

■ **Clamp Installation**

The modules can be fixed on both the long and the short side of the module within the constraints shown in drawing 2, using a minimum of four clamps. The modules are rated for a downward force of up to 3600 Pa (550 kg/m²) or 1600 Pa (244 kg/m²) with a safety factory of 1.5 according to where they are clamped. Site-specific loads such as wind or snow which may exert forces in a different way need to be taken into consideration to ensure this limit is not exceeded for each respective mounting option.

A. For standard module with back sheet

1. Clamp picture as below:



Figure 1 Double-side clamp



Figure 2 Single-side clamp

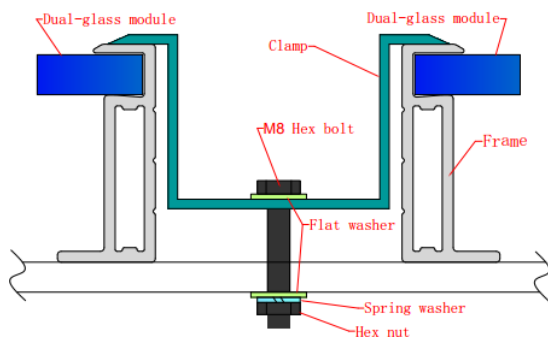


Figure 3 Double-side clamp installation

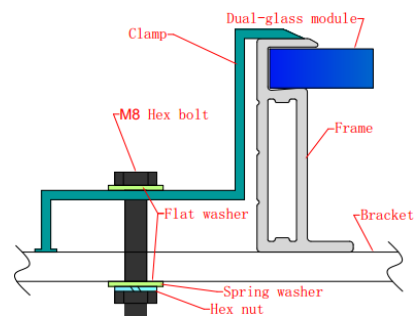
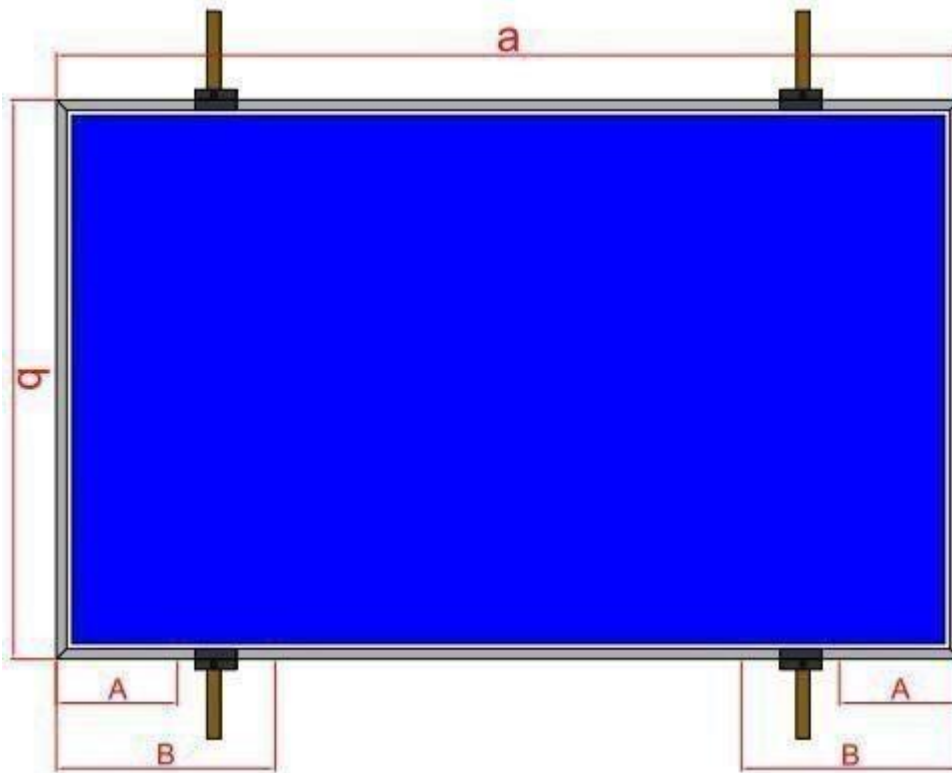


Figure 4 Single-side clamp installation

Drawing 2

2. Install module with clamps at long sides of frames



Drawing 3

The selection and installation of the clamps shall obey the requirement according to table 3(mounting area is between A and B). Otherwise the module may not satisfy the mechanical load and have the risk of broken.

