EcoMatters Solar Panel Installation Instructions

Applicable Product Models:

For 6'' poly series:

a) 72 cells: JYxxxM72 (xxx=330-345, in steps of 5);
b) 60 cells: JYxxxM60 (xxx=275-285, in steps of 5);
c) 54 cells: JYxxxM54 (xxx=250-255, in steps of 5);
d) 48 cells: JYxxxM48 (xxx=220-230, in steps of 5);
e) 36 cells: JYxxxM36 (xxx=165-170, in steps of 5).

For 6'' poly series:

a) 72 cells: JYxxxP72 (xxx=300-330, in steps of 5);
b) 60 cells: JYxxxP60 (xxx=255-275, in steps of 5);
c) 54 cells: JYxxxP54 (xxx=225-240, in steps of 5);
d) 48 cells: JYxxxP48 (xxx=200-215, in steps of 5);
e) 36 cells: JYxxxP36 (xxx=150-165, in steps of 5).

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Content

1. Introduction

Thank you very much for choosing the Photovoltaic Modules(referred as 'Modules') manufactured and sold by Guangdong Jinyuan Lighting Technology Co.,Ltd.

This installation manual provides the modules installation and use info of Guangdong Jinyuan Lighting Technology Co.,Ltd(referred as 'Jinyuan').

Do read and understand this manual before installation, use and maintenance. Please provide this manual to the owner and installer of the PV System for their reference, and notify them all the requirements and suggestions about safety, operation and maintenance. If there is any question, please contact our customer service department for further explanation.

The installer should be familiar with the mechanical and electrical requests of the PV System before installing. The product limited warranty will be invalid if the operation during installing doesn't follow the requirements of this manual. Please keep this manual properly as reference for future maintenance and servicing.

The design of Jinyuan PV Modules conforms to IEC61215 and IEC61730 International Standard, with the application level Grade A: the modules can be applied to the systems available for public access with voltage or power above DC50V or 240W. Also the modules have passed two parts of the international standard, which are IEC61730-1 and IEC61730-2, meeting the requirements of Safety Class II.

2. Disclaimer

Jinyuan will not bear any corresponding responsibility for all matters infringing on third party patents or any other rights in the process of using Jinyuan Modules.

For some installation, operation, use and maintenance of the modules, which are beyond the control of Jinyuan, Jinyuan will not bear any corresponding responsibility for the module power loss, damage or casualties and any extra cost caused by the improper installation, operation, use or maintenance.

All the info in this manual is based on Jinyuan's reliable experience, however, all the info and suggestions don't constitute any guarantee, neither ostensive or connotative. Jinyuan reserves the

right of updating the installation manual, the PV products and specifications or product info without prior notice.

3. General Safety Rules

The mechanical and electrical installation of modules should refer to the relevant rules and regulations, including Electrical Code, Architecture Law and power connection requirements. All these rules may be different due to all the changes of installation locations, installation system voltages and whether using DC or AC, so please contact the local authorized organizations for detailed rules and get the corresponding permit. The installer should comply with all the safety protections in this manual and the local rules.

Under normal working conditions, the parameters such as power, current and voltage may be different from the values stated on the labels which are tested under standard conditions. Accordingly, when designing the rated voltage, current, fuse and controller of the modules or system-matched components, the short circuit current(Isc) and open circuit voltage(Voc) stated on the module label should be multiplied by the coefficient 1.25.

It is forbidden to use modules with different structures in one system. PV system can only use the PV specialized equipment such as inverters, connectors, cables and brackets. The integrated night PID recovery inverter is recommended to avoid the power station PID problem. The installer should read and comply with all the installation and safety cautions of all the other components of the system, including the electric wire, connector, DC switch, fixed device, inverter, rechargeable batteries, etc.

3.1 Safety Cautions

The modules will generate direct current when irradiated by the sun. Touching electriferous components is potentially dangerous. It is forbidden to touch the connectors of the junction box. Special attention should be paid when handling and connecting wires.

It is forbidden to gather the sun to the modules with mirror or any other amplifiers. Cover the modules completely with opaque material during the installation to avoid current generated.

When load connected, do not disassemble the modules, disassemble or move the labels or components on the modules. Do not mark the modules with sharp objects. Do not paint or paste on the surface of the modules.



Make sure not to wipe the front and back side of the modules with sharp objects, neither scrape nor strike the modules to avoid module damage. Make sure not to install or use cracked or damaged modules to avoid fire disaster, electric shock and personal injury. Keep the children away from the PV module system under handling, mechanical or electrical installation.

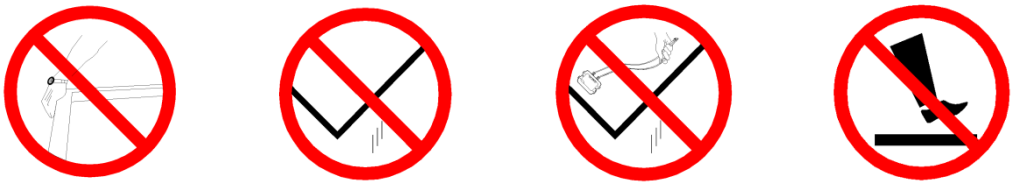
4. Transportation, Storage and Handling

Jinyuan modules are packed with Jinyuan cartons for transportation, and the modules should be stored in the original carton before installation. Please keep the packages from damage. Do not drop the modules which are packed in pallet. When piling the modules, please choose a flat table-board, and do not exceed the ceiling limit which is printed on the carton. Before opening the carton, please keep the package at a lucifugal, dry and flat place. If the modules need to be stored before installation, please do not open the package. The package should be stored somewhere lucifugal, draughty and away from exposure. If the modules need to be taken out of the package for temporary storage, then they should be put on the dry and draughty pallet, and make sure the glass side of the modules are downwards(the glass side of the bottom module should be upwards), with maximum quantity of 30 pieces on each pallet.

