



正信光电科技股份有限公司
ZNSHINE PV-TECH CO.,LTD

Mounting Manual

INSTALLATION INSTRUCTION FOR SINGLE GLASS SOLAR MODULE

Single glass solar modules are made of 120/132/144/pcs of 158.75mm×79.375mm crystalline solar cells in series with high efficiency, high transmission and low iron toughened glasses , anti-aging EVA and high flame-resistant back sheet to laminate, and anodized aluminum alloy frame. Products have high efficiency, lifespan easy installation, high wind resistance etc.

Products are made according to international standard IEC61215-2016; IEC61730-2016 and have passed authority test center's examination. Our products can be used in home roof solar systems, PV stations, communication stations, petrol, ocean, meteorological, traffic and solar building etc.

Information for installers

Installers must read and understand this manual before installation.

Please ensure that installation, operation and maintenance of your photovoltaic system is only carried out by qualified persons able to carry out the technical procedures described in this manual, i.e. system planners, installers and maintenance personnel, and is carried out in accordance with all safety precautions in this manual and any and all applicable local codes. If you do not possess these qualifications, you may not carry out the work described herein except for cleaning.

This manual and the instructions set forth herein are part of the product and should therefore be kept for the entire useful life of the solar installation.

Information for operators

Keep these instructions safe for the entire useful life of the solar installation.

Please contact your plant supplier for information concerning the formal requirements for solar systems. Please be sure to learn about directives and permit requirements from the responsible local authorities and energy providers prior to installation of the solar plant.

We recommend that you insure your solar system against natural hazards (e.g. against lightning strikes).

1、Electrical Specification Mono/Poly-Si series

PHOTOVOLTAIC MODULE						
Model	ZXM6-H144	ZXP6-H144	ZXM6-H132	ZXP6-H132	ZXM6-H120	ZXP6-H120
Max series fuse rating(A)	15					
Nominal Mass	22.5kg/21.5kg		21kg/20.5kg		20.5kg/19.5kg	
Package Size (mm)	2000x992x40/35 2024x1002x40/35 2020x1002x40/35 2040x1002x40/35		1844x992x40/35 1860x1002x40/35		1675x992x40/35 1696x1002x40/35	
Cell Size(mm)	158.75x79.375/156.75x78.37					
MAX System voltage	DC1500V					
Application class	Class A					

- The electrical characteristics are within ± 3 percent of the indicated values of I_{sc} , V_{oc} and P_{mpp} under test conditions (irradiance of $1000\text{W}/\text{cm}^2$, AM1.5 spectrum, and a cell temperature of 25°C)

- 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 values 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 size of controls connected to the PV output."

- Installation should be in accordance with Australian installation standards AS3000 wiring rules and AS/NZS 5033.

2、 Operating environment

CLIMATE CONDITION

Install the PV module in the following conditions:

- Environment temperature: -20°C to 40°C 。
- Operating temperature: -40°C to 80°C 。
- Waterproof: don't dip the modules into the water or continually explode under the water device or fountain.
- Antisepsis: keep away from salt erode and sulfuration places
- Do not wear rings, jewelry, watches or other metallic items while working with photovoltaic modules.

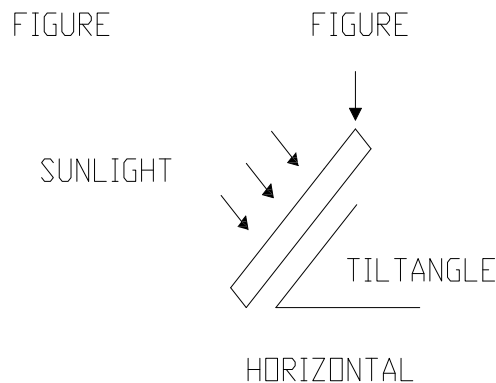
3、 Mounting and notes

- The modules' electrical performance in a system is the same. When connected in series, all modules must have the same amperage. When connected in parallel, the modules must all have the same voltage. Connect the quantity of modules that match the voltage specifications of the devices used in the system. The modules must not be connected together to create a voltage that is higher than the permitted system voltage.
- To minimize risk in the event of an indirect lightning strike, avoid forming loops when designing the system.
- Modules must not be fitted as overhead glazing. Ensure that the mounting system can also withstand the anticipated wind and snow loads.
- If there is exposure to salt (i.e., marine environments) and sulfur (i.e., sulfur sources, volcanoes), there is a risk of corrosion. It's not recommended to install the modules, when the distance is less than 100m ; and it's recommended to install the modules with the anti-salt function, when the distance is between 100m and 1km.

