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This manual is for Wujun photovoltaic modules listed as the content,

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Please read this manual carefully before installing the modules. Non-compliance with these instructions may void the module warranty.

1. General Information

1.1 Overview

This manual contains information regarding the installation and safe handling of WUJUN photovoltaic (PV) modules. All instructions should be read and understood before attempting to install. If there are any questions, please contact your dealer or WUJUN for further information. The installer should conform to all safety precautions from the manual when installing modules. The installation work of the PV array can only be done under the protection of sun-sheltering covers or sunshades and only qualified person can install or perform maintenance work for the module.

If not otherwise specified, it is recommended that the requirements of the U.S. National Electrical Code (NEC) or respective European Code and other local regulations be followed.

Non-compliance with this installation instruction may result in property damage and/or physical injury, WUJUN will not be liable for compensation of any loss or injury caused by this type of non-compliance.

1.2 Codes and regulations

The mechanical and electrical installation of PV systems should be performed in accordance with all applicable codes, including electrical codes, building codes and electric utility interconnection requirements. Such requirement may vary from mounting location. Requirements may also vary with system voltage, and for DC or AC application. Contact local authorities for governing regulations.

1.3 Module identification

Each module is pasted with 2 labels providing information as below:

- Nameplate: It describes product type, standard rated power, rated current, rated voltage, open circuit voltage, short circuit current under testing conditions, certification indicator, maximum system voltage, etc.
- Serial No.: Each module has a unique serial number which is laminated inside the module permanently and it can be seen from front top of the module. In addition, you can find the same serial number on the module nameplate.

1.4 General safety

The modules are qualified for Application Class A: Hazardous voltage (greater than 50 V DC) or hazardous power applications (greater than 240 W), where general contact access is anticipated. Modules qualified for safety under IEC 61730-1, IEC 61730-2 and within this application class are considered to meet the requirements for Safety Class II.

The safety and protection measures must be taken to avoid electric shocks under the installation, operation, use, and maintenance of the Module. When installing modules at elevated positions, take appropriate safety and protection measures to prevent personnel, tools, or the Module

from falling from heights and causing damage.

When installing the Module on a roof, the roof and the entire structure must retain a certain level of fire resistance, and it must be evaluated by an architect or engineering experts to verify that the roof can withstand the pressure and weight of the photovoltaic system (including the Module).

For your safety, do not work in rain, snow or windy conditions.

1.5 Electrical safety

- Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at standard test conditions. Accordingly, the value of I_{sc} and V_{oc} marked on the module should be multiplied by 1.25 when determining PV system component voltage ratings, conductor capacities, fuse sizes, and size of controls connected to the PV output. For example, a safety factor for V_{oc} and I_{sc} of 1.25 is recommended since irradiance is often higher than 1000 W/m² and temperature below 25°C may raise V_{oc} . Refer to Section 690-8 of the National Electrical Code of an additional multiplying factor of 125 percent (80 percent de-rating) which may be applicable.
- PV modules generate DC electrical energy when exposed to sunlight or other light sources. Do not touch live terminals with bare hands. Use insulated tools for electrical connections.
- Due to the risk of electrical shock, do not perform any work if the terminals of the PV module are wet.
- 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.
- Do not disconnect any of the modules when under load.

1.6 Operating safety and general installation notes

- 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 in time. If they are not installed immediately, protective measures (such as adding rubber joint cover, etc.) should be taken on the connection head.
- Store packaging carton in ventilated, rain-proof and dry places before unpacking of modules.
- It is suggested that completely cover the module with an opaque material during installation to keep electricity from being generated.
- Do not lift the module by holding the junction box or wires at any time.
- Do not stand or walk on modules, otherwise it will result in unexpected permanent or impermanent module defects, such as cracks, snail trails and etc.
- Do not try to disassemble the modules or remove nameplate or parts of modules.
- Do not damage or scratch back film of modules.
- Always wear protective headgear, insulating gloves and safety shoes (with rubber soles) and other protective measures, use insulated tools and do not use wet tools 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.

- When installing PV modules, do not drop any objects (e.g., PV modules or tools).
- Do not brush paint or corrosive substances on the surface of the module.
- 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.
- All PV systems must be grounded to earth. If there is no special regulation, please follow the National Electrical Code or other national code.
- 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, lubricant, rust inhibitor, herbicides and so on.
- The maximum altitude to install the PV module is designed for $\leq 2000\text{m}$.
- Insert module connectors fully and correctly. An audible "click" sound should be heard. This sounds confirms the connectors are fully seated.
- The module leads should be securely fastened to the module frame, Wire Management should be done in a way to avoid the connector from scratching or impacting the back sheet of the module.
- During the installation or operation, don't use sharp tools to wipe the back sheet and glass. Scratches can appear on the module.
- Do not drill holes on the frame, which may reduce frame loading capacity or lead to frame corrosion.
- The irradiance reflected on the rear of the bifacial solar modules shall not exceed $300\text{W}/\text{m}^2$.

1.7 Fire safety

- WUJUN modules are tested for Class C of fire safety classification under IEC61730-2 standard. The fire rating of this module is valid only when mounted in the manner specified in the mechanical mounting instructions.
- The fire safety of building may be affected by the roof construction and installations. Improper installation may cause hazards in the event of fire.
- Consult with local authority for requirements for building or structural fire safety.
- To use components such as earth ground fault circuit breakers, fuses and circuit breakers as required by local authority in the PV system for fire prevention.
- For roof installation, PV modules should be mounted over a fire-resistant roof covering which is rated for the application.
- In case of fire, the modules on the roof are likely to produce dangerous DC voltage and may have potential hazard, even in the case of:
 - a. Low light intensity
 - b. Modules being disconnected from the inverter
 - c. Modules being partly or entirely destroyed
- When fire has been extinguished or for the duration of fire, stays away from all elements of

the PV system. Have your installer perform the necessary steps to bring the PV system back into a safe condition.

