




**IEC INSTALLATION INSTRUCTION AND
MAINTENANCE MANUAL
FOR CRYSTALLINE SOLAR PV MODULE**

| | | |
|---|--|--------------------------------|
|  | | TECHNICAL SPECIFICATION |
| TITLE: IEC INSTALLATION INSTRUCTION MANUAL FOR THE CRYSTALLINE SOLAR PHOTOVOLTAIC MODULE | SPEC. NO.: | CNPV-PS-M-S0010-IEC |
| | REVISION: | K |
| | EFFECTIVE DATE: | January 2013 |
| AUTHOR(S): | Bypina Veerraju Chaudary, Andy Nguyen, Yang Xiaowu | Page 1 of 14 |

1. INTRODUCTION

This installation instruction manual provides information about CNPV Crystalline Photovoltaic Modules. CNPV Dongying Solar Power Company Limited has a history of successful innovation within the Solar Industry. The company was founded in 2006 and has made significant investments in research and development, creating over 10 patents during the company's history.

The company has several fully integrated product lines including ingots, casting, wafers, Cells and Modules of Mono and Poly crystalline, and those products are also exported to overseas markets. With an experienced international management team and a strong reputation for innovation, CNPV is one of the leaders in China's Solar Energy Sector and provides the highest quality PV Modules in a range of sizes designed to meet the requirements of the most demanding energy and power users worldwide.

2. POWER MODULE

CNPV Solar Photovoltaic Modules consist of a series of electrically interconnected crystalline silicon solar cells, which are permanently encapsulated between a low iron toughened glass superstrate and substrate. The entire laminate is secured within an anodized aluminum frame for structural strength; ease of installation and to protect the cells from the most severe environmental conditions.

3. APPLICATIONS

CNPV PV Modules are a highly reliable, virtually maintenance-free direct current (DC) power source, designed to operate most efficiently in sunlight. CNPV series Modules are ideal to power remote homes, recreational vehicles, water pumps, telecommunication systems and many other applications either with or without the use of storage batteries.


4. PERMIT

Before installing your system, contact local authorities to determine the necessary permit, installation and inspection requirements.

5. CLIMATE CONDITION

Install the CNPV Solar Photovoltaic Crystalline series Modules in the following conditions:

- Ambient temperature: -20°C to +40°C.
- Operating temperature: -40°C to +85°C.
- Storage temperature: -40°C to +40°C,
- Humidity: below 85RH%
- Wind pressure: below 50.12lb / ft² (2400Pa).
- Snow Load Pressure: below 112.76lb / ft² (5400Pa).
- Corrosion resistance: Except for heavy corrosive salt area and sulfurous area.

| | | | |
|---|--|--------------------------------|--------------|
|  | | TECHNICAL SPECIFICATION | |
| TITLE: IEC INSTALLATION INSTRUCTION MANUAL FOR THE CRYSTALLINE SOLAR PHOTOVOLTAIC MODULE | SPEC. NO.: | CNPV-PS-M-S0010-IEC | |
| | REVISION: | K | |
| | EFFECTIVE DATE: | January 2013 | |
| AUTHOR(S): | Bypina Veerraju Chaudary, Andy Nguyen, Yang Xiaowu | | Page 2 of 14 |

6. SITE SELECTION

In most applications, CNPV PV Modules should be installed in a location where they will receive maximum sunlight throughout the year. When choosing a site, avoid trees, buildings or obstructions, which could cast shadows on the solar photovoltaic 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.

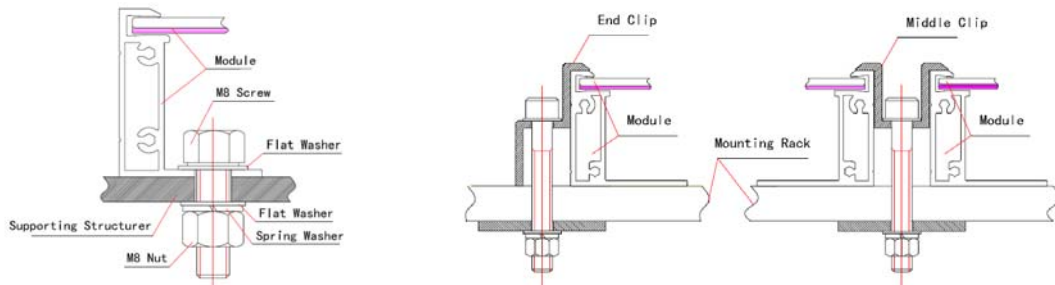
Do not install the PV Module near naked flame or flammable materials. Do not install the PV Module in a location where it would be immersed in water or continually exposed to water from a sprinkler or fountain etc.

7. MOUNTING AND NOTES

Systems should be installed by qualified personnel only. It involves electricity, and can be dangerous if the personnel are not familiar with the appropriate safety procedures.

The Module frame is made of anodized aluminum, and therefore corrosion can occur if the Module is subject to a salt water environment with contact to a rack of another type of metal (Electrolysis Corrosion). If required, PVC or stainless steel washers can be placed between the PV Module frame and support structure to prevent this type of corrosion. Module support structures that are to be used to support PV Modules at correct tilt angles should be wind and snow load rated for use by the appropriate local and civil codes prior to installation.

CNPV PV Modules can be mounted as following method:




Method a: Using corrosion-proof screws on existing installation

Method b: Using suitable module clamps on the module frame

Figure 2 Mounting Method a and b

- Using corrosion-proof screws (M8) on the existing installing holes (see drawing 1, 3, 5 & 7) in the Module frame. The frame of each Module has 4 or 8 mounting holes (12mm×9mm) used to secure the Modules to supporting structure. The Module frame must be attached to a supporting rack using M8 stainless steel hardware together with spring washers and flat washers in four places symmetrical on the PV Module. See method a of Figure 2. The applied torque is about 8 Newton-meters.
- Using suitable Module clamps on the Module frame. See method b of Figure 2. The module frame must be attached to supporting rack using M8 stainless steel hardware together with corrosion-proof clips in four places on the PV module. See Drawing 2, 4, 6 & 8, with *clamping clip*, for positioning of clamping clips. The applied torque is about 8 Newton-meters.
- Insertion System

| | | | |
|---|--|--------------------------------|--------------|
|  | | TECHNICAL SPECIFICATION | |
| TITLE: IEC INSTALLATION INSTRUCTION MANUAL FOR THE CRYSTALLINE SOLAR PHOTOVOLTAIC MODULE | SPEC. NO.: | CNPV-PS-M-S0010-IEC | |
| | REVISION: | K | |
| | EFFECTIVE DATE: | January 2013 | |
| AUTHOR(S): | Bypina Veerraju Chaudary, Andy Nguyen, Yang Xiaowu | | Page 3 of 14 |

NOTES:

- (1) The Module clamps must not come into contact with the front glass and must not deform the frame. Avoid shadowing effects from the Module clamps and the insertion systems. It is not permitted to modify the Module frame under any circumstances. Recommended distance between 2 Solar Modules is 5mm considering linear thermal expansion of the Module frames.
- (2) Clearance between the Module frame and mounting surface may be required to prevent the junction box from touching the surface, and to circulate cooling air around the back of the Module.
- (3) The Modules are not designed for integral mounting as part of a roof or wall. The mounting design may have an impact on the fire resistance. If the Modules are to be installed on the roof or wall of a building, the fire resistance of roof covering or wall should be rated for the application. Here the standoff method or the rack method is recommended. The Modules are supported parallel to surface of the building wall or roof. Clearance between the Module frames and surface of the wall or roof is required to prevent wiring damage and to allow air to circulate behind the Module. The recommended stand-off height is 115mm. Any slope less than 5in/ft (127mm/305mm) required to maintain a fire class rating. Do not mount PV Module in such way that the drain holes of PV Module are intended to block up.
- (4) Do not step on the Module, although PV Modules are quite rugged, the glass can be broken (and the Module will no longer work properly) if it is dropped or hit by tools or other objects.

8. MODULE GROUNDING

All Module frames must be properly grounded in accordance with the local regulations.