- Precipitate can run off through small openings on the back side of the module. Make sure that the openings are not masked after mounting.
- The modules have passed mechanical load test 5400Pa, To avoid exceeding the maximum load, site-specific live loads such as wind and snow should be taken into account.
- The installation of project must be facing north in the southern hemisphere, and facing south in the northern hemisphere, the electricity will be comparatively lower when the project facing west or east. The incorrect installation will lead to the loss of power

RECOMMENDED TILT ANGLES FOR A FIXED SYSTEM	
SITE LATITUDE IN DEGREES	FIXED TILT ANGLE
0° TO 15°	15°
15° TO 25°	SAME AS LATITUDE
25° TO 30°	LATITUDE+5°
30° TO 35°	LATITUDE+10°
35° TO 40°	LATITUDE+15°
40° +	LATITUDE+20°

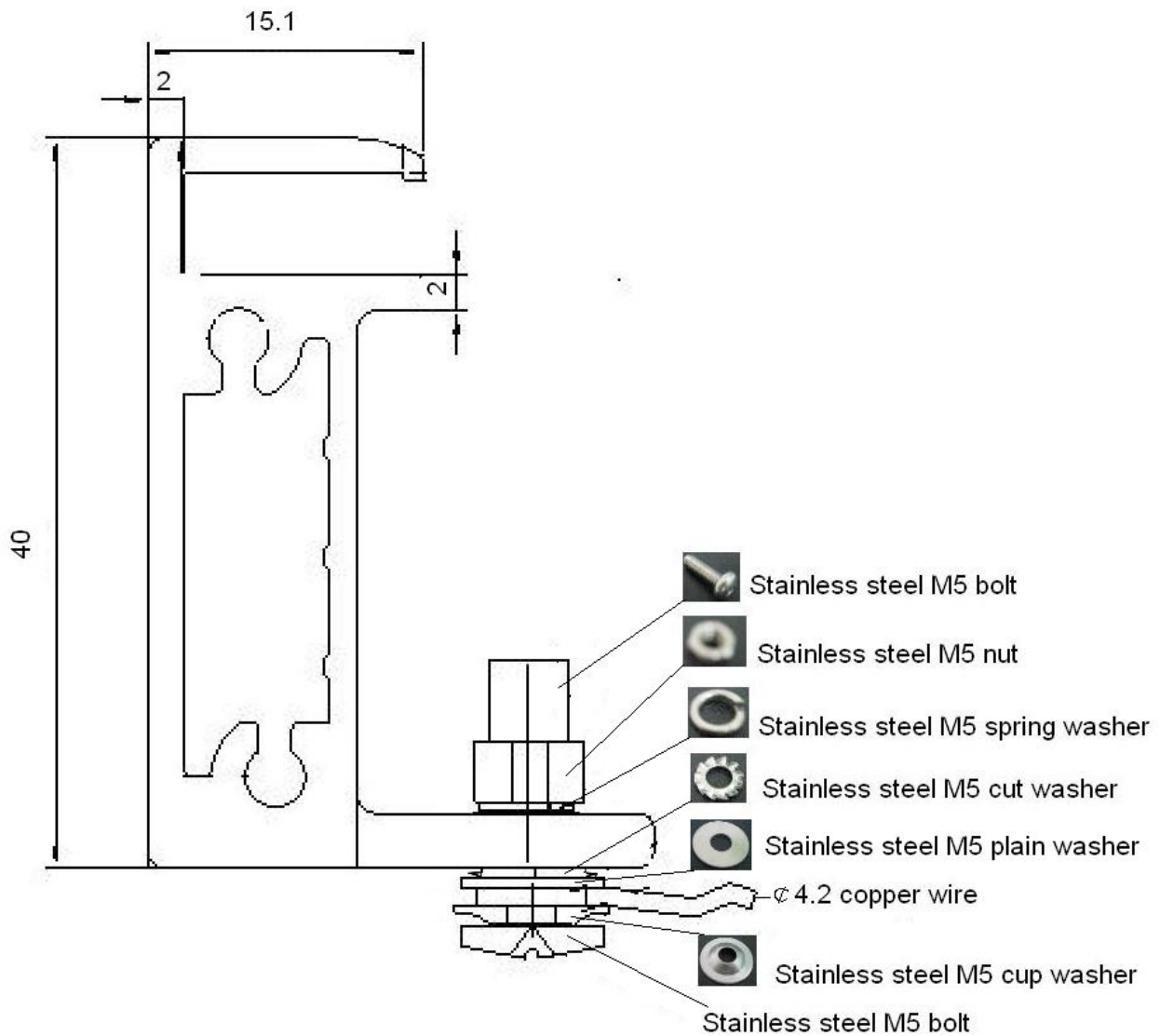
- The modules, which are connected in series, must be in the same angle, otherwise, it will lose power because of the difference in sunlight intensity. Solar modules generate the power to the maximum when they are pointed directly at the sun. For installations where the solar modules are mounted to a permanent structure, the solar modules should be tilted for optimum winter performance. As a rule, if the system power output is adequate in the winter, it will be satisfactory during the rest of the year. The module tilt angle is measured between the solar modules and the ground.