- Confirm mounting slope is less than 5 inches(127mm) to maintain the fire class rating.

2. Installation

2.1 Installation condition

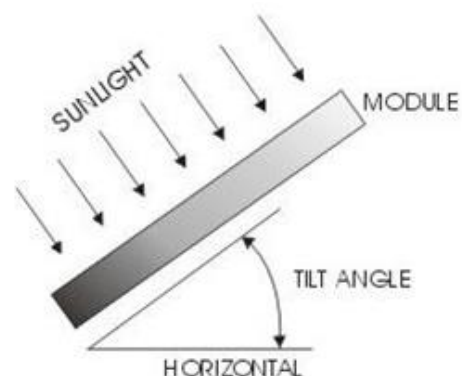
2.1.1 Installation site and working environment

- WUJUN suggests that modules be installed in the working environment with the temperature of -40°C to 40°C which is the monthly average highest and lowest temperature of the installation sites. The solar module's operating temperature range is $-40^{\circ}\text{C}\sim 85^{\circ}\text{C}$.
- WUJUN modules shall be installed on proper buildings or other appropriate places (Such as ground, building outer wall, roof, PV tracking system) and shall not be installed on any vehicles.
- Do not install the PV module in a location where it would be immersed in water or continually exposed to water from a sprinkler or fountain etc.
- Make sure that installed modules do not suffer wind or snow pressure that exceeds the permissible maximum load limit.
- Modules shall be installed at locations free from shadows throughout the year. Make sure there are no light-blocking obstacles at the installation sites.
- Carry out lightning protection for modules installed in places with frequent lightning and thunder.
- Do not install modules at locations with possible flammable gas.
- Modules cannot be used in environments with too much hail, snow, flue gas, air pollution and soot or in places with strong corrosive substances such as salt, salt mist, saline, active chemical steam, acid rain, or other substances that may corrode modules and affect module safety or performance.

* 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.

2.1.2 Tilt angle selection

- Include angle between module surface and horizontal surface, the module will obtain the maximum power output if directly facing sunlight.
- Modules are preferred to be south-facing in the northern hemisphere and north-facing in the southern hemisphere. Please refer to standard modules' installation guidelines or suggestions from experienced PV module installer, for the specific installation angle.



- It is recommended that module installation tilt angle be no less than 10° so module surface dust can be washed away easily by rainfall and times of cleaning can be reduced.
- The WUJUN modules connected in series should be installed with the same orientation and tilt angle. Different orientation and tilt angle may result in differences of solar irradiation received by the modules and result in loss of power output.

2.2 Mechanical installation

WUJUN modules usually can be mounted by using two methods: bolts and clamps.

* Note:

- All installation methods herein are only for reference, and WUJUN will not provide related mounting components, 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.
- Before installation, the following items should be addressed:
 - Visually check the module for any damage. Clean the module if any dirt or residue remains from shipping.
 - Check if module serial number stickers match.
- Modules can be installed horizontally or vertically. When installing the components, be careful not to block the drain hole of the frame.
- Modules will have thermal expansion and cold contraction effect. When installing, the interval between two adjacent conventional modules is recommended > 10mm. The minimum clearance between two adjacent double-sided modules is recommended > 20mm; If there are special requirements, please confirm with WUJUN and install it;
- When the modules are supported parallel to the surface of a building wall or roof, a minimum clearance of 10cm between the module frame and the surface of the wall or the roof is required to allow air to circulate behind the modules and to prevent wiring damage.

2.2.1 Mounting with Bolts

For mounting with bolts, the modules listed in table 1 are applicable.

- The frame of each module has 8 mounting holes (Length* Width: 14*9mm) used to secure the modules to support structure.
- The module must be attached and supported at minimum 4 or 8 bolts through the indicated mounting holes to fix module on the mounting rail.
- Depending on the local wind and snow loads, additional mounting points may be required.

- The frame must be attached to a mounting rail using appropriate corrosion-proof fastening materials (bolt/spring washer/flat washer/nut) in eight symmetrical locations on the PV module, all mounting hardware should be stainless steel M8 size. The applied torque value should be big enough to fix the modules steadily, we recommend to use a tighten torque of 16~20 N-m.

Please find detailed mounting information from figure 1.1, 1.2., 1.3.

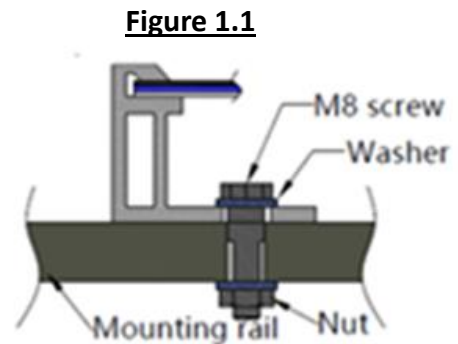
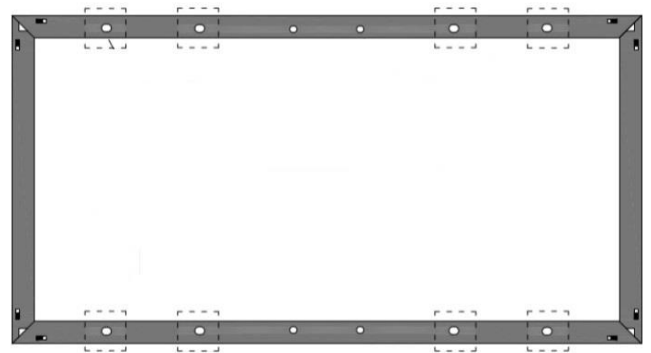


