

INSTALLATION MANUAL

FOR THE SUN EARTH TDB—SERIES

OF SOLAR PHOTOVOLTAIC POWER MODULES

1、 Introduction

1.1 Ningbo Solar Electric Power Co,Ltd commenced manufacturing Sun Earth solar cells and modules in 1978. For more than twenty years company provides the highest quality Mono-crystalline Silicon modules in a range of sizes designed to meet the requirements of the users domestic and abroad. Our company has advanced technology and high quality products. The products conform to criterion of IEC61215, and has passed ISO 9001-2000、 CE and TUV certification.

1.2 Solar Modules

The modules consist of a series of electrically interconnected crystalline silicon solar cells, which are permanently laminated within special solar EVA and encapsulated between a tempered glass cover plate and TPT. The entire laminate is secured within an anodized aluminum frame, which not only supply structural strength, but also supply electrical insulation and certain chemical protection. Therefore modules are long life and reliable.

1.3 Applications

SUN EARTH solar modules is a high-efficiency、 long-life direct current power source. The modules are ideal to remote mountainous area、 traffic light、 water pumps、 long-distance telecommunication systems and electricity station.

1.4 Note

- 1.4.1 Because of high voltage、 high power of the solar array which is made of many modules, please take care of the safety of installation personnel. To reduce the risk of electrical shock or burns, modules may be covered with opaque material (e.g., Black cloth) during installation.
- 1.4.2 Installation personnel must be authorized. During installation follow operating requirement to avoid shocks or burns. Do not touch live terminals with bare hands. Use insulated tools for electrical connections.
- 1.4.3 Before installation, in order to make sure the requirements of installation and check. Installation personnel have to red installation manual and kinds of using instructions carefully (storage battery、 charge controller、 inverter)

Silicon Solar Cell Module TDB125×125-72-P Electrical Parameters

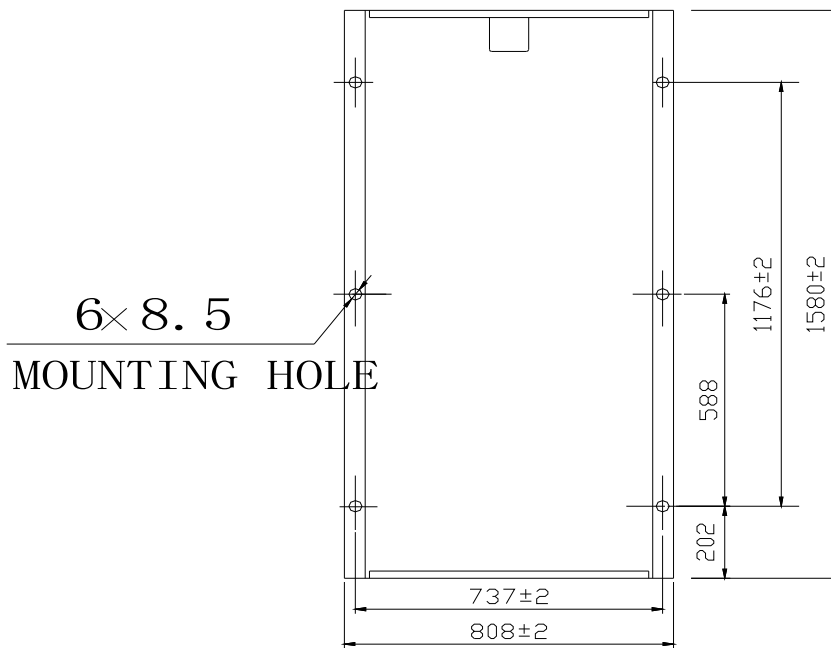
Testing Condition: AM1.5 Ee=1000W/m² T=25°C±2°C

