Crystalline Silicon PV Module Installation Guide (TUV)

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CONTENT

1. Introduction

1.1 Purpose

This document provides detailed instructions and valuable safety information regarding the installation, electrical connection and maintenance of the following JINNENG CLEAN ENERGY TECHNOLOGY Crystalline Photovoltaic modules, involved module series are as follow Table 1:

JNMP60–XXX	JNMP72–XXX
JNMM60–XXX	JNMM72–XXX

Table 1

All instructions and mechanical and electrical requirements should be read and understood before attempting installation.

The installer should conform to all safety precautions in this guide when installing the module. Keep this guide in a safe place for further reference.

1.2 Limitation of Liability

Because the use of this manual and the conditions or methods of installation, operation, use and maintenance of photovoltaic (PV) products are beyond JINNENG CLEAN ENERGY control, JINNENG CLEAN ENERGY 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. JINNENG CLEAN ENERGY reserves the right to change the manual without prior notice.

1.3 Others

1.3.1 Modules rated for use in this application class may be used in systems operating at greater than 50V DC or 240W, where general contact access is anticipated. Modules qualified for safety through IEC 61730-1 and this part of IEC 61730 within this application class are considered to meet the requirements for safety class II.

1.3.2 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.

2. Safety

2.1 General Safety

2.1.1 Consult and follow local codes and other applicable laws concerning required permitting as well as installation & inspection requirements, rules, and regulations.

2.1.2 PV modules should be installed and maintained by qualified personnel.

2.1.3 Use the same performance modules within a given series.

2.1.4 Follow all safety precautions of all components used in the system.

2.1.5 Do not shade portions of the PV module surface from the sun for a long period of time. The shaded cell may become hot (hot spot phenomenon), which can result in solder joints peeling off.

2.1.6 Do not clean the glass surface with chemicals.

2.1.7 Do not drop the PV module or drop objects onto the PV module.

2.1.8 Do not concentrate sunlight on the modules or panels.

2.1.9 Do not attempt to disassemble the modules, and do not remove any attached components from the modules.

2.1.10 Do not scratch or hit at the back sheet, the glass, the terminal box. Do not pull the cables or touch them with bare hands.

2.1.11 Do not drill holes in the frame or scratch the insulating coating of the frame.

2.1.12 Keep the PV module packed in the carton until installation.

2.1.13 Do not use modules near equipment or in places where flammable gases may be generated.

2.2 Installation Safety

2.2.1 Wear protective head gear, insulating gloves, safety shoes, and insulated tools when installing the modules.

2.2.2 Do not install the modules in rain, snow, or otherwise wet or windy conditions.

2.2.3 Completely cover the PV module surface with an opaque material during PV module installation and wiring to prevent accidental charge buildup.

2.2.4 Plug in connectors tightly when working on wiring.

2.2.5 Due to the risk of electrical shock, do not perform any work if the terminals of PV module are wet.

2.2.6 Do not touch the terminal box and the end of output cables (connectors) with bare hands.

2.2.7 Do not unplug the connector under load.

2.2.8 Do not work alone.

2.2.9 Wear a safety belt if working far above the ground.

2.2.10 Do not wear metallic jewelry, which can cause electric shock, while installing or troubleshooting the PV system.

2.2.11 Follow the safety regulations for any and all other system components, including wires, connectors, charging regulators, batteries, inverters, etc.

2.2.12 Do not expose wires to direct sunlight. Use UV-resistant cabling.

2.2.13 Do not damage the surrounding PV modules or mounting structure when replacing a

PV module.

2.2.14 Do not change any PV module components (diode, junction box, plug connectors, etc.).

2.2.15 Maximum reverse current is 20.25A for module with 6 inch cells. Use a blocking diode a- nd maximum series overcurrent protective device in the combiner box are recommended for reverse current protection when more than three strings are connected in parallel.

2.2.16 The solar modules are recommended to be installed over a fireproof and insulating roof covering when installed on a roof.

