



INSTALLATION & MAINTENANCE MANUAL FOR PV MODULES

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1. Preface

This manual offers general installation and maintenance information of the Photovoltaic Modules (hereinafter referred to as the Modules) of Renesola Jiangsu Ltd (hereinafter referred to as Renesola).

Before installation, handling or maintenance, ensure that you have read and understand this manual and use the Modules correctly & safely.

The installation manual is only for glass-backsheet type Module, the model names covered are:

A Series Module: JC***M-24/A()
JC***S-24/A()
JC***F-24/A()

B Series Module: JC***M-24/B()
JC***S-24/B()
JC***F-24/B()

C Series Module: JC***M-18/C()
JC***S-18/C()
JC***F-18/C()

D Series Module: JC***M-24/D()
JC***S-24/D()
JC***F-24/D()

E Series Module: JC***M-18/E()
JC***M-18/E()
JC***M-18/E ()

Remarks

1. The “***” stands for the module power for detailed information, please refer our module TDS.

2. JC indicate Renesola, while M indicate Multiple crystalline, F indicate square mono-crystalline and S indicate Single Crystalline.

3. The brackets stand for additional information such as “bs” refer to Modules with PV back-sheet and 4 Busbar cells.

2. Safety



ATTENTION: Danger of death from electric shock

1. Installation, trouble shooting and maintenance of solar installations present hazards associated with electrocution, electrical arcs, burns, working from heights and manual handling; therefore, this work must only be carried out by suitably trained professionals with the appropriate safety equipment and procedures in place at all times.
2. Do not dismantle, disassemble or modify any part of the Modules and do not remove or alter in anyway the labels or markings on Modules.
3. Do not install a panel that has been damaged, glass smashed or back-sheet torn.
4. Mating connector pairs on Module and array leads must be the same brand and type.
5. Do not touch exposed parts, cables or connectors.
6. Do not step or walk on the modules. Doing so may damage and crack parts of modules.
7. Do not strike Modules or subject Modules to impact with tools or objects.
8. Do not expose modules to chemicals, for instance paints, solvents, adhesives.
9. Keep the Modules away from inflammable gas, hazardous chemicals or flammable items
10. Electrical hazards must be taken in account at all times when working on or around solar modules. Please take necessary actions to avoid possibility of electrical injuries.

3. Transportation and Handling



HANDLE WITH CARE – FRAGILE GLASS

Solar Modules are glass and contain very fragile Silicon wafers inside them and must be transported and handled with the utmost care. Do not strike, drop or bend a Solar module

1. Never transport other items (eg. Inverters) on top to a solar module pack.
2. Store the modules safely in cool and dry area. The packaging is not weatherproof.
3. Leave modules in their packaging until they are to be installed.
4. The Modules should be be transported in their original packaging where possible with any free space in the box securely filled with soft packaging materials to prevent the panels from moving around.
5. Use extreme caution if stacking modules for transport of less than a pallet at a time line up the modules with their edge protectors in place and wraps, strap and fasten them so that they cannot move around or rattle and fall. Care must be taken with fasteners that secure modules but do not bend or damage the modules in any way.

6. During Unpacking ReneSola strongly recommends having two people handling the module frames

7. Unpacking PV modules from the original package:

Step 1: Remove securing straps.

Step 2: Remove the pallet lid.

Step 3: Unpack the Modules one by one and stack them (surface glass side down) without removing the cardboard edge protector.

Step 4: Remove the cardboard edge protector from the Modules before installing.



Figure 1 Unpacking

8. Check the module for damage due to transportation before the installation.
9. Never move modules by pulling their cables.
10. Carry the modules with both hands and with their glass surface facing the operator when absolutely necessary (one operator available) (please see Figure 2).
11. Do NOT stack the modules back-sheet side down to avoid glass scratch and electric shock risk (please see Figure 3).

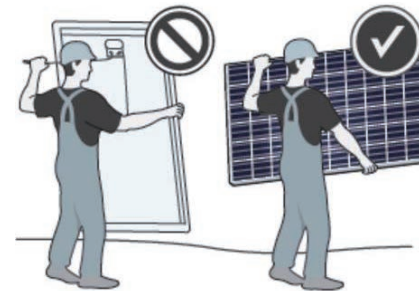


Figure 2. Carry the Modules



Figure 3. Stack the Modules

12. Carry the Modules carefully and handle them according to instructions.
13. The surface oxide layer of the frame may be damaged by sharp objects, do not destroy or scratch the frame of the Modules.
14. Glass surface, back-sheet and aluminum frame are susceptible to damage that could affect the performance or integrity of the PV module; do not damage or scratch the surfaces, and do not spray any non-validated chemicals paints, solvents or adhesive to any of the surfaces, including the frame. Doing so may degrade performance or cause irreparable damage and will void any applicable warranties.
15. Do not step or walk on the Modules. Doing so may damage modules (please see Figure 4).
16. Do not carry wet or hot Modules dropping a module from an height and the impact of falling tools may affect the electrical performance or break the module (please see Figure 4).

