HJT PV MODULE INSTALLATION MANUAL

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6. Module Junction box properties

6.1 Cable

6.2Connector

6.3 Bypass diode

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1. General Information

1.1 Overview

This general manual provides important safety information relating to the installation, maintenance and handling of heterojunction(HJT) solar modules. Professional installer must read these guidelines carefully and strictly follow these instructions. Failure to follow these instructions may result in death, injury or property damage. The installation and handling of HJT PV modules requires professional skills and should only be performed by qualified professionals. Installers must inform end -users (consumers) about the aforesaid information accordingly.

The "module" or "HJT module" in this specification refers to one or more HS series HJT photovoltaic modules. Please keep this manual for future reference

It is recommended to visit the HUASUN website www.huasun.net regularly to obtain the latest version.

1.2 Installation Manual Disclaimer

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

No responsibility is assumed by HUASUN 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 rights.

The information in this manual is based on HUASUN's knowledge and experience and is believed to be reliable, but such information including product specification (without limitations) and suggestions do not constitute a warranty, expresses or implied. HUASUN reserve the right to change the manual, the PV produce, the specifications, or product information sheets without prior notice.

1.3 Limitation of Liability

HUASUN is not responsible for any form of injury, including but not limited to module operation, system installation, and physical injury, injury and property damage caused by whether it is in accordance with the instructions in this manual.

1.4 Fire Safety

Please refer to local laws and regulations before installing modules and abide by requirements on building fire protection. According to the corresponding certification standards, the fire rating of Huasun modules is Class A (According to UL790).

The roof should be coated by a layer of fireproof materials with suitable fire protection rating for roofing installation and make sure that the back sheet and the mounting surface are fully ventilated.

Different roof structures and installation modes will affect fireproof performance of buildings. Improper installation may lead to the risk of fire.

To guarantee roof fire rating, the distance between module frame and roof surface must be ≥10cm. (4in)
Adopt proper module accessories such as fuse, circuit breaker and grounding connector according to local regulations.
Please do not apply modules in where exposed inflammable gases are nearby.

2. Installation

2.1 **Installation Safety**

① Always wear protective head gear, insulating gloves and safety shoes (with rubber soles).
② Never disconnect electrical connections or unplug connectors while the circuit is under load.
③ Contact with electrically active parts of the modules, such as terminals, can result in burns, sparks and lethal shock whether or not the module is connected.
④ Do not touch the PV module unnecessarily during installation. The glass surface and the frame may be hot; there is a risk of burns and electric shock.
⑤ Do not work in the rain, snow or in windy conditions.
⑥ Avoid exposing cables and connectors to direct sunlight and scratches or cuts in order to prevent insulation degradation.
⑦ Use only insulated tools that are approved for working on electrical installations.
⑧ Keep children well away from the system while transporting and installing mechanical and electrical components.
⑨ Completely cover the module with an opaque material during installation to prevent electricity from being generated.
⑩ Do not wear metallic rings, watchbands, earrings, nose rings, lip rings or other metallic objects while installing or troubleshooting photovoltaic systems.
11 Follow the safety regulations(e.g., safety rules for working on electrical power plant stations) of your regions and for all other system components, including wires and cables, connectors, charging regulators, inverters, storage batteries, rechargeable batteries, etc.
12 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 Isc and Voc marked on this module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor current ratings, minimum factor of fuse sizes, and size of controls connected to the PV output.
13 Only use same connectors to connect modules to form a string, or connect to another device. Removing the connectors will void the warranty.

2.2 Installation Conditions

2.2.1Climate Conditions
Please install the modules in the following conditions:
a) Working environment: -40°C to +40°C

b) Humidity: < 85RH%

* Note: The mechanical load bearing (include wind and snow loads) of the module is based on the installation method and installation location. When calculating the mechanical load, a professional installer must calculate it according to the design requirements of the system. Modules should be installed in locations where the altitude is less than 2000m.

2.2.2 Site Selection

·The modules should be facing south in northern latitudes and north in southern latitudes. HUASUN recommends that the inclination angle of the installation modules should not be less than 10°, so that the dust is washed away by rain, and more effective light intensity and ventilation are obtained, because the hot air above and below the components can flow in one direction and the components are efficient at lower temperatures higher.

·For detailed information about the best installation angle, please refer to the standard solar photovoltaic installation guide or consult professional solar installers and system integrators.

·The modules should not be blocked by sunlight at any time.

·Do not use components near or in locations where flammable gas may be generated or collected.

·The modules cannot be directly irradiated by artificially concentrated sunlight.

2.3 Mechanical Installation Introduction

HJT PV modules usually can be installed in the following ways: Clamps and Bolts.

Note:

1) All installation methods herein are for reference only, and HUASUN is not responsible for providing related installation parts, design and installation of modules systems. Mechanical load and safety must be completed by a professional system installer or an experienced person.

2) Before installation, you need to confirm the following important items:

a) Visually check the module for any damage. Clean the module if any dirt or residue remains from shipping .

b) Check if the serial number of the module is correct.

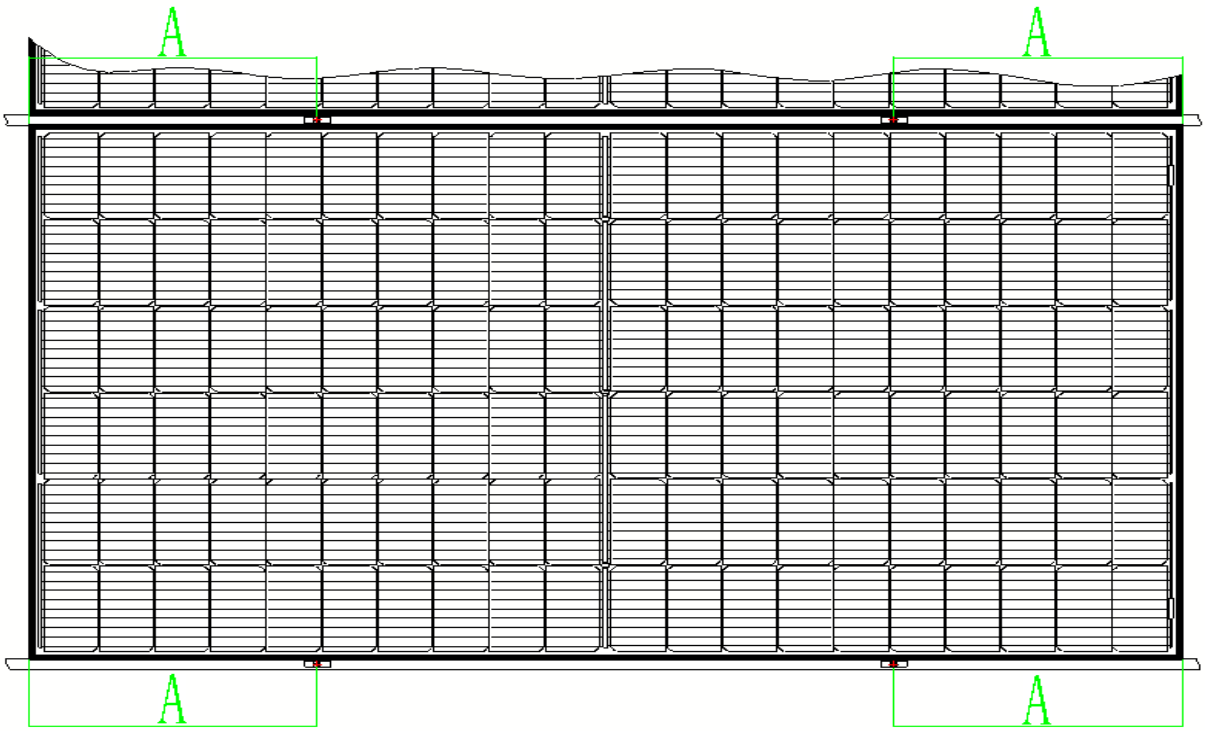
3) The mechanical load of HUASUN HJT PV modules（framed module） was tested under 5400Pa on the front side（Designed 3600Pa, safety factor 1.5）and 2400Pa on the back side（Designed 1600Pa, safety factor 1.5）, PV modules（frameless module）was tested under 3600Pa on the front side（Designed 2400Pa, safety factor 1.5）and 2400Pa on the back side（Designed 1600Pa, safety factor 1.5）. If the installation environment of the module is snowy and strong wind, special protection should be adopted when the module is installed to meet the actual requirements.