2.2.17 Module may not be contacted during working.

3. Mechanical Installation

3.1 Installation Condition

3.1.1 Environment temperature: -40 to 85℃

3.1.2 Operating temperature: -40 to 85℃

3.1.3 Mechanical load on panels (e.g., from wind or snow): wind load less than 2400 Pa/snow load less than 5400 Pa.

3.1.4 Tilt Angle selection: The installation should be facing north in the southern hemisphere and facing south in the northern hemisphere.

3.1.5 To maintain the modules' Class C fire rating, the fire class of the roof and building mate- rials should higher than Class C. The fire rating of this module is valid only when mounted in the manner specified in the mechanical mounting instructions.

3.1.6 Raise the distance when installation requirement is greater than or equal to 0.3 m. Mod- ule installation use appropriate installation angle, refer to the following Table 2.

Local latitude	Installation angle
0°~15°	15°
15°~25°	latitude
25°~30°	latitude+5°
30°~35°	latitude+10°
35°~40°	latitude+15°
＞40°	latitude+20°

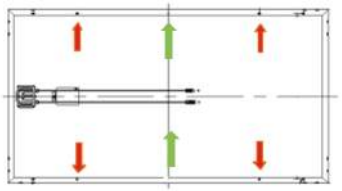
Table 2

3.2 Installation Methods

3.2.1 Bolting

All modules must be securely fastened with at least 4 bolts (Fig. a). For maximum security aga-

inst strong winds or heavy snow falls, suggestion for all of the mounting holes should be used.



Remark: As for above diagram, the solid red arrows indicate primary bolt positions; dashed green arrows indicate positions where bolts can be added for additional support.

Fig. a

Bolts are inserted as described in the process below (Fig. b).

1. Place the module on the supporting bars underneath.
2. Insert stainless-steel bolts (M6 or M8) through the holes (use M6 series mounting access- ories when the size of mounting holes is 7x11.5mm and use M8 series when the size is 9x13 mm) in the frame according to the Fig. a. For maximum security against strong winds and he- avy snow, all available mounting holes should be used.
3. Secure each bolt to the frame with 2 stainless-steel washers, one on each side of the mo- unting structure; and screw on either a stainless-steel spring washer or a toothed lock wash- er. Finally, secure with a stainless steel nut (M6 or M8).
4. The torque for tightening the nut and bolts recommended 13Nm when the property class of bolts and nuts is Class 8.8.

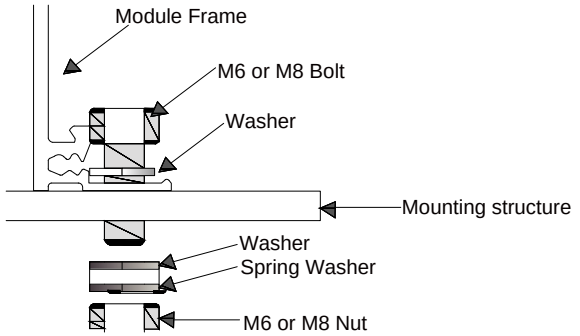


Fig. b

3.2.2 Clamping

Modules can be laid either across the supporting bars (Fig. c) or parallel to them (Fig. d & e).

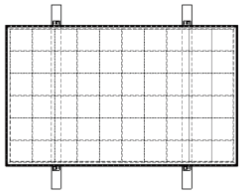


Fig. c

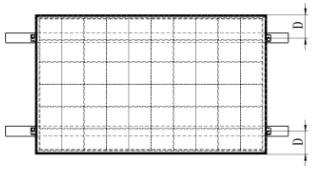


Fig. d

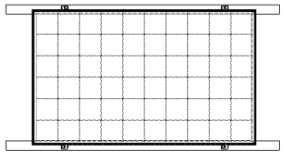


Fig. e

Remark: Illustrations of the three different methods for clamping modules onto the frame with aluminum clamps.