Figure 1.2 : Bolt mounting (4 mounting holes)



Figure 1.3 : Bolt mounting (8 mounting holes)



2.2.2 Mounting with clamps

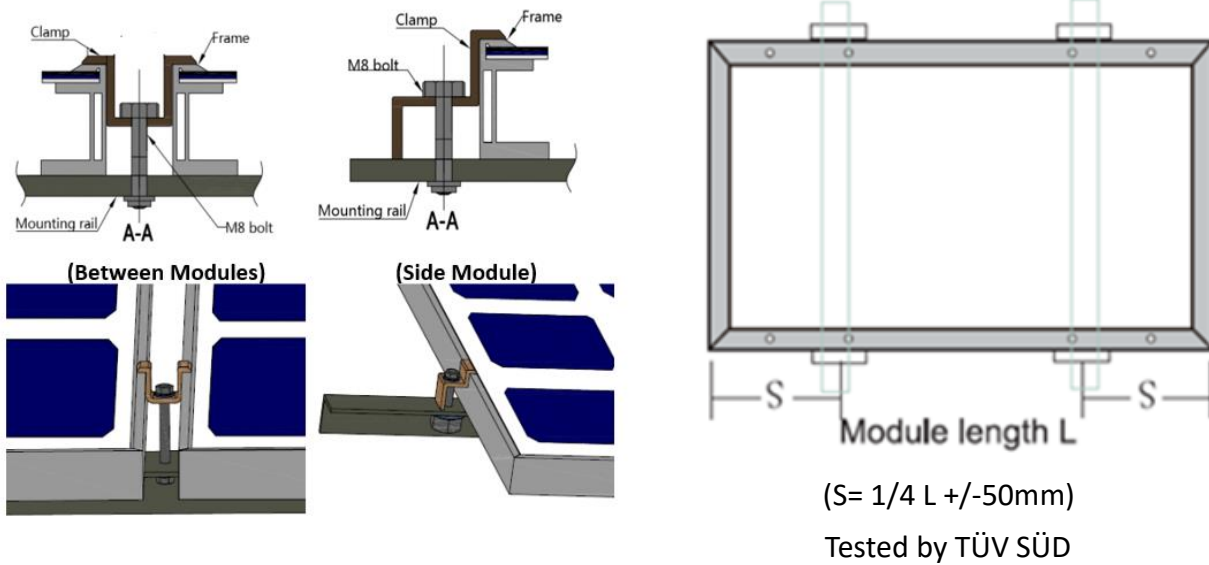
For mounting with clamps, the modules listed in tables 1 are applicable.

- When choosing clamp mounting method, please be sure to use at least four clamps on each module, two clamps should be attached on each long sides of the module. Depending on the local wind and snow loads, if excessive pressure load is expected, additional clamps or support would be required to ensure the module can bear the load. The applied torque value should be big enough to fix the modules steadily, we recommend the applied torque is about 16 ~ 20 N-m. (Please consult with the clamp or support's supplier for the specific torque value)
- The clamps must be fastened to supporting structure using M8 stainless steel hardware (all fitting components must be corrosion-proof material).

Please find detailed mounting information in figure 2.1, 2.2.

Figure 2.1 : Mounting by Clamps

Figure 2.2 Mounting by Clamps



2.2.3 Installation position and static loads

- WUJUN modules are designed to meet a maximum positive (or downward) pressure of 3600Pa and negative (or upward) pressure of 1600Pa. This design load was then tested with a safety factor of 1.5 times. So WUJUN modules are tested under a maximum downward pressure of 5400Pa and 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.

Table 1: Mechanical dimensions for bolt and clamp installation

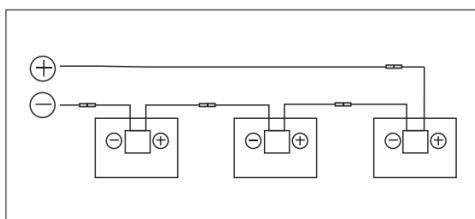
Module series	Cell type	Cell No.	Model series	Module Dimension Length x width x height (mm)	Installation methods			
					Bolt mounting		Clamp mounting	
					4 or 8 mounting holes	Bolt/Nut/Washer type	on long side of the frame	Clamp length
Single glass module	158.75mm	156	WJM78S10 xxxW/9BH	2177 x 996 x 40	V	M8, Stainless steel	V	≥ 50mm
		144	WJM72S10 xxxW/9BH	2015 x 996 x 40				
		120	WJM60S10 xxxW/9BH	1689 x 996 x 40				
	166mm	156	WJM78S20 xxxW/9BH	2264 x 1038 x 35	V	M8, Stainless steel	V	≥ 50mm
		144	WJM72S20 xxxW/9BH	2094 x 1038 x 35				
		120	WJM60S20 xxxW/9BH	1755 x 1038 x 35				
	182mm	156	WJM78S30 xxxW/10BH	2465 x 1134 x 35	V	M8, Stainless steel	V	≥ 50mm
		144	WJM72S30 xxxW/10BH	2279 x 1134 x 35				