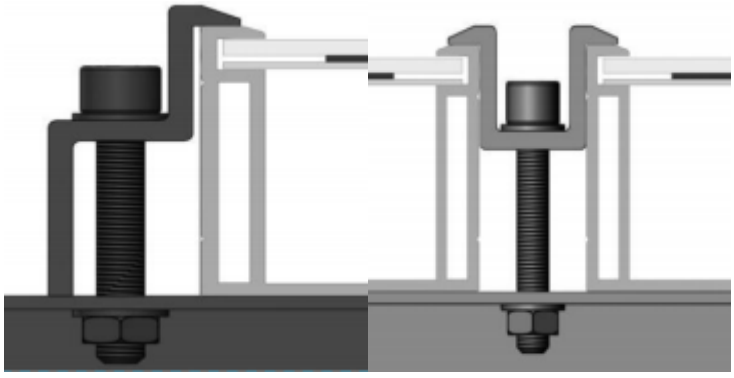
2.3.1 Mounting with Clamps（framed module）

The module clamps used with M8 bolts should notcontact with the front glass and not deform the frame. Be sure to avoid shadowing effects from the module clamps. The module

frame is not to be modified under any circumstances. When choosing the type of clamp-mounting method, please make sure that there are 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 torque used for installation is 16-20N.





Fringe Modules Installation　　Middle Modules Installation

Module Type	A	Clamp Length	Clamp Type（for reference）

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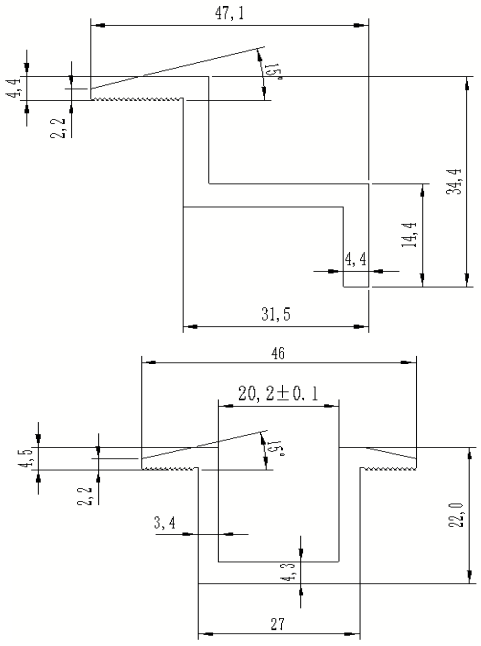
HS-B120DS HS-B120DSN HS-B120DSB HS-S120SS HS-S120SSB	439±50mm	60mm	
HS-B132DS HS-B132DSN HS-B132DSB HS-S132SS HS-S132SSB	485±50mm	60mm	
HS-B144DS HS-B144DSN HS-B144DSB HS-S144SS HS-S144SSB	525±50mm	60mm	
HS-B156DS HS-B156DSN HS-B156DSB HS-S156SS HS-S156SSB	567±50mm	60mm	
HS-210-B110DS	440~540mm	60mm	
HS-210-B120DS	360~430mm	60mm	
HS-210-B132DS	440~540mm	60mm	

2.3.2 Mounting with Clamps（frameless module）

The module clamps used with M8 bolts should not make glass winding. Be sure to avoid shadowing effects from the module clamps. When choosing the type of clamp-mounting method, please make sure that there are six clamps on each module, three 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 torque used for installation is 16-20N.

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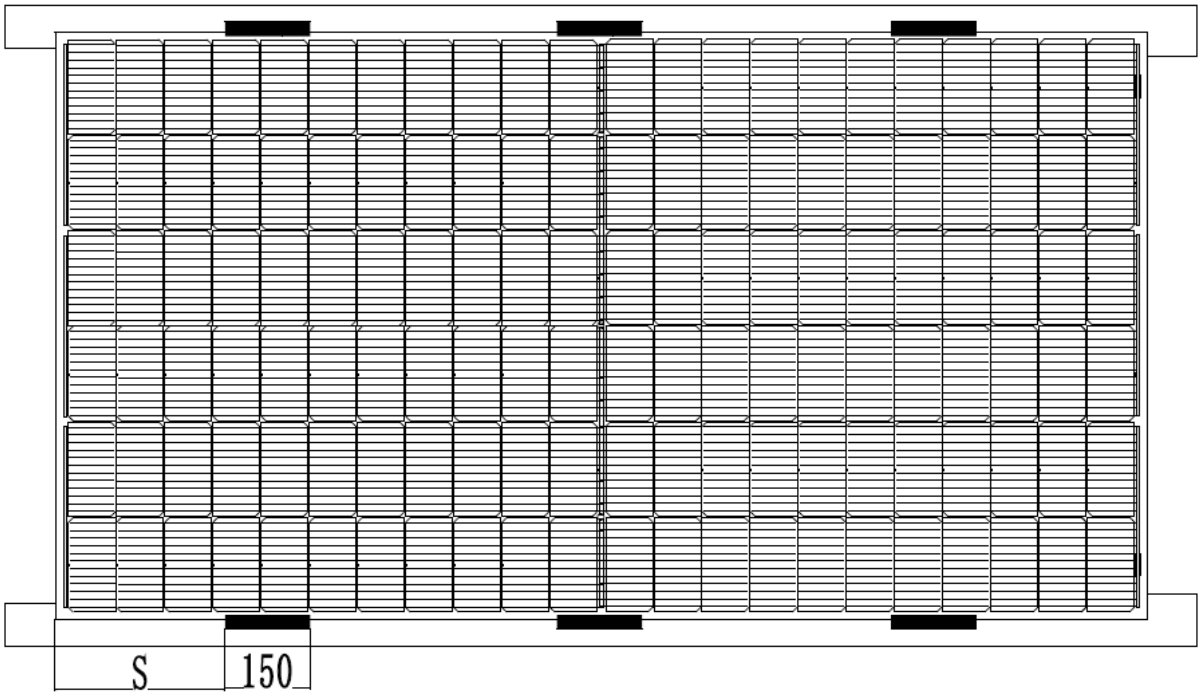

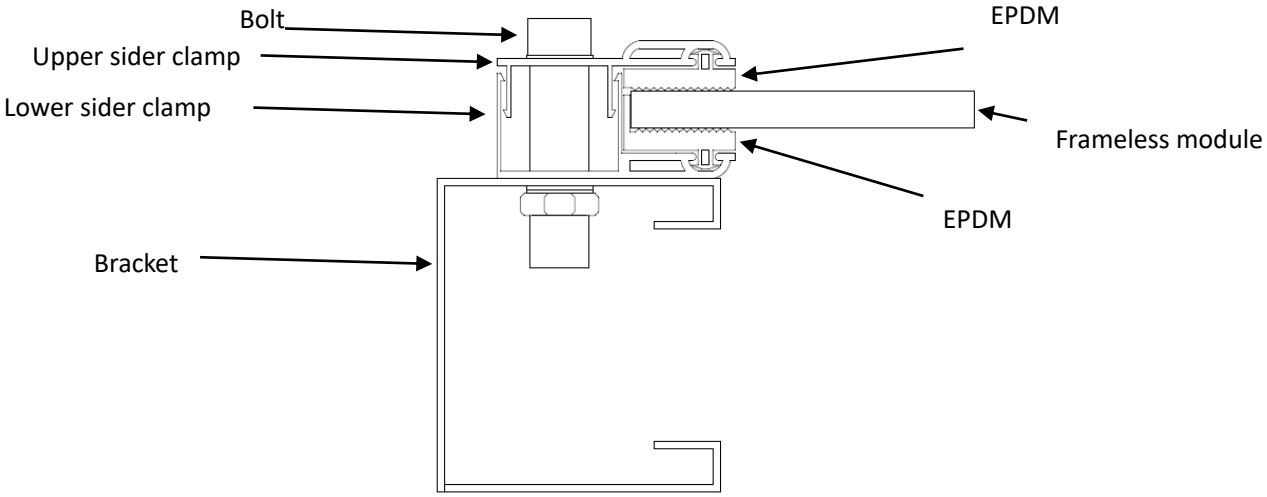

Module Type	S	Clamp Length
HS-B120DN HS-B120DNN	300~400mm	150mm
HS-B132DN HS-B132DNN	300~400mm	150mm
HS-B144DN HS-B144DNN	400~500mm	150mm
HS-B96DNN	200~300mm	150mm

