

PV Installation Manual

Polysolar

Polysolar PS-MC-ST Series Glass Laminate Modules

INSTALLATION MANUAL

According to: IEC 61215 IEC 61730

72 cells models

60 cells models

36 cells models

Please read this guide in its entirety before the installation. Failure of follow instructions in this guide may damage system components, endanger personnel, damage property, or invalidate the panel warranty.

The purpose of this document is to provide minimum requirements and recommendations for safe and successful installation of PV modules. This document also contains requirements necessary to retain Polysolar PV module compliance with IEC 61215 and IEC 61730 standards. Note that for BIPV installation bespoke mounting requirements mean this documents should be used for guidance only



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1 Safety

General

You must understand and follow all applicable local, and national regulations and standards for building construction, electrical design, fire, and safety, and must check with local authorities to determine applicable permit requirements before attempting to install or maintain PV modules.

Rooftop PV systems should only be installed on dwellings that have been formally analysed for structural integrity, and confirmed to be capable of handling the additional weighted load of PV system components, including PV modules, by a certified building specialist or engineer.

For your safety, do not attempt to work on a rooftop until safety precautions have been identified and taken, including without limitation fall protection measures, ladders or stairways, and personal protective equipment (PPE).

For your safety, do not install or handle PV modules under adverse conditions, including without limitation strong or gusty winds, and wet or frosted roof surfaces. The flat-plate PV module construction consists of a laminated assembly of solar cells encapsulated within an insulating material within two glass sheets.

Electrical

PV modules can produce current and voltage when exposed to light of any intensity. Electrical current increases with higher light intensity. DC voltage of 30 Volts or higher is potentially lethal. Contacting the live circuitry of a PV system operating under light can result in lethal electric shock.

De-energize PV modules by removing them entirely from light or by covering their front surface with an opaque material. Regard the safety regulations for live electrical equipment when working with modules that are exposed to any light. Use insulated tools and do not wear metallic jewellery while working with PV modules.

In order to avoid arcing and electrical shock, do not disconnect electrical connections under load. Faulty connections can also result in arcing and



electrical shock. Keep connectors dry and clean, and ensure that they are in proper working condition. Never insert metallic objects into the connectors, or modify them in any way in order to secure an electrical connection.

Do not touch or handle PV modules with broken glass unless the PV modules are first disconnected and you are wearing proper PPE. Avoid handling PV modules when they are wet unless cleaning the PV modules as directed in this manual. Never touch electrical connections that are wet without protecting yourself with insulated gloves.

Handling

Glass Glass laminate PV modules must be transported in the supplied packaging only and kept in the packaging until they are ready to be installed. Protect pallets against movement and exposure to damage during transportation. Secure pallets from falling over. Do not exceed the maximum height of pallets to be stacked, as indicated on the pallet packaging. Store pallets in a cool and dry location until the PV modules are ready to be unpackaged.

Polysolar BIPV glass modules are heavy, and should be handled with care. Never use the junction box or cables as a grip. Do not exert mechanical stress on the cables. Never step on PV modules or drop or place heavy objects on them. Be careful when placing PV modules on hard surfaces, and secure them from falling. Broken glass can result in personal injury. PV modules with broken glass cannot be repaired and must not be used. Broken or damaged PV modules must be handled carefully and disposed of properly.

In order to avoid arcing and electrical shock, do not disconnect electrical connections under load. Faulty connections can also result in arcing and electrical shock. Keep connectors dry and clean, and ensure that they are in proper working condition. Never insert metallic objects into the connectors, or modify them in any way in order to secure an electrical connection.

Do not touch or handle PV modules with broken glass unless the PV modules are first disconnected and you are wearing proper PPE



2 Specifications

	PS-MC-360	PS-MC-240	PS-MC-370
Dimensions	1770x1049x7.1 (+/- 2mm)	1770x1049x7.1 mm (+/- 2mm)	1820x1081x7.1 mm (+/- 2mm)
Transparency	10%	25%	0% Black
Weight	30 kg	30 kg	26 kg
Construction	Frameless glass/glass laminate 3 mm tempered solar glass front & back		Glass laminate 2mm x 2mm strengthen
Solar cells	60 cells Mono bifacial	40 cells Mono bifacial	60 cells mono bifacial
Output cables	2X 500 mm		
Electrical connectors	Split junction box IP68 – MC4		
Standard Mounting system	4 clamps (100mm) for 5400 Pa load – 2 rail system Fire class A		





3 Application

Restrictions

BIPV modules must be mounted on appropriate mounting structures positioned on suitable buildings, the ground, or other structures suitable for BIPV modules (e.g. carports, building facades or PV trackers). PV modules must not be installed in locations where they could be submerged in water.

Artificially concentrated light must not be directed on Polysolar PV modules.

Recommendations

Polysolar recommends that PV modules be mounted at a minimum tilt angle of 5-10 degrees to allow for proper self-cleaning from rain. No additional maintenance or cleaning should then be required

Mono crystalline silicon cells are linked in long series chains to maximise wattage output. Therefore they operate at the lowest individual cell yield. Partial or complete shading of a PV module or modules can therefore significantly reduce system performance. Polysolar recommends minimizing the amount of shade throughout the year to increase the amount of energy produced by the PV modules.

