

XDISC[®]

MOUNTING INSTRUCTION

for

PHOTOVOLTAIC MODULES

Type: ASOL-250P-WSR



ACTIVESOL

make use of natural power

CONTENT

INTRODUCTION	3
FOR INSTALLATION PERSONNEL.....	3
WORK SAFETY.....	3
APPLICATION	4
INSTRUCTIONS ON CABLING.....	5
INSTRUCTIONS FOR GROUNDING.....	6
ELECTRICAL SPECIFICATIONS	6
By-pass diode specifications.....	6
LOCATION SELECTION	6
MODULE TILT ANGLE.....	6
MOUNTING OF THE MODULES	7
Clips location.....	7
Mounting with screws.....	9
MAINTENANCE OF PHOTOVOLTAIC MODULES ASOL-250P-WSR.....	9
Periodic cleaning of the module	9
Visual inspection.....	9
Connection and wiring controls.....	10
Manufacturer.....	10

INTRODUCTION



- Before installation, operation and maintenance, be sure to read these instructions and use the PV module safely.
- All applicable local codes and the national electrical code should be followed.
- Failure to observe the following instructions may result in death or personal injury and property damage.

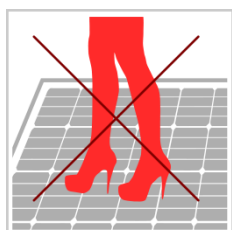
FOR INSTALLATION PERSONNEL

- Qualified persons familiar with DC and AC circuits should perform the solar module installation.
- Please read this manual carefully before installing the system and carry out the installation procedures correctly.
- This manual does not list all precautions needed for safe work. Be sure to follow OSHA guideline.
- This manual provides guidelines for installation, but it does not guarantee the quality of installation work. Please complete all work in a responsible and professional manner. Electrical work should be performed by a qualified electrician.

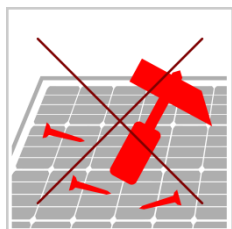
WARNING !

This photovoltaic module produces electricity when exposed to the sun or other light sources. The electrical hazard from the voltage and current of a single module is low. However, the voltage increases as modules are connected in series and the available current increases as modules are connected in parallel. Thus, for a module connected within a system, contact with electrically active parts of the module such as terminals can result in lethal shock, sparks, and burns. The only way to eliminate this hazard is to prevent exposure of the module(s) to light.

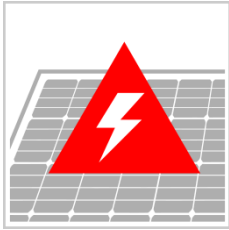
WORK SAFETY



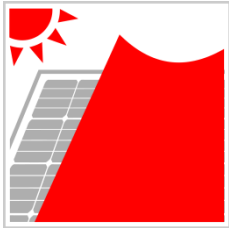
- Never step or sit on the glass surface of a solar module. The glass may break, resulting in shock or bodily injury. The module may also stop generating power.



- Keep the backside of solar module surfaces free of foreign objects.
- Do not lay modules on rocky or uneven surfaces during assembly use recommended tools for handling (e.g. Suction Lifter).



- Avoid contact with cables terminals when modules are exposed to light.
- Do not attempt to install or use a module with broken front cover glass or a perforated backsheet.



- Keep solar module(s) in original packing until point of assembly/installation to reduce risk of damage.
- Cover module face(s) completely with opaque material to halt the production of electricity when working with module wiring. Disconnect module(s) from other sources of electricity, such as batteries, when working on system.
- Avoid artificial or concentrated sunlight directed on module
- Avoid shadowing cells in order to prevent solar module hot spots and/or reduction in power.



- Never touch the terminals with bare hands.
- Use insulated tools when wiring to solar module terminals, wear rubber gloves to eliminate shock or burn potential when wiring solar modules.



