

Installation instructions for framed glass-glass PV modules

v. 202012

Table of contents

1	<u>GENERAL INFORMATION</u>	2
1.1	INTRODUCTION	2
1.2	PRODUCTS	2
1.3	SAFETY INSTRUCTIONS	2
2	<u>INSTALLATION INSTRUCTIONS</u>	3
2.1	SAFETY MEASURES	3
2.2	PLACE OF INSTALLATION	3
2.2.1	ENVIRONMENT CONDITIONS	3
2.2.2	ON SITE MEASURES	3
2.2.3	TILT OF THE MODULES	4
2.3	INSTALLATION METHODS	4
2.3.1	INSTALLATION WITH MODULE CLAMPS	4
2.3.2	USING THE MOUNTING HOLES EXISTING IN THE FRAME	5
3	<u>CONNECTION</u>	7
4	<u>MAINTENANCE</u>	7
4.1	VISUAL INSPECTION	8
4.2	CLEANING	8
4.3	INSPECTION OF CONNECTORS AND CABLES	8
5	<u>ELECTRICAL PARAMETERS</u>	8
6	<u>DISCLAIMER OF LIABILITY</u>	8

1 GENERAL INFORMATION

1.1 Introduction

Thank you for choosing our glass-glass framed SUNCELL PV modules manufactured under license by Changzhou Almaden Co. To install the PV modules correctly and achieve stable power output, please read the installation manual carefully before installing the modules.

1.2 Products

These instructions apply to the following product series with frame:

SCL-Bxx-60, SCL-Bxx-72, SCL-HBxx-120, et SCL-HBxx-144

1.3 Safety instructions

- 1) Direct current may be generated whenever the PV modules are exposed to sunlight or other light sources. Be careful not to touch the electrically active parts.
- 2) Do NOT use mirrors or lenses to focus sunlight on the double glass modules.
- 3) The front and back glass protect the solar cells. The module with broken glass (risk of electric shock and fire) should be replaced immediately.
- 4) In ordinary outdoor environment, the current and voltage generated by the PV modules with double glass structure are different from those indicated on the label. The electrical parameters indicated on the label are tested under standard test conditions. Parameters such as voltage rating/current rating/connector capacity/fuse capacity/control capacity, etc., related to module output are confirmed by referring to the data printed on the module label. The system design parameters should be based on values corresponding to 125% of the STC power.
- 5) To reduce the risk of electric shock and fire, please use opaque materials to cover the module surface when installing double glass modules after sunrise and before sunset. Only authorized and trained personnel should have access to the installation and maintenance of the modules.
- 6) The configuration of the double glass photovoltaic system must follow the battery manufacturer's specifications when using a storage battery in the photovoltaic system.
- 7) DO NOT use double glass modules to replace some or all of the roof and wall materials.
- 8) DO NOT touch the electrical parts of the double glass module. Please use insulation tools to connect all electrical connections.
- 9) DO NOT disassemble any parts of the Suncell Dual Glass Module without permission.
- 10) Please read the installation manual before installing and maintaining the modules.
- 11) DO NOT lift the module by pulling on the cables.
- 12) Please make sure the double-glass module systems are grounded, if there is no special regulation, please follow the International Electrotechnical Commission or other international standards, or special local standards.
- 13) Please open the carton carefully when you receive the modules. Do not cut the straps until you are sure that the modules cannot fall over.
- 14) DO NOT stand or walk on the modules, as this could damage them and be dangerous to people.
- 15) Only modules of the same size and type can be connected in series.
- 16) Make sure that the modules are transported carefully to their destination without being shaken strongly. Strong shaking can damage the modules,
- 17) DO NOT use corrosive chemical solutions to wipe down the double glass modules.
- 18) DO NOT disconnect the module connectors during operation of the system.