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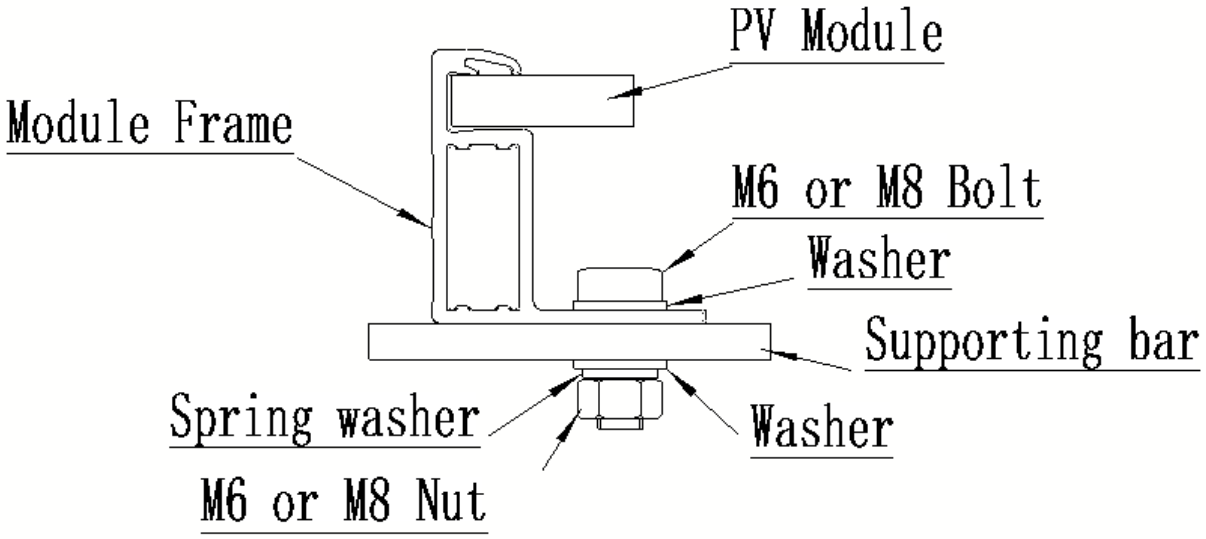
2.3.3 Mounting with Bolts（framed module）

There are 4 or 8 mounting holes of 9mm*14mm and 7mm*10mm on the frame of the module. In consideration of the fastness of the module after installation, each mounting hole must be fixed with the corresponding bolt connection.



Module Type	Bolt Type	Quantity
HS-B120DS HS-B120DSN HS-B120DSB HS-S120SS HS-S120SSB	M8	4 sets
HS-B132DS HS-B132DSN HS-B132DSB HS-S132SS HS-S132SSB HS-B144DS HS-B144DSN HS-B144DSB HS-S144SS HS-S144SSB HS-B156DS HS-B156DSN HS-B156DSB HS-S156SS HS-S156SSB	M6 & M8	4 sets/each

3. Module Wiring

3.1 Correct Wiring Scheme

① Ensure that the wiring is correct before starting up the system. If the measured open circuit voltage (Voc) and short-circuit current (Isc) differ substantially from the specifications, this indicates that there is a wiring fault.

② Do not connect different connectors (brand and model) together.

③ Before the modules are connected to the grid, appropriate protective measures need to be taken to prevent water vapor and dust from penetrating into the connector.

④ The cable should be fixed on the module frame or mounting rail to avoid blocking the back of the module.

⑤ In order to meet the system wiring requirements, the distance between the two adjacent modules of the left and right must be within 50mm; for the adjacent two rows of modules, the distance between the modules must be within 25mm.

3.2 Correct Connection of Plug Connectors

·Make sure that all connections are safe and properly mated. The PV connectors should not be subjected to stress from the exterior. Connectors should only be used to connect the circuit. They should never be used to turn the circuit on and off.

·If the connector is not connected positively and negatively, the connector is not waterproof. After the modules are installed, they need to be connected as soon as possible or take appropriate measures (such as using connector end caps) to avoid infiltration of water vapor and dust.

·Do not clean or precondition the connectors using lubricants or any unauthorized chemical substances.

4. Maintenance and Care

It is required to perform regular inspection and maintenance of the modules, especially during the warranty period. In order to ensure the best performance of the modules, HUASUN recommends the following maintenance measures:

4.1 Visual Inspection

Please carefully check the modules for appearance defects. Focus on the following points:

a) If modules are observed having slight cell color differences at different angles, this is a normal phenomenon of modules with anti-reflection coating technology.

b) Whether the glass is broken.

c) Whether any sharp objects touch the surface of the module;

d) Whether the module is blocked by obstacles or foreign objects; if there is snow, you can use a brush with soft bristles to clean the surface of the module;

e) Whether there is corrosion near the grid line of the cell. This kind of corrosion is caused by the damage of the packaging material on the surface of the module during installation or transportation, which causes water vapor to penetrate into the module;

f) Observe whether there are burn-through traces on the back plate of the module;
g) Check whether the fixing screws between the modules and the bracket are loose or damaged, and adjust or repair them in time;
h) The system should be checked regularly to ensure that the supporting structure of the junction box is intact.
I) If you need inspection or maintenance of electrical or mechanical performance, it is recommended that the inspection or maintenance be carried out by certified and approved professionals to avoid electric shock or personal injury.

4.2 Module Cleaning

4.2.1 Safety Warning

·Cleaning will cause the risk of damage to modules and a series of parts, and also increase the risk of electric shock.
· Cracked or damaged modules will present a risk of electric shock due to leakage current, and wet modules will aggravate this risk of electric shock. Before cleaning, check the modules for cracks, damage, and loose joints.
· During the day, the voltage and current existing in the array are enough to cause fatal electric shock accidents.
· Since touching exposed parts of live parts can cause injury, make sure that the circuit is disconnected before cleaning.
· Before cleaning, make sure that the array and live parts (such as inverters and combiner boxes) are disconnected.
· Wear suitable protective clothing (clothes, insulating gloves, etc.).
· Do not immerse the modules partially or completely in water or any kind of washing liquid.

4.2.2 Handling Notice

·Use a proper cleaning solution and suitable cleaning equipment.
·Do not use abrasive or electric cleaners on the module.
·Particular attention should be taken to avoid the module back-sheet or frame to come in contact with sharp objects, as scratches may directly affect product safety.
·Do not use abrasive cleaners, degreasers or any unauthorized chemical substance (e.g. oil, lubricant, pesticide, etc.) on the module.
·Do not use cleaning corrosive solutions containing hydrofluoric acid, alkali, acetone, or industrial alcohol. Only substances explicitly approved by HUASUN are allowed to be used for cleaning modules.
·HUASUN recommends to avoid rotating brush cleaning methods, as they could create micro-cracks in the PV modules.
·Dirt must never be scraped or rubbed away when dry, as this will cause micro-scratches on the glass surface

4.3 Inspection of Connector and Cable

The following preventive maintenance is recommended every six months:
a) Check the sealing gels of the junction box for any damage.
b) Examine the PV module(s) for signs of deterioration. Check all wiring for possible rodent

damage, weathering and that all connections are tight and corrosion free. Check electrical leakage to ground.

5. Electrical Specification

5.1 **Test conditions**

The module electrical rating are measured under two Standard Test Conditions, In some cases, the module may generate a voltage or current value higher or lower than the rated value.The maximum allowable reflected light intensity on the back is 300W/m^2.

5.1.1 1000W/m^2 on front, irradiance with AM 1.5 spectrum and 25 deg (77°F) ambient temperature,hereinafter referred to as STC.

5.1.2 1000W/m^2 on front,135W/m2 on back, irradiance with AM 1.5 spectrum and 25 deg (77°F) ambient temperature,hereinafter referred to as BSTC.

