



PA219组件安装手册

Installation and Maintenance Guide For
SG PA219 Module

1.0 Summary

First of all, thank you very much for choosing Sungold solar Co.,Ltd Light weight Flexible Modules. This manual is for Sungold solar Co.,Ltd (hereinafter referred to as "Sungold") PA219 series solar standard modules (hereinafter referred to as "modules").

Installation, maintenance and use on upright lock edge color steel tiles provide important safety instructions. Users and installers have the responsibility to read and understand the installation methods. Users and installers must complete a site technical survey of the project to ensure that the provided installation method is suitable for the project. Failure to comply with these safety guidelines may result in personal injury or property damage. Installing and operating solar panels requires specialized skills, and only professionals can perform this work. Please read the safety and installation instructions before using and operating the panels. Installers must inform end customers (or consumers) of the above matters accordingly.

The modules have been evaluated for a maximum positive design loading of 1600Pa (33.4 lbs/ft²) and negative design loading of 1600Pa (33.4 lbs/ft²) with safety factor 1.5.

1.1 Disclaimer

Sungold reserves the right to change this installation manual without prior notice. After the change, Sungold will publicize the changed content and the latest installation manual on the official website of Sungold. Customers should pay attention to the above changes at any time. And Sungold will not give further notice.

If the customer does not follow the requirements listed in the installation manual (including the change content displayed on the official website of Sungold at the time of installation) during the installation of the modules, the limited warranty of the products provided to the customer will be invalid.

There is no warranty for any express or implied information contained in this specification. Users and installers must complete the site technical survey of the project to ensure that the installation methods provided comply with local laws and building standards.

1.2 Scope of responsibility

No matter whether the installation of the modules is carried out according to the instructions in the installation manual (including the changes announced on the official website of Sungold at the time of installation), Sungold shall not be liable for any damage caused during the installation process, including but not limited to personal and property losses caused by component operation and system installation.

In case of inconsistent description between different language versions of this manual, the Chinese version shall prevail.

This manual is for installation guidance only. Whether or not it is explicitly or implicitly stated in this manual, it does not have any warranty meaning.

1.3 Warning information

If there is a non-Sungold approved hardware connected to the PA219 component, the warranty is invalid.

2.0 Safety precautions



Warning: Before installing, wiring, operating, or maintaining the component, carefully read and understand all safety instructions; otherwise, it may result in property damage or even personal injury. When the component is exposed to sunlight or other light sources, it can generate direct current. Direct contact with the live parts of the component, such as terminal blocks, whether connected or not, may lead to personal injury.

Safety rules

- All installation work must be in full compliance with local and local regulations and corresponding domestic and international electrical standards.
- Use insulating tools to reduce the risk of electric shock.
- Use appropriate protective measures (anti-slip gloves, work clothes, etc.) to avoid direct contact between personnel and 30V DC or higher voltage, and avoid direct contact with sharp edges during installation to protect the installers hands.
- Do not wear metal ornaments when installing, so as to avoid piercing the modules and causing electric shock.
- If the modules are installed or operated on a rainy day, strong wind or dewy morning, appropriate protective measures should be taken to avoid damage to the modules and personnel.
- When working on the roof, please do not work on the roof without safety protection measures, including but not limited to fall protection, ladders or stairs and personal protective equipment etc.
- Children or unauthorized personnel are not allowed to approach the installation area or modules storage area.
- During the installation or wiring of the modules, if the circuit breaker and the overcurrent fuse cannot be opened, or the inverter cannot be turned off, opaque material is used to cover the array modules to stop the power output.
- Do not use or install damaged modules.
- If the surface material is damaged or worn, direct contact with the component surface may cause electric shock.
- Prohibit attempt to repair any part of the component, there are no elements available by the user in the modules.
- The cover of the junction box should be kept closed at all times.
- Do not disassemble or move any part of the module.

- Do not artificially focus light on the modules.
- When the component has current or external current, the component shall not be connected or disconnected.
- Ensure that the base material has been tested and matches the adhesive or bonding method specified in the manual. If unsure, consult Sungold for confirmation.

3.0 Mechanical properties/electrical properties

The rated electrical performance data of the modules were measured under standard test conditions (STC) of irradiance 1000 W/m^2 , AM 1.5, and cell temperature 25°C . The specific electrical and mechanical performance parameters of the solar modules are provided in Appendix A of this installation manual. The nameplate of each module is also marked with the main electrical performance parameters under the STC conditions. The maximum system voltage for all module series is 600V/1000V/1500V.

In some cases, the current or voltage generated by a component may be greater than its optimal operating current or voltage in its standard test environment (STC). Therefore, when determining the rated value of an element and the load value, the open-circuit voltage and short-circuit current of the module at STC should be multiplied by 1.25.

4.0 Storage and unpacking

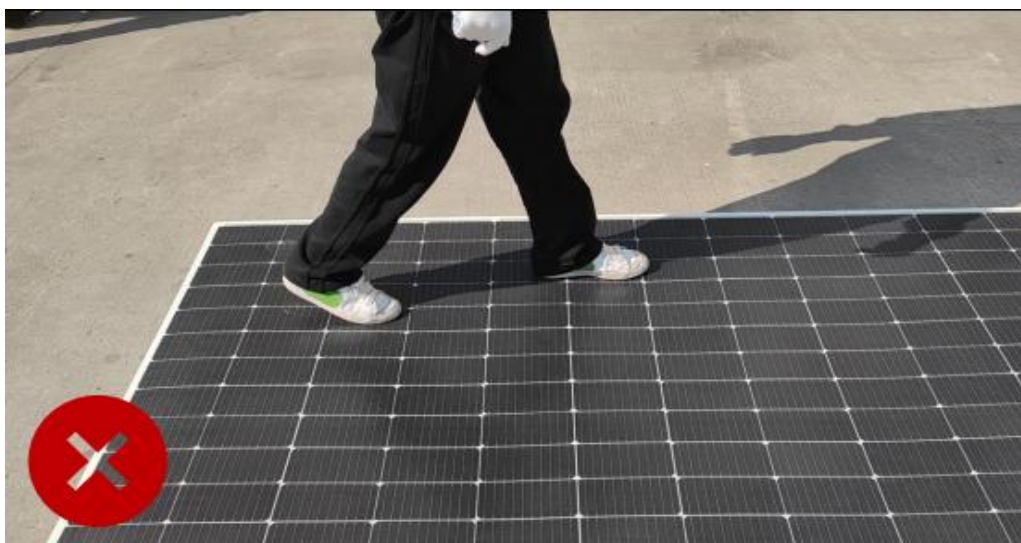
Preventive measures and general safety rules

- Modules should be stored in a dry and ventilated environment.
- The modules must be shipped in the packaging box provided by Sungold and stored in the original packaging box before installation. Please protect the packaging from damage. Open the modules package according to the recommended unpacking steps. Handle the opening, transportation and storage process with care.
- Do not apply excessive loads or distort modules.

- Do not move modules through the wires or junction boxes of the modules.



- Standing, climbing, walking or jumping on the modules is prohibited.



- The modules are prohibited from contact with sharp objects, and scratches will directly affect the safety of the modules.
- Do not place modules in an environment without reliable support or without fixation.
- Do not change the wiring of the bypass diode.
- Keep all electrical interfaces clean and dry.

5.0 Module installation

Preventive measures and general safety rules

- Before installing modules, complete the site technical survey for the project to ensure that the methods provided comply with local laws, regulations and/or building standards.
- Check applicable building codes to ensure that the building of the project is suitable for Sungold modules installation.
- When installing modules, ensure that the modules are installed on a fire-resistant roof.

Ambient condition

The modules are suitable for general climatic conditions, i.e. in accordance with IEC 60721-2-1-Environmental Conditions Classification Part 2-1: Environmental conditions occurring in nature-temperature and humidity.

- If the modules are used in a special installation environment, please consult the technical support department of Sungold in advance.
- The installation surface should be flat, without depressions or protrusions.
- modules shall not be installed near flames or combustible objects.
- Do not expose modules to artificial light sources.
- The modules shall not be immersed in water (pure water or salt water), and shall not be installed in an environment that is long-term wet (pure water or salt

water) (such as fountains, waves, etc.) or in a position that is prone to water accumulation (such as potholes, drainage outlets, etc.).

- There is a risk of corrosion if the component is placed in salt spray (i.e., marine environment) or sulfur-containing (i.e., sulfur source, volcano, etc.).
- If the above precautions are not complied with, the warranty of Shangguan will be invalid.

Installation requirements

- Ensure that the modules meet the overall technical requirements of the system.
- Ensure that other system modules do not cause destructive mechanical or electrical performance effects on the assembly.
- Allows series modules to increase voltage or parallel to increase current. When connected in series, the positive pole of the component is connected to the next. The negative terminal of one component is connected. When connected in parallel, the positive terminal of one component is connected to the positive terminal of the next component.
- The number of bypass diodes provided varies depending on the component model.
- Connect an appropriate number of modules according to the voltage specifications of the inverter used in the system. Even under the worst local temperature conditions, the voltage generated by the connected modules must not exceed the systems allowable voltage value. If overcurrent protection devices (fuses) are not used in series within each module string, up to two module strings can be connected in parallel. If an appropriate and proven overcurrent protection device is used in series on each module string, three or more module strings can be connected in parallel.

- To avoid (or reduce) the mismatch effect of the array, it is recommended to connect modules with similar electrical performance on the same string.
- To reduce the risk of indirect lightning strike, loops should be avoided in the design system.
- modules should be securely fastened to withstand all possible loads, including wind and snow loads.
- When modules are installed in roof applications, overall maintenance needs to be considered later on. The roof where the pv system is installed must be evaluated by construction experts or engineers and have a formal complete structural analysis that can be proven to withstand additional system support pressure, including the weight of the pv modules themselves.
- During installation, it is forbidden for a single component to span the joint where the direct contact material will move. Otherwise, there may be hidden cracks in the component.
- If the installation specifications of this manual are not complied with, damage such as hidden cracks and fire may occur.

Optimal direction and inclination

- In order to achieve the maximum annual power generation, the optimal orientation and inclination of PV modules should be determined first. Usually, when sunlight is perpendicular to PV modules, maximum power can be generated.

Avoid shadows

- Even a small amount of shading (such as dust) can cause a decrease in power generation. If all surfaces of the module are not shaded throughout the year, it can be considered "shadowless." Ensure that even on the shortest day of the year, sunlight can still reach the module.
- The aging of EVA and the long-term heating of diodes caused by the frequent shielding of modules will affect the service life of modules, so

please ensure that the installation position of modules is free from shadow for a long time.

5.1 Component wiring

Correct electrical wiring

■ **Before starting the system, check whether the wiring is correct. If the measured open circuit voltage (Voc) and short circuit current (Isc) are not consistent with the specifications provided, there may be a wiring fault.**

Correct connection of connectors

- **Ensure the connector is securely fastened and correctly connected. Use a dedicated wrench to tighten the connector nut, ensuring the torque matches the photovoltaic cable being used. Typical values range from 3.4 ■m to 3.5 ■m (please refer to the connector suppliers information for specific connection steps). The connector must not be subjected to external pressure. The connector should only be used for electrical connection functions and must not be used to turn circuits on or off. Do not insert any other metal objects into the connector or make electrical connections in any other way.**
- **The connector should be kept dry and clean to prevent rain and moisture. Avoid soaking the connector in water.**
- **Do not allow the junction box and connector to come into contact with organic solvents, oily substances, other corrosive materials and other substances that may cause functional failure, so as to avoid damage. If the junction box and connector are contaminated, do not continue to use;**

Use appropriate materials

- **Based on local fire protection, building and electrical codes, use special solar cables and connectors of the same brand and model used in the**

ancient PA219 module, and ensure good electrical and mechanical performance of the cable.

- The licensed solar cable is a single wire cable, 2.5-10mm² (8-14 AWG), grade 90°C, with appropriate insulation to withstand the maximum system open circuit voltage. The appropriate conductor specification should be selected to reduce voltage drop. The conductor material is copper.

cable protection

- Secure the cable to the installation system with a zip tie that has UV resistance. Appropriate measures should be taken to protect exposed cables from damage (e.g., place them in a plastic sleeve with UV resistance).

5.2 Grounding

- The component part of the PA219 has no metal conductor and does not need to be set up.

6.0 Installation Guide

6.1 modules and construction tools

6.1.1 modules

Applicable component model:

Electrical performance parameters are shown in Annex A

6.1.2 Construction tools

Structural adhesive, cleaning tools, tape measure, line laying, etc.

- Structural adhesive



adhesive

■ Electric glue gun



■ cleaning machine



6.2 Precautions for component unpacking, handling and inspection

- During transportation, in order to ensure the safety of modules, please open the component packing box after arriving at the installation site;
- Before unpacking, please check whether the packing box is damaged;
- Unbox personnel are advised to wear anti-slip gloves in advance;

- Under no circumstances shall the junction box or connecting cable be used as a handle to lift or move the assembly;
- To avoid damaging the battery, two people should lift the four corners of the component (away from the battery position) to move the component;



- Be careful during the handling of modules to avoid the edges of modules hitting the ground or other sharp and hard objects;
- Please check whether the surface of the component is damaged. If the surface material of the component is damaged or worn, do not use it;
- Check whether the junction box, connector and cable are damaged and whether the box cover is tightly closed. If there is damage, do not use it;
- It is strictly prohibited to paint, apply adhesive, label and other operations on the surface of the modules.