Electrical Characteristics						
Cell	Mono – Crystal Silicon					
No. of Cells and Connections	72 in Series					
Rated Maximum Power (Pmax)	150Wp	155 Wp	160 Wp	165 Wp	170 Wp	175 Wp
Voltage at Pmax(Vmp)	34.2	34.4	34.6	34.8	35.0	35.2
Current at Pmax(Imp)	4.39	4.51	4.63	4.74	4.86	4.96
Open-circuit Voltage(Voc)	43.2	43.4	43.6	43.8	44.0	44.0
Short-circuit Current(Isc)	5.10	5.13	5.19	5.26	5.36	5.48
Temperature Coefficients						
Open-Circuit Voltage(Voc)	-(0.35±0.02)%/°C					
Short-Circuit Current(Isc)	+(0.04±0.015)%/°C					
Power (P _{max})	-(0.5±0.05)%/°C					
NOCT(Air 20°C, Sun 0.8KW/m ² , wind 1m/s)	47°C±2°C					
Maximum System Voltage	600VDC					
Series Fuse Rating	10A					
Bypass Diodes	Three 10A, 1000V					
Junction Box	MC PV-JB/2					
Output Cables	USE-2 , 12AWG (4mm ²)					
Connector	Type YP-368, YC-838					
Fire Resistance Rating	Class C					
Absolute Maximum Ratings						
Operating Temperature	- 40 to 194°F/-40 to +90 °C					
Storage Temperature	- 40 to 194°F/-40 to +90 °C					
Mechanical Characteristics						
Dimensions	1580mm×808mm×46mm					
Weight	16kg					

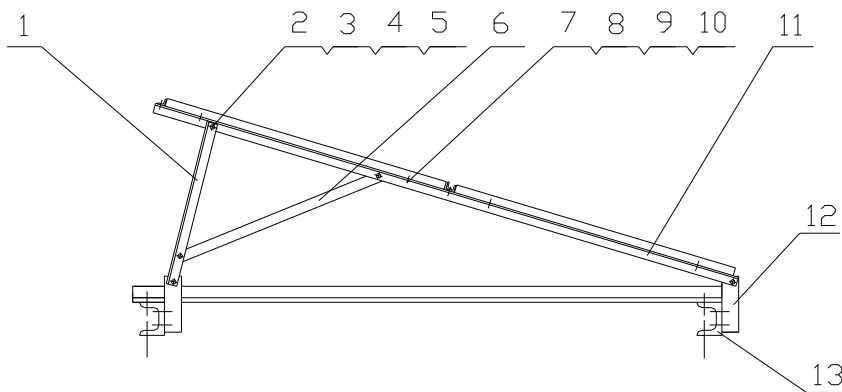
2、 Installation and Operation

- 2.1 Only authorized and trained personnel should have access to these modules. The system involves electricity, and can be dangerous if the personnel are not familiar with the appropriate safety procedures.
- 2.2 During installation, please take care of glass, which may be scratched and hit.
- 2.3 Solar modules' Installation position and range manner(in series, in parallel) on rack should according to constructional drawing(rack device drawing and power

connection drawing). Solar array tilt angle should be adjusted according to regulation.

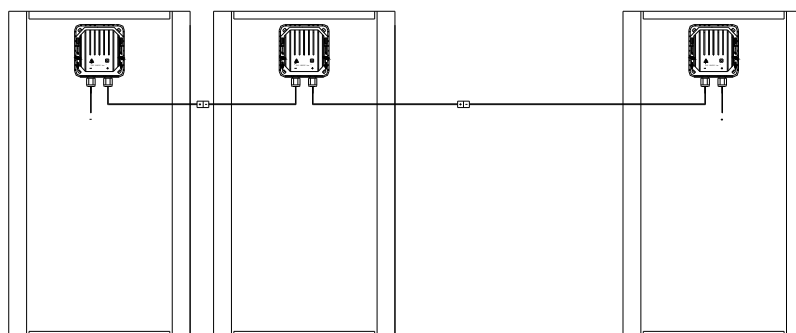


TDB125 × 125-72-P
MODULE BACK SURFACE DRAWING



- 1. *A* M16
- 5. Spring-flat M16
- 6. Angle Steel 40mm×40mm
- 7. Bolt M16×10
- 8. Nut M6
- 9. Flat M6
- 10. Spring-flat M6
- 11. Angle Steel 40mm×40mm
- 12. Angle Steel 40mm×40mm
- 13.

