Double Glass PV Module Installation Introduction

SUITABLE FOR BIFICIAL DOUBLE GLASS PV MODULE

CHANGZHOU ALMADEN CO., LTD.

NO.639, QINGLONG EAST ROAD, CHANGZHOU, CHINA

TEL: +86-519-8888 0015 FAX: +86-519-8888 0017

Contents

1. GENERAL INFORMATION

1.1. OVERVIEW

Thanks for choosing our double glass photovoltaic (PV) modules from Changzhou Almaden Co., Ltd (hereinafter referred to as "Almaden"). In order to install the PV module correctly and obtain stable power output, please read the installation manual carefully before installing modules.

1.2. PRODUCTS

This manual is suitable for following product series:

SEAB60 series、SEAB72 series

1.3. SECURITY WARNING

1) DC current may generate when PV Modules are exposed to sunlight or other light source. At that time, please do not contact with electrical active parts.
2) Do NOT use mirrors or any lens to focus sunlight on the double glass modules
3) Front and back glass could protect solar cells. The module which the glass is broken must be replaced immediately.
4) In ordinary outdoor environment, current and voltage generated from double glass pv modules are different from that listed in label. Because the electrical parameters in label are tested in Standard Test Condition. The parameters such as rated voltage/ rated current/ wire capacity/ fuse capacity/ control capacity and so on, relating to output power of modules are confirmed by referencing the data which is printed in the label of the modules. The system designing parameters should be based on 125% STC power values.
5) In order to decrease risk of electric shock and fire, please use nontransparent materials to cover the surface of modules when installing double glass modules. Only authorized and trained personnel have access to install and maintain modules.
6) Double Glass PV System configuration should follow suggestions from battery manufacture when using storage battery in photovoltaic system.
7) DO NOT replace parts of or all of the rooftop and wall materials by double glass modules.
8) DO NOT touch any electric parts of double glass module. Please use insulation tools to connect all electrical connections.
9) DO NOT pull down any parts of double glass module provided by Almaden without permission.
10) Please read installation manual before installing and maintaining modules.

11) DO NOT lift module up by using the cable of Junction BOX.
12) Please make sure all the double glass systems are connected to the ground, if there are no special regulations; please follow the international Electro technical Commission standards or other international standards, or local special standards.
13) Please open the carton carefully after modules are shipped to the destination.
14) DO NOT stand or walk on the top of modules, which will damage modules, and is dangerous for people.
15) Only same size and type of modules can be connected in series.
16) Please make sure modules can be smoothly transported to destination without severe shake. Because severe shake may cause damage to modules,
17) DO NOT use corrosive chemical solution to wipe double glass modules.
18) DO NOT cut off the module connections when load working works.

2. INSTALLATION INSTRUCTIONS

2.1. SAFETY GUIDES

1) Wear protective insulation gloves and insulation shoes during installation.
2) Use professional tools when installing modules
3) Unpack cartons until installing modules.
4) Try to avoid touching double glass module without necessary.
5) DO NOT install solar modules in rainy, snowy or blustery days.
6) If terminals are wet, please do not install anything.
7) To install modules with insulated and dry tools.
8) DO not throw any objects (such as double glass modules or tools) casually during installation.
9) Make sure that no inflammable gas can be close to nearby the installation site.
10) Please connect positive connector with other module's negative connectors, check status of all connections and make sure all connections are correct and safe.
11) DO NOT touch junction box or connectors without insulation protection during installation.
12) DO NOT put heavy things on the double glass module or strike modules with any objects, which may cause micro-cracks in cells.
13) DO NOT use sharp tool to wipe module, which may cause scratch on the modules.

