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# Lightweight PV Installation Guide



# **OPENAX Lightweight Photovoltaic PV module**

## Installation Manual

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# I .Summary

## 1.1 Purpose of the Manual

First of all, thank you for choosing OPENAX photovoltaic PV modules (hereinafter referred to as "PV modules" purpose of this manual is to provide users with relevant information on how to use OPENAX PV modules correctly.

The installation and construction party must read and understand the safety and installation instructions in this manual before use and installation, and inform the end customer. If you have any questions, please contact our technical service department for more information. Professional skills are required for the installation and operation of solar PV modules, and only professionals can engage in this work. During the installation process, the construction party must comply with the safety precautions in this manual and local laws and regulations. Failure to comply with these safety guidelines may result in personal injury or property damage.

Please keep this manual properly for future reference (maintenance and upkeep) or for the possible sale and disposal of the PV modules.

## 1.2 Scope of Responsibility

OPENAX reserves the right to change this installation manual without prior notice and makes no warranties, express or implied, regarding any information contained in this manual. Failure to follow the requirements listed in this manual during the installation of the PV modules may result in the limited warranty provided to the customer being invalidated.

OPENAX is not responsible for any form of injury, including but not limited to bodily injury, injury, and property damage, resulting from PV module operation, system installation, or failure to follow the instructions in this manual.

If any non-OPENAX approved hardware is connected to the PV module, the limited warranty provided to the customer will be invalidated.

This manual is for reference only for PV module installation and does not represent any express or implied warranties by OPENAX regarding the performance, suitability, reliability, or other aspects of the PV modules.

# II .Applicable Products

This installation manual is applicable to solar PV modules below:

Type 1 OXP-XXX-F1MX、 OXP-XXX-F6MX、 OXP-XXX-F8MX

E.G.

OXP-XXX-F1MA、 OXP-XXX-F6MA、 OXP-XXX-F8MA  
 OXP-XXX-F1MB、 OXP-XXX-F6MB、 OXP-XXX-F8MB  
 OXP-XXX-F1MC、 OXP-XXX-F6MC、 OXP-XXX-F8MC  
 OXP-XXX-F1MD、 OXP-XXX-F6MD、 OXP-XXX-F8MD  
 Type 2 OXP-XXX-G1MX、 OXP-XXX-G6MX、 OXP-XXX-G8MX

E.G.

OXP-XXX-G1MA、 OXP-XXX-G6MA、 OXP-XXX-G8MA  
 OXP-XXX-G1MB、 OXP-XXX-G6MB、 OXP-XXX-G8ME  
 OXP-XXX-G1MC、 OXP-XXX-G6MC、 OXP-XXX-G8MC  
 OXP-XXX-G1MD、 OXP-XXX-G6MD、 OXP-XXX-G8MD

Type3 OXP-XXX-GFX

Note: XXX is a PV module power rating which set out in the relevant Product Datasheet(such as “OXP-100-F8ME、 OXP-400-G8MC、 OXP-200-GF6D”)

## III. Safety

### 3.1 Safety Guidelines

- The solar PV module is rated as Class A and can be connected to systems with a capacity greater than 50V DC or 240W in design. The PV module complies with relevant safety standards in IEC 61730 and IEC 61730-2 and meets the requirements of Safety Class II under this application level.
- The PV module should be properly grounded according to the requirements of this guide or national electrical regulations.
- Installation of the PV module requires professional skills and knowledge, and electrical connections must be operated by certified electricians in compliance with local laws and regulations.
- Installation personnel may be exposed to injury risks during the installation process, including but not limited to electric shock risks.
- A single PV module may generate a voltage of more than 30V under direct sunlight, and contact with a voltage of more than 30V may pose potential danger.
- The PV module is designed for outdoor use and can directly convert solar energy into DC power. It can be installed on rooftops, vehicles, or boats, and reasonable support structure design is the responsibility of system designers and installers.
- Do not use mirrors or magnifying glasses to concentrate sunlight onto the PV module.
- Local and national laws and regulations must be followed during the installation of the PV module, and building permits may be required if necessary.
- Only use equipment, connectors, cables, and support brackets that are compatible with the PV module.
- Do not use corrosive chemicals to clean the PV module.

## 3.2 Handling Safety

- Do not lift the PV module by grabbing the PV module junction box or leads.
- Do not walk or place heavy objects on the PV module.
- Do not drop or allow objects to fall onto the PV module.
- Handle the PV module with care during movement, transportation, and installation.
- Do not attempt to disassemble the PV module or remove any nameplates or accessories attached to the PV module.
  - Do not paint the surface of the PV module.
  - Do not scratch or hit the front and back of the PV module.
  - Do not use PV modules with torn back sheets or front films that pose an electric shock hazard.
    - Do not handle the PV module in damp conditions unless appropriate protective measures are taken.
      - Do not expose the PV module to sunlight for a long time before installation to avoid unnecessary degradation.
      - Ensure that the PV module is not subjected to severe vibration during all handling and transportation processes, as vibration may cause hidden cracks in the internal solar cells or damage to the PV module.
        - Do not allow the PV module to come into contact with sharp objects, as scratches can directly affect the safety of the PV module.

