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PV Module Installation and User Manual

Thank you for selecting PV Modules from OMNIS POWER.

In order to use the PV modules properly, please read this Installation Manual carefully and completely before any operating. Solar type installation reference as below:

6' cell poly-crystalline PV module

Type family .....:	**OP***-P (***=290-335, in steps of 5W, 72 cells)**			
Pmp [W] Tolerance of rating [%]:±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
335	45.9	9.10	36.9	9.08
330	45.9	9.09	36.9	8.94
325	45.9	9.09	36.8	8.83
320	45.9	9.08	36.7	8.72
315	45.9	9.08	36.6	8.61
310	45.8	8.98	36.5	8.50
305	45.7	8.86	36.5	8.36
300	45.6	8.71	36.4	8.24
295	45.4	8.58	36.4	8.11
290	45.2	8.48	36.2	8.01

Type family..... :	**OP***-P (***=240-285, in steps of 5W, 60 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
285	38.70	9.21	31.40	9.08
280	38.50	9.10	31.20	8.97
275	38.20	9.05	31.05	8.86
270	38.16	9.04	30.99	8.72
265	38.1	9.0	30.99	8.56
260	38.1	8.91	30.87	8.43
255	37.88	8.81	30.62	8.33
250	37.68	8.68	30.36	8.24
245	37.58	8.56	30.18	8.12
240	37.32	8.52	29.98	8.02

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Type family .....:	**OP***-P (***=210 - 235, in steps of 5W, 72 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
210	44.6	6.4	34.8	6.04
215	44.6	6.52	34.8	6.18
220	44.6	6.68	34.8	6.33
225	44.8	6.77	35.0	6.43
230	44.8	7.02	35.0	6.58
235	45.0	7.12	35.2	6.68
Type family .....:	**OP***-P (***=190- 205, in steps of 5W, 72 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
190	44.6	5.83	34.8	5.46
195	44.8	5.94	35.0	5.57
200	45.6	6.02	35.2	5.69
205	45.8	6.12	35.4	5.79
Type family .....:	**OP***-P (***=160-185, in steps of 5W, 72 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
160	44.4	4.92	34.8	4.60
165	44.5	5.06	34.8	4.74
170	44.6	5.22	34.8	4.89
175	45.0	5.33	35.0	5.00
180	45.6	5.49	35.2	5.12
185	45.8	5.60	35.4	5.23
Type family .....:	**OP***-P (***=130-155, in steps of 5W, 36 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
130	22.1	8.01	17.2	7.56
135	22.3	8.36	17.3	7.81

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140	22.4	8.59	17.4	8.05
145	22.5	8.76	17.5	8.29
150	22.6	9.01	17.6	8.53
155	22.8	9.19	17.8	8.71
Type family .....:	**OP***-P (***=120 or 125, 36 cells)**			
Pmp [W] Tolerance of rating [%]:±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
120	22.6	7.26	17.6	6.82
125	22.6	7.43	17.8	7.02
Type family .....:	**OP***-P (***=110 or 115, 36 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
110	22.4	6.78	17.4	6.33
115	22.6	6.91	17.6	6.54
Type family .....:	**OP***-P (***=100 or 105, 36 cells)**			
Pmp [W] Tolerance of rating [%]:±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
100	22.6	6.09	17.6	5.69
105	22.6	6.29	17.6	5.97
Type family .....:	**OP***-P (**=90 or 95, 36 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
90	22.6	5.46	17.6	5.12
95	22.8	5.68	17.80	5.34
Type family .....:	**OP**-P (**=80 or 85, 36 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
80	22.4	4.91	17.4	4.60
85	22.4	5.22	17.4	4.89
Type family .....:	**OP**-P (**=70 or 75, 36 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]