When taking the modules out of the package, follow the unboxing instruction on the box. Remove the straps and package cover, and take out the modules one piece at one time. Pay attention to avoid the remaining modules dumped on one side during this process.

The modules are with certain weight, so do hold the frame carefully and handle with care. When handling, please do not wear any accessory such as watch or ring to avoid scratching the modules. Don’t jolt or crash the modules during handling or installing. Don’t put down the modules violently. It is forbidden to pick up the modules by grabbing the junction box or the cables under any circumstance. Don’t stand or walk on the modules. Don’t drop one module onto another one. Don’t

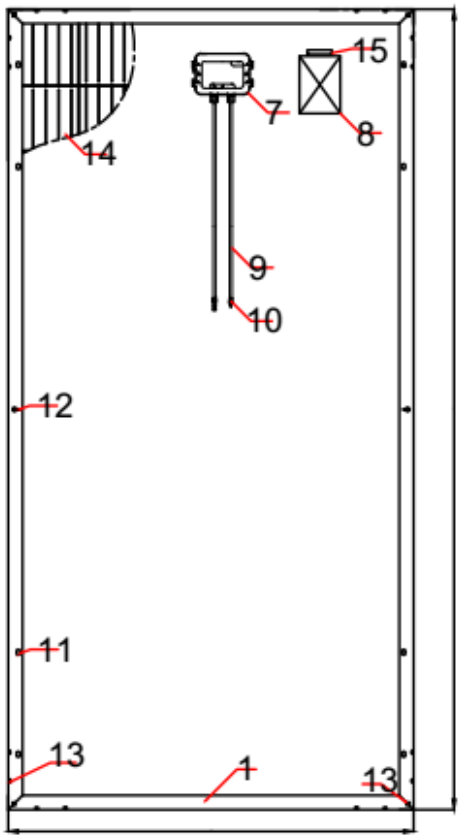
put any weight on the module glass. Broken glass can be dangerous, do not use the modules which glass is broken.. The broken or damaged modules should be handled carefully and specially.

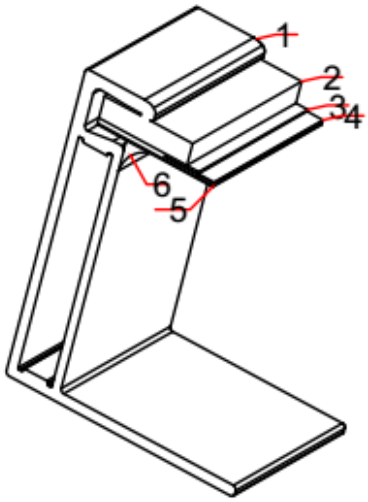


Before installation, check whether the modules have been damaged during the transportation. The surface of the module is very easy to be damaged, and when it is damaged, the performance and security may be affected. If any damaged module is founded, please contact Jinyuan customer service department.

For your safety concern, please do not disassemble or modify Jinyuan modules, which may affect the performance and security of the product and even bring some invocatable damage, and also invalidate any applicable warranty.

5. Product Identification Info

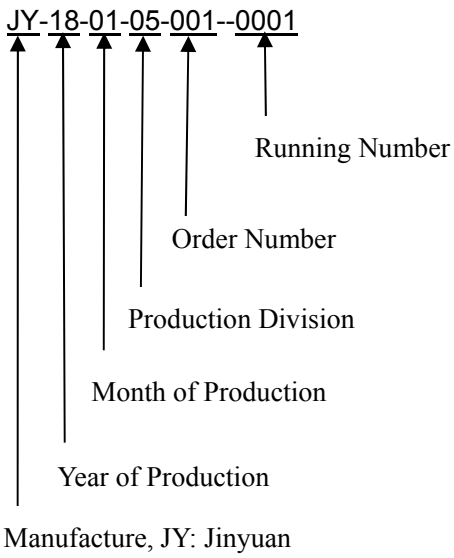




1. Aluminium Alloy Frame	2. PV Tempered Glass	3. EVA	4. Cells
5. Back Board	6. Silicon Rubber	7. Junction Box	8. Label
9. Cable	10.Connector	11.Mounting Slots	12.Ground Hole
13. Waterspout	14. Cells	15.Bar Code	

Figure 1: PV module structure

Every module has a rating plate(label) on the back with the following info: product model number, data under standard test conditions such as rated power, rated current, rated voltage, open circuit voltage and short circuit current, weight, specifications and dimensions, maximum system voltage, maximum protect current, etc. Every module has several serial numbers for tracking. One of them is encapsulated in the module permanently, which is visible from the front of the module. The rest serial numbers are stuck on the frame and back sheet of the modules. The serial number coding rule is as blow:



6. Installation Conditions

Jinyuan Module is suitable for installation on the ground, and can not be used in space.