This Installation method is applicable to the series of PV modules as listed below:

Type-1	STAR-370W-m60HB
Type-2	STAR-440W-M60H-M10

Table 2

Module type	a (mm)	b (mm)	Clamp length	A (mm)	B (mm)	Loads(Pa)
Type 1	1755	1048	250 mm	180	580	3600
				0	580	1600
Type 2	1910	1134	≥50 mm	180	480	3600
				0	480	1600

**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 modules. **BE AWARE** of dangerous high DC voltage when connecting module. **DO NOT** damage or scratch the rear surface of the module. **DO NOT** handle or install module when they are wet.

Electrical Installation

General installation

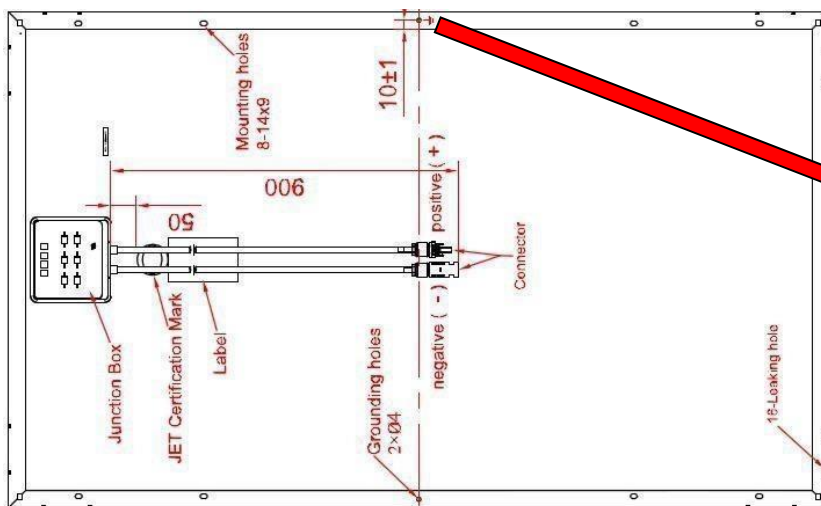
- Any hardware used must be compatible with the mounting structure material to avoid galvanic corrosion
- It is not recommended to use modules with different configurations (grounding, wiring) in the same system.
- The module maximum system voltage is 1500 volts DC. For applications requiring a high 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.
- 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.
- Our modules are supplied with connectors to be used for system electrical connections.
- The maximum number of series connected modules can be calculated through this formula: $1500 / (1.25 * V_{oc})$.
- The recommended maximum parallel module configuration is 16 parallels. And the number of modules have something to do with system design parameters such as current or power output.
- 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 4mm^2 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 85°C , and that of the connector is 105°C . And all the cables diameter that been used for wiring must reach at least 4mm^2 .
- 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.

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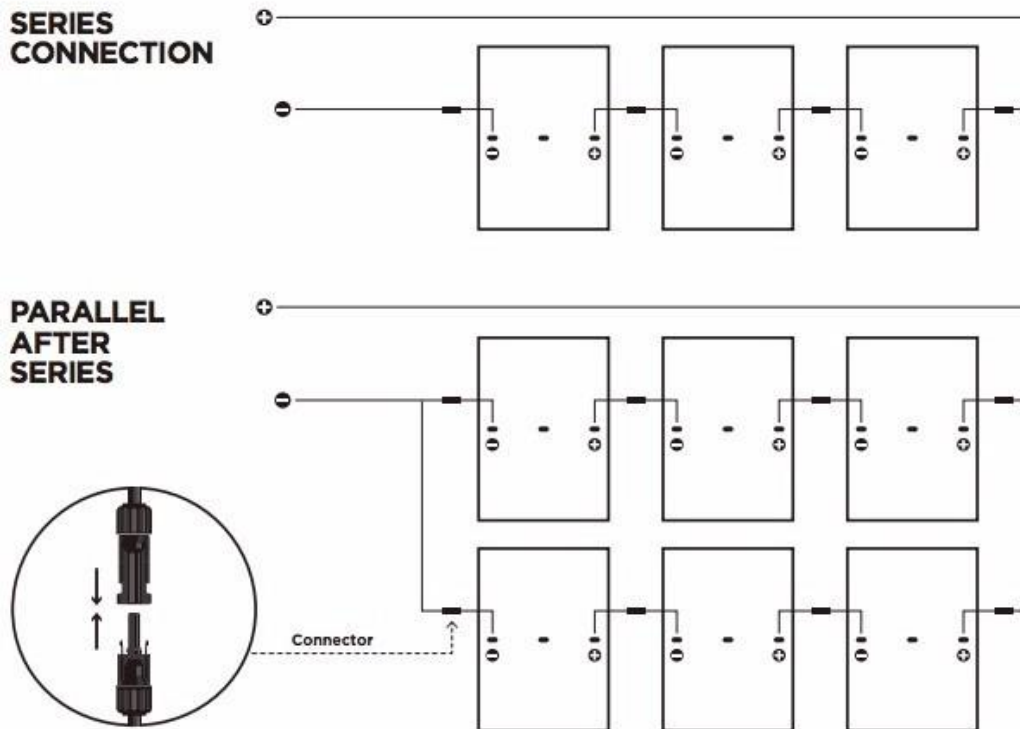
Grounding

