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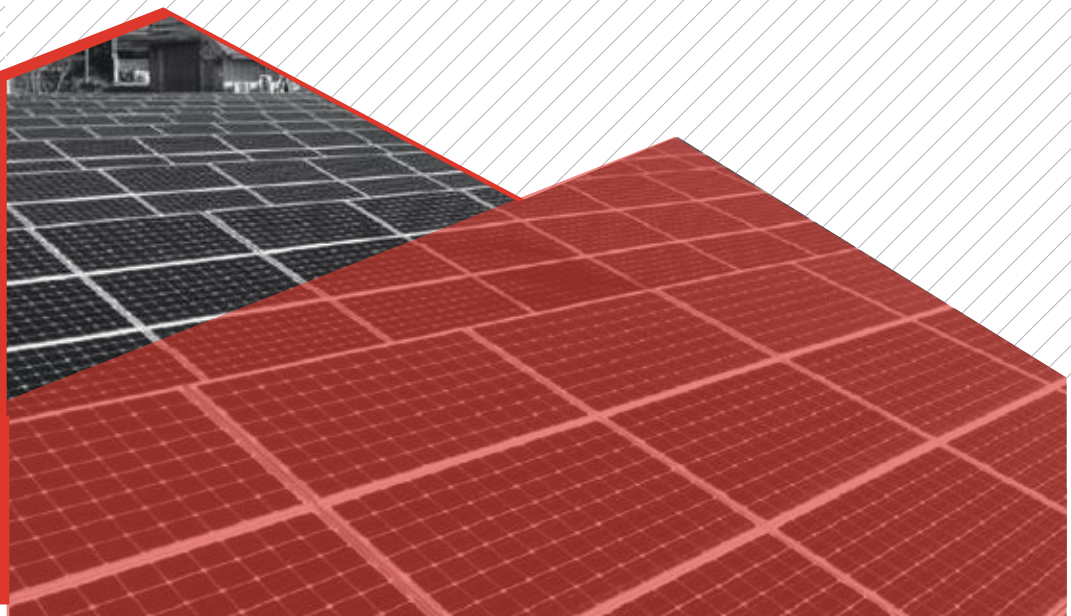
INSTALLATION GUIDE

SEG SOLAR PHOTOVOLTAIC MODULE

SEG SOLAR INC. (SEG)

ADD:
SEG Headquarters:
10625 Telge Road, Houston, TX 77095
WEB:www.segsolar.com
T: 925-468-4198



UL INSTALLATION GUIDE
FOR
SEG SOLAR PHOTOVOLTAIC MODULE

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1 PURPOSE OF THIS GUIDE

Thank you for choosing SEG Solar Photovoltaic Modules (hereafter referred to as "PV Modules"), This Guide is to give information on how to apply SEG Solar PV modules properly.

Installers must read and understand this Guide prior to installation. For any questions, please contact our technical department (technic@segsolar.com) for further information. Installers should follow all safety precautions described in this Guide as well as local codes when installing a module.

Keep this Guide For future reference (care and maintenance) and in the event of sale or disposal of the PV modules.

1.1 APPLICABLE PRODUCTS

This document is applicable to the following PV modules:

Type 1 (ZION/166)	SEG-XXX-6MB-HV, SEG-XXX-6MB-TB
Type 2 (ZION/166)	SEG-XXX-6MA-HV, SEG-XXX-6MA-TB
Type 3 (YUKON/182)	SEG-XXX-BMD-HV, SEG-XXX-BMD-TB
	SEG-XXX-BTD-HV, SEG-XXX-BTD-TB
Type 4 (YUKON/182)	SEG-XXX-BMB-HV, SEG-XXX-BMB-TB
	SEG-XXX-BTB-HV, SEG-XXX-BTB-TB
Type 5 (YUKON/182)	SEG-XXX-BMA-HV, SEG-XXX-BMA-TB
	SEG-XXX-BTA-HV, SEG-XXX-BTA-TB
Type 6 (ALPINE/210)	SEG-XXX-BMC-HV, SEG-XXX-BMC-TB
	SEG-XXX-BTC-HV, SEG-XXX-BTC-TB

Definitions:
-HV: High voltage 1500V
-TB: Transparent backsheet

2 SAFETY

2.1 GENERAL SAFETY

• The PV module is used in systems operating at greater than 50 VDC or 240 W where general access is anticipated. The PV module is certified for safety through UL 1703 and within this application class are also certified to meet the requirements for fire safety Type 1 or 2.