Permitted environment should meet the requirements as below:

Environment Temperature is -40℃~85℃,

Operating Temperature is -20℃~50℃,

Nominal operating temperature(NMOT) is 45℃±2℃

Humidity is less than RH85%,

Design load：3600 Pa for positive (downward) and 1600 Pa for negative (upward);

Safety factors γ_m =1.5

The module is suggested not to be operated at the limit temperature for long time, to avoid the untimely power attenuation and failure.

The module is suggested to be installed in the areas with altitude below 2000m. Special electrical design by professionals is required when the altitude of the installation area is above 2000m.(with the increase of altitude, there are consequences as follow: 1. decreased air density, worse heat dispersion, leads the product to be used with reduced capacity. 2. decreased compression strength, the rated voltage and isolation voltage will decrease when the electrical clearance of creepage distance is invariant. 3.reducing the product over-voltage bearing capacity, arcing ability and breaking ability.)

Make sure the wind pressure or snow pressure after module installation will not exceed the bearable load.

The module should be installed somewhere with sufficient sun irradiation and no shadow perennially.

The module system need lightning protection during the installation and operation, especially when it is installed in the area of lightning frequent activity, otherwise the module may be damaged by the lightning.

The module is not allowed to installed in the environment with severe salt spray erosion or obvious corrosive gases. The module installation location is recommended to be at least 1km straight-line distance away from the seaside.

The module is not allowed to be installed near any equipment or place that is liable to produce or collect flammable gases.

The module is not allowed to installed somewhere with water soaking, water-drying device or water injector.

7. Mechanical Installation

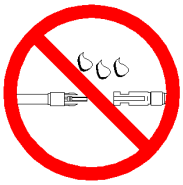
7.1 General Installation Rules

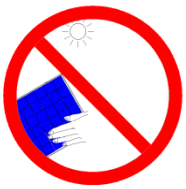
◆ The PV system installation requires professional knowledge and technique, and should be installed by qualified persons with specialized and licensed installation tools.The module installers undertake all the risk of injury including electric shock. The module installation should abide by all the local applicable laws and regulations, including local,regional and host countries. The construction electric installation permit should be obtained in necessity.

◆ PV module converts light energy to direct current energy, which is specially design for outdoor use. The modules can be installed on the ground, bracing piece or the roof. The designer and installer of the system are responsible to design the support structure correctly.

◆ The installation can only be operated under dry conditions with dry tools. Do not handle wet modules, unless the carrier is wearing proper protective equipment. Please stop the installation when it is snowy, rainy or windy.

◆ Do not wear any metal object such as watch, ring, earring, nose ring or oral ring,etc. Please do not touch the module with bare hands which will lead to dangers like scald or electric shock because the surface and the frame of the glass may be very hot.





◆ Due to the thermal expansion and contraction effect of the module frame, the distance between two adjacent modules should be bigger than 10mm. The end of the junction box should be installed in a relatively high place when installing.

◆ The screw should be installed with the set mounting holes on the module frame. The most common screw installation is with the four symmetrical mounting holes in the middle of the module frame. Eight mounting holes are required to be all installed when the system is installed somewhere with frequent wind and snow.

7.2 Selection of Installation Direction and Tilt Angle

A. To obtain the maximum generation efficiency, the module should be installed southward when in the Northern Hemisphere, and northward when in the Southern Hemisphere.

B. The module can be installed lengthways or sideways. Do check whether the length of the cable is enough when installing. If extra cables needed, do choose the cable with same type of

connector.

C. To get the best installation tilt angle, please refer to standard PV installation manual or consult the professional installer or system integrator for detail info. Jinyuan suggests the PV module installation tilt angle to be above 10°, as this tilt angle will make sure the system can do self-cleaning when it is raining.

D. The same string of modules should be installed at the same tilt angle. Otherwise with different installation angle, the modules will absorb different irradiation and causes the mismatching current and therefore lowers the system efficiency.

7.3 Selection of the Suitable Bracket

a) Check the instruction manual and safety cautions of the bracket which will be used for the module installation. The designer or installer of the system should calculate and choose the proper bracket to guarantee the load demand. The installation bracket should be made with materials resistant to abrasion, corrosion and UV resistance.

b) Do not drill extra mounting holes on the surface or the frame of the modules, otherwise the warranty will be invalid.

7.4 Ground Installation

Choose the proper installation height, tilt angle and distance to avoid the bottom of the module from flooded by the rain or buried by the snow. Meanwhile, do make sure the module is not covered by shrubs, buildings or obstructions, etc, and will not be hit and broken by the windblown dinas.

7.5 Roof Installation

- Better in calm weather for roof or building installation. Installing in gale weather may cause safety accident.
- For roof or building installation, make sure the modules are fastened safely and will not be blown off by the wind or collapsed by the snow.
- When roof installation, make sure the roof structure is suitable for installing. The system designer needs to set up the corresponding brace beam based on the roof special structure requirement. If it should be installed through the roof, make sure the perforation is sealed correctly to avoid water leaking.

- Roof installation may affect the fireproof endurance rating of the building. The fireproof endurance rating of the module is grade C.
- Reserve at least 10cm height space between the module and the roof to make sure the cooling of the module under working status.