- Regardless of whether you are working on a new or existing roof, never allow the sheathing and metal parts to become wet.
- Protect the sheathing and metal parts from rain during the installation. Failure to do so may cause leaks.
- Work under dry conditions with dry tools.
- Avoid installing modules and mounting system in high corrosion areas.



- Do not install near flammable gases.

APPLICATION

ASOL-250P-WSR modules are designed to provide high-power output for roof mounted/building integrated photovoltaic systems as well as in-grid systems. The modules are assigned to the Application class A (in accordance with IEC 61730). The modules thus fulfil the requirements of Protection class II.

NOTE: ASOL-250P-WSR MODULES ARE “A” CLASS APPLICATION DEVICES. MAXIMUM SYSTEM VOLTAGE 1000 VDC.

ASOL-250P-WSR series modules and most PV system components have a maximum system voltage rating of 1000 volts DC. Some grid feed in systems operate at or near this voltage rating. Like other polycrystalline solar modules, the open circuit voltage of the ASOL-250P-WSR series modules increases as the ambient temperature decreases. Maximum system voltage is computed as the sum of the open-circuit voltage of the series-connected photovoltaic modules for the lowest expected ambient temperature. Temperature coefficients, specific to the module of use, can be used to provide the most accurate prediction of module voltage under temperature extremes.

NOTE: Install the maximum number of series for the ASOL-250P-WSR series modules so that the system voltage is less than 1000 V. XDISC S.A. recommends to connect less than twenty modules in series to keep safe voltage rate in the system.

XDISC S.A. does not recommend connecting modules in parallel configuration due to damage or destruction of modules.

NOTE: In normal conditions, PV modules may produce larger current and/or voltage than reported in the standard test conditions. Therefore, when voltage evaluations for components, capacity of conductors, size of fuses, and size of control systems connected to the module output are determined, multiply the values of short-circuit current (I_{sc}) and open-circuit voltage (V_{oc}) that are marked in ASOL-250P-WSR series modules by the coefficient, 1.25.

Before installing your system, contact local authorities to determine the necessary permit, installation and inspection requirements.

INSTRUCTIONS ON CABLING

The modules are supplied ex works with a solar cable, 4 mm² including connector and an installation coupling to the MC 4 system power socket.

- Ensure that the maximum system values for voltage and current are not exceeded.
- When connecting modules in series ensure that the modules have the same current, the same alignment and inclination.
- When interconnecting the modules ensure that the maximum string voltage does not exceed the maximum system voltage of the respective module type (for values refer to the data sheet of the corresponding module).
- Do not open the power socket.
- Avoid large cable loops.
- Ensure that the polarity is correct.
- Use only suitable connectors (MC 4).
- Use only a suitable solar cable with a correspondingly suitable conductor cross-section (min. 4 mm², copper).
- Protect the cables against direct solar irradiation.
- Before commissioning the overall system check that the cabling and the DC voltages are correct.
- Fasten the cables with cable ties that are resistant to ultraviolet rays (e.g. to the mounting frame).

- Ensure that the connectors are connected correctly.

INSTRUCTIONS FOR GROUNDING

The modules have to be grounded. Please observe the corresponding national regulations and standards. Due to ASOL-250P-WSR modules are framed and do not have specified point of grounding it is necessary to ground all installation system.

Use one of the fastening holes in the construction to ground the module.

Use a copper grounding conductor with a minimum diameter of 16 mm² (heat resistance 90 °C).

When fastening the grounding conductor use a tooth lock washer so that the anodized layer of the construction is penetrated.

ELECTRICAL SPECIFICATIONS

The module electrical ratings are measured under Standard Test Conditions (STC) of 1 kW/m² irradiance with an AM 1.5 spectrum, and cell temperature of 25. The detailed electrical and mechanical characteristics of ASOL-250P-WSR crystalline silicon PV modules can be found in datasheet. Main electrical characteristics at STC also appear on each module label. The maximum system voltage for all module series is 1000 V. Under certain conditions, a module may produce more current or voltage than its Standard Test Conditions rated power. Accordingly, when determining component ratings and capacities, the module short-circuit current at STC should be multiplied by 1.25, and a correction factor should be applied for the open-circuit voltage.