2 INSTALLATION INSTRUCTIONS

2.1 Safety measures

- 1) Wear protective gloves and insulated shoes during installation.
- 2) Use professional tools when installing the modules.
- 3) Do not unpack the boxes until the modules are installed.
- 4) Try to avoid touching the double glass module if not necessary to avoid the risk of burns or electric shock.
- 5) Do NOT install the solar modules in rain, snow or stormy weather.
- 6) If the connectors are wet, do not install anything.
- 7) Install the modules with insulated, dry tools.
- 8) Be careful not to drop objects (such as tools or other modules) on the modules during installation.
- 9) Make sure there are no flammable gases near or adjacent to the installation site.
- 10) Please connect the positive connector to the negative connector of the next module and vice versa, check the condition of all connections and make sure that all connections are correct and safe.
- 11) DO NOT touch the junction box or connectors without insulation protection during installation.
- 12) DO NOT place heavy objects on the double glass module or cause shocks to the modules, which could cause micro-cracks in the cells.
- 13) DO NOT use hard or sharp tools to clean the module, which may cause scratches on the modules.

2.2 Place of installation

2.2.1 Environment conditions

The SUNCELL PV module with a double glass structure must be installed under the conditions indicated below:

- 1) Operating temperature : -40°C to +85°C
- 2) Storage temperature: -20°C to +40°C
- 3) Humidity: < 85%RH
- 4) Mechanical load capacity: the maximum capacity values in pressure (snow) and suction (wind) are indicated in Pa in section 2.4.

PLEASE NOTE :

- The mechanical load capacity depends on the installation methods used. Failure to follow the installation instructions in this manual may result in different snow and wind load capacities. Make sure that the mechanical load capacities are calculated by a professional installer, based on the design condition of the system.
- The side of the junction box is the back side, the other side is the front side.

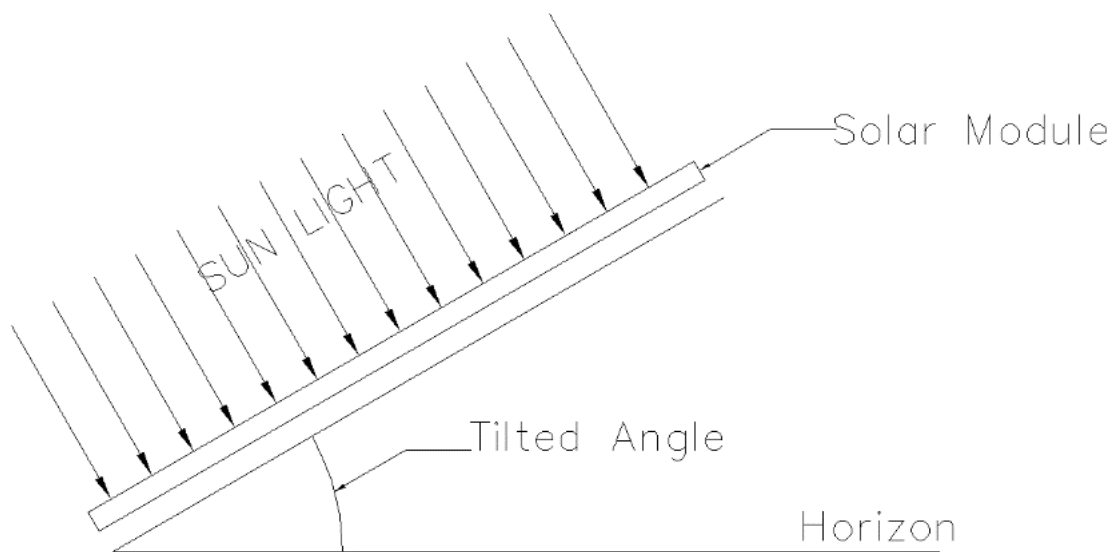
2.2.2 On site measures

- 1) All modules should be installed in a location where they can receive maximum sunlight throughout the year.
- 2) When choosing a location to install the modules, please ensure that there is no shade on the modules from trees, buildings or nearby obstructions at any time.
- 3) DO NOT install the modules in corrosive conditions, or in a location at high risk of damage from natural elements.
- 4) DO NOT install the modules in a location that is likely to be immersed in water or exposed to continuous water sources.
- 5) DO NOT install the modules near an open fire or fuel.

- 6) The distance between the modules and the wall or roof should not be less than 120 mm to avoid damage to the cables and to ensure air circulation behind the modules.