## 3.3 Installation Safety

- Installation work should follow IEC standards and electrical installation safety standards.
- Do not disconnect PV module connections with loads.
- Do not touch the conductive parts of the PV module, whether connected or not, as it may cause electric sparks, burns, and fatal electric shocks.
  - Do not install in rainy, snowy, or windy weather.
  - Do not expose the PV modules to artificial light, and use opaque materials to completely cover the surface of the PV modules during installation to prevent current generation.
    - Do not wear metal rings, watch straps, ear, nose, lip rings, or other metal items during installation and maintenance.
    - Only use insulated tools allowed for electrical installation work.
    - Comply with all other safety regulations for system accessories, including cables, connectors, load regulators, inverters, battery chargers, etc.
    - Under normal outdoor conditions, the current and short-circuit current generated by the PV module may differ from the data in the product parameter table. When designing the system, the current and short-circuit current should be multiplied by a factor of 1.25 for the selection of other accessories.
    - Only use connectors compatible with the PV module connector. Unauthorized disassembly of the connector will invalidate the warranty terms.

- Do not disassemble installed PV modules for other projects, which may cause the warranty to be void.
- The PV module is not installed within 500m of the coastline. When installed within 500~1000 meters, all system PV modules with anti-salt fog specifications must be used.

### 3.4 Fire Safety

- The fire rating of the PV module is only effective if this manual is fully complied with.
- Please consult local relevant departments for guidance and requirements on fire safety in construction projects. Do not use PV modules near equipment or locations that may produce flammable gases.
- Comply with local laws and regulations when installing PV modules.

## IV. Product Identification

Each PV module has two barcode stickers, a unique serial number, and a nameplate sticker.

Barcode 1: Laminated inside the PV module.



Barcode 2: Stuck on the back of the PV module.

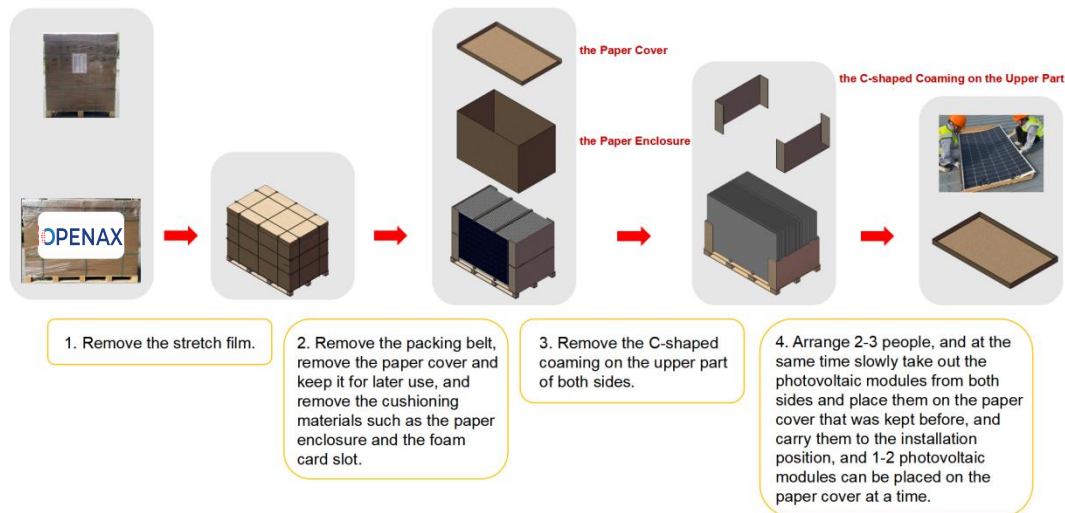


Nameplate: Stuck on the back of the PV module, containing various parameter characteristics of the PV module.

Please check whether the serial number on the barcode is consistent with the packaging list when unpacking. When you need Hanwha to provide support for specific PV modules, please provide your PV module serial number.

## V. Storage and Unpacking

- PV modules should be stored in a dry and ventilated environment.
- PV modules must be transported using the packaging box provided by Hanwha and stored in the original packaging box before installation.
- Open the PV module packaging according to the recommended unpacking steps, and protect the packaging from damage. Careful operation is required during the process of opening, transporting, and storing, and violent unpacking will invalidate the warranty terms.



- It is forbidden to apply excessive loads or twist the PV modules.
- It is forbidden to stand, climb, walk, or jump on the PV modules.
- It is forbidden to place the PV modules in an environment without reliable support or fixation.
- Keep all electrical interfaces clean and dry.
- It is strictly forbidden to brush paint, apply adhesive, or paste labels on the PV module surface.

## VI. Installation Guide

### 6.1 General Installation Guidelines

- It is recommended to install the PV modules with a minimum tilt angle of 10 degrees to ensure that dust can be easily washed off.
- It is recommended to leave at least 10 mm gap between the PV modules to prevent material expansion and contraction.
- The PV modules should be properly installed according to the corresponding mechanical load requirements.
- Pay attention to the temperature range of the photovoltaic PV modules:  $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$ .
- The PV modules should be installed at a sufficient height to keep them away from potential shading, flying sand, snow accumulation, and water.