5.2 **Electrical performance parameter table**

5.2.1 Electrical rating（grid back panel glass、Data under STC）

MODULE TYPE/S	HS-B144DS440	HS-B144DS445	HS-B144DS450	HS-B144DS455	HS-B144DS460	HS-B144DS465	HS-B144DS470	HS-B144DS475	HS-B144DS480
	HS-B144DN440	HS-B144DN445	HS-B144DN450	HS-B144DN455	HS-B144DN460	HS-B144DN465	HS-B144DN470	HS-B144DN475	HS-B144DN480
Voc (with tolerance± 3%) [V]	52.70	52.83	52.96	53.09	53.22	53.35	53.48	53.61	53.74
Isc (with tolerance±5%) [A].....	10.34	10.40	10.46	10.52	10.58	10.64	10.70	10.76	10.82
VPmax [V]	44.45	44.65	44.85	45.04	45.24	45.44	45.66	45.86	46.08
IPmax [A].....	9.92	9.98	10.05	10.12	10.18	10.24	10.30	10.36	10.43
Pmax (with tolerance +3%)[W]	440	445	450	455	460	465	470	475	480
α [%/°C]	0.028%								
β [%/°C]	-0.0036%								
δ [%/°C]	-0.26%								

MODULE TYPE/S	HS-B120DS365	HS-B120DS370	HS-B120DS375	HS-B120DS380	HS-B120DS385	HS-B120DS390	HS-B120DS395	HS-B120DS400	HS-B120DS405
	HS-B120DN365	HS-B120DN370	HS-B120DN375	HS-B120DN380	HS-B120DN385	HS-B120DN390	HS-B120DN395	HS-B120DN400	HS-B120DN405
Voc (with tolerance± 3%) [V]	43.83	43.96	44.09	44.22	44.35	44.48	44.61	44.74	44.87
Isc (with tolerance±5%) [A].....	10.32	10.38	10.44	10.50	10.56	10.62	10.68	10.74	10.80
VPmax [V]	36.90	37.11	37.31	37.52	37.70	37.91	38.16	38.36	38.57
IPmax [A].....	9.91	9.98	10.06	10.14	10.22	10.30	10.36	10.44	10.52
Pmax (with tolerance +3%)[W]	365	370	375	380	385	390	395	400	405
α [%/°C]	0.028%								
β [%/°C]	-0.0036%								
δ [%/°C]	-0.26%								

MODULE TYPE/S	HS-B132DS405	HS-B132DS410	HS-B132DS415	HS-B132DS420	HS-B132DS425	HS-B132DS430	HS-B132DS435	HS-B132DS440	HS-B132DS445
	HS-B132DN405	HS-B132DN410	HS-B132DN415	HS-B132DN420	HS-B132DN425	HS-B132DN430	HS-B132DN435	HS-B132DN440	HS-B132DN445
Voc (with tolerance± 3%) [V]	48.31	48.47	48.62	48.80	48.9	49.08	49.21	49.29	49.42
Isc (with tolerance±5%) [A].....	10.61	10.63	10.65	10.66	10.69	10.7	10.72	10.75	10.77
VPmax [V]	39.63	39.97	40.30	40.66	40.95	41.31	41.63	41.95	42.27
IPmax [A].....	10.22	10.26	10.30	10.33	10.38	10.41	10.45	10.49	10.53
Pmax (with tolerance +3%)[W]	405	410	415	420	425	430	435	440	445
α [%/°C]	0.028%								
β [%/°C]	-0.0036%								
δ [%/°C]	-0.26%								

MODULE TYPE/S	HS-B144DS485	HS-B144DS490	HS-B144DS495	HS-B144DS500	HS-B132DS445	HS-B132DS450	HS-B132DS455	HS-B120DS405	HS-B120DS410	HS-B120DS415
	HS-B144DN485	HS-B144DN490	HS-B144DN495	HS-B144DN500	HS-B132DN445	HS-B132DN450	HS-B132DN455	HS-B120DN405	HS-B120DN410	HS-B120DN415
Voc (with tolerance± 3%) [V]	54.00	54.25	54.50	54.75	49.71	50.12	50.53	45.04	45.34	45.64
Isc (with tolerance±5%) [A].....	10.88	10.94	11.00	11.06	10.78	10.81	10.84	10.8	10.86	10.92
VPmax [V]	46.20	46.36	46.53	46.69	42.27	42.58	42.89	38.5	38.68	38.86
IPmax [A].....	10.50	10.57	10.64	10.71	10.53	10.57	10.61	10.52	10.6	10.68
Pmax (with tolerance +3%)[W]	485	490	495	500	445	450	455	405	410	415
α [%/°C]	0.028%									
β [%/°C]	-0.0036%									
δ [%/°C]	-0.26%									

module type/s	HS-B156DS490	HS-B156DS495	HS-B156DS500	HS-B156DS505	HS-B156DS510	HS-B156DS515	HS-B156DS520
Voc (with tolerance± 3%) [V] :	57.86	57.93	58.01	58.04	58.15	58.19	58.21
Isc (with tolerance±5%) [A] :	10.64	10.66	10.67	10.70	10.71	10.73	10.76
VPmax [V] :	47.72	48.02	48.36	48.61	48.95	49.24	49.53
IPmax [A] :	10.27	10.31	10.34	10.39	10.42	10.46	10.50
Pmax (with tolerance +3%)[W] :	490	495	500	505	510	515	520
α [%/°C]	0.028%						
β [%/°C]	-0.0036%						
δ [%/°C]	-0.26%						

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MODULE TYPE/S	HS-210-B132DS660	HS-210-B132DS665	HS-210-B132DS670	HS-210-B132DS675	HS-210-B132DS680	HS-210-B132DS685	HS-210-B132DS690	HS-210-B132DS695	HS-210-B132DS700
Voc (with tolerance± 3%) [V]	48.85	49.02	49.18	49.34	49.50	49.66	49.82	49.98	50.13
Isc (with tolerance±5%) [A].....	16.95	17.01	17.07	17.13	17.19	17.25	17.31	17.37	17.43
VPmax [V]	40.87	41.03	41.19	41.34	41.49	41.65	41.80	41.95	42.10
IPmax [A].....	16.15	16.21	16.27	16.33	16.39	16.45	16.51	16.57	16.63
Pmax (with tolerance +3%)[W]	660	665	670	675	680	685	690	695	700
α [%/°C]	0.028%								
β [%/°C]	-0.0036%								
δ [%/°C]	-0.26%								

MODULE TYPE/S	HS-210-B120DS595	HS-210-B120DS600	HS-210-B120DS605	HS-210-B120DS610	HS-210-B120DS615	HS-210-B120DS620	HS-210-B120DS625	HS-210-B120DS630	HS-210-B120DS635
Voc (with tolerance± 3%) [V]	44.04	44.22	44.41	44.59	44.77	44.95	45.13	45.30	45.48
Isc (with tolerance±5%) [A].....	16.95	17.01	17.07	17.13	17.19	17.25	17.31	17.37	17.43
VPmax [V]	36.85	37.02	37.19	37.36	37.53	37.69	37.86	38.03	38.19
IPmax [A].....	16.15	16.21	16.27	16.33	16.39	16.45	16.51	16.57	16.63
Pmax (with tolerance +3%)[W]	595	600	605	610	615	620	625	630	635
α [%/°C]	0.028%								
β [%/°C]	-0.0036%								
δ [%/°C]	-0.26%								

MODULE TYPE/S	HS-210-B110DS540	HS-210-B110DS545	HS-210-B110DS550	HS-210-B110DS555	HS-210-B110DS560	HS-210-B110DS565	HS-210-B110DS570	HS-210-B110DS575	HS-210-B110DS580
Voc (with tolerance± 3%) [V]	39.97	40.17	40.37	40.57	40.77	40.96	41.16	41.35	41.54
Isc (with tolerance±5%) [A].....	16.95	17.01	17.07	17.13	17.19	17.25	17.31	17.37	17.43
VPmax [V]	33.44	33.63	33.81	33.99	34.17	34.35	34.53	34.71	34.88
IPmax [A].....	16.15	16.21	16.27	16.33	16.39	16.45	16.51	16.57	16.63
Pmax (with tolerance +3%)[W]	540	545	550	555	560	565	570	575	580
α [%/°C]	0.028%								
β [%/°C]	-0.0036%								
δ [%/°C]	-0.26%								

5.2.2 Electrical rating（grid back panel glass、Data under BSTC）

MODULE TYPE/S	HS-B144DS440	HS-B144DS445	HS-B144DS450	HS-B144DS455	HS-B144DS460	HS-B144DS465	HS-B144DS470	HS-B144DS475	HS-B144DS480