The frame of each module is grounded by fixing an appropriate grounding cable (solid copper wire with a minimum of 14AWG-2.5mm² to a maximum of 10AWG-6.0mm²) to one of the 4mm diameter grounding holes (marked ⊕) on the module frame using a screw, nut, and a serrated washer.

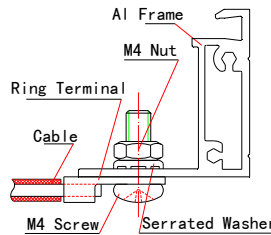



Figure 3 Schematic drawing for PV Module grounding

For specific requirements of grounding PV arrays, refer to NEC Article 690 or local regulations.

9. SYSTEM EARTHING/GROUNDING

For optimal performance, it is strongly recommended to use the system negative grounding where the negative polarity of the PV modules array [i.e. Negative grounding at the DC bus bar level] is connected to the ground Failure to comply with this recommendation will reduce the module performance and may invalidate the limited power warranty of the module.

| | | | |
|---|--|--------------------------------|--------------|
|  | | TECHNICAL SPECIFICATION | |
| TITLE: IEC INSTALLATION INSTRUCTION MANUAL FOR THE CRYSTALLINE SOLAR PHOTOVOLTAIC MODULE | SPEC. NO.: | CNPV-PS-M-S0010-IEC | |
| | REVISION: | K | |
| | EFFECTIVE DATE: | January 2013 | |
| AUTHOR(S): | Bypina Veerraju Chaudary, Andy Nguyen, Yang Xiaowu | | Page 4 of 14 |

10. BYPASS DIODES AND BLOCKING DIODES

Partial shading of an individual Module can cause a reverse voltage across the shaded PV Module. Current is then forced through the shaded area by the other Modules.

When a bypass diode is wired in parallel with the series string, the forced current will flow through the diode and bypass the shaded PV Module, thereby minimizing Module heating and array current losses.

In system utilizing a battery, blocking diodes are typically placed between the battery and the PV Module output to prevent battery discharge at night.

Diodes that are used as blocking diodes must: Have a Rated Average Forward Current [$I_{F(AV)}$] **above** maximum system current at highest Module operating temperature. Have a Rated Repetitive Peak Reverse Voltage [V_{RRM}] **above** maximum system voltage at lowest Module operating temperature.

11. WARNING AND NOTES

The PV Modules generate electricity when exposed to light. Array of many Modules can cause lethal electrical shock and burn hazards. Only authorized and trained personnel should have access to these Modules. To reduce the risk of electrical shock or burns, modules maybe covered with an opaque material during installation to avoid electrical shocks or burns. Do not touch live terminals with bare hands. Use insulated tools for electrical connections.

Use appropriate methods to mount PV Modules. Fall of Modules from high place will cause death, injury or damage. The PV Module has a pair of male and female waterproof connectors. For a series electrical connection, connect positive (+) connector of first PV Module to negative (-) connector of the following Module.

Do not short the positive and the negative. Do not disconnect under load. Be sure connectors have no gap between the insulators. In case there is a gap, a fire and/or an electrical shock may occur.


NOTES:

(1) Artificially concentrated sunlight shall not be directed on the PV Module. The rated electrical characteristics are within 10 percent of measured values under standard test conditions (Irradiance of $1000W/m^2$, AM 1.5 spectrum, and cell temperature of $25^{\circ}C$).

(2) Under normal conditions, a solar 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 this Module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor current ratings, fuse sizes, and sizes of controls connected to the PV output.

(3) Details for wiring in accordance with the local regulations.

(4) If you install modules in parallel electrically, each module (or series string of modules so connected) shall be provided with the maximum series fuse as specified.

| | | | |
|---|--|--------------------------------|--------------|
|  | | TECHNICAL SPECIFICATION | |
| TITLE: IEC INSTALLATION INSTRUCTION MANUAL FOR THE CRYSTALLINE SOLAR PHOTOVOLTAIC MODULE | SPEC. NO.: | CNPV-PS-M-S0010-IEC | |
| | REVISION: | K | |
| | EFFECTIVE DATE: | January 2013 | |
| AUTHOR(S): | Bypina Veerraju Chaudary, Andy Nguyen, Yang Xiaowu | | Page 5 of 14 |

12. MODULE WIRING

Each Module has two #12 AWG type standard 90°C sunlight resistant output cables each terminated with plug & ply connectors. This cable is suitable for applications where wiring is exposed to the direct rays of the Sun. We recommend that all wiring and electrical connections comply with local regulations.

For field connections, use the minimum No. #12 AWG copper wires insulated for a minimum of 90°C and sunlight resistant as well. The minimum and maximum outer cable diameters of the cable are 5 to 7mm. Refer to table 1 for the maximum electrical rating of series fuse.

13. TYPE OF PRODUCT APPLICATION

“The modules are qualified for application class A: Hazardous voltage (IEC61730: higher than 50V DC; EN61730: higher than 120V), hazardous power applications (higher than 240W) where general contract access is anticipated (Modules qualified for safety through EN IEC61730-1 and EN IEC61730-2 within this application class are considered to meet the requirements for Safety class II)”

14. MAINTENANCE

Under most weather conditions, normal rainfall is sufficient to keep the PV Module glass surface clean. If dirt build-up becomes excessive, clean the glass only with a soft cloth using mild detergent and water. USE CAUTION WHEN CLEANING THE BACK SURFACE OF THE MODULE TO AVOID PENETRATING THE SUBSTRATE MATERIALS. PV Modules that are mounted flat (0° tilt angle) should be cleaned more often, as they will not "self clean" as effectively as Modules mounted at a 15° tilt or greater. Once a year, check the tightness of terminal screws and the general condition of the wiring. Also, check to be sure that mounting hardware is tight. Loose connections will result in damage for array. Changed PV Module must be the same kind and type. Do not touch live parts of cables and connectors. Use appropriate safety equipment (insulated tools, insulating gloves, etc.), when touching them.

Cover the front surface of the PV Module by an opaque or other material when repairing. The PV Modules when exposed to sunlight generate high voltage and are dangerous.

15. SPECIFICATIONS: See Table 1

Notes

1. Standard Test Condition(STC) of Irradiance of 1000W/m², AM1.5 Solar Spectrum & 25°C cell temperature
2. Nominal Operating Cell Temperature (NOCT): 45±2°C
3. The tolerance of Voltage and Current within ±10%
4. Temperature coefficient of Current is 0.05%/°K
5. Temperature coefficient of Voltage is -0.30%/°K
6. See PV Module drawing for mounting and grounding holes locations. The drawing for CNPV-xxxxM and CNPV-xxxxB (Black module) is identical.

TITLE: IEC INSTALLATION INSTRUCTION MANUAL FOR THE CRYSTALLINE SOLAR PHOTOVOLTAIC MODULE

SPEC. NO.:

CNPV-PS-M-S0010-IEC

REVISION:

K

EFFECTIVE DATE:

January 2013

AUTHOR(S): Bypina Veerraju Chaudary, Andy Nguyen, Yang Xiaowu

Page 6 of 14

Table 1: Electrical and Mechanical Specifications

| Module Series | Model | Dimensions (mm) | Weight (kg) | Electrical Performance @ STC | | | | | Max-System Voltage (VDC) | Max-Series Fuse (A) | Recommended Max. Module Number | | | | | |
|---|------------|-----------------|-------------|------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------------|---------------------|--------------------------------|-------------|---------------------------|----|----|---|
| | | | | P _{max} (Wp) | V _{pm} (V) | I _{pm} (A) | V _{oc} (V) | I _{sc} (A) | | | In Series | In Parallel | | | | |
| 72pcs 125x125mm PV Module (Mono-Crystalline Silicon) | CNPV-160M | 1581x809x35 | 15 | 160 | 34.5 | 4.65 | 43.0 | 5.15 | IEC61215/IEC61730:1000VDC | 10 | 17 | 2 | | | | |
| | CNPV-165M | | | 165 | 35.2 | 4.70 | 43.4 | 5.20 | | | 17 | 2 | | | | |
| | CNPV-170M | | | 170 | 35.8 | 4.75 | 43.8 | 5.25 | | | 17 | 2 | | | | |
| | CNPV-175M | | | 175 | 36.6 | 4.80 | 44.2 | 5.30 | | | 17 | 2 | | | | |
| | CNPV-180M | | | 180 | 37.2 | 4.85 | 44.6 | 5.35 | | | 17 | 2 | | | | |
| | CNPV-185M | | | 185 | 37.8 | 4.90 | 45.0 | 5.40 | | | 17 | 2 | | | | |
| | CNPV-190M | | | 190 | 37.8 | 5.05 | 45.1 | 5.55 | | | 17 | 2 | | | | |
| | CNPV-195M | | | 195 | 37.9 | 5.15 | 45.2 | 5.60 | | | 17 | 2 | | | | |
| | CNPV-200M | | | 200 | 38.0 | 5.25 | 45.3 | 5.65 | | | 17 | 2 | | | | |
| | CNPV-205M | | | 205 | 38.1 | 5.38 | 45.4 | 5.70 | | | 17 | 2 | | | | |
| CNPV-210M | 210 | | | 38.2 | 5.50 | 45.6 | 5.80 | 17 | | | 2 | | | | | |
| 72pcs 125x125mm PV Module-Black (Mono-Crystalline Silicon) | CNPV-160MB | | | 1581x809x35 | 15 | 160 | 34.5 | 4.65 | | | 43.0 | 5.15 | IEC61215/IEC61730:1000VDC | 10 | 17 | 2 |
| | CNPV-165MB | | | | | 165 | 35.2 | 4.70 | | | 43.4 | 5.20 | | | 17 | 2 |
| | CNPV-170MB | | | | | 170 | 35.8 | 4.75 | | | 43.8 | 5.25 | | | 17 | 2 |
| | CNPV-175MB | | | | | 175 | 36.6 | 4.80 | | | 44.2 | 5.30 | | | 17 | 2 |
| | CNPV-180MB | | | | | 180 | 37.2 | 4.85 | | | 44.6 | 5.35 | | | 17 | 2 |
| | CNPV-185MB | | | | | 185 | 37.8 | 4.90 | | | 45.0 | 5.40 | | | 17 | 2 |
| | CNPV-190MB | | | | | 190 | 37.8 | 5.05 | | | 45.1 | 5.55 | | | 17 | 2 |
| | CNPV-195MB | | | | | 195 | 37.9 | 5.15 | | | 45.2 | 5.60 | | | 17 | 2 |
| | CNPV-200MB | | | | | 200 | 38.0 | 5.25 | | | 45.3 | 5.65 | | | 17 | 2 |
| | CNPV-205MB | 205 | 38.1 | | | 5.38 | 45.4 | 5.70 | 17 | 2 | | | | | | |
| CNPV-210MB | 210 | 38.2 | 5.50 | | | 45.6 | 5.80 | 17 | 2 | | | | | | | |

**TITLE: IEC INSTALLATION INSTRUCTION
MANUAL FOR THE CRYSTALLINE
SOLAR PHOTOVOLTAIC MODULE**

SPEC. NO.:

CNPV-PS-M-S0010-IEC

REVISION:

K

EFFECTIVE DATE:

January 2013

AUTHOR(S):

Bypina Veerraju Chaudary, Andy Nguyen, Yang Xiaowu

Page 7 of 14

| Module Series | Model | Dimensions (mm) | Weight (kg) | Electrical Performance @ STC | | | | | Max-System Voltage (VDC) | Max-Series Fuse (A) | Recommended Max. Module Number | |
|--|--|-----------------|-------------|------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------------|---------------------|--------------------------------|-------------|
| | | | | P _{max} (Wp) | V _{pm} (V) | I _{pm} (A) | V _{oc} (V) | I _{sc} (A) | | | In Series | In Parallel |
| 54pcs 156x156mm PV Module (Mono-Crystalline Silicon) | CNPV-190M-54 | 1482x992x35 | 16.5 | 190 | 26.6 | 7.15 | 32.6 | 7.90 | IEC61215/IEC61730:1000VDC | 20 | 23 | 3 |
| | CNPV-195M-54 | | | 195 | 26.9 | 7.25 | 32.8 | 8.00 | | | 23 | 3 |
| | CNPV-200M-54 | | | 200 | 27.0 | 7.40 | 33.0 | 8.10 | | | 23 | 3 |
| | CNPV-205M-54 | | | 205 | 27.2 | 7.55 | 33.2 | 8.20 | | | 23 | 3 |
| | CNPV-210M-54 | | | 210 | 27.4 | 7.65 | 33.4 | 8.30 | | | 23 | 3 |
| | CNPV-215M-54 | | | 215 | 27.6 | 7.80 | 33.6 | 8.40 | | | 23 | 3 |
| | CNPV-220M-54 | | | 220 | 27.7 | 7.95 | 33.7 | 8.50 | | | 23 | 3 |
| | CNPV-225M-54 | | | 225 | 27.8 | 8.10 | 33.8 | 8.60 | | | 23 | 3 |
| | CNPV-230M-54 | | | 230 | 28.0 | 8.20 | 33.9 | 8.70 | | | 23 | 3 |
| | CNPV-235M-54 | | | 235 | 28.3 | 8.30 | 34.0 | 8.80 | | | 23 | 3 |
| | CNPV-240M-54 | | | 240 | 28.7 | 8.35 | 34.1 | 8.85 | | | 23 | 3 |
| | 60pcs 156x156mm PV Module (Mono-Crystalline Silicon) | | | CNPV-220M | 1650x992x35 | 18 | 220 | 29.7 | | | 7.40 | 36.8 |
| CNPV-225M | | 225 | 30.0 | 7.50 | | | 37.0 | 8.10 | | 21 | 3 | |
| CNPV-230M | | 230 | 30.3 | 7.60 | | | 37.2 | 8.20 | | 21 | 3 | |
| CNPV-235M | | 235 | 30.7 | 7.65 | | | 37.5 | 8.30 | | 21 | 3 | |
| CNPV-240M | | 240 | 30.8 | 7.80 | | | 37.6 | 8.40 | | 21 | 3 | |
| CNPV-245M | | 245 | 30.9 | 7.93 | | | 37.7 | 8.50 | | 21 | 3 | |
| CNPV-250M | | 250 | 31.0 | 8.05 | | | 37.8 | 8.60 | | 21 | 3 | |
| CNPV-255M | | 255 | 31.3 | 8.15 | | | 37.9 | 8.70 | | 21 | 3 | |
| CNPV-260M | | 260 | 31.5 | 8.25 | | | 38.0 | 8.80 | | 21 | 3 | |
| CNPV-265M | | 265 | 31.7 | 8.35 | | | 38.1 | 8.90 | | 21 | 3 | |
| 72pcs 156x156mm PV Module (Mono-Crystalline Silicon) | CNPV-255M | 1965x992x35 | 22 | 250 | 35.9 | 7.10 | 43.2 | 7.70 | | 20 | 17 | 3 |
| | CNPV-260M | | | 260 | 36.1 | 7.20 | 43.4 | 7.80 | | | 17 | 3 |
| | CNPV-265M | | | 265 | 36.3 | 7.30 | 43.6 | 7.90 | | | 17 | 3 |
| | CNPV-270M | | | 270 | 36.5 | 7.40 | 43.8 | 8.00 | | | 17 | 3 |
| | CNPV-275M | | | 275 | 36.7 | 7.50 | 44.0 | 8.10 | | | 17 | 3 |
| | CNPV-280M | | | 280 | 36.9 | 7.60 | 44.2 | 8.20 | | | 17 | 3 |
| | CNPV-285M | | | 285 | 37.0 | 7.70 | 44.4 | 8.30 | | | 17 | 3 |
| | CNPV-290M | | | 290 | 37.2 | 7.80 | 44.6 | 8.40 | | | 17 | 3 |
| | CNPV-295M | | | 295 | 37.3 | 7.90 | 44.8 | 8.50 | | | 17 | 3 |
| | CNPV-300M | | | 300 | 37.5 | 8.00 | 45.0 | 8.60 | 17 | | 3 | |
| | CNPV-305M | | | 305 | 37.7 | 8.10 | 45.1 | 8.70 | 17 | | 3 | |
| | CNPV-310M | | | 310 | 37.9 | 8.18 | 45.2 | 8.80 | 17 | | 3 | |
| | CNPV-315M | | | 315 | 38.1 | 8.25 | 45.3 | 8.90 | 17 | | 3 | |
| | CNPV-320M | | | 320 | 38.3 | 8.35 | 45.4 | 8.95 | 17 | | 3 | |

