



JINKOSOLAR PHOTOVOLTAIC MODULE

USER MANUAL (UL61730)

EDITION 08/2023

Solar
JinkO

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1. General Information

1.1 Overview

In order to ensure the PV modules are installed correctly, please read the following installation instructions carefully before modules are installed and used. Please remember that these products generate electricity and certain safety measures need to be taken to avoid danger. Make sure the module array is designed in such a way as not to exceed the maximum system voltage of any system component such as connectors or inverters.

Modules must be installed over a roof which has appropriate fire resistance. Before mounting the module, please consult your local building department to determine approved roofing materials. The modules are qualified for application class A, and modules qualified for safety through UL61730 within this application class are considered to meet the requirements of Safety Class II.

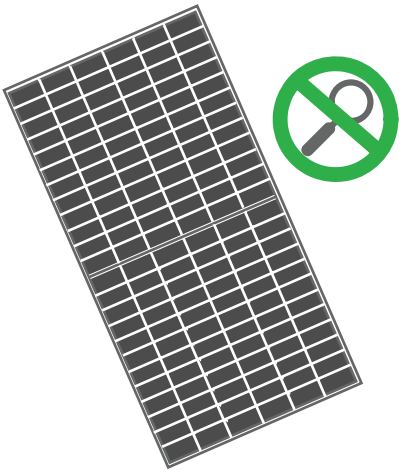
For single glass module, the Fire rating is Class C in Canada, but the Module Fire Performance is Type 1 in the U.S. While for dual glass module, the Fire rating is Class C in Canada, but the Module Fire Performance is Type 29 in the U.S. The specified construction is shown in the below table. Both type 1 and type 29 modules installed with Class A racking achieves System Class A Fire Rating in the U.S.

Module model	Specific construction	Marking
Single Glass Modules	Superstrate: 3.2 mm thick; EVA: 0.25~0.8 mm thick; Substrate: 0.32~0.34 mm thick;	Class C (Canada) Type 1 (USA)
Dual Glass Modules	Front glass 2.0/2.5 mm thick; EVA: 0.5~0.8mm thick; Back glass:2.0/2.5 mm thick;	Class C (Canada) Type 29 (USA)

Notes: Module model refer to appendix 1 for details.

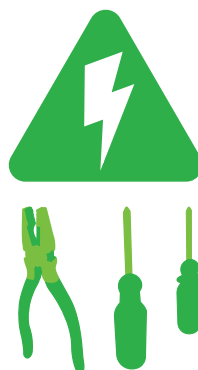
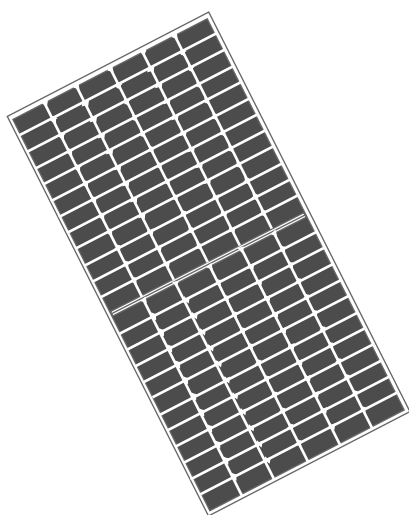
1.2 Warnings

- PV modules generate DC electrical energy when exposed to sunlight or other light sources. Active parts of modules such as terminals can result in burns, sparks, and lethal shock.
- Artificially concentrated sunlight shall not be directed on the module or panel.
- Front protective glass is utilized on the module. Broken solar module glass is an electrical safety hazard (may cause electric shock or fire). These modules cannot be repaired and should be replaced immediately.





- To reduce the risk of electrical shocks or burns, modules may be covered with an opaque material during installation to avoid injury.
- The fire rating of this module is valid only when mounted in the manner specified in the mechanical mounting instructions.
- The module is considered to be in compliance with UL 61730 only when the module is mounted in the manner specified by the mounting instructions below.
- All installations must be performed in compliance with the National Electrical Code (NEC) and modules installed in Canada need to follow Canadian Electric Code (CEC).
- A module with exposed conductive parts is considered to be in compliance with UL 61730 only when it is electrically grounded in accordance with the instructions presented below and the requirements of the National Electrical Code.
- The installation work of the PV array can only be done under the protection of sun-sheltering covers or sunshades and only qualified personnel can install or perform maintenance work on this module.
- Follow the battery manufacturer's recommendations, if batteries are used with modules.
- Do not use this module to replace or partly replace roofs and walls of buildings.
- Do not install modules where flammable gas may be present.
- Do not touch live terminals with bare hands. Use insulated tools for electrical connections.
- Do not use water to extinguish the fire when the power supply is not disconnected.



Use insulated tools for electrical connection

- Do not remove any part installed by Jinko Solar or disassemble the module.
- All instructions should be read and understood before attempting to install, wire, operate, and maintain the module.
- Do not lift up PV modules using the attached cables or the junction box.
- All PV systems must be grounded to earth. If there is no special regulation, please follow the National Electrical Code or other national code.
- Common hardware items such as nuts, bolts, star washers, lock washers, and the like have not been evaluated for electrical conductivity or for use as grounding devices and should be used only for maintaining mechanical connections and holding electrical grounding devices in the proper position for electrical conductivity. Such devices,

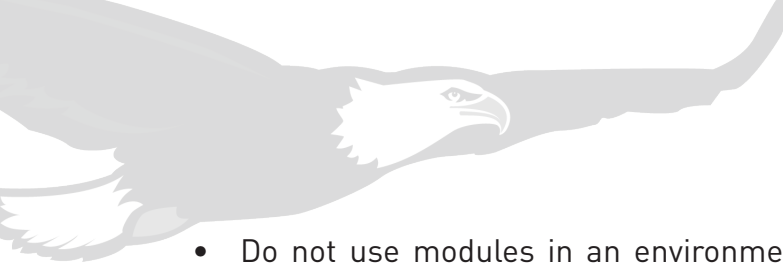


where supplied with the module and evaluated through the requirements in UL 61730, may be used for grounding connections in accordance with the instructions provided with the module.

- Under normal conditions, a module is likely to experience conditions that produce more current and/or voltage than reported at standard test conditions. The requirements of the National Electrical Code (NEC) in Article 690 shall be followed to address these increased outputs. In installations, not under the requirements of the NEC, the value of I_{sc} and V_{oc} marked on the module should be multiplied by a factor of 1.25 when determining module voltage ratings, conductor ampacities, overcurrent device ratings, and size of controls connected to the PV output.
- Once the PV module has been shipped to the installation site, all of the parts should be unpacked properly with care.
- Do not stand or step on the PV module like below pictures show. This is prohibited, and there is a risk of damage to the module and injury to you.



- Only PV modules with the same cell size should be connected in series.
- During transportation of modules, please attempt to minimize shock or vibration to the module, as this may damage the module or lead to cell micro cracks.
- Modules (glass, junction boxes, connectors, etc.) shall be protected from long-term exposure to environments containing sulfur, strong acid, strong alkaline, etc., which may pose a risk of corrosion to the product.
- Do not clean the glass with chemicals. Only use tap water. Make sure the module surface temperature is cool to the touch. Cleaning modules with cool water when module surface temperature is high may result in glass breakage. Do not brush paint or corrosive substances on the surface of the modules.
- Do not disconnect any of the modules when under load.
- The recommended standoff height is 6 inches (15cm). If other mounting means are employed this may affect the UL Listing.
- When looking at PV modules with anti-reflection (AR) coating technology, it will be normal to see some cells with a slight color difference at different angles. Modules with LRF (light reflective film) and without LRF should not be used in the same array.
- The junction box connector should not be in contact with oily substances, organic solvents and other corrosive materials to avoid damage to the connector. For example, alcohol, gasoline, lubricants, rust inhibitors, herbicides and so on.
- Before the installation of modules, it is recommended to add rainproof facilities in the project site to avoid direct open-air placement.



- Do not use modules in an environment with aliphatic, aromatic, phenols, ketones, halogenated substance or mineral oil, which may chemically corrode the junction box.
- Do not contact junction box connectors with oily substances (e.g. lubricant, rust inhibitor, etc.).

2. Installation

2.1 Installation Safety

- Always wear protective head gear, insulating gloves, and safety shoes (with rubber soles) and other protective measures during installation.
- When installing or maintaining the photovoltaic system, please do not wear metal rings, watches and other metal products, so as not to cause electric shock danger and damage the modules.
- Keep the PV module packed in the carton until installation. Once the modules are removed from the packing box, they should be installed and connected to the bus box in time. If they are not installed immediately, protective measures (such as adding rubber joint cover, etc.) should be taken on the connection head.
- Do not touch the PV module unnecessarily during installation. The glass surface and the frame may be hot. There is a risk of burns and electric shock.
- Do not work in rain, snow, or windy conditions.
- Due to the risk of electrical shock, do not perform any work if the terminals of the PV module are wet.
- Use insulated tools and do not use wet tools.
- When installing PV modules, do not drop any objects (e.g., PV modules or tools).
- Make sure flammable gasses are not generated or present near the installation site.
- The modules are equipped with PV wiring connectors that comply with UL 6703, Standard for Connectors for use in Photovoltaic Systems. Connectors from different manufacturers should not be mated together.