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70	22.4	4.30	17.4	4.02
75	22.6	4.55	17.6	4.26
Type family .....:	**OP**-P (36 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
65	22.6	3.88	17.7	3.67
Type family .....:	**OP**-P (**=55 or 60, 36 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
55	22.4	3.38	17.4	3.17
60	22.6	3.64	17.6	3.41
Type family .....:	**OP**-P (**=45 or 50, 36 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
45	22.4	2.77	17.4	2.59
50	22.5	3.04	17.6	2.85
Type family .....:	**OP**-P (**=35 or 40, 36 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
40	22.4	2.46	17.4	2.30
35	22.2	2.19	17.2	2.03
Type family .....:	**OP***-P (**=30 or 25, 36 cells)**			
Pmp [W] Tolerance of rating [%]:±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
30	22.5	1.82	17.6	1.70
25	22.3	1.56	17.4	1.44
Type family .....:	**OP**-P (**=20 or 15, 36 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
20	22.4	1.23	17.4	1.15
15	22.2	0.95	17.2	0.87
Type family .....:	**OP**-P (36 cells)**			

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Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
10	22.4	0.63	17.4	0.58
Type family .....:	**OP**-P (36 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
5	22.2	0.31	17.3	0.29

156 Mono-crystalline sillicon module

Type family .....:	**OP***-6M (***=300-340, in steps of 5W, 72cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
300	44.1	8.94	35.6	8.42
305	44.3	9.04	35.8	8.52
310	44.5	9.14	36.0	8.62
315	44.6	9.24	36.2	8.71
320	44.8	9.32	36.4	8.80
325	44.9	9.39	36.5	8.91
330	44.9	9.51	36.5	9.04
335	45.1	9.60	36.7	9.13
340	45.1	9.61	36.9	9.21
Type family .....:	**OP***-6M (***=250-295, in steps of 5W, 60 cells)**			
Pmp [W] Tolerance of rating [%]:±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
250	36.8	8.84	29.8	8.39
255	37.0	8.99	30.0	8.50
260	37.2	9.12	30.2	8.64
265	37.4	9.22	30.4	8.72
270	37.6	9.32	30.6	8.83
275	37.7	9.46	30.6	8.99
280	37.8	9.59	30.7	9.12
285	37.8	9.73	30.8	9.26

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290	37.9	9.86	30.9	9.39
295	37.9	9.98	30.9	9.55
Type family .....:	**OP***-6M (***=200-245, in steps of 5W, 72 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
200	44.6	5.98	35.4	5.65
205	44.7	6.10	35.5	5.77
210	44.7	6.24	35.6	5.90
215	44.7	6.38	35.6	6.04
220	44.8	6.49	35.8	6.15
225	44.8	6.55	35.8	6.28
230	44.8	6.65	36.0	6.39
235	44.9	6.75	36.0	6.53
240	44.9	6.89	36.0	6.67
245	45.1	6.97	36.2	6.77
Type family .....:	**OP***-6M (***=180 -195, in steps of 5W, 72 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
180	44.4	5.42	35.2	5.12
185	44.6	5.53	35.4	5.23
190	44.6	5.72	35.4	5.37
195	44.8	5.83	35.6	5.48
Type family .....:	**OP***-6M (***=140-175, in steps of 5W, 36 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
140	22.2	8.6	17.2	8.14
145	22.3	8.82	17.4	8.34
150	22.4	9.05	17.5	8.63
155	22.5	9.28	17.6	8.81
160	22.6	9.52	17.7	9.04
165	22.7	9.71	17.8	9.27
170	22.8	9.93	17.9	9.50

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175	22.9	9.95	18.1	9.67
Type family .....:	**OP***-6M (***=130 or 135, 36 cells)**			
Pmp [W] Tolerance of rating [%]:±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
130	22.4	7.92	17.4	7.48
135	22.6	8.09	17.6	7.67
Type family .....:	**OP***-6M (***=120 or 125, 36 cells)**			
Pmp [W] Tolerance of rating [%]:±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
120	22.4	7.09	17.6	6.82
125	22.6	7.43	17.8	7.02
Type family .....:	**OP***-6M (***=110 or 115, 36 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
110	22.4	6.78	17.4	6.37
115	22.6	6.91	17.6	6.54
Type family .....:	**OP***-6M (***=100 or 105, 36 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
100	22.4	6.08	17.4	5.75
105	22.6	6.29	17.6	5.97
Type family .....:	**OP**-6M (**=85 -95, in step of 5W, 36 cells)**			
Pmp [W] Tolerance of rating [%]: ±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
90	22.4	5.49	17.4	5.18
95	22.6	5.72	17.6	5.40
85	22.2	5.33	17.2	4.95
Type family .....:	**OP**-6M (**=70-80, in steps of 5W, 36 cells)**			
Pmp [W] Tolerance of rating [%]:±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
70	22.2	4.35	17.2	4.07
75	22.4	4.61	17.4	4.32