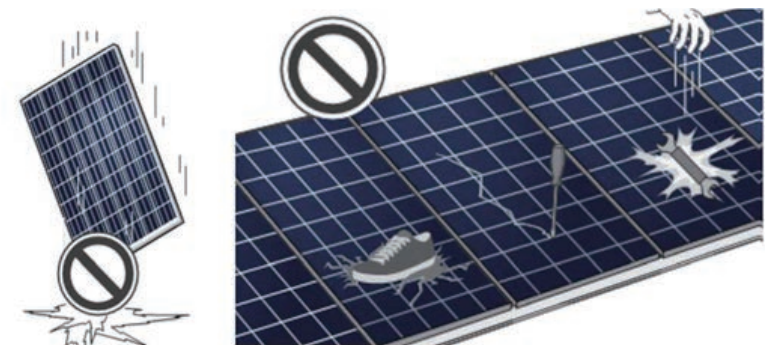


Figure 4. Handling Precautions

4. Installation

1. Installers must be qualified and familiar with solar and electrical principles.
 2. Notify ReneSola of any damage to product immediately. Do not use or install damaged Modules. Damaged Modules may cause fire or electric shock, resulting in property damage, fire and or death.
 3. Do not disconnect or connect any cables under load.
 4. The maximum modules of one PV string $N = (\text{The Maximum System Voltage}) / (V_{oc})$, note the V_{oc} is the value at the lowest temperature in the project sites.
 5. Suitable over current protection devices (string fuses etc.) must be installed when connecting 3 or more strings in parallel configuration.
 6. Match the polarities of cables and terminals when making the connections, failure to do so may result in damage to the module. Keep the connector dry and clean and do not impact external force on the connector such as heavy snow、strong wind.
 7. Under normal conditions, a Module may be able to produce voltage and current higher than in standard test condition. Accordingly, when determining component rated voltage, conductor ampacities, fuse current and size of controls connected to the PV output, the short circuit current and open circuit voltage value marked on this module shall be multiplied by a factor (safety factor) of 1.25.*
- * Note:** The safety factor for component rated voltage, conductor ampacities, fuse current and size of controls connected to the PV output is subject to the meteorological conditions of project sites.
8. The Modules shall be installed so as to maximize solar exposure and to minimize shading by trees, buildings or other obstacles in the surrounding area. Generally in the Northern hemisphere Modules are ideally orientated to the South and in the Southern hemisphere Modules orientated to the North.
 9. A suitable mounting structure shall be installed. It must withstand the pressure of high winds or heavy snow according to the site conditions and structure. The mounting structure must be made of durable, corrosion & UV resistant materials.
 10. The mounting structures must be designed by qualified structural engineers, and installation design and procedures shall be consistent with the relevant local standards.
 11. Select either method of fixing mentioned below depending on site conditions:
Screw-fixing system (Figure 5-a)、Fixture-fixing system (Figure 5-b) .

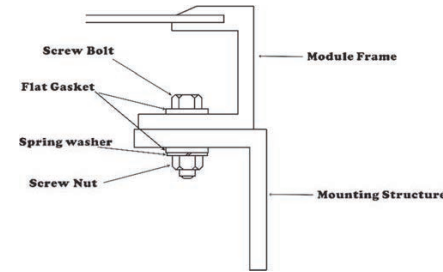


Figure 5-a Installed by nut and bolt

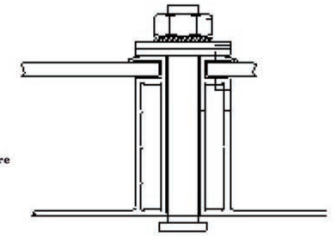


Figure 5-b Installed by fixture

12. Installation method and location

1) Screw-fixing :

Fix the modules on the bracket at 8 border prefabricated installation holes (Figure 6). The inside installing holes must be fixed with bolts in all the cases and the outside installing holes would be also used in the case of strong wind and/or heavy snow. Applied torque is recommended as 7-11 N•m for M6 (diameter is 6mm) screw.

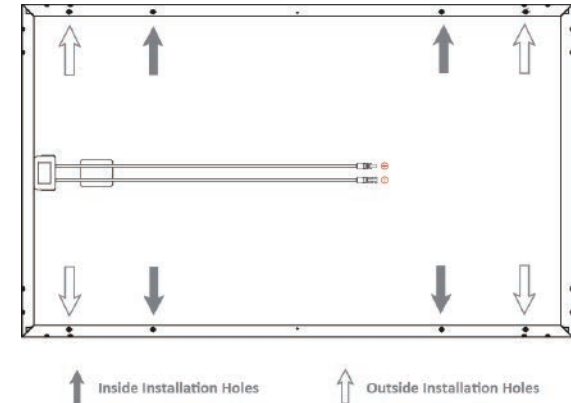
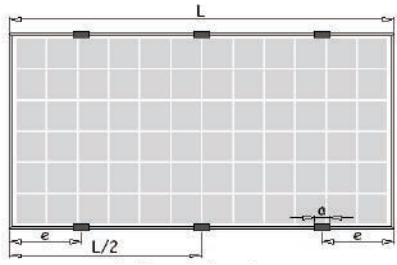


Figure 6 Screw-fixing

2) Fixture-fixing :

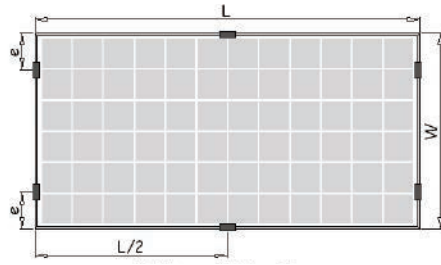
Fix the module safely and securely on the mounting structure. The length of clamp should be 40mm minimum. Applied torque is recommended as 7-11 Nm for M6(diameter is 6mm)screw.