Connector model name (female)	Allowable mating connector model name(male)
PV-JK03M-F/xy(female)	PV-JK03M-M/xy(male)
PV-JK03M2-F/xy(female)	PV-JK03M2-M/xy(male)
PV-KBT4/6II-UR(female)	PV-KST4/6II-UR(male)
PV-KBT4/6I-UR(female)	PV-KST4/6I-UR(male)
PV-KBT4-EV02/6II-UR(female)	PV-KST4-EV02/6II-UR(male)
PV-KBT4-EV02/6I-UR(female)	PV-KST4-EV02/6I-UR(male)

Table 1: Allowable mating connector model name



- Insert module connectors fully and correctly. An audible “click” sound should be heard. This sound confirms that the connectors are fully seated. Check all connections.
- The module leads should be securely fastened to the module frame. Wire Management should be done in a way to prevent the connector from scratching or impacting the back sheet of the module.
- Do not touch the junction box and the end of the interconnect cables (connectors) with bare hands during installation or under sunlight, whether or not the PV module is connected to or disconnected from the system.
- Do not expose the PV module to excessive loads on the surface of the PV module or twist the frame.
- Do not hit or put excessive load on the glass or back sheet; this may break the cells or cause micro cracks.
- During installation or operation, do not use sharp tools to wipe the back sheet and glass. Scratches can appear on the module.
- Do not drill holes in the frame; it may cause corrosion of the frame and void the warranty.
- When installing modules on roof mounted structures, please try to follow the “from top to bottom” and/or “from left to right” principle, and do not step on the module. This will damage the module and would be dangerous for personal safety. In roof mounting applications, the assembly is to be mounted over a fire resistant roof covering rated for the application.
- Modules will expand and contract due to ambient temperature. It is recommended that the minimum spacing between adjacent modules is shown as below:
 - 1: 0.4 inch (10mm) for monofacial module;
 - 2: 0.8 inch (20mm) for bifacial module;
- If there are special requirements, please confirm with Jinko.
- During the installation, disassembly, maintenance and any other related processes of the product, it is recommended that the force applied between the cable and the connector & between the cable and the junction box shall be no more than 44.25 lb-ft (60N*m).
- All PV systems must be grounded to earth (Refer to 3. “Wiring and connection” for specific grounding).
- Rated operating altitude of up to 2000 m.

2.2 Installation Condition

2.2.1 Climate Condition

Please install the modules in the following conditions:

- a) Operating temperature: -40°C (-40°F) to 85°C (185°F).
- b) Humidity: $< 85\text{RH}\%$.
- c) Ambient air temperature range of -40°C to $+ 40^{\circ}\text{C}$.

***Note:**

The mechanical load bearing (include wind and snow loads) of the module is based on the approved mounting methods. The professional system installer must be responsible for mechanical load calculation according to the system design.



2.2.2 Site Selection

In most applications, Jinko Solar PV modules should be installed in a location where they will receive maximum sunlight throughout the year. In the Northern Hemisphere, the module should typically face south, and in the Southern Hemisphere, the modules should typically face north. Modules facing 30 degrees away from true South (or North) will lose approximately 10 to 15 percent of their power output. If the module faces 60 degrees away from true South (or North), the power loss will be 20 to 30 percent.

When choosing a site, avoid trees, buildings, or obstructions, which could cast shadows on the modules, especially during the winter months when the arc of the sun is lowest over the horizon. Shading causes loss of output, even though the factory fitted bypass diodes of the PV module will minimize any such loss.

Do not install the PV module near open flame or flammable materials. When solar modules are used to charge batteries, the battery must be installed in a manner, which will protect the performance of the system and the safety of its users. Follow the battery manufacturer's guidelines concerning installation, operation, and maintenance recommendations. Do not install the PV module in a location where it would be immersed in water or continually exposed to water from a sprinkler, fountain, or other liquid.

2.2.3 Tilt Angle Selection

The tilt angle of the PV module is measured between the surface of the PV module and a horizontal ground surface (Figure 1). The PV module generates maximum output power when it faces the sun directly.

When the PV modules are attached to a permanent structure, the tilt angle of the PV modules should be selected to optimize the performance based on seasonal load and sunlight. In general, if the PV output is

adequate when irradiance is low (e.g., winter), then the angle chosen should be adequate during the rest of the year. For grid-connected installations where the PV modules are attached to a permanent structure, PV modules should be tilted so that the energy production from the PV modules will be maximized on an annual basis. The System Fire Class Rating of a module or panel in a roof mounted system should meet local code requirements in order to achieve the specified System Fire Class Rating for a non-BIPV module or panel.

The fire test slope is 5 in/ft (22.5°) based on UL790 is required to maintain System Fire Class Rating. Any module or panel mounting system have limitations on inclination required to maintain a specific System Fire Class Rating.

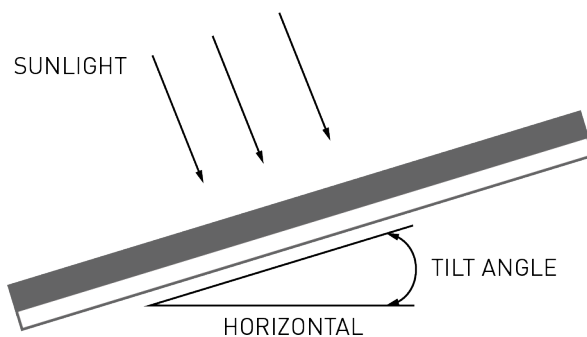


Figure1: PV module tilt angle



2.3 Mechanical Installation Introduction

PV modules usually can be mounted by using the following methods: bolts and clamps.

***Note:**

1. All installation methods herein are only for reference, and Jinko Solar will not provide related mounting tools. The system installer or trained professional personnel must be responsible for the PV system's design, installation, and mechanical load calculation and security of the system.
2. Before installation, the following items should be addressed:
 - a. Visually check the module for any damage. Clean the module if any dirt or residue remains from shipping.
 - b. Check if module serial number stickers match.
 - c. The minimum distance between modules should be more than 10mm for all installation methods.
3. The mounting with bolts and/or clamps on the long side of the frames can meet a maximum positive testing (downward) pressure of 5400Pa and negative testing (upward) pressure of 2400Pa. When mounting modules in snow-prone or high-wind environments, special care should be taken to mount the modules in a manner that provides sufficient design strength while meeting local code requirements.
4. Where common grounding hardware (nuts, bolts, star washers, spilt-ring lock washers, flat washers, and the like) is used to attach a listed grounding/bonding device, the attachment must be made in conformance with the grounding device manufacturer's instructions.
5. Common hardware items such as nuts, bolts, star washers, lock washers, and the like have not been evaluated for electrical conductivity or for use as grounding devices and should be used only for maintaining mechanical connections and holding electrical grounding devices in the proper position for electrical conductivity. Such devices, where supplied with the module and evaluated through the requirements in UL 61730, may be used for grounding connections in accordance with the instructions provided with the module.
6. The use of third party grounding devices is not allowed unless the grounding device is UL2703 certified with Jinko modules. The installation of that grounding hardware must follow the grounding manufacturer's installation manual.
7. The clearance between the module and the roof deck should be a minimum of 0.6 inches (15mm).