### 6.2 Selection of Position and Angle

- We recommend installing the PV modules in a location with abundant sunlight resources. In the northern hemisphere, the PV modules should generally face south, while in the southern hemisphere, they should generally face north. The optimal installation angle of the PV modules will vary according to latitude and longitude, so please consult an expert with relevant knowledge when determining the installation location and angle.



- When selecting the installation location, avoid trees, buildings, or obstacles that may cast shadows on the PV modules, as shadows can cause hot spots and power loss. Even if the factory has configured a bypass diode in the PV modules, it can only reduce but not avoid these losses.
- Do not install the PV modules near open flames or flammable materials.
- Do not install the PV modules in places that may be flooded or constantly sprayed with water or fountains.
- Note that a construction and maintenance channel of 500-800mm should be reserved for the array.

## 6.3 Installation Method 1 (Structural Adhesive Method)

Taking the size of 1735\*1141mm PV PV module (Model: OXP-400-F8MC) as an example.

Tools:

Adhesive



Gluing gun



Cleaning tool: Power washer, High-pressure water gun or other cleaning tools



Roller Paint Brush



## 6.3.1 Installation Surface Cleaning

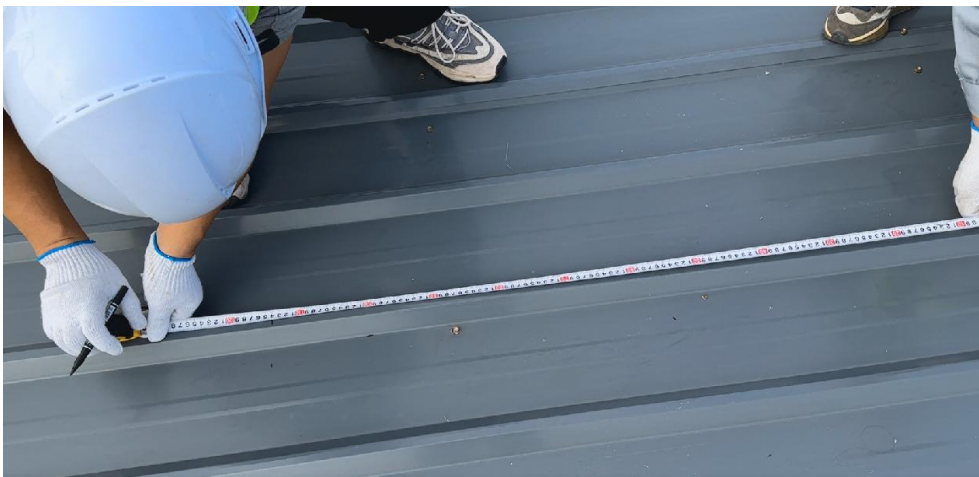
- Use a power cleaning machine to clean the entire installation surface before installation.
- If the roof is dirty, use a special cleaning agent suitable for the roof to clean it, and then use a power cleaning machine to rinse off the surface of the cleaning agent to ensure that the cleaning

agent is rinsed clean, otherwise it will affect the bonding effect.



### 6.3.2 Determination of PV module Installation Position and Area

Determine the installation area and position of the PV modules according to the design drawings.



### 6.3.3 Gluing (see Figure 1)

- Confirm whether the gluing position is clean. If it is not clean, use a clean cloth to clean it again.



- Confirm that there are no water stains on the surface of the gluing area before gluing.
- Use a glue gun to apply glue along the center of the wave peak. The width of the glue should not be less than 10mm, and the height should not be less than 4mm.



- The glue must be even and continuous. Do not scrape the glue strip before sticking it. Use extrusion to make the glue spread.
- The gluing and assembly time should be completed in the shortest time possible (no more than 5 minutes).
- The special adhesive will solidify to a depth of 2-3mm within 48 hours. Do not apply force or move it before it is completely solidified.



Figure 1

### 6.3.4 Installation (see Figure 2)

Two people hold the corners of the PV module and gradually fit it from one end to the other end in the direction of the length of the PV module, as shown in Figure 2, until it is fully adhered to the painted steel tile adhesive area. When sticking, ensure that it is level and vertical, and avoid secondary sticking.



Figure 2

As shown in Figure 3, after the components are flattened, do not press the battery cells (Black area) by hand to stabilize them. Use a soft-bristled roller brush to compact the components and roll the soft-bristled roller brush back and forth on the surface of the components to ensure that the glue and components are fully bonded.



Figure 3

## 6.4 Installation Method 2 (Tape Method)

### 6.4.1 Installation Surface Cleaning

- Use a power cleaning machine to clean the entire installation surface before installation.
- If the roof is dirty, use a special cleaning agent suitable for the roof to clean it, and then use a power cleaning machine to rinse off the surface of the cleaning agent to ensure that the cleaning agent is rinsed clean, otherwise it will affect the bonding effect.



### 6.4.2 Determination of PV module Installation Position and Area

Determine the installation area and position of the PV modules according to the design drawings.



### 6.4.3 Tape Pasting

- Confirm whether the gluing position is clean. If it is not clean, use a clean cloth to clean it again.



- Confirm that there are no water stains on the surface of the gluing area before pasting the tape.
- Paste the tape along the center of the wave peak to ensure that it is pasted flat.
- Tear off the release film or paper on the double-sided tape, and do not leave any residue or stick to other items.
- Ensure that the double-sided tape after tearing off the release film or paper is clean, and do not step on it or contaminate it.