6.3 Construction precautions

- It can be normally constructed in the temperature range of 5 to 40°C and humidity below 80% (the specific construction temperature range is subject to the information of the special adhesive manufacturer);

- The surface of the base must be cleaned or wiped clean, and kept dry, free of floating soil, oil and other dirt. In order to achieve the required adhesion, the roof shall be cleaned with the cleaning agent specified in Annex B or the cleaning agent approved by Shangmai;
- The bonding area should not be torn or peeled off within 24 hours after construction;
- The roof angle is less than 45 degrees;
- The adhesive surface needs to be flat, no dents or protrusions;
- When storing auxiliary materials used in construction, the storage specifications of auxiliary materials shall be followed.
- Ensure that the substrate has been tested and matches the adhesive or bonding method specified in the manual. If unsure, consult Sun gold and confirm.

6.4 Structural adhesive construction code

- After cleaning the construction surface, the surface should be free of water stains before applying glue;
- After applying the adhesive, the width should be no less than 10mm and the height no less than 5mm; after bonding, the height of the structural adhesive must reach 3-10mm, neither too high nor too flat. If it is too high, it will cause the curing time of the structural adhesive to be excessively long; if it is too flat, it will lead to the failure of the bonding strength of the structural adhesive. Do not use your feet or any other non-designated tools to compact the structural adhesive;
- The coating must be uniform and continuous, and the strip should not be flattened before pasting. The strip should be spread by the weight of the component;
- The glue application and assembly time should be controlled to the shortest time (should not exceed 5 minutes);

- Structural adhesive will solidify 2~3mm deep within 48 hours. Do not apply force, move modules, or perform pull tests until fully cured;

不同环境温度下专用胶固化表 Special glue curing table at different ambient temperatures			
环境温度Ta Ambient Temperature	$-10 \leq T_a \leq 0$	$0 < T_a < 20$	$20 \leq T_a \leq 45$
完全固化时间 (Day) Full Solidification Time	21	14	7
标准固化条件: 温度 $(23 \pm 2) ^\circ \text{C}$ 、湿度 $(50 \pm 5) \%$ 条件下7天可完全固化 Standard solidification conditions: temperature $(23 \pm 2) ^\circ \text{C}$, humidity $(50 \pm 5) \%$ conditions can be completely solidified in 7 days			

Table 1. Complete curing time of special adhesive

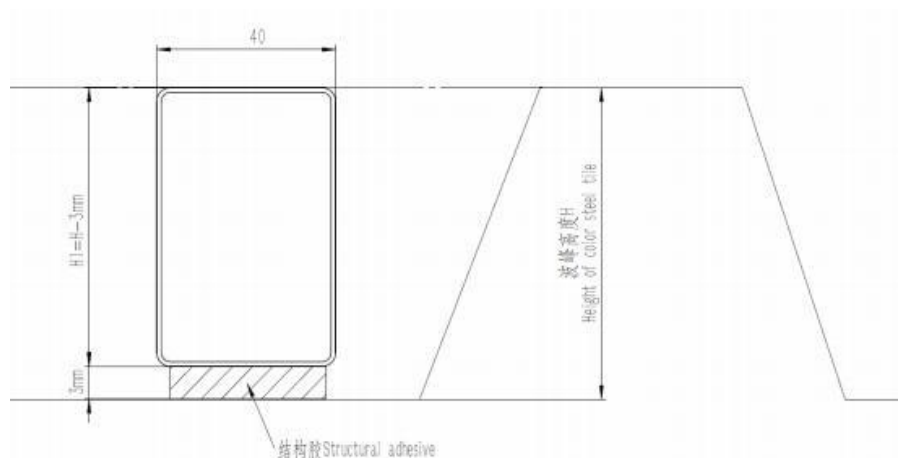
(This table is only used as a reference table for the curing time of Tian Shan 1527 structural adhesive. For different models of special adhesives from different manufacturers, the specific curing time shall be based on the information of special adhesive manufacturers)

6.5 Construction plan for ladder color steel sheet

Installation steps

6.5.1 Support

- Level the aluminum square tube



Material: aluminum profile 6063-T5/T6

Surface treatment: Anodizing AA10 or above

Dimension: $B=40\text{mm}$, $H1=(H-3\text{mm}) \pm 2\text{mm}$

6.5.2 Clean the roof

Remove debris from the roof substrate and clean the roof substrate with a specified or approved cleaning agent (see Annex B). If the roof substrate is very dirty, spray with low pressure water or use a power washer before using the cleaning agent (1/4 cup of trisodium phosphate, 1/2 cup of liquid cleaner (optional) and 5 gallons of water).



6.5.3 Line laying and positioning

- Determine the position of the modules on the roof according to the design drawings and conduct line measurement;

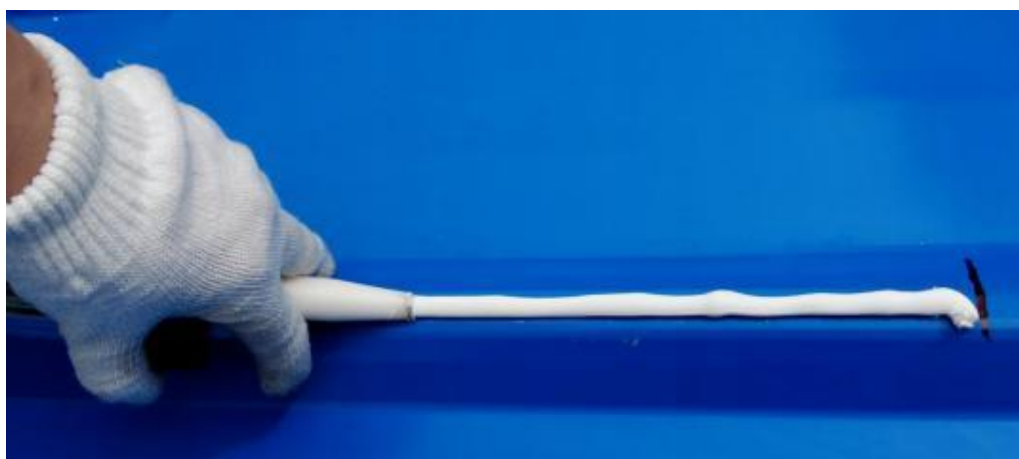


- If there is a splicing situation from the roof ridge to the eaves of the color steel plate roof, the joint shall be placed between the modules. A single component shall not cover the joint;

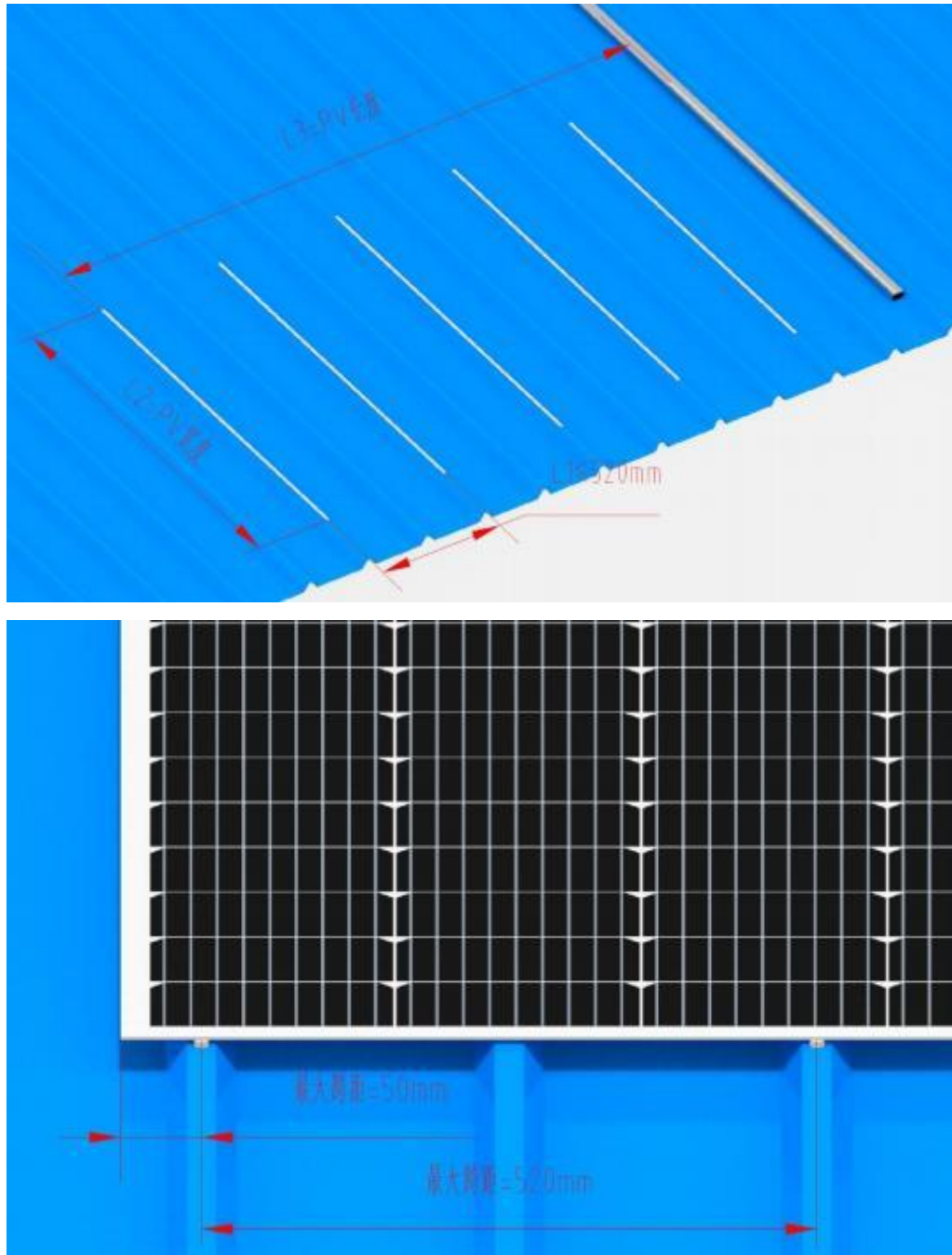


6.5.4 Apply structural adhesive

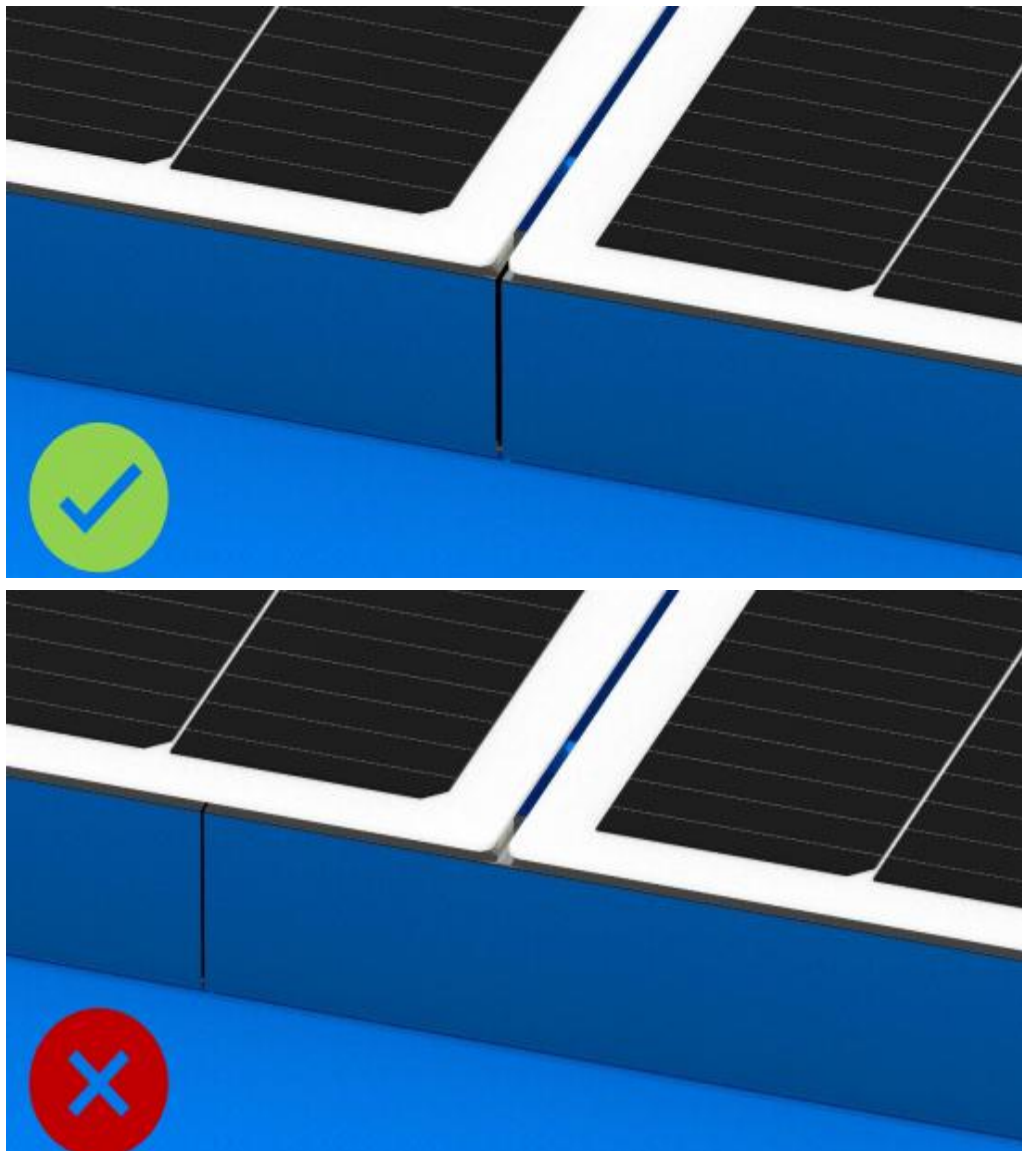
- On the crest platform of color steel plate, glue should be applied continuously and evenly; spot glue application or segmented glue application is strictly prohibited;



