



# PV Module Installation Manual





## Contents

|                                             |    |
|---------------------------------------------|----|
| 1. Introduction                             | 4  |
| 1.1 Manual use                              | 4  |
| 1.2 Disclaimer                              |    |
| 1.3 Product Identification                  | 5  |
| 2. Safe guideline                           | 5  |
| 2.1 General Security Guide                  | 5  |
| 2.2 Product Protection                      | 7  |
| 2.3 Transport and Storage Safety Guidelines | 7  |
| 3. Mechanical Installation                  | 8  |
| 3.1 site selection                          | 8  |
| 3.2 Select the applicable bracket for mount | 8  |
| 3.3 Universal installation                  | 9  |
| 3.4 installation method                     | 10 |
| 4. electrical installation                  | 22 |
| 4.1 Module selection                        | 22 |
| 4.2 Safety factor                           | 22 |
| 4.3 General installation                    | 22 |
| 4.4 Grounding                               | 26 |
| 5. Maintenance                              | 28 |



## 1. Introduction

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This manual is valid for the module of JDGN solar.

The information in this manual is based on JDGN solar L s knowledge and experience and is considered to be reliable; but such information, including product specifications (without limitation) and suggestion, does not have any significance as a warranty or constitute an express or implied guarantee. JDGN solar reserves the right to change this manual, PV Module, specifications, or product information sheets without prior notice.

JDGN solar shall not bear any expenses arising from damage, loss or installation, operation, use or maintenance if the use of this manual and the conditions or methods of installation, operation, use and maintenance of photovoltaic products are beyond JDGN solar L s control. JDGN solar does not cover any legal liability beyond the due function and safety performance. This manual is for reference only. No license is granted by implication or otherwise under any patent or patent rights.

As for special modules, please install and use separately according to the module specifications or agreed terms in the contract.

If your questions are not adequately addressed in this manual, please contact your system supplier.

For more information, please visit website [www.ztt.cn](http://www.ztt.cn).

#### Product Identification

Each Module has three labels and provides the following information:

nameplate: describes the product type, rated power, rated current, rated voltage, open circuit voltage, short circuit current under standard test conditions, certification mark, weight, dimension etc.; And maximum system voltage, fuse current.

serial number and Bar Code Label : serial number has 16 digits; Each module has a unique serial number and bar code as a unique identifier , Each Module has three barcodes, one permanently laminated inside the Module ,this label can be normally found in the front side of corner; the other label is pasted on the rear side of the module. another label is pasted on the side of the module frame.

Removing the nameplate will make the JDGN warranty invalid .

## 2. Safe guideline

### 2.1 General safety Guidelines

Danger! Danger due to Electric shock





RG

Module voltage rating, conductor current rating, fuse size, and control device size connected to the PV output, the values of ISC and VOC marked on the Module should be multiplied by 1.25 times.

modules in this application class can be used in systems with DCOP voltages greater than 50V or 240V. modules that pass IEC61730 can be considered to meet the requirements of safety Level II.

## 2.2 Product Protection

Do not attempt to remove the Module.

Do not attempt to remove any nameplates or parts.

Do not open the junction box under any circumstances.

Do not connect blocked or contaminated plugs.

You may only modify the modules after JDGN's written confirmation.

Do not attempt to drill holes in the modules (for example, to install fasteners).

Use only insulation tools special for electrical installation.

Do not use ~~any~~ concentrating device (such as a mirror or lens) to try to increase the power generation of the Module. This allows the modules to be damaged and not covered.

Do not squeeze, hit, or scratch the tempered glass of the photovoltaic module with sharp objects.

## 2.3 Transport and Storage



Do not use the cable or junction box to lift or move the assembly under any circumstances!

Do not place any hard objects on the upper and lower surfaces of the assembly.

Do not expose the surface of the Module to mechanical stress.

Do not stand on modules.

Do not drop or place objects on the modules.

### 3. Mechanical Installation

#### 3.1 site selection

modules are certified to standards such as IEC 61215 for safe operation in mild weather conditions. When installing modules at high altitudes, it is recommended to use appropriate mounting systems to ensure stability and safety.

Ensure adequate ventilation at the back of the Module.

Ensure the long-term stability of the support.

Ensure that electrochemical corrosion is not caused by the use of metals in direct contact (i.e. ground wires, screws, washers, etc.).