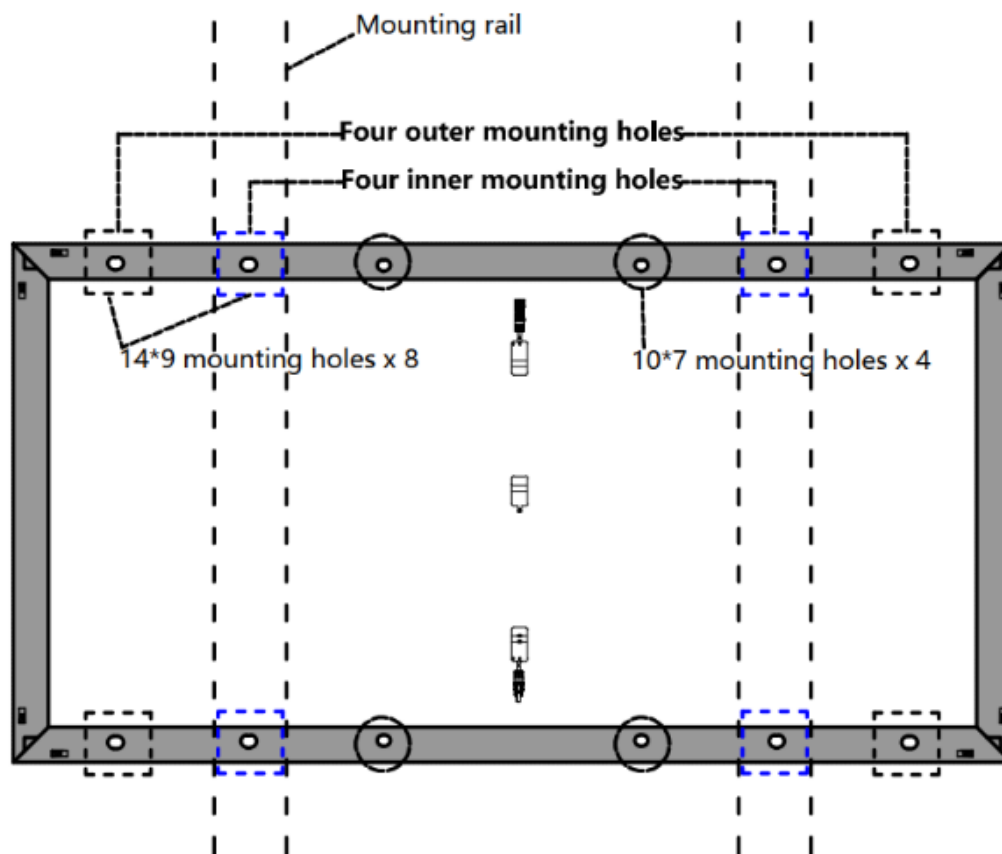
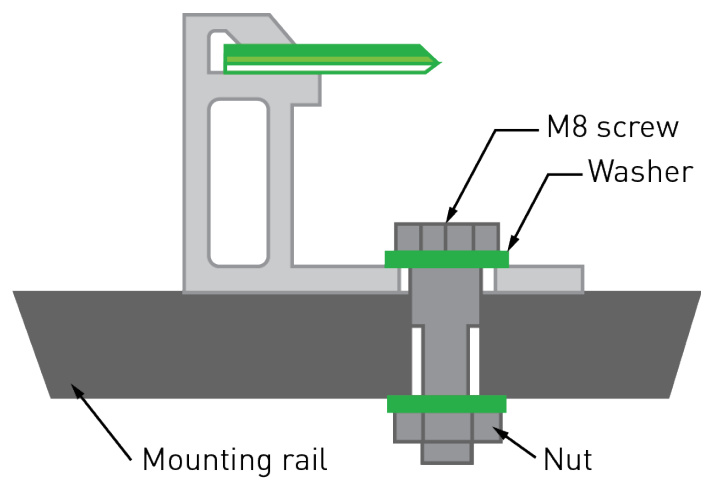
2.3.1 Mounting with Bolts

The module frame must be attached to a mounting rail using M8 corrosion-proof bolts together with spring washers and flat washers in four symmetrical locations on the PV module. The applied torque value should be big enough to fix the modules steadily. The torque value for M8 bolt is 16~20 N*m and M6 bolt is 8 N*m. For special racking systems or systems with special installation requirements, please reconfirm with the supplier for the appropriate torque value. Please find detailed mounting information in Figure 2. The installation instructions shall specify that the modules have been evaluated by UL for bolt mounting using the 4 provided mounting holes in the frame with a torque of 16~20 N*m. The following stainless steel mounting hardware should be included in the installation instructions: For eight 14x9 holes for M8 and four 10x7 holes for M6 (Red label for mounting hole), mounting hardware is shown below in Table 2:

Module	Mounting hardware configuration				Max. Pressure
All modules (Except the modules without 14x9 inner mounting holes)	Hardware	Material	Size(holes) 14x9 (Four inner mounting holes)	Number provided	Test load: 5400Pa (positive) & 2400Pa (negative) Design load: 3600Pa (positive) & 1600Pa(negative)
	Bolt	Stainless Steel	M8	4 M8	
	Spring washer	Stainless Steel	M8		
	Nut	Stainless Steel	M8		

Module without 14x9 inner mounting holes	Holes size and relevant distance				Remark
JKMxxxM-72HL4-TV(F35mm) JKMxxxN-72HL4-TV JKMxxxN-72HL4-BDV	Holes size (mm)	10x7	10x7	14x9	The modules without 14x9 inner mounting holes do not involve mounting with bolts for fixed system
	Holes distance (mm)	400	790	1400	

Table 2: The mounting part for Four inner mounting holes



All modules (Except the modules without 14x9 inner mounting holes)
Figure 2: PV module installed with Bolt fitting method

2.3.2 Mounting with Clamps

The module clamps should not come into contact with the front glass and must not deform the frame. Be sure to avoid shading effects from the module clamps. The module frame is not to be modified under any circumstances. When choosing this type of clamp-mounting method, please be sure to use at least four clamps on each module. Two clamps should be attached on each long side of the module. The applied torque value should be high enough to mount the modules steadily. (Please consult with the clamp or racking supplier for the specific torque value). Please find detailed mounting information in the below illustration. The mounting zone is greater than J and less than K. Figure 3 shows how a clamp should be mounted to the module frame.

When installing modules using clamps on the long side of the frame, the applicable product types and installation locations are shown in Figure 4 and Table 4.

When installing modules using clamps on the short side of the frame, the applicable product types and installation locations are shown in Figure 5 and Table 5.

When installing modules using clamps on the long side & short side of the frame, the applicable product types and installation locations are shown in Figure 6 and Table 6.

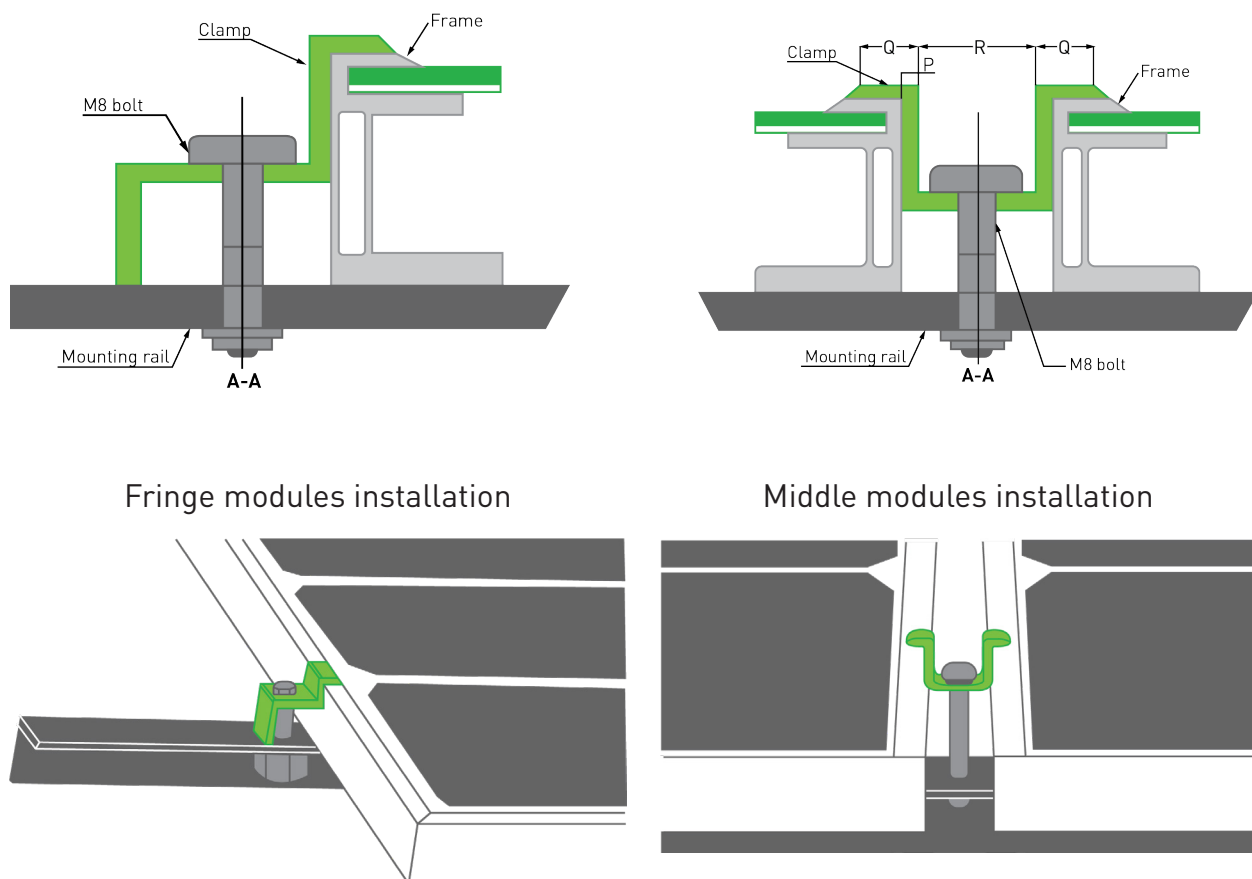


Figure 3: PV module installed at the side with Clamp fitting method



Clamp type	Dimension (mm)			Composition material
End Clamp (40 mm thickness)	39 x 50 x 42 39 x 60 x 42 (For 1.5mm thickness frame)			Aluminum-alloy
End Clamp (35 mm thickness)	41.5 x 50 x 40			
Middle Clamp (40 mm & 35 mm thickness)	42 x 50 x 28 42 x 60 x 28 (For 1.5mm thickness frame)			
	Q	R	P	
	13.5	15	2.5	

Table 3: Mechanical dimensions, specification and material when modules installed with mid Clamp