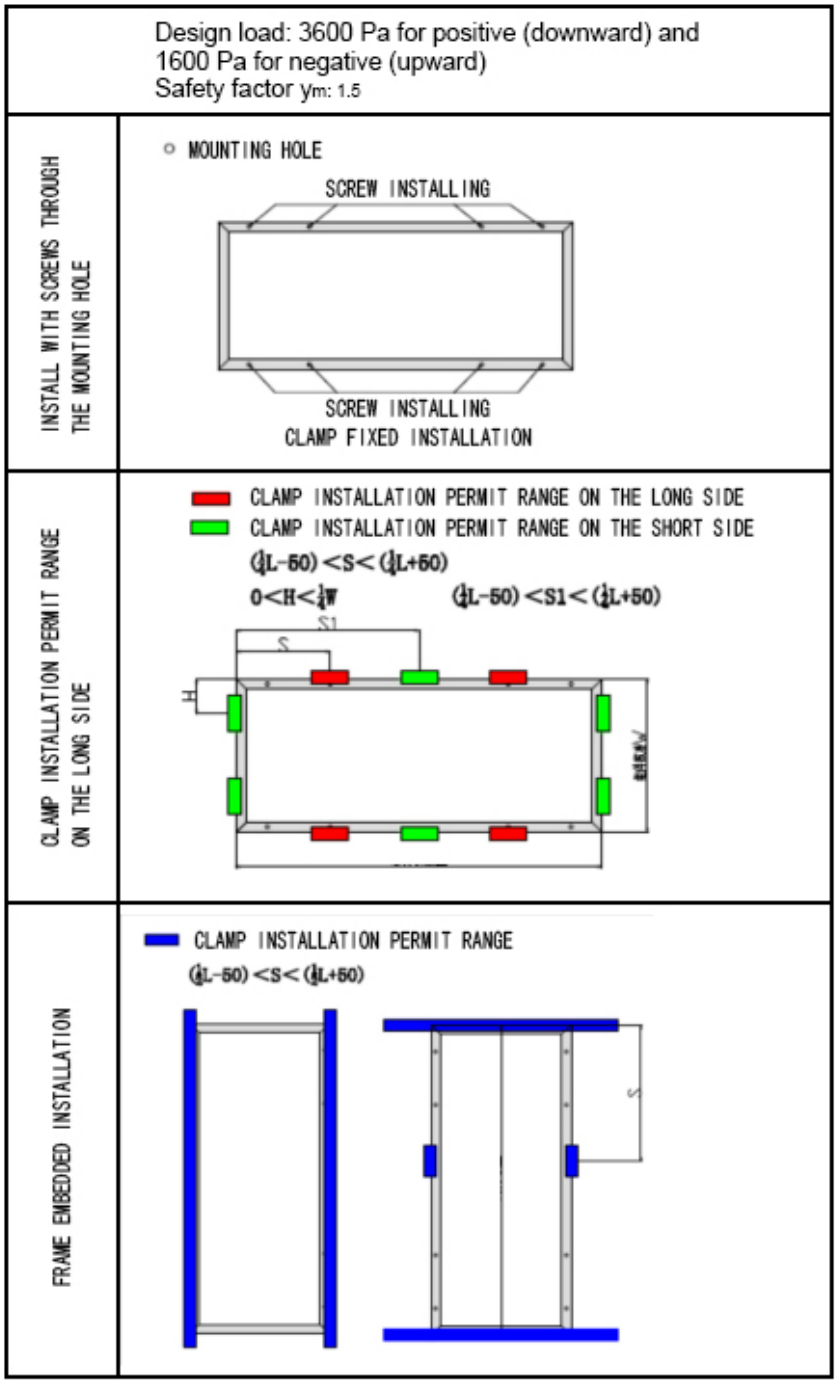
7.6 Installation Method

The module has three different installation methods: install through the mounting hole(with screws), clamp fixed installation(with clamp),and embedded installation(with frame embedded). The installer can choose the suitable method for installation. Aluminum alloy is recommended for clamp material.

There are 8 mounting holes with dimension 9*14mm on the frame of every module,which are used to fasten the module to the bracket using screws.

Under any circumstance, the clamp can not contact the glass or cause the module frame shape changing. The contact surface of the clamp and the frame should be flat and smooth. The clamp can not cover the waterspout. The clamp can not have shelter effect on the solar cells.

7.6.1 Installation Method and Position



Design load：3600 Pa for positive (downward) and 1600 Pa for negative (upward);

Safety factors γ_m =1.5

Install with screws through the mounting hole　　Mounting hole　Screw installing

using 8 mounting holes　　Clamp fixed installation

Clamp installation permit range on the long side

Clamp installation permit range on the short side

Frame embedded installation　　Clamp installation permit range

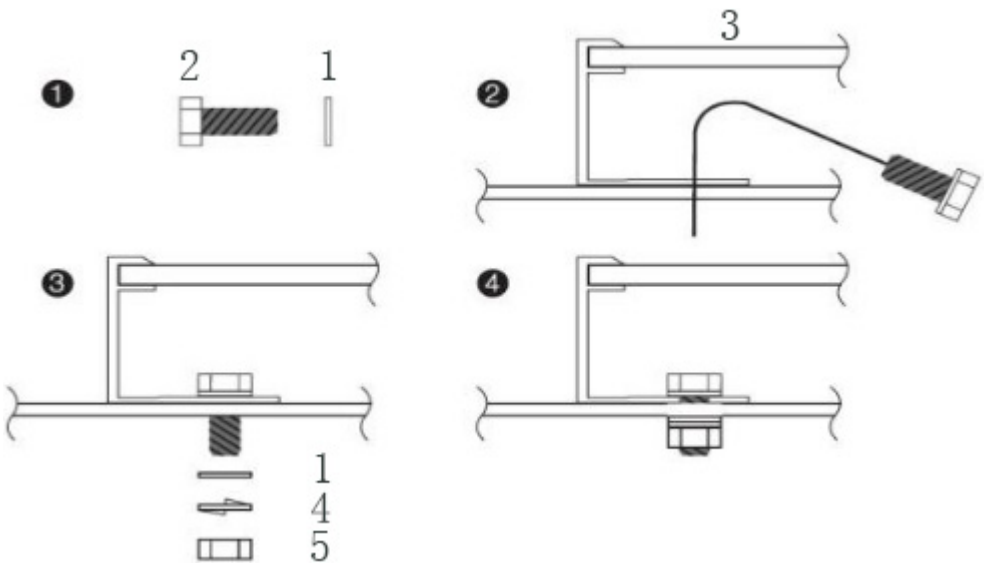
Figure 2. Installation Method and Position