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80	22.6	4.87	17.6	4.55
Type family .....:	**OP**-6M (**=60 or 65, 36 cells)**			
Pmp [W] Tolerance of rating [%]:±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
60	22.4	3.68	17.4	3.45
65	22.6	3.92	17.6	3.70
Type family .....:	**OP**-6M (**=50 or 55, 36 cells)**			
Pmp [W] Tolerance of rating [%]±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
50	22.4	3.04	17.4	2.85
55	22.6	3.31	17.6	3.13
Type family .....:	**OP**-6M (**=40 or 45, 36 cells)**			
Pmp [W] Tolerance of rating [%]:±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
40	22.2	2.48	17.2	2.33
45	22.6	2.72	17.6	2.56
Type family .....:	**OP**-6M (**=30 or 35, 36 cells)**			
Pmp [W] Tolerance of rating [%]:±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
35	22.8	2.09	17.8	1.97
30	22.6	1.83	17.6	1.71
Type family .....:	**OP**-6M (**=15-25, in steps of 5W, 36 cells)**			
Pmp [W] Tolerance of rating [%]:±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
25	22.4	1.51	17.4	1.44
20	22.2	1.24	17.2	1.17
15	22.0	0.95	17.0	0.88
Type family .....:	**OP**-6M (36 cells)**			
Pmp [W] Tolerance of rating [%]:±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
10	22.6	0.61	17.6	0.57

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125 mono-crstalline sillicon module

Type family .....:	**OP***-5M (***=190-210, in steps of 5W, 72 cells)**			
Pmp [W] Tolerance of rating [%]:±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
190	45.2	5.51	35.4	5.37
195	45.4	5.64	35.6	5.48
200	45.6	5.76	35.9	5.57
205	45.8	5.89	36.2	5.67
210	45.9	5.99	36.4	5.77
Type family .....:	**OP***-5M (***=90-100, in steps of 5W, 36 cells)**			
Pmp [W] Tolerance of rating [%]:±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
90	22.2	5.33	17.4	5.17
95	22.3	5.62	17.6	5.40
100	22.4	5.79	17.8	5.62
Type family .....:	**OP**-5M (**=60 or 65, 36 cells)**			
Pmp [W] Tolerance of rating [%]:±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
60	22.4	3.61	17.4	3.45
65	22.6	3.88	17.6	3.69
Type family .....:	**OP**-5M (**=45 or 50, 36 cells)**			
Pmp [W] Tolerance of rating [%]:±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
45	22.4	2.75	17.4	2.59
50	22.6	2.99	17.8	2.81
Type family .....:	**OP**-5M (**=20 or 25, 36 cells)**			
Pmp [W] Tolerance of rating [%]:±3	Voc [V]	Isc [A]	Vmp [V]	Imp [A]
20	22.2	1.29	17.8	1.13
25	22.4	1.61	18.2	1.38

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In order to use the modules properly, avoiding property losses or injuring the operater or anyone else , warnings and some other caution signss are printed on the solar modules and Manuals.

■ Sign Introduction

Sign	Introduction
 Warning	Means ” Misoperation will cause a risk of lethal or personal serious injury ”
 Caution	Means”Misoperation will cause a risk of injuring or porperty loss ”

■ Graph introduction

Graph	Introduction
	Prohibited (proceeding not permitted) The details will be described in the signs, graphs and texts
	Compulsion (proceeding is compulsory) The details will be described in the signs ,graphs and texts
	Caution (Warning included) The details will be described in the signs or graphs and texts

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General warnings

warning

Solar module installation,maintenance,removal and resetting shall only be done by distributor or professionals

- If there were defects, there is a risk of electrical shock or fire.