- Avoid installing under the shadow, even the module factory use the bypass diode to decrease the loss of energy, the shadow will lead to the loss of output power.

4. Grounding

- All module frames must be attached to an earth ground. A qualified electrician must do the ground connection. The cable which connects the earth must be copper wire with 12AWG.



- Use the holes(5.0mm) marked '  '. To create the conductive connection (frame is anodized), use Stainless steel M5nut, two Stainless steel cut washer, Stainless steel M5 plain washer, Stainless steel M5 spring washer , M5 copper wire ,and Stainless steel M5 bolt.

1. Copper wires with M5 cupped washer should be placed through the bolt;
2. Put the cut washer through the bolt, and the bolt must be put through the hole fixed in the aluminum frame;
3. Use the nut and cut washer to fix all the parts. The copper wire can not be attached to the aluminum.

- Do not interrupt or influence the conductive connection when making daily maintenance .All the crunodes on the conductive connection must be fixed. The fastness does not depend on soldering.

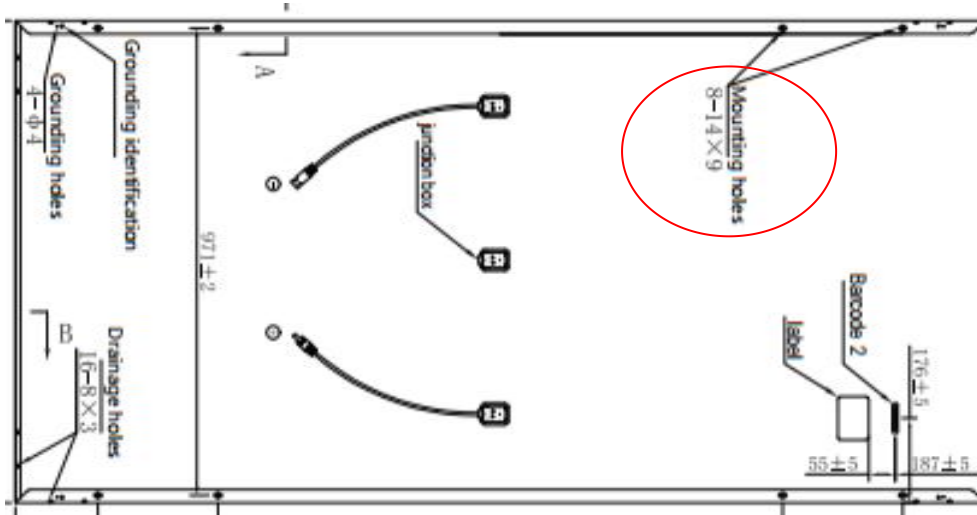
5、 Suggested maximum number of modules in parallel and in series

- When designing the system, we Suggested maximum number of modules in parallel and in series for $[V_{sys}/(1.25V_{oc})]/1$ 、 fuse rating/ $I_{sc}+1$.

