	580	5400
			50	580	2400
1755/1909	1038/1134	≥ 50mm	300	500	5400
1674/1690	992/1002	≥ 50mm	300	500	5400
			50	480	2400
1852	1002	≥ 50mm	300	500	5400
			50	500	2400
1707/1730	1133/1134	≥ 50mm	300	500	5400
1722	1134	≥ 50mm	300	500	5400

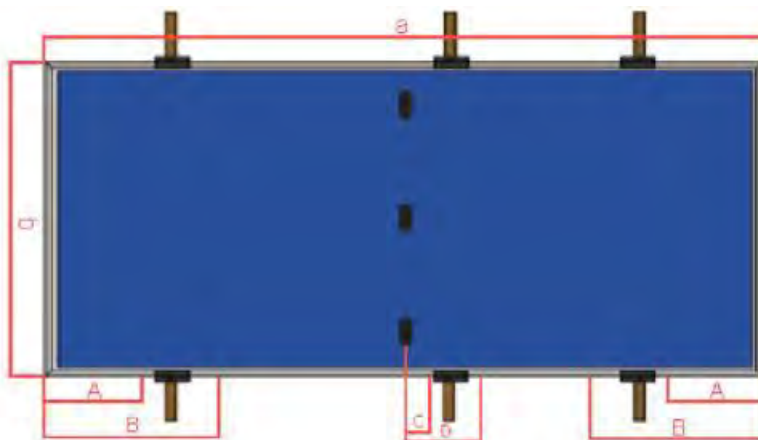


FIGURE 2-2

TABLE 2-2

a(mm)	b(mm)	Clamp Length	A(mm)	B(mm)	C(mm)	D(mm)	Loads (Pa)
2172	1303	≥80mm	250	450	50	100	5400
2384	1303	≥80mm	280	480	50	100	5400

4.4.2. Install module with clamps at short sides of frames;



FIGURE 3-1



FIGURE 3-2

TABLE 3

e(mm)	d(mm)	Clemps Length	E(mm) Figure 3-1	D(mm) Figure 3-1	D, E(mm) Figure 3-2	Loads (Pa)
1909	1134	≥ 50mm	100	240	0	1600
1722	1134	≥ 50mm	100	240	0	1600

4.5 ELECTRICAL INSTALLATION



WARNING: Electrical Hazard

This module produces electricity when exposed to light. Follow all applicable electrical safety precautions.

ONLY qualified personnel can install or perform maintenance work on these PV modules.

- Be aware of dangerous high DC voltage when connecting modules.
- Do not damage or scratch the rear surface of the module.
- Do not handle or install modules when they are wet.

The wiring components must be compatible with the PV modules. Modules connected in series should have similar currents. The open-circuit voltage (Voc) of one PV string should not exceed the maximum system voltage (refer to the maximum system voltage marked on the label). The Voc temperature coefficient feature and the extreme low temperature of the installation location must be taken into account when calculating the Voc of the PV string.

Modules connected in parallel should have similar voltages. The short-circuit current (Isc) temperature coefficient feature and the extreme high temperature of the installation location must be considered when calculating the Isc of the PV array.

Please refer to local regulations to determine the system wire size, type, and temperature.

The cross-sectional area and cable connector capacity must satisfy the maximum short-circuit current of the PV system. For a single component, we recommend a cable cross-sectional area of 4mm² and a connector rated current of more than 15A; otherwise, cables and connectors may overheat due to large current.

Please note: the temperature limit for cables is 85°C, and for connectors, it is 105°C. A qualified system designer or integrator should always be consulted.

Building permits, inspections, and approvals from the local utility are generally required.

Before installation, ensure that the connector is well protected and free of foreign matter such as soil, sand, and gravel. If present, it must be cleaned before installation. If the connector is damaged or deformed, it must be replaced before use; if there is no spare connector, please contact SIRIUS in time.

Remark: If a conversion cable is needed, see Attachment 1 for details.

4.6 GROUNDING

Where common grounding hardware (such as nuts, bolts, star washers, split-ring lock washers, flat washers, etc.) is used to attach a listed grounding/bonding device, the attachment must conform to the grounding device manufacturer's instructions.

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. The grounding wire must be properly fastened to the module frame to ensure adequate electrical connection (grounding hole shown in Figure 4).

When the system operates in high humidity and high temperature conditions, using a transformer-based inverter that allows system negative grounding is highly recommended to mitigate the risk of a higher power degradation rate.