High system voltages could be induced in the event of an indirect lightning strike, which could cause damage to PV system components. The open area of wire loops should be minimized; in order to reduce the risk of lightning induced voltage surges. Lightning conductors should be deployed on large exposed structures



4 Electrical Installation

Configuration

Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at Standard Test Conditions (STC: 1000 W/m², AM 1.5, and 25° cell temperature). The short-circuit current (ISC) should be multiplied by a factor of 1.25 and the open-circuit voltage (VOC) should be multiplied by a factor of up to 1.25 based on the lowest ambient temperature recorded for the installation location when determining component voltage ratings, conductor current ratings, fuse sizes, and size of controls connected to the PV output.

Voltages are additive when PV modules are connected directly in series, and module currents are additive when PV modules are connected directly in parallel. PV modules with different electrical characteristics must not be connected directly in series. The use of suitable third-party electronic devices connected to PV modules may enable different electrical connections and must be installed according to the manufacturer's specified instructions.

The maximum number of PV modules that can be connected in a series string must be calculated in accordance with applicable regulations in such a way that the specified maximum system voltage of the PV module and all other electrical DC components will not be exceeded in open-circuit operation at the lowest temperature expected at the PV system location.

An appropriately rated overcurrent protection device must be used when the reverse current could exceed the value of the maximum fuse rating of the module. An overcurrent protection device is required for each series string if more than two series strings are connected in parallel.



Cable & wiring

Polysolar PV modules are provided with two standard, sunlight resistant output cables that are terminated with PV connectors ready for most installations. The positive (+) terminal has a male connector while the negative (-) terminal has a female connector. The module wiring is intended for series connections [i.e. male (+) to female (-) interconnections], but can also be used to connect suitable third-party electrical devices that may have alternative wiring configurations so long as the manufacturer's instructions are followed.

Use field wiring with suitable cross-sectional areas that are approved for use at the maximum short-circuit current of the PV module. Polysolar recommends installers use only sunlight resistant cables qualified for direct current (DC) wiring in PV systems. The minimum wire size should be 4 mm².

Cables should be fixed to the mounting structure in such a way that mechanical damage of the cable and/or the module is avoided. Do not apply stress to the cables. For fixing, use appropriate means, such as sunlight resistant cable ties and/or wire management clips.

While the cables are sunlight resistant and waterproof, where possible, avoid direct sunlight exposure and water immersion of the cables.

Connectors

Keep connectors dry and clean, and ensure that connector caps are hand tight before connecting the modules. Do not attempt making an electrical connection with wet, soiled, or otherwise faulty connectors. Avoid sunlight exposure and water immersion of the connectors. Avoid connectors resting on the ground or roof surface.

Faulty connections can result in arcs and electrical shock. Check that all electrical connections are securely fastened. Make sure that all locking connectors are fully engaged and locked.



Bypass diodes

The junction box used with Polysolar PV modules contains bypass diodes wired in parallel with the PV cell strings. In the case of partial shading, the diodes bypass the current generated by the non-shaded cells, thereby limiting module heating and performance losses.

Bypass diodes are not overcurrent protection devices. Bypass diodes divert current from the cell strings in the event of partial shading.

5 Mounting Instructions

With Polysolar BIPV modules there are a wide variety of mounting options using PV designed systems as well as those deployed in the glazing industry. Polysolar is happy to discuss bespoke mounting options and also offer their own profiles for façade and overhead glazing.

Mounting rails

With mounting rails or glazing bars please observe the safety regulations and installation instructions included with the mounting rail. If necessary, please contact the supplier directly for further information.

The modules must be safely set onto the mounting rail. The whole rail supporting the photovoltaic system must be strong enough to resist potential mechanical pressures caused either by wind or snow, in accordance with local, regional and state safety (and other associated) standards.

Make sure that the mounting rail will not deform or affect the modules when it expands as a result of thermal expansion.

The mounting rail must be made of durable, anti-corrosive and UV resistant materials.



Mounting with clamps

Modules have been tested its modules with Alumero laminated CLICK 6.8 clamps.

Use at minimum 4 clamps to fix modules on the mounting rails.

Modules clamps metal parts should not come into contact with the front or back glass.

When choosing this type of clamp-mounting method, use at least four clamps on each module; two clamps should be attached on each long side. Depending on local wind and snow loads, additional clamps may be required to ensure that modules can bear the load.

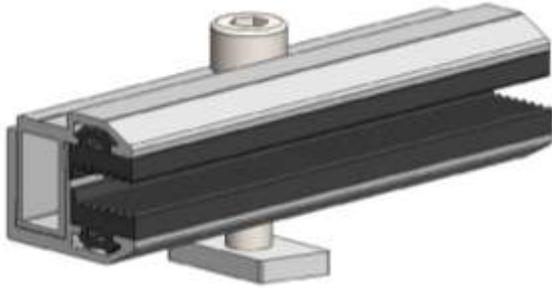
Applied torque should refer to mechanical design standard according to the bolt customer is using.