When installing,wiring,operating, removing and maintaining modules, pay attention to the risk of electrical shock

- If module is shined by sunlight or other illuminator, the DC electricigy will be produced.
- Artificially concentrated sunlight shall not be directed on the module.
- 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 multipied by a factor of 1.25 when determining component voltage ratings, conductor ampacities, fuse sizes,and size of controls connected to the PV output.please refer to Section 690-8 of the National Electrical Code for an additional multiplying factor of 125 percent(80 percent derating) which may be applicable.
- If modules are connected in series or parallel, the voltage and current will increase, the danger will be increased tremendously accordingly.
- When installing, wiring or maitaining modules, in order to prevent producing the DC electricity, please cover the module surface with sufficiently opaque stuff.
- When installing, wiring or maitaining modules, please use protective instruments such as rubber gloves.

If high reliability is required (the machine is related to person life), please don't use those modules

- Output is unstable

Serious accidence such as lethal injure may occur.

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Warning for installation

Warning

Installing, maintaining, removing and resetting modules shall only be done by distributor or professionals.

Don't stand or stamp on the solar modules

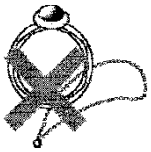
- Because glass face of the module will be damaged and it is slippery which may make injure to someone.

Don't touch the terminal

- There is a risk of electrical shock

Don't wear steel stuff like rings

- There is a risk of electrical shock



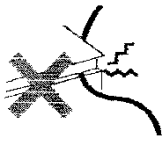
Sharp stuff prohibited

It may puncture the back of module

- There is risks of electrical shock ,electricity leakage and solar module's service life may be shortened

Don't put wires between Frame and prop.

- The wire may be damaged and cause electrical shock and fi



- When connecting modules with other controlling device please entrust distributors or professionals

Don't damage or process wiring Material.

- It may cause a risk of electrical shock .

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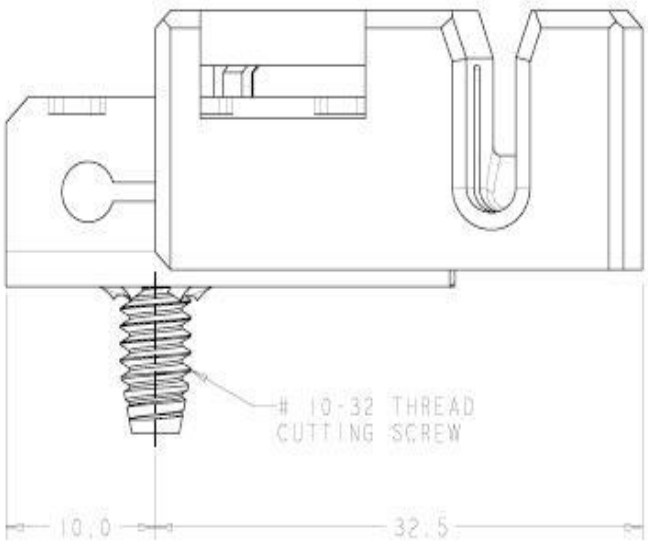
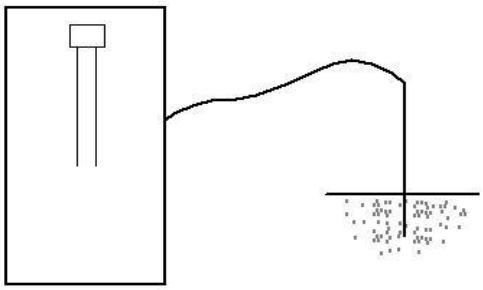
Warning

Grounding

If not connected properly, it will cause a risk of electrical shock. Please don't connect the cable with any other pipes such as gas pipe, water pipe, thunder-avoiding rod etc. Each PV module has a hole on the each side with a grounding sign . The use of the listed grounding and bonding equipment (KDER), type 1954381-1, by Tyco Electronics Corp (E69905), is order to provide a reliable grounding connection to the module frame.





Don't install solar modules on movable objects such as doors,vehicles.

The glass may be damaged and cause injury due to libration.

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Warning for operating

Warning

- Do not open cover of junction Box, it may result in electric shock.

- Don't let children approach modules There was risk of electric shock or injury.

- Do not damage or process wiring material, which may cause risk of electric shock.

- Do not prick back of solar module with sharp objects otherwise may result in electric Shock, electricity leakage or make solar module damaged

- Don't stand on or step on the solar modules because the solar module may be damaged and people may be injured if slipped down.