#### 6.4.4 Installation (see Figure 5)

Do not excessively twist the PV module during installation. Two people should hold the white edge of the PV module and slowly put it into the adhesive area. When sticking the PV module, it should be level and vertical, and avoid secondary sticking.



Figure 5

As shown in Figure 6, after the components are flattened, do not press the battery cells (Black area) by hand to stabilize them. Use a soft-bristled roller brush to compact the components and roll the soft-bristled roller brush back and forth on the surface of the components to ensure that the glue and components are fully bonded.



Figure 6

## 6.5 Installation Method 3 (PVC Roof Installation Method)

The installation of PVC roofs can use the installation methods of 6.3 and 6.4, but the following points should be noted:

- If the roof is dirty, it is recommended to use plastic cleaning agent NLJ-16032 to clean it, and then use a power cleaning machine to rinse off the surface of the cleaning agent to ensure that the cleaning agent is rinsed clean, otherwise it will affect the bonding effect.
- Before installation, measure and lay out the installation area of the PV module on the PVC roof according to the design drawings, as shown in Figures 7 and 8.



Figure 7





Figure 8

- If using 6.3 (structural adhesive installation method), use a glue gun to apply glue in the drawn area. The gluing diagram refers to Figure 9. Note that there should be a 30mm gap between the vertical glue strip and the lower horizontal glue strip to facilitate the smooth discharge of water vapor.
- If using the tape pasting method, refer to Figure 9 to paste the tape on the back of the PV module. Note that there should be a 30mm gap between the vertical tape and the lower horizontal tape to facilitate the smooth discharge of water vapor.