• The PV modules shall be properly grounded in accordance with the instructions in this Guide or the requirements of the National Electrical Code.

• Installing PV modules requires specialized skills and knowledge. Installation should only be performed by qualified personnel. Electrical connections require a licensed electrician where applicable according to local code and law (i.e. the NEC for the USA and CEC for Canada).

• Installers should assume all risk of injury that might occur during installation, including, but not limited to the risk of electric shock.

• One single PV module may generate more than 30V DC when exposed to direct sunlight. Access to a DC voltage of 30V or more is potentially hazardous.

• PV modules which convert light energy to DC electrical energy, are designed for outdoor use and can be mounted on the ground, rooftop, vehicles or boats, etc. Proper support structure design is the responsibility of the system designers and installers.

• Do not use mirrors or other magnifiers to concentrate sunlight onto the PV modules.

• When installing the PV modules, comply with all local, regional and national statutory regulations. Obtain a building permit if necessary.

• Only use equipment, connectors, wiring and support frames compatible with the PV modules.

• Do not clean the modules with chemicals.

2.2 HANDLING SAFETY

• Do not lift the PV module by grasping the module' s junction box or electrical leads.

• Do not stand or step on the PV modules or place heavy objects onto it.

• Do not drop the PV module or allow objects to fall on the PV module.

• Do handle with care when moving, transporting and installing the PV modules.

• Do not attempt to disassemble the PV modules and do not remove any attached nameplates or components.

• Do not apply paint or adhesive to the PV module top surface.

• Do not scratch or hit the back sheet.

• Do not drill holes in the frame. This may reduce the frame mechanical strength and cause cells to crack due to vibration.

• Do not break the anodized coating of the frame (except for grounding connection), this may cause corrosion of the frame.

• Do not use PV modules with broken glass or torn back sheet which presents danger of electrical shock.

• Do not handle panels in wet conditions without appropriate protection.

• Do not expose PV module to sunlight until installation to avoid unnecessary degradation.

2.3 INSTALLATION SAFETY

• Any module without a frame (laminate) shall not be considered to comply with the requirements of UL 1703 unless the module is mounted with hardware that has been tested and evaluated with the module under this standard or by a field Inspection certifying that the installed module complies with the requirements of UL 1703.

• Installation shall conform with UL standards and Safety Standards for Electrical Installations.

• Do not disconnect under load.

• Do not touch conductive parts of PV modules, such as terminals, which can result in burns, sparks and lethal shock whether or not the PV module is connected.

• Do not touch the PV module unnecessarily during installation.

• Do not work in the rain, snow or windy conditions.

• Do not expose artificial sunlight to PV modules. Completely cover the PV module with an opaque material during installation to prevent electricity from being generated.

• Do not wear metallic rings, watchbands, ear, nose, lip rings or other metallic objects while installing or troubleshooting.

• Only use insulated tools that are qualified for working on electrical installations.

• Follow the safety regulations for all other system components, including wire and cables, connectors, charging regulators, inverters, storage batteries, rechargeable batteries, etc.

• Under normal outdoor conditions the current and voltage generated will differ from those listed on the datasheet. Current and short-circuit current should be multiplied by a factor of 1.25 to determine component ratings.

• Only use connectors compatible with the PV module connectors. Removing the connectors without prior authorization will invalidate the warranty.

• Do not move installed modules to another location, which may invalidate the warranty.

• Do not install modules within 50m of the shoreline

2.4 FIRE SAFETY

• The fire rating of this module is valid only if this Guide is followed.

• Consult your local authority for Guidelines and requirements for building or structural fire safety.

• Do not use PV modules near equipment or in places where flammable gases may be generated.