Caution

- don't touch solar modules
  - The module will become high temperature under sunshine, and may cause a risk of scalding

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Warning for maintenance

warning

Don't open cover of junction box and clean inside with liquid, it may result in electrical shock.

Don't immerse the solar modules in liquid, it may result in electrical shock

Do not use damaged, abnormal solar module which may cause risk of an electric shock. If so please contact distributor or NESL.

Don't deform , mend solar Module, it may result in electric shock or be wounded.

Don't stand or step on solar module.

The module may be damaged due to its glass surface and it may make person injured when they are slipped down.

Don't touch the cable of the solar module
since DC electricity will be produced when solar module is under sunlight, please pay attention to this to avoid electrical shock.

Specification for bypass diode

Rated current	10A
Max reversing voltage	50V

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Installation

●Selecting the location

1.Select a suitable location for installation of the module.

2.The module should be facing true south in northern latitudes and true north in southern latitudes for best power production.

3.For detailed information on the best elevation tilt angle for the installation, refer to standard solar photovoltaic installation guides or a reputable solar installer or systems
integrator.

4.The module should not be shaded at any time of the day.

5.Do not use module near equipment or in locacollected.

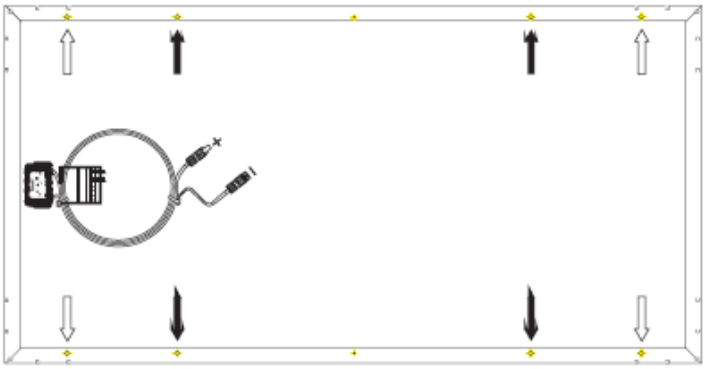
●Selecting the proper support frame

1. Always observe the instructions and safety precautions included with the support frame to be used with the module.

2. No attempt must be made to drill holes in the glass surface of the module. To do so will void the warranty.

3.Do not drill additional mounting holes in the frame of the module. Doing so will void the warranty.

4.Modules must be securely attached to the mounting structure using four mounting points for normal installation. Load calculations are left to the system designer or installer.



Mounting holes for normal installation

For high wind and snow-loads, these mounting holes must also be used

5. The support module mounting structure must be made of durable,corrosion-resistant and UV-resistant material.

●Ground mount

Select the height of the mounting system to prevent the lowest edge of the module from being covered by snow for a long time in winter in areas that experience heavy snowfalls. In addition, assure the lowest portion of the module is placed high enough so that it is not shaded by plants or trees or damaged by sand and stone driven by wind.

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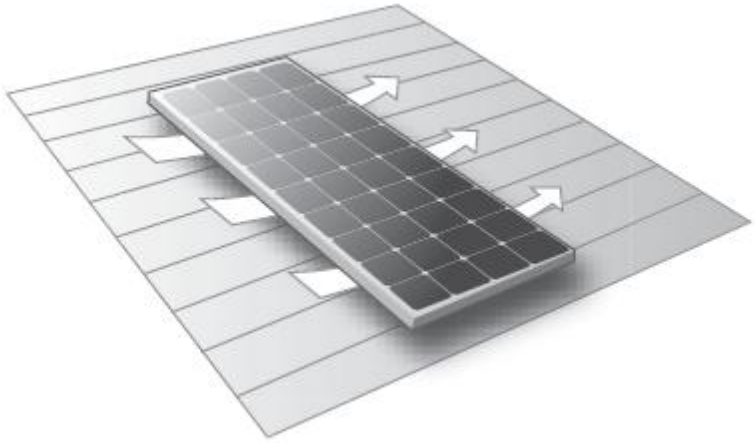
●Roof mount