Allow for strain-free expansion and contraction due to changes in the natural ambient temperature.

### 3.3 Universal installation

Assemblies installed in series shall ensure the same orientation and inclination Angle.

Differences in orientation or inclination (different illumination) can result in loss of output power.



Figure1 Angle of Module installation

When developing the final layout of the PV system, adequate personnel access should be ensured for subsequent maintenance. Minimize the risk of indirect

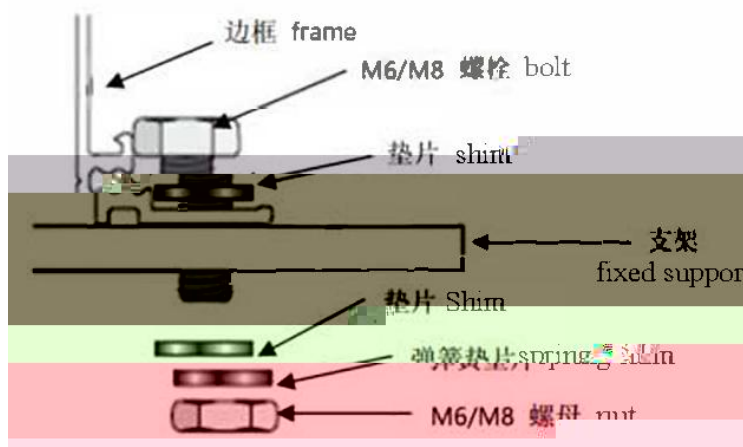






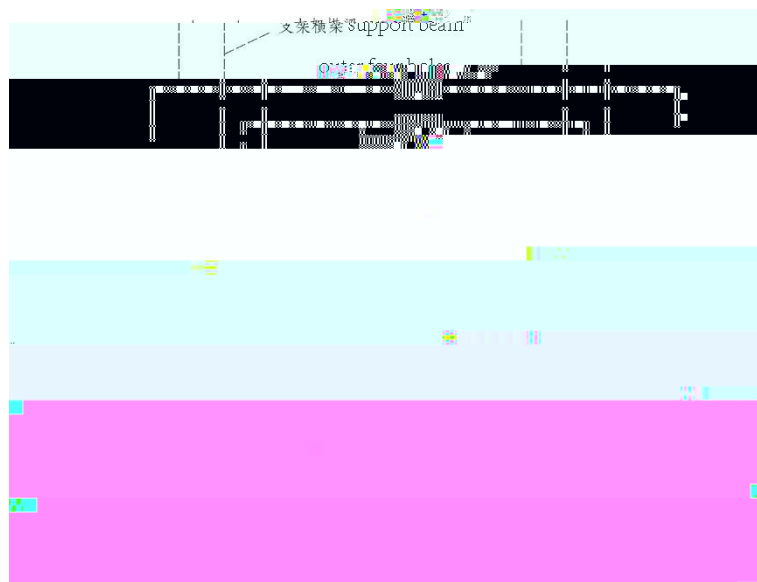
Ž The recommended tightening torque for M6 bolts is 9-12 N m, and the recommended tightening torque for M8 bolts is 16-20 N m. As bolt material may be different, the specific torque value is subject to the confirmation of the bolt supplier.

Ž When selecting a 30mm height frame assembly, it is recommended to select fasteners with a length of less than 20mm.



### 3.4.1 mounting hole installation

Bolt mounting mode (inner 4 holes perpendicular to the long side)



| Module type | Photovoltaic module size<br>L*W*H (mm) | Four hole mounting in bolt (test load Pa) |
|-------------|----------------------------------------|-------------------------------------------|
| ZTT-ND78HD  | 2465*1134*30                           | 5400Pa/ -2400Pa                           |
| ZTT-ND72HD  | 2278*1134*30                           | 5400Pa/ -2400Pa                           |