		132	WJM66S30 xxxW/10BH	2094 x 1038 x 35		(8 mounting holes)		
		120	WJM60S30 xxxW/10BH	1909 x 1134 x 35				
Double glass module	158.75mm	156	WJM78D10 xxxW/9BH	2198 x 1005 x 30	V	M8, Stainless steel	V	$\geq 50\text{mm}$
		144	WJM72D10 xxxW/9BH	2037 x 1005 x 30				
		120	WJM60D10 xxxW/9BH	1711 x 1005 x 30				
	166mm	156	WJM78D20 xxxW/9BH	1774 x 1052 x 30	V	M8, Stainless steel	V	$\geq 50\text{mm}$
		144	WJM72D20 xxxW/9BH	2117 x 1052 x 30				
		120	WJM60D20 xxxW/9BH	2287 x 1052 x 30				
	182mm	156	WJM78D30 xxxW/10BH	2465 x 1134 x 30	V	M8, Stainless steel (8 mounting holes)	V	$\geq 50\text{mm}$
		144	WJM72D30 xxxW/10BH	2285 x 1134 x 30				
		132	WJM66D30 xxxW/10BH	2100 x 1134 x 30				
		120	WJM60D30 xxxW/10BH	1915 x 1134 x 30				

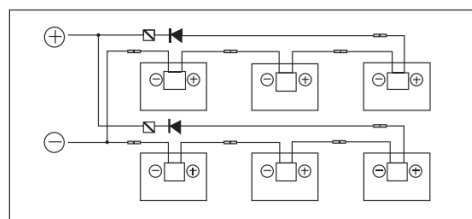
2.3 Electrical installation

2.3.1 Electrical Performance

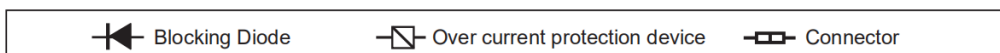
- Module electric performance parameters such as I_{sc} , V_{oc} and P_{max} nominal values have $\pm 3\%$ deviation with those under standard testing conditions of: irradiance of 1000 W/m^2 , cell temperature of 25°C and air mass of AM1.5. While modules are in series connection, the final voltage is sum of that of the single module. When modules are in parallel connection, the final current is sum of the single module as below. Modules with different electric performance models cannot be connected in series.



Series Connection



Parallel then series connection



- The number of modules in series connection in each strand shall be calculated according to relative regulations. The open circuit voltage value under the expected lowest temperature shall not exceed the maximum system voltage value stipulated for modules and other values required by DC electric parts. (WUJUN modules maximum system voltage is DC1500V---actual system voltage is designed based on the modules model used and inverter.) The Voc factor can be calculated with the following formula. $C_{Voc}=1-\beta V_{oc} \times (25-T)$

T: The expected lowest temperature of the installation site.

β : Voc temperature coefficient (% / °C) (please refer to below table for the detail)

If there is reverse current exceeding the maximum fuse current flowing through the module, use overcurrent protection device with the same specifications to protect the module; if parallel connection strands are more than 2, there shall be an overcurrent protection device on each strand of module.

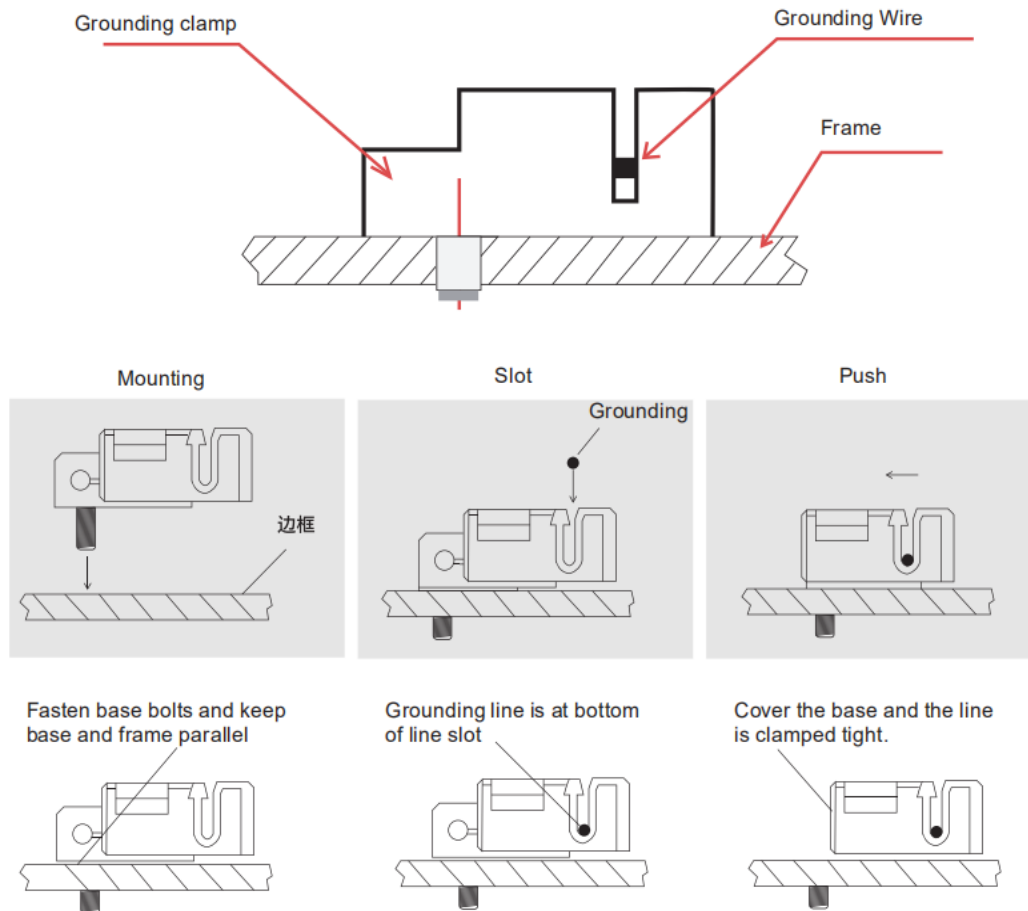
Product Series	NOCT (°C)	Temperature Coefficient [%/°C]		
		I _{sc} [α]	V _{oc} [β]	P _{max} [δ]
WJM78S10 xxxW/9BH、WJM72S10 xxxW/9BH、 WJM60S10 xxxW/9BH、WJM78D10 xxxW/9BH、 WJM72D10 xxxW/9BH、WJM60D10 xxxW/9BH	45±2	0.057	-0.286	-0.370
WJM78S20 xxxW/9BH、WJM72S20 xxxW/9BH、 WJM60S20 xxxW/9BH、WJM78D20 xxxW/9BH、 WJM72D20 xxxW/9BH、WJM60D20 xxxW/9BH	45±2	0.060	-0.300	-0.370
WJM78S30 xxxW/10BH、WJM72S30 xxxW/10BH、 WJM66S30 xxxW/10BH、WJM60S30 xxxW/10BH、 WJM78D30 xxxW/10BH、WJM72D30 xxxW/10BH、 WJM66D30 xxxW/10BH、WJM60D30 xxxW/10BH	45±2	0.048	-0.28%	-0.35%