2.3.2.1 Mounting with Clamps at Long Sides of the Frames

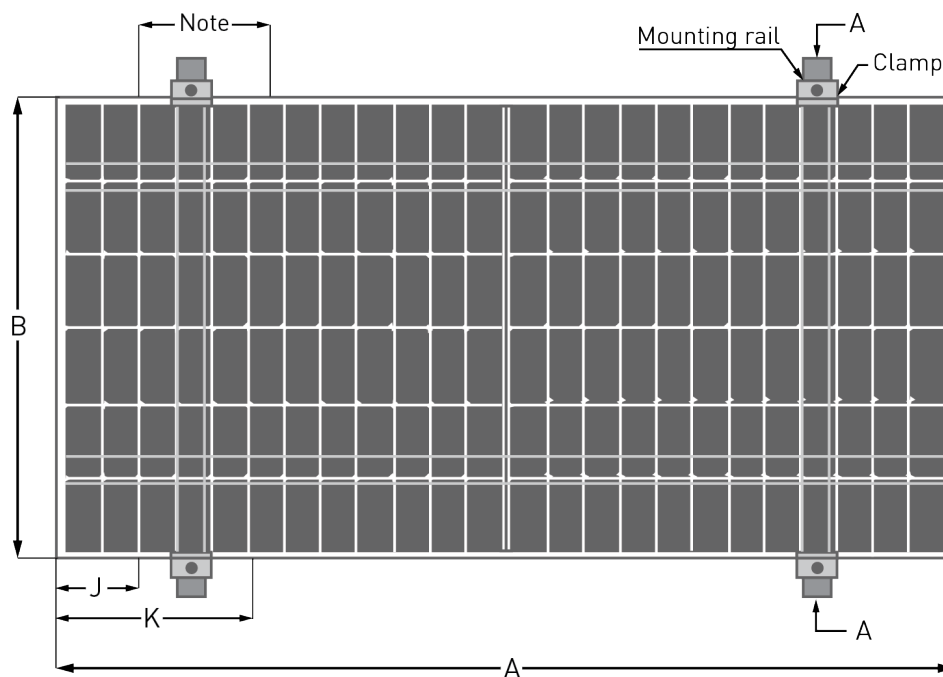


Figure 4: Installation methods of clamps on long sides



Module type	Dimension (mm)		
	Max. Test Pressure: 5400Pa (positive) & 2400Pa (negative) mechanical load Note: A is the length of the long side of the module		
	A*B*C	J	K
JKMxxxM-72HL-TV	2031*1008*40	280	420
	2031*1008*35	A/4-50	A/4+50
JKMxxxM-72H(B)L-(V)	2008*1002*40	280	420
	2008*1002*35	A/4-50	A/4+50
JKMxxxM-60H(B)L-(V)	1684*1002*35	280	420
	1684*1002*35	A/4-50	A/4+50
JKMxxxM-7RL3-(V)	2182*1029*40	430	570
	2182*1032*40		
JKMxxxM-6RL3-(B)-(V)	1855*1029*35	280	420
	1855*1032*35		
	1855*1029*35	A/4-50	A/4+50
JKMxxxM-6TL3-(B)-(V)	1692*1029*35	280	420
	1692*1029*35	A/4-50	A/4+50
JKMxxxM-7RL3-TV	2205*1032*40	430	570
	2205*1032*35	A/4-50	A/4+50
JKMxxxM-72HL4-(V)-(TV) JKMxxxN-72HL4-(V)-(TV)	2274*1134*35	A/5-50	A/5+50
	2278*1134*35		
	2274*1134*40	A/4-50	A/4+50
	2278*1134*40		
JKMxxxM-60HL4-(B)-(V)	1903*1134*35	A/4-50	A/4-50
	1903*1134*40		
JKMxxxM-54HL4-(B)-(V) JKMxxxN-54HL4-B	1718*1134*35	A/5-50	A/5+50
	1722*1134*35		
	1718*1134*40		
JKMxxxM-72HLM-TV	2096*1039*40	A/4-50	A/4+50
JKMxxxN-72HL4-BDV	2278*1134*35	A/4-50	A/4+50
	2278*1134*30		

Table 4: Mechanical dimensions when modules installed at long side with Clamp

2.3.2.2 Clamping Mounting on Short Sides of the Frames

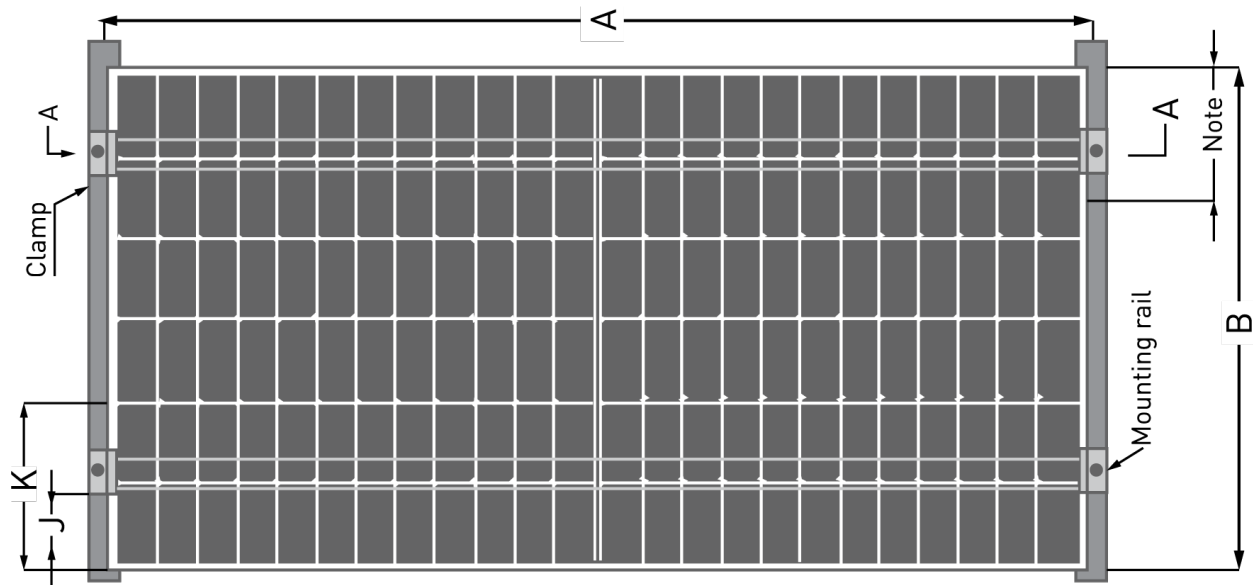


Figure 5: Installation of clamps on short side of frames

Module type	Dimension (mm)		
	Max. Test Pressure: 1600Pa (positive) & 1600Pa(negative) mechanical load		
	A*B	J	K
JKMxxxM-72HL-TV	2031*1008*40	100	240
JKMxxxM-60H(B)L-(V)	1684*1002*35	100	240
JKMxxxM-72H(B)L-(V)	2008*1002*40	100	240
JKMxxxM-6RL3-(B)-(V)	1855*1029*35 1855*1032*35	130	240

Table 5: Mechanical dimensions of modules installed with clamps on short side of frame

Note: The installation method of clamps on short sides is based on Jinko's internal results and have not been evaluated by UL.