• Follow local codes and laws when installing the modules

• Roof construction and installation may affect the fire safety of a building; Improper installation may create a hazard in the event of a fire.

• Do not install module that is damaged in any way as it can pose a fire or elec trical shock hazard.

3 PRODUCT IDENTIFICATION

Each module has three Barcode stickers and one label which have the same unique serial no. of each module.
Barcode 1: Laminated into PV modules.
Barcode 2: Sticker on the backside of PV modules.
Barcode 3: Sticker on the middle location of long frame side.
Label: Sticker on the backside of PV modules, contains model no. and specific information pertaining to the module.

Check the serial No. in the barcode with the packing list when unpacking. Provide the PV module serial No. When you need support from SEG SOLAR for a particular PV module.

4 MECHANICAL INSTALLATION

4.1 GENERAL INSTALLATION PRINCIPLE

• Modules can be installed in both landscape and portrait modes[1]

• The PV modules shall be installed high enough to keep it away from potential shading, windblown sand, snow and water.

• It is recommended that installation of the PV modules be 30cm away from the ground to insure adequate ventilation.

• Appropriate installation structure shall be chosen to meet required mechanical load.

• It is recommended that PV modules be installed with a minimum tilt angle of 10 degrees to facilitate cleaning and washdown.

• It is recommended to maintain minimum 10mm gap between PV modules for ther mal expansion of materials.

• Install PV modules appropriately according to corresponding mechanical load needs.

4.2 LOCATION AND ANGLE SELECTION

It is recommended that PV modules be installed where there is excellent solar insolation. In the Northern Hemisphere, the module should typically face south, and in the Southern Hemisphere, the modules should typically face north. The most optimum installation angle varies according to different latitudes and longitudes; please consult experts with appropriate knowledge background when determining the installation locations and angles.

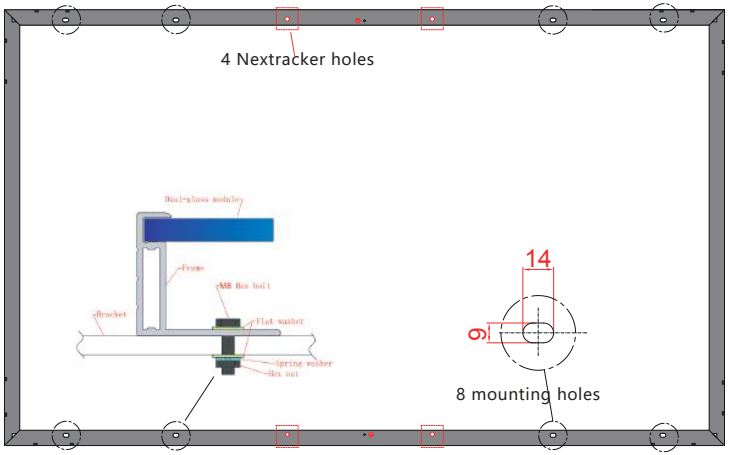
When choosing a site, avoid trees, buildings or obstructions which could cast shad--ws on the solar photovoltaic modules. Shading can cause hot spots and loss of out--put. Factory fitted bypass diodes will minimize such effect.

Do not install the PV modules near naked flame or flammable materials.

Do not install the PV modules in a location where it would be immersed in water or constantly exposed to water from a sprinkler or fountain etc.

4.3 SCREW INSTALLATION

Each PV module has 8 mounting holes(shown on drawing 1-1).The downward mechanical load resistance of module will be different based on the location of the installation holes used(shown as table 1-1).The module frame must be attached to a mounting rail using M8 corrosion-proof screws together with spring washers and flat washers in eight symmetrical locations on the PV module. The applied torque should be adequate to attach it firmly. The refer ence torque value for M8 screws is 16~20N*m.