2.2.3 Tilt of the modules

- 1) All modules connected in the same array must be installed with the same orientation and angle. A different orientation or angle may result in a loss of power for the entire array, as the intensity of solar radiation is different depending on the orientation or angle.
- 2) Suncell's double glass modules produce optimum power when they are oriented directly towards the sun. If installed with a fixed structure, the angle of the modules should be adjusted to the angle used in winter to achieve the maximum annual output. In most cases, the theoretical optimal angle of the PV modules is equal to the latitude of the location.

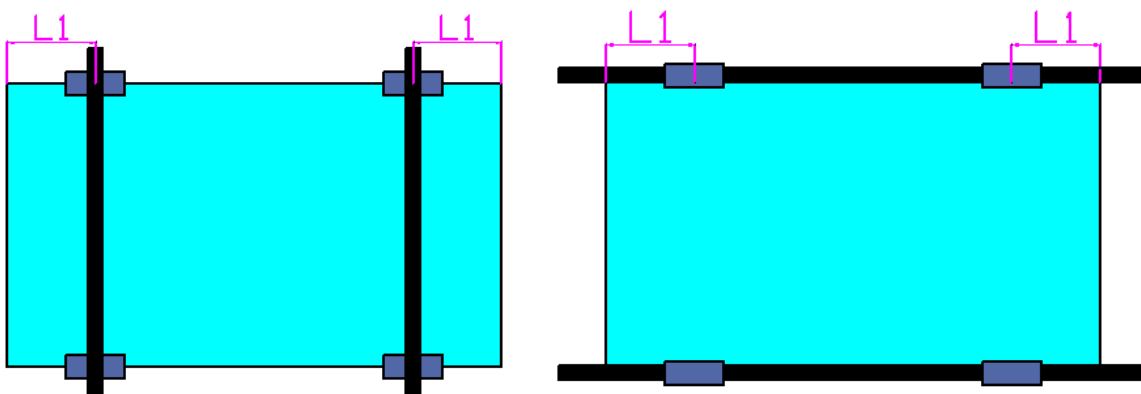


2.3 Installation methods

There are two options for installing framed PV modules: with mounting clamps or using the mounting holes existing in the frame.

2.3.1 Installation with module clamps

Attach 4 aluminum alloy clamps, 2 on each long side of the module frame. They can be installed as shown below (in line with the rail or perpendicular to it).



Please refer to 2.4. for L1 values.

Use the end clamp to install the modules on the edge of the PV arrays (as shown in Fig. 1). The middle clamps are used for modules located in the middle of a PV array (Fig. 2).