For A Series (156-72 cell JC***M-24/A**) modules , six clamps must be used:



$$L/8 \leq e \leq L/4, a \geq 8\text{cm}$$

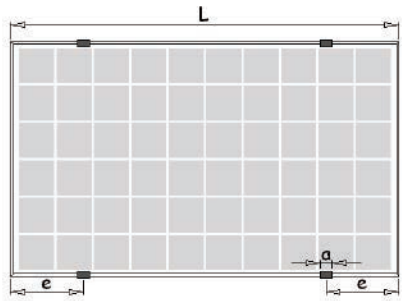
Figure 7-1 On long frame



$$W/8 \leq e \leq W/4, a \geq 8\text{cm}$$

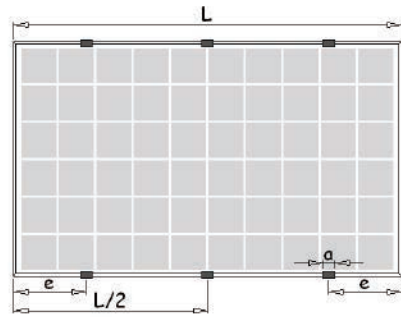
Figure 7-2 On short frame

For other series module, fix the module with the long sides (Figure 8-1) or short sides (Figure 8-2) according to the bracket locations specified below and mechanical load requirements.



$$L/8 \leq e \leq L/4, a \geq 6\text{cm}$$

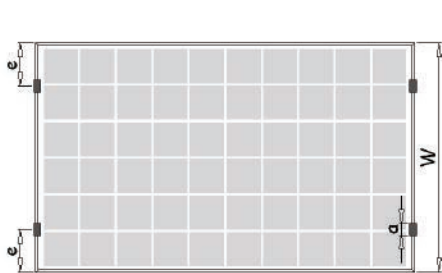
2400Pa



$$L/8 \leq e \leq L/4, a \geq 6\text{cm}$$

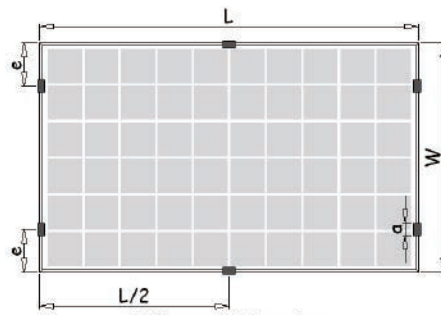
5400Pa

Figure 8-1 Fixing on the long sides for the other module series



$$W/8 \leq e \leq W/4, a \geq 6\text{cm}$$

2400Pa



$$W/8 \leq e \leq W/4, a \geq 6\text{cm}$$

5400Pa

Figure 8-2 Fixing on the short sides for the other module series

3) Inserting System :

Fix the module with U type groove or flange beam.

All available installation methods for A series modules (156-72 cell)(Figure 9)

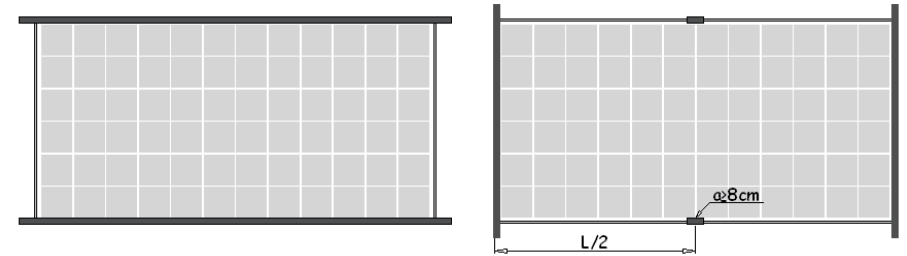
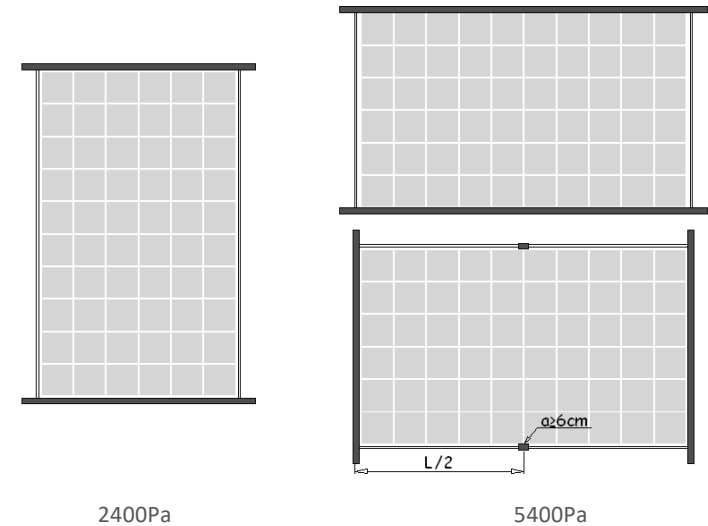


Figure 9 Fixing with sideways for A series modules

For other series module, fix the module with the long sides or short sides according to the bracket design and mechanical load requirement.(Figure 10)



2400Pa

5400Pa

Figure 10 Fixing with sideways for the other module series

Fixing eight installation holes simultaneously is recommended according to the Security Considerations. When installed correctly, the Modules can withstand a maximum snow pressure of 5400 Pa or wind pressure of 2400 Pa.

13. When installing the Modules on the roof, ensure there is an appropriate mounting structure.

14. Grounding

1) PID (Potential Induced Degradation) due to combined effects of high temperature, high humidity and high voltage, is most likely to be observed in similar climates and mounting surroundings such as India, Southeast Asia, floating designs. Except for equipment grounding, negative system grounding is strongly recommended as the basic solution for PID phenomenon.

2) Grounding method shall be consistent with the local standard and regulations. Any grounding system/method, which is designed in accordance with relevant international and local standards and regulations, such as UL2703, UL467, IEC60335, NEC article 250 and section 690.V.43, etc. could be attached to the Modules.

3) In order to prevent electrochemical corrosion, materials in contact with module frames, should be properly selected and galvanic isolation provided where necessary.

4) Grounding wire shall be the bare copper wire with simple surface treatment and no insulation sleeve. Wire cable with cross-sectional area of 4~6 mm² (10~12 AWG) and ground clamp (such as Tyco, identification of product: 1954381-2) are recommended (diagrammatic sketches are as follows).