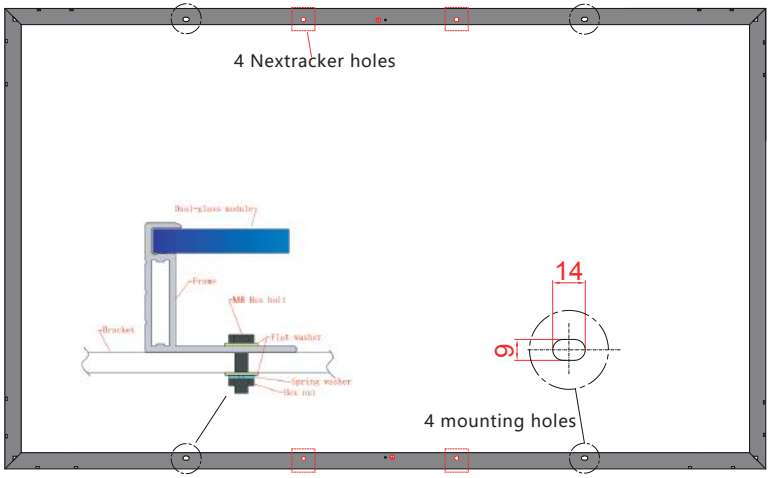


DRAWING 1-1

INSTALLED HOLES USED	MECHANICAL LOAD
8 Installation Holes (For 166 module&182-BMB)	5400Pa
4 Installation Holes (Inner ones)	2400Pa
4 Nextracker Holes (only for 72 type module)	2400Pa

TABLE 1-1

For 182-BMA/BMD & 210 modules, four mounting holes are used for the frame in the standard industry, so as to facilitate customer installation.We used four mounting holes in the frame of 182-BMA/BMD & 210 modules (shown on drawing 1-2).



DRAWING 1-2

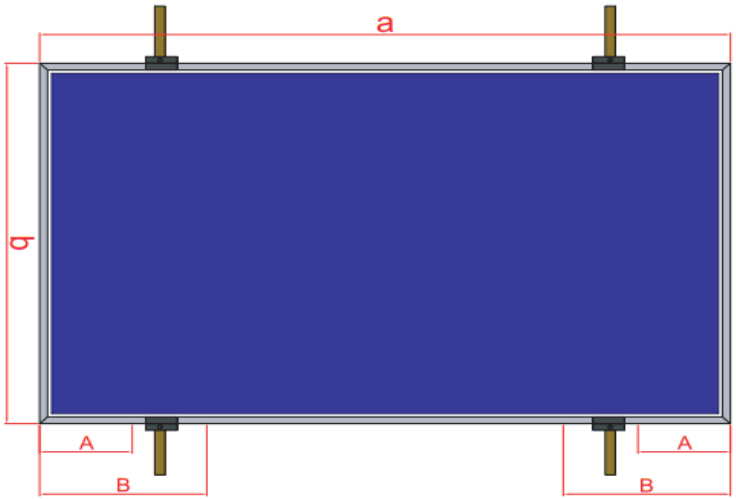
INSTALLED HOLES USED	MECHANICAL LOAD
4 Installation Holes (only for 182-BMA/BMD&210 module)	5400Pa
4 Nextracker Holes (only for 72 type module)	2400Pa

TABLE 1-2

4.4 CLAMP INSTALLATION

The modules can be fixed on both the long and the short side of the module within the constraints shown in drawing2 and drawing3,using a minimum of four clamps. The modules are built to withstand a downward force of up to 5400 Pa (550kg/m^2) or 2400 Pa (244 kg/m^2) according to where they are clamped (shown as table2 and table3),Site-specific loads such as wind or snow which may exert forces in a different way need to be taken into consideration to ensure this limit is not exceeded for each respective mounting option.