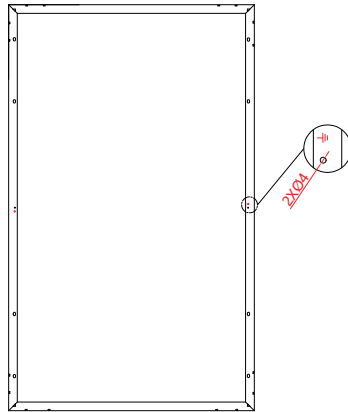


FIGURE 3-2

5 MAINTENANCE

Clean the glass surface of the module regularly with clean water and a soft sponge or cloth. A mild, non-abrasive cleaning agent may be used to remove stubborn dirt. Water with high mineral content is not recommended for cleaning the module.

The frequency of cleaning should be based on the level of pollution in the area.

Check the electrical, grounding, and mechanical connections every six months to ensure they are clean, secure, undamaged, and free of corrosion. If any problems arise, consult a professional for suggestions.

Caution: Observe the maintenance instructions for all components used in the system, such as support frames, charging regulators, inverters, batteries, etc.

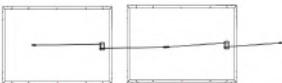
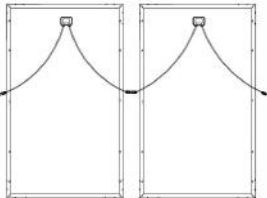
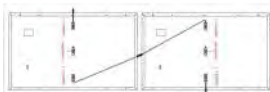

6 PARAMETERS

The parameters may be updated from time to time. For accurate parameters, please check our website at

www.siriuspv.com

Note: This Installation Guide is valid until a new update becomes available.

REMARK

Module Type	Landscape installation	Portrait installation
Type1 Type2		
Type3 Type4 Type5 Type6 Type7		

ATTACHMENT 1

INSTRUCTIONS FOR USE OF CONVERSION CABLES

Conversion cables are required to meet any of the following conditions:

1. When the DC side input terminal of the inverter or combiner box is original MC4.
2. When the manufacturer of inverter or combiner box requires series DC input bus terminal must be MC4.

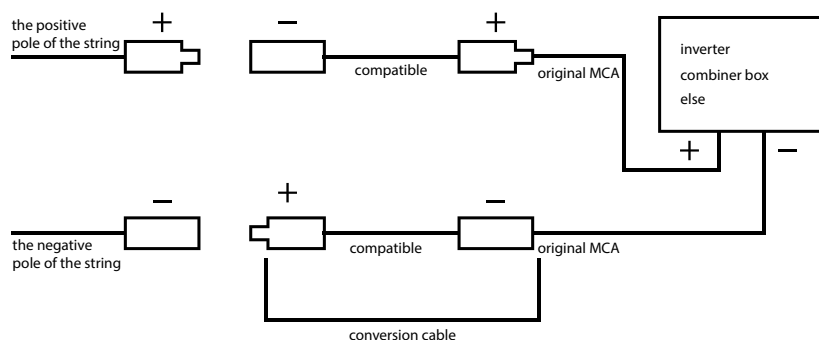
Inspection before use:

1. Confirm the original MC4 connector of the conversion cable and compatible MC4 connector.
2. Make sure that the connector on the conversion cable is not detached or loose, and the metal core is not skewed or water stained, etc.
3. Confirm that the cable insulation layer of the conversion cable is not damaged, and the cable is not severely bent or twisted.

Installation of conversion cable:

1. The conversion cable installation position: The positive pole of the string is the positive pole of the first component junction box cable in the string, and the negative pole is the negative pole of the last component junction box cable in the string.
2. Insert the positive pole of the string into the negative pole of the conversion cable (compatible), and connect the the other positive pole of the conversion cable (original MC4) to the DC positive input terminal of the inverter or combiner box.
3. Insert the negative pole of the string into the positive pole of the conversion cable (compatible), and connect the negative pole of the conversion cable (original MC4) to the DC negative input of the inverter or combiner box.

The schematic diagram is as follows:



Precautions:

1. Make sure that the polarity of the string after connection matches the polarity between the inverter or combiner box.
2. When using, install and connect strictly according to the schematic diagram, and do not reverse operation.
3. Each string on the DC side is limited to one pair of conversion cable wires and must not be misused, such as by connecting multiple extension wires repeatedly.