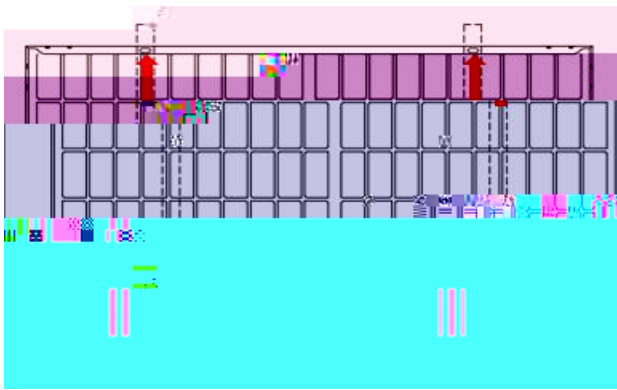
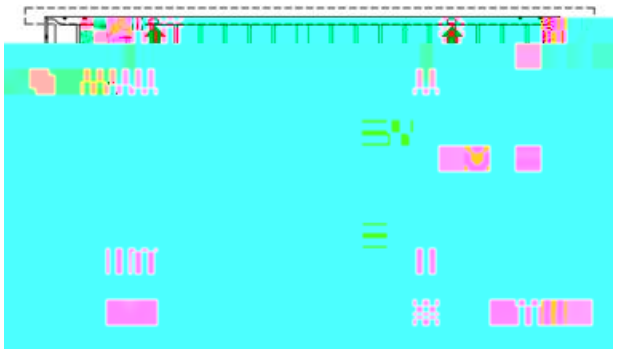
|            |              |                 |
|------------|--------------|-----------------|
| ZTT-ND60HD | 1908*1134*30 | 5400Pa/ -2400Pa |
| ZTT-ND54HD | 1722*1134*30 | 5400Pa/ -2400Pa |
| ZTT-NE48HD | 1762*1134*30 | 5400Pa/ -2400Pa |
| ZTT-NE66HD | 2382*1134*30 | 5400Pa/ -2400Pa |

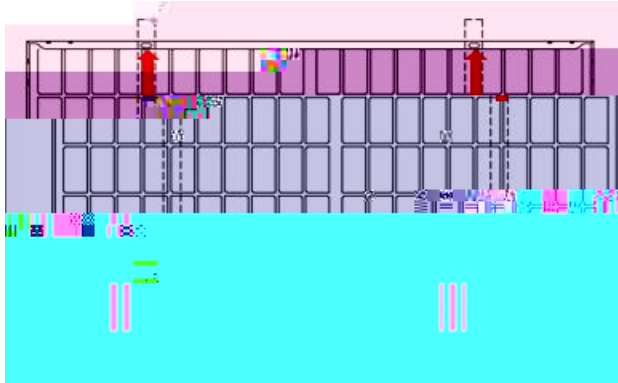
Inner four hole  
bolt mounting  
The beam is  
perpendicular to  
the long side



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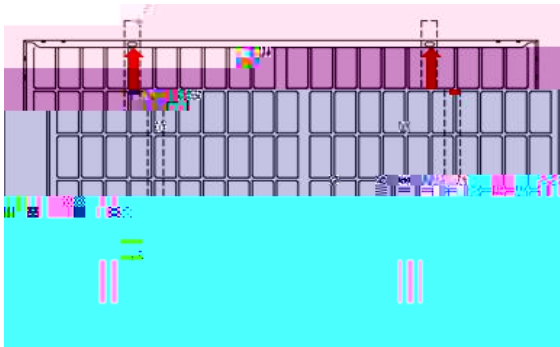
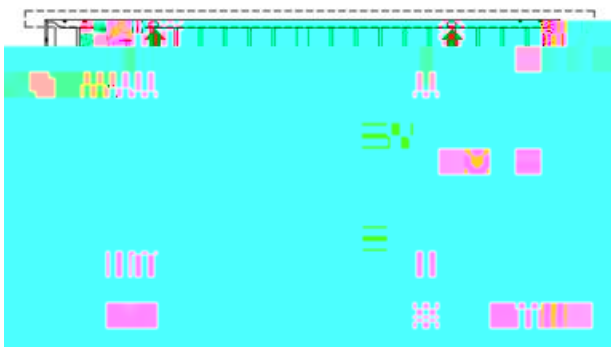


|            |              |                                                                                                                                                                                                     |                    |
|------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| ZTT-ND60HD | 1908*1134*30 |  <p>The long frame is mounted with 4 bolts (1400mm holes), and the guide rail is vertically long</p>              | 5400Pa<br>/-2400Pa |
|            |              |  <p>The long frame is installed with 4 bolts (790mm holes), and the guide rail coincides with the long frame</p> | 3600Pa<br>/-2400Pa |

| Module type              | Photovoltaic module size<br>L*W*H (mm) | Installation diagram                                                                                                                                                                     | Load value         |
|--------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| ZTT-ND72HD<br>ZTT-NE66HD | 2278*1134*30<br>2382*1134*30           |  <p>The long frame is mounted with 4 bolts (1400mm holes), and the guide rail is vertically long</p> | 5400Pa<br>/-2400Pa |