2.3.2 Grounding

- All module frames must be properly grounded. Please connect grounding in accordance with IEC Standards or NEC article 250 or the electrical codes and regulations of the site/country of installation to ensure that the Module is correctly grounded.
- The grounding device shall be in full contact with inner side of the aluminum alloy and penetrate the frame surface oxide film. Please use the grounding holes on the Module frame for grounding. It is strictly forbidden to drill additional holes that may damage the frame.
- Observe all local electric codes and regulations.
- A bonding or toothed washer is required to make proper and reliable electrical grounding connection with the anodized aluminum frame.
- Devices listed and identified for grounding metallic frames of PV modules are permitted to ground the exposed metallic frames of the module to grounded mounting structures.
- Consider using a lay-in lug, rated for outdoor use, if the module grounding conductor is to be larger than #10 AWG.
- For optimal performance, WUJUN recommends the DC cathode(-) of the module's array is connected to ground. Failure to comply with this requirement may reduce the performance of the system.

- The grounding between components must be confirmed by qualified electricians, and the grounding device must be made by a qualified electrical manufacturer. The proposed torque value of bolt is 1.5 ~2.2N-m with minimum No. 12 AWG (4 mm²) grounding wires. The following Listed grounding Clips (E69905) in combination with the following model number PV module(s), used with a stainless steel, 8-32 machine screw for mounting, approx. 0.5 in long with an 11/32 (8-32) in. hex nut.

Model Series	Grounding Clip / Lug		
	Manufacturer	Type	Wire Size
WJM78S10 xxxW/9BH、WJM72S10 xxxW/9BH、WJM60S10 xxxW/9BH、WJM78S20 xxxW/9BH、WJM72S20 xxxW/9BH、WJM60S20 xxxW/9BH、WJM78S30 xxxW/10BH、WJM72S30 xxxW/10BH、WJM66S30 xxxW/10BH、WJM60S30 xxxW/10BH WJM78D10 xxxW/9BH、WJM72D10 xxxW/9BH、WJM60D10 xxxW/9BH、WJM78D20 xxxW/9BH、WJM72D20 xxxW/9BH、WJM60D20 xxxW/9BH、WJM78D30 xxxW/10BH、WJM72D30 xxxW/10BH、WJM66D30 xxxW/10BH、WJM60D30 xxxW/10BH	TYCO ELECTRONICS CORP.	1954381-2	12 AWG



2.3.3 Wire

- The junction box on each PV module has two wires that terminate in a male and a female connector. When the modules are to be connected in series, the male connector should be plugged into the female connector of the neighboring module while the female connector should be plugged into the male connector of the other neighboring module.
- When connecting parallel module's strings to the distribution box, use proper third-party PV system connectors with suitable cable which are qualified for EN50618(or IEC62852). All field wiring cables must have large enough cross-sectional areas approved for use at the maximum short-circuit current of the PV module. WUJUN recommends that installers use only sunlight resistant cables for direct current (DC) wiring in PV systems. The recommended minimum wire size should be 4 mm²(12AWG) and must be subject to the local national codes and regulations.
- The connecting cables must not cross each other and must be kept away from direct sunlight, heat source and any static pool of water. The cables should be secured by the modules mounting structure and should maintain a distance of at least 25 mm from one another with no possibility of coming into contact.

2.3.4 Connectors

- The connectors should be kept dry and clean. Do not attempt to make electrical connections between wet, soiled which will lead to faulty connectors. Faulty connections can result in

electrical shock and arc.