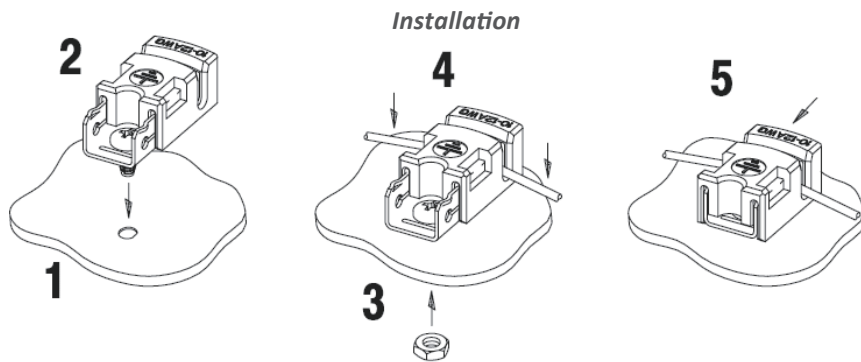


Figure 11 Grounded with Ground clamp

15. When the connecting wires of the Modules do not meet length requirements, a correctly rated electrical cable that is designed and certified for long term outdoor use along with the correct connectors can be used to extend the connections. The connectors must match the Module connectors. The cross-sectional area for PV array wire must be no less than 4 mm², and the connection system is IP 65 rated.

16. The minimum separation between two Modules shall be more than 10 mm; when installing on the roof, the recommended separation between the Modules and the roof surface is 100 mm to allow for air flow around the modules. When installing on ground mounts keep ground clearances to more than 450 mm.

17. It is better to use the Modules with same specifications when connected in series.

18. Artificially concentrated sunlight shall not be directed on the module.

19. Our modules have passed the salt mist and ammonia test (Please refer the test report for detailed information) and can be installed in some corrosive environments, e.g. sea side.

20. The modules should not be installed at the place which is less than 100 meters from the seashore. If the distance of the seashore and the project site is 100~1000 meters, anti-corrosion application should be taken during the installation and grounding processes.

5. Product Identification

Nameplate: describes the product model; rated power; rated current, rated voltage, open circuit voltage, and short circuit current. All above parameters are measured in standard test conditions.

Other information, such as weight, size, maximum system voltage and maximum fuse current are marked on the nameplate as well.

Barcode: the barcode is located in the inside the glass the Module, and contains the serial number (also displayed).

Do not remove or alter any label or marking, this will void warranty.

6. Maintenance

1. Do not touch any live parts of the array wires, uninsulated cable and the connector. Use the safety equipment when working on solar equipment (insulating tool, insulating gloves etc.).

2. An opaque cloth or other non-abrasive material can be used to cover the front of the modules to eliminate sunlight exposure and reduce the chance of electrocution during maintenance when required.

3. Cleaning instructions

Periodic cleaning is recommended for solar modules. The cleaning process should be done by suitably trained professionals with the appropriate safety equipment and procedures in place at all times. When cleaning the module surface.

a) The following rules apply:

✓ To reduce cold and hot shock clean panels at low irradiance time.

✓ Only use soft cloths or sponges to clean the glass surface.

✓ Only use clean water as the cleaning solvent.

✓ The difference between water temperature and module temperature should be in the range of -5 °C to +10 °C.

✓ Water pressure should be less than 1000 Pa.

b) following notes should be taken into account:

- ✓ No other chemical should be used in cleaning process.
- ✓ No aggressive tools or coarse cleaning materials are permitted.
- ✓ Do not step or walk on the Modules.
- ✓ Do not strike Modules or subject Modules to impact with tools or objects
- ✓ Isolate modules during cleaning and maintenance, the modules must not be under load.
- ✓ Do not touch exposed cables or connectors.
- ✓ Do not remove dust in dry way (without water).

7. Annual Inspection

1. Check if nuts, bolts of mounting structure are secure and not loose. Tighten the loose components again, if required.
2. Check the connecting cables, grounding cables and connectors and the performance of the ground resistance.
3. Check all electrical and mechanical connections for freedom from corrosion.
4. Check the ground resistance of metal parts such as the module frames and the mounting structures.

8. Disclaimer of Liability

1. The use of this manual and installation, handling, maintenance and use of modules are beyond ReneSola's control, and ReneSola does not assume any responsibility for loss, damage, injury or expense resulting from incorrect installation, handling, use or maintenance.
2. ReneSola assumes no responsibility for any infringement of intellectual property right (including without limitation patent, copyright and trademark) or other rights of third parties that may result from use of modules. No license in connection with intellectual property right (including without limitation patent, copyright and trademark) or other rights of ReneSola, whether expressly or impliedly, is granted to customers because of use of modules.
3. All information stated in this manual is based on ReneSola's knowledge and experience, but no warranty about such information (including modules specifications) is made by ReneSola, whether expressly or implied. ReneSola reserves the right to update this manual, modules specifications or relevant information without prior notice.

9. Applicable Law and Dispute Settlement

This "Installations & Maintenance for PV Modules" shall be governed by and interpreted under the laws of Hong Kong (irrespective of its choice of law principles).

Except for the technical disputes, all disputes arising out of or in connection with this **"Installations & Maintenance for PV Modules"** shall, unless amicably settled between the parties, shall be settled by arbitration in Hong Kong under the Hong Kong International Arbitration Centre Administered Arbitration Rules in force when the Notice of Arbitration is submitted in accordance with these Rules. The language of arbitration shall be English. The award of the Arbitrators will be final and binding upon the Parties. Provided that there is any inconsistency between the sale's contracts to which this "Installations & Maintenance for PV Modules" is attached, the terms and conditions of the sales contract shall prevail.