6、 Mounting

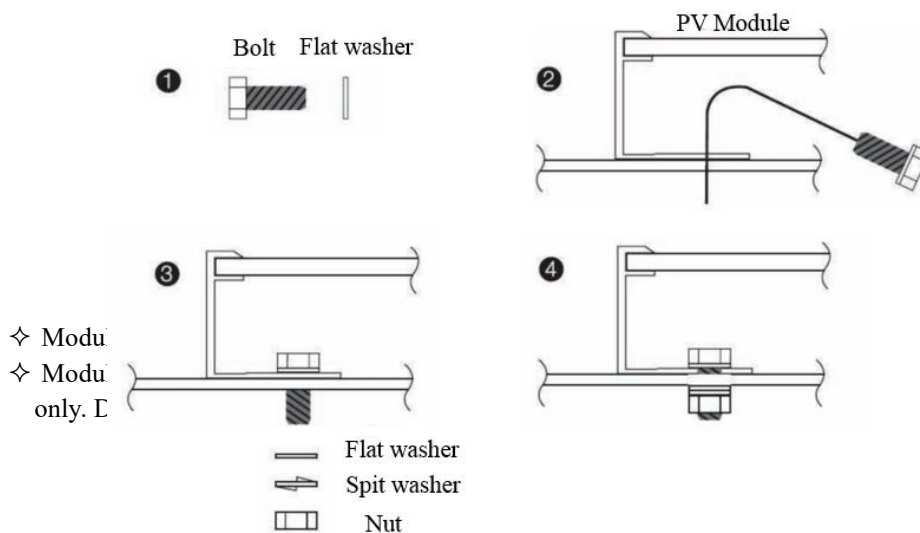
(A) Fixation with screws

- ◇ The frame of each module has 8-φ9*14mm mounting holes, used to secure the modules to support structure. Always use all the eight mounting holes to secure the modules.



The module installed with screws on the front frame for load (see the following picture), and refer to the following table.

Mechanical load pressure	Installation direction
+3600Pa/-1600Pa (with safety factor 1.5)	<p>8 mounting holes</p>



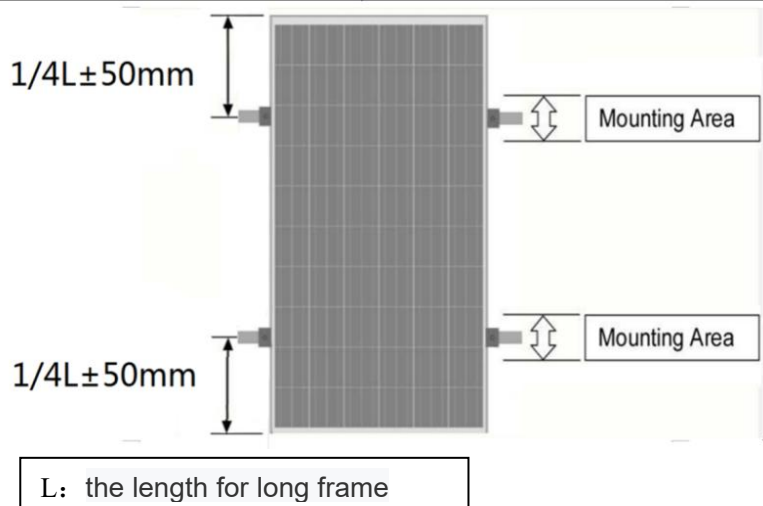
ing holes in the frame.
the frame's back flanges