2.2. INSTALLATION ENVIRONMRNT

2.2.1 ENVIRONMENT CONDITIONS

ALMADEN double glass PV module should be installed under the conditions shown as follows:

- Operating temperature: -40 ℃ to +85 ℃
- Storage temperature: -20 ℃ to +40 ℃
- Humidity: < 85%RH
- Mechanical Load Capacity: Max capacity from the front side (snow) ≤5400Pa (550 Kg/m²)

  Max capacity from the back side (wind) ≤2400Pa

- The capacity of mechanical load is dependent upon used installation methods. If do not follow the instructions of this manual to install, it may result in different capabilities to withstand snow and wind loads. Make sure capacities of mechanical load are calculated, based on the status of system design, by professional system installer.
- The side of junction box is the rear side, the other side is the front side.

2.2.2 INSTALLATION SITE

1) All modules should be installed in a location where they can receive maximum sunlight all the year round.
2) When choosing a location to install modules, please make sure there is no shadow, which cover modules, from trees, buildings or obstructions at any time.
3) DO NOT install modules under corrosive conditions, such as somewhere easily damaged by severe natural disasters.
4) DO NOT install modules to immerse modules in water or expose to springs.
5) DO NOT install module near open fire or combustible.
6) The distance between edge of modules and wall or rooftop should not less than 120mm in case of damaging wires, and keep the airs behind modules flowing.

2.2.3 TILTED ANGLE OF INSTALLATION

1) The modules connected in series should be installed at same orientation and angle. Different orientation or angle may cause power loss, because sunlight irradiance is different at different orientation or angle.

2) Double glass modules from Almaden could produce optimum power when they are installed directly towards the sun. If they were installed with a fixed structure, we should adjust angle of modules to angle used in winter in order to get the maximum power output for each year. In most cases, PV modules optimum angle are equal to the location's latitude. Please check the Fig 1.

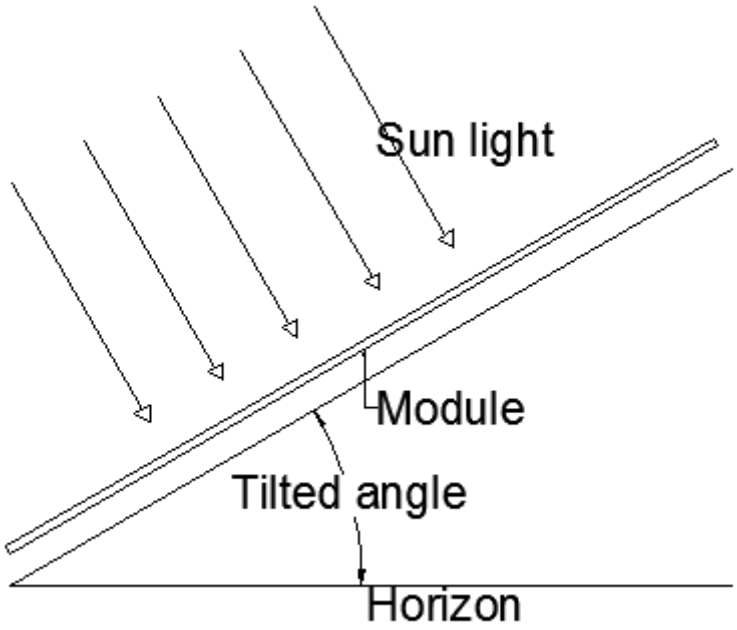


Fig1.Optimum angle

2.3. INSTALLATION METHOD INTRODUCTION

This manual is suitable for bifacial PV module from Almaden, Please reference Fig. 2 for more details