**TITLE: IEC INSTALLATION INSTRUCTION
MANUAL FOR THE CRYSTALLINE
SOLAR PHOTOVOLTAIC MODULE**

SPEC. NO.:

CNPV-PS-M-S0010-IEC

REVISION:

K

EFFECTIVE DATE:

January 2013

AUTHOR(S):

Bypina Veerraju Chaudary, Andy Nguyen, Yang Xiaowu

Page 8 of 14

| Module Series | Model | Dimensions (mm) | Weight (kg) | Electrical Performance @ STC | | | | | Max-System Voltage (VDC) | Max-Series Fuse (A) | Recommended Max. Module Number | |
|--|--|-----------------|-------------|------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------------|---------------------|--------------------------------|-------------|
| | | | | P _{max} (Wp) | V _{pm} (V) | I _{pm} (A) | V _{oc} (V) | I _{sc} (A) | | | In Series | In Parallel |
| 54pcs 156x156mm PV Module-Black (Mono-Crystalline Silicon) | CNPV-190MB-54 | 1482x992x35 | 16.5 | 190 | 26.6 | 7.15 | 32.6 | 7.90 | IEC61215/IEC61730:1000VDC | 20 | 23 | 3 |
| | CNPV-195MB-54 | | | 195 | 26.9 | 7.25 | 32.8 | 8.00 | | | 23 | 3 |
| | CNPV-200MB-54 | | | 200 | 27.0 | 7.40 | 33.0 | 8.10 | | | 23 | 3 |
| | CNPV-205MB-54 | | | 205 | 27.2 | 7.55 | 33.2 | 8.20 | | | 23 | 3 |
| | CNPV-210MB-54 | | | 210 | 27.4 | 7.65 | 33.4 | 8.30 | | | 23 | 3 |
| | CNPV-215MB-54 | | | 215 | 27.6 | 7.80 | 33.6 | 8.40 | | | 23 | 3 |
| | CNPV-220MB-54 | | | 220 | 27.7 | 7.95 | 33.7 | 8.50 | | | 23 | 3 |
| | CNPV-225MB-54 | | | 225 | 27.8 | 8.10 | 33.8 | 8.60 | | | 23 | 3 |
| | CNPV-230MB-54 | | | 230 | 28.0 | 8.20 | 33.9 | 8.70 | | | 23 | 3 |
| | CNPV-235MB-54 | | | 235 | 28.3 | 8.30 | 34.0 | 8.80 | | | 23 | 3 |
| | CNPV-240MB-54 | | | 240 | 28.7 | 8.35 | 34.1 | 8.85 | | | 23 | 3 |
| | 60pcs 156x156mm PV Module-Black (Mono-Crystalline Silicon) | | | CNPV-220MB | 1650x992x35 | 18 | 220 | 29.7 | | | 7.40 | 36.8 |
| CNPV-225MB | | 225 | 30.0 | 7.50 | | | 37.0 | 8.10 | | 21 | 3 | |
| CNPV-230MB | | 230 | 30.3 | 7.60 | | | 37.2 | 8.20 | | 21 | 3 | |
| CNPV-235MB | | 235 | 30.7 | 7.65 | | | 37.5 | 8.30 | | 21 | 3 | |
| CNPV-240MB | | 240 | 30.8 | 7.80 | | | 37.6 | 8.40 | | 21 | 3 | |
| CNPV-245MB | | 245 | 30.9 | 7.93 | | | 37.7 | 8.50 | | 21 | 3 | |
| CNPV-250MB | | 250 | 31.0 | 8.05 | | | 37.8 | 8.60 | | 21 | 3 | |
| CNPV-255MB | | 255 | 31.3 | 8.15 | | | 37.9 | 8.70 | | 21 | 3 | |
| CNPV-260MB | | 260 | 31.5 | 8.25 | | | 38.0 | 8.80 | | 21 | 3 | |
| CNPV-265MB | | 265 | 31.7 | 8.35 | | | 38.1 | 8.90 | | 21 | 3 | |
| 72pcs 156x156mm PV Module-Black (Mono-Crystalline Silicon) | CNPV-255MB | 1965x992x35 | 22 | 250 | 35.9 | 7.10 | 43.2 | 7.70 | | 20 | 17 | 3 |
| | CNPV-260MB | | | 260 | 36.1 | 7.20 | 43.4 | 7.80 | | | 17 | 3 |
| | CNPV-265MB | | | 265 | 36.3 | 7.30 | 43.6 | 7.90 | | | 17 | 3 |
| | CNPV-270MB | | | 270 | 36.5 | 7.40 | 43.8 | 8.00 | | | 17 | 3 |
| | CNPV-275MB | | | 275 | 36.7 | 7.50 | 44.0 | 8.10 | | | 17 | 3 |
| | CNPV-280MB | | | 280 | 36.9 | 7.60 | 44.2 | 8.20 | | | 17 | 3 |
| | CNPV-285MB | | | 285 | 37.0 | 7.70 | 44.4 | 8.30 | | | 17 | 3 |
| | CNPV-290MB | | | 290 | 37.2 | 7.80 | 44.6 | 8.40 | | | 17 | 3 |
| | CNPV-295MB | | | 295 | 37.3 | 7.90 | 44.8 | 8.50 | | | 17 | 3 |
| | CNPV-300MB | | | 300 | 37.5 | 8.00 | 45.0 | 8.60 | 17 | | 3 | |
| | CNPV-305MB | | | 305 | 37.7 | 8.10 | 45.1 | 8.70 | 17 | | 3 | |
| | CNPV-310MB | | | 310 | 37.9 | 8.18 | 45.2 | 8.80 | 17 | | 3 | |
| | CNPV-315MB | | | 315 | 38.1 | 8.25 | 45.3 | 8.90 | 17 | | 3 | |
| | CNPV-320MB | | | 320 | 38.3 | 8.35 | 45.4 | 8.95 | 17 | | 3 | |

TITLE: IEC INSTALLATION INSTRUCTION MANUAL FOR THE CRYSTALLINE SOLAR PHOTOVOLTAIC MODULE

SPEC. NO.:

CNPV-PS-M-S0010-IEC

REVISION:

K

EFFECTIVE DATE:

January 2013

AUTHOR(S):