- The length of structural adhesive L2 is equal to the width of the component, and the spacing of structural adhesive L1 is less than or equal to 520 mm, and the cantilever part of the component is more than 50mm, so aluminum square tube is used to level;



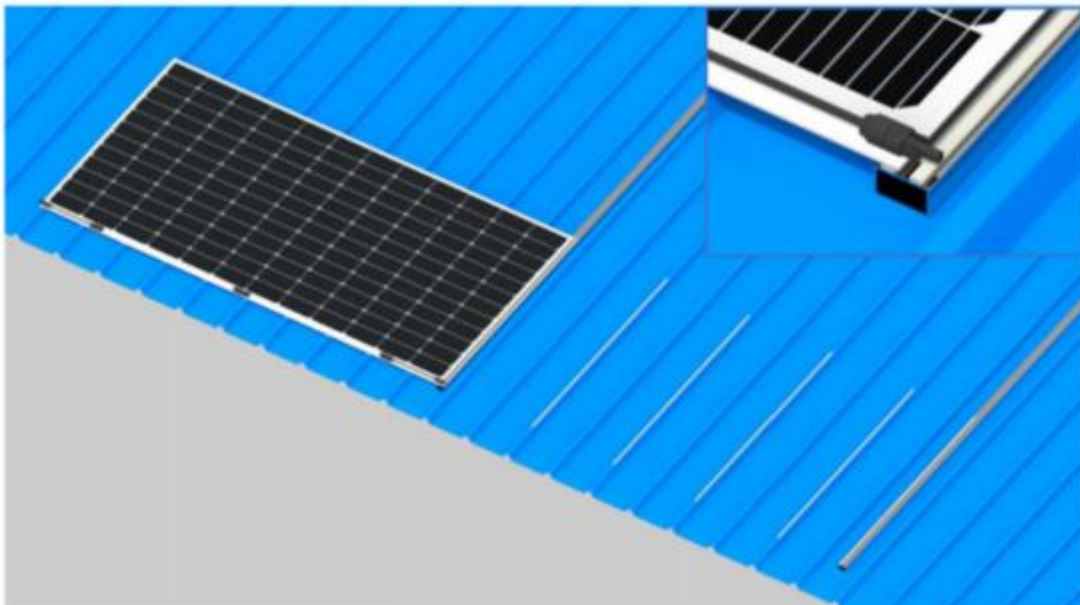
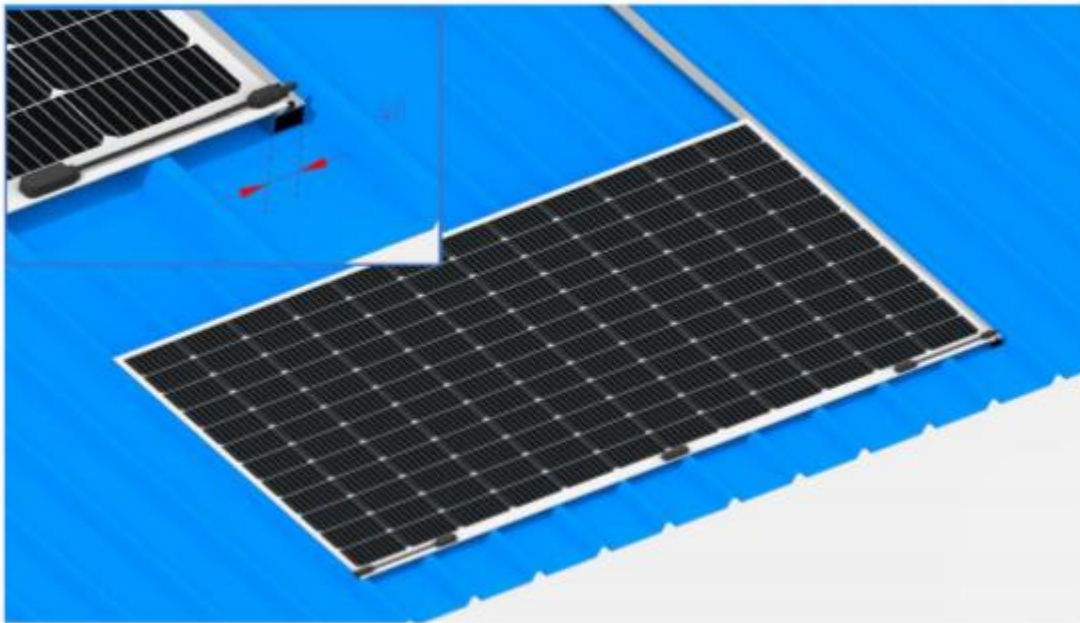
- If there is a splicing situation in the aluminum square pipe, the joint shall be placed between the modules. A single component shall not cover the joint of the aluminum square pipe;

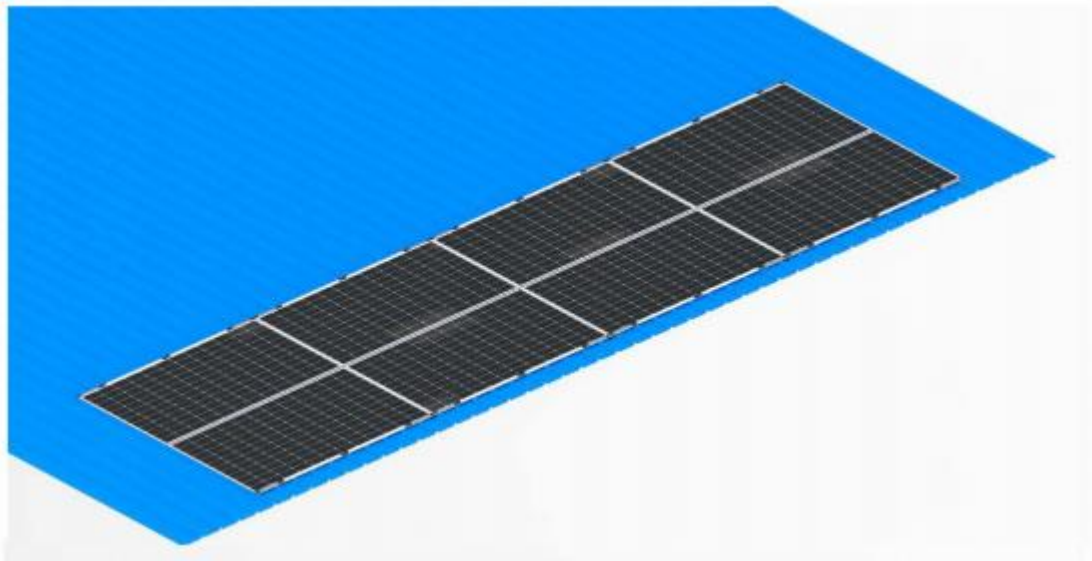


6.5.5 Paste modules

- Do not twist the component excessively when installing the component. Two people should grab the white edge of the component and slowly put it into the glue area. When sticking the component, it should be horizontal and vertical, and do not stick it twice;
- The short side of the component must be parallel to the crest of the color steel plate, and it is forbidden to be perpendicular to the crest of the color steel plate;
- After the modules are flat, do not press the battery to stabilize it;

- The minimum distance between modules is 5mm, and the construction and maintenance passage between arrays is 500~800mm (this spacing is for reference only);
- Adjacent modules share the leveling aluminum strip;
- The junction box is placed on the maintenance passage side for easy wiring and inspection;
- Install other modules according to the above steps.



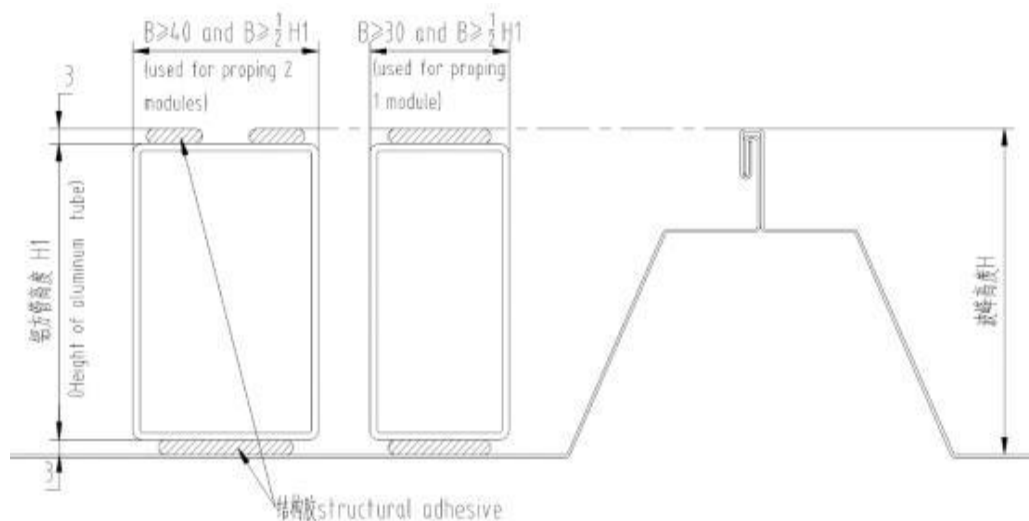


6.6 Construction plan of vertical edge color steel sheet aluminum square tube

Installation steps

6.6.1 Support members

■ Level the aluminum square tube



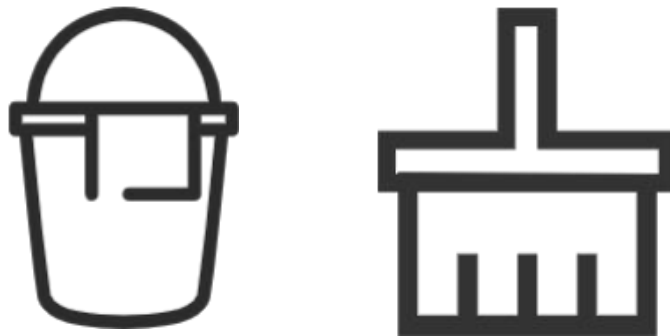
Material: aluminum profile 6063-T5/T6;

Surface treatment: anodizing AA10 or above; size: $H_1 = (H - 6\text{mm}) \pm 2\text{mm}$;

For the square tube shared by the two modules, $B \geq 40\text{mm}$ and $B \geq \frac{1}{2} H1$; for other square tubes, $B \geq 30\text{ mm}$ and $B \geq \frac{1}{2} H1$.

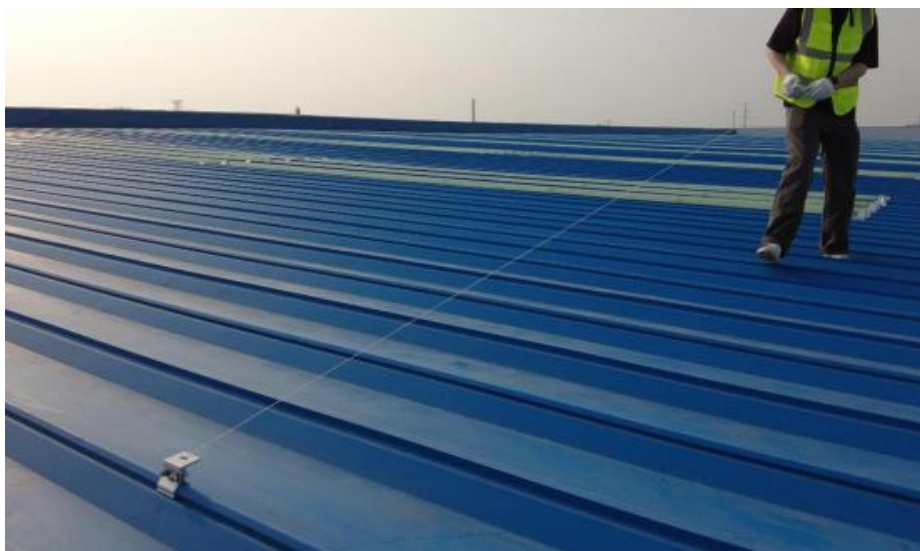
6.6.2 Clean the roof

- Remove debris from the roof substrate and clean the roof substrate with a specified or approved cleaning agent (see Annex B). If the roof substrate is very dirty, spray it with low-pressure water or use a power washer before using the cleaning agent. Use (1/4 cup sodium tripolyphosphate, 1/2 cup liquid cleaner (optional) and 5 gallons of water) to clean it.