2.3.2.3 Clamping Mounting on Long/Short Sides

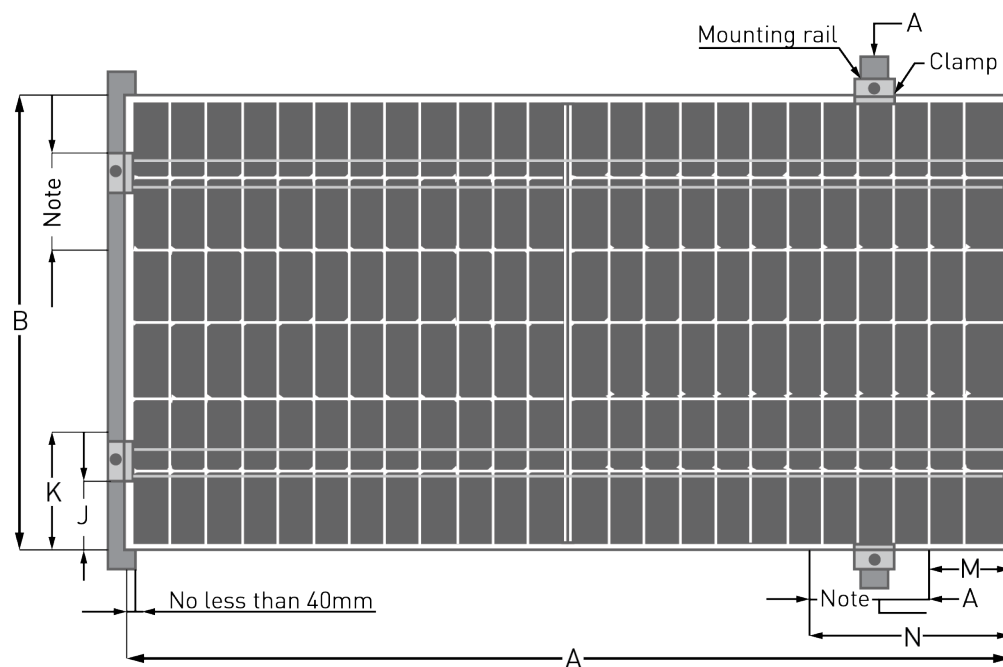


Figure 6: Installation of clamps on long/short side of frame

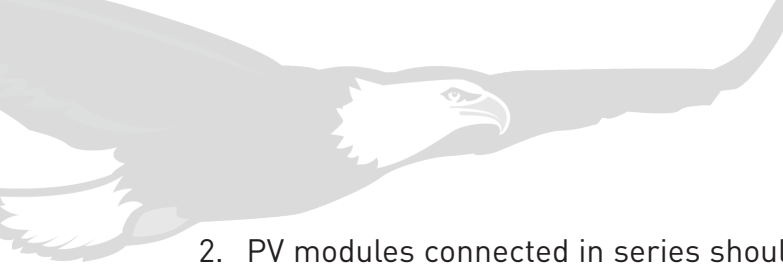
Module type	Dimension (mm)				
	Max. Test Pressure: 2400Pa (positive) & 2400Pa (negative) mechanical load				
	Note: A is the length of the long side of the module				
	A*B	J	K	M	N
JKMxxxM-72HL-TV	2031*1008*40	100	240	280	480
JKMxxxM-72H(B)L-(V)	2008*1002*40	100	240	280	480
JKMxxxM-60H(B)L-(V)	1684*1002*35	100	240	280	420
JKMxxxM-6RL3-(B)-(V)	1855*1029*35 1855*1032*35	100	240	A/4-50	A/4+50
JKMxxxM-7RL3-(V) JKMxxxM-7RL3-TV	2182*1029*40 2182*1032*40 2205*1032*40	130	240	A/4-50	A/4+50
JKMxxxN-72HL4-BDV (±1600pa)	2278*1134*35 2278*1134*30	130	240	A/4-50	A/4+50

Table 6: Mechanical dimensions of modules installed with clamps on long & short side of frame

Note: The installation method of clamps on long and short sides is based on Jinko's internal results and have not been evaluated by UL.

3. Wiring and Connection

- Before this procedure, please read the operating instructions of the PV system carefully. Connect the PV module connections in series or parallel, as determined by the user's configuration requirement for system power, current, and voltage.



2. PV modules connected in series should have similar current, and modules must not be connected together to create a voltage higher than the permitted system voltage. The maximum number of modules in series depends on system design, the type of inverter used, and environmental conditions.
3. The maximum current rating of overcurrent protection in an array string can be found on the product label or in the product datasheet. The current rating of overcurrent protection also corresponds to the maximum reverse current that a module can withstand, e.g. when one string is in shade then the other parallel strings of modules will be loaded by the shaded string, and the current will pass through to create a current circuit. Based on the maximum series current rating of overcurrent protection of module and local electrical codes and standards, make sure the module strings in parallel are protected with the appropriate in- line string fusing. Recommended maximum series/parallel module configurations; $[(1500\text{ V}/(1.25 \cdot V_{oc}))]/[\text{current rating of overcurrent protection}/I_{sc}+1]$.
4. Connect the conductors from the PV array to the combiner box in accordance with the design and local codes and standards. The cross-sectional area and cable connector capacity must satisfy the maximum short-circuit of the PV system (for a single module, it is recommended that the cross-sectional area of cables be 4mm^2 (Cu Wire) and the rated current of connectors be more than 10A); otherwise cables and connectors will become overheated from high current. Please note the temperature limit of the cables is 90°C .
5. Jinko modules can be grounded using bolts. Attach the equipment grounding conductor to the module frame using the hole and hardware provided. Note that a stainless-steel bolt is used between the ground 6-12AWG wire and module frame as illustrated in the following figure. A washer is used to avoid corrosion due to dissimilar metals. Tighten the screw securely. It is recommended that the applied torque is 1.7~2.0 ft-lbs (2.3 to 2.8 N*m).

Module	Mounting hardware configuration			
	Hardware	Material	Size	Number provided
All	Bolt	Stainless Steel	M4	2
	Spring washer	Stainless Steel	M4	2
	Nut	Stainless Steel	M4	2
	Star Washer	Stainless Steel	M4	2
	Plain Washer	Stainless Steel	M4	4

Table 7: The mounting part of the ground mounting hole

The use of bolt grounding devices is not allowed unless the grounding device is UL61730 or UL2703 certified with Jinko modules. Alternate grounding options built into the racking system are acceptable as long as they have been UL approved.

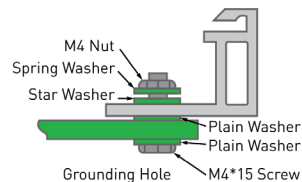


Figure 7: Ground Installation PV modules

6. Other third party grounding methods cannot be used unless the grounding device is UL2703 certified with Jinko modules.
7. Follow the requirements of applicable local and national electrical codes.
8. These modules contain factory installed bypass diodes. If these modules are incorrectly connected to each other, the bypass diodes, cable, or junction box may be damaged.
9. The module shall wire in accordance with the NEC. The grounding method of the frame of arrays shall comply with the NEC, article 250.
10. CNL model shall be in accordance with CSA C22.1, Safety Standard for Electrical Installations, Canadian Electrical Code, Part 1.
11. It is recommended that the M8 bolt be tightened to a torque of about 16~20 N*m and the M6 bolt be tightened to a torque of about 8 N*m.

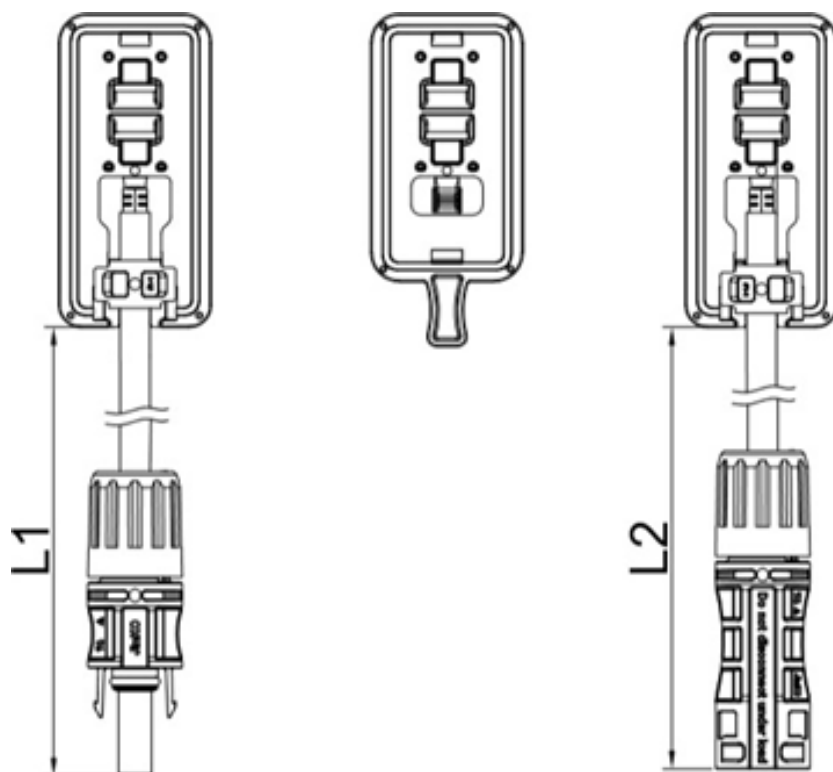


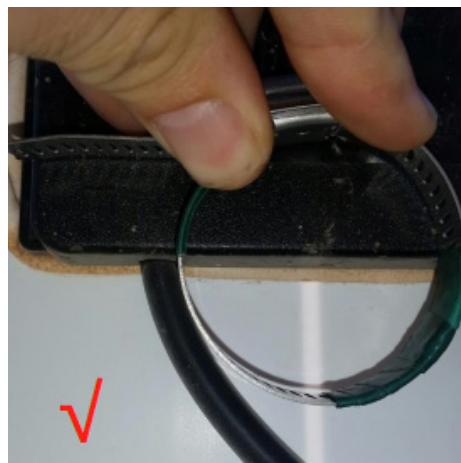
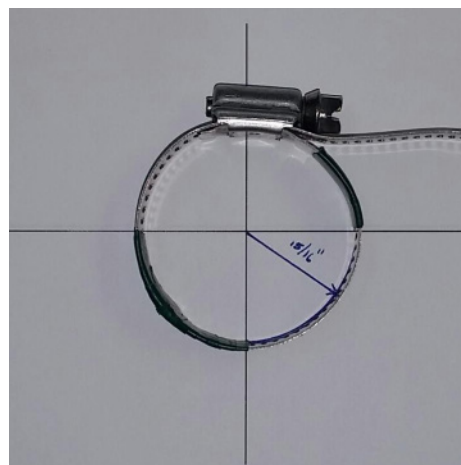
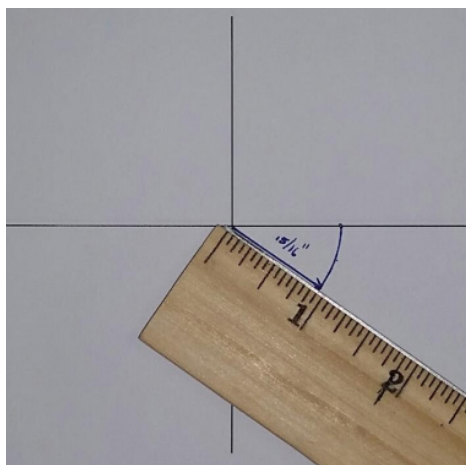
Figure 8: Junction box