An additional 1.25 multiplier for the short-circuit current (for a total of 1.56) for sizing conductors and fuses may be applicable, depending on your local regulations.

BY-PASS DIODE SPECIFICATIONS

MODULE SERIES	NUMBER OF BY-PASS DIODES	NUMBER OF CELLS BY DIODES	DIODE RATINGS		DIODE TYPE
			VOLTAGE	CURRENT	
ASOL-250P-WSR	3	20	45V	16 A	Schottky

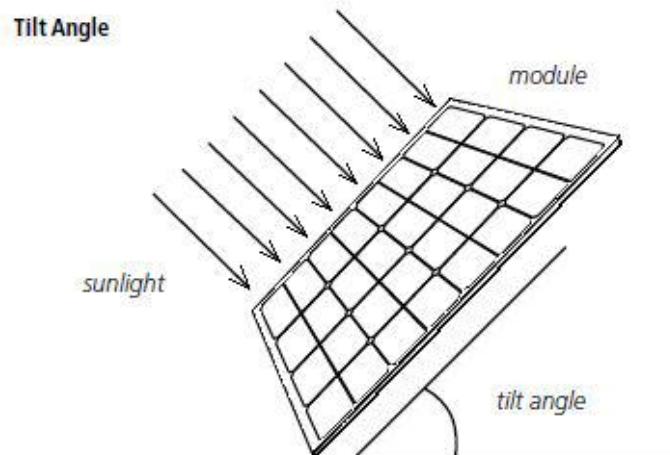
LOCATION SELECTION

The solar modules should be mounted in a location where they will receive maximum sunlight throughout the year. Modules facing 30 degrees away from true South (or North) will lose approximately 10 to 15 percent of their power output. If the module faces 60 degrees away from true South (or North), the power loss will be 20 to 30 per cent. When choosing a site, avoid trees, buildings or obstructions which could cast shadows on the solar modules especially during the winter months when the arc of the sun is lowest over the horizon.

MODULE TILT ANGLE

Modules connected in series should be installed at same orientation and angle. Different orientation or angle may cause loss of output power due to difference of amount of sunlight exposed to the module.

Modules produce the most power when they are pointed directly at the sun. For installations where the Solar Modules are attached to a permanent structure, the Modules should be tilted for optimum winter performance. As a rule, if the system power production is adequate in winter, it will be satisfactory during the rest of the year. The module tilt angle is measured between the solar Modules and the ground. Optimal tilting of module is almost the same as the latitude of installation location.