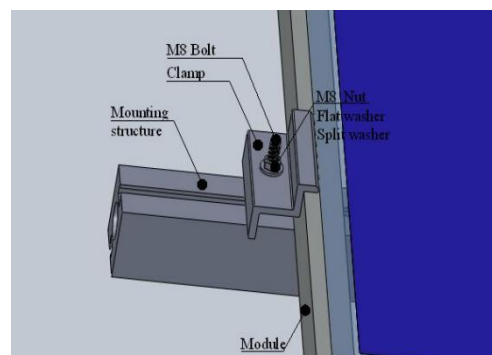
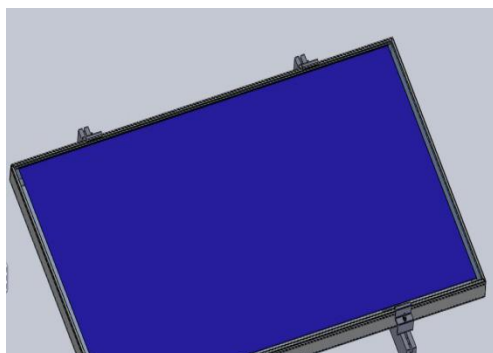
- ✧ Use appropriate corrosion-proof fastening materials. All mounting hardware (bolt/split washer/flat washer/nut) should be stainless steel M8 size.
- ✧ Follow mounting guidelines recommended by the PV mounting supplier. The mounting design must be certified by a registered professional engineer.
- ✧ The mounting design and procedures shall comply with local codes and all authorities having jurisdiction.
- ✧ Use a torque wrench for installation. Tightening torques should be within 10~17 Nm for M8 coarse thread bolts, depending on bolt quality class.
- ✧ Ensure that the drainage openings of the frame are left open following installation to allow water runoff. This prevents frost damage.
- ✧ Install the module in such a way that rainwater and snow melt can run off freely to avoid standing water or puddling.
- ✧ This resistance value can decrease if modules are not mounted following the instructions above.

(B) Clamping installation (Only for frame with 40mm thickness)

Modules can be installed with clamps. Modules must be securely attached to the mounting structure with four clamps on the long frame.

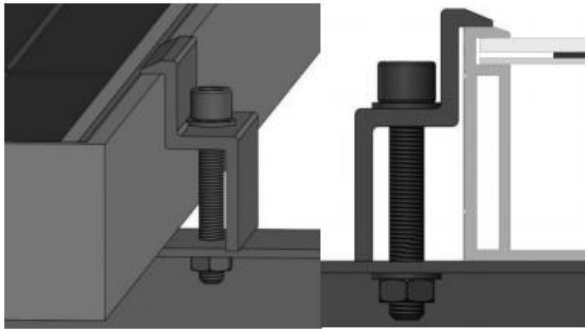
- ✧ The modules must be properly secured to their support so that they can withstand live load condition, including wind uplift, to the pressure they have been certified for. It's the installer's responsibility to ensure the clamps used to secure the modules are strong enough.
- ✧ The modules are not subject to wind or snow loads exceeding the maximum permissible loads.
- ✧ The module clamps which are used must not come into contact with the front glass and must not deform the frame. Avoid shadowing effects from the module clamps. Drain holes in the module frame must not be closed or obscured by the clamps.
- ✧ The module installed with clamps on the front frame for load (see the following picture), and refer to the following table.

Mechanical load pressure	Clamps Width	Installation direction
+2400Pa/-2400Pa (with safety factor 1.5)	$\geq 60\text{mm}$	 <p>L: the length for long frame</p>

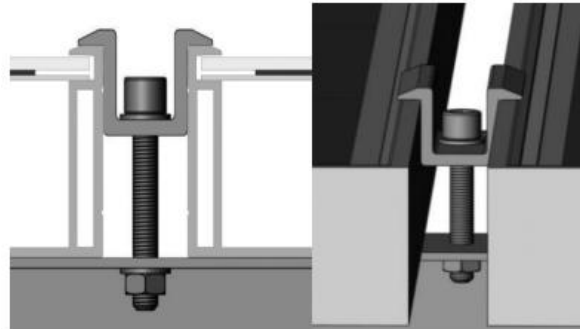




End Clamp installation



Middle Clamp installation



- ✧ Use a torque wrench for installation, and the compression for each clamps is not strong to avoid potential damages to module frames. The recommended maximum compression for each clamp is 20MPa (2900PSI).
- ✧ The module mounting structure must be made of durable, corrosion-resistant and UV-resistant material. All mounting hardware (bolt/flat washer/split washer/nut) should be stainless steel M8 size.
- ✧ The minimum recommended length for each clamp is 60mm.
- ✧ The modules have been designed to resist a static load, and the resistance value can decrease if modules are not mounted following the instruction above.
- ✧ This manual is just for reference. Customer can select the corresponding installation manual based on the purchased module.