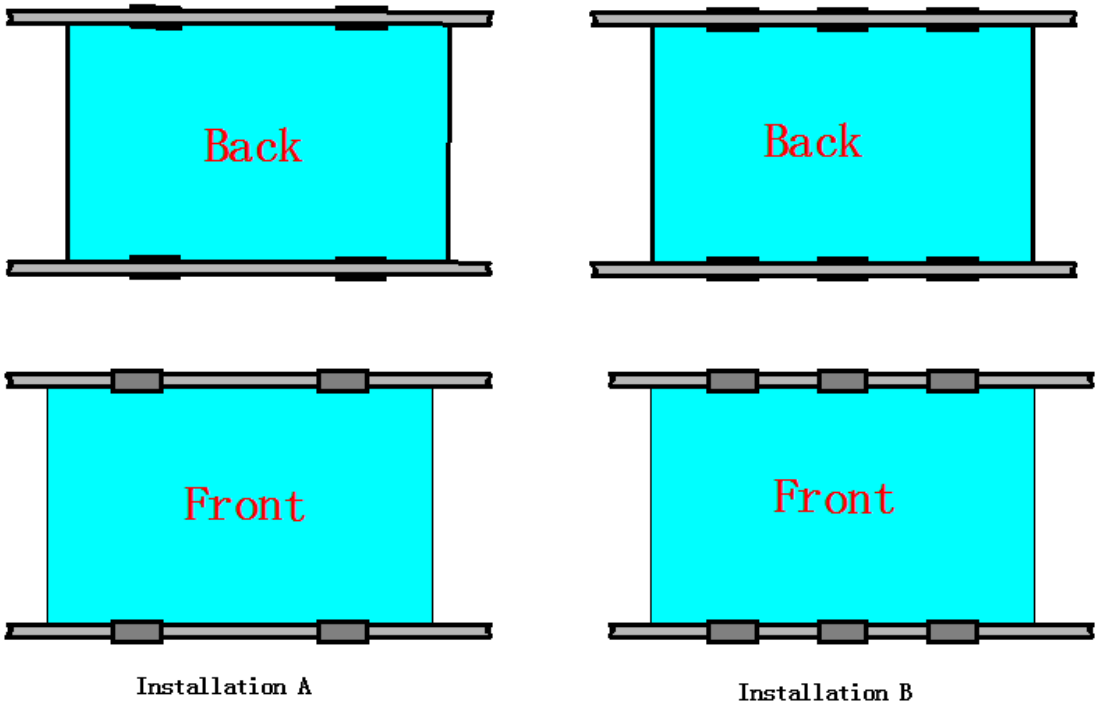


Fig. 2：Top view sketch diagrams of PV module installation

Option A：Horizontal installation with two purlines and four aluminium alloy clamps.

Option B：Horizontal installation with two purlines and six aluminium alloy clamps.

Notes: all clamps are installed on the long side of PV module and no purline exist on the backside of module.

2.3.1 MAIN PARTS AND FUNCTIONALITY

During PV module installation, please reference following introduction about some key parts