7.6.2 Installation Details

- Screw Installation

suggested accessory dimension

accessories	bolt	nut	spacer	Spring shim
material	stainless steel	stainless steel	stainless steel	stainless steel
Dimension and length	M8*16mm	M8	M8	M8
Torque range of screw tightening：18N.m to 24N.m.				



1.spacer 2. Bolt 3. PV module 4.spring shim 5. nut

Figure 3. Screw Installation

- Clamp Fixed Installation

The module are fastened to the bracket with metal clamps. Clamp A is used on the module square edge, clamp B is used between two modules. Clamps with below conditions are recommended:

Width: ≥38mm

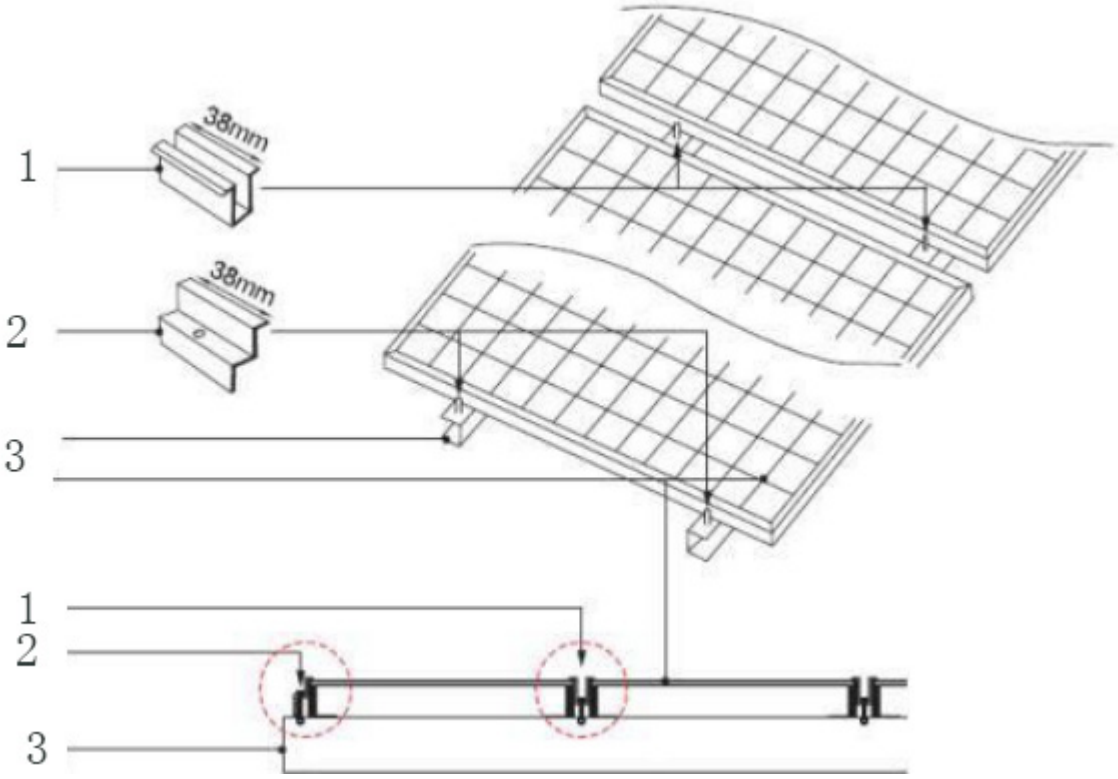
Thickness:≥3mm

Material: Aluminum Alloy

Bolt dimension: M8

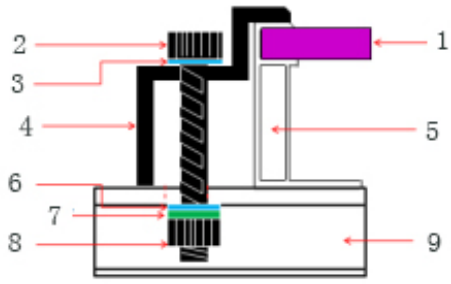
Torque range of screw tightening: 18N.m to 24N.m

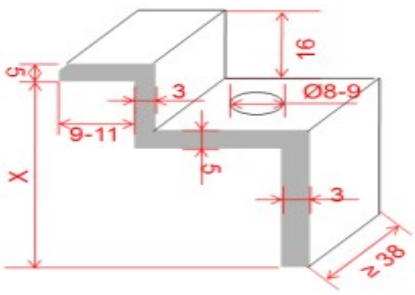
Under any circumstance, the clamp can not contact the glass or cause the module frame shape changing. The contact surface of the clamp and the frame should be flat and smooth, otherwise the frame and the module will be damaged. The clamp can not have shelter effect on the solar cells. The clamp can not cover the waterspout.