7、Wiring

- The modules use the PV-JX1203 type junction box. This box, on the back side of the module, is weatherproof and is designed to be used with standard wiring or conduit connections. Wiring methods should be in accordance with the NEC (National Electrical Code). Bypass diodes and cable clamps are included with each module when shipped from the factory.
- **Correct wiring scheme**

When designing the system, avoid forming loops to minimize risk in the event of an indirect lightning strike. Check that wiring is correct before starting the generator. If the measured open circuit voltage (V_{oc}) and short-circuit current (I_{sc}) differ from the specifications, then there is a wiring fault.
- **Correct connection of contact plug connectors**

The plug connector has its own polarity. Make sure that the connection is safe and tight. The plug connector should not receive outer stress. Otherwise, it is only used to connect the circuit!
- **Use of suitable material**

Use cable extensions and plugs that are designed for outdoor application. Ensure that they are in perfect electrical and mechanical condition. Use only cables having one conductor. Select the appropriate cable diameter to minimize voltage drop (to calculate the minimum cable diameter and the fuse, and to calculate controls, multiply the I_{sc} and V_{oc} by a factor of 1.56).

If the module is connected to the control box, you must choose the control box with Ljq-1、 Ljq-3 type Connectors.

8、 Maintenance and cleaning

- Do not change the PV components optionally (diode, junction box, plug connectors)
- Given a sufficient tilt (at least 15°), it is not generally necessary to clean the modules (rainfall will have a self-cleaning effect). In case of heavy soiling (which will result in output reductions), we recommend cleaning the modules using plenty of water (from a hose) without cleaning agents and using a gentle cleaning implement (a sponge). Dirt must never be scraped or rubbed away when dry, as this will cause micro-scratch. We recommend that the system be inspected at regular intervals.

9、 Checklists:

- All fastenings are tight and secure and free of corrosion.
- All cable connections are secure, tight, clean and free of corrosion.
- Cables are not damaged in any way.
- Check the earthing resistive of metals.

10、 Danger of death from electric shock!

Solar modules generate electricity as soon as they are exposed to light. One module on its own is below the safety extra low volt level, but multiple modules connected in series (summing the voltage) or in parallel (summing the current) represent a danger. The following points must be observed when handling the solar modules to avoid the risk of fire, sparking and fatal electric shock.

- Do not insert electrically conducting parts into the plugs or sockets!
- Do not fit solar modules and wiring with wet plugs and sockets!
- Exercise utmost caution when carrying out work on wiring and safety equipment (use insulated tools, insulated gloves, etc.)!
- Do not use damaged modules! Do not dismantle modules! Do not mark on the rear of the module using sharp objects!
- Exercise utmost caution when working on wiring and the inverter. Be sure carefully to follow manufacture's installation instructions!
- Artificially concentrated sunlight shall not be directed on the modules or panels!

11、 Danger of death from arcing !

Modules generate direct current when light shines on them. An arc may be produced when connections are separated. We therefore recommend covering modules with a lightproof cloth during installation. When breaking a connected string of modules (e.g. when disconnecting the DC line from the inverter under load), a lethally strong arc can occur:

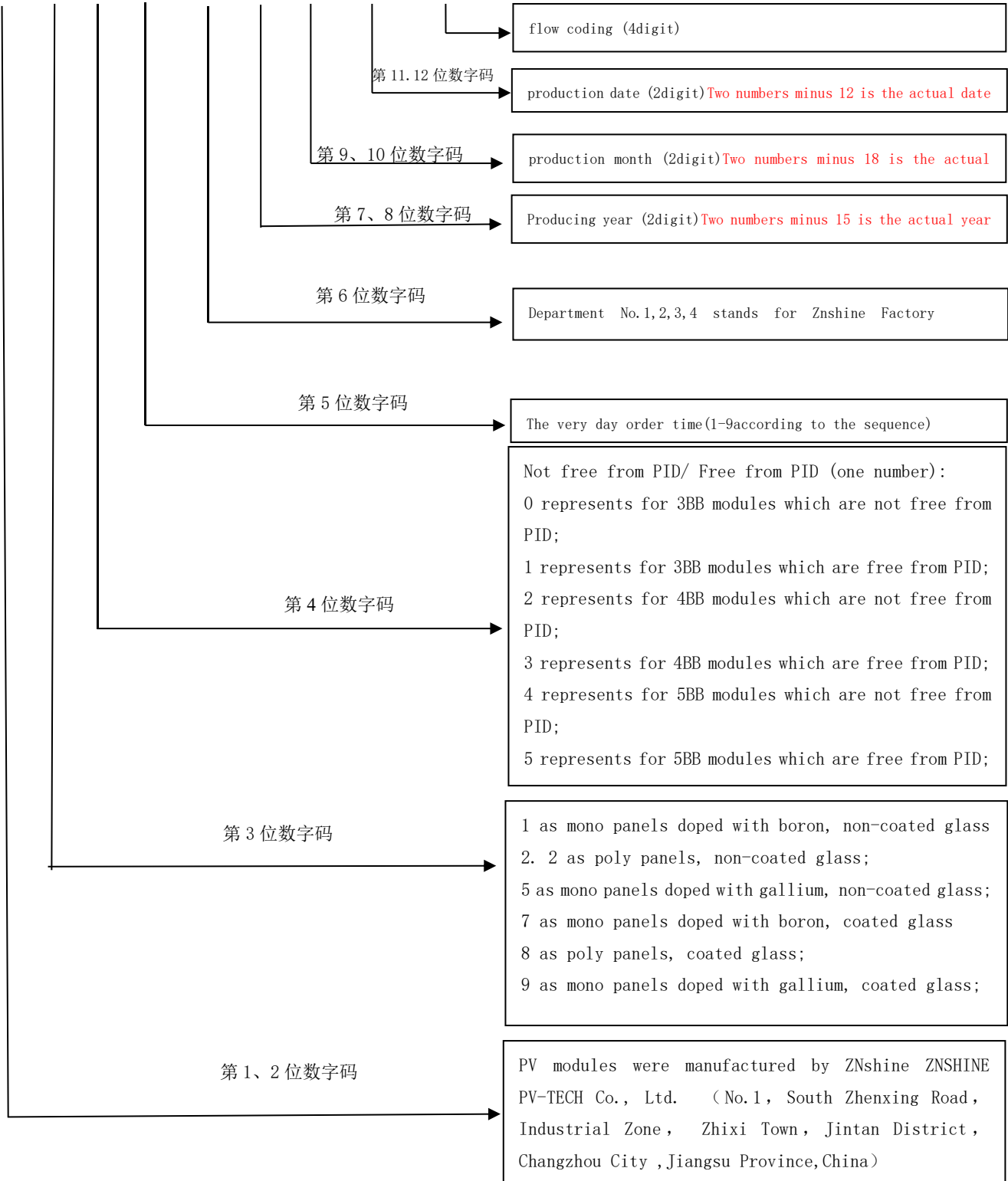
- **Never disconnect the solar generator from the inverter while the inverter is connected to the mains grid—remove the fuse from the AC side on the inverter first!**
- **Ensure cable connections in perfect condition (no splitting, soiling or other contamination)!**

Remark: all sizes are measured in mm; and tolerance +/- 2 mm

12、 Specification for solar module barcode

- Bar code compiling regulation: company two letters with 14 numbers to make the code, (except for that client asked for special requirement), a total of 16;

ZX X X X X XX XX XX XXXX



12 TECHNICAL DATA

组件系列 Module Series	144pcs 158.75×158.75mm Monocrystalline Silicon Module			
尺寸 (mm) /重量 (kg) Dimensions(mm)/ Weight(kg)	2024*1002*40/35			
系统电压 (VDC) Max-System Voltage (VDC)	1500			
最大保险丝额定电流 (A) Max-Series Fuse(A)	15			
电气参数 (标准测试条件下) Electrical Performance @ STC				
组件类型 Model Type	ZXM6-H14 4-390/M	ZXM6-H144 -395/M	ZXM6-H144 -400/M	ZXM6-H144 -405/M
最大功率 Max-Power Pm(W)	390	395	400	405
最大功率点的工作电压 Max-Power Voltage V _{mp} (V)	40.6	40.8	41	41.2
最大功率点的工作电流 Max-Power Current I _{mp} (A)	9.61	9.69	9.76	9.84
开路电压 Open Circuit Voltage Voc(V)	48.7	48.9	49.1	49.3
开路电流 Short Circuit Current Isc(A)	10.08	10.16	10.24	10.32