Bypina Veerraju Chaudary, Andy Nguyen, Yang Xiaowu

Page 9 of 14

| Module Series | Model | Dimensions (mm) | Weight (kg) | Electrical Performance @ STC | | | | | Max-System Voltage (VDC) | Max-Series Fuse (A) | Recommended Max. Module Number | | | |
|--|--|-----------------|-------------|------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------------|---------------------------|--------------------------------|-------------|------|------|
| | | | | P _{max} (Wp) | V _{Fm} (V) | I _{Fm} (A) | V _{oc} (V) | I _{sc} (A) | | | In Series | In Parallel | | |
| 54pcs 156x156mm PV Module (Poly-Crystalline Silicon) | CNPV-190P-54 | 1482×992×35 | 16.5 | 190 | 26.2 | 7.25 | 32.7 | 7.95 | IEC61215/IEC61730:1000VDC | 20 | 23 | 3 | | |
| | CNPV-195P-54 | | | 195 | 26.5 | 7.35 | 32.9 | 8.05 | | | 23 | 3 | | |
| | CNPV-200P-54 | | | 200 | 26.7 | 7.5 | 33.1 | 8.15 | | | 23 | 3 | | |
| | CNPV-205P-54 | | | 205 | 26.9 | 7.63 | 33.3 | 8.25 | | | 23 | 3 | | |
| | CNPV-210P-54 | | | 210 | 27.1 | 7.75 | 33.5 | 8.35 | | | 23 | 3 | | |
| | CNPV-215P-54 | | | 215 | 27.4 | 7.85 | 33.7 | 8.40 | | | 23 | 3 | | |
| | CNPV-220P-54 | | | 220 | 27.7 | 7.95 | 33.9 | 8.45 | | | 23 | 3 | | |
| | CNPV-225P-54 | | | 225 | 28.1 | 8.00 | 34.1 | 8.50 | | | 23 | 3 | | |
| | CNPV-230P-54 | | | 230 | 28.4 | 8.10 | 34.3 | 8.55 | | | 23 | 3 | | |
| | CNPV-235P-54 | | | 235 | 28.6 | 8.20 | 34.5 | 8.65 | | | 23 | 3 | | |
| 60pcs 156x156mm PV Module (Poly-Crystalline Silicon) | CNPV-210P | 1650×992×35 | 18 | 210 | 29.2 | 7.20 | 36.4 | 7.80 | | IEC61215/IEC61730:1000VDC | 20 | 21 | 3 | |
| | CNPV-215P | | | 215 | 29.5 | 7.30 | 36.6 | 7.90 | | | | 21 | 3 | |
| | CNPV-220P | | | 220 | 29.8 | 7.40 | 36.8 | 8.00 | | | | 21 | 3 | |
| | CNPV-225P | | | 225 | 30.1 | 7.50 | 37.0 | 8.10 | | | | 21 | 3 | |
| | CNPV-230P | | | 230 | 30.3 | 7.60 | 37.2 | 8.20 | | | | 21 | 3 | |
| | CNPV-235P | | | 235 | 30.5 | 7.70 | 37.3 | 8.30 | | | | 21 | 3 | |
| | CNPV-240P | | | 240 | 30.8 | 7.80 | 37.4 | 8.40 | | | | 21 | 3 | |
| | CNPV-245P | | | 245 | 31.0 | 7.90 | 37.5 | 8.50 | | | | 21 | 3 | |
| | CNPV-250P | | | 250 | 31.2 | 8.00 | 37.6 | 8.55 | | | | 21 | 3 | |
| | CNPV-255P | | | 255 | 31.3 | 8.15 | 37.7 | 8.60 | | | | 21 | 3 | |
| | CNPV-260P | | | 260 | 31.5 | 8.25 | 37.8 | 8.65 | | | | 21 | 3 | |
| | CNPV-265P | | | 265 | 31.7 | 8.35 | 37.9 | 8.70 | | | | 21 | 3 | |
| | 72pcs 156x156mm PV Module (Poly-Crystalline Silicon) | | | CNPV-250P | 1965×992×35 | 22 | 250 | 35.8 | | | | 7.00 | 43.4 | 7.60 |
| CNPV-255P | | 255 | 36.0 | 7.10 | | | 43.6 | 7.70 | | | 17 | 3 | | |
| CNPV-260P | | 260 | 36.2 | 7.20 | | | 43.8 | 7.80 | | | 17 | 3 | | |
| CNPV-265P | | 265 | 36.4 | 7.30 | | | 44.0 | 7.90 | | | 17 | 3 | | |
| CNPV-270P | | 270 | 36.6 | 7.40 | | | 44.2 | 8.00 | | | 17 | 3 | | |
| CNPV-275P | | 275 | 36.7 | 7.50 | | | 44.4 | 8.10 | | | 17 | 3 | | |
| CNPV-280P | | 280 | 36.9 | 7.60 | | | 44.6 | 8.20 | | | 17 | 3 | | |
| CNPV-285P | | 285 | 37.0 | 7.70 | | | 44.8 | 8.30 | | | 17 | 3 | | |
| CNPV-290P | | 290 | 37.2 | 7.80 | | | 45.0 | 8.40 | 17 | 3 | | | | |
| CNPV-295P | | 295 | 37.4 | 7.90 | | | 45.1 | 8.45 | 17 | 3 | | | | |
| CNPV-300P | | 300 | 37.6 | 8.00 | | | 45.2 | 8.50 | 17 | 3 | | | | |
| CNPV-305P | | 305 | 37.7 | 8.10 | | | 45.3 | 8.55 | 17 | 3 | | | | |
| CNPV-310P | | 310 | 38.0 | 8.15 | | | 45.4 | 8.60 | 17 | 3 | | | | |
| CNPV-315P | | 315 | 38.2 | 8.25 | | | 45.5 | 8.65 | 17 | 3 | | | | |



TECHNICAL SPECIFICATION

TITLE: IEC INSTALLATION INSTRUCTION MANUAL FOR THE CRYSTALLINE SOLAR PHOTOVOLTAIC MODULE

SPEC. NO.:

CNPV-PS-M-S0010-IEC

REVISION:

K

EFFECTIVE DATE:

January 2013

AUTHOR(S):

Bypina Veerraju Chaudary, Andy Nguyen, Yang Xiaowu

Page 10 of 14

| Module Series | Model | Dimensions (mm) | Weight (kg) | Electrical Performance @ STC | | | | | Max-System Voltage (VDC) | Max-Series Fuse (A) | Recommended Max. Module Number | |
|--|--|-----------------|-------------|------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------------|---------------------|--------------------------------|-------------|
| | | | | P _{max} (Wp) | V _{pm} (V) | I _{pm} (A) | V _{oc} (V) | I _{sc} (A) | | | In Series | In Parallel |
| 54pcs 156x156mm PV Module-Black (Poly-Crystalline Silicon) | CNPV-190PB-54 | 1482x992x35 | 16.5 | 190 | 26.2 | 7.25 | 32.7 | 7.95 | IEC61215/IEC61730:1000VDC | 20 | 23 | 3 |
| | CNPV-195PB-54 | | | 195 | 26.5 | 7.35 | 32.9 | 8.05 | | | 23 | 3 |
| | CNPV-200PB-54 | | | 200 | 26.7 | 7.50 | 33.1 | 8.15 | | | 23 | 3 |
| | CNPV-205PB-54 | | | 205 | 26.9 | 7.63 | 33.3 | 8.25 | | | 23 | 3 |
| | CNPV-210PB-54 | | | 210 | 27.1 | 7.75 | 33.5 | 8.35 | | | 23 | 3 |
| | CNPV-215PB-54 | | | 215 | 27.4 | 7.85 | 33.7 | 8.40 | | | 23 | 3 |
| | CNPV-220PB-54 | | | 220 | 27.7 | 7.95 | 33.9 | 8.45 | | | 23 | 3 |
| | CNPV-225PB-54 | | | 225 | 28.1 | 8.00 | 34.1 | 8.50 | | | 23 | 3 |
| | CNPV-230PB-54 | | | 230 | 28.4 | 8.10 | 34.3 | 8.55 | | | 23 | 3 |
| | CNPV-235PB-54 | | | 235 | 28.6 | 8.20 | 34.5 | 8.65 | | | 23 | 3 |
| | 60pcs 156x156mm PV Module-Black (Poly-Crystalline Silicon) | | | CNPV-210PB | 1650x992x35 | 18 | 210 | 29.2 | | | 7.20 | 36.4 |
| CNPV-215PB | | 215 | 29.5 | 7.30 | | | 36.6 | 7.90 | | 21 | 3 | |
| CNPV-220PB | | 220 | 29.8 | 7.40 | | | 36.8 | 8.00 | | 21 | 3 | |
| CNPV-225PB | | 225 | 30.1 | 7.50 | | | 37.0 | 8.10 | | 21 | 3 | |
| CNPV-230PB | | 230 | 30.3 | 7.60 | | | 37.2 | 8.20 | | 21 | 3 | |
| CNPV-235PB | | 235 | 30.5 | 7.70 | | | 37.3 | 8.30 | | 21 | 3 | |
| CNPV-240PB | | 240 | 30.8 | 7.80 | | | 37.4 | 8.40 | | 21 | 3 | |
| CNPV-245PB | | 245 | 31.0 | 7.90 | | | 37.5 | 8.50 | | 21 | 3 | |
| CNPV-250PB | | 250 | 31.2 | 8.00 | | | 37.6 | 8.55 | | 21 | 3 | |
| CNPV-255PB | | 255 | 31.3 | 8.15 | | | 37.7 | 8.60 | | 21 | 3 | |
| CNPV-260PB | | 260 | 31.5 | 8.25 | | | 37.8 | 8.65 | | 21 | 3 | |
| CNPV-265PB | | 265 | 31.7 | 8.35 | | | 37.9 | 8.70 | | 21 | 3 | |
| 72pcs 156x156mm PV Module-Black (Poly-Crystalline Silicon) | | CNPV-250PB | 1965x992x35 | 22 | | | 250 | 35.8 | 7.00 | 43.4 | 7.60 | 20 |
| | CNPV-255PB | 255 | | | 36.0 | 7.10 | 43.6 | 7.70 | 17 | 3 | | |
| | CNPV-260PB | 260 | | | 36.2 | 7.20 | 43.8 | 7.80 | 17 | 3 | | |
| | CNPV-265PB | 265 | | | 36.4 | 7.30 | 44.0 | 7.90 | 17 | 3 | | |
| | CNPV-270PB | 270 | | | 36.6 | 7.40 | 44.2 | 8.00 | 17 | 3 | | |
| | CNPV-275PB | 275 | | | 36.7 | 7.50 | 44.4 | 8.10 | 17 | 3 | | |
| | CNPV-280PB | 280 | | | 36.9 | 7.60 | 44.6 | 8.20 | 17 | 3 | | |
| | CNPV-285PB | 285 | | | 37.0 | 7.70 | 44.8 | 8.30 | 17 | 3 | | |
| | CNPV-290PB | 290 | | | 37.2 | 7.80 | 45.0 | 8.40 | 17 | 3 | | |
| | CNPV-295PB | 295 | | | 37.4 | 7.90 | 45.1 | 8.45 | 17 | 3 | | |
| | CNPV-300PB | 300 | | | 37.6 | 8.00 | 45.2 | 8.50 | 17 | 3 | | |
| | CNPV-305PB | 305 | | | 37.7 | 8.10 | 45.3 | 8.55 | 17 | 3 | | |
| | CNPV-310PB | 310 | | | 38.0 | 8.15 | 45.4 | 8.60 | 17 | 3 | | |
| | CNPV-315PB | 315 | | | 38.2 | 8.25 | 45.5 | 8.65 | 17 | 3 | | |