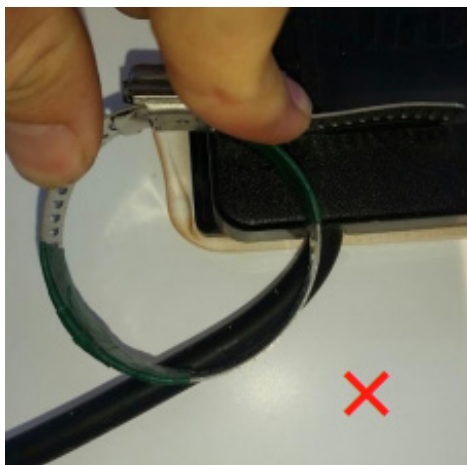
12. The junction box cable is defined as L, as seen below. Since cable lengths vary by module type, please review the data sheet for the model being installed. It is recommended that cable lengths be considered before designing the wiring layout.



13. Per wire management Jinko Solar recommends below solution:

1. The bending radius of cables shall be no less than 4 x the cable OD (outer diameter), see below schematic diagram:





2. The cable shall be fixed with metal cable ties or metal cable clip on the frame as the attached picture shows.



3. No stress on the cable able to pull it out or stress the connection in the J-Box.
14. Jinko Solar requires the negative grounding of the inverter when a system is installed with standard PV solar modules. Alternatively, a 'charge-equalizing' device may be used to mitigate the effects of the Potential Induced Degradation (PID) phenomenon that can occur in specific environments that the array is installed in.

4. Maintenance and Care

1. A building up of dust or dirt on the module's front glass will result in a decreased energy output. Clean the modules preferably once annually (depending on site conditions) using a soft, dry or damp cloth, as necessary. Water with high mineral content may leave deposits on the glass surface and is not recommended. It is recommended to use neutral water to clean the glass to avoid strong acid and alkali, so as not to cause damage to the glass coating layer.
2. Never use abrasive material under any circumstances.
3. Examine the PV module(s) for signs of deterioration. Check all wiring for possible rodent damage and, weathering. Check that all connections are tight and corrosion free. Check electrical leakage to ground.



4. Check that fixing screws/bolts and mounting brackets are tight. Adjust and tighten as necessary.
5. Check the junction box and diodes as well. If you have any diodes problems, please contact Jinko Solar.
6. When cleaning the modules, it is not permitted to stand on the module.
7. Never use chemicals when cleaning modules as this may affect the module warranty and energy output.

5. Electrical Specification

The module electrical ratings are measured under Standard Test Conditions (1000 W/m², (25± 2) °C, AM 1,5 according to IEC 60904-3). The module might produce more or less voltage or current than rated value in non-standard conditions. Tables in Appendix 2 are electrical characteristics of PV products at STC and the tolerance is ±4% of I_{sc}, ±3% of V_{oc} and P_{max}, ±10% of V_{mp} and I_{mp}. The protection class of module is Class II.

6. Disclaimer of Liability

Because the use of the manual and the conditions or methods of installation, operation, use, and maintenance of (PV) modules are beyond Jinko's control, Jinko does not accept responsibility and expressly disclaims liability for loss, damage, or expense arising out of or in any way connected with such installation, operation, use, or maintenance.

No responsibility is assumed by Jinko for any infringement of patents or other rights of third parties, which may result from use of the PV module. NO license is granted by implication or otherwise under any patent or patent rights. The information in this manual is based on Jinko's knowledge and experience and is believed to be reliable, but such information including product specification (without limitations) and suggestions do not constitute a warranty, expresses or implied. Jinko reserves the right to change the installation manual, the PV module, the electrical specifications, or product information sheets without prior notice.



Appendix 1 : Applicable Products

This document is applicable to the series of solar modules as listed below:

Group 1

JKMxxxM-72HL-TV			
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{xxx =375~420, in increment of 5}

Group 2

JKMxxxM-72HL	JKMxxxM-72HL-V	JKMxxxM-72HBL	
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{xxx =395~420, in increment of 5}

JKMxxxM-72HBL-V			
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{xxx =370~420, in increment of 5}

Group 3

JKMxxxM-60HL	JKMxxxM-60HBL	JKMxxxM-60HL-V	
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{xxx =330~350, in increment of 5}

Group 4

JKMxxxM-7RL3	JKMxxxM-7RL3-V		
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{xxx =430~475, in increment of 5}

Group 5

JKMxxxM-6RL3	JKMxxxM-6RL3-V		
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{xxx =365~400, in increment of 5}

Group 6

JKMxxxM-6TL3	JKMxxxM-6TL3-V		
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{xxx =330~365, in increment of 5}

Group 7

JKMxxxM-7RL3-TV			
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{xxx =420~475, in increment of 5}

Group 8

JKMxxxM-6RL3-B			
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{xxx =365~400, in increment of 5}

Group 9

JKMxxxM-72HL4-V	JKMxxxM-72HL4		
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{xxx =500~555, in increment of 5}

Group 10

JKMxxxM-60HL4-V	JKMxxxM-60HL4		
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{xxx =420~460, in increment of 5}

Group 11

JKMxxxM-54HL4-V	JKMxxxM-54HL4		
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{xxx =380~420, in increment of 5}

Group 12

JKMxxxM-72HL4-TV			
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{xxx =495~550, in increment of 5}



Group 13

JKMxxxM-60HL4-B			
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(xxx =425~445, in increment of 5)

Group 14

JKMxxxM-72HLM-TV			
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(xxx =425~455, in increment of 5)

Group 15

JKMxxxN-54HL4-B			
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(xxx =405~440, in increment of 5)

Group 16

JKMxxxN-72HL4-V	JKMxxxN-72HL4		
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(xxx =525~575, in increment of 5)

Group 17

JKMxxxN-72HL4-TV			
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(xxx =555~585, in increment of 5)

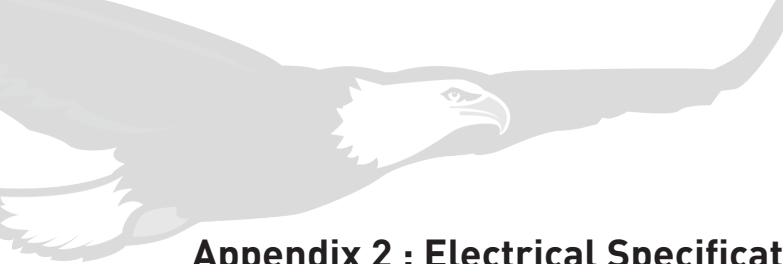
Group 18

JKMxxxN-72HL4-BDV			
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(xxx =525~590, in increment of 5)

Notes:

- V: Module with 1500V System Voltage
- Blank: Module with 1000V System Voltage
- H: Half-cut series module
- L: G2 series module
- TV: G3 bifacial module
- RL3: G4 TR series module
- B: Black backsheet series module
- L4: Large cell of 182mm cell dimension
- HLM: 166 large cell series module
- BDV: Bifacial & double glass module



Appendix 2 : Electrical Specifications

For the tolerance of electrical characteristics and protection class of modules, please refer to Section 5 “Electrical Specification”.

Module Type	Group 1									
xxx =	375	380	385	390	395	400	405	410	415	420
Maximum Power at STC (Pmax, Wp)	375	380	385	390	395	400	405	410	415	420
Maximum Power Voltage (Vmp, V)	39.25	39.36	39.50	39.62	39.83	40.01	40.19	40.38	40.50	40.65
Maximum Power Current (Imp, A)	9.56	9.66	9.76	9.84	9.92	10.00	10.08	10.16	10.25	10.33
Open-circuit Voltage (Voc, V)	47.92	47.96	48.10	48.14	48.26	48.35	48.45	48.56	48.64	48.74
Short-circuit Current (Isc, A)	9.92	10.02	10.08	10.17	10.23	10.32	10.42	10.51	10.61	10.70
Maximum system Voltage	1500VDC									
Dimensions	2031*1008*40mm (79.96*39.69*1.57 inch) 2031*1008*30mm (79.96*39.69*1.18 inch)									
Maximum series overcurrent protective device rating	25A									
Temperature coefficients	0.048% for Isc -0.29% for Voc -0.35% for Pmax									