1. Clamp B(at least 2 pcs) 2. Clamp A(at least 2 pcs) 3.Installation bracket 4. PV module

Figure 4: Clamp Fixed Installation

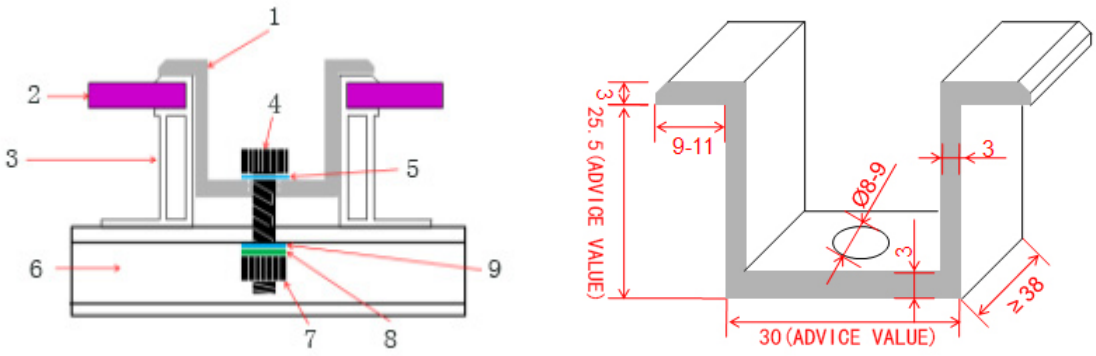




1. Laminated piece 2. Bolt 3. Spacer 4.Clamp A 5. Aluminum frame 6. Spacer

7. Spring shim 8. Nut 9. Installation bracket

Figure 5. Clamp A: clamp for terminal modules(X=frame thickness)



1. Clamp B 2.Laminated piece 3.Aluminum frame 4.Bolt

5.Spacer 6.Installation bracket 7. Nut 8.Spring Shim 9.Spacer

Figure 6. Clamp B: clamp for middle modules

8. Electrical Installation

8.1 General Installation Rules

Normally the module may generate more electricity than standard condition. When deciding the PV system component, with the parameters associated with rated voltage, wire rated current, fuse model numbers and module output power,etc, do consider the actual installation environment and conditions.

Please make sure the electrical components such as connector and inverter are in disconnection during the installation.

Photovoltaic system can be formed with several modules in series and then in parallel, which is especially suitable for higher voltage requirement. When the modules are in series, the total voltage of the system is the sum total of each module voltage. And when higher current is required, the modules can be organized in parallel, with total current of the system equal to the sum total of each module current.

The maximum quantity for module to be in series or parallel should be calculated according to the requirement of relevant regulations. The open circuit voltage under the expected local

lowest temperature and maximum irradiation can not exceed the module specified maximum system voltage DC1000V. The reference formula of maximum quantity in series is 1000V/(1.25*Voc). The reference formula of maximum quantity in parallel is max protective current/Isc+1(the maximum protective current of Jinyuan junction box is 15A)

The over-current protection of module is used on the DC side. Please refer to the local regulations to make sure the fuse application requirement. If there may be a reverse current through the module which exceeds the maximum fuse current, an equivalent over-current protection will be needed to protect the module. If the number of parallel is equal or greater than 2 strings, every string of modules should be installed with an over-current protection device.

Please choose the dimension, type and temperature requirement of cable according to the standards of local, regional and host country. To avoid the cable and connector overheated, the cable conductivity and connector endurance should meet the short circuit current and temperature when the system is exposed outdoor. Jinyuan suggests that the connect cable on site should satisfy the module to be used under the module maximum short circuit current. The cable should be a waterproof and UV-proof cable complying with the photovoltaic DC requirement, with sectional area 4mm^2 and temperature range -40℃~85℃. Jinyuan module connector is MC4 port, with male and female connectors distinguishing positive and negative poles, which should be connected accordingly. When connecting with a third party matched wiring device, follow the operating manual of the equipment manufacturer. Please make sure the connector is clean,dry, in place and firm when connecting. Wrong connection or not in place may cause a voltaic arc or electric shock. Connector should not subjected to additional pressure. Non-professionals are prohibited to open the lock nut. The connector is only for connecting circuit without opening or closing circuit function.

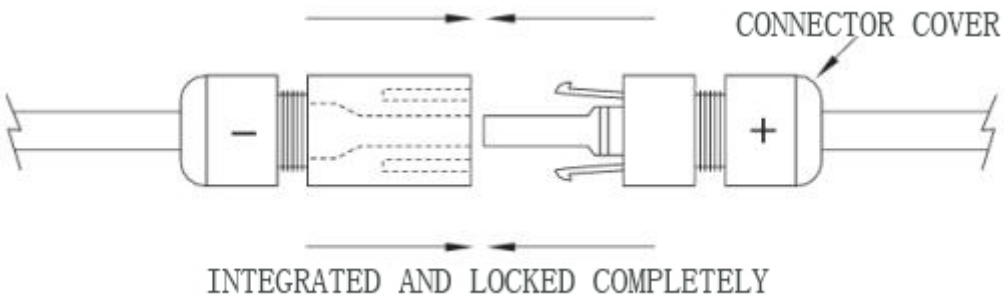


Figure 7. Male Connector and Female Connector

The PV system should be installed with lightning protection device where there is frequent lightning activity. To reduce the risk of lightning stroke, the minimum loop area should be applied when laying the cable.