	HS-B144DN440	HS-B144DN445	HS-B144DN450	HS-B144DN455	HS-B144DN460	HS-B144DN465	HS-B144DN470	HS-B144DN475	HS-B144DN480
Voc (with tolerance± 3%) [V]	53.53	53.73	53.93	54.13	54.33	54.73	55.33	55.93	56.53
Isc (with tolerance±5%) [A].....	11.42	11.45	11.47	11.50	11.53	11.57	11.61	11.65	11.69
VPmax [V]	45.28	45.51	45.74	45.97	46.20	46.40	46.60	46.80	47.00
IPmax [A].....	10.96	11.01	11.05	11.10	11.14	11.19	11.24	11.29	11.34
Pmax (with tolerance +3%)[W]	490	495	500	505	510	515	520	525	530
α [%/°C]	0.028%								
β [%/°C]	-0.0036%								
δ [%/°C]	-0.26%								

MODULE TYPE/S	HS-B120DS365	HS-B120DS370	HS-B120DS375	HS-B120DS380	HS-B120DS385	HS-B120DS390	HS-B120DS395	HS-B120DS400	HS-B120DS405
	HS-B120DN365	HS-B120DN370	HS-B120DN375	HS-B120DN380	HS-B120DN385	HS-B120DN390	HS-B120DN395	HS-B120DN400	HS-B120DN405
Voc (with tolerance± 3%) [V]	44.61	44.78	45.17	45.34	45.61	45.94	46.81	47.51	48.11
Isc (with tolerance±5%) [A].....	11.41	11.43	11.46	11.49	11.53	11.57	11.61	11.65	11.67
VPmax [V]	37.63	37.78	38.12	38.31	38.50	38.67	38.93	39.20	39.28
IPmax [A].....	10.85	10.95	11.03	11.09	11.13	11.18	11.23	11.28	11.33
Pmax (with tolerance +3%)[W]	405	410	415	420	425	430	435	440	445
α [%/°C]	0.028%								
β [%/°C]	-0.0036%								
δ [%/°C]	-0.26%								

MODULE TYPE/S	HS-B132DS405	HS-B132DS410	HS-B132DS415	HS-B132DS420	HS-B132DS425	HS-B132DS430	HS-B132DS435	HS-B132DS440	HS-B132DS445
	HS-B132DN405	HS-B132DN410	HS-B132DN415	HS-B132DN420	HS-B132DN425	HS-B132DN430	HS-B132DN435	HS-B132DN440	HS-B132DN445
Voc (with tolerance± 3%) [V]	49.06	49.16	49.26	49.4	49.45	49.59	49.67	49.71	49.83
Isc (with tolerance±5%) [A].....	11.61	11.63	11.65	11.66	11.69	11.7	11.72	11.75	11.77
VPmax [V]	40.11	40.41	40.71	41.05	41.31	41.64	41.93	42.22	42.54
IPmax [A].....	11.22	11.26	11.30	11.33	11.38	11.41	11.45	11.49	11.53
Pmax (with tolerance +3%)[W]	450	455	460	465	470	475	480	485	490
α [%/°C]	0.028%								
β [%/°C]	-0.0036%								
δ [%/°C]	-0.26%								

MODULE TYPE/S	HS-B144DS485	HS-B144DS490	HS-B144DS495	HS-B144DS500	HS-B132DS445	HS-B132DS450	HS-B132DS455	HS-B120DS405	HS-B120DS410	HS-B120DS415

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	HS-B144DN485	HS-B144DN490	HS-B144DN495	HS-B144DN500	HS-B132DN445	HS-B132DN450	HS-B132DN455	HS-B120DN405	HS-B120DN410	HS-B120DN415
Voc (with tolerance± 3%) [V]	56.55	56.58	56.61	56.62	51.34	51.41	51.47	47.54	47.58	47.58
Isc (with tolerance±5%) [A].....	12.11	12.19	12.28	12.35	12.19	12.28	12.35	11.99	12.1	12.22
VPmax [V]	47.10	47.46	47.81	48.17	42.5	42.79	43.07	39.28	39.55	39.81
IPmax [A].....	11.36	11.38	11.4	11.42	11.53	11.57	11.61	11.33	11.38	11.43
Pmax (with tolerance +3%)[W]	535	540	545	550	490	495	500	445	450	455
α [%/°C]	0.028%									
β [%/°C]	-0.0036%									
δ [%/°C]	-0.26%									

module type/s	HS-B156DS490	HS-B156DS495	HS-B156DS500	HS-B156DS505	HS-B156DS510	HS-B156DS515	HS-B156DS520
Voc (with tolerance± 3%) [V] :	58.24	58.26	58.27	58.28	58.30	58.33	58.38
Isc (with tolerance±5%) [A] :	11.65	11.67	11.68	11.71	11.72	11.74	11.76
VPmax [V] :	47.88	48.15	48.46	48.69	49.00	49.26	49.53
IPmax [A] :	11.28	11.32	11.35	11.40	11.43	11.47	11.51
Pmax (with tolerance +3%)[W] :	540	545	550	555	560	565	570
α [%/°C]	0.028%						
β [%/°C]	-0.0036%						
δ [%/°C]	-0.26%						

MODULE TYPE/S	HS-210-B132DS660	HS-210-B132DS665	HS-210-B132DS670	HS-210-B132DS675	HS-210-B132DS680	HS-210-B132DS685	HS-210-B132DS690	HS-210-B132DS695	HS-210-B132DS700
Voc (with tolerance± 3%) [V]	48.85	49.02	49.18	49.34	49.50	49.66	49.82	49.98	50.13
Isc (with tolerance±5%) [A].....	18.75	18.80	18.85	18.91	18.96	19.01	19.07	19.12	19.17
VPmax [V]	40.87	41.03	41.19	41.34	41.49	41.65	41.80	41.95	42.10
IPmax [A].....	17.87	17.92	17.97	18.03	18.08	18.13	18.19	18.24	18.29
Pmax (with tolerance +3%)[W]	730	735	740	745	750	755	760	765	770
α [%/°C]	0.028%								
β [%/°C]	-0.0036%								
δ [%/°C]	-0.26%								

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MODULE TYPE/S	HS-210-B120DS595	HS-210-B120DS600	HS-210-B120DS605	HS-210-B120DS610	HS-210-B120DS615	HS-210-B120DS620	HS-210-B120DS625	HS-210-B120DS630	HS-210-B120DS635
Voc (with tolerance± 3%) [V]	44.04	44.22	44.41	44.59	44.77	44.95	45.13	45.30	45.48
Isc (with tolerance±5%) [A].....	18.80	18.85	18.90	18.96	19.01	19.06	19.11	19.16	19.21
VPmax [V]	36.85	37.02	37.19	37.36	37.53	37.69	37.86	38.03	38.19
IPmax [A].....	17.92	17.97	18.02	18.07	18.12	18.18	18.23	18.28	18.33
Pmax (with tolerance +3%)[W]	660	665	670	675	680	685	690	695	700
α [%/°C]	0.028%								
β [%/°C]	-0.0036%								
δ [%/°C]	-0.26%								

MODULE TYPE/S	HS-210-B110DS540	HS-210-B110DS545	HS-210-B110DS550	HS-210-B110DS555	HS-210-B110DS560	HS-210-B110DS565	HS-210-B110DS570	HS-210-B110DS575	HS-210-B110DS580
Voc (with tolerance± 3%) [V]	39.97	40.17	40.37	40.57	40.77	40.96	41.16	41.35	41.54
Isc (with tolerance±5%) [A].....	18.83	18.88	18.93	18.98	19.03	19.08	19.13	19.18	19.23
VPmax [V]	33.44	33.63	33.81	33.99	34.17	34.35	34.53	34.71	34.88
IPmax [A].....	17.95	17.99	18.05	18.10	18.15	18.20	18.25	18.30	18.35
Pmax (with tolerance +3%)[W]	600	605	610	615	620	625	630	635	640
α [%/°C]	0.028%								
β [%/°C]	-0.0036%								
δ [%/°C]	-0.26%								

