

MxPower Solar Pvt. Ltd.

See Beyond

User Manual

MxPower Series

Applicable Models

MxP 72300

MxP 60250

MxP 12150

MxP 12100

MxP 1275

MxP 1240

MxP 1237

MxP 1212

MxP 1210

MxP 1208

MxP 1205



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1. DISCLAIMER OF LIABILITY

- The usage of this manual, installation, handling of MxPower Solar modules are beyond MxPower Solar's control. MxPower Solar does not assume any responsibility against failure to follow instructions resulting into any Loss, Damage, Injury or Expense due to Improper Installation, Handling, Usage or Maintenance.
- MxPower Solar assumes no Responsibility for Infringement of Intellectual property rights or other rights of Third parties that may result from use of the Module. No License is granted in this regards whether expressed or implied by Implication or under any patent Rights.
- All information given in this manual is based on MxPower Solar knowledge and experience. MxPower Solar reserve the rights to change this manual and module specifications without prior notice.

2. SAFTY PRECAUTIONS

- MxPower Solar PV modules are application Class A PV Modules, generate electricity upon direct exposure to light, which can produce electrical shock. Use of insulated tools and gloves is recommended while working with modules in sunlight. No metallic contacts should be on the human body.
- No one should stand on the front and backside of the PV module as non-uniform localized pressures might cause damage to the solar cells inside the module.
- The front surface of the module is constructed with tempered glass and hence it should be handled with utmost care. If the glass breaks then human contact with the surface can lead to electric shock particularly when the ambient condition is wet. Broken modules cannot be repaired and it should be disposed of properly.
- All electrical connectors should be well protected against corrosion and soiling. Ensure that connectors are corrosion free, cleaned with absolutely no gaps between the contacts. Gap can result into an electrical arcing causing a Fire Hazard.
- For personal safety do not install/handle PV modules under adverse environmental conditions viz. gusty winds, wet frosted roof surface.
- Ensure the polarity of the modules or strings are not reversed considering the other modules in the string.
- Concentrating artificial sunlight on solar module is not allowed as it will degrade its performance and life span.
- MxPower Solar modules are certified for operating in installation at voltages below 1000Vdc. Consider this value while designing the power plant considering the temperature ranges in the location of power plant. Mixing of power classes in one string is not allowed and can be harmful. Damages of modules due to this mixing can lead to invalidity of product warranty.
- To allow for increased output of a module or panel resulting from certain conditions of use, the installation instructions for a module or panel shall include the following statement or the

equivalent: Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at standard test conditions. The requirements of the National Electrical Code [NEC] in Article 690 shall be followed to address these increased outputs. In installation not under the requirements of the NEC, the values of ISC and VOC marked on this module should be multiplied by factor of 1.25 when determining component voltage ratings, conductor capacities. Installation shall be in accordance with CSA C22.1, Safety Standard for Electrical Installation, Canadian Electrical code, Part 1, Overcurrent device ratings, and size of controls connected to the PV output.

03. UNPACKING & STORAGE

- On receipt of PV modules verify the product details as it had been ordered. Packing list pasted outside the box contains all details including the serial no of modules.
- Do NOT stack packing boxes [pallets] more than 2 boxes high. If pallets are stored temporarily outside then the external protective cover to be placed and stack height should not be more than 1 pallet high.
- Unpacking of PV modules should always be done in the vertical manner as shown in the photograph by involving two persons. Adequate care should be taken for falling over one module to the other inside the packaging box.
- PV module surfaces may get damaged/ scratched if not handled carefully. No paint or adhesive to be applied to any of the surfaces including frame.
- Do NOT connect male & female connectors of the Junction box cable of the module.
- Do NOT use a knife to cut the zip-ties, but use wire cutting pliers.
- Do NOT place module directly on top of each other.



3.1 MODULE IDENTIFICATION

Each module has a unique serial number, which is laminated behind the glass. Please do not tamper with the serial number of the module and always record the serial numbers in an installation for your future records.

04. ENVIRONMENTAL CONSIDERATIONS

4.1 CLIMATE CONDITIONS

MxPower Solar Modules are certified for *IEC 61701, IEC 61215, * IEC 61730-I & II. In addition to the required IEC certification to meet European standards MxPower Solar products have also passed IEC 61701 [salt mist corrosion test] with a salt concentration of 5% by weight, galvanic corrosion can occur between the aluminum frame and mounting or ground materials if such materials are made of dissimilar metals. Stainless steel and aluminum metal direct contact is recommended for seaside installations to avoid metal corrosion.