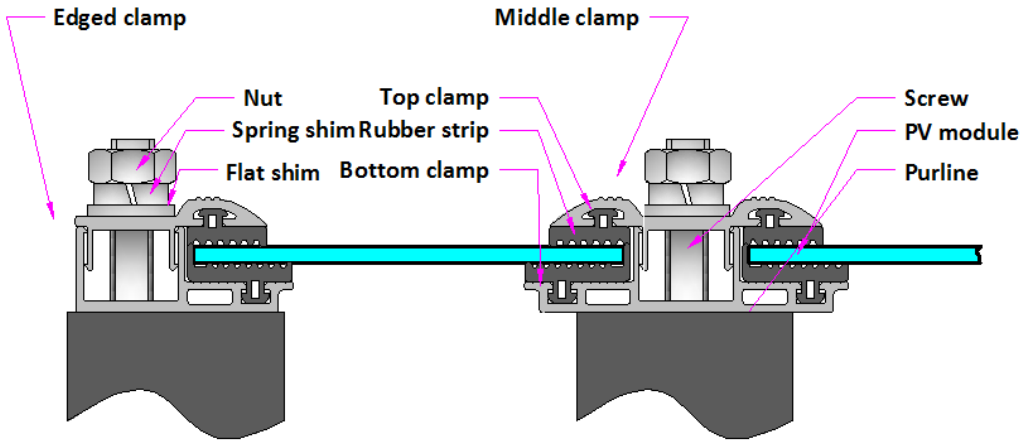


Fig. 3：Cross view sketch diagrams of PV module installation

Table 1：Parts and requirement introduction

No.	Name	Function	Requirement
1	Middle clamp	Clip; For all sides excluding the edged side of edged module	Please use specified clamp
2	Edged clamp	Clip; For the edged side of edged module	Please use specified clamp
3	Rubber strip	Cushion protection	EPDM
4	Spring shim /Flat shim	Fasten parts	Resistance to corrosion
5	Nut/Screw	Fasten parts	Resistance to corrosion
6	Purline	Holder	Same with holder

2.3.2 INSTALLATION METHOD

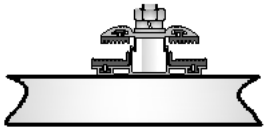
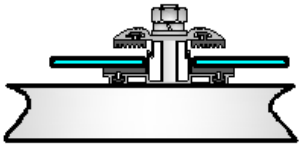
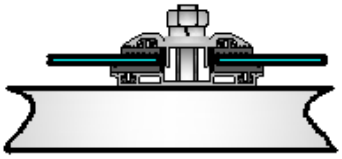
To avoid destroying PV module during installation, Please follow installation steps on Table2.

Firstly, install clamp on purline.

Secondly, install PV module and adjust position of PV module

Lastly, Fasten clamps by torque wrench

Table 2：Installation steps

Step		Notes
1	**Install clamp** Use type M8 screws, and choose length of screws based on situation, and notice the	
2	**Install PV module** Adjust installation distance L1 and L2,please reference Table 3 for more detail	
3	**Fasten clamps** Use torque wrench，torque between（15~18）N*M	

2.3.3 INSTALLATION PARAMETER

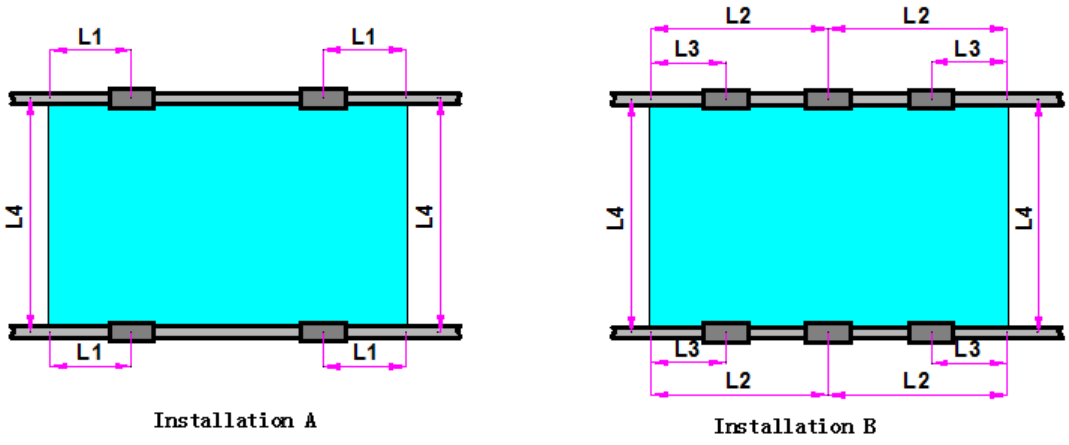


Fig 3：Parameters of double glass PV module

Parameters of Double glass PV module		
Type	SEAB-60	SEAB-72
Dimension（mm）	1662*990*5 1658*992*5	1980*990*5 1972*992*5
L1（mm）	280~380	410~450
L2（mm）	831±10	990±10
L3（mm）	200~250	250~350
L4（mm）	1015	1015

Notes:

1) Interval between two modules ≥10mm

2) Ground clearance of bifacial double glass PV module（≥0.5m），please reference following Fig. 4