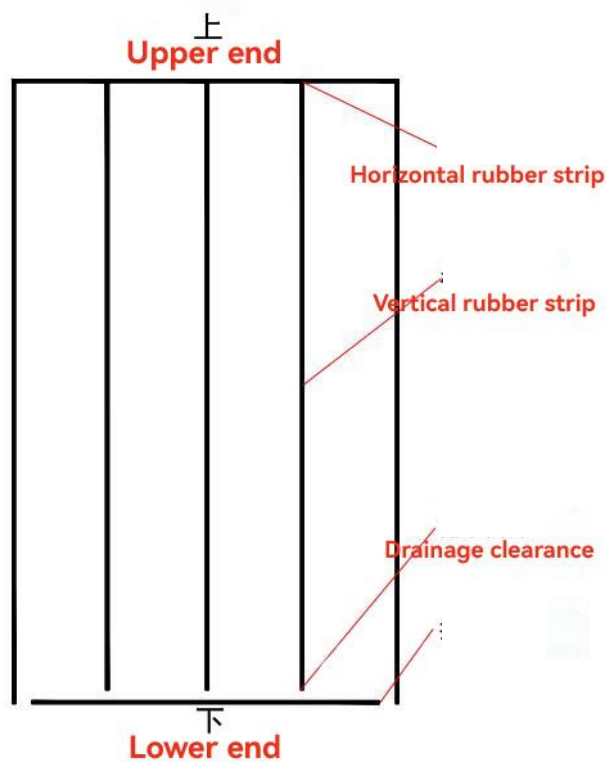


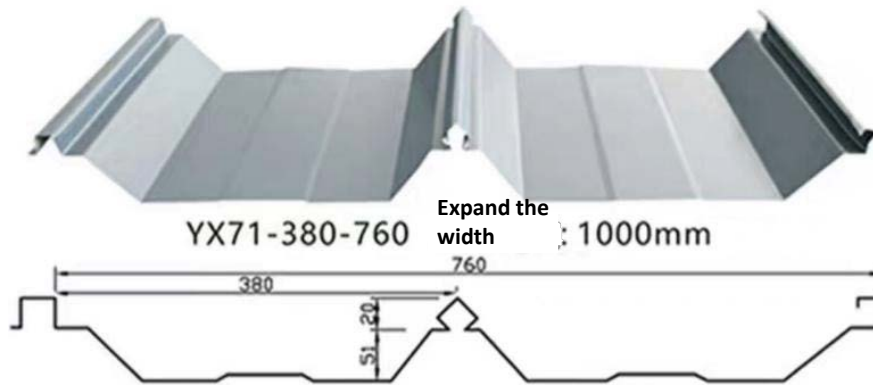
Figure 9

## 6.6 Installation Method 4 (Vertical Locking Seam Colored Steel Tile Installation Method)

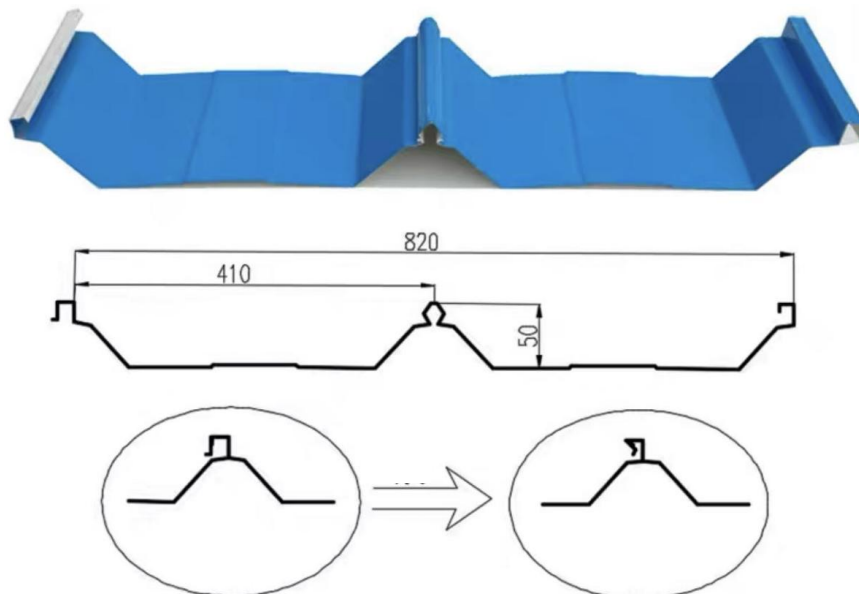
The installation steps of vertical locking seam colored steel tiles are as follows:

- First, install the vertical locking seam special fixture on the colored steel tile..

For example: 760 Type, 820 Type vertical seam color steel tile



760 Type



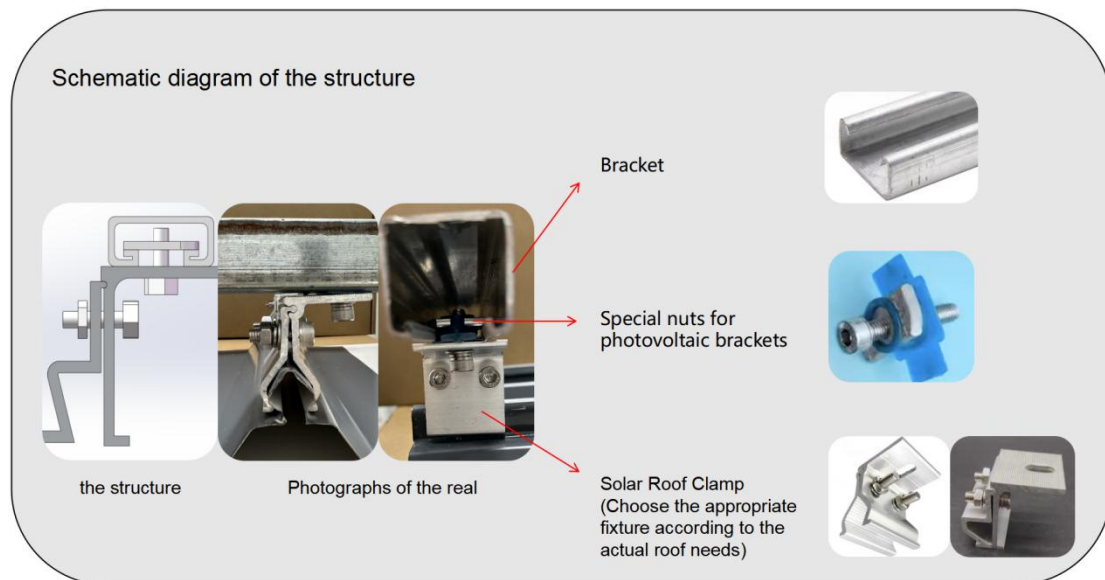
820 Type

Selection of fixtures:

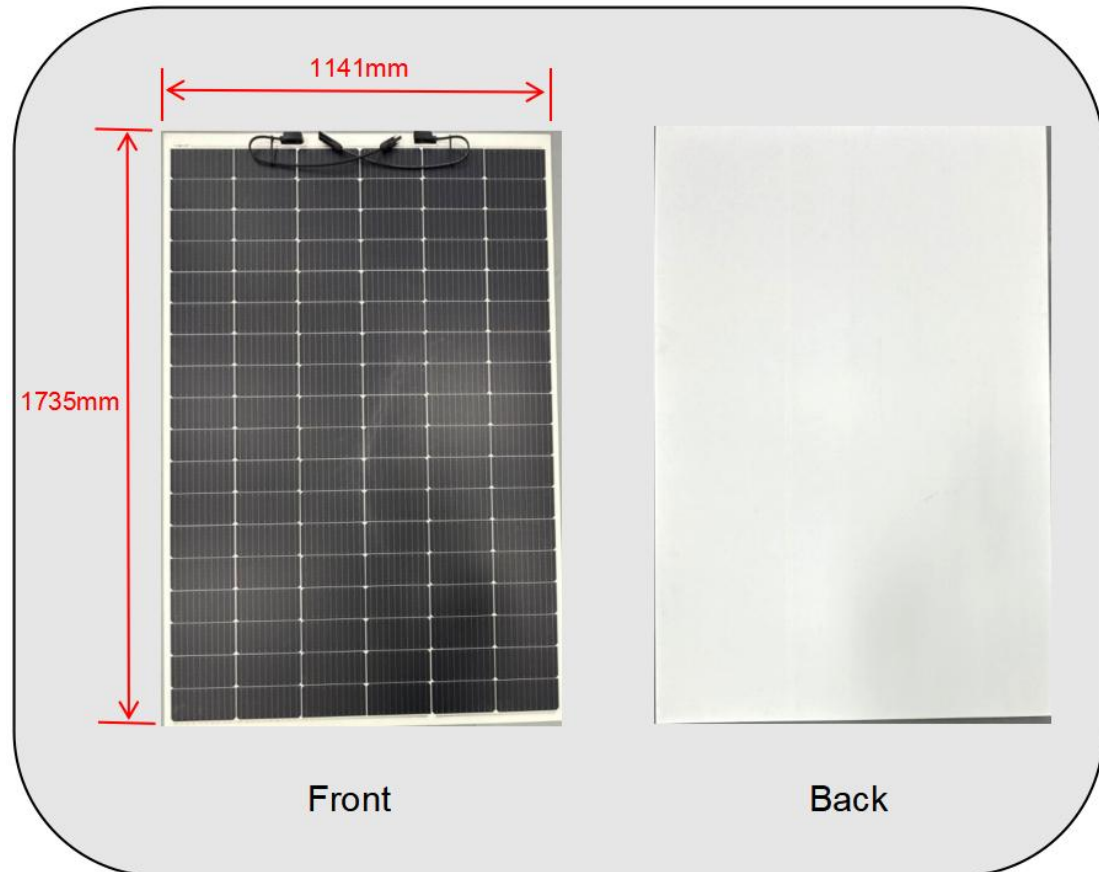


\*Choose the appropriate fixture according to different color steel tile types.

- Fix the bracket to the clamp with rotor nuts and screws.

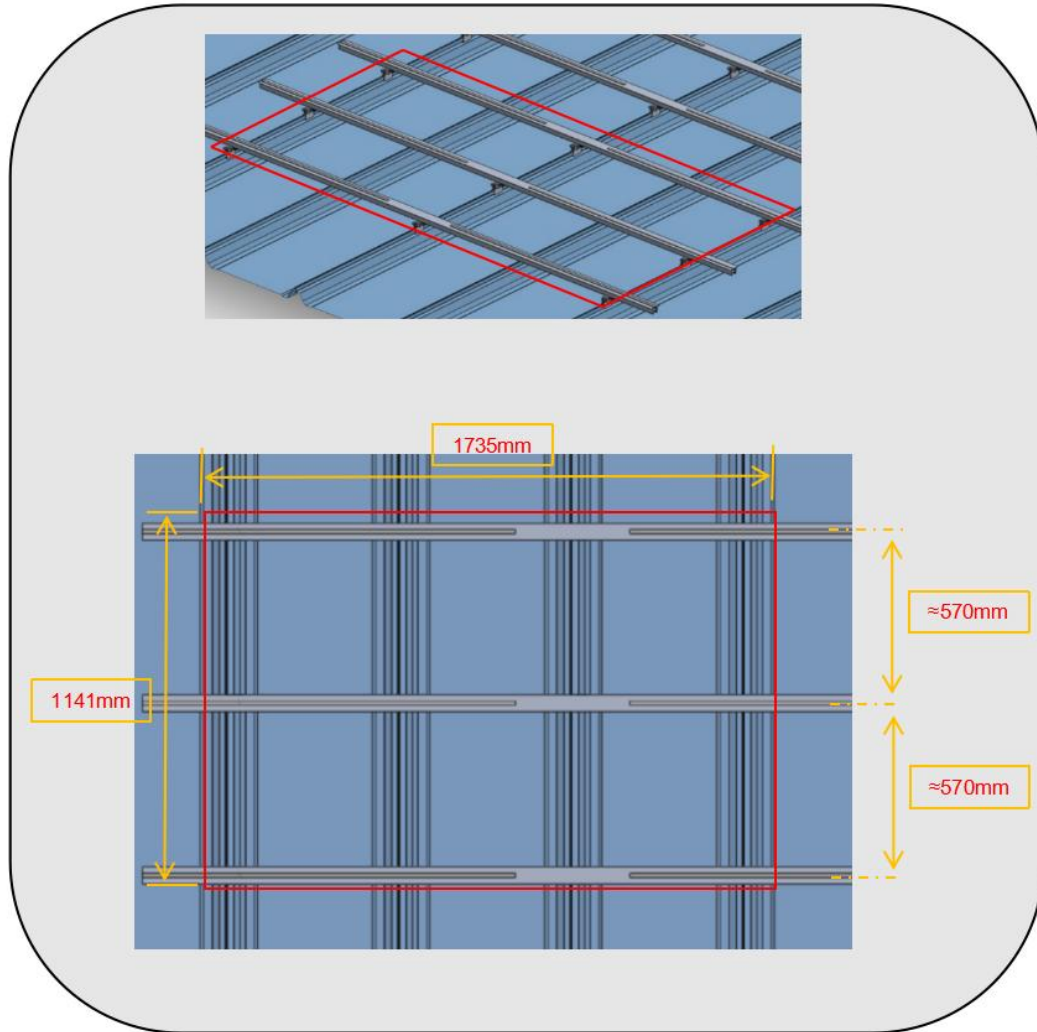


Take the installation of OXP-400-F8MC (size 1735\*1141mm) as an example.