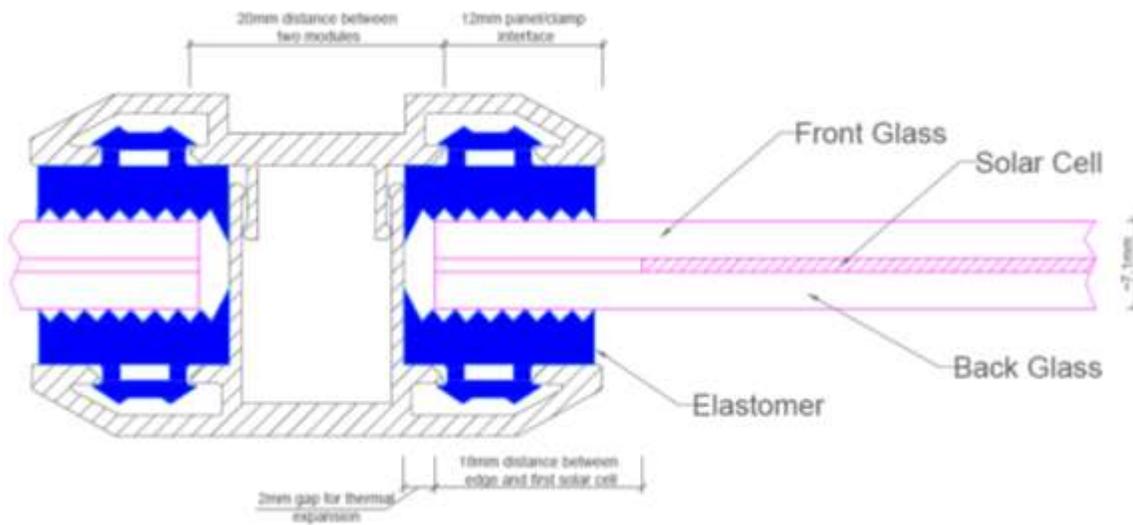
Clamp technical data

Table 1. Laminated, CLICK 6.8 type, clamp details

Product	Visualisation	Length options	Material / surface
Laminate middle clamp CLICK 6.8		1. 100mm 2. 200mm	EN AW 6063/T66; EPDM; mill finish / black

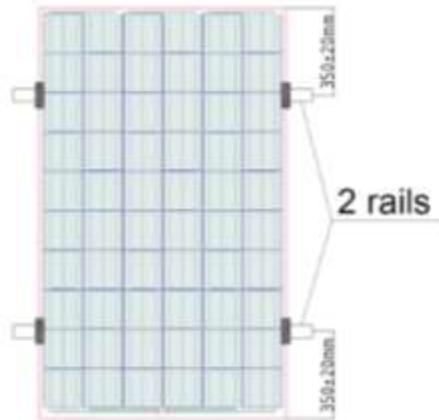


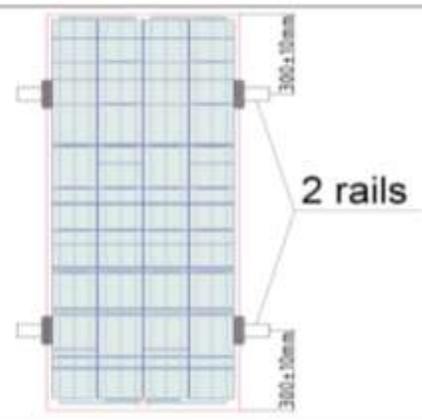
<p>Laminate end clamp CLICK 6.8</p>		<ol style="list-style-type: none">1. 100mm2. 200mm	<p>EN AW 6063/T66; EPDM; mill finish / black</p>
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Module mounting schemes



Mechanical loading	Clamp length	Quantity	
+2400Pa/-2400Pa 2 rails	100mm	4	
+5400Pa/-2400Pa 2 rails	200mm	4	

Mechanical loading	Clamp length	Quantity	
+2400Pa/-2400Pa 2 rails	100mm	4	
+5400Pa/-2400Pa 2 rails	200mm	4	

Maintenance

In order to ensure optimum module performance, Polysolar recommends:

If necessary, the glass front of the module can be cleaned with water and a soft sponge or cloth. A mild, non-abrasive detergent can be used to remove more stubborn stains.

Check the electrical and mechanical connections periodically and make sure they are clean, safe, complete and secure.

In the event of a problem, consult with a licensed/qualified person.



7 Warrantee & Liability Disclaimer

Polysolar's PS-MC-ST series modules are performance warranted for 30 years from date of shipment with an 87% power guarantee and a product warranty of 10 years. The products are certified by TUV and are MCS pending.

Since it is impossible for Polysolar to control installation, operation, application and maintenance of the photovoltaic system according to this instruction. Polysolar does not accept responsibility and expressly disclaims liability for any loss, damage or expense arising out of or in any way connected with such installation, operation, use or maintenance.

Polysolar will not take any responsibilities for any possible violation of patent rights and third party rights that are related to application of the solar energy system. No permission of patents is given through implication.

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