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

MOUNTING OF THE MODULES

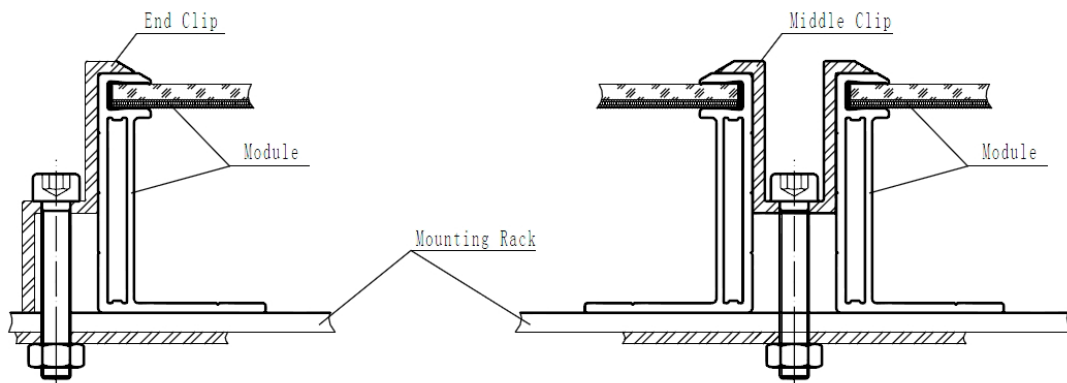
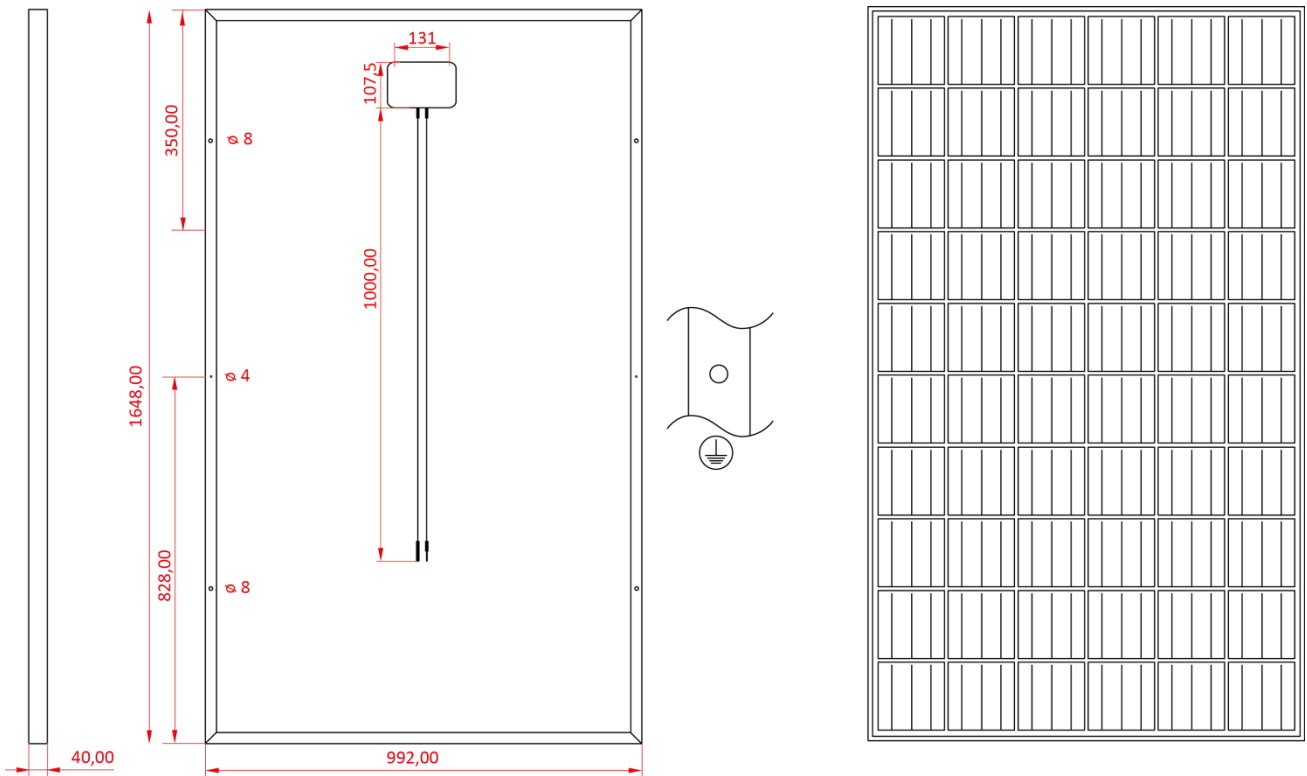
CLIPS LOCATION

XDISC S.A. recommends using typical aluminium clips designed for framed modules.