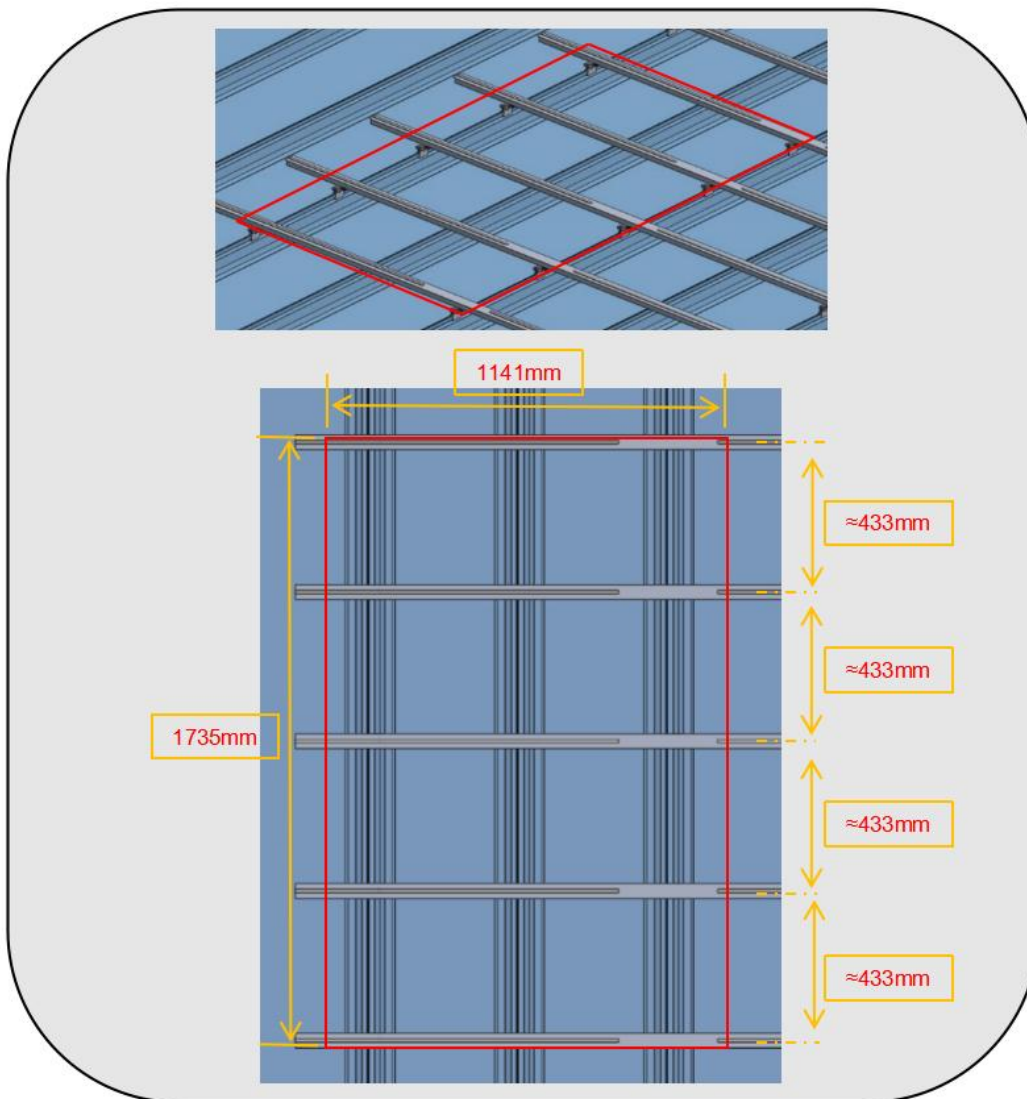


Bracket installation method schematic:

Method 1:



Or Method 2:

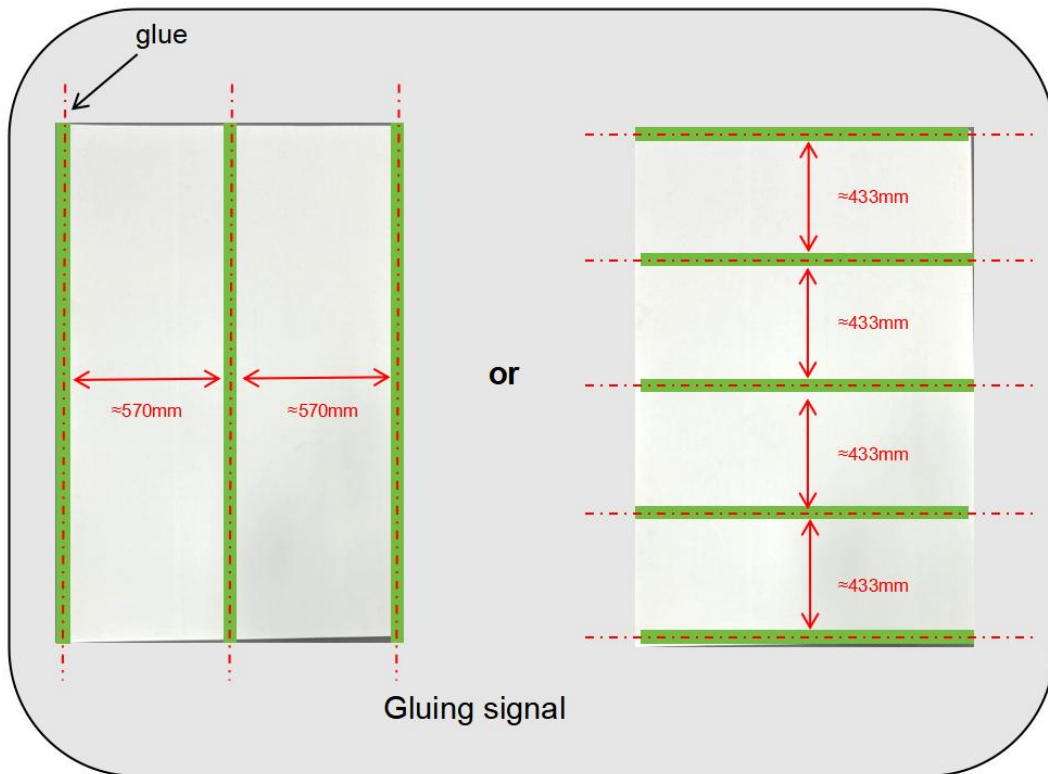


- Clean the surface of the bracket to ensure that there is no dust or pollution.
- Apply special structural adhesive on the surface of the bracket.



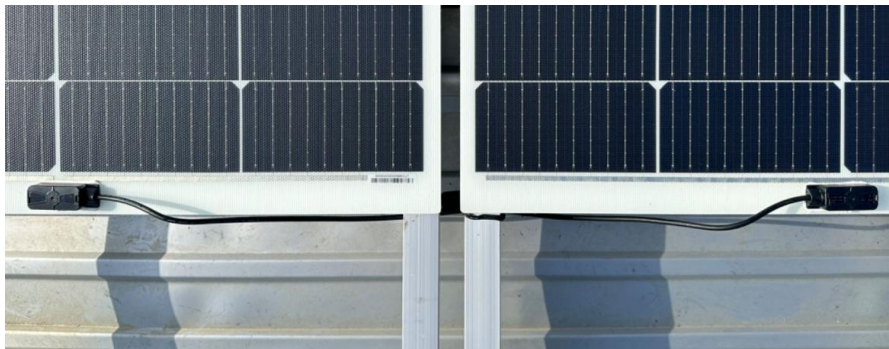
Schematic diagram of the adhesive strip corresponding to the position of the component on the

bracket:



\* During installation, do not step on the PV module.

- Connect the connectors of the PV module and confirm whether the lock is connected.
- Fix the PV module on the profile with glued surface, ensuring symmetry on both sides.



- After the string is connected, test whether the string is connected normally within half an hour.

## VII. Electrical Installation



Warning, danger of electric shock!

This PV module will generate current when exposed to light. Please follow all applicable electrical safety measures.

- Only qualified personnel can install or maintain the PV module.
- Pay attention to the high voltage danger during the PV module connection process.
- Do not damage or scratch the front and back of the PV module.
- The cable accessories used must be compatible with the PV module.
- The PV modules connected in series have the same current, and the open circuit voltage of each string must not be higher than the maximum system voltage (refer to the maximum system voltage indicated on the back of the PV module nameplate). When calculating the open circuit voltage of the string, the temperature coefficient and the extreme minimum temperature at the installation site must be considered.
- The PV modules connected in parallel have the same voltage, and when calculating the short-circuit current of the array, the temperature coefficient and the extreme maximum temperature at the installation site must be considered.
- Please refer to local regulations to determine the size, model, and temperature of the system cable.
- The cross-sectional area of the cable and the capacity of the connector must meet the needs of the maximum short-circuit current of the photovoltaic system (for a single PV module, we recommend a cable cross-sectional area of 4mm<sup>2</sup> and a connector with a rated current not exceeding 15A), otherwise the cable and connector will overheat due to the large current. Note: The temperature limit of the cable is 85°C and the temperature limit of the connector is 105°C.
- Consult a qualified system design or integration professional.
- Generally, the project needs to obtain a building permit and inspection and approval from local departments.

## VIII. Maintenance

- Regularly clean the surface of the PV module with clean water and a clean sponge or cloth, and use a mild and non-abrasive cleaner to remove stubborn dirt. It is not recommended to use water containing minerals to clean the PV module.
- Check the electrical, grounding, and mechanical connections every six months to ensure that they are clean, safe, undamaged, and not corroded.
- If there are any problems, please consult a professional.

Note: Carefully read the introduction of all PV modules used in the system, such as the regulator, inverter, and battery, to ensure that the system matches.

## IX. Parameters

The PV module parameters will be updated from time to time. Please visit our company's website



([www.openax.com](http://www.openax.com)) to obtain accurate parameters, or consult our company's technical support team by email ([customer.care@openax.com](mailto:customer.care@openax.com)).

## Attachment 1:

## Construction Tool Recommendations



Adhesive



Gluing gun



High-pressure water gun



Roller Paint Brush

## Attachment 2:

### Bonding Material Usage Recommendations

#### 1. Glue Usage Recommendations

Glue Type	Suitable for
Henkel MS939	Color steel tile roof
Tianshan 1527	aluminum roof
	stone roof
	PVC roof
	solid wood roof

#### 2. Tape Usage Recommendations

Tape Type	Suitable for
3M VHB	Color steel tile roof
Butyl Tape	aluminum roof
	PVC roof



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