- Only compatible connectors can be mated, i.e., from the same vendor and model shall be used.
- The main types and corresponding manufacturer of connectors used by WUJUN are as below :

WUJUN Model	Manufacturer	Connector type
WJM78S10 xxxW/9BH 、 WJM72S10 xxxW/9BH 、 WJM60S10 xxxW/9BH 、 WJM78S20 xxxW/9BH 、 WJM72S20 xxxW/9BH 、 WJM60S20 xxxW/9BH 、 WJM78S30 xxxW/10BH 、 WJM72S30 xxxW/10BH 、 WJM66S30 xxxW/10BH 、 WJM60S30 xxxW/10BH	QC Solar (Suzhou) Corporation	QC4.10-cds
WJM78D10 xxxW/9BH 、 WJM72D10 xxxW/9BH 、 WJM60D10 xxxW/9BH 、 WJM78D20 xxxW/9BH 、 WJM72D20 xxxW/9BH 、 WJM60D20 xxxW/9BH 、 WJM78D30 xxxW/10BH 、 WJM72D30 xxxW/10BH 、 WJM66D30 xxxW/10BH 、 WJM60D30 xxxW/10BH	Staubli Electrical Connectors AG	PV-KST4-EVO2/XY_UR , PV-KBT4-EVO2/XY_UR

2.3.5 Bypass Diodes

WUJUN module junction boxes contain bypass diode which is parallel connection with the PV cell strings. if hot spot occurred, the diode will come into operation to stop the main current from flowing through the hot spot cells in order to prevent module over-heated and performance loss. Notice, bypass diode is not the overcurrent protection device. If the diode is suspected to be defective, the installer or system providers shall contact WUJUN. Please do not try to open the junction box by yourself.

Each junction box has 3 bypass diodes. Bypass Diode manufacturers are as below.

WUJUN's model name	By pass diode manufacturer	Type
WJM78S10 xxxW/9BH 、 WJM72S10 xxxW/9BH 、 WJM60S10 xxxW/9BH 、 WJM78S20 xxxW/9BH 、 WJM72S20 xxxW/9BH 、 WJM60S20 xxxW/9BH 、 WJM78S30 xxxW/10BH 、 WJM72S30 xxxW/10BH 、 WJM66S30 xxxW/10BH 、 WJM60S30 xxxW/10BH WJM78D10 xxxW/9BH 、 WJM72D10 xxxW/9BH 、 WJM60D10 xxxW/9BH 、 WJM78D20 xxxW/9BH 、 WJM72D20 xxxW/9BH 、 WJM60D20 xxxW/9BH 、 WJM78D30 xxxW/10BH 、 WJM72D30 xxxW/10BH 、 WJM66D30 xxxW/10BH 、 WJM60D30 xxxW/10BH	QC Solar (Suzhou) Corporation	Type: QCM2545 or 20SQ050 for 20A QCM3045 for 22A, QCM4045 or 30SQ050A for 25A QCM5045 or QCM5045B for 30A

2.3.6 General electrical installation

- Do not use modules with different configuration in the same system.
- The module is supplied with connector for electrical connection.
- Refer to local code to determine appropriate types and temperature ratings of conductors. Wiring should be 4 mm²(minimum), and must be temperature rated at 90 °C (minimum).
- Completely cover system modules with an opaque material to prevent electricity from being generated while disconnecting conductors.
- Refer to local code to determine over current, conductor ampacity and size requirements.
- Installation shall be in accordance with local code.
- For best performance, ensure that positive and negative DC wires run closely together to avoid loops.



WARNING!

Electrical shock hazard!

Do not touch bare conductors or other potentially energized parts.

3. Operation and Maintenance

It is required to perform regular inspection and maintenance of the modules, especially during the period of warranty.

WUJUN recommends the following maintenance items to ensure optimal performance of the module.

3.1 Cleaning

- The dust or dirt accumulated on the module(s) front face will result in a decreased energy output. Clean the module(s) preferably once per annum if possible (depend on site conditions). Using a soft cloth dry or damp, 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.
- It is suggested to use damp clean water sponge or soft cloth to wipe the glass surface. Do not use acid and alkaline detergents to clean modules. Do not use tools with rough surfaces to clean in any case.
- In order to avoid potential risk of electrical shock or burn, WUJUN suggests to clean the module during early morning and evening with less solar irradiation and lower module temperature especially area with high average temperature.
- In order to avoid potential risk of electrical shock, do not try to clean the modules with glass damage or exposed wires.

3.2 Module Appearance Inspection

- Check whether the module glass is broken.
- Check whether there are traces of burning on the module back plate and grounding condition.
- Check if any obstacles shading the PV modules.

- Check for any loose or damage screws between the module and bracket. If so, adjust and fix as soon as possible.

3.3 Inspection of connectors and cables

It is suggested to carry out the following preventive inspection once every 6 months:

- Check connector sealing and cable connection.
- Look for gaps on the sealant of the terminal box and confirm whether it is cracking.

4. Disclaimer of Liability

WUJUN shall not be liable for any loss, damage, destruction, and expenses as a result or arising from inappropriate installation, operation, use or maintenance. No responsibility is assumed by WUJUN for any infringement of patents or other rights of third parties, which may result from use of the PV product. No license is granted by implication or otherwise under any patent or patent right.

The information in this manual is based on WUJUN's knowledge and experience and is believed to be reliable, but such information including product specification (without limitations) and suggestions does not constitute a warranty, expressed or implied. WUJUN reserves the right to change the manual, the product, the specification, or product information sheet without prior notice.

5. Electrical Ratings

Appendix 1 : Electrical Ratings for modules with 166mm cell type

Rated electrical characteristics are within 3 percent of measured values at Standard Test Conditions of: 1000 W/m², 25°C cell temperature and solar spectral irradiance per IEC 60904-3" or irradiation of AM1.5 spectrum.