Environment

- * Ambient temperature: - 40⁰ C to + 50⁰ C.
- * Operating temperature: - 40⁰ C to + 85 C.
- * Storage temperature : -20⁰ C to + 50⁰ C.
- * Humidity : < 85 RH%
- * Mechanical Load Pressure*: 5400Pa [112.8lb/ft²] From front and 2400Pa from the rear [50.1lb*ft²]

* Notes:

The mechanical load bearing capacity depends upon the Installer's mounting methods and failure to follow the instructions of this manual may result in different capabilities to withstand snow and wind loads. The system installer should ensure that installation methods used meet these requirements and any local codes and regulations. *IEC 61215, IEC 61730-I & II are completed remaining certifications are under progress.

05. SITE SELECTION

- PV Modules should be installed in a place where there is no shading across the location throughout the year. Shading can be minimized by having the distance between the obstruction and solar array more than thrice the height of obstruction.
- PV modules should typically face south in the northern hemisphere and north in southern hemisphere. MxPower Solar modules can be mounted either in landscape or portrait orientation however the impact of dirt shading the solar cells can be minimized by orienting the product in portrait.
- For optimum energy production, solar modules should normally be mounted facing the equator at an angle to the horizontal plane equivalent to latitude of the installation. If the PV module is placed at a different angle or orientation, then it could have a direct impact on the generation output.

- Any slope of less than 1: 2.4 is required to maintain the fire class rating. Module is Type 1 Rated for Class C. The fire rating of this module is valid only when mounted in the manner specified in the mechanical mounting instructions.
- Avoid using mounting methods where drainage holes are blocked.
- PV modules should not be installed in such a way it will be immersed under water under any circumstances and should not be also installed in a moving vehicle / vessel.

06. MOUNTING INSTRUCTION

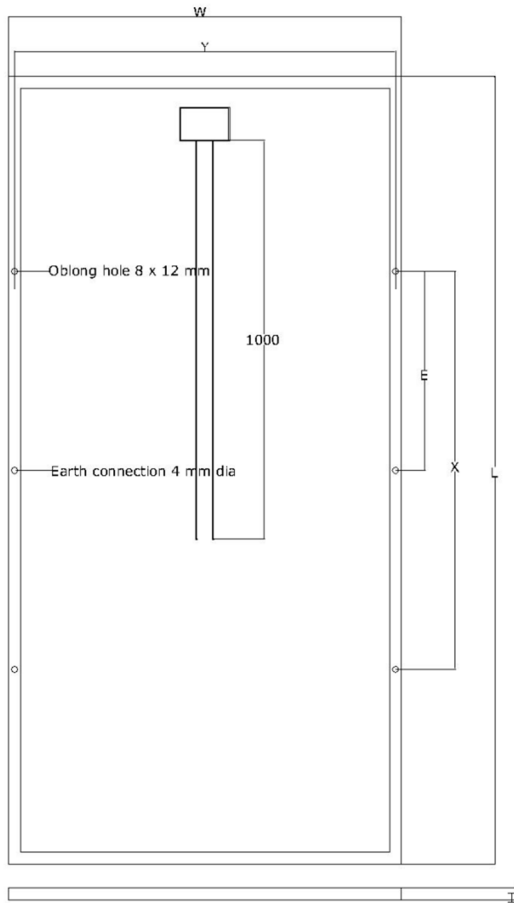
6.1 MOUNTING METHODS

Corrosion proof M6 bolts to be used on the PV modules mounting holes, which are on the rear side of the module. PV modules can be fixed either by bolt method or by the clamp method. Regardless of the mounting method, the modules should ensure that :-

- 120mm clearance is provided between module frames and the surface of the roof or the wall.
- Minimum distance of 10.50mm between 2 modules.
- Drainage holes are not blocked under any circumstances. PV panels are not to be subjected to wind or snow loads exceeding the maximum permissible loads, and should not be subjected to excessive forces due to Thermal expansion of support structures. When modules are ground mounted, select the height of the mounting system in such away to prevent the lowest edge of the module from getting covered by snow for long time in Winter in the areas that experience severe snow fall. If snow settles on the PV modules regular cleaning of snow and other foreign particles are highly recommended for long term reliability of the PV modules, failure to comply may result in damage of the module resulting in deformation and not covered under warranty.
- The minimum mechanical means is to be used for securement of the module or panel to the roof as per the instructions below, for a non-integral module or panel, the assembly is to be mounted over a fire resistant roof covering rated for the application.