5.2.3 Electrical rating（clear back panel glass、Data under STC）

MODULE TYPE/S	HS-B144DSN440	HS-B144DSN445	HS-B144DSN450	HS-B144DSN455	HS-B144DSN460	HS-B144DSN465	HS-B144DSN470	HS-B144DSN475	HS-B144DSN480
	HS-B144DNN440	HS-B144DNN445	HS-B144DNN450	HS-B144DNN455	HS-B144DNN460	HS-B144DNN465	HS-B144DNN470	HS-B144DNN475	HS-B144DNN480
Voc (with tolerance± 3%) [V]	53.08	53.18	53.28	53.38	53.48	53.58	53.68	53.78	53.88
Isc (with tolerance±5%) [A].....	10.44	10.54	10.64	10.74	10.84	10.94	11.04	11.14	11.24
VPmax [V]	44.33	44.39	44.45	44.51	44.57	44.63	44.69	44.75	44.81
IPmax [A].....	9.94	10.04	10.14	10.24	10.34	10.43	10.53	10.63	10.73
Pmax (with tolerance +3%)[W]	440	445	450	455	460	465	470	475	480
α [%/°C]	0.028%								
β [%/°C]	-0.0036%								
δ [%/°C]	-0.26%								

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MODULE TYPE/S	HS-B120DSN365 HS-B120DNN365	HS-B120DSN370 HS-B120DNN370	HS-B120DSN375 HS-B120DNN375	HS-B120DSN380 HS-B120DNN380	HS-B120DSN385 HS-B120DNN385	HS-B120DSN390 HS-B120DNN390	HS-B120DSN395 HS-B120DNN395	HS-B120DSN400 HS-B120DNN400	HS-B120DSN405 HS-B120DNN405
Voc (with tolerance± 3%) [V].....	44.17	44.27	44.37	44.47	44.57	44.67	44.77	44.87	44.97
Isc (with tolerance±5%) [A].....	10.42	10.52	10.62	10.72	10.82	10.92	11.02	11.12	11.22
VPmax [V]	36.87	36.96	37.02	37.09	37.15	37.23	37.32	37.43	37.53
IPmax [A].....	9.92	10.03	10.15	10.27	10.37	10.49	10.60	10.70	10.81
Pmax (with tolerance +3%)[W]	365	370	375	380	385	390	395	400	405
α [%/°C]	0.028%								
β [%/°C]	-0.0036%								
δ [%/°C]	-0.26%								

MODULE TYPE/S	HS-B132DSN405 HS-B132DNN405	HS-B132DSN410 HS-B132DNN410	HS-B132DSN415 HS-B132DNN415	HS-B132DSN420 HS-B132DNN420	HS-B132DSN425 HS-B132DNN425	HS-B132DSN430 HS-B132DNN430	HS-B132DSN435 HS-B132DNN435	HS-B132DSN440 HS-B132DNN440	HS-B132DSN445 HS-B132DNN445
Voc (with tolerance± 3%) [V].....	47.46	47.62	47.72	47.82	47.95	48.09	48.18	48.26	48.43
Isc (with tolerance±5%) [A].....	10.8	10.82	10.85	10.88	10.9	10.92	10.95	10.98	10.99
VPmax [V]	39.17	39.47	39.83	40.2	40.48	40.84	41.16	41.44	41.79
IPmax [A].....	10.34	10.39	10.42	10.45	10.5	10.53	10.57	10.62	10.65
Pmax (with tolerance +3%)[W]	405	410	415	420	425	430	435	440	445
α [%/°C]	0.028%								
β [%/°C]	-0.0036%								
δ [%/°C]	-0.26%								

module type/s	HS-B156DSN490	HS-B156DSN495	HS-B156DSN500	HS-B156DSN505	HS-B156DSN510	HS-B156DSN515	HS-B156DSN520
Voc (with tolerance ± 3%) [V] :	57.46	57.87	58.27	58.67	59.07	59.46	59.85
Isc (with tolerance ± 5%) [A] :	10.47	10.49	10.51	10.53	10.55	10.57	10.59
VPmax [V] :	48.52	48.87	49.27	49.66	50.05	50.45	50.84
IPmax [A] :	10.10	10.13	10.15	10.17	10.19	10.21	10.23
Pmax (with tolerance +3%)[W] :	490	495	500	505	510	515	520
α [%/°C]	0.028%						

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β [%/°C]	-0.0036%
δ [%/°C]	-0.26%

module type/s	HS-B96DNN295	HS-B96DNN300	HS-B96DNN305	HS-B96DNN310	HS-B96DNN315	HS-B96DNN320
Voc (with tolerance± 3%) [V] :	34.20	34.43	34.66	34.91	35.17	35.40
Isc (with tolerance± 5%) [A] :	10.84	10.87	10.90	10.92	10.94	10.97
VPmax [V] :	28.34	28.74	29.14	29.47	29.86	30.22
IPmax [A] :	10.41	10.44	10.47	10.52	10.55	10.59
Pmax (with tolerance +3%)[W] :	295	300	305	310	315	320
α [%/°C]	0.028%					
β [%/°C]	-0.0036%					
δ [%/°C]	-0.26%					

5.2.4 Electrical rating（clear back panel glass、Data under BSTC）

MODULE TYPE/S	HS-B144DSN440 / HS-B144DNN440	HS-B144DSN445 / HS-B144DNN445	HS-B144DSN450 / HS-B144DNN450	HS-B144DSN455 / HS-B144DNN455	HS-B144DSN460 / HS-B144DNN460	HS-B144DSN465 / HS-B144DNN465	HS-B144DSN470 / HS-B144DNN470	HS-B144DSN475 / HS-B144DNN475	HS-B144DSN480 / HS-B144DNN480
Voc (with tolerance± 3%) [V].....	53.86	54.06	54.26	54.46	54.66	54.92	55.37	55.97	56.63
Isc (with tolerance±5%) [A].....	11.47	11.50	11.52	11.55	11.58	11.61	11.64	11.66	11.69
VPmax [V]	45.46	45.69	45.94	46.19	46.44	46.64	46.84	47.04	47.24
IPmax [A].....	11.00	11.05	11.09	11.14	11.19	11.23	11.27	11.31	11.35
Pmax (with tolerance +3%)[W]	495	500	505	510	515	520	525	530	535
α [%/°C]	0.028%								
β [%/°C]	-0.0036%								
δ [%/°C]	-0.26%								

MODULE TYPE/S	HS-B120DSN365 / HS-B120DNN365	HS-B120DSN370 / HS-B120DNN370	HS-B120DSN375 / HS-B120DNN375	HS-B120DSN380 / HS-B120DNN380	HS-B120DSN385 / HS-B120DNN385	HS-B120DSN390 / HS-B120DNN390	HS-B120DSN395 / HS-B120DNN395	HS-B120DSN400 / HS-B120DNN400	HS-B120DSN405 / HS-B120DNN405
Voc (with tolerance± 3%) [V].....	44.88	45.05	45.45	45.61	45.88	46.21	46.84	47.54	48.39

MODULE TYPE/S	HS-B120DSN365 HS-B120DNN365	HS-B120DSN370 HS-B120DNN370	HS-B120DSN375 HS-B120DNN375	HS-B120DSN380 HS-B120DNN380	HS-B120DSN385 HS-B120DNN385	HS-B120DSN390 HS-B120DNN390	HS-B120DSN395 HS-B120DNN395	HS-B120DSN400 HS-B120DNN400	HS-B120DSN405 HS-B120DNN405
Isc (with tolerance±5%) [A].....	11.46	11.48	11.51	11.54	11.58	11.61	11.64	11.66	11.68
VPmax [V]	37.88	38.08	38.28	38.49	38.70	38.87	39.18	39.50	39.72
IPmax [A].....	10.99	11.04	11.08	11.13	11.18	11.22	11.28	11.32	11.34
Pmax (with tolerance +3%)[W]	410	415	420	425	430	435	440	445	450
α [%/°C]	0.028%								
β [%/°C]	-0.0036%								
δ [%/°C]	-0.26%								