6.6.3 Line laying and positioning

- Determine the position of modules on the roof according to the design drawings, and conduct line measurement;

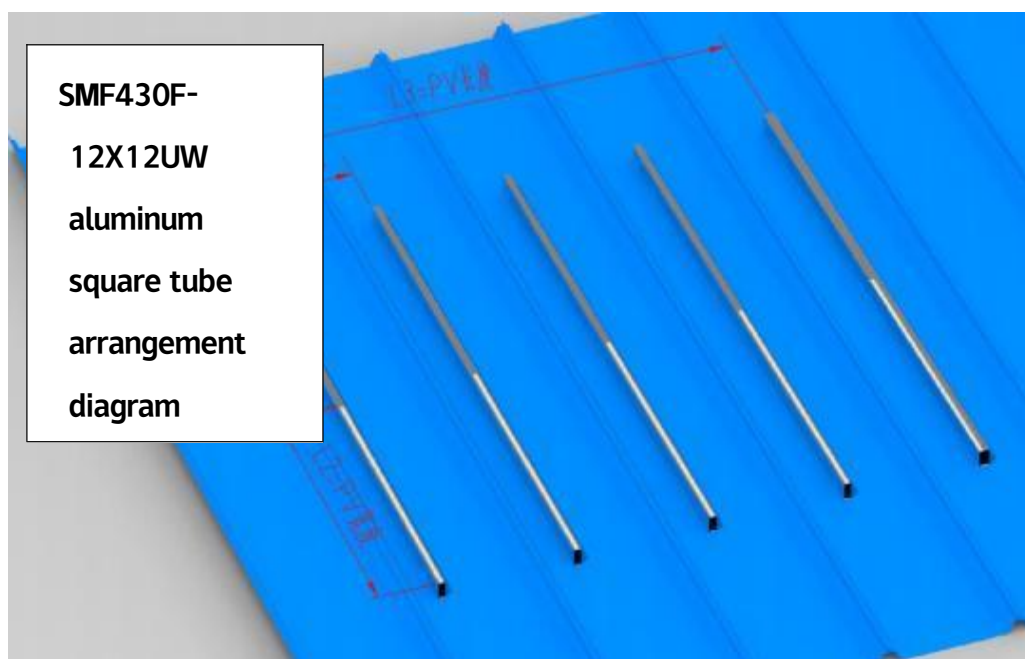


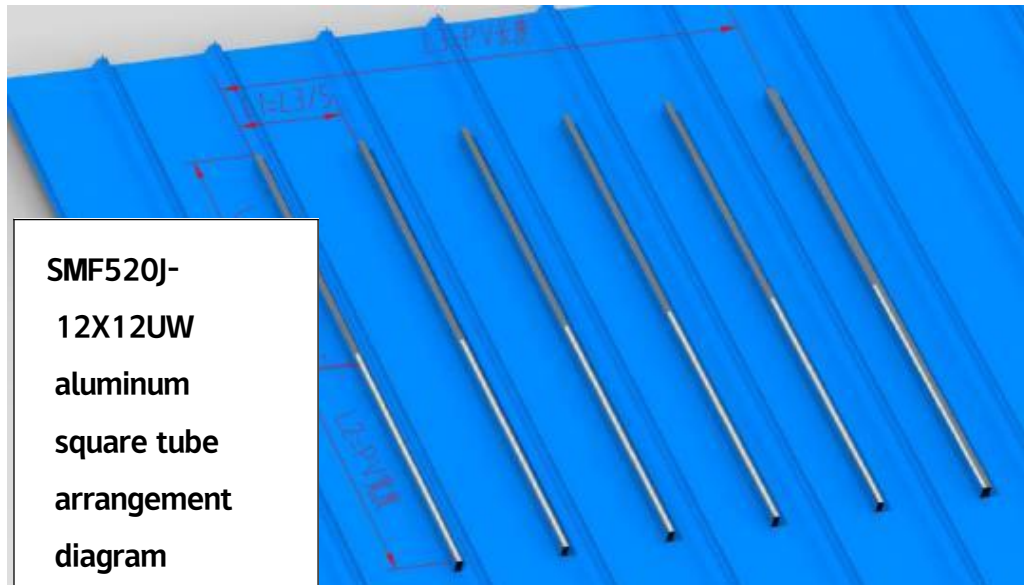
- For SG-PA219-430 W modules, no less than 5 aluminum square tubes shall be used to support, and evenly distributed in the length direction of the modules;
- For SG-PA219-475 W modules, no less than 6 aluminum square tubes are used to support, and they are evenly distributed in the length direction of the modules;
- When the square tube position interferes with the wave crest, the square tube position can be adjusted appropriately;
- If there is a splicing situation from the roof ridge to the eaves of the color steel plate roof, the joint shall be placed between the modules. A single component shall not cover the joint;



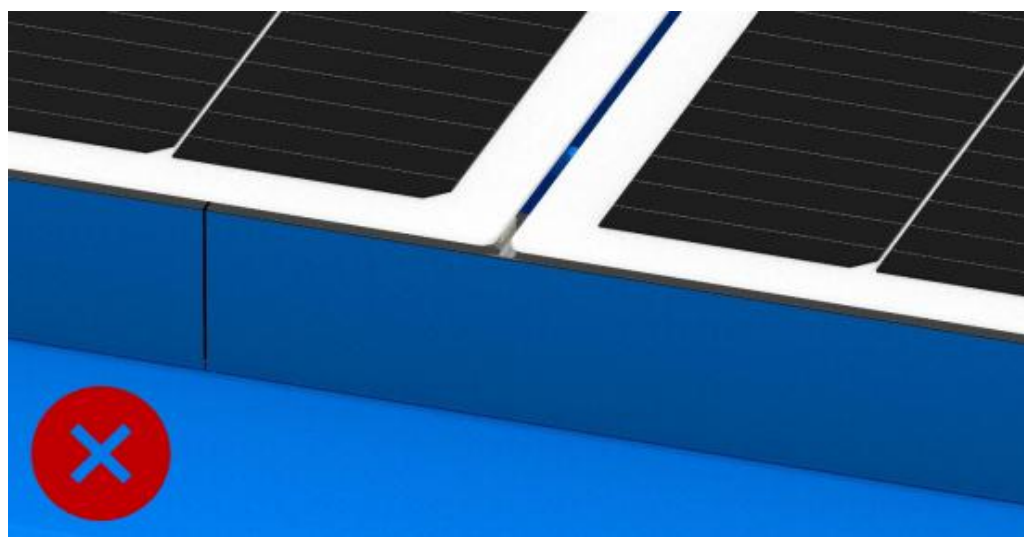
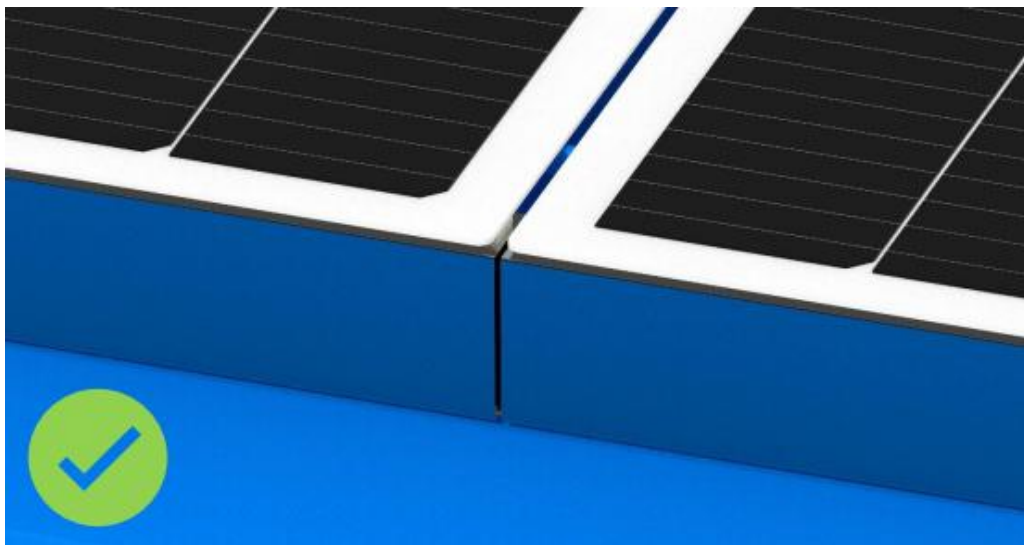
6.6.4 Apply structural adhesive

- Apply glue continuously and evenly on the color steel plate wave valley, and it is forbidden to apply glue in spots or in segments;
- Paste aluminum square tubes. Use square tubes with a width of at least 40mm at the common use area between two modules, and use square tubes with a width of at least 30mm at other positions;
- The structural adhesive length L2 is equal to the component width, and L3 is equal to the component length;
- Apply glue evenly on the upper surface of the square tube;





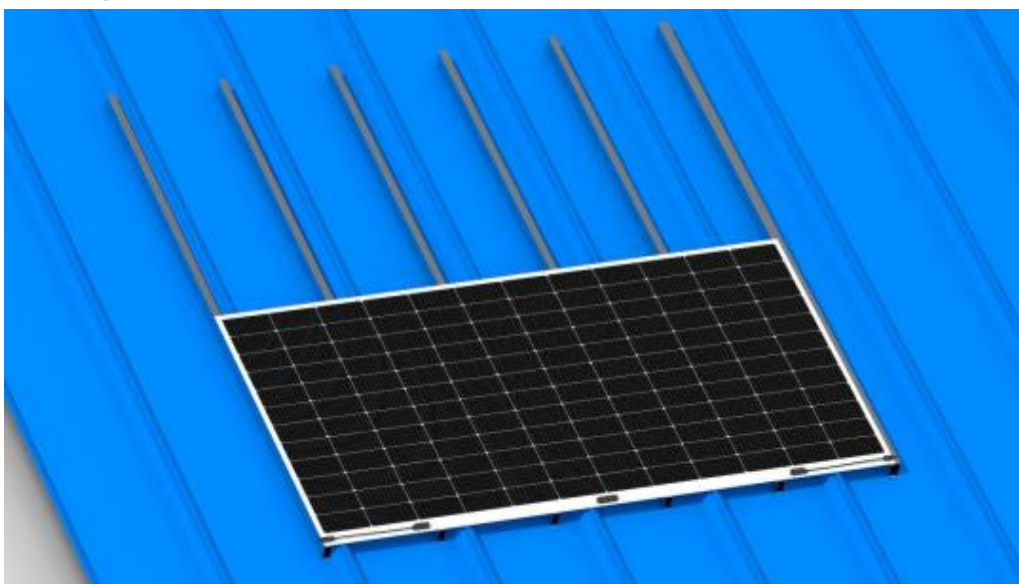
■ If there is a splicing situation in the aluminum square tube, the joint shall be placed between the modules. A single component shall not cover the joint of the aluminum square tube;