Model (166mm cell type)	Voc (V dc) ±3%	Vmp (V dc)	Maximum System Voltage (V dc)	Imp (A dc)	Isc (A dc) ±3%	Pmax (Watts) ±3%	Maximum Series Fuse (A)	Protection Class
WJM60S20 360/9BH	40.96	33.69	1500	10.69	11.25	360	20	Class II
WJM60S20 365/9BH	41.13	33.96		10.75	11.30	365		
WJM60S20 370/9BH	41.30	34.23		10.81	11.35	370		
WJM60S20 375/9BH	41.45	34.5		10.87	11.41	375		
WJM60S20 380/9BH	41.62	34.77		10.93	11.47	380		

Model (166mm cell type)	Voc (V dc) ±3%	Vmp (V dc)	Maximum System Voltage (V dc)	Imp (A dc)	Isc (A dc) ±3%	Pmax (Watts) ±3%	Maximum Series Fuse (A)	Protection Class
WJM72S20 435/9BH	49.25	40.62		11.22	10.72	435		
WJM72S20 440/9BH	49.41	40.91		11.27	10.76	440		
WJM72S20 445/9BH	49.56	41.21		11.32	10.80	445		
WJM72S20 450/9BH	49.70	41.52		11.36	10.84	450		
WJM72S20 455/9BH	49.85	41.82		11.41	10.88	455		
WJM78S20 470/9BH	48.4	44.10		10.66	11.40	470		
WJM78S20 475/9BH	48.6	44.27		10.73	11.47	475		
WJM78S20 480/9BH	48.8	44.49		10.79	11.53	480		
WJM78S20 485/9BH	49.0	44.66		10.86	11.6	485		
WJM78S20 490/9BH	49.2	44.87		10.92	11.66	490		
WJM60D20 360/9BH	40.88	33.43	1500	10.77	11.30	360	20	Class II
WJM60D20 365/9BH	41.05	33.74		10.82	11.35	365		
WJM60D20 370/9BH	41.21	33.98		10.89	11.41	370		
WJM60D20 375/9BH	41.37	34.25		10.95	11.47	375		
WJM60D20 380/9BH	41.52	34.52		11.01	11.53	380		
WJM60D20 385/9BH	41.68	34.82		11.06	11.58	385		
WJM72D20 440/9BH	49.30	40.60		10.84	11.33	440		
WJM72D20 445/9BH	49.45	40.91		10.88	11.38	445		
WJM72D20 450/9BH	49.61	41.21		10.92	11.42	450		
WJM72D20 455/9BH	49.75	41.52		10.96	11.46	455		
WJM72D20 460/9BH	49.91	41.79		11.01	11.50	460		
WJM72D20 465/9BH	50.05	42.09		11.05	11.55	465		

Model (166mm cell type)	Voc (V dc) ±3%	Vmp (V dc)	Maximum System Voltage (V dc)	Imp (A dc)	Isc (A dc) ±3%	Pmax (Watts) ±3%	Maximum Series Fuse (A)	Protection Class
WJM78D20 470/9BH	52.86	43.53		10.08	11.33	470		
WJM78D20 475/9BH	53.06	43.73		10.87	11.39	475		
WJM78D20 480/9BH	53.26	43.93		10.94	11.47	480		
WJM78D20 485/9BH	53.46	44.13		11.0	11.53	485		
WJM78D20 490/9BH	53.66	44.33		11.06	11.59	490		
WJM60S10B 320/9BH	39.61	32.96	1500	9.49	10.14	320		
WJM60S10B 325/9BH	39.84	33.60		9.57	10.22	325		
WJM60S10B 330/9BH	41.08	34.24		9.64	10.30	330		
WJM60S10B 335/9BH	41.32	34.88		9.72	10.38	335		
WJM60S10B 340/9BH	41.55	34.73		9.79	10.46	340		
WJM72S10B 390/9BH	49.03	39.87		9.56	10.21	390		
WJM72S10B 395/9BH	49.31	41.05		9.62	10.27	395		
WJM72S10B 400/9BH	49.58	41.33		9.68	10.33	400		
WJM72S10B 405/9BH	49.86	41.60		9.74	10.39	405		
WJM72S10B 410/9BH	50.12	41.88		10.45	9.79	410		
WJM60S20B 350/9BH	40.5	33.3		10.53	11.20	350		
WJM60S20B 355/9BH	40.7	33.5		10.60	11.30	350		
WJM60S20B	40.9	33.7		10.68	11.40	360		

Model (166mm cell type)	Voc (V dc) ±3%	Vmp (V dc)	Maximum System Voltage (V dc)	Imp (A dc)	Isc (A dc) ±3%	Pmax (Watts) ±3%	Maximum Series Fuse (A)	Protection Class
360/9BH								
WJM60S20B 365/9BH	41.1	33.9		10.77	11.50	365		
WJM60S20B 370/9BH	41.3	34.1		10.85	11.60	370		
WJM72S20B 420/9BH	48.0	39.6		10.61	10.81	420		
WJM72S20B 425/9BH	48.2	39.9		10.65	11.12	425		
WJM72S20B 430/9BH	48.4	40.2		10.70	11.80	430		
WJM72S20B 435/9BH	48.7	40.5		10.74	11.24	435		
WJM72S20B 440/9BH	48.9	40.8		10.78	11.30	440		