Each aluminum mounting clamp comes with an M8 bolt, a plain washer, a spring washer, and an M8 nut. To fasten the module:

1. Place the module on the two supporting bars (not provided). The bars should be made with stainless material or treated with an anti-corrosion process (e.g., anodic oxidation treatment).
2. The bar's top surface contacted with module frame should come with grooves compatible with an M8 bolt.
3. If the bars do not come with grooves, holes of a suitable diameter may need to be drilled to allow bolts to be attached to the bars at the same locations as mentioned before.
4. Secure each clamp by attaching plain washer, spring washer, and nut, in that order.
5. Both of close-ups of Fig. f indicate the middle clamps and Fig. g indicate the side clamps for your reference. The dimensions for the middle clamps are a ≥ 40mm, b ≥ 26mm, c = 8mm, d ≥ 28mm, and Ø = 9mm. The torque for tightening the nut and bolts recommended 28Nm when the property class of bolts and nuts is Class 8.8.

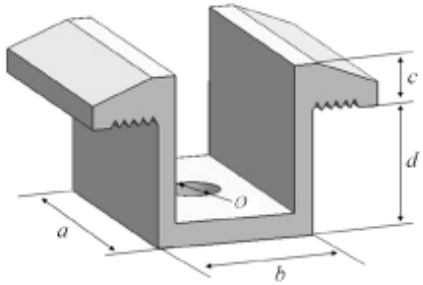


Fig. f

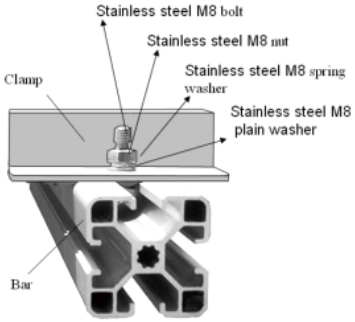
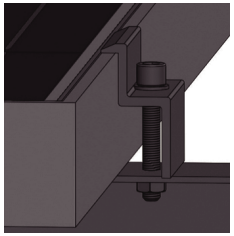
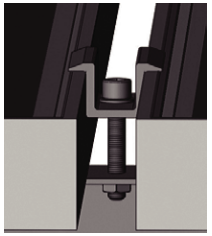


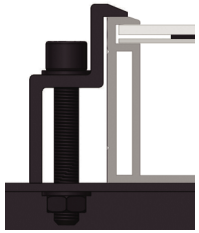
Fig. g

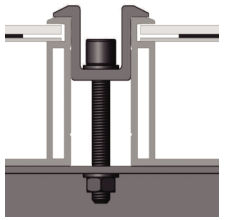
6. Especially for Fig. c mounting method, slide bolts through groove on the supporting bars next



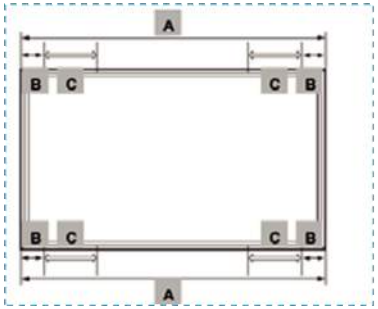


End Clamp installation





Middle Clamp installation



Variable clamping range

Fig. h

For exact dimensions for a given module series, please see the following Table 3. Use in conjunction with Fig. i to determine permitted clamping locations for a given module series for clamping with clamps.

Module	Series Dimension(mm)	A(mm)	B(mm)	C(mm)
JNMP60-XXX	1650*992*35/40	1650	200	210
JNMM60-XXX	1650*992*35/40	1650	200	210
JNMP72-XXX	1956*992*40/45	1956	380	100
JNMM72-XXX	1956*992*40/45	1956	380	100