TITLE: IEC INSTALLATION INSTRUCTION MANUAL FOR THE CRYSTALLINE SOLAR PHOTOVOLTAIC MODULE

SPEC. NO.:

CNPV-PS-M-S0010-IEC

REVISION:

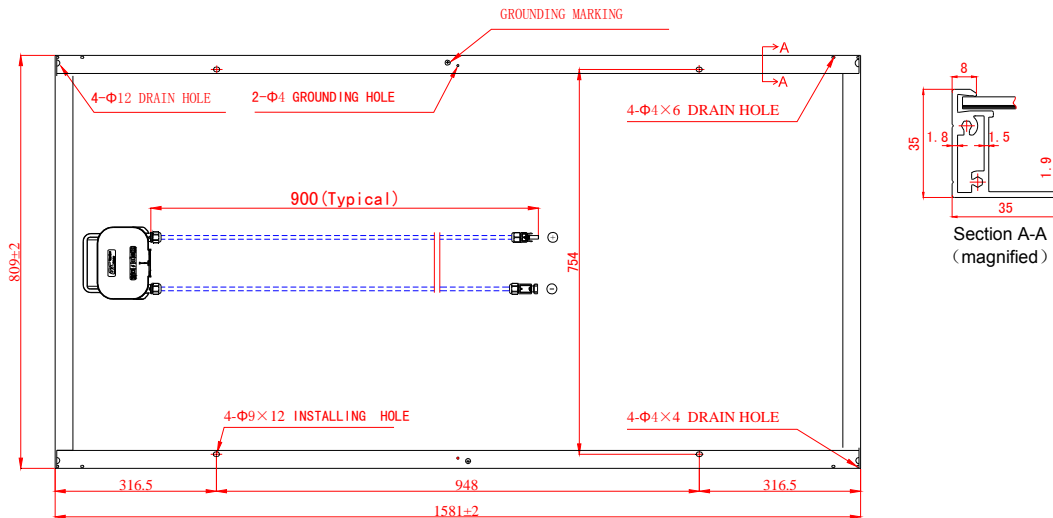
K

EFFECTIVE DATE:

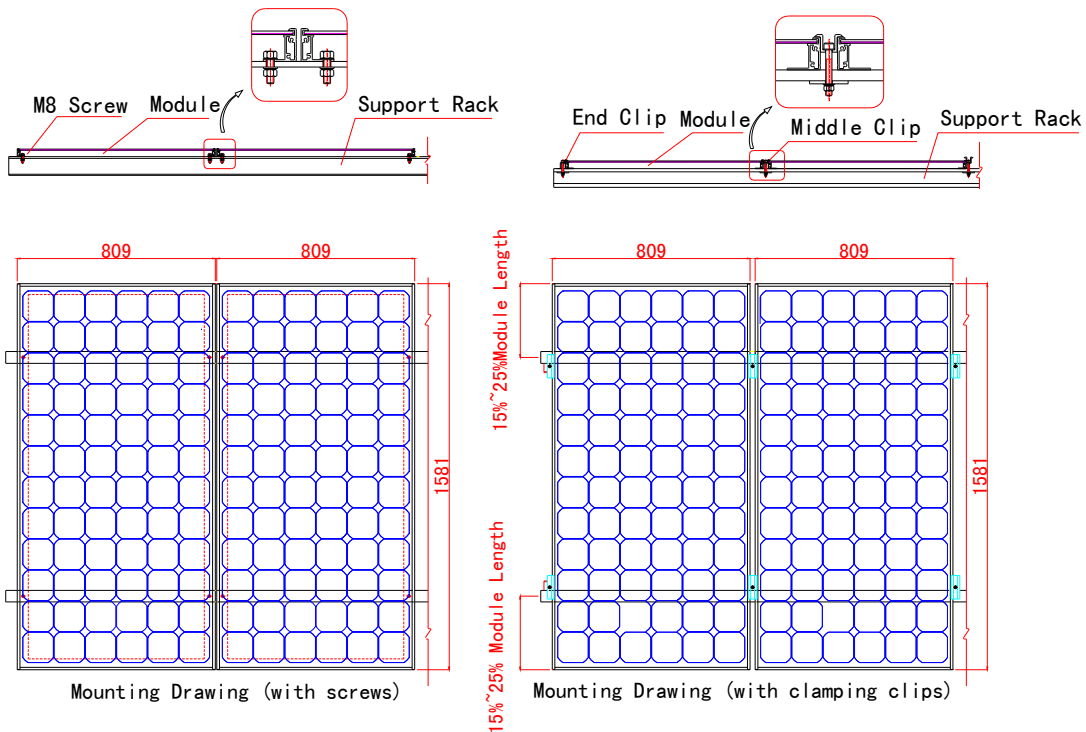
January 2013

AUTHOR(S): Bypina Veerraju Chaudary, Andy Nguyen, Yang Xiaowu

Page 11 of 14



Drawing 1 Back View of 6x12-125mm- 72cell PV Module



Drawing 2 Mounting Drawing for 6x12-125x125mm 72cell PV Module (with screws and clamping clips on long frames)

TITLE: IEC INSTALLATION INSTRUCTION MANUAL FOR THE CRYSTALLINE SOLAR PHOTOVOLTAIC MODULE

SPEC. NO.:

CNPV-PS-M-S0010-IEC

REVISION:

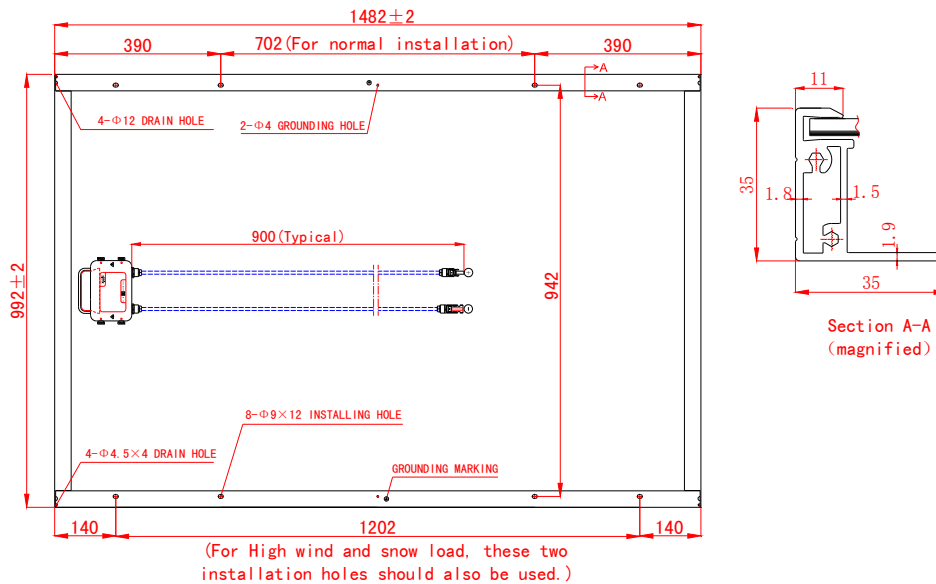
K

EFFECTIVE DATE:

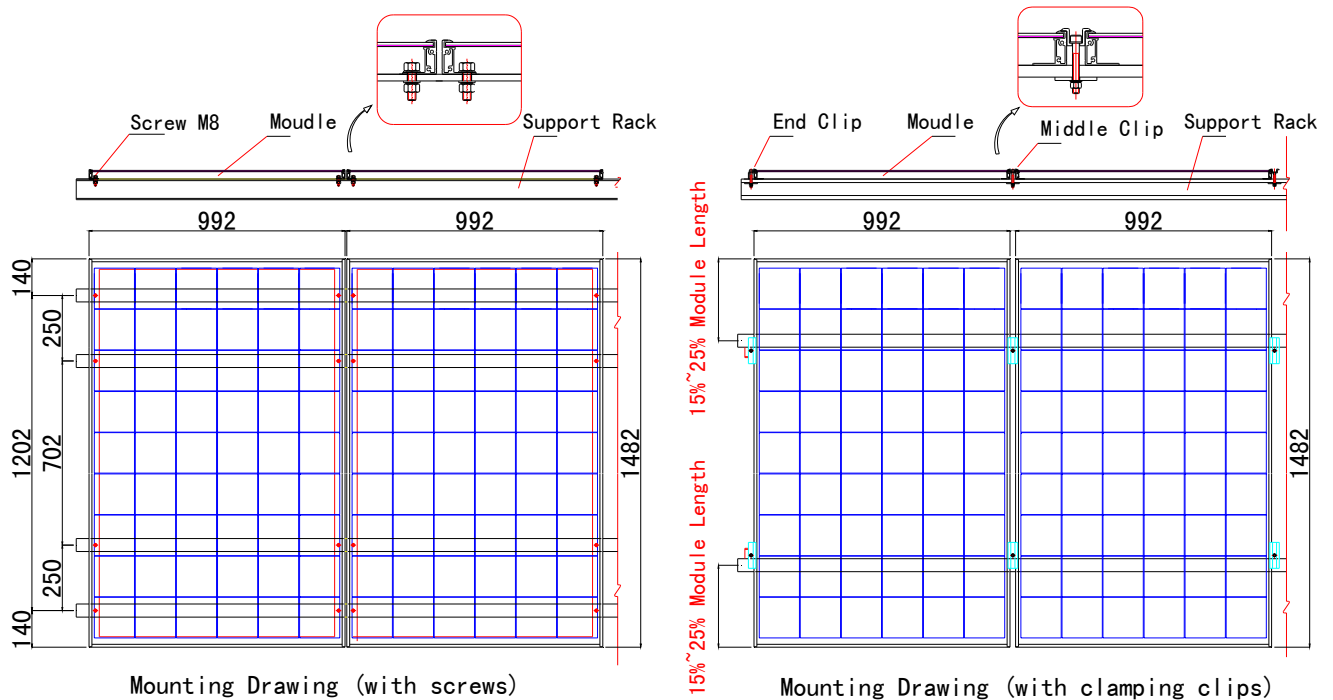
January 2013

AUTHOR(S): Bypina Veerraju Chaudary, Andy Nguyen, Yang Xiaowu

Page 12 of 14



Drawing 3 Back View of 6x9-156x156mm 54cell PV Module



Drawing 4 Mounting Drawing for 6x9-156x156mm 54cell PV Module (with screws and clamping clips on long frames)

TITLE: IEC INSTALLATION INSTRUCTION MANUAL FOR THE CRYSTALLINE SOLAR PHOTOVOLTAIC MODULE

SPEC. NO.:

CNPV-PS-M-S0010-IEC

REVISION:

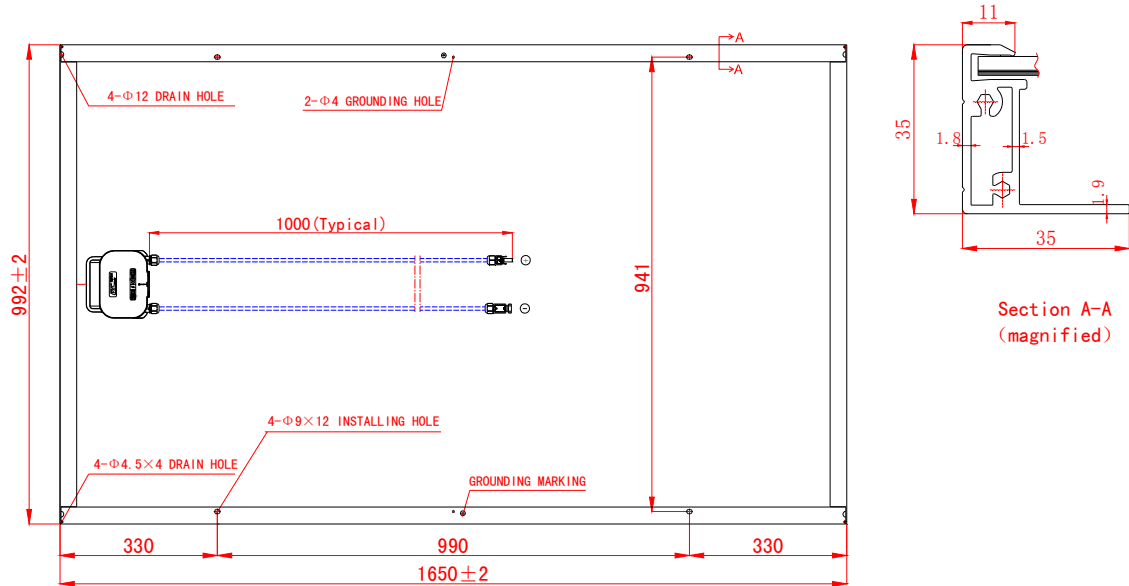
K

EFFECTIVE DATE:

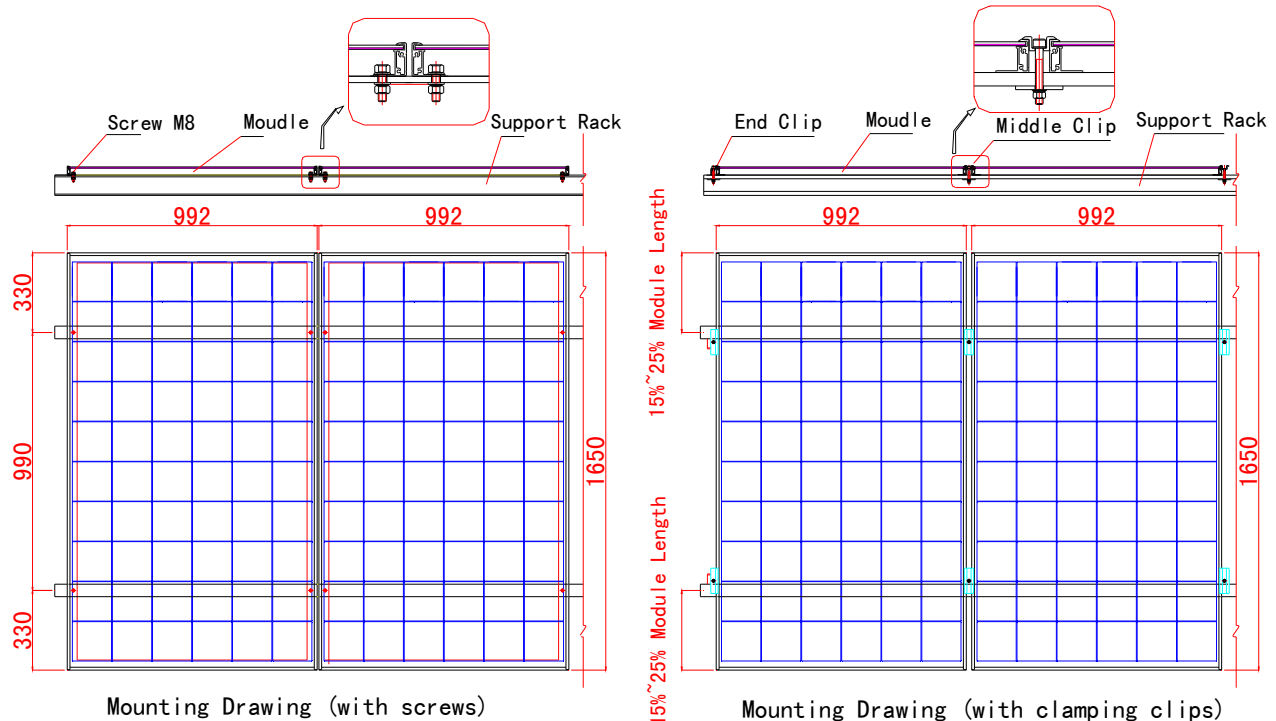
January 2013

AUTHOR(S): Bypina Veerraju Chaudary, Andy Nguyen, Yang Xiaowu

Page 13 of 14



Drawing 5 Back View of 6×10-156×156mm 60cell PV Module



Drawing 6 Mounting Drawing for 6×10-156×156mm 60cell PV Module (with screws and clamping clips on long frames)

TITLE: IEC INSTALLATION INSTRUCTION MANUAL FOR THE CRYSTALLINE SOLAR PHOTOVOLTAIC MODULE

SPEC. NO.:

CNPV-PS-M-S0010-IEC

REVISION:

K

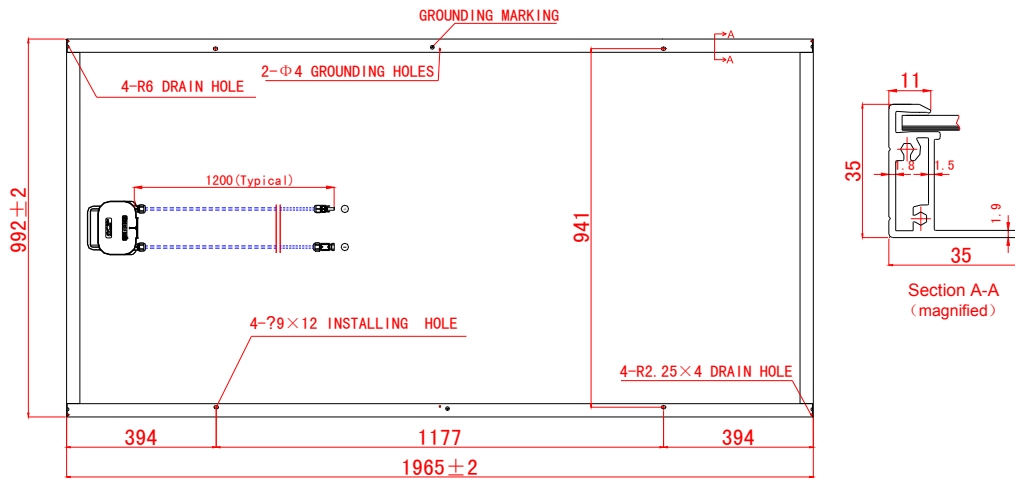
EFFECTIVE DATE:

January 2013

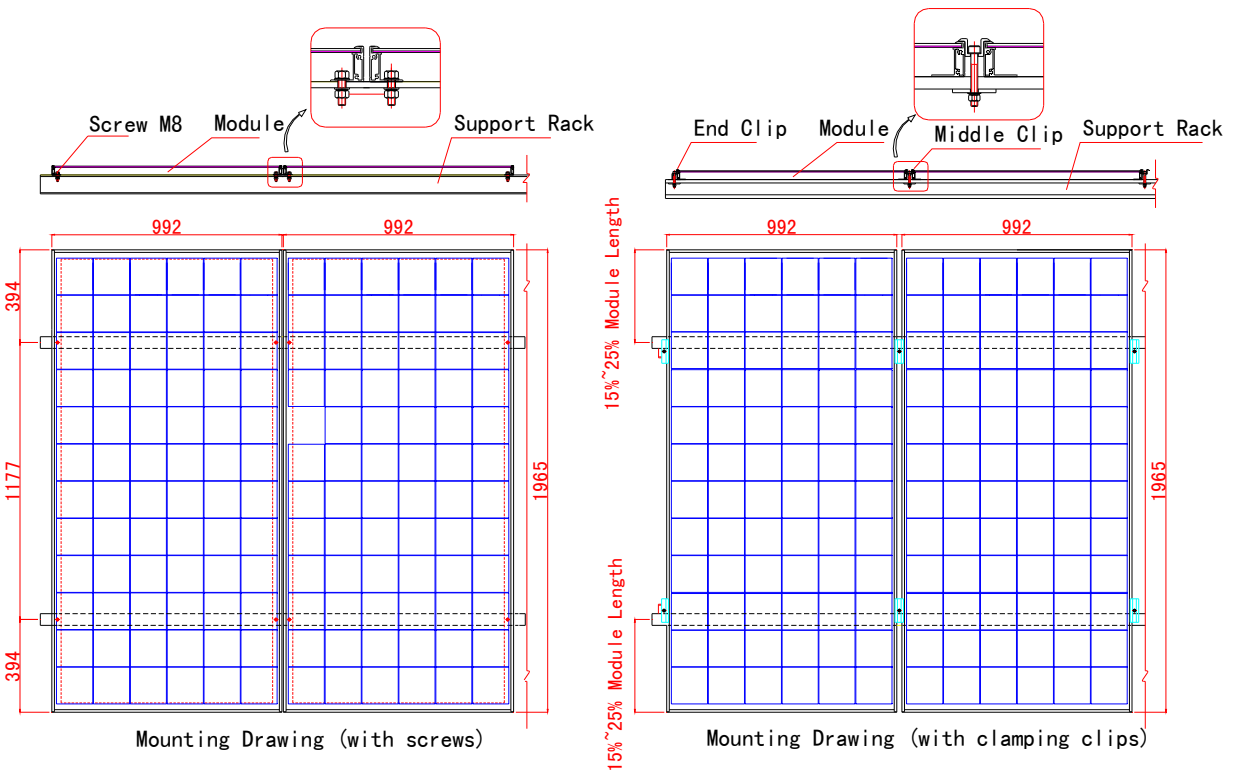
AUTHOR(S):

Bypina Veerraju Chaudary, Andy Nguyen, Yang Xiaowu

Page 14 of 14



Drawing 7 Back View of 6x12-156x156mm 72cell PV Module



Drawing 8 Mounting Drawing for 6x12-156x156mm 72cell PV Module (with screws and clamping clips on long frames)