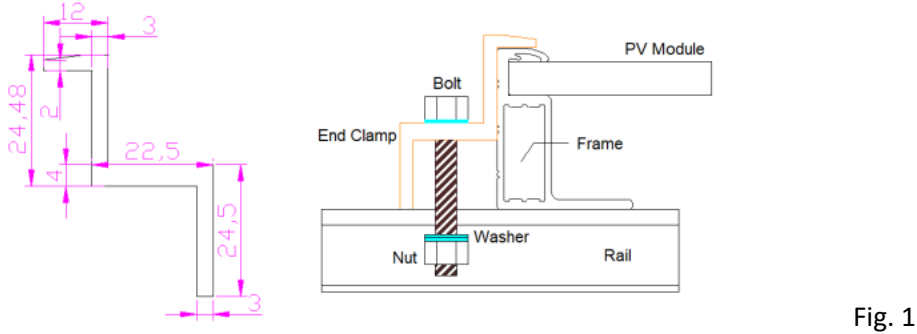


Fig. 1

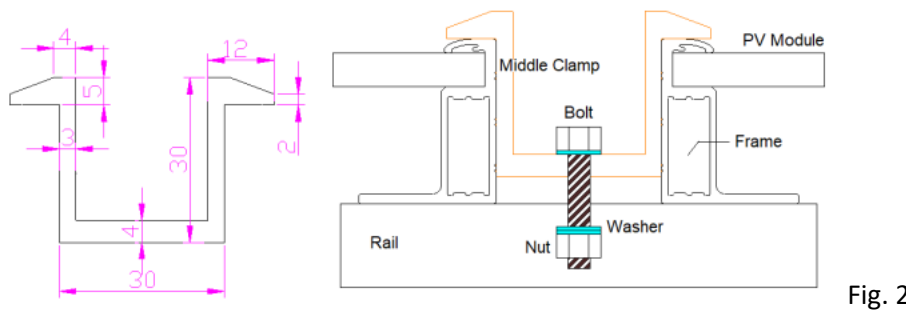
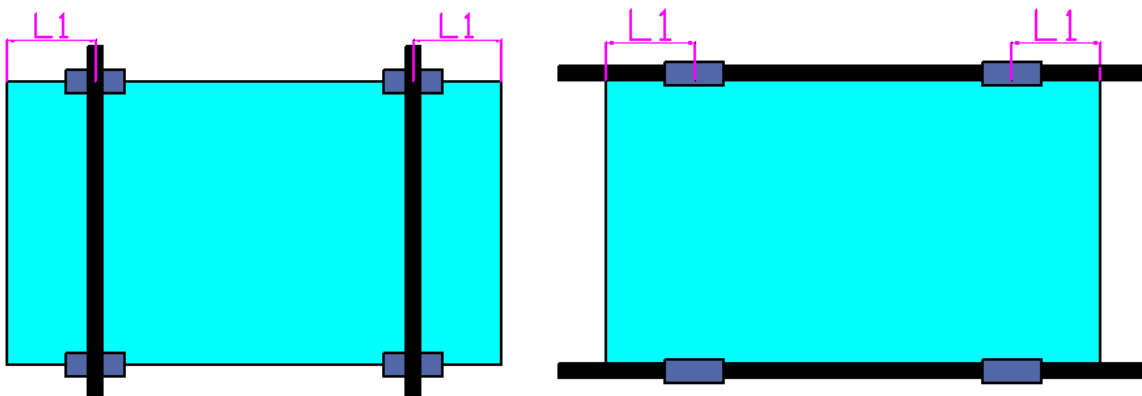


Fig. 2

To ensure durability of the installation, it is strongly recommended to use corrosion resistant components (aluminum or stainless steel). Install the modules with proper bolts and nuts, flat washers and spring washers where provided, torquing them to 15-18 N.m. All stainless-steel flat washers in contact with the module frames should be 1.8 mm (minimum) thick, with an outside diameter of 20-24 mm (0.79"-0.94"). The edge of the clamps that hold the module frame must be greater than 8 mm (≥ 8 mm) wide. The bolt for installing the clamps is M6.