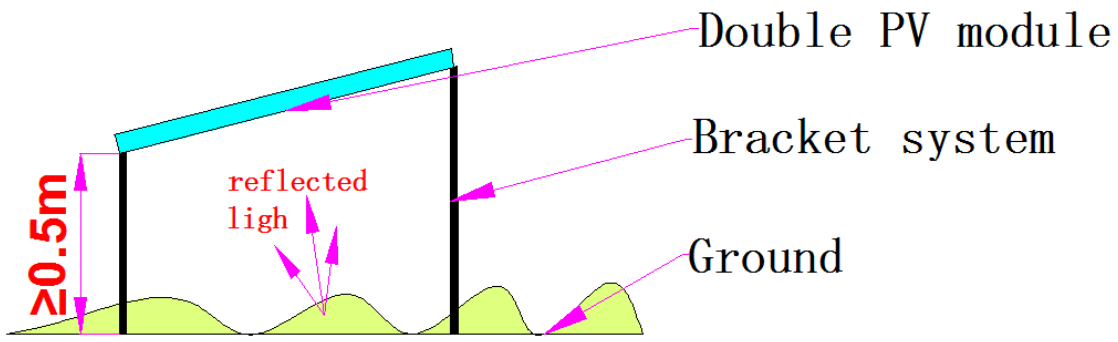


Fig. 4

2.3.4 INSTALLATION SCHEME

Based on load capacity requirement, please reference Table 4 for more details.

Table 4：Installation scheme

Installation scheme			
Type	load capacity	Length of clamp	Installation scheme
SEAB-60	+2400Pa/-2400Pa	150mm	A
	+3600Pa/-2400Pa	150mm	B
SEAB-72	+2400Pa/-2400Pa	200mm	A
	+3600Pa/-2400Pa	200mm	B

2.3.5 SELECTION CRITERIA OF CLAMP

During usage of clamps, proper structure of cross selection of clamp and size can enhance load ability of PV module after installation. Please reference Fig 2 for more details about cross selection of clamp, and reference Table 5 about size; firstly, EPDM has buffer effect and protective effect which can make sure PV module are not destroyed. Secondly, no contact stain on or into materials of PV module during usage happens, service life of EPDM is same of PV module, please reference table6 for requirement. And Strength of aluminum alloy of clamps also affects load capacity. Please reference table 7 for more parameters.

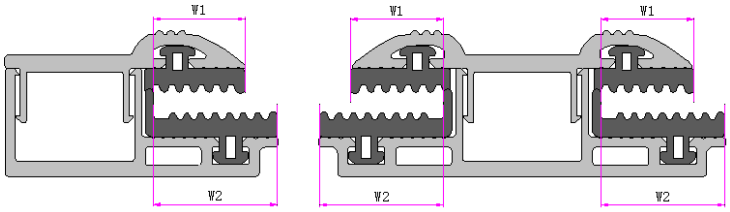


Fig. 5： Reference diagram of cross selection of clamp

Size of cross selection of clamp		
No.	Item	Criteria
1	width of one-sided acting surface of upper clamp	16±1mm
2	width of one-sided acting surface of down clamp	17mm±2mm
3	Wall Thickness	≥2mm
4	Thickness of EPDM	≥3mm

Table 5： Size of cross selection of clamp

Please reference below table about EPDM for more details.

EPDM Main performance parameters(suitable for double glass PV module)		
No.	Item	Criteria
1	Appearance	Smooth, no tortuosity, no crack and bubble on surface
2	Shore hardness	65±5/sha
3	Tensile strength	≥10.5/Mpa
4	Elongation at break	≥300/%
5	Contact stain	No pollution

Table6： EPDM Performance parameters

For more details about Aluminum alloy clamp, please reference Table 7

Performance parameters of Aluminum alloy clamp		
No.	Item	Criteria
1	Type	6005 or 6063
2	Strength of extension b	≥160/Mpa
3	Non-proportionalσp0.2 elongation stress	≥110/Mpa
4	elongationδ	≥7/%

Table 7： Performance standard of Aluminum alloy clamp

If improper clamps are used or installation method deviates from this document, limited warranty from Almaden will be invalid.