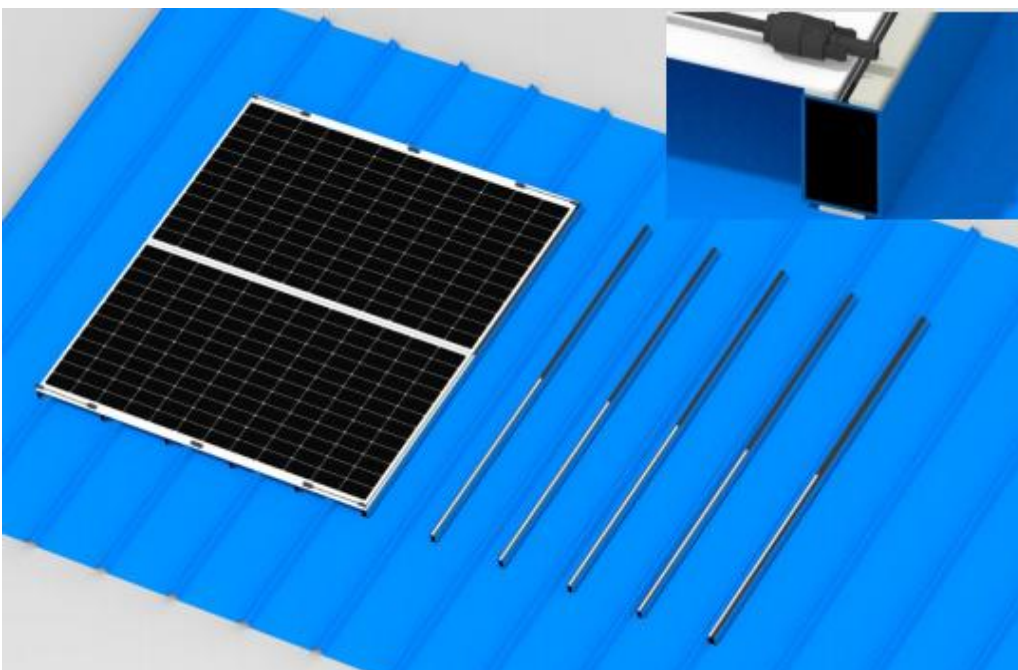
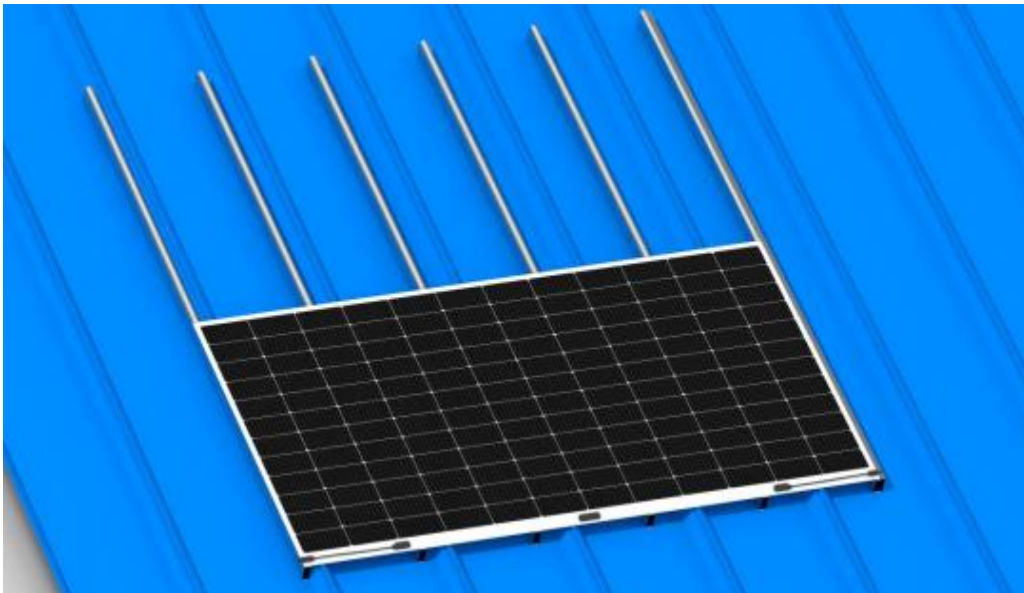
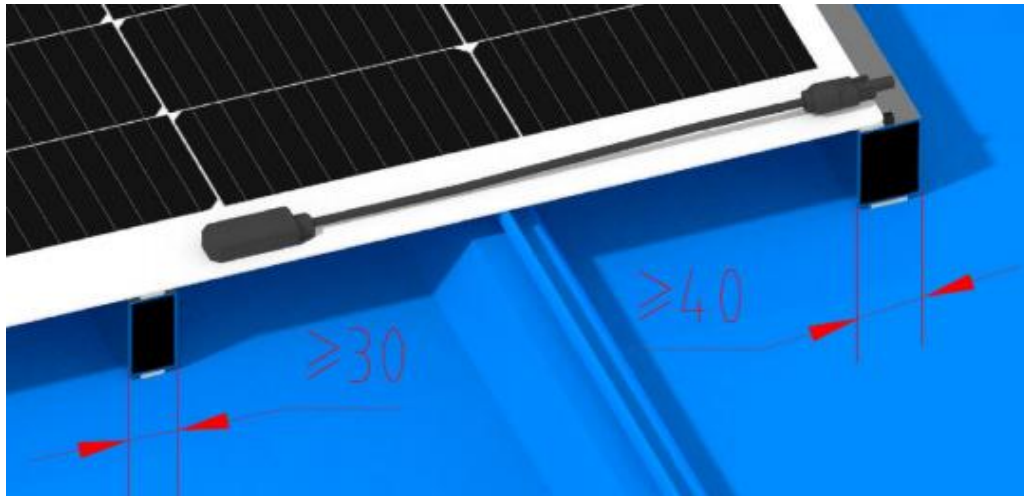


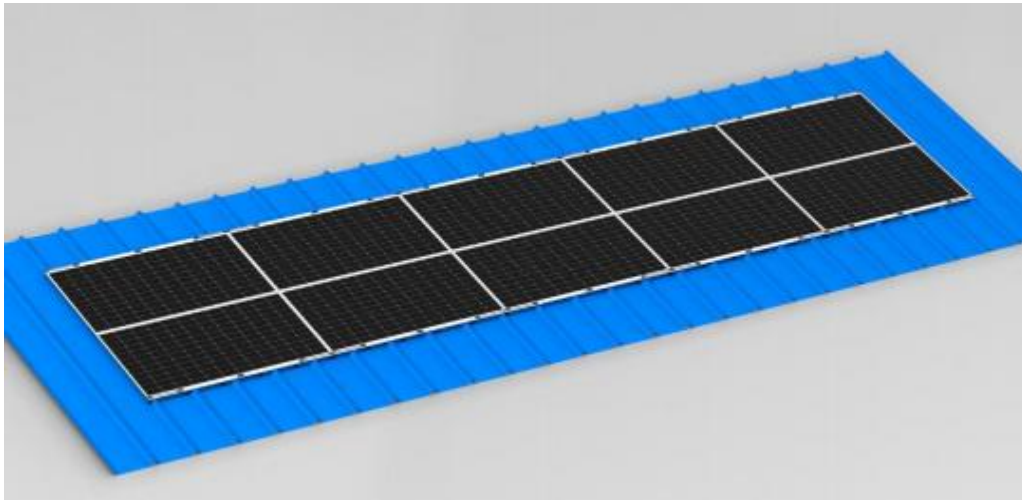
6.6.5 Paste modules

- Do not twist the component excessively when installing the component. Two people should grab the white edge of the component and slowly put it into the glue area. When pasting the component, it should be horizontal and vertical, and do not paste twice;
- The short side of the component must be parallel to the aluminum square tube, and it is forbidden to be perpendicular to the aluminum square tube;
- After the component is flat, do not press the battery with your hand to stabilize it;
- The minimum distance between modules is 5mm, and the construction and maintenance passage between arrays is 500~800mm (this spacing is for reference only);
- Adjacent modules share the leveled aluminum square tube;
- The junction box is placed on the maintenance passage side for easy wiring and inspection;
- Install other modules according to the above steps.

Note: The following schematic diagrams are for SG-PA219-475 W modules. Other model modules can be constructed by referring to this step.







6.7 Construction plan of aluminum square pipe on flat roof

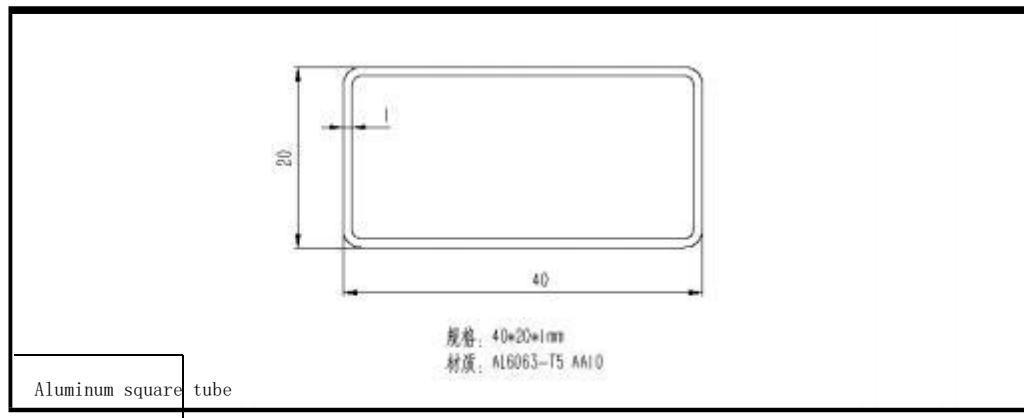
Installation steps

If the surface of the asphalt membrane roof contains a protective film, the film must be removed before construction and installation can be carried out.

Note: The installation steps are illustrated for TPO roof for reference only. Different roof types can be constructed according to these steps.

6.7.1 Support members

- Aluminum square tube



6.7.2 Clean the roof

Remove debris from the roof substrate and clean the roof substrate with a specified or approved cleaning agent (see Annex B). If the roof substrate is very dirty, spray it with low-pressure water or use a power washer before using the cleaning agent (1/4 cup sodium tripolyphosphate, 1/2 cup liquid cleaner (optional) and 5 gallons of water).



6.7.3 Positioning and layout

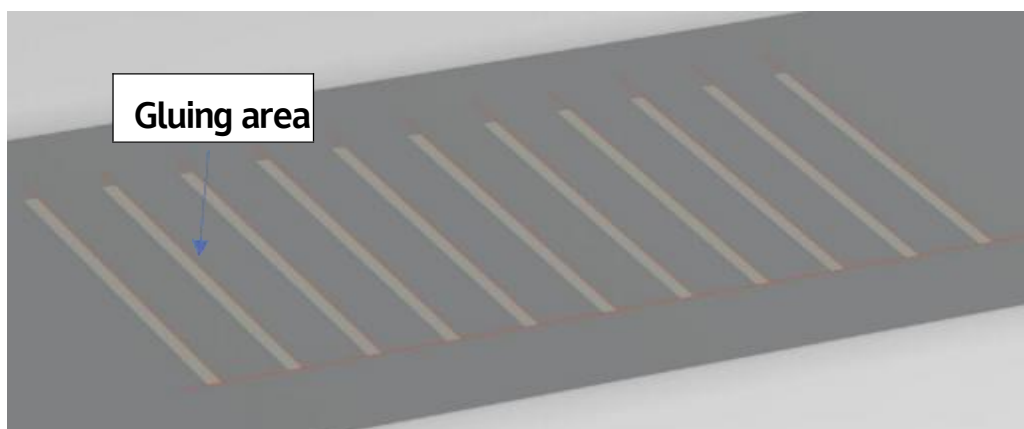
- Determine the spacing of aluminum square tubes according to the design drawings (please contact Shangmai New Energy for design drawings);



- For the SG-PA219-475 W component, no less than 5 aluminum square tubes are used to support the component and they are evenly distributed along the length of the component.
- For SG-PA219-475 W modules, no less than 6 aluminum square tubes are used to support and are evenly distributed in the length direction of the component.

6.7.4 Primer coating (this step can be ignored if the substrate does not require primer coating)

- Determine the glue area of the modules on the cleaned roof (refer to the design drawings for specific dimensions);

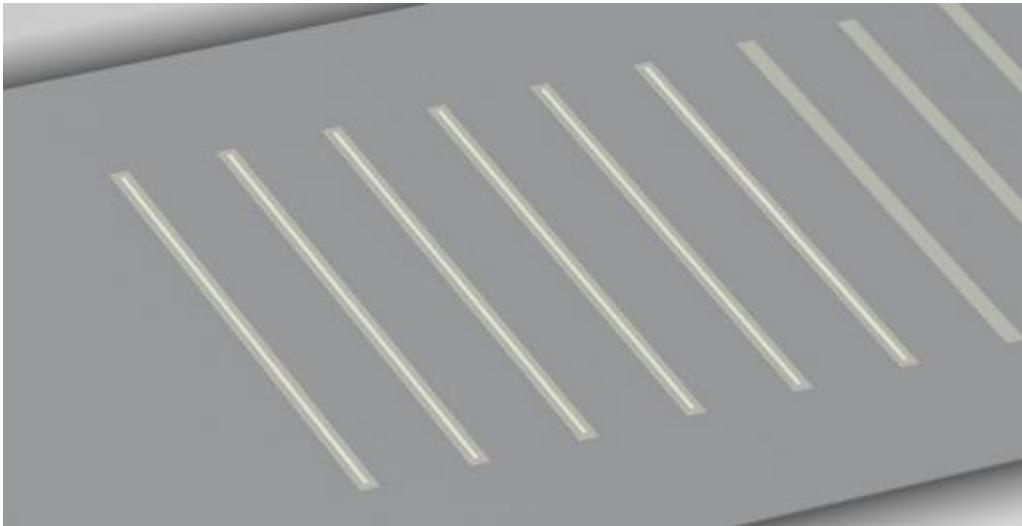


- Secondary cleaning of the coated area, using the special cleaner B to wipe the area;

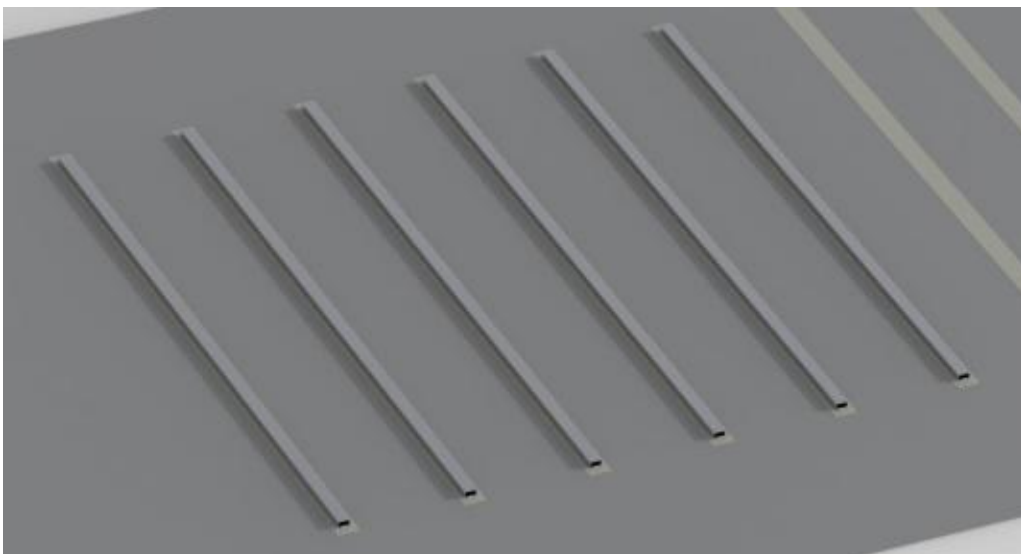
■ In the coating area, a layer of primer is applied before the structural adhesive is applied to increase adhesion.