Module Type	Group 2										
xxx =	370	375	380	385	390	395	400	405	410	415	420
Maximum Power at STC (Pmax, Wp)	370	375	380	385	390	395	400	405	410	415	420
Maximum Power Voltage (Vmp, V)	38.58	38.86	39.10	39.37	39.64	39.90	40.16	40.42	40.68	40.93	41.18
Maximum Power Current (Imp, A)	9.59	9.65	9.72	9.78	9.84	9.90	9.96	10.02	10.08	10.14	10.20
Open-circuit Voltage (Voc, V)	47.80	48.00	48.20	48.40	48.60	48.80	49.10	49.40	49.60	49.90	50.20
Short-circuit Current (Isc, A)	10.15	10.23	10.30	10.38	10.46	10.54	10.61	10.69	10.76	10.82	10.88
Maximum system Voltage	1500VDC/1000VDC										
Dimensions	2008*1002*40mm (79.06*39.45*1.57 inch) 2008*1002*30mm (79.06*39.45*1.18 inch)										
Maximum series overcurrent protective device rating	20A										
Temperature coefficients	0.048% for Isc -0.29% for Voc -0.35% for Pmax										

Module Type	Group 3				
xxx =	330	335	340	345	350
Maximum Power at STC (Pmax, Wp)	330	335	340	345	350
Maximum Power Voltage (Vmp, V)	33.54	33.74	33.93	34.12	34.31
Maximum Power Current (Imp, A)	9.84	9.93	10.02	10.11	10.20
Open-circuit Voltage (Voc, V)	40.60	40.80	41.00	41.20	41.40
Short-circuit Current (Isc, A)	10.61	10.73	10.82	10.91	11.00
Maximum system Voltage	1500VDC/1000VDC				
Dimensions	1684*1002*35mm (66.30*39.45*1.38 inch) 1684*1002*30mm (66.30*39.45*1.18 inch)				
Maximum series overcurrent protective device rating	20A				
Temperature coefficients	0.048% for Isc -0.29% for Voc -0.35% for Pmax				



Module Type	Group 4									
xxx =	430	435	440	445	450	455	460	465	470	475
Maximum Power at STC (Pmax, Wp)	430	435	440	445	450	455	460	465	470	475
Maximum Power Voltage (Vmp, V)	42.41	42.52	42.64	42.75	42.86	42.97	43.08	43.18	43.28	43.38
Maximum Power Current (Imp, A)	10.14	10.23	10.32	10.41	10.50	10.59	10.68	10.77	10.86	10.95
Open-circuit Voltage (Voc, V)	51.10	51.20	51.30	51.40	51.50	51.60	51.70	51.92	52.14	52.24
Short-circuit Current (Isc, A)	10.96	11.05	11.14	11.23	11.32	11.41	11.50	11.59	11.68	11.77
Maximum system Voltage	1500VDC/1000VDC									
Dimensions	2182*1032*40mm (85.91*40.63*1.57 inch) 2182*1029*40mm (85.91*40.51*1.57 inch)									
Maximum series overcurrent protective device rating	20A									
Temperature coefficients	0.048% for Isc -0.28% for Voc -0.35% for Pmax									

Module Type	Group 5							
xxx =	365	370	375	380	385	390	395	400
Maximum Power at STC (Pmax, Wp)	365	370	375	380	385	390	395	400
Maximum Power Voltage (Vmp, V)	36.00	36.10	36.20	36.30	36.39	36.49	36.58	36.67
Maximum Power Current (Imp, A)	10.14	10.25	10.36	10.47	10.58	10.69	10.80	10.91
Open-circuit Voltage (Voc, V)	43.32	43.41	43.49	43.58	43.66	43.75	43.93	44.12
Short-circuit Current (Isc, A)	10.94	11.03	11.12	11.21	11.30	11.39	11.48	11.57
Maximum system Voltage	1500VDC/1000VDC							
Dimensions	1855*1032*35mm (73.03*40.63*1.38 inch) 1855*1029*35mm (73.03*40.51*1.38 inch)							
Maximum series overcurrent protective device rating	20A							
Temperature coefficients	0.048% for Isc -0.28% for Voc -0.35% for Pmax							



Module Type	Group 6							
xxx =	330	335	340	345	350	355	360	365
Maximum Power at STC (Pmax, Wp)	330	335	340	345	350	355	360	365
Maximum Power Voltage (Vmp, V)	32.64	32.75	32.85	32.95	33.05	33.15	33.24	33.34
Maximum Power Current (Imp, A)	10.11	10.23	10.35	10.47	10.59	10.71	10.83	10.95
Open-circuit Voltage (Voc, V)	39.31	39.41	39.51	39.61	39.71	39.81	39.91	40.01
Short-circuit Current (Isc, A)	10.92	11.04	11.16	11.28	11.40	11.52	11.64	11.76
Maximum system Voltage	1500VDC/1000VDC							
Dimensions	1692*1029*30mm (66.61*40.51*1.18 inch)							
Maximum series overcurrent protective device rating	20A							
Temperature coefficients	0.048% for Isc -0.28% for Voc -0.35% for Pmax							

Module Type	Group 7											
xxx =	420	425	430	435	440	445	450	455	460	465	470	475
Maximum Power at STC (Pmax, Wp)	420	425	430	435	440	445	450	455	460	465	470	475
Maximum Power Voltage (Vmp, V)	42.77	42.85	42.92	42.99	43.06	43.13	43.19	43.25	43.32	43.38	43.44	43.50
Maximum Power Current (Imp, A)	9.82	9.92	10.02	10.12	10.22	10.32	10.42	10.52	10.62	10.72	10.82	10.92
Open-circuit Voltage (Voc, V)	51.10	51.20	51.30	51.40	51.50	51.60	51.70	51.80	51.90	52.00	52.10	52.16
Short-circuit Current (Isc, A)	10.63	10.72	10.81	10.90	10.99	11.08	11.17	11.26	11.35	11.44	11.53	11.63
Maximum system Voltage	1500VDC											
Dimensions	2205*1032*40mm (86.81*40.63*1.57 inch)											
Maximum series overcurrent protective device rating	25A											
Temperature coefficients	0.048% for Isc -0.28% for Voc -0.35% for Pmax											



Module Type	Group 8							
xxx =	365	370	375	380	385	390	395	400
Maximum Power at STC (Pmax, Wp)	365	370	375	380	385	390	395	400
Maximum Power Voltage (Vmp, V)	36.61	36.71	36.80	36.90	37.02	37.15	37.27	37.39
Maximum Power Current (Imp, A)	9.97	10.08	10.19	10.30	10.40	10.50	10.60	10.70
Open-circuit Voltage (Voc, V)	43.92	44.02	44.12	44.22	44.34	44.47	44.59	44.71
Short-circuit Current (Isc, A)	10.79	10.90	11.01	11.12	11.22	11.32	11.42	11.52
Maximum system Voltage	1000VDC							
Dimensions	1855*1032*35mm (73.03*40.63*1.38 inch) 1855*1029*35mm (73.03*40.51*1.38 inch)							
Maximum series overcurrent protective device rating	20A							
Temperature coefficients	0.048% for Isc -0.28% for Voc -0.35% for Pmax							

Module Type	Group 9											
xxx =	500	505	510	515	520	525	530	535	540	545	550	555
Maximum Power at STC (Pmax, Wp)	500	505	510	515	520	525	530	535	540	545	550	555
Maximum Power Voltage (Vmp, V)	40.10	40.18	40.26	40.33	40.41	40.48	40.56	40.63	40.70	40.80	40.90	40.99
Maximum Power Current (Imp, A)	12.47	12.57	12.67	12.77	12.87	12.97	13.07	13.17	13.27	13.36	13.45	13.54
Open-circuit Voltage (Voc, V)	48.78	48.86	48.94	49.02	49.10	49.18	49.26	49.34	49.42	49.52	49.62	49.72
Short-circuit Current (Isc, A)	13.29	13.36	13.43	13.50	13.57	13.64	13.71	13.79	13.85	13.94	14.03	14.12
Maximum system Voltage	1500VDC/1000VDC											
Dimensions	2274*1134*35mm (89.52*44.65*1.38 inch) 2274*1134*40mm (89.52*44.65*1.57 inch)											
Maximum series overcurrent protective device rating	25A											
Temperature coefficients	0.048% for Isc -0.28% for Voc -0.35% for Pmax											



Module Type	Group 10								
xxx =	420	425	430	435	440	445	450	455	460
Maximum Power at STC (P _{max} , W _p)	420	425	430	435	440	445	450	455	460
Maximum Power Voltage (V _{mp} , V)	33.31	33.42	33.52	33.62	33.72	33.82	33.91	34.06	34.20
Maximum Power Current (I _{mp} , A)	12.61	12.72	12.83	12.94	13.05	13.16	13.27	13.36	13.45
Open-circuit Voltage (V _{oc} , V)	40.70	40.78	40.86	40.94	41.02	41.10	41.18	41.33	41.48
Short-circuit Current (I _{sc} , A)	13.49	13.55	13.61	13.67	13.73	13.79	13.85	13.93	14.01
Maximum system Voltage	1500VDC/1000VDC								
Dimensions	1903*1134*35mm (74.92*44.65*1.38 inch) 1903*1134*40mm (74.92*44.65*1.57 inch)								
Maximum series overcurrent protective device rating	25A								
Temperature coefficients	0.048% for I _{sc} -0.28% for V _{oc} -0.35% for P _{max}								