This document constitutes part of the contract and valid automatically when the contract is signed.



光伏组件 安装维护手册

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1. 概述信息

本安装手册阐明了适用于江苏昱辉阳光有限公司(后面称为昱辉)的光伏组件（后面称为组件）的安装与维护的信息。

在安装、搬运、维护作业前请确保您已经阅读并理解本在安装手册，并正确安全地使用组件。

本安装手册仅适用于玻璃-背板类型型组件，适用的组件型号如下：

A 系列组件： JC***M-24/A()

JC***S-24/A()

JC***F-24/A()

B 系列组件： JC***M-24/B()

JC***S-24/B()

JC***F-24/B()

C 系列组件： JC***M-18/C()

JC***S-18/C()

JC***F-18/C()

D 系列组件： JC***M-24/D()

JC***S-24/D()

JC***F-24/D()

E 系列组件： JC***M-18/E()

JC***M-18/E()

JC***M-18/E ()

标识信息

1. 星号 “***” 代表组件的功率数值，详细的信息请参考产品册。
2. JC 代表Renesola，M代表多晶，F代表方单晶，S代表单晶。
3. 括号代表补充信息如如 “bs” 表示组件使用光伏背板及4主栅电池材料。

2. 安全措施



警告: 电击可导致人体死亡

1. 在安装、调试、维护作业过程中会面临电击、电弧、燃烧、高处作业、手工作业等风险，这些工作必须由合适的经过培训的专业人员进行操作，并时时在场所内配备安全装备并遵守安全程序。
2. 不能拆卸或改变组件的任何部件，不能撕毁或改变组件的标识。
3. 不能安装玻璃粉碎、背板破裂等破损组件。
4. 必须使用相同型号或品牌的连接器来连接组件及阵列。
5. 不能接触暴露的部件、线缆或连接器。
6. 不能踩踏或在组件上行走，否则会导致组件的裂片或损坏。
7. 不能敲打组件或使用工具等物体撞击组件。
8. 不能将组件暴露在化学物品中，如颜料、溶液、粘合剂等。
9. 应将组件远离易燃气体、危险化学品及其它易燃物品等。
10. 操作组件或在周围工作时必须考虑到电气危险，必须采取必要的防护措施避免电气损伤。

3. 运输及搬运



小心搬运 – 易碎品

光伏组件是玻璃制品及采用易碎的硅片制成，在运输及搬运时必须十分小心。不能踩踏、跌落或弯曲组件。

- 1.不能在组件包装箱上额外放置其它物品(如逆变器等)进行运输。
- 2.组件应安全地存放在凉爽干燥的区域,避免包装箱风吹雨淋。
- 3.应保持组件在原始包装箱中直到它们被安装。
- 4.使用最初的包装箱运输组件，其空隙部分用合适的软物质进行填充防止组件发生位移。
- 5.运输小于1托组件时必须十分小心。使用合适的边角护角，整齐地将组件堆砌并紧紧束缚在一起。束紧组件时必须小心，束缚力不能导致组件的弯曲及破损。
- 6.昱辉强烈建议由两人抓取边框取出组件。

7.从包装箱中拆取组件：

- 第一步：裁掉打包带
- 第二步：除去包装纸箱纸盖
- 第三步：一件一件地取出组件并保留组件的护角，玻璃面向下堆积。
- 第四步：在安装前去掉纸护角

8.在安装前检查组件是否在运输过程中发生破损。

9.不能拽着组件的电缆线移动组件。

10.必要的时候允许单个搬运者使用双手搬运组件，玻璃面应面向搬运者（见图2）

不能背板面朝下堆叠避免背板面划伤及可能的电击风险（见图3）。



图1 拆取组件

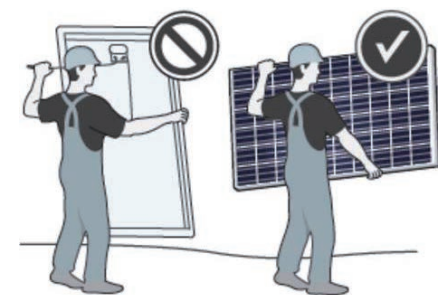


图2 搬运组件



图3 堆叠组件

11.按照本说明小心地拿取及搬运组件。

12.组件边框的氧化膜可能会被尖锐的物件破损，避免划伤或破损组件的边框。

13.玻璃表面、背板及铝边框表面容易破损继而可能影响组件的性能及完整性。因此不能划伤这些物体的表面、喷涂未经验证的化学颜料、溶剂或者使用表面粘接剂，包括金属边框上的使用。这样做可能会降低组件的性能或引起不可恢复的损坏并导致质保的失效。