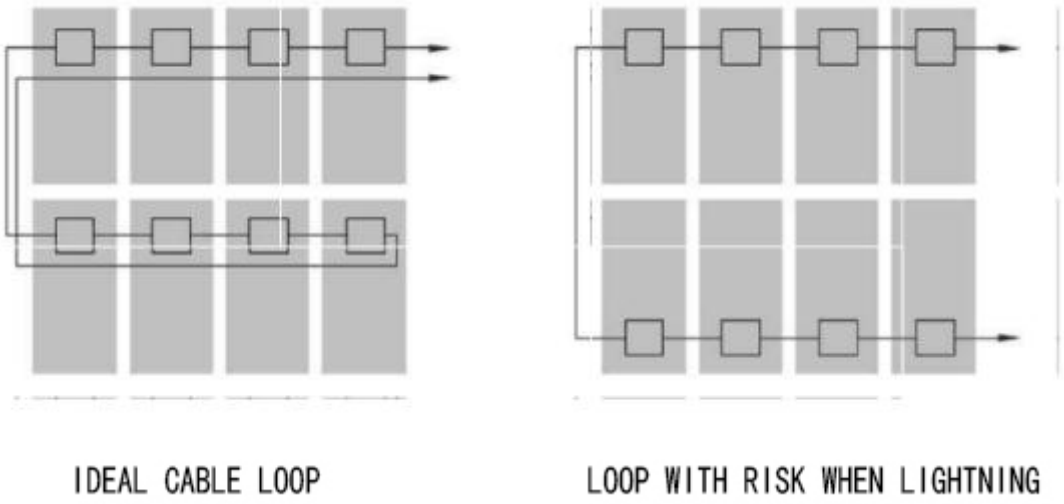


Figure 8. Circuit Design

When the cables are fixed on the bracket, it is necessary to avoid the mechanical damage of the cable or the module. Do not press the cable.when fixing cable in a proper way, it should be fixed with light-resistant cable ties, and avoid direct sunlight and water soaking.

8.2 Grid Electrical System

The DC current of PV system can be converted to AC and connected to the public supply network. As the policies in different area about connecting PV system to public supply network are different, please consult the senior system design engineer when designing. Usually, the installation of this system will need the recognition,acceptance and formal approval of the public utilities.

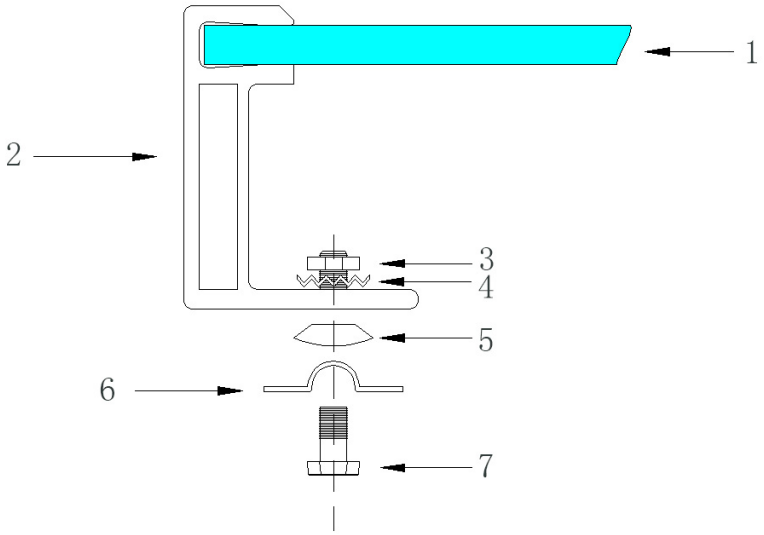
8.3 Equipotential Connection

In order to avoid the risk of electric shock or fire hazard, the module frame needs to do the equipotential connection before the system operation. Please refer to the local safety and electrical installation standard for the installation requirement.

The correct grounding device is to connect all the metal devices which is not used for

conducting to the grounding device with proper dimension or to a bracket as an integrated grounding device. There are grounding hole(Ø4) and grounding mark on the aluminum frame, which are not used for fixing module. Extra holes are prohibited to be drilled on the module.

Grounding screws, spacers and nuts should be stainless steel material. Bend the grounding wire into shape Ω and fix it between the screw head and spacers. Grounding screw penetrates the grounding hole. The toothed lock washer should be installed to penetrate the anodic oxide film of the aluminum frame to make sure a safe and reliable grounding effect.



1. PV module 2. Aluminum frame 3. Nut 4. Toothed lock washer

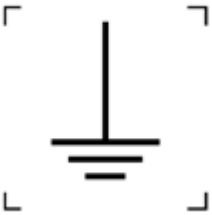
5.Cup shape washer 6. Grounding connector 7. Bolt

Figure 9 Equipotential Connection Diagram

The PV module can do the grounding with modules connected to the bracket as an integrated grounding device or additional ground equipment. But all these grounding measures should be safe and effective, and can not cause the electrochemical corrosion between the aluminum frame of the module and the other different metals.

In order to obtain the best output power and avoid the PID effect, the DC negative of the module array should be earthed when installing the modules. If this rule is not followed during the installation, the output power of the system may be lowered.