Module Type	Group 11								
xxx =	380	385	390	395	400	405	410	415	420
Maximum Power at STC (P _{max} , W _p)	380	385	390	395	400	405	410	415	420
Maximum Power Voltage (V _{mp} , V)	30.00	30.11	30.21	30.32	30.42	30.52	30.62	30.79	30.91
Maximum Power Current (I _{mp} , A)	12.67	12.79	12.91	13.03	13.15	13.27	13.39	13.48	13.59
Open-circuit Voltage (V _{oc} , V)	36.66	36.74	36.82	36.90	36.98	37.06	37.14	37.31	37.43
Short-circuit Current (I _{sc} , A)	13.50	13.57	13.64	13.71	13.78	13.85	13.92	14.01	14.12
Maximum system Voltage	1500VDC/1000VDC								
Dimensions	1718*1134*35mm (67.64*44.65*1.38 inch) 1718*1134*40mm (67.64*44.65*1.57 inch)								
Maximum series overcurrent protective device rating	25A								
Temperature coefficients	0.048% for I _{sc} -0.28% for V _{oc} -0.35% for P _{max}								



Module Type	Group 12											
xxx =	495	500	505	510	515	520	525	530	535	540	545	550
Maximum Power at STC (Pmax, Wp)	495	500	505	510	515	520	525	530	535	540	545	550
Maximum Power Voltage (Vmp, V)	39.96	40.07	40.18	40.29	40.40	40.50	40.61	40.71	40.81	40.91	41.07	41.23
Maximum Power Current (Imp, A)	12.39	12.48	12.57	12.66	12.75	12.84	12.93	13.02	13.11	13.20	13.27	13.34
Open-circuit Voltage (Voc, V)	48.82	48.90	48.98	49.05	49.12	49.20	49.27	49.35	49.42	49.49	49.65	49.81
Short-circuit Current (Isc, A)	13.18	13.25	13.32	13.40	13.47	13.54	13.64	13.71	13.79	13.87	13.94	14.01
Maximum system Voltage	1500VDC											
Dimensions	2274*1134*40mm (89.52*44.65*1.57 inch) 2278*1134*35mm (89.69*44.65*1.38 inch)											
Maximum series overcurrent protective device rating	30A											
Temperature coefficients	0.048% for Isc -0.28% for Voc -0.35% for Pmax											

Module Type	Group 13				
xxx =	425	430	435	440	445
Maximum Power at STC (Pmax, Wp)	425	430	435	440	445
Maximum Power Voltage (Vmp, V)	34.06	34.24	34.42	34.59	34.77
Maximum Power Current (Imp, A)	12.48	12.56	12.64	12.72	12.80
Open-circuit Voltage (Voc, V)	40.83	41.01	41.19	41.36	41.54
Short-circuit Current (Isc, A)	13.24	13.32	13.40	13.48	13.56
Maximum system Voltage	1500VDC/1000VDC				
Dimensions	1903*1134*35mm (74.92*44.65*1.38 inch) 1903*1134*40mm (74.92*44.65*1.57 inch)				
Maximum series overcurrent protective device rating	25A				
Temperature coefficients	0.048% for Isc -0.28% for Voc -0.35% for Pmax				



Module Type	Group 14						
xxx =	425	430	435	440	445	450	455
Maximum Power at STC (Pmax, Wp)	425	430	435	440	445	450	455
Maximum Power Voltage (Vmp, V)	40.40	40.61	40.81	41.01	41.21	41.40	41.59
Maximum Power Current (Imp, A)	10.52	10.59	10.66	10.73	10.80	10.87	10.94
Open-circuit Voltage (Voc, V)	48.56	48.76	48.96	49.16	49.36	49.56	49.76
Short-circuit Current (Isc, A)	11.21	11.28	11.35	11.42	11.49	11.56	11.63
Maximum system Voltage	1500VDC						
Dimensions	2096*1039*40mm (82.52*40.91*1.57 inch)						
Maximum series overcurrent protective device rating	25A						
Temperature coefficients	0.048% for Isc -0.28% for Voc -0.35% for Pmax						

Module Type	Group 15							
xxx =	405	410	415	420	425	430	435	440
Maximum Power at STC (Pmax, Wp)	405	410	415	420	425	430	435	440
Maximum Power Voltage (Vmp, V)	31.52	31.74	31.95	32.16	32.37	32.58	32.78	32.99
Maximum Power Current (Imp, A)	12.85	12.92	12.99	13.06	13.13	13.20	13.27	13.34
Open-circuit Voltage (Voc, V)	38.10	38.32	38.53	38.74	38.95	39.16	39.36	39.57
Short-circuit Current (Isc, A)	13.30	13.37	13.44	13.51	13.58	13.65	13.72	13.80
Maximum system Voltage	1000VDC							
Dimensions	1718*1134*35mm (67.64*44.65*1.38 inch) 1718*1134*40mm (67.64*44.65*1.57 inch) 1722*1134*35mm (67.80*44.65*1.38 inch)							
Maximum series overcurrent protective device rating	25A							
Temperature coefficients	0.045% for Isc -0.25% for Voc -0.29% for Pmax							



Module Type	Group 16										
xxx =	525	530	535	540	545	550	555	560	565	570	575
Maximum Power at STC (Pmax, Wp)	525	530	535	540	545	550	555	560	565	570	575
Maximum Power Voltage (Vmp, V)	40.86	41.00	41.13	41.26	41.38	41.51	41.64	41.77	41.92	42.07	42.22
Maximum Power Current (Imp, A)	12.85	12.93	13.01	13.09	13.17	13.25	13.33	13.41	13.48	13.55	13.62
Open-circuit Voltage (Voc, V)	49.62	49.74	49.86	49.98	50.10	50.22	50.34	50.47	50.60	50.74	50.88
Short-circuit Current (Isc, A)	13.64	13.71	13.77	13.83	13.91	13.99	14.07	14.15	14.23	14.31	14.39
Maximum system Voltage	1500VDC/1000VDC										
Dimensions	2274*1134*35mm (89.52*44.65*1.38 inch) 2278*1134*35mm(89.69*44.65*1.38 inch)										
Maximum series overcurrent protective device rating	25A										
Temperature coefficients	0.045% for Isc -0.25% for Voc -0.29% for Pmax										



Module Type	Group 17						
xxx =	555	560	565	570	575	580	585
Maximum Power at STC (Pmax, Wp)	555	560	565	570	575	580	585
Maximum Power Voltage (Vmp, V)	43.36	43.54	43.72	43.90	44.08	44.26	44.44
Maximum Power Current (Imp, A)	12.81	12.87	12.93	12.99	13.05	13.11	13.17
Open-circuit Voltage (Voc, V)	51.90	52.03	52.16	52.29	52.42	52.55	52.68
Short-circuit Current (Isc, A)	13.48	13.54	13.60	13.66	13.72	13.78	13.84
Maximum system Voltage	1500VDC						
Dimensions	2274*1134*35mm (89.52*44.65*1.38 inch) 2278*1134*35mm (89.69*44.65*1.38 inch)						
Maximum series overcurrent protective device rating	30A						
Temperature coefficients	0.045% for Isc -0.25% for Voc -0.29% for Pmax						



Module Type	Group 18							
xxx =	515	520	525	530	535	540	545	550
Maximum Power at STC (Pmax, Wp)	515	520	525	530	535	540	545	550
Maximum Power Voltage (Vmp, V)	40.55	40.69	40.83	40.96	41.10	41.19	41.38	41.58
Maximum Power Current (Imp, A)	12.70	12.78	12.86	12.94	13.02	13.11	13.17	13.23
Open-circuit Voltage (Voc, V)	49.59	49.64	49.69	49.74	49.79	49.88	50.07	50.27
Short-circuit Current (Isc, A)	13.64	13.68	13.73	13.78	13.83	13.89	13.95	14.01
Maximum system Voltage	1500VDC							
Dimensions	2278*1134*35mm(89.69*44.65*1.38 inch) 2278*1134*30mm (89.69*44.65*1.18 inch)							
Maximum series overcurrent protective device rating	30A							
Temperature coefficients	0.045% for Isc -0.25% for Voc -0.29% for Pmax							

Module Type	Group 18 (cont.)							
xxx =	555	560	565	570	575	580	585	590
Maximum Power at STC (Pmax, Wp)	555	560	565	570	575	580	585	590
Maximum Power Voltage (Vmp, V)	41.77	41.95	42.14	42.29	42.44	42.59	42.74	42.88
Maximum Power Current (Imp, A)	13.29	13.35	13.41	13.48	13.55	13.62	13.69	13.76
Open-circuit Voltage (Voc, V)	50.47	50.67	50.87	51.07	51.27	51.47	51.67	51.86
Short-circuit Current (Isc, A)	14.07	14.13	14.19	14.25	14.31	14.37	14.43	14.49
Maximum system Voltage	1500VDC							
Dimensions	2278*1134*35mm(89.69*44.65*1.38 inch) 2278*1134*30mm (89.69*44.65*1.18 inch)							
Maximum series overcurrent protective device rating	30A							
Temperature coefficients	0.045% for Isc -0.25% for Voc -0.29% for Pmax							



7. Contact us

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