14.不允许踩踏组件这样做会导致组件的隐裂等损坏（见图4）。

15.不允许搬运湿的或热的组件，避免组件从高处跌落，小心滑落的工具对组件的撞击。遭遇跌落或撞击组件可能发生破损并影响组件的性能。（见图4）。

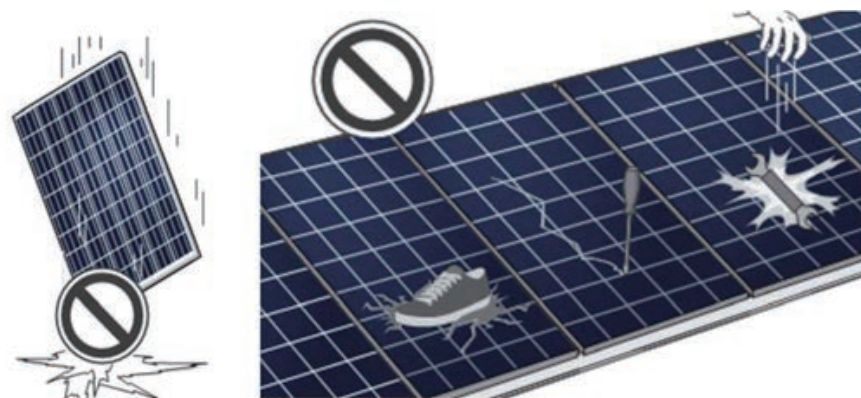


图4 作业预防

4. 安装

1. 安装者必须是有资质并熟悉组件及电气原理的人员。

2.发现组件破损时请立即告知昱辉，不能安装或使用破损的组件。破损的组件可能引起大火、电弧放电等，导致财产损失、火灾、人员伤亡。

3. 不允许有负载的情况下断开或连接电缆。

4.每个光伏组件串允许的最大串接数量N由 $N=(\text{最大系统电压}/\text{组件开路电压})$ 公式给出。注意组件的开路电压为采用项目地预计的最低温度条件下计算的电压。

5.当3串及3串以上的组件串并联时应当使用适合的过电流保护(熔断等)装置。

6.必须确保线缆及终端的极性正确，错误的连接可能导致组件的损坏。应保持连接器干燥干净，不允许连接器承载外界压力如大雪、强风。

7.在正常使用组件时可能产生高于标准测试条件下的电压及电流值。因此在确定元器件的额定电压、导体载流量、熔断电流及输出端的控制规格时，需要将组件标称的开路电压值、短路电流值乘以1.25倍的安全系数。

***注意：**元元件的额定电压、导体的载流量、熔断电流、组件输出端相关的安全系数取决于项目地的气象条件。

8.组件应当安装在能够充分曝光、不被或最大化减少周围树木、建筑物的遮蔽的区域。在北半球组件朝向南方安装，在南半球组件朝向北方安装。

9.根据当地的安装条件，使用能够承受住强风、强雪的支架结构，支架应使用耐久性、耐腐蚀、抗紫外线的材料加工制成。

10.安装支架必须经有资质的工程师人员设计，安装设计及步骤应符合当地的有关规定。

11.根据项目地的条件选择安装方式：螺丝安装（图5-a）、夹具安装（图5-b）、导轨固定安装。

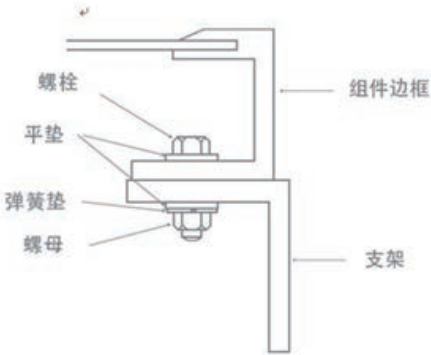


图5-a 螺栓和螺母安装

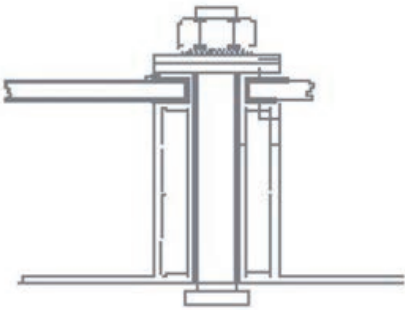


图 5-b 夹具安装

12. 安装方式及位置

1) 螺丝安装：

使用边框预制的8个安装孔进行安装（见图6）。必须使用4个内安装孔，在强风、强雪的安装条件下还需要使用4个外侧安装孔，螺栓（直径6mm规格）拧紧的应用扭矩推荐为 $7-11N\cdot M$ 。