3 CONNECTIONS

1) Carefully read this manual before starting Installation. According to requirement of system capacity, current and voltage, customers can serial or parallel connect modules by using multi-port cables.
2) All modules connected in series must have the same rated current; the total voltage of one string should never exceed the limit of system voltage. The number of modules for each string should be designed by the system capacity, and the type of used inverter is based on specific requirement.
3) Max rated Fuse current value can be found in module labels and specifications. The rated fuse current is the highest reverse current which module can suffer. Please choose fuse properly according to the local standards and the rated fuse current.
4) Please choose the cable according to the system capacity, current, voltage, and the international standards.
5) Please follow the local electric standards to connect the connections.
6) There are 3 bypass diodes in one module. Make sure installation is correct, otherwise bypass diodes, cable, and junction box may be damaged.

4 MAINTENANCE

Modules should be checked and maintained regularly, especially in warranty period. In order to achieve the b est performance, please follow the details below:

4.1 APPEARANCE INSPECTION

Please check carefully whether appearance defects exist or not. Especially for following aspects:

1) Corner protection is used to protect modules in case of damages when transportation. We do not suggest customers to remove them.

2) Check the module glass whether there is any breakage or not.

3) Make sure no sharp obstacles on the module surface.

4) Check whether modules are shaded by obstacles or not.

5) Check whether any corrosive situation happened around the cell busbar or not.

6) Inspect whether all screws between modules and structures is broken or loose or not, and please fasten the screws in time.

4.2 CLEAN

1) Sand and dust will cause module power attenuation, so it is particularly important to clean modules regularly (clean time should be decided by the location situation). When cleaning modules, please use a soft cloth with mild detergent. DO NOT use mineral water to clean modules which may leave some stains on the surface of modules.

2) DO NOT use rough cloth to clean modules.

3) Recommend to clean modules in early morning or late afternoon when irradiance is not too strong, especially in high temperature area.

4) DO NOT clean modules in which glasses are broken or wire line are exposed. These modules are dangerous for people. Because they may cause electric shock risk.

4.3 CONNECTORS AND WIRE INSPECTION

1) Inspect the sealant in junction Box and make sure no crack or gaps in junction box.

2) Inspect aging situation of modules, including probable animal damages, climate affection. And check whether connections between connectors are tight connected or not, and whether corrosive situations in the module exist or not.

3) Check whether modules are grounded well or not.

5 ELECTRICAL PROPERTIES

The electrical performance parameters of double glass PV module are tested under standard test conditions, that is to say: sun irradiance: 1000 W/m^2, AM:1.5 and environment temperature: 25℃. In some cases, the PV module may produce a voltage or current value that is higher or lower than the rating. When confirming the rated voltage, rated current, fuse sizes and specification of control element which is connected with PV modules system, values of short current and open circuit voltage marked in the label of double glass module should multiply by a factor of 1.25

The corresponding electrical parameters can be downloaded from the website: ***www.czamd.com***

6 DISCLAIMER OF LIABILITY

1) The purpose of this document is to provide clear instructions on how to install Almaden photovoltaic modules. This installation instruction is designed to guide the installation of double glass modules produced by Changzhou Almaden Co., Ltd.
2) The installation, operation and usage of Almaden double glass series modules are beyond company control, accordingly, Almaden does not assume responsibility for loss, damage, injury or expense resulting from improper installation, operation, use or maintenance.
3) Almaden does not assume responsibility for any infringement of patents or other rights of third parties that may result from usage of the PV module. No license is granted by implication or under any patent or patent rights.
4) Specifications included in this manual may change without prior notice.

7 REVISED RECORDS