MODULE TYPE/S	HS-B132DSN405 HS-B132DNN405	HS-B132DSN410 HS-B132DNN410	HS-B132DSN415 HS-B132DNN415	HS-B132DSN420 HS-B132DNN420	HS-B132DSN425 HS-B132DNN425	HS-B132DSN430 HS-B132DNN430	HS-B132DSN435 HS-B132DNN435	HS-B132DSN440 HS-B132DNN440	HS-B132DSN445 HS-B132DNN445
Voc (with tolerance± 3%) [V].....	49.4	49.49	49.58	49.72	49.76	49.89	49.97	50.01	50.19
Isc (with tolerance±5%) [A].....	11.66	11.68	11.70	11.71	11.74	11.75	11.77	11.80	11.82
VPmax [V]	40.38	40.68	40.97	41.31	41.56	41.89	42.18	42.47	42.78
IPmax [A].....	11.27	11.31	11.35	11.38	11.43	11.46	11.50	11.54	11.58
Pmax (with tolerance +3%)[W]	455	460	465	470	475	480	485	490	495
α [%/°C]	0.028%								
β [%/°C]	-0.0036%								
δ [%/°C]	-0.26%								

module type/s	HS-B156DSN490	HS-B156DSN495	HS-B156DSN500	HS-B156DSN505	HS-B156DSN510	HS-B156DSN515	HS-B156DSN520
Voc (with tolerance ± 3%) [V] :	57.66	58.02	58.32	58.68	59.13	59.48	59.87
Isc(with tolerance ± 5%) [A] :	11.62	11.64	11.67	11.69	11.71	11.73	11.75
VPmax [V] :	49.06	49.38	49.69	50.05	50.41	50.76	51.12
IPmax [A] :	11.11	11.14	11.17	11.19	11.21	11.23	11.25
Pmax (with tolerance +3%)[W] :	545	550	555	560	565	570	575
α [%/°C]	0.028%						

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β [%/°C]	-0.0036%
δ [%/°C]	-0.26%

module type/s	HS-B96DNN295	HS-B96DNN300	HS-B96DNN305	HS-B96DNN310	HS-B96DNN315	HS-B96DNN320
Voc (with tolerance± 3%) [V] :	34.91	35.13	35.38	35.55	35.80	36.03
Isc (with tolerance± 5%) [A] :	11.70	11.72	11.73	11.76	11.77	11.79
VPmax [V] :	28.69	29.03	29.39	29.70	30.06	30.39
IPmax [A] :	11.33	11.37	11.40	11.45	11.48	11.52
Pmax (with tolerance +3%)[W] :	325	330	335	340	345	350
α [%/°C]	0.028%					
β [%/°C]	-0.0036%					
δ [%/°C]	-0.26%					

5.2.5 **Electrical rating（black grid back panel glass、Data under STC）**

module type/s	HS-B156DSB490	HS-B156DSB495	HS-B156DSB500	HS-B156DSB505	HS-B156DSB510	HS-B156DSB515	HS-B156DSB520
Voc (with tolerance ± 3%) [V] :	57.46	57.87	58.27	58.67	59.07	59.46	59.85
Isc (with tolerance ± 5%) [A] :	10.47	10.49	10.51	10.53	10.55	10.57	10.59
VPmax [V] :	48.52	48.87	49.27	49.66	50.05	50.45	50.84
IPmax [A] :	10.10	10.13	10.15	10.17	10.19	10.21	10.23
Pmax (with tolerance +3%)[W] :	490	495	500	505	510	515	520
α [%/°C]	0.028%						
β [%/°C]	-0.0036%						
δ [%/°C]	-0.26%						

module type/s	HS-B144DSB450	HS-B144DSB455	HS-B144DSB460	HS-B144DSB465	HS-B144DSB470	HS-B144DSB475	HS-B144DSB480

Voc (with tolerance ± 3%) [V] :	51.46	51.86	52.28	52.68	53.09	53.49	53.88
Isc (with tolerance ± 5%) [A] :	10.76	10.78	10.80	10.82	10.84	10.86	10.88
VPmax [V] :	44.60	44.97	45.37	45.77	46.17	46.57	46.97
IPmax [A] :	10.09	10.12	10.14	10.16	10.18	10.20	10.22
Pmax (with tolerance +3%)[W] :	450	455	460	465	470	475	480
α [%/°C]	0.028%						
β [%/°C]	-0.0036%						
δ [%/°C]	-0.26%						

module type/s	HS-B132DSB410	HS-B132DSB415	HS-B132DSB420	HS-B132DSB425	HS-B132DSB430	HS-B132DSB435	HS-B132DSB440
Voc (with tolerance ± 3%) [V] :	46.88	47.31	47.73	48.15	48.57	48.99	49.39
Isc (with tolerance ± 5%) [A] :	10.76	10.78	10.80	10.82	10.84	10.86	10.88
VPmax [V] :	40.64	41.01	41.43	41.84	42.24	42.65	43.06
IPmax [A] :	10.09	10.12	10.14	10.16	10.18	10.20	10.22
Pmax (with tolerance +3%)[W] :	410	415	420	425	430	435	440
α [%/°C]	0.028%						
β [%/°C]	-0.0036%						
δ [%/°C]	-0.26%						

module type/s	HS-B120DSB375	HS-B120DSB380	HS-B120DSB385	HS-B120DSB390	HS-B120DSB395	HS-B120DSB400
Voc (with tolerance± 3%) [V] :	42.75	43.19	43.62	44.05	44.48	44.90
Isc (with tolerance± 5%) [A] :	10.78	10.80	10.82	10.84	10.86	10.88
VPmax [V] :	37.10	37.48	37.90	38.32	38.73	39.14
IPmax [A] :	10.11	10.14	10.16	10.18	10.20	10.22

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Pmax (with tolerance +3%)[W] :	375	380	385	390	395	400
α [%/°C]	0.028%					
β [%/°C]	-0.0036%					
δ [%/°C]	-0.26%					

5.2.6 **Electrical rating（black grid back panel glass、Data under BSTC）**

module type/s	HS-B156DSB490	HS-B156DSB495	HS-B156DSB500	HS-B156DSB505	HS-B156DSB510	HS-B156DSB515	HS-B156DSB520
Voc (with tolerance ± 3%) [V] :	57.48	57.89	58.29	58.69	59.09	59.48	59.87
Isc (with tolerance ± 5%) [A] :	11.76	11.78	11.80	11.82	11.84	11.86	11.88
VPmax [V] :	48.83	49.15	49.51	49.87	50.23	50.59	50.94
IPmax [A] :	11.06	11.09	11.11	11.13	11.15	11.17	11.19
Pmax (with tolerance +3%)[W] :	540	545	550	555	560	565	570
α [%/°C]	0.028%						
β [%/°C]	-0.0036%						
δ [%/°C]	-0.26%						

module type/s	HS-B144DSB450	HS-B144DSB455	HS-B144DSB460	HS-B144DSB465	HS-B144DSB470	HS-B144DSB475	HS-B144DSB480
Voc (with tolerance ± 3%) [V] :	51.79	52.16	52.53	52.89	53.26	53.62	53.97
Isc (with tolerance ± 5%) [A] :	11.76	11.78	11.80	11.82	11.84	11.86	11.88
VPmax [V] :	44.80	45.13	45.50	45.87	46.23	46.60	46.99
IPmax[A] :	11.05	11.08	11.10	11.12	11.14	11.16	11.18
Pmax (with tolerance +3%)[W] :	495	500	505	510	515	520	525
α [%/°C]	0.028%						

β [%/°C]	-0.0036%
δ [%/°C]	-0.26%

module type/s	HS-B132DSB410	HS-B132DSB415	HS-B132DSB420	HS-B132DSB425	HS-B132DSB430	HS-B132DSB435	HS-B132DSB440
Voc (with tolerance ± 3%) [V] :	47.08	47.46	47.85	48.23	48.60	49.01	49.42
Isc (with tolerance ± 5%) [A] :	11.76	11.78	11.80	11.82	11.84	11.86	11.88
VPmax [V] :	40.73	41.07	41.45	41.86	42.28	42.69	43.10
IPmax [A] :	11.05	11.08	11.10	11.12	11.14	11.16	11.18
Pmax (with tolerance +3%)[W] :	450	455	460	465	470	475	480
α [%/°C]	0.028%						
β [%/°C]	-0.0036%						
δ [%/°C]	-0.26%						

module type/s	HS-B120DSB345	HS-B120DSB350	HS-B120DSB355	HS-B120DSB360	HS-B120DSB365	HS-B120DSB370
Voc (with tolerance± 3%) [V] :	42.77	43.21	43.65	44.08	44.61	44.95
Isc (with tolerance± 5%) [A] :	11.78	11.80	11.82	11.84	11.86	11.88
VPmax [V] :	37.14	37.49	37.91	38.36	38.78	39.15
IPmax [A] :	11.07	11.10	11.12	11.14	11.16	11.18
Pmax (with tolerance +3%)[W] :	410	415	420	425	430	435
α [%/°C]	0.028%					
β [%/°C]	-0.0036%					
δ [%/°C]	-0.26%					