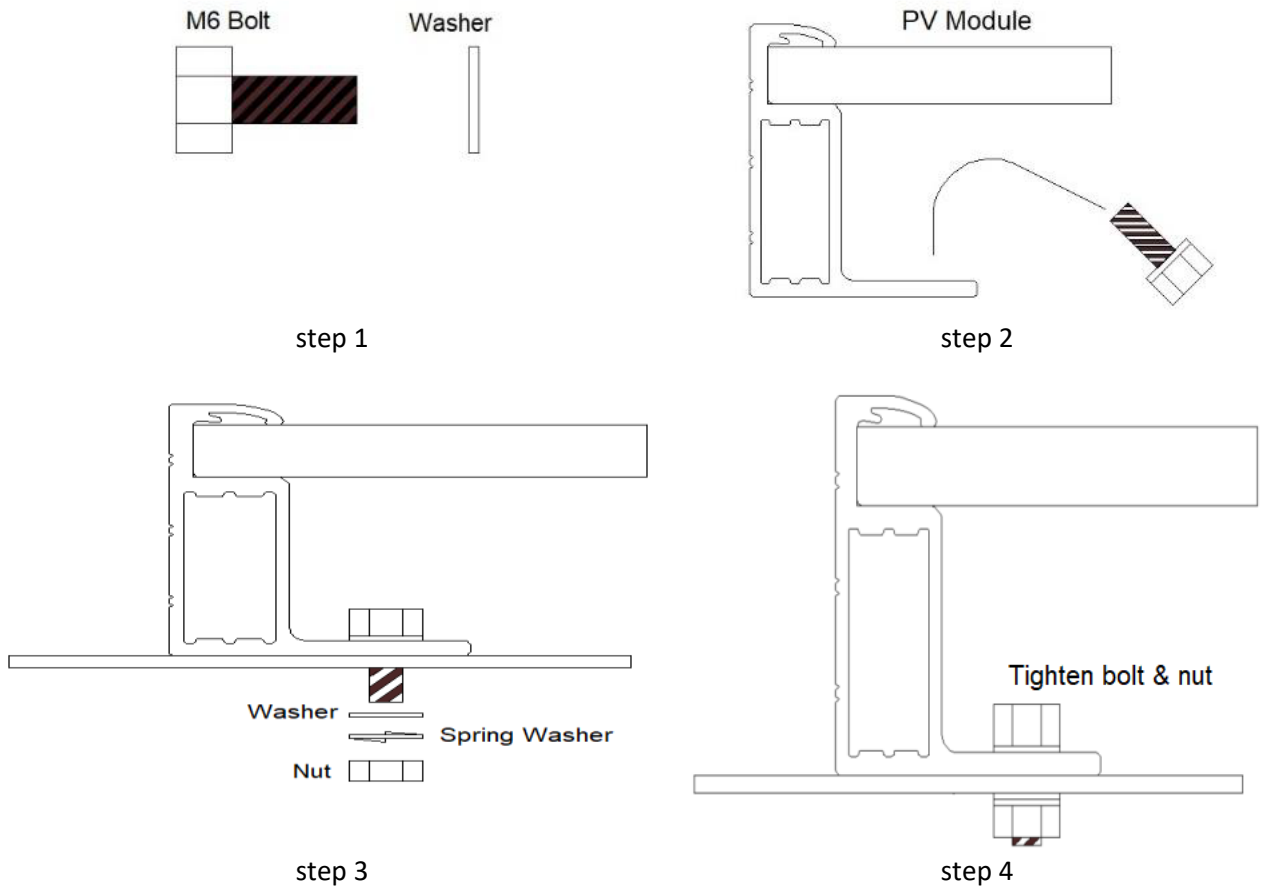
2.3.2 Using the mounting holes existing in the frame

The module frame has 4 fixing holes (6.5 mm diameter). With these fixing holes, the modules can be fixed to the supporting structure to optimize the load capacity (applicable to module frame with channel). It can be installed as shown below (in the direction of the rail or perpendicular to it).



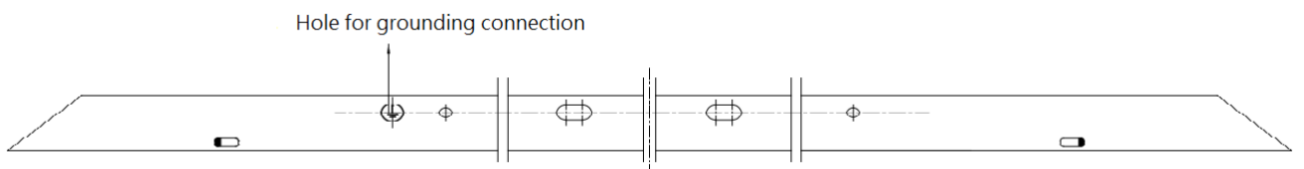
Please refer to 2.4. for L1 values.

To ensure durability of the installation, it is strongly recommended to use corrosion resistant components (stainless steel). Install the modules using appropriate M6 bolts and nuts, flat washers and spring washers where provided, torqued to 15-18 N.m. All stainless-steel flat washers in contact with the module frames must have a minimum thickness of 1.8 mm and an outside diameter of 20-24 mm (0.79"-0.94"):



PLEASE NOTE :

** For the module frame with channel, the holes for the grounding connection are fixed on the long sides of the module.



** For the module frame without channel, the holes for the ground connection are fixed on the short sides of the module.



2.4 Permitted loads

	Module type	Glass structure (mm)	L1 (mm)	Torque N.m.	Max. load (Pa)
Installation with module clamps see 2.3.1.	SCL-Bx-60 SCL-HBx-120	2.0 + 2.0	280-380	15-18	pressure 5400 suction 2400
		1.6 + 1.6			pressure 3600 suction 2400
	SCL-Bx-72 SCL-HBx-144	2.0 + 2.0	410-450	15-18	pressure 5400 suction 2400
		1.6 + 1.6			pressure 3600 suction 2400
Installation using fixing holes see 2.3.2	SCL-Bx-60 SCL-HBx-120	2.0 + 2.0	280-380	15-18	pressure 5400 suction 2400
		1.6 + 1.6			pressure 3600 suction 2400
	SCL-Bx-72 SCL-HBx-144	2.0 + 2.0	410-450	15-18	pressure 5400 suction 2400
		1.6 + 1.6			pressure 3600 suction 2400