Appendix 2 : Electrical Ratings for modules with 182mm cell type

Model (182mm cell type)	Voc (V dc) ±3%	Vmp (V dc)	Maximum System Voltage (V dc)	Imp (A dc)	Isc (A dc) ±3%	Pmax (Watts) ±3%	Maximum Series Fuse (A)	Protection Class
WJM78S30 580/10BH	53.11	44.35	1500	13.08	13.84	580	25A	Class II
WJM78S30 585/10BH	53.20	44.56		13.13	13.88	585		
WJM78S30 590/10BH	53.30	44.80		13.17	13.93	590		
WJM78S30 595/10BH	53.40	45.05		13.21	13.98	595		
WJM78S30 600/10BH	53.50	45.30		13.25	14.03	600		
WJM78D30 580/10BH	53.11	44.35		13.08	13.84	580	30A	
WJM78D30	53.20	44.56		53.20	44.56	585		

Model (182mm cell type)	Voc (V dc) ±3%	Vmp (V dc)	Maximum System Voltage (V dc)	Imp (A dc)	Isc (A dc) ±3%	Pmax (Watts) ±3%	Maximum Series Fuse (A)	Protection Class	
585/10BH									
WJM78D30 590/10BH	53.30	44.80		13.17	13.93	590			
WJM78S30 595/10BH	53.40	45.05		13.21	13.98	595			
WJM78D30 600/10BH	53.50	45.30		13.25	14.03	600			
WJM72S30 540/10BH	49.73	41.13		13.13	13.89	540			
WJM72S30 545/10BH	49.92	41.32		13.19	13.95	545			
WJM72S30 550/10BH	50.11	41.51		13.25	14.01	550			
WJM72S30 555/10BH	50.30	41.70		13.31	14.07	555			
WJM72S30 560/10BH	50.49	41.89		13.37	14.13	560			
WJM72D30 540/10BH	49.73	41.13		13.13	13.89	540	25A	Class II	
WJM72D30 545/10BH	49.92	41.32		13.19	13.95	545			
WJM72D30 550/10BH	50.11	41.51		13.25	14.01	550			
WJM72D30 555/10BH	50.30	41.70		13.31	14.07	555			
WJM72D30 560/10BH	50.49	41.89		13.37	14.13	560			
WJM66S30 485/10BH	45.3	38.0		12.89	13.79	485			Class II
WJM66S30 490/10BH	45.4	38.2		12.96	13.86	490	25A		
WJM66S30 495/10BH	45.5	38.4		13.02	13.93	495			
WJM66S30	45.6	38.6		13.08	14.00	500			

Model (182mm cell type)	Voc (V dc) ±3%	Vmp (V dc)	Maximum System Voltage (V dc)	Imp (A dc)	Isc (A dc) ±3%	Pmax (Watts) ±3%	Maximum Series Fuse (A)	Protection Class
500/10BH								
WJM66S30 505/10BH	45.7	38.8		13.14	14.07	505		
WJM60S30 435/10BH	41.0	34.0		12.79	13.72	435		
WJM60S30 440/10BH	41.2	34.2		12.87	13.79	440		
WJM60S30 445/10BH	41.4	34.4		12.94	13.86	445		
WJM60S30 450/10BH	41.6	34.6		13.01	13.93	450		
WJM60S30 455/10BH	41.8	34.8		13.07	14.00	455		
WJM66D30 480/10BH	44.95	37.78	1500	12.71	13.59	480	25A	Class II
WJM66D30 485/10BH	45.10	37.93		12.79	13.67	485		
WJM66D30 490/10BH	45.25	38.08		12.87	13.74	490		
WJM66D30 495/10BH	45.40	38.23		12.95	13.82	495		
WJM66D30 500/10BH	45.55	38.38		13.03	13.91	500		
WJM60D30 435/10BH	40.80	33.76		12.89	13.34	435		
WJM60D30 440/10BH	40.95	33.91		12.98	13.41	440		
WJM60D30 445/10BH	41.10	34.06		13.07	13.52	445		
WJM60D30 450/10BH	41.25	34.21		13.16	13.62	450		

Model (182mm cell type)	Voc (V dc) ±3%	Vmp (V dc)	Maximum System Voltage (V dc)	Imp (A dc)	Isc (A dc) ±3%	Pmax (Watts) ±3%	Maximum Series Fuse (A)	Protection Class
WJM60D30 455/10BH	41.40	34.36		13.25	13.72	455		

Module Fire Performance:

Module Series	Module Fire Performance
WJM78S10 xxxW/9BH 、 WJM72S10 xxxW/9BH 、 WJM60S10 xxxW/9BH 、 WJM78S20 xxxW/9BH 、 WJM72S20 xxxW/9BH 、 WJM60S20 xxxW/9BH 、 WJM78S30 xxxW/10BH 、 WJM72S30 xxxW/10BH 、 WJM66S30 xxxW/10BH 、 WJM60S30 xxxW/10BH	Class C
WJM78D10 xxxW/9BH 、 WJM72D10 xxxW/9BH 、 WJM60D10 xxxW/9BH 、 WJM78D20 xxxW/9BH 、 WJM72D20 xxxW/9BH 、 WJM60D20 xxxW/9BH 、 WJM78D30 xxxW/10BH 、 WJM72D30 xxxW/10BH 、 WJM66D30 xxxW/10BH 、 WJM60D30 xxxW/10BH	Class C

“The fire rating of this module is valid only when mounted in the manner specified in the mechanical mounting instructions.”

The System Fire Class Rating of the module or panel in a mounting system in combination with a roof covering complete with requirements to achieve the specified System Fire Class Rating for a non-BIPV module or panel.

Any module or panel mounting system limitations on inclination required to maintain a specific System Fire Class Rating.