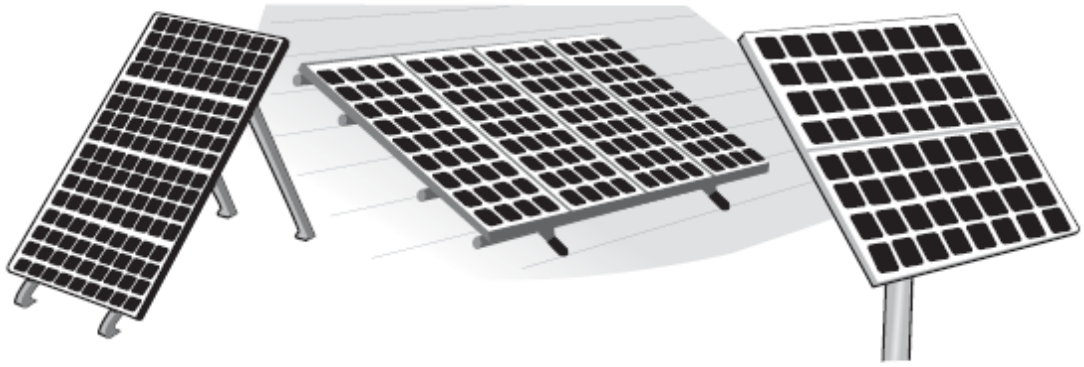
1. When installing a module on a roof or building, ensure that it is securely fastened and cannot fall as a result of wind or snow loads.
2. Provide adequate ventilation under a module for cooling (5cm minimum air space between module and mounting surface).



3. When installing module on a roof, ensure that the roof construction is suitable. In addition, any roof penetration required to mount the module must be properly sealed to prevent leaks.
3. In some cases, a special support frame may be necessary.
4. The roof installation of solar modules may affect the fireproofing of the house construction.
5. The National Electric Code requires the use of a properly sized GFDI on photovoltaic arrays installed on dwellings. Refer to the NEC for further information on earth ground fault breakers.
6. When installing the module on a roof or building, do so in calm winds. Installing a module during strong winds may cause accidents

●Pole mount

1. When installing a module on a pole, choose a pole and module mounting structure that will withstand anticipated winds for the area.



Ground mount Roof mount Pole mount

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●General installation

1. Module mounting must use the pre-drilled mounting holes in the frame.
2.The most common mounting is achieved by mounting the module using the four symmetry points close to the inner side on module frame.
3. If excessive wind or snow loads are expected, all eight mounting holes must be used.
4. Do not lift the module by grasping the module's junction box or electrical leads.
5. Do not stand or step on module.
6. Do not drop module or allow objects to fall on module.
7. To avoid glass breakage, do not place any heavy objects on the module.
8. Do not set the module down hard on any surface.
9. Inappropriate transport and installation may break the glass of the module.

Wiring and connection:

900mmx4mm^2 cable for solar modules, Temperature for interior and exterior of the cable can't exceed 85 ℃ and 55℃ separately.

If solar modules from OMNIS POWER were connected with other solar modules, the output of power generation will be deteriorated and may cause bad effect to solar modules. So please avoid this.

When PV modules are generating DC electricity please use the diodes or other applicable methods to prevent reversed current. Diodes are not subsidiary components of the solar modules

wiring

■ wiring

Please observe the correct cable connection polarity when installing the modules. If not connected properly, the bypass diode could be destroyed.

PV modules can be wired in series to increase voltage as shown in figure 1.In this case, the maximum open circuit voltage must not be greater than the specified maximum system voltage. The voltage is proportional to the number of series. You can calculate the maximum series number through the following formula.