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TDB125×125-72-P
IN SERIES CONNECTION DRAWING

- 2.5 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. If required, PVC or stainless washers can be placed between the solar module frame and support structure to prevent this type of corrosion.
- 2.6 The solar module frame must be attached to a support structure using M6 stainless steel hardware in a minimum of four places symmetrical on the solar module.
- 2.7 module support structures should be wind rated(system design).

3、 Grounding

All module frame and mounting racks must be properly grounded in accordance with electrical codes.

4、 Check and Accept

Check and accept accordance with electrical codes.

5、 Site Selection

Choose a location where modules will receive maximum sunlight throughout the year. For example, in the Northern Hemisphere, the modules should face south. When choosing a site, avoid trees, building or obstructions which could cast shadows on the solar modules on the solar modules especially during the winter months.

6、 Module Tilt Angle

Tilt angle is the angle between modules and horizon. In order to get the best tilt angle, as a rule, we should sacrifice superfluous power in summer and make up

the shortage of the winter. According to the location of the sun in winter, refer to table for the recommended module tilt angle your site(see the below table)

Site latitude In Degrees	0°-15°	15°-25°	25°-30°	30°-35°	35°-40°	40°+
Fixed Tilt Angle	15°	Same as latitude	latitude+ 5°	latitude+ 10°	latitude+ 15°	latitude+ 20°

7、 Blocking diodes

Blocking diodes are typically placed between the battery and the PV module output to prevent battery discharge at night. Most PV charge regulators do have a nighttime disconnect feature.

8、 Bypass Diodes

Partial shading of an individual in a 17.3 volt or 34.6 volt “series” string can cause power loss. Shading module will produce hot-pot. This hot pot intenerate the encapsulating polymer and make it turn to brown.

By having a bypass diode, the aboved current will bypass the shaded module in a series circuit, thereby minimizing module heating and array current losses.

Bypass Diodes Electrical Characteristics

Type		10A10	UNITS
Maximum Repetitive Peak Reverse Voltage	V_{RRM}	1000	V
Maximum RMS Voltage	V_{RMS}	700	V
Maximum DC Blocking Voltage	V_{DC}	1000	V
Maximum Average Forward Rectified Current @T=50°C	$I_{F(AV)}$	10.0	A

Peak Forward Surge Current, 8.3ms Single Half Sine-wave Superimposed on Rated Load M (JEDEC method)	I_{FRM}	600	A
Maximum Forward Voltage AT 10A DC	V_F	1.0	V
Maximum DC Reverse Current @ $T_J=25^{\circ}C$ At Rated DC Blocking Voltage @ $T_J=100^{\circ}C$	I_R	10.0 100	μA
Typical Junction Capacitance (Notc 1)	C_J	150	pF
Typical Thermal Resistance (Notc 2)	R_{UJA}	10.0	$^{\circ}C/W$
Operating Temperature Range	T_J	-50 to +125	$^{\circ}C$
Storage Temperature Range	T_{STG}	-50 to +150	$^{\circ}C$
NOTES: 1.Measured at 1.0 MHz and Applied Reverse Voltage of 4.0 Volts DC. 2.Thermal Resistance Junction to Ambient.			

9、 Maintenance

Sun Earth solar module id designed according to the rule of long life and free maintenance. Under most conditions, normal rainfall and wind is sufficient to keep the module glass clean. You should clean the class with a soft cloth using mild detergent and water. When clean the back, please don't break the TPT.

10、 Others

- 10.1 Contrasted with standard test conditions, the electrical characteristics are within $\pm 10\%$ of indicated values of I_{sc} , V_{oc} and P_{max} under outdoors test.
- 10.2 Under certain conditions, a photovoltaic module is likely to 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 standard values which are connected to the PV output.