组件系列 Module Series	132pcs 158.75×158.75mm Monocrystalline Silicon Module	
尺寸 (mm) /重量 (kg) Dimensions(mm)/ Weight(kg)	1860*1002*40/35	
系统电压 (VDC) Max-System Voltage (VDC)	1500	
最大保险丝额定电流 (A) Max-Series Fuse(A)	15	
电气参数 (标准测试条件下) Electrical Performance @ STC		
组件类型 Model Type	ZXM6-H132-350/M	ZXM6-H132-370/M
最大功率 Max-Power Pm(W)	350	370
最大功率点的工作电压 Max-Power Voltage V _{mp} (V)	36.7	37.4
最大功率点的工作电流 Max-Power Current I _{mp} (A)	9.54	9.9

Max-Power Current $I_{mp}(A)$		
开路电压 Open Circuit Voltage $V_{oc}(V)$	44.52	45.3
开路电流 Short Circuit Current $I_{sc}(A)$	10.06	10.4

组件系列 Module Series	120pcs 158.75×158.75mm Monocrystalline Silicon Module	
尺寸 (mm) /重量 (kg) Dimensions(mm)/ Weight(kg)	1696*1002*40/35	
系统电压 (VDC) Max-System Voltage (VDC)	1500	
最大保险丝额定电流 (A) Max-Series Fuse(A)	15	
电气参数 (标准测试条件下) Electrical Performance @ STC		
组件类型 Model Type	ZXM6-H120-315/M	ZXM6-H120-330/M
最大功率 Max-Power $P_m(W)$	315	330
最大功率点的工作电压 Max-Power Voltage $V_{mp}(V)$	33.2	33.8
最大功率点的工作电流 Max-Power Current $I_{mp}(A)$	9.49	9.77
开路电压 Open Circuit Voltage $V_{oc}(V)$	40	40.6
开路电流 Short Circuit Current $I_{sc}(A)$	10	10.3

组件系列 Module Series	132pcs 156.75×156.75mm Polycrystalline Silicon Module	
尺寸 (mm) /重量 (kg) Dimensions(mm)/ Weight(kg)	1844*992*40/35	
系统电压 (VDC) Max-System Voltage (VDC)	1500	
最大保险丝额定电流 (A) Max-Series Fuse(A)	15	
电气参数 (标准测试条件下) Electrical Performance @ STC		
组件类型 Model Type	ZXP6-H132-315/P	ZXP6-H132-330/P
最大功率	315	330

Max-Power Pm(W)		
最大功率点的工作电压 Max-Power Voltage V_{mp} (V)	34.8	35.4
最大功率点的工作电流 Max-Power Current I_{mp} (A)	9.06	9.33
开路电压 Open Circuit Voltage V_{oc} (V)	42.9	43.5
开路电流 Short Circuit Current I_{sc} (A)	9.35	9.59

组件系列 Module Series	120pcs 156.75×156.75mm Polycrystalline Silicon Module
尺寸 (mm) /重量 (kg) Dimensions(mm)/ Weight(kg)	1675x992x40/35
系统电压 (VDC) Max-System Voltage (VDC)	1500
最大保险丝额定电流 (A) Max-Series Fuse(A)	15
电气参数 (标准测试条件下) Electrical Performance @ STC	
组件类型 Model Type	ZXP6-H120-300/P
最大功率 Max-Power Pm(W)	300
最大功率点的工作电压 Max-Power Voltage V_{mp} (V)	32.6
最大功率点的工作电流 Max-Power Current I_{mp} (A)	9.21
开路电压 Open Circuit Voltage V_{oc} (V)	39.6
开路电流 Short Circuit Current I_{sc} (A)	9.64

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