5.2.7 **Electrical rating（Data under STC）**

module type/s	HS-S156SSB490	HS-S156SSB495	HS-S156SSB500	HS-S156SSB505	HS-S156SSB510	HS-S156SSB515	HS-S156SSB520
Voc (with tolerance ± 3%) [V] :	57.46	57.87	58.27	58.67	59.07	59.46	59.85
Isc (with tolerance ± 5%) [A] :	10.47	10.49	10.51	10.53	10.55	10.57	10.59
VPmax [V] :	48.52	48.87	49.27	49.66	50.05	50.45	50.84
IPmax [A] :	10.10	10.13	10.15	10.17	10.19	10.21	10.23
Pmax (with tolerance +3%)[W] :	490	495	500	505	510	515	520

module type/s	HS-S156SS490	HS-S156SS495	HS-S156SS500	HS-S156SS505	HS-S156SS510	HS-S156SS515	HS-S156SS520
Voc (with tolerance± 3%) [V] :	57.86	57.93	58.01	58.04	58.15	58.19	58.21
Isc (with tolerance± 5%) [A] :	10.64	10.66	10.67	10.70	10.71	10.73	10.76
VPmax [V] :	47.72	48.02	48.36	48.61	48.95	49.24	49.53
IPmax [A] :	10.27	10.31	10.34	10.39	10.42	10.46	10.50
Pmax (with tolerance +3%)[W] :	490	495	500	505	510	515	520

module type/s	HS-S144SSB450	HS-S144SSB455	HS-S144SSB460	HS-S144SSB465	HS-S144SSB470	HS-S144SSB475	HS-S144SSB480
Voc (with tolerance ± 3%) [V] :	52.82	53.24	53.66	54.07	54.48	54.89	55.30
Isc (with tolerance ± 5%) [A] :	10.46	10.48	10.50	10.52	10.54	10.56	10.58
VPmax [V] :	44.60	44.97	45.37	45.77	46.17	46.57	46.97
IPmax [A] :	10.09	10.12	10.14	10.16	10.18	10.20	10.22
Pmax (with tolerance +3%)[W] :	450	455	460	465	470	475	480

module type/s	HS-S144SS450	HS-S144SS455	HS-S144SS460	HS-S144SS465	HS-S144SS470	HS-S144SS475	HS-S144SS480

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Voc (with tolerance± 3%) [V] :	52.96	53.09	53.22	53.35	53.48	53.61	53.74
Isc (with tolerance± 5%) [A] :	10.46	10.52	10.58	10.64	10.70	10.76	10.82
VPmax [V] :	44.85	45.04	45.24	45.44	45.66	45.86	46.08
IPmax [A] :	10.05	10.12	10.18	10.24	10.30	10.36	10.43
Pmax (with tolerance +3%)[W] :	450	455	460	465	470	475	480

module type/s	HS-S132SSB410	HS-S132SSB415	HS-S132SSB420	HS-S132SSB425	HS-S132SSB430	HS-S132SSB435	HS-S132SSB440
Voc (with tolerance ± 3%) [V] :	48.12	48.56	48.99	49.42	49.84	50.27	50.69
Isc (with tolerance ± 5%) [A] :	10.46	10.48	10.50	10.52	10.54	10.56	10.58
VPmax [V] :	40.64	41.01	41.43	41.84	42.24	42.65	43.06
IPmax [A] :	10.09	10.12	10.14	10.16	10.18	10.20	10.22
Pmax (with tolerance +3%)[W] :	410	415	420	425	430	435	440

module type/s	HS-S132SS410	HS-S132SS415	HS-S132SS420	HS-S132SS425	HS-S132SS430	HS-S132SS435	HS-S132SS440
Voc (with tolerance± 3%) [V] :	48.47	48.62	48.80	48.90	49.08	49.21	49.29
Isc (with tolerance± 5%) [A] :	10.63	10.65	10.66	10.69	10.70	10.72	10.75
VPmax [V] :	39.97	40.30	40.66	40.95	41.31	41.63	41.95
IPmax [A] :	10.26	10.30	10.33	10.38	10.41	10.45	10.49
Pmax (with tolerance +3%)[W] :	410	415	420	425	430	435	440

module type/s	HS-S120SSB375	HS-S120SSB380	HS-S120SSB385	HS-S120SSB390	HS-S120SSB395	HS-S120SSB400
Voc (with tolerance± 3%) [V] :	43.93	44.38	44.83	45.27	45.71	46.14

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Isc (with tolerance± 5%) [A] :	10.48	10.50	10.52	10.54	10.56	10.58
VPmax [V] :	37.10	37.48	37.90	38.32	38.73	39.14
IPmax [A] :	10.11	10.14	10.16	10.18	10.20	10.22
Pmax (with tolerance +3%)[W] :	375	380	385	390	395	400

module type/s	HS-S120SS375	HS-S120SS380	HS-S120SS385	HS-S120SS390	HS-S120SS395	HS-S120SS400
Voc (with tolerance± 3%) [V] :	44.09	44.22	44.35	44.48	44.61	44.74
Isc (with tolerance± 5%) [A] :	10.44	10.50	10.56	10.62	10.68	10.74
VPmax [V] :	37.31	37.52	37.70	37.91	38.16	38.36
IPmax [A] :	10.06	10.14	10.22	10.30	10.36	10.44
Pmax (with tolerance +3%)[W] :	375	380	385	390	395	400

5.3 Electrical Installation

The maximum allowed quantity of modules in string connection 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 allowed by modules and other values required by DC electric parts.

Normally,the VOC factor can be calculated by the following formula. CVoc=1-βVoc×(25-T)

T: The expected lowest temperature of the installation site.

β: VOC temperature coefficient (% /℃) (Refer to modules data sheet)

Recommended maximum series is [Max System voltage V/(1.25*Voc)], parallel module configurations is [fuse rating/1.25*Isc]

6. Module Junction box properties

6.1 Cable :

Cable tybe : H1Z2Z2-K, 4mm²

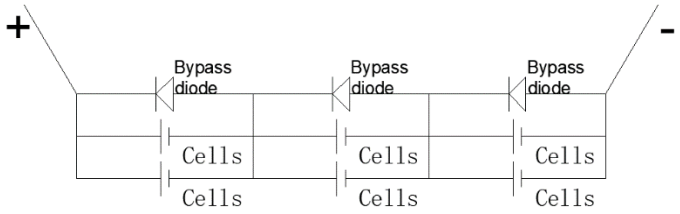
6.2 Connector,can be connected with MC4 Connector,type:

6.2.1 Zhejiang Renhe Photovoltaic Technology Co., Ltd.:05-8 ; RHC2xyzu

6.2.2 Staubli Electrical Connectors AG:PV-KST4-EVO 2/xy_UR; PV-KBT4-EVO 2/xy_UR
6.2.3 Amphenol Technology (Shenzhen) Co.,Ltd.:UTXCFabcd; UTXCMabcd
6.2.4 Tyco Electronics(Shanghai) Co., Ltd:PV4-S1yx
6.2.5 Ningbo huayuPhotovoltaic:PV-H4

6.3 Bypass diode

6.3.1 Number of series and parallel : As shown in the figure below, each diode is connected in parallel with 2 cell string units, and then connected in series with other cell string units.



Module Type	cell string units
HS-B120DS, HS-B120DSN HS-B120DSB, HS-S120SS HS-S120SSB, HS-B120DN HS-B120DNN, HS-210-B120 DS	20 half cells in series
HS-B132DS, HS-B132DSN HS-B132DSB, HS-S132SS HS-S132SSB, HS-B132DN HS-B132DNN, HS-210-B132DS	22 half cells in series
HS-B144DS, HS-B144DSN HS-B144DSB, HS-S144SS HS-S144SSB, HS-B144DN HS-B144DNN	24 half cells in series
HS-210-B110DS	22 half cells in series*2 11 half cells in series*1
HS-B156DS, HS-B156DSN HS-B156DSB, HS-S156SS HS-S156SSB	26 half cells in series
HS-B96DNN	16 half cells in series

6.3.2 Bypass diode type
Zhejiang Renhe Photovoltaic Technology Co., Ltd.:FMK5040D /FMK4530T /FMK4530B

QC Solar (Suzhou) Corporation : QCM2545/20SQ050/QCM3045/QCM4045/30SQ050A/ QCM5045/QCM5045B

PAN JIT ELECTRONICS(WUXI) CO.,LTD:GF3045/GF3550/GF5545

Ningbo huayu Photovoltaic Technology Co.,Ltd:HY3050MK/HY4050MK/HY5050MK

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