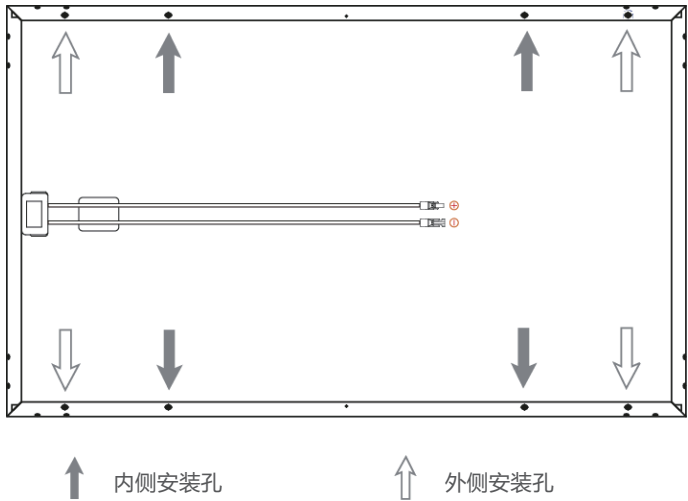


图6 螺丝安装

2) 夹具安装：

把组件安全紧固地安装在支架上，安装夹具的最小长度为40mm，螺栓（直径6mm规格）拧紧的应用扭矩推荐为 $7-11N\cdot M$ 。

A系列组件（156-72 cell JC**M-24/A**）使用6个夹具进行安装：

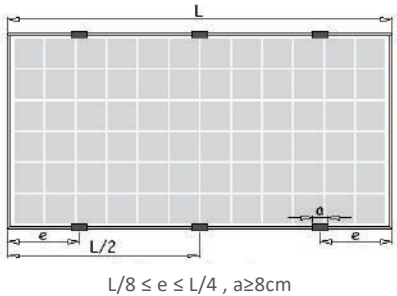


图7-1 在长边上安装

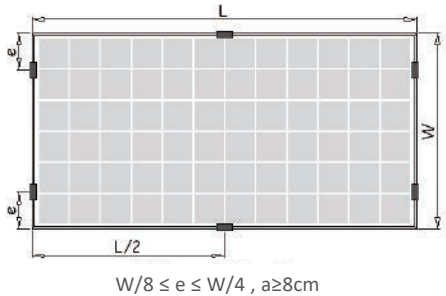


图7-2 在短边上安装

对于非A系列组件根据支架设计及承载要求可以在长边（图8-1）或短边（图8-2）上安装

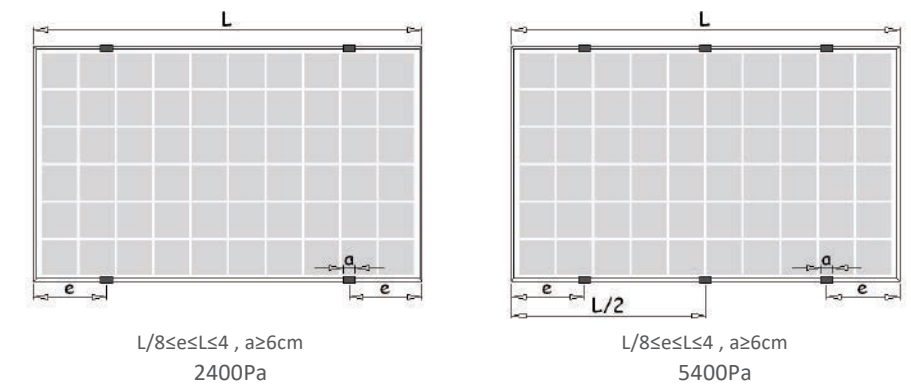


图8-1在长边上安装其它系列组件

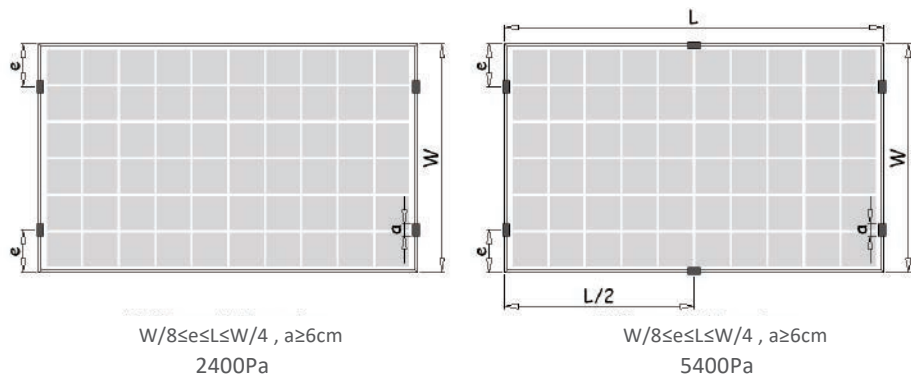


图8-2在短边上安装其它系列组件

3) 导轨固定安装：

用U型槽或工字钢固定组件

A系列组件（156-72 cell）允许的安装方式见（图9）

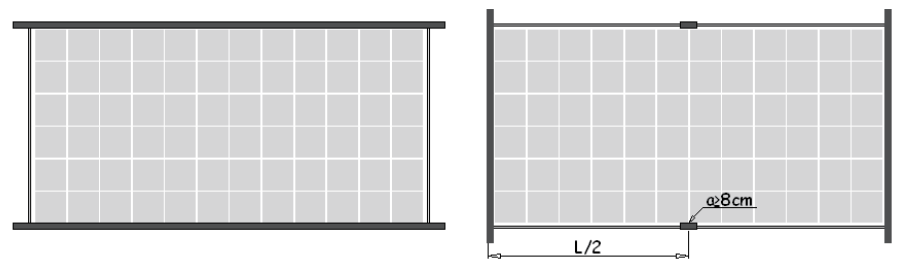


图9 A系列组件导轨固定图

其它系列的组件根据安装支架的设计及载荷要求安装在支架短边或长边上。

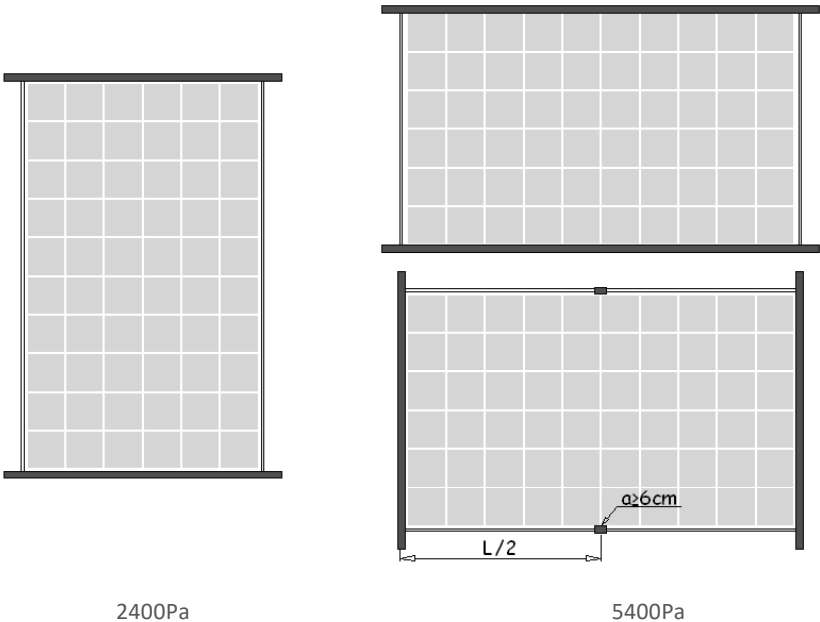


图10 非A系列组件导轨固定图

基于安全的考虑昱辉推荐使用8个安装孔进行固定安装，在正确地安装方式下组件可以承受最大5400Pa的雪压及2400Pa的风压。

13. 在屋顶上安装组件时请确保具有合适的安装结构。

14. 接地

1)PID(电势诱导衰减)效应起源于高温、高湿、高电压等因素，具有类似气候的地方容易出现PID现象，如印度、南亚、漂浮系统电站等。昱辉强烈建议进行负极系统接地消除PID效应。