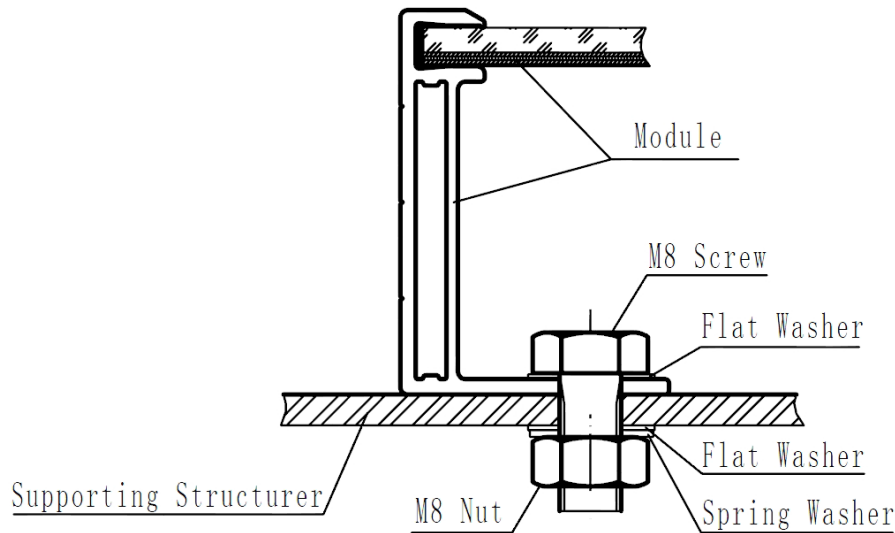
ASOL-250P-WSR module mounting configurations must meet the following requirements:

- Clearance of 7mm or more between modules is required to allow for thermal expansion.
- Modules must not be subjected to wind or snow loads in excess of the maximum permissible loads and must not be subjected to excessive forces due to thermal expansion of the support structure.

- The mounting system design must provide adequate support for module, to prevent damage from occurring when the module is subjected to site wind loads.
- All mounting structures must provide a flat plane for modules to be mounted, and must not cause any twist or stress to be placed on the module.
- Modules should be secured to mounting structure using four aluminium at least 80 mm long module clips.
- The retaining clips must each provide a minimum contact area of 10 mm x 80 mm.
- The centre of mounting clips must be located on the long side of the module between 350 mm and 400 mm from the edge. See following figure for allowed clip locations:



MOUNTING WITH SCREWS



In case of mounting modules directly to the construction XDISC S.A. advises to use M8 screws.

MAINTENANCE OF PHOTOVOLTAIC MODULES ASOL-250P-WSR

Photovoltaic modules require very little maintenance with respect to their configuration, except for parts and the interior circuits of the cells and the connection welding insulated by layers of protective material.

Maintenance covers the following processes:

- Periodic cleaning of the module.
- Visual inspection of possible internal deterioration of the water-tightness of the module.
- Control of the state of the electrical connections and wiring.
- Eventually, control of the electrical characteristics of the module.

PERIODIC CLEANING OF THE MODULE

The dirt accumulated on the transparent cover of the module reduces its performance and can produce reverse effects similar to those produced by shading. The problem can become serious in the case of industrial waste or waste caused by birds. The intensity of the effects depends on the opaqueness of the residue. The layers of dust that reduce the intensity of the sun are not dangerous and the reduction in power is not usually very significant. The regular recurrence of the cleaning process depends, logically, on the intensity of the process. Rainfall can help in many cases to reduce or eliminate the need to clean the modules.

The cleaning in general should be done by the special trained staff, always trying to avoid the accumulation of the water on the module. It is not advisable to use pressure hoses under any circumstances.

VISUAL INSPECTION

The visual inspection is meant to detect possible failures, specifically:

- Possible breaks in the glass.

- Rust on the circuits and welding of the photovoltaic cells: they are normally due to humidity entering the module through breaks in the encapsulation layers occurring during the installation or transportation.

CONNECTION AND WIRING CONTROLS

Every six months, check the tightness of terminal screws and the general condition of the wiring. Also, check to be sure that mounting hardware is tight. Loose connections will result in damage for array. Do not touch live parts of cables and connectors. Use appropriate safety equipment (insulated tools, insulating gloves, etc.), when touching them. Cover the front surface of the Module by an opaque or other material when repairing. The ASOL-250P-WSR modules when exposed to sunlight generate high voltage and are dangerous.

MANUFACTURER



XDISC S.A.



82 Jagiellonska St. ,03-301 Warsaw, Poland



pv@x-disc.pl, www.x-disc.pl



+48 22 811 21 43