- Where common grounding hardware (nuts, bolts, star washers, split-ring lock washers, flat washers and the like) is used to attach a listed grounding/bonding device, the attachment must be made in conformance with 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.
- If grounding is required, the grounding wire must be properly fastened to the module frame to assure adequate electrical connection.



For double glass module

Series and Parallel Connections



- * Electrical performance parameter of module, such as nominal value of I_{sc} , V_{oc} and P_{mas} has $\pm 3\%$ random error compared with value of STC. The standard testing environment of module is: Irradiance 1000/m², Cell temperature 25° C, Spectrum AM 1.5.
- * Normally, the current and voltage of module, will be a little higher compared with the value under STC, so when confirmed the associated parameters of solar system accessories, such as rated voltage, cable capacity, fuse capacity and module power, the corresponding short circuit current and open circuit voltage should be amplified by 1.25 times.
- * The maximum number of modules per series string must be calculated according to the requirements. The value of the V_{oc} in the local expected minimum temperature cannot exceed the maximum system voltage value specified of the module (According to IEC61730 safety test, the maximum system voltage of Star Solar Inc. Module is DC1000V) and other DC electrical components require values.
- * The V_{oc} correction factor can be calculated according to the following formula: $C_{Voc} = 1 - \beta V_{oc} \times (25 - T)$, T is the minimum ambient temperature expected for the installation of the system, β (% / °C) is The temperature coefficient of the selected module V_{oc} (according to the corresponding module data sheet).
- * If the reverse current which probably exceed the maximum fuses current of module passed through the module, the modules must be protected by an equivalent current protection device. If the number of parallel is more than or equal to 2 strings, there must be equipped an overcurrent protection device on each series of modules.

Maintenance

- To ensure optimum module performance, Star Solar Inc. recommends the following maintenance measures:
- Clean the glass surface of the module when required. Always use clean water and a soft sponge or cloth for cleaning. A mild, non-abrasive cleaning agent may be used to remove stubborn dirt.
- Check the electrical, grounding and mechanical connections every six months to verify that they are clean, secure, undamaged and free of corrosion.
- If any problem arises, 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.

Dimension & Parameters: -

Type Name or Model No.	STAR-370W-m60HB	STAR-440W-M60H-M10
Maximum System Voltage	1500	1500
Rated Maximum Power (W)	370	440
Rated Short Circuit (A)	11.36	13.54
Rated Open Circuit Voltage (V)	42.2	41.2
Tolerance of Rating Pmax/Isc.Voc (%)	3/3/3	3/3/3
Over-Current Protection Ration (A)	20	25
Protection Class	Class II	Class II
Fire Rating	Class C	Class C
Fire Performance	Type 4	Type 4
Dimensions (lxwxh) (mm)	1755x1048x35	1910x1134x35
Module Area (m ²)	1.84	2.17
Min - Creepage Distance (mm)	13.8	14.88
Number of Solar Cells	120	120
Cells per Bypass Diode	40	40
Serial/Parallel Connction of Cells	SP	SP
Design Load Down/Up (Pa)	3600/1600	3600/1600
Safety Factor	1.5	1.5