2)接地方法应当遵守当地的标准、规定。任何接地系统或方法必须遵守诸如UL2703、UL467、IEC60335、NEC250、NEC690等国际及当地的标准、规章。

3)为避免电化学腐蚀，请选择合适的与组件边框接触的接地材料如不锈钢隔离垫片等。

4)接地线应为只经过表面处理没有绝缘层的裸露铜线。推荐使用线径4-6mm²(10-12AWG)的接地线及接地夹具（如Tyco,型号1954381-2）进行接地（见图11）。

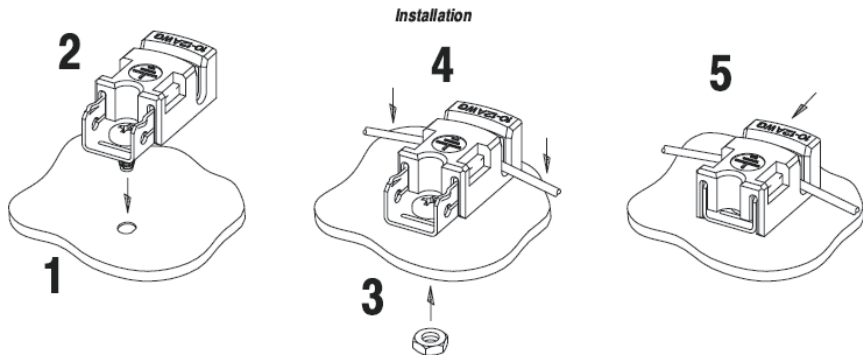


图11 接地夹具接地

15.组件自身的连接线不能满足系统设计要求是，可以使用合适的能够承受住户外长期使用的商用电缆及连接器来延长连接线。连接线的线径至少为4mm²连接系统的防护等级要达IP65。

16.组件之间的间隙应至少10mm，当安装在屋顶上时组件与屋顶表面的距离应大于100mm以确保组件周围的空气能够流通，在地面安装时组件与地面的间隙应大于450mm。

17.应尽量在同一系统中配置相同型号的组件。

18.人工聚焦的阳光不能照射在组件上。

19.昱辉的组件通过了盐雾、耐氨试验（详细信息参见试验报告）可以使用在如海边等腐蚀环境中。

20.组件不能安装在小于100m以内的海边，安装在距离海边100-1000米的地方，安装及接地时应当进行采取防腐蚀措施。

5. 产品标识

铭牌：描述产品型号、额定功率、额定电流、开路电压、短路电流。以上参数均在标准测试条件获得。

其它如重量、最大系统电压、熔丝电流等也标注在铭牌上。

条码：条码通过层压工艺封装在组件内部，其包含了产品的追溯信息。

请勿撕毁或更改标识否则质保自动失效。

6. 维护

1.不要随意触摸带电的部件、未绝缘的电线、连接头等。接触作业时需使用安全装备（绝缘工具、绝缘手套等）。

2.维修作业时请使用不透明的衣物或其它材料覆盖在组件表面，组件在阳光下会产生高压有电击的危险。

3. 清洗说明

推荐定期清洗组件。清洗作业应有专业受过训练的人员，使用适合的安全设备按照作业程序进行。

a)遵守的规范：

- √ 应避免冷热冲击仅在低辐照的时间段进行清洗
- √ 只允许使用柔软的衣物或海绵材料清洗组件的玻璃表面
- √ 只允许使用清水进行清洗
- √ 清洗水的温度与组件的温度差异在-5℃-+10℃之间
- √ 清洗水的压强应当小于1000Pa

b)注意点：

- √ 不能使用化学品进行清洗
- √ 不允许使用尖锐及粗糙的物体清洗组件
- √ 不能踩踏或在组件上行走
- √ 不能撞击或用工具敲击组件
- √ 清洗维护组件时必须使组件隔离负载
- √ 不要触摸暴露的电缆及连接器
- √ 不允许不用水直接清除干燥的脏污

7. 年度检查

1. 检查安装的螺丝、螺栓是否安全紧固，必要时拧紧松动的部件。
2. 检查连接线缆、接地线缆、连接器及接地的性能。
3. 检查所有的电气及机械连接确保没有腐蚀。
4. 检查金属部件的接地阻值如金属边框和安装支架。

8. 免责声明

1. 由于本手册的使用及组件安装、操作、维护、使用方法或条件超出了昱辉的控制范围，昱辉不对任何与安装、操作、使用或维护相关的作业引起的损失、破坏、费用负责。

2. 因使用组件而侵犯第三方的知识产权（包括但不限于专利、著作权、商标权）昱辉不承担任何责任。客户不因使用昱辉的组件而获得昱辉的知识产权（包括但不限于专利权、著作权、商标权）或其它权利的使用权，无论明示的或暗示的。

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9. 适用法律与争议处理

本“光伏组件安装维护手册”适用于香港法律（其冲突法不适用）。除非技术条款的争议所有因“光伏组件安装维护手册”产生的所有争议，如未能协商友好解决，双方同意提交香港国际仲裁中心按照提交申请时仲裁中心生效的仲裁规则进行仲裁解决。仲裁地点在香港，仲裁语言为英语，仲裁裁决为最终裁决，仲裁结果对双方均有约束力。若销售合同条款与本“光伏组件安装维护手册”不一致，依据销售合同为准。

本安装手册构成合同的一部分，随着合同的签署自动生效。