Joint the module with field installation equipotential connection conductors and grounding conductors. The connector or junction of the module should be marked with below special identifier, any other connector or junction can not use this symbol



9.Commissioning and Maintenance

1) It is suggested to have the mechanical and electric checking at least once every six months to make sure the module and system connectors are clean and connected reliably. Pay attention to comply with all the maintenance manuals of all the components used in the system, including bracket, inverter, junction box and battery, etc.

2)There may be accumulated dirt and dust on the surface of the modules as time goes on, which will lower the output power of the module. It is suggested to clean the module at least once every year to make sure the maximum output power, especially in the areas with low rainfall. Please choose the time with not strong sunlight for the module cleaning.

3) Please do not touch or handle the glass surface of the module with bare hands to avoid leaving the fingerprint or any other dirt on the glass. When cleaning the module surface, firstly use a dry duster or cloth to brush off the surface adhesive materials, and then clean with wet soft sponge or cloth. Mild cleaning agent without abradant can also be used to get rid of the dirties.

4) When cleaning, do not use the water with high mineral content, do not use the water with big water pressure. Normal municipal water supply is enough.

5)If the module is installed somewhere with more sand-dust, it is suggested to blow the sand with gas. If there is snow cover on the module surface , please do not try to remove the frozen snow or ice with brute force.

6) Please do not clean the modules with damaged glass or bare wire, otherwise there will be risk of electrical shock.

7)If there is any question, please arrange qualified person for checking.

10. Module Electrical Performance Parameters

Module rated parameters are tested average values under STC standard conditions. Tolerance of maximum power is ±3%, tolerance of open circuit voltage is ±3%, tolerance of short circuit current is ±5%. In the module model numbers, JY stands for Jinyuan, xxx is module power gear, P stands for poly-crystal, M stands for mono-crystal, xx stands for the quantity of solar cell inside the module. (STC standard test condition: irradiation 1000W/㎡, atmospheric quality AM1.5, solar cell temperature 25±2℃)

Module Model No.	Pmax	Vmp	Imp	Voc	Isc
JY330M72	330±3%	38.2	8.64	46.7±3%	9.12±5%
JY335M72	335±3%	38.4	8.72	46.9±3%	9.19±5%
JY340M72	340±3%	38.8	8.79	47.1±3%	9.24±5%
JY345M72	345±3%	38.9	8.87	47.3±3%	9.31±5%
JY275M60	275±3%	31.7	8.7	38.5±3%	9.41±5%
JY280M60	280±3%	31.8	8.81	38.6±3%	9.49±5%
JY285M60	285±3%	32.1	8.91	38.7±3%	9.51±5%
JY250M54	250±3%	28.7	8.71	34.5±3%	9.18±5%
JY255M54	255±3%	28.9	8.93	34.8±3%	9.26±5%
JY220M48	220±3%	25.5	8.63	30.8±3%	9.48±5%
JY225M48	225±3%	25.7	8.76	31±3%	9.58±5%
JY230M48	230±3%	25.9	8.89	31.3±3%	9.61±5%
JY165M36	165±3%	19.1	8.64	23.1±3%	9.58±5%
JY170M36	170±3%	19.5	8.99	23.2±3%	9.61±5%
JY300P72	300±3%	36.6	8.2	45.3±3%	8.84±5%
JY305P72	305±3%	36.8	8.3	45.6±3%	8.91±5%
JY310P72	310±3%	37	8.38	46±3%	8.96±5%
JY315P72	315±3%	37.2	8.48	46.2±3%	9.01±5%
JY320P72	320±3%	37.4	8.56	46.4±3%	9.06±5%
JY325P72	325±3%	37.6	8.65	46.7±3%	9.11±5%
JY330P72	330±3%	37.8	8.75	46.9±3%	9.14±5%
JY255P60	255±3%	30.8	8.28	38±3%	8.92±5%
JY260P60	260±3%	31.1	8.37	38.1±3%	8.98±5%
JY265P60	265±3%	31.4	8.44	38.6±3%	9.03±5%

JY270P60	270±3%	31.7	8.52	38.8±3%	9.09±5%
JY275P60	275±3%	32	8.61	39.1±3%	9.15±5%
JY225P54	225±3%	27.8	8.09	33.8±3%	8.93±5%
JY230P54	230±3%	28.1	8.19	34.2±3%	8.97±5%
JY235P54	235±3%	28.3	8.3	34.5±3%	9.03±5%
JY240P54	240±3%	28.5	8.52	34.9±3%	9.08±5%
JY200P48	200±3%	24.8	8.06	30.3±3%	8.46±5%
JY205P48	205±3%	25.1	8.17	30.5±3%	8.62±5%
JY210P48	210±3%	25.3	8.3	30.8±3%	8.74±5%
JY215P48	215±3%	25.4	8.53	31±3%	9.11±5%
JY150P36	150±3%	18.4	8.15	22.9±3%	8.42±5%
JY155P36	155±3%	18.8	8.24	23±3%	8.66±5%
JY160P36	160±3%	19	8.55	23.3±3%	9.14±5%
JY165P36	165±3%	19.1	8.64	23.4±3%	9.21±5%
Operating temperature range（℃）		—40℃~85℃			
Maximum Reverse Protection Rated Current		15A			
Maximum System Voltage		1000V			
Pmax Temperature Coefficient		-0.395%/℃			
Voc Temperature Coefficient		-0.317%/℃			
Isc Temperature Coefficient		0.0577%/℃			