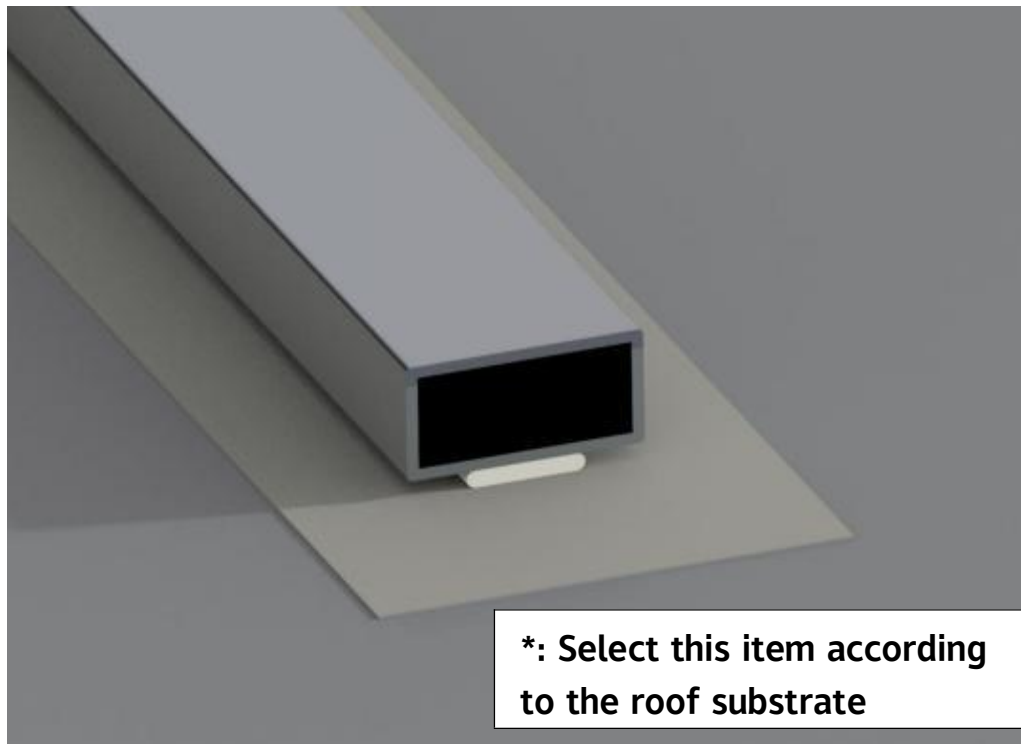
6.7.5 Paste square tubes

■ According to the requirements of the glue application specification, the glue application operation shall be carried out in the glue application area, and the glue shall be applied continuously and evenly. It is strictly prohibited to apply the glue in spots or in segments;



■ Paste the square tube and stick it along the glue path, gently press it to keep the glue thickness not less than 3mm;

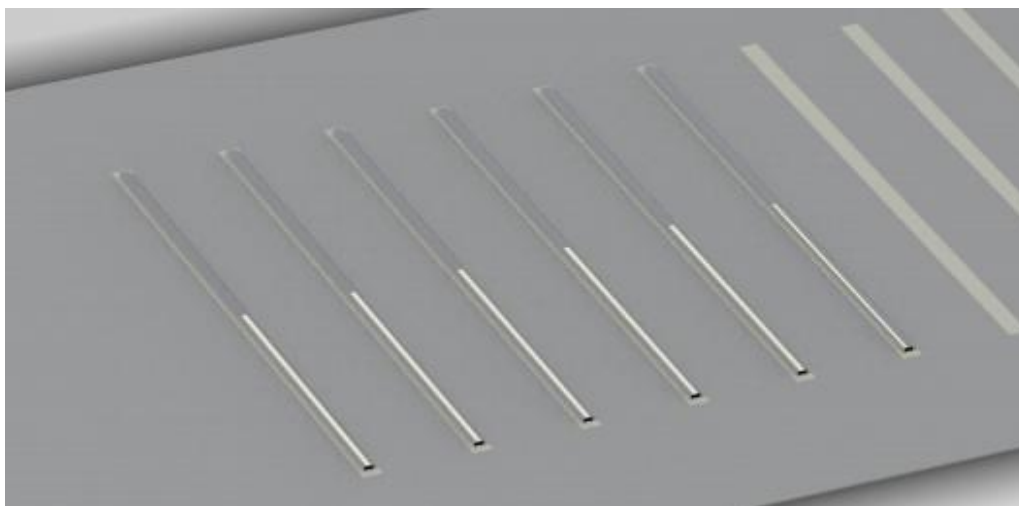




6.7.6 Paste modules

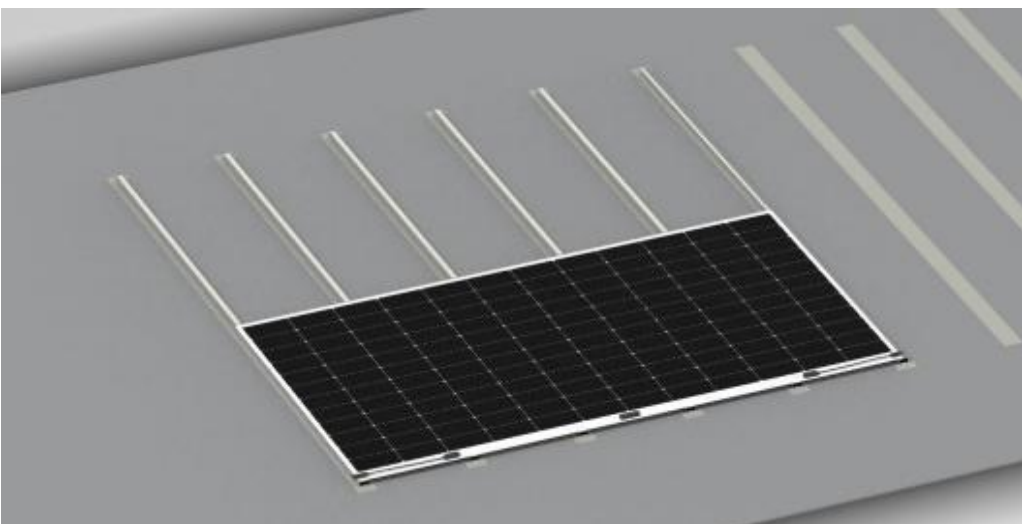
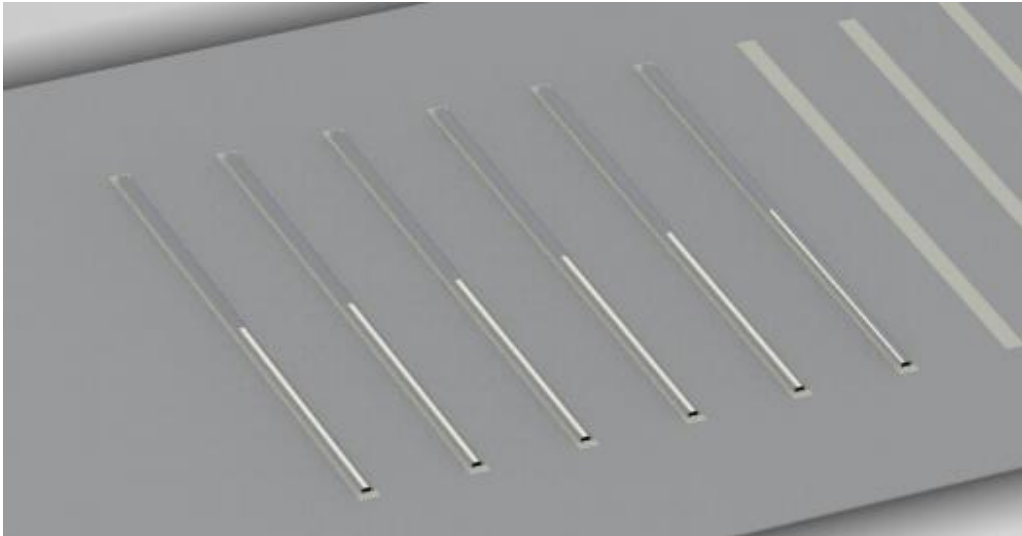
- According to the requirements of the glue application specification, the glue application operation shall be carried out on the upper surface of the square tube, and the glue application shall be continuous and uniform, and it is strictly prohibited to apply the glue in spots or in segments;

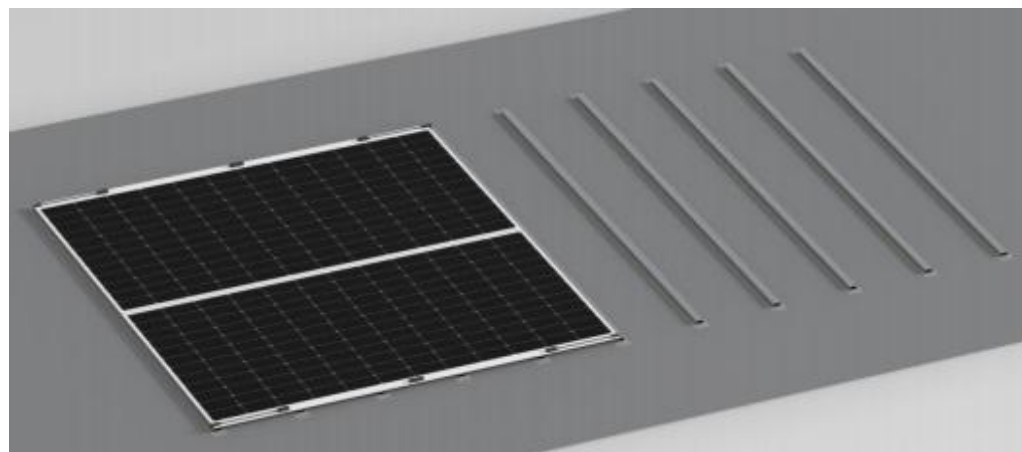
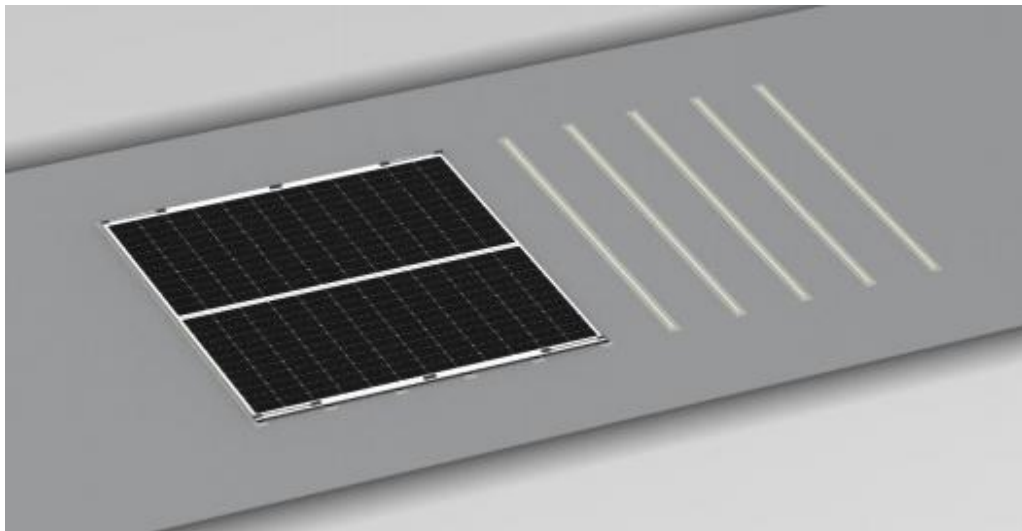