Table 3

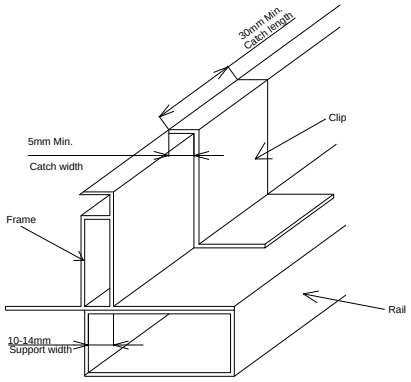


Fig. i

to the locations where the 4 clamps are to be fastened. The module may be clamped only in the permitted clamping area as on the long edge of the frame. For exact locations on the frame refer to Fig. h in conjunction with Table 3 below.
7. Especially for Fig. d mounting method which is only suitable for JNMP60 & JNMM60 series modules, clamp positions are important – the clamp centerlines refer to mark “D” which must be between 50mm and 200mm from the end of the module.
8. Especially for Fig. e mounting method, the modules may be mounted using clamps designed for solar modules refer to Fig. i, the modules must be supported along the length of the long edge and should overlap the array rail by 10mm–14mm. The module may be clamped only in the permitted clamping area as on the long edge of the frame. For exact locations on the frame refer to Fig. h in conjunction with Table 3.

4. Electrical Installation

Details for wiring in accordance with the NEC, and that the grounding method of the frame of arrays shall comply with the NEC, Article 250. CNL model instruction manuals shall also include a statement that installation shall be in accordance with CSA C22.1, Safety Standard for Electrical Installations, Canadian Electrical Code, Part 1.

4.1 Installation

4.1.1 The electrical characteristics are within ±10 percent of the indicated values of Isc. Voc and Pmax under standard test conditions (irradiance of 1000mW/cm^2 , AM 1.5 spectrum, and a cell temperature of 25°C (77°F)).
4.1.2 The maximum system voltage for all module series is 1000V for North American Market and 1000V for European Market.
4.1.3 Connect quantity of modules that match the voltage specifications of the inverters used in system. Modules must not be connected together to create a voltage higher than the permitted maximum system voltage under the worst local temperature conditions.
4.1.4 Under normal conditions, a photovoltaic 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 values of Isc and Voc marked on this module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor capacities, over current device ratings, and size of controls connected to the PV output.
4.1.5 Each module (or series-connected string of modules) shall be provided with the maximum series overcurrent protective device, specified as 15A for the 6 inch cell module series.

4.1.6 Use a special solar cable and plugs for installing the PV system and make sure that all connections are safe and tight. The cable cross section size should be 4mm^2 (12AWG) and able to withstand the maximum possible system open-circuit voltage.
4.1.7 Bypass diodes are included in module junction boxes to avoid decreased module performance in the event of shade or shelter. Please check the relevant product datasheet for the specific diodes of J-box.

4.2 Grounding

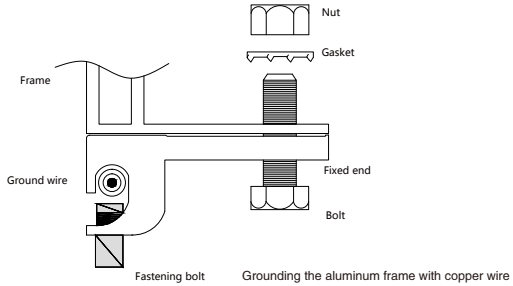


Fig. j

4.2.1 Use the marked 5.5mm grounding holes (5.5mm) to ground the anodized frame. Use an M5 nut, an M5 gasket, and an M5 bolt, Fastening bolt and a Ground wire. All nuts, bolts, and gasket are type M5 and should be made of stainless steel (Fig. j).
4.2.2 Fixed Ground wire on Fixed end through fastening bolt. (Note that the copper wire cannot be attached directly to the aluminum).
4.2.3 Put the bolt through the Fixed end and then through the hole in the aluminum frame.
4.2.4 Add the gasket and nut on the other side of the bolt and tighten to secure all parts. The tightening torque should be 2.1±0.1Nm.

5. Maintenance and Disposal

5.1 Regularly carry out a visual inspection for dirt, dust, bird dropping, leaves, and other detritus covering the modules.
5.2 If there is a buildup of dirt or dust on the module surface, wash the module with clean water and a gentle implement (a sponge). Never use chemicals on the surface of the module.
5.3 If snow is present, a soft-bristled brush with soft bristles may be used to clean the surface of the modules.
5.4 Regular electrical and mechanical inspection by a licensed professional will keep the system safe and operating at maximum efficiency.