4.4.1 .Install module with clamps at longsides of frames

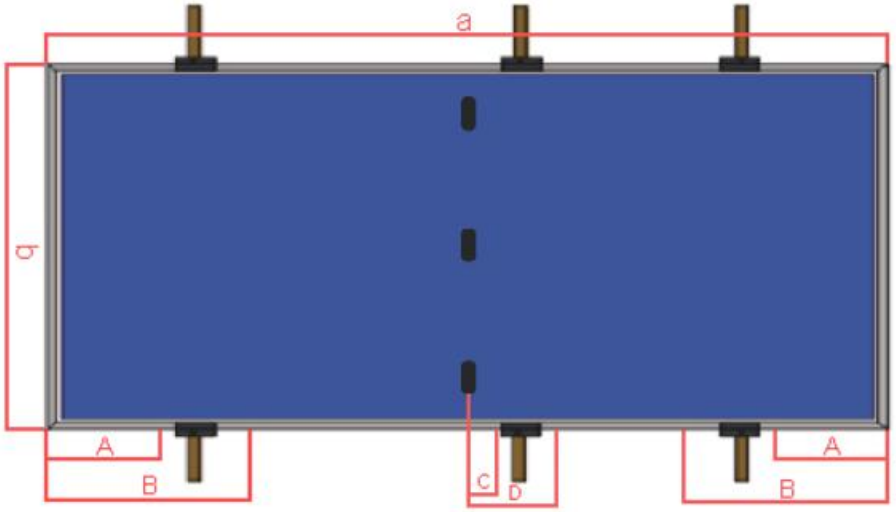


DRAWING 2-1

Module type	a(mm)	b(mm)	Clamp length	A(mm)	B(mm)	Load(Pa)
Type1 (ZION/166)	1755	1038	≥50mm	300	500	5400
				50	500	3600
Type2 (ZION/166)	2094	1038	≥50mm	380	500	5400
				50	500	3600
Type3 (YUKON/182)	1722	1134	≥50mm	300	500	5400
				50	500	3600
Type4 (YUKON/182)	1909	1134	≥50mm	300	500	5400
				50	500	3600
Type5 (YUKON/182)	2278	1134	≥50mm	380	500	5400
				50	500	3600

TABLE 2-1

For 210 modules, four mounting holes are used for the frame in the standard industry, so as to facilitate customer installation.We used four mounting holes in the frame of the 210 modules.
In addition, to ensure the reliability of the 210 plate assembly against mechanical loads, we used three mounting brackets,as shown in drawing 2-2.

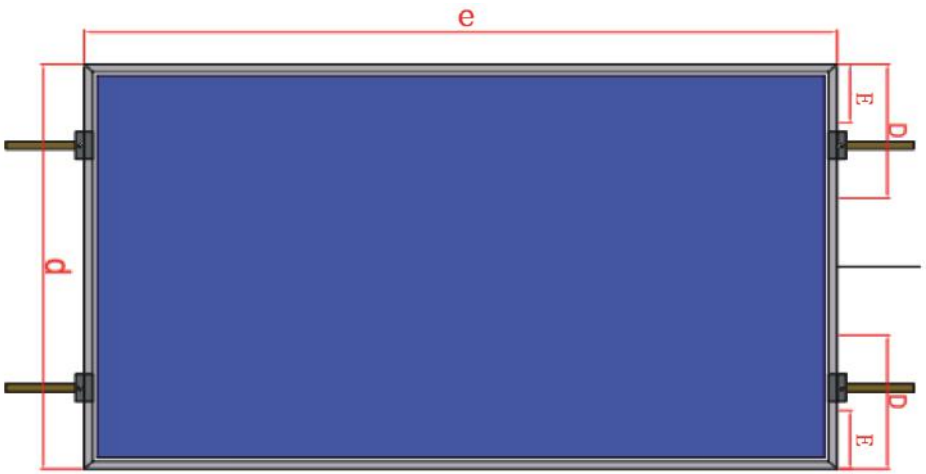


DRAWING 2-2

Module type	a(mm)	b(mm)	Clamp length	A(mm)	B(mm)	C(mm)	D(mm)	Load(Pa)
Type6 (ALPINE/210)	2384	1303	≥80mm	280	480	50	100	5400

TABLE 2-2

4.4.2 .Install module with clamps at short sides of frames



DRAWING 3

Module type	e(mm)	d(mm)	Clamp length	E(mm)	D(mm)	Load(Pa)
Type1 (ZION/166)	1755	1038	≥50mm	50	248	3600
Type2 (ZION/166)	2094	1038	≥50mm	50	248	3600
Type3 (YUKON/182)	1722	1134	≥50mm	60	280	3600
Type4 (YUKON/182)	1909	1134	≥50mm	60	280	3600
Type5 (YUKON/182)	2278	1134	≥50mm	60	280	3600
Type6 (ALPINE/210)	2384	1303	≥80mm	60	280	2400

TABLE 3

4.5 ELECTRICAL INSTALLATION

WARNING Electrical Hazard

This module produces electricity when exposed to light. Follow all applicable electrical safety precautions.