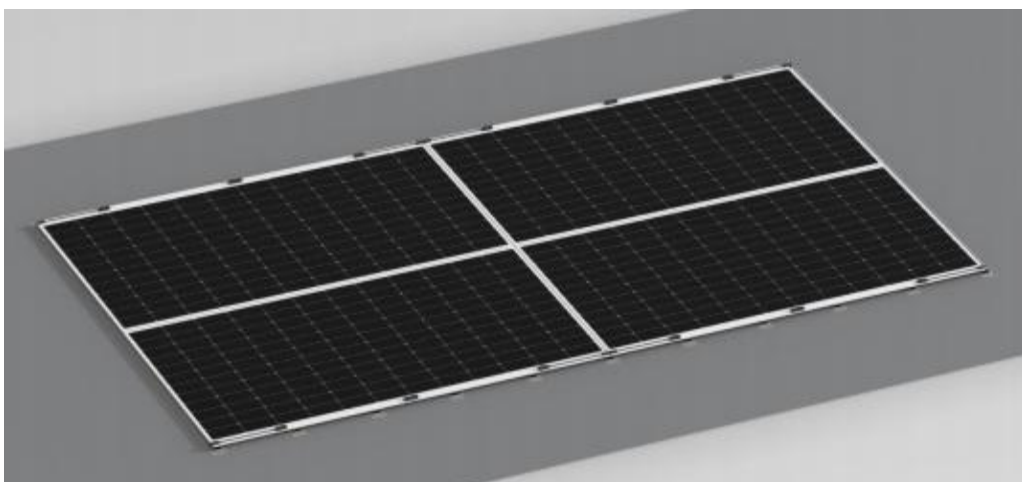
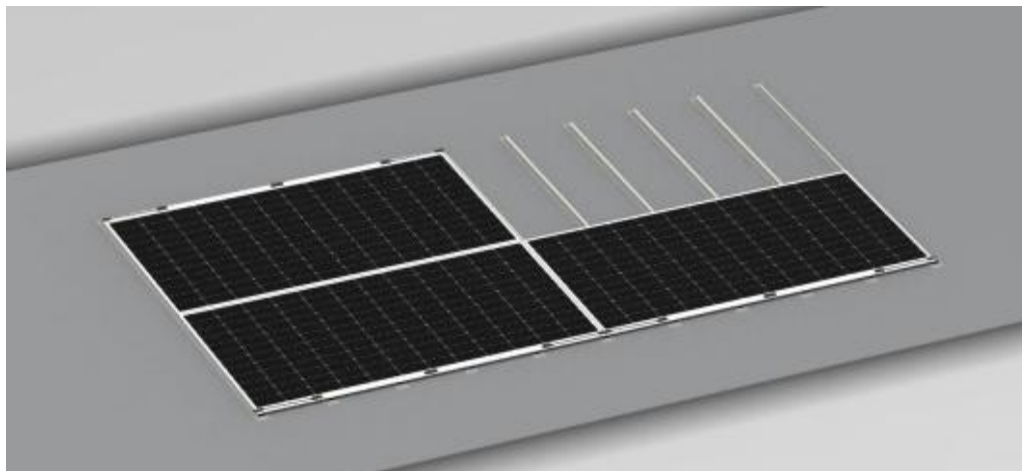
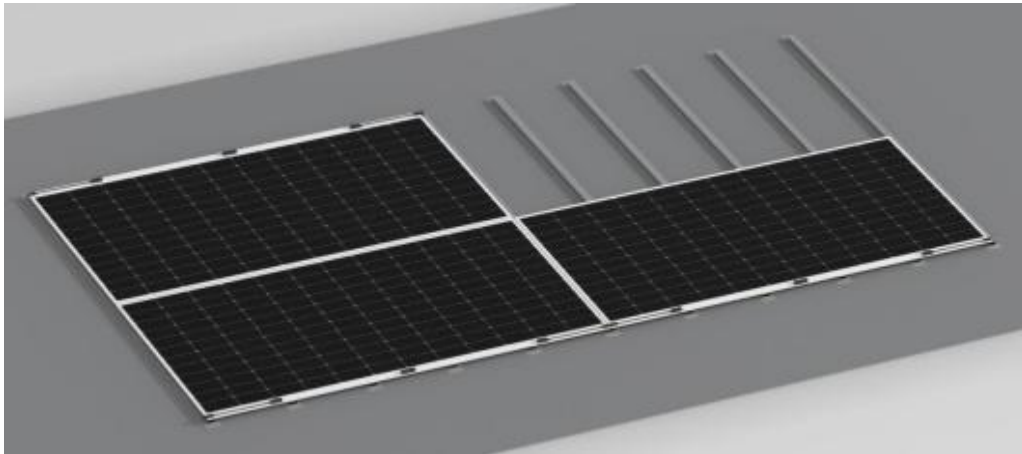
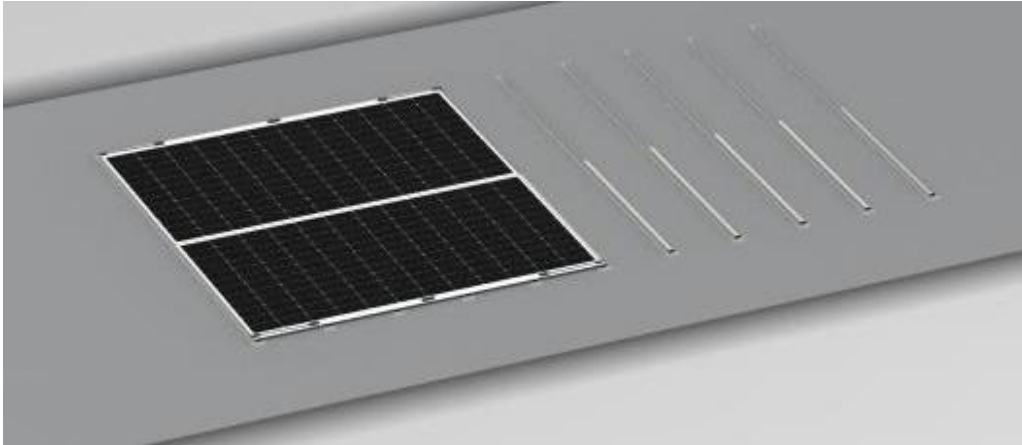


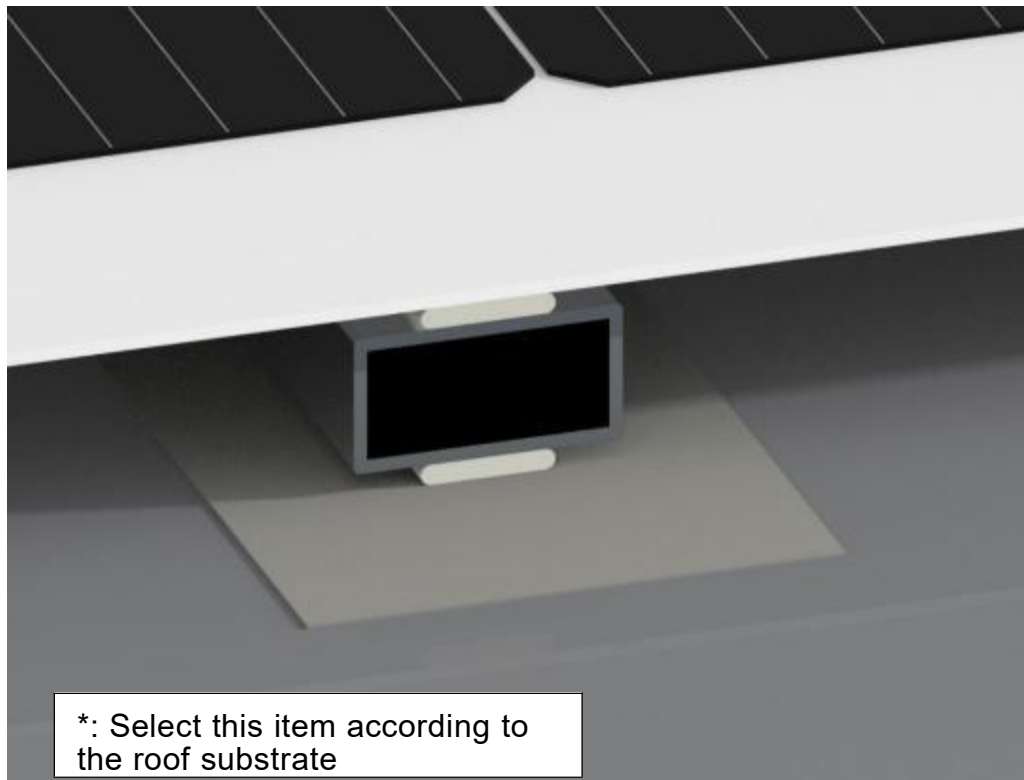
- Do not twist the component excessively when installing the component. Two people should grab the white edge of the component and slowly put it into the glue area. When pasting the component, it should be horizontal and vertical, and do not paste it twice;
- The short side of the component must be parallel to the aluminum square tube, and it is forbidden to be perpendicular to the aluminum square tube;
- After the component is flat, do not press the battery with your hand for stability;
- The minimum distance between modules is 5mm, and the construction and maintenance passage between arrays is 500~800mm (this spacing is for reference only);
- If the component selection is 12*11 series (i.e., the junction box is in the long direction of the photovoltaic module), place the junction box on the edge to facilitate the wiring of the string and maintenance inspection;
- Install other modules according to the above steps.

Note: The following schematic diagrams are for SG-PA219-475 W modules. Other types of modules can be constructed by referring to this step.



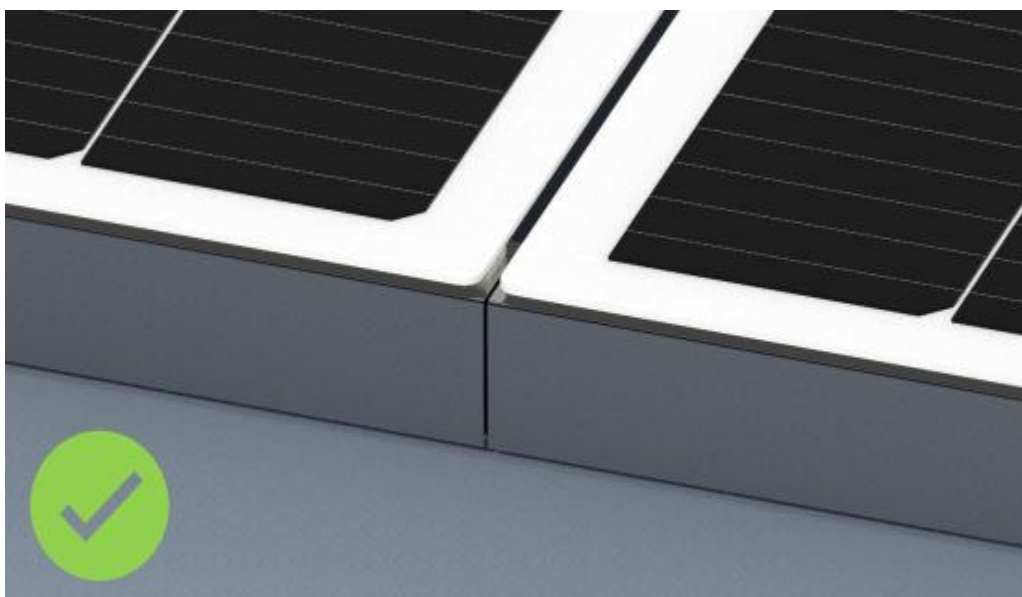


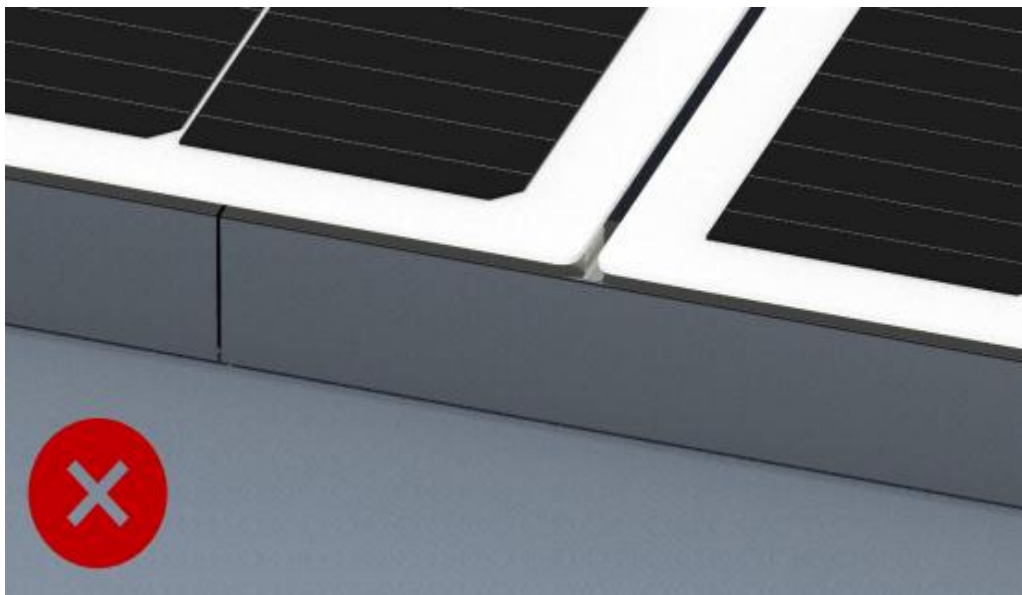




6.7.7 Square tube splicing

- If there is a splicing situation in the aluminum square tube, the joint shall be placed between the modules. A single component shall not cover the joint of the aluminum square tube;