Number of series=Vmax system/1.25*Voc

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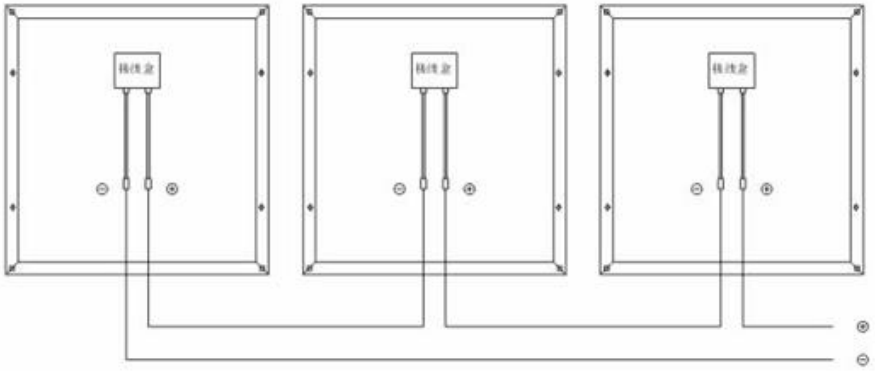
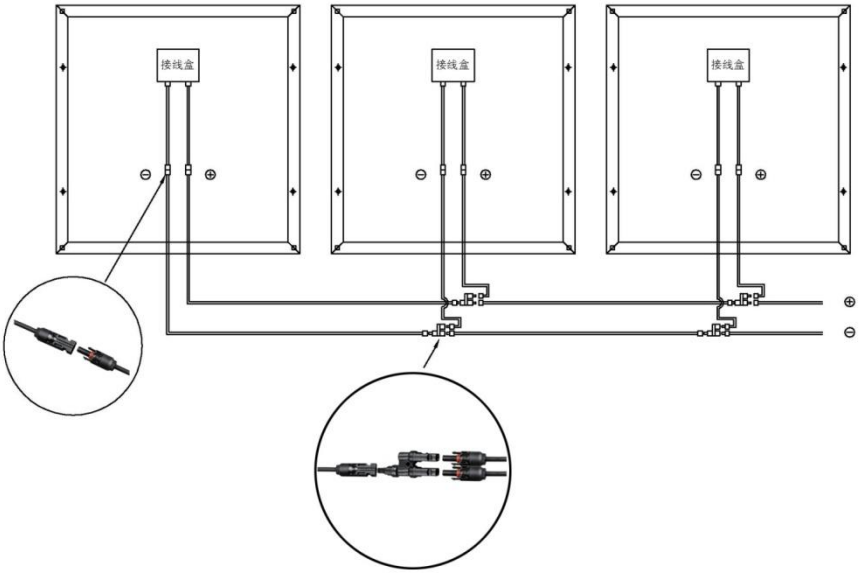


figure 1



PV modules can be wired in parallel to in increase the current as shown in figure 2. A maximum of two stings can be connected in parallel without using over-current protection device (fuses……) incorporated in series within each string. Three of more strings can be connected in parallel if an appropriate and certified over-current protection device is installed in series with each string.

In case of parallel connection, please take proper measure to block the reverse current flow. The current may easily flow in a reverse direction.

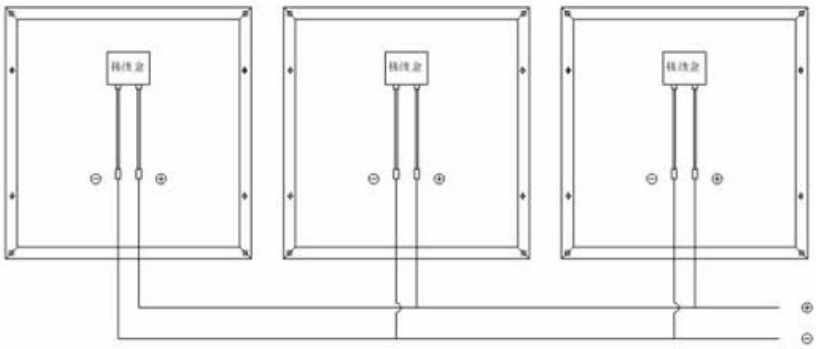


figure 2

Removal

Only professionals can disassemble or reinstall the solar modules.

Maintenance & inspection

Routine inspection

It is unnecessary to do inspection everyday; our suggestion is one time for one year.

If the dirt were built-up please clean the surface with soft sponge with water.

Inspection for wind and rain hazard or earthquake

When wind and rain hazard or earthquake happens, please check

whether something dropped on the PV modules and made some damages to them.

Inspection for salt or snow hazard

Please make a schedule to inspect whether PV modules were corroded

After heavy snow, please check the condition of solar modules.

After-sale service

Warranty

After filling the form, please contact the concerned distributor.

Model/ series number (printed in label):

Company Name:

Address:

Date of buying:

Telephone Number

Description of abnormal module:

If there was anything you want to know more please contact distributor.

OMNIS POWER reserve the right to revise the models/contents without notice.