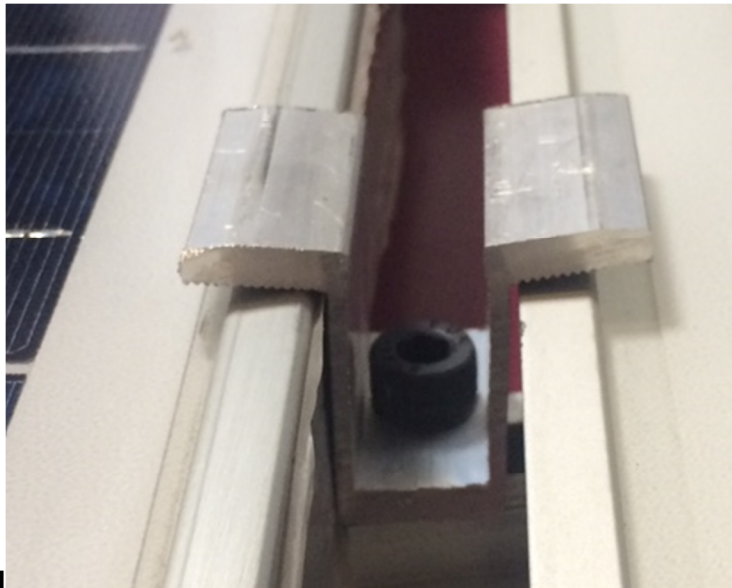
A. Mounting with Frame Bolts holes

The frames of each module has 6 (6.5mm x 10mm) mounting holes. MxPower Solar strongly recommends the use of corrosion proof (stainless steel) fixing. The modules needs to be secured with an M6 bolt, and a flat washer spring washer and nut as shown in the figure. The assembly should be tightened to a torque of minimum 16 - 25Nm.



B. Mounting with Clamp Fixing

- MxPower Solar has tested modules with a number of clamps and suggests to use clamps which has a EPDM or any other insulating washer.
- To fix the modules on the mounting rail, a minimum of 4 clamps need to be fixed.
- The clamps should never touch the glass and cause any breakage and also clamps should not cause any shadow effects on the module.
- The customer should not do any modification to the frame under any circumstances.
- When modules are mounted using clamp mounting method at least 4 clamps need to be used. Two clamps on each of the long side of the module and 2 clamps on each of the short side of the module. MxPower Solar modules are certified for 2400 Pa [50.12 Lb/ft²] [Wind Load] and 5400 Pa [112.8b/ft²] [Snow Load] on the front side. Additional clamps can be used to ensure modules can bear the load.
- Module installation photographs are given below



MODULE INSTALLATION

Dimensions depending on Module type in[mm]	Cell Qty.	Model Name	Length	Width	Height	Y[mm]	X[mm]	Module Weight
	72 Cell, Cell Module	MxP72300	1980	985	35	1000	955	22.2
	60cell, 156mm cell Module	MxP60250	1655	985	35	900	955	17.8
	36 Cell, 156mm cell Module	MxP12150	1475	670	35	550	635	9
	36 Cell	MxP12100	1000	665	35	550	635	7.51
	36 Cell	MxP 1275	790	670	35	300	635	6.14
	36 Cell	MxP 1240	670	440	35	200	640	3.59
	36 Cell	MxP 1237	670	440	35	200	640	3.59
	36 Cell	MxP 1212	350	250	25	150	235	1.26
	36 Cell	MxP 1210	350	250	25	150	235	1.26
36 Cell	MxP 1208	350	255	25	140	225	1.1	
36 Cell,	MxP1205	275	220	25	140	175	0.82	

Different mounting configurations can be tried as per installer's calculations, however failure to comply with the above suggestions may result in a lowering of load handling capabilities and may lead to failure of any overload situations which may not be covered under product warranty. "The module is considered to be in compliance with **UL 1703** only when the module is mounted in the manner specified by the mounting instructions .

6.2 GROUNDING

All module frames and mounting racks must be properly grounded in accordance with appropriate respective National Electrical Code.

A module with exposed conductive parts is considered to be in compliance with **UL 1703** only when it is electrically grounded in accordance with the instructions and the requirements of the National Electrical Code.

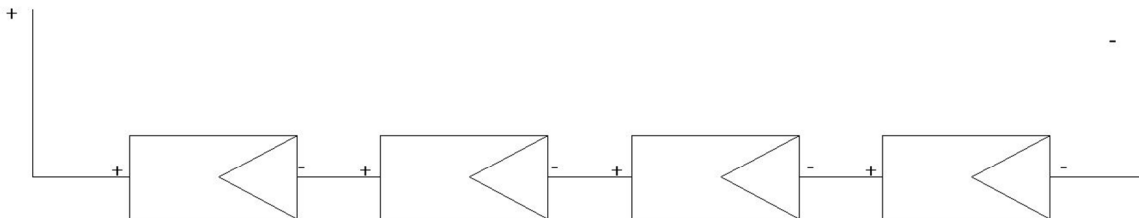
Proper grounding is achieved by bonding the module frame[s] and all metallic structural members together continuously using a suitable grounding conductor. Grounding conductor or strap may be copper, copper alloy, or other material acceptable for use as an electrical conductor per respective National Electrical Codes. The grounding conductor must then make a connection to earth using a suitable earth ground electrode.