6.9 Wiring and testing

- Prohibit the use of photovoltaic modules with different configurations in photovoltaic systems;
- Excessive cables must be organized or fixed in an appropriate position, and must not be covered by the battery;
- For applications requiring high operating voltage, several photovoltaic modules can be connected in series to form a photovoltaic group, and the system voltage is equal to the sum of the voltages of each photovoltaic module;
- For applications requiring high operating current, several photovoltaic modules can be connected in parallel, and the system current is equal to the sum of the currents of each photovoltaic module.
- The maximum system voltage is DC1500V;
- The maximum number of series photovoltaic modules depends on the system design, the type of inverter used and environmental conditions;

- According to the maximum series fuse rating of the PV module and local electrical installation specifications, if there is no fuse or blocking diode in the PV module, please ensure that no more than two strings are connected in parallel;
- There is no limit to the number of photovoltaic modules that can be connected in parallel (the fuse for each string should be considered), and the number of photovoltaic modules is determined by system design parameters such as current or power output;
- Refer to local regulations to determine the size, type and temperature of system wires;
- The photovoltaic module is equipped with connectors for system electrical connections. Please refer to local regulations and data sheets that allow the use of connectors;
- To ensure reliable electrical connections and prevent possible moisture intrusion, connectors must be fitted and locked together until a click is heard. Otherwise, an arc and shock may occur. Ensure that all electrical connections are secure and that all locked connectors are fully connected.

The DC power generated by the photovoltaic system can be converted into AC power and fed into the public grid. Since local power supply companies have varying policies for connecting renewable energy systems to the grid, you can seek help from a photovoltaic system designer or integrator to ensure smooth

approval, inspection, and licensing from the local power company department.

7.0 Operation and maintenance

To ensure that the modules achieve optimal performance and maximize the system power generation, the following maintenance measures are recommended:

1. Component appearance inspection, focusing on the following points:

- A) Whether the component is damaged;
- b) Whether there is contact between the component surface and a sharp object;
- C) Whether the modules are blocked by obstacles or foreign objects, and avoid new trees or new power poles from blocking the modules;
- D) Whether there is corrosion near the battery grid line. This corrosion is caused by damage to the surface packaging material of the component during transportation, resulting in water vapor penetration into the interior of the component.
- e) Check whether the special glue between the component and the roof is loose and adjust or repair it in time.

2. Component cleaning The accumulation of dust or dirt on the surface of the component will reduce the power output, so it should be cleaned regularly to keep the surface clean. Generally, it should be cleaned at least once a month, and the frequency should be increased appropriately under harsh natural conditions. When cleaning photovoltaic modules, attention should be paid to:

A) First rinse with clear water, then dry the water with a soft cloth, and do not use corrosive solvents to clean or wipe the photovoltaic module with hard objects;

b) Photovoltaic modules should be cleaned under irradiance of less than 200W/m², preferably when there is no sunshine or in the morning or evening;

C) It is strictly prohibited to clean photovoltaic modules under meteorological conditions with wind force greater than 4, heavy rain or heavy snow.

Note: Do not walk, stand or sit on the component for cleaning.

3 Component connector and cable inspection, it is recommended to perform a preventive inspection every six months:

A) Check signs of aging in pv modules. This includes possible rodent damage, climate aging, and whether all connectors are tightly connected and free of corrosion;

appendix A

Electrical performance parameters

Series	Products	STC					Module size (mm)
		Pmp	Vmp	Imp	Voc	Isc	
	SG-PA219- 475 W	475	46.46	12.65	39.99	11.88	2250 x1125 x 3
	SG-PA219- 430 W	430	42.03	12.70	36.14	11.90	2250 x1035 x 3
	SG-PA219- 385 W	385	37.90	12.62	32.58	11.82	2250 x940 x 3

appendix B:

A basic cleanser

Roof type	Recommend the name of the cleaning agent in ancient times
TPO, PVC, asphalt, EPDM, and other plastic roof surfaces	Plastic cleaning agent China: RA-1033 Overseas: Use cleaning agents recommended by roof material manufacturers
Color steel sheet, glass roof, metal roof	90% isopropanol + 10% water

Use the above cleaning agents or those recommended by the roof material supplier;



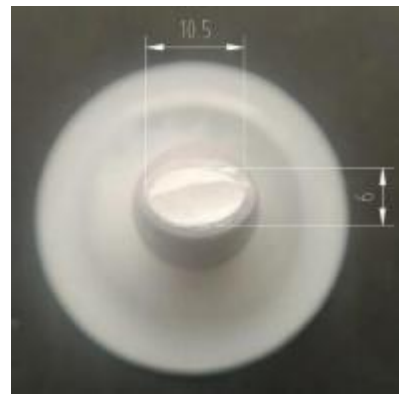
appendix C

Seal operation specifications

1. Cut the nozzle

The inner size of the standard nozzle cut is 10.5mm x 6mm.

When making, it is necessary to cut about 20mm length from the original nozzle, and then flatten it to the required size, as shown in the following figure:



Please follow the following operation mode for nozzle cutting;



Standard tool scissors (included with structural adhesive)

operating steps



1. Use a ruler or tape measure to measure 20mm length of the nozzle head to confirm the cutting position, and then use a tool to cut it off;



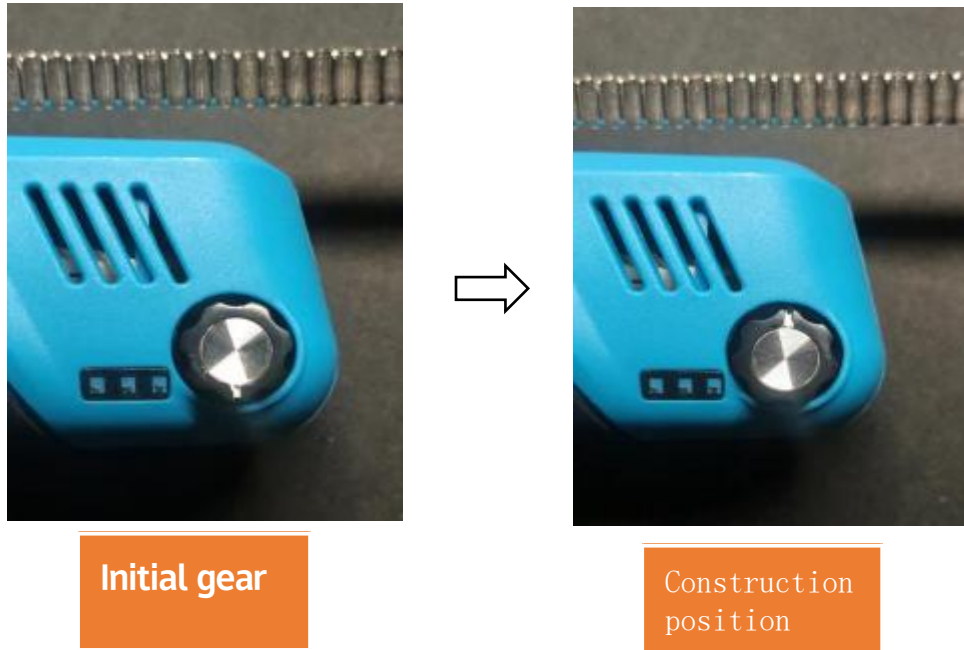
2. It is recommended to use a lighter to heat the nozzle for about 2s to prevent it from being flattened and rebounding;



3. Use the tool to cut the flat mold and squeeze the nozzle to the required size;

2. Electric glue gun adjustment

Standard glue output speed: rotate the speed knob half a turn, see the figure below:



3. Glue parameters

Seal length: average 10.8m/600ml

Gelling speed: about 10cm/s

Glue Angle: The glue gun is about 40° angle to the ground, as shown in the following figure:



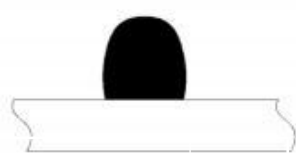
Gel size and standard quantity: at least 10*5mm; 5 strips/1

piece of module (gel along the width of the photovoltaic module);

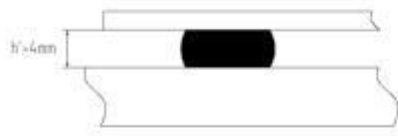
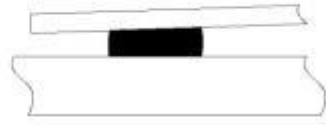
3 strips/1 piece of module (gel along the length of the photovoltaic module)

4. Structural adhesive form

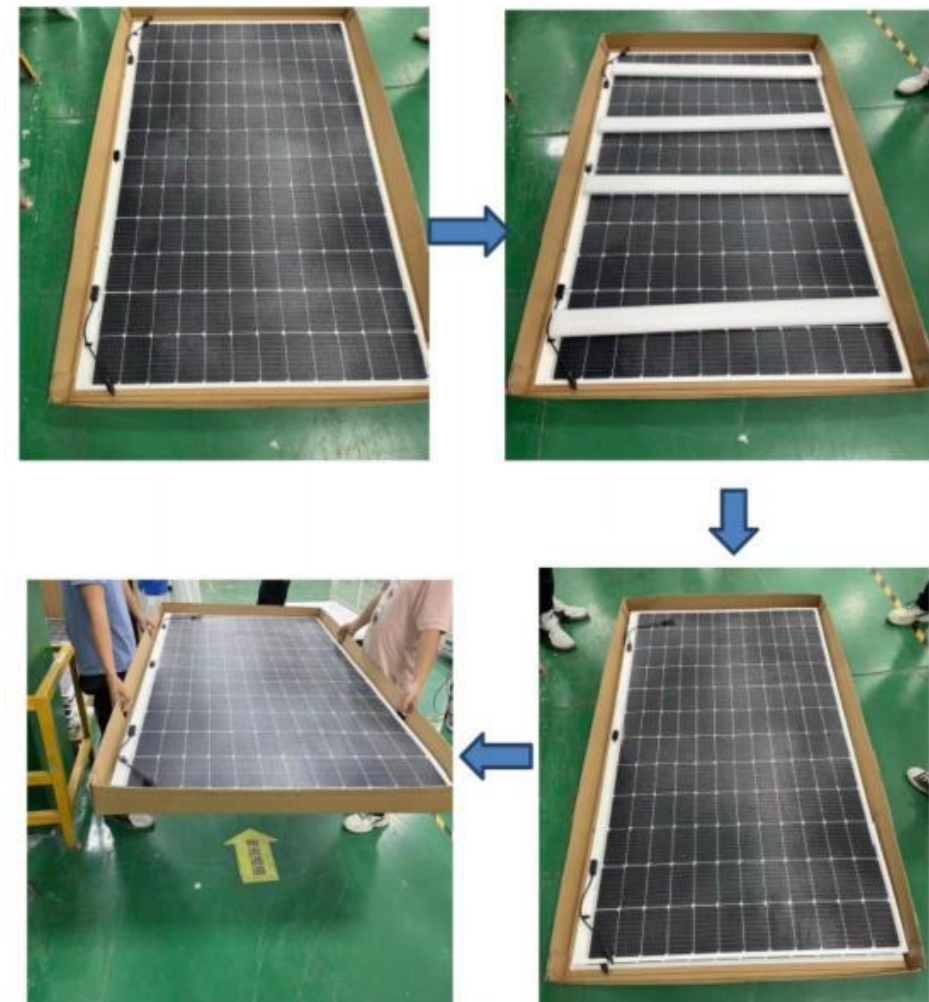
Read on for an understanding of the correct structural adhesive application

	
✓ Correct dimension	⚠ Too flat
	
⚠ Too high, too small	⚠ Poor wetting

The correct form of structural adhesive after pasting the component

	
✓ Correct dimension	⚠ Too flat
	
⚠ Too high	⚠ Inclined

The method of component stacking and handling is as follows



Box opening precautions

- When opening the box outdoors, avoid operating in rainy weather;
- When working outdoors in wind, the disassembled modules should be fixed;
- Before the modules are unpacked, stack the modules in a ventilated, rainproof and dry area;
- When cutting the outer packaging packing tape with scissors or craft knife, do not scratch the front or back of the component;

- The number of modules in the box should be confirmed in time after opening;
- The unpacking area should ensure that the packaging box is placed horizontally and stably to avoid component tipping;
- During unpacking and moving, please wear protective gloves correctly to avoid scratches;
- In no case shall the junction box or cable be pulled;
- Grab the component and prohibit touching the battery area with your hand.