|  |  |                                                                                                                                                                                                     |                            |
|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
|  |  |  <p>The long frame is installed with 4 bolts (1400mm holes), and the guide rail coincides with the long frame</p> | <p>3600Pa<br/>/-2400Pa</p> |
|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|

| Module type | Photovoltaic module size<br>L*W*H (mm) | Installation diagram                                                                                                                                                                                  | Load value                 |
|-------------|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| ZTT-ND78HD  | 2465*1134*30                           |  <p>The long frame is installed with 4 bolts (1500mm holes), and the guide rail is vertically long</p>             | <p>5400Pa<br/>/-2400Pa</p> |
|             |                                        |  <p>The long frame is installed with 4 bolts (1500mm holes), and the guide rail coincides with the long frame</p> | <p>3600Pa<br/>/-2400Pa</p> |

modules shall be bolted to the support through mounting holes located on the back of the frame.

Do not drill additional holes or you will not be covered.

Use appropriate tightening torque reference value  $16 \sim 20 \text{ N} \cdot \text{m}$ ; The reference torque of M6 bolts ranges from  $9 \text{ to } 16 \text{ N} \cdot \text{m}$ . Because bolt materials may vary, the specific torque value depends on the bolt supplier's confirmation. And the parts in contact with the frame shall use a flat washer with a diameter of 16mm or above.

Each M8 bolt shall be securely secured using at least four mounting holes. Emergency

are also used if there is additional wind or snow load. System designers and installers should calculate the load in advance to make the correct support structure design.

Use appropriate corrosion resistant fasteners including bolts, spring washers, flat washers, nuts. M8 bolt tightening torque reference value  $16 \sim 20 \text{ N} \cdot \text{m}$ ; The reference torque of M6 bolts ranges from  $9 \text{ to } 16 \text{ N} \cdot \text{m}$ . Because bolt materials may vary, the specific torque value depends on the bolt supplier's confirmation. And the parts in contact with the frame shall use a flat washer with a diameter of 16mm or above.

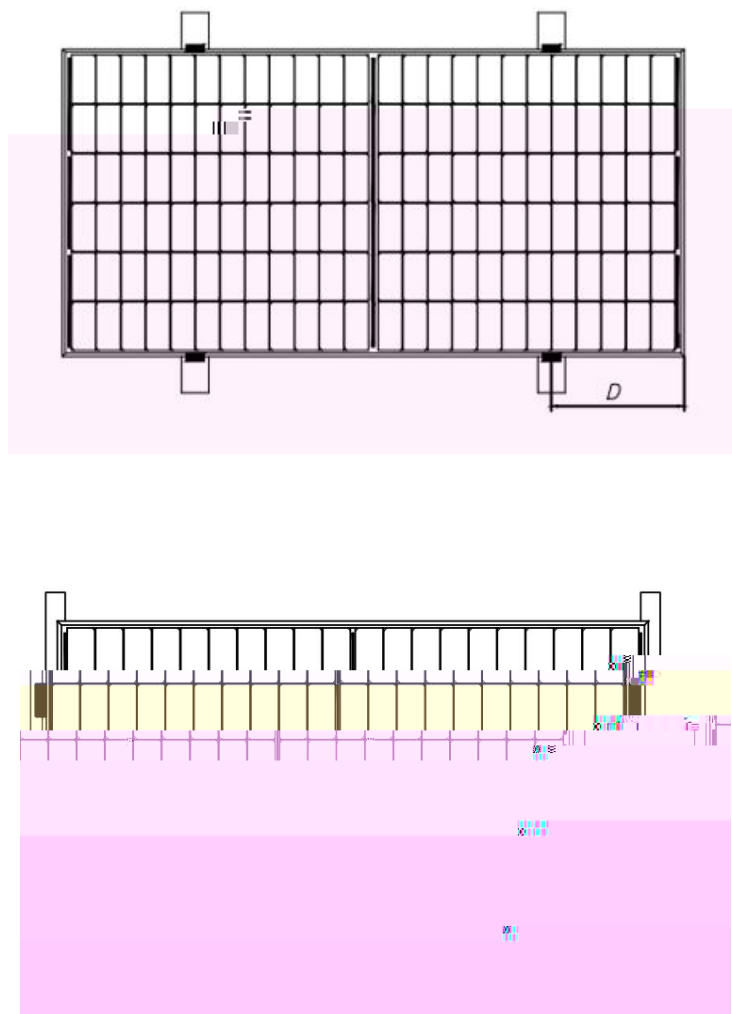


Figure5 The guide rail is fitted with a short frame

! Note:

the length of the bracket must be longer than the size of the photovoltaic module, otherwise it should be confirmed by Jiangdong Light Energy in advance; The above diagram is the installation method using aluminum pressing blocks (also known as fixtures).  $\pm D \pm$  indicates the allowable installation range of aluminum block. For specific recommended installation positions and corresponding on-board values, see Table 3; Each aluminum block is fitted with an M8 bolt, two flat washers, a spring washer, and an M8 nut. The securing steps are as follows:

ÿ Place the assembly on two supports (not provided). The bracket must be made of stainless steel



or have been treated with anti-corrosion (such as hot-dip galvanizing). Each photovoltaic module needs at least four press blocks to fix. During installation, do not let the press block directly touch the glass and deform the frame, otherwise the Module will be damaged.

Be sure to avoid the shadow caused by the fixture on the Module shielding effect. The leak hole should not be blocked by the fixture. The fixture must overlap with the assembly frame by at least 8mm but not more than 11mm (the fixture section can be changed if the assembly is installed reliably).

The upper surface of the bracket in contact with the assembly frame shall have a groove matching the M8 bolt.

If there is no groove on the support, it is necessary to drill a hole with a suitable diameter in the above mentioned position for bolt fixing.

Ensure that the installation sequence of each press block is flat washer, spring washer, nut.

Figure 7 and 8 are the schematic diagram of the block, and Figure 9 and Figure 10 are the schematic diagram of the installation of the block. The size of the block is  $a \approx 60$  mm,  $b \approx 16$  mm,  $c \approx 5$  mm,  $d \approx 8$  mm,  $e \approx 15$  mm,  $f \approx 9$  mm, and the thickness of the block is  $\approx 3$  mm. When bolts and screws are rated 8.8, the recommended tightening torque is 17 to 23N m.

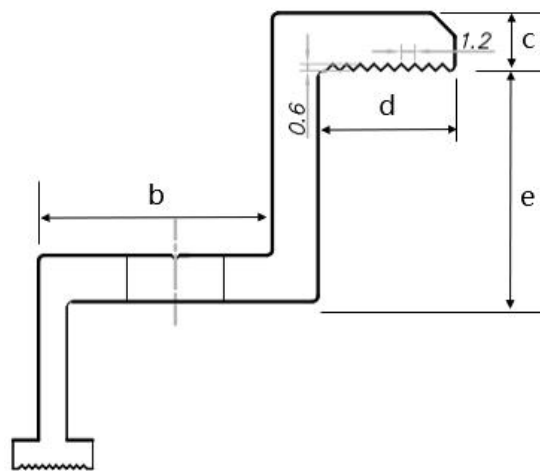
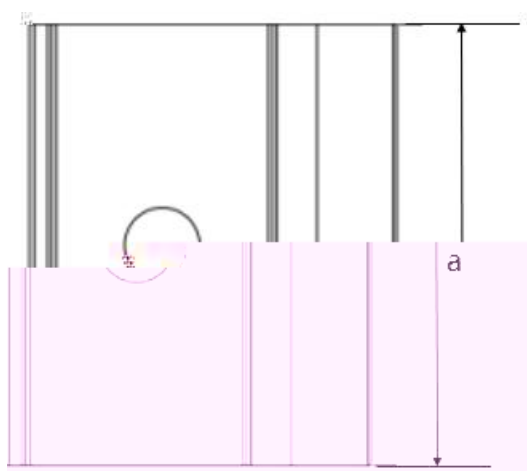


Figure7 Top view of side press block

Figure8 Cross-section diagram of the side pressing block



Figure9 Installation diagram of edge block

Figure10 Installation diagram of medium pressure block

To prevent the assembly from falling off the frame after installation, it is recommended to select the edge mounting press block and the middle mounting press block with pattern groove structure on the contact surface of the frame A, the recommended number of pattern groove structure is about 9, the distance between adjacent pattern groove is about 1.2mm, and the depth of pattern groove is about 0.6mm as shown in Figure 8. 8 For the installation method shown in





materials. For example, tighten the M8 bolt to a torque ranging from 16 to 20N m. Ensure that the crimper does not fail due to deformation or corrosion when the whole Module is loaded.