• ONLY qualified personnel can install or perform maintenance work on these PV modules.

• BE AWARE of dangerous high DC voltage when connecting module.

• DO NOT damage or scratch the rear surface of the module.

• DO NOT handle or install module when they are wet.

The wiring components shall be compatible with the PV modules.

The PV modules connected in serial shall have similar current. The Voc of one PV string shall no higher than the maximum system voltage(make reference to the maximum system voltage marked on label), , the Voc temperature coefficient feature and the extreme low temperature of installation location must be taken into consideration when calculate the Voc of the PV string .

The PV modules connected in parallel shall have similar Voltage. The Isc tem perature coefficient feature and the extreme high temperature of installation location must be taken into consideration when calculate the Isc of the PV array.

Please refer to local regulations to determine the system wires size, type and temperature.

The cross-sectional area and cable connector capacity must satisfy the maxi mum short-circuit of PV system (For a single component, we recommended the cross-sectional area of cables is 4mm2 and the the rated current of connectors is more than 15A), otherwise cables and connectors will become overheating for large current. Please pay attention: the temperature limit of cables is 85 ° C and the temperature limit of connector is 105°C

A qualified system designer or integrator should always be consulted.

Building permits, inspections and approvals by the local utility are generally required.

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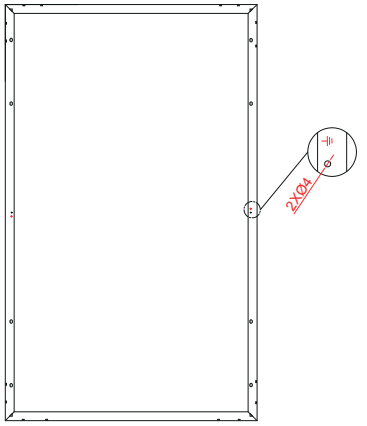
4.6 GROUNDING

Where common grounding hardware (nuts, bolts, star washers, spilt-ring lock washers, flat washers and the like) is used to attach a listed grounding/bonding device, the attachment must be made in conformance with the grounding device manufacturer’ s instructions.

For grounding and bonding requirements, please refer to regional and national safety and electricity standards. If grounding is required, use a recommended connector type, or an equivalent, for the grounding wire.

If grounding is required, the grounding wire must be properly fastened to the module frame to assure adequate electrical connection (grounding hole shown as drawing 4).

When system operates in high humidity and high temperature circumstances, transformer-Based inverter allowing system negative grounding is highly rec ommended to achieve mitigating risk of higher power degradation rate.



DRAWING 4

5 MAINTENANCE

Clean the glass surface of the module regularly with clean water and a soft sponge or cloth. A mild, non-abrasive cleaning agent may be used to remove stubborn dirt.Water with high mineral content is not recommended to clean the module.

Check the electrical, grounding and mechanical connections every six months to verify that they are clean, secure, undamaged and free of corrosion.

If any problem arises, consult a professional for suggestions.

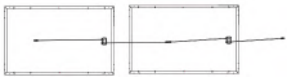
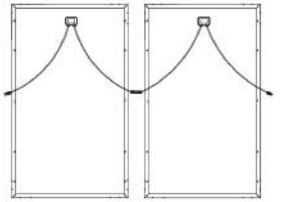
Caution: observe the maintenance instructions for all components used in the system, such as support frames, charging regulators, inverters, batteries etc.

6 PARAMETERS

The parameters may be updated time to time, accurate parameters please check on our website: http://www.segsolar.com or email to our technical support team: technic@segsolar.com.

Note: This version of UL Installation Guide are effective from November 2021, until it is replaced by new version.

【1】REMARK

Module Type	Landscape installation	Portrait installation
Type1 Type2		
Type3 Type4 Type5 Type6