3 CONNECTION

- 1) Read this manual carefully before starting the installation. Depending on the capacity, current and voltage requirements of the system, the installer can connect the modules in series or in parallel using suitable DC solar cable.
- 2) All modules connected in series must have the same current rating; the total voltage of a string must never exceed the system voltage limit. The number of modules for each string and the type of inverter used must be sized by a professional installer, in strict compliance with the technical values announced by the manufacturers and based on the applicable standards.
- 3) The maximum value of the nominal fuse current can be found on the labels and specifications of the module. The fuse current rating is the highest reverse current that the module can withstand. Please choose the fuse correctly according to the local standards and the fuse current rating.
- 4) Please choose the cable according to the capacity, current and voltage of the system, and the applicable standards.
- 5) Please follow the applicable local electrical standards to make the connections.
- 6) There are 3 bypass diodes in one module. Make sure that the installation is correct, otherwise the bypass diodes, the cable and the junction box may be damaged.

4 MAINTENANCE

Modules should be checked and serviced regularly, especially during the warranty period. In order to obtain the best performance, please follow the guidelines below:

4.1 Visual inspection

Please check carefully whether there are any defects in appearance, in particular for the following aspects:

- 1) The corner protector is used to protect the modules from damage during transport.
- 2) Check the module glass for damage.
- 3) Make sure there are no sharp objects in contact with the module surface.
- 4) Check that the modules are not shaded by obstacles or dirt.
- 5) Check that there is no visible damage (oxidation, corrosion) around the cell busbars.
- 6) Regularly check that all screws between the modules and the structures are in good condition and properly tightened. Re-tighten or replace the screws in time.

4.2 Cleaning

- 1) Sand and dust cause a reduction in the power of the module. It is therefore particularly important to clean the modules regularly (the frequency of cleaning should be determined according to the geographical location). To clean the modules, please use a soft cloth with a mild detergent and demineralized water. Do NOT use non-demineralized water to clean the modules, as this may leave stains on the surface of the modules.
- 2) Do NOT use an abrasive cloth to clean the modules.
- 3) It is imperative to clean the modules only in the early morning or late afternoon when the irradiation is very low, to avoid thermal shock to the modules.
- 4) DO NOT clean modules with broken glass or exposed wires. These modules are dangerous to people because they can cause an electrical shock hazard.

4.3 Inspection of connectors and cables

- 1) Inspect the silicone sealant on the junction box and ensure that there are no cracks or gaps between the module and the junction box.
- 2) Monitor the aging condition of the modules, including possible damage from animals or natural elements. Check that there is no play between the connectors and that they are tight, and that there are no corrosion spots in the modules.
- 3) Check that the modules are properly grounded.

5 ELECTRICAL PARAMETERS

The electrical performance parameters of the PV module with double glass structure are tested under standard test conditions, namely: solar irradiation: 1000 W/m², AM:1.5 and ambient temperature: 25°C. In some cases, the PV module may produce a voltage or current value higher or lower than the rated value. In determining the rated voltage, rated current, fuse size and specification of safety elements connected to the PV module system, the short circuit current and open circuit voltage values shown on the label of the double glass structure module should be multiplied by a factor of 1.25.

The corresponding electrical parameters can be downloaded from the website: <http://suncell.ch>

6 DISCLAIMER OF LIABILITY

- 1) The purpose of this document is to provide clear instructions on how to install Suncell PV modules.

- 2) The installation, operation and use of Suncell's Dual Glass Series Modules are beyond the control of Suncell, therefore, Suncell assumes no responsibility for loss, damage, injury or expense resulting from improper installation, operation, use or maintenance.
- 3) Suncell assumes no liability for any infringement of patents or other third party rights that may result from the use of the PV Module. No license is granted by implication or under any patent or patent right.
- 4) Specifications included in this manual are subject to change without notice.