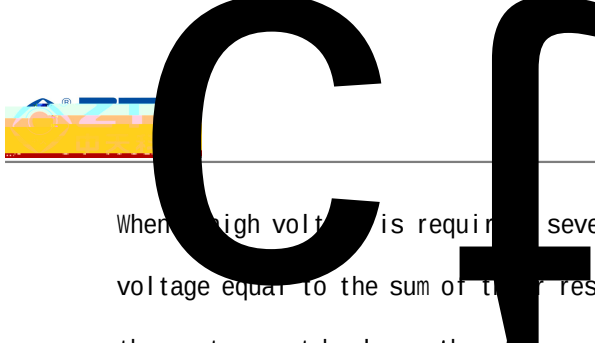
The minimum recommended length of the block is 50mm, overlapping the assembly frame by at least 8mm but not more than 12mm.

If the Module is not installed as described above, the actual load bearing value may be reduced.

| Module type | Photovoltaic module size<br>L*W*H (mm) | Refer to Figure 3<br>for installation<br>methods | Refer to Figure 4<br>for installation<br>methods | Refer to Figure 5<br>for installation<br>methods  |
|-------------|----------------------------------------|--------------------------------------------------|--------------------------------------------------|---------------------------------------------------|
| ZTT-ND54HD  | 1722*1134*30                           | +3600Pa/-2400Pa<br>fitting limit D<br>266~466mm  | +5400Pa/-2400Pa<br>fitting limit D<br>266~466mm  | +1800Pa/-1800Pa<br>fitting limit D<br>150~250mmPa |
| ZTT-NE48HD  | 1762*1134*30                           | +3600Pa/-2400Pa<br>fitting limit D<br>266~466mm  | +5400Pa/-2400Pa<br>fitting limit D<br>266~466mm  | +1800Pa/-1800Pa<br>fitting limit D<br>150~250mm   |
| ZTT-ND60HD  | 1908*1134*30                           | +3600Pa/-2400Pa<br>fitting limit D<br>320~520mm  | +5400Pa/-2400Pa<br>fitting limit D<br>320~520mm  | +1800Pa/-1800Pa<br>fitting limit D<br>150~250mm   |



|            |              |                  |     |
|------------|--------------|------------------|-----|
|            |              | +3600Pa/ -2400Pa | +54 |
| ZTT-ND72HD | 2278*1134*30 | fitting limit D  |     |
|            |              | 430~530mm        |     |



When high voltage is required, several PV modules may be connected in series with a total voltage equal to the sum of their respective voltages, provided that the maximum voltage of the system must be lower than the maximum certified voltage and the maximum input voltage of the frequency converter and other electrical equipment in the installed system. The maximum number of modules in series is  $(N) \leq \frac{\text{System } V_{\text{max}}}{\{V_{\text{oc}} (\text{in STC}) \times [1 + (T - 25) \times K_v]\}}$ , where:

System  $V_{\text{max}}$ : the smaller of the highest certified voltage, the highest output voltage of the system inverter or other electrical equipment

$V_{\text{oc}}$ : photovoltaic module open circuit voltage (v)

t: Ambient minimum Temperature ( $^{\circ}\text{C}$ )

$K_v$ : Temperature coefficient of the open circuit voltage of the PV module ( $/^{\circ}\text{C}$ )

-- see the product specification

- × Connect the appropriate number of modules according to the voltage specification of the inverter used in the

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connections.

## module wiring

the electrical properties of the modules are tested under standard test conditions, i.e.

light intensity

or the voltage difference is greater than 10V, the structural configuration is checked before the connection is made.

Jiangdong Solar's solar modules use special photovoltaic cables with a cross-sectional area greater than or equal to 4mm<sup>2</sup> and are UV-proof. All other cables used to connect DC systems should have similar (or higher) specifications. Jiangdong Light Energy recommends that all cables should be laid in appropriate pipelines or cable slots and away from places prone to water accumulation. The voltage of the string must not be higher than the maximum voltage that the system can withstand, and the maximum input voltage of the inverter and other electrical equipment in the installation system. To ensure this, the open circuit voltage of the array needs to be calculated at the lowest expected ambient temperature at that location.

The outer diameter of the cable ranges from 5 mm to 7mm.

Special photovoltaic cables with a minimum temperature and light resistance of 90℃ and a cross section of not less than 4mm<sup>2</sup> shall be used as photovoltaic connection cables for onsite wiring. When installing modules on the roof tile, it is recommended to use 4-6mm<sup>2</sup> photovoltaic cables.

The minimum bending radius of the cable is 43mm.

## Wiring mode

### Short line straight connection type C

Note: The ends of the upper and lower rows need to be connected in series

Vertical assembly of modules:

Select a standard short cable

Choose from standard long cable or custom

#### 4.4 earthing conductor

modules must be grounded. Ensure that the

modules meet safety level II, and that the grounding method complies with local national, regional, or international regulations, laws, and standards, and local electrical directives and regulations. The ground connection should be performed by qualified electricians.

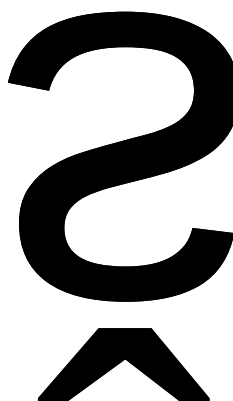
grounding applies only to the modules with a frame. The frame of the component must be properly grounded. The ground wire must be properly secured to the assembly frame to ensure good mechanical connection. Use the recommended type or equivalent connection cable.

The design of the photovoltaic module uses anodized corrosion resistant aluminum alloy frame as a rigid support. In order to use safely and avoid the damage of lightning and static electricity, the frame of the photovoltaic module must be grounded. When grounding, the grounding device must be fully in contact with the interior of the aluminum alloy and penetrate the oxide film on the surface of the frame.

Do not fill any additional ground holes in the frame of the photovoltaic module.

The hole marked with a grounding label on the border can be used for grounding only.

② , v h

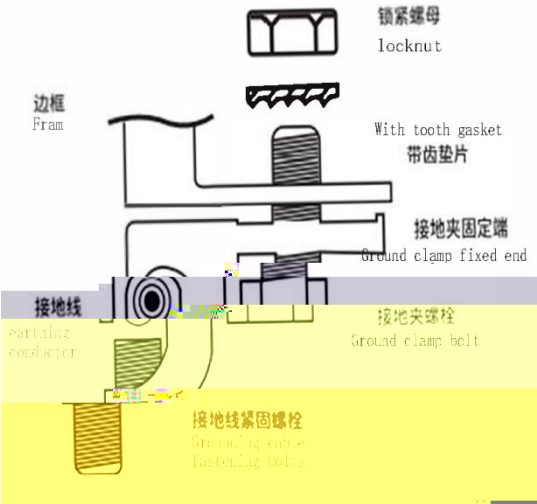


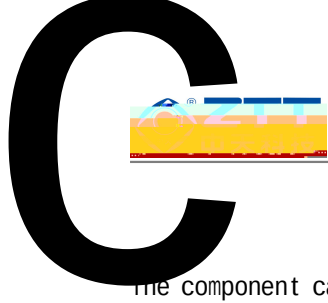


The median line of the ground label overlapped with that of the hole in the same direction as the length of the border. The grounding between modules must be confirmed by a qualified electrician, and the grounding device must be manufactured by a qualified electrical manufacturer. The zh g

o

| 零件 part | 示意图 diagram | 连接方式 link mode                                                                                                                                      |
|---------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
|         |             | Place star washers, flat washers, and ground wires in turn, thread screws through the ground holes, and tighten them to secure adjacent components. |





The component can



Appearance inspection of modules Visually inspect the appearance of modules for defects, in particular:

1. The glass of the component is broken.
2. Corrosion at the welding of the battery main gate: during installation or transportation, the surface



containing alkali and acid to clean modules. Due to damage caused by improper cleaning methods, Jiangdong Solar Limited warranty will be void

Check connectors and cables

It is recommended to perform a preventive inspection every six months as follows:

1. Check the tightness of connectors and the tightness of cable connections.
2. Check the sealant at the junction box to ensure that there is no cracking or gap. Check modules for signs of aging. Inspect all wiring for rodent damage and material aging, and all connectors for tight connections and corrosion. Check whether modules are properly grounded.

If anything goes wrong, please have it investigated by a qualified person. Note: Read the service instructions for <sup>1</sup>