MxPower Solar modules can be installed with the use of third party listed grounding devices for grounding the metallic frames of PV modules.

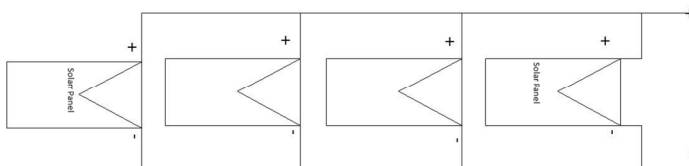
- The lug should be installed on a surface that is larger than the bottom surface of the lug.
- The lug should be installed in the grounding holes provided on the PV module.
- Machine bolt A should be torque to 35 in lb, to secure the grounding bolt to module frame.
- The grounding bolt is only listed for use with 6-12 AWG bare solid copper wire.
- For proper wire binding, machine bolt B should be torque to 35 in lb.
- Where common grounding hardware [nuts, bolts, star washers, split-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 ground device manufacturer's instructions. Common hardware items such as nuts, bolts, star washers, lock washers and the like have not been evaluated for electrical conductivity or for use as a grounding devices and should be used only for maintaining mechanical connections and holding electrical grounding devices in the proper position for electrical conductivity. Such devices, where supplied with the module and evaluated through the requirement in **UL 1703**, may be used for grounding connections in accordance with the instructions provided with the module.

6.3 MODULE WIRING

SERIES CONNECTION:



PARALLEL CONNECTION:



- All wiring should be performed by qualified installers, in accordance with the local codes and regulations.
- Modules can be connected in series to increase the operating voltage by plugging the positive plug of one module into the negative socket of the next. Before connecting modules always ensure that the contacts are corrosion free, clean and dry.
- Product can be damaged in an irreparable manner if an array string is connected in reverse polarity to another. Always verify the voltage and polarity of each individual string before making a parallel connection. If you measure a reversed polarity or a difference of more than 10V between strings then check the string configuration before making the connection. Module wiring should be performed by professional expert installers in accordance with local regulation and national codes.
- PV modules can be connected in series to have an increase in the operating voltage. The Positive Connector plug of module is connected to the Negative Connector Plug of another module until there is a click sound. Only if there is a click sound assumes the modules are connected.
- There can be irreparable damage done if the array strings are connected in reverse polarity. i.e. if the positive end is connected to negative input of the string combiner box and vice versa. So proper connection in the right polarity is recommended and if any reverse polarity is seen or any difference of more than 10V is observed, the string configuration connection need to be checked and connected appropriately.
- MxPower Solar modules are provided with standard Copper cables with a 4mm² cross-sectional area and are rated for 1000V [IEC] , for maximum system voltage, 90⁰C and are UV resistant. Ensure the cables are not exposed to water logged area's.
- The maximum voltage of the system should be leaser then the certified system voltage [typically 1000V] or the maximum input voltage of the inverter. Since $v_{oc} \propto [1/T]$, the open circuit voltage of the array needs to be calculated at the lowest ambient temperature for the location of power plant.

07. ELECTRICAL CONFIGURTION

Solar array generates DC electricity once sunlight falls on the module and the inverter is in active mode once the minimum voltage and current requirements are met and is converted into AC power appropriately.

CAUTION

- The module are rated to operate at potentially lethal DC voltages which have the potential to cause Severe Electric Hazards in the form of shock, arcing and other fire hazards. Hence only trained professionals are requested to operate on the panels and the DC solar array and the DC combiner box. The PV modules are certified to operate at 1000V DC.
- Always a Rated Isolator [DC Switch] is to be used to interrupt the Current Flow while disconnecting the connectors. Even after disconnecting, the DC power maybe active for some

time, hence only expert operators are recommended to operate upon the Panels, String Combiner Box, etc. MxPower Solar will not be responsible for any electrical accidents occurring in power plants using MxPower Solar Panels.

7.1 FUSING

Please rate the fuses for maximum Vdc and connected in each, non-grounded Pole of the solar array. [If the system is a floating system then fuses should be connected in both positive or negative poles]. The maximum fuse rating connected in series with the array string is usually 15A, but the actual module specific rating can be found on the module data sheet. The fuse rating also corresponds to maximum reverse current that a module will be able to withstand. 15A fuse per series string is recommended.

Electrical Specifications [Nominal Values: For 72 Cell mode]

Maximum System Voltage: 1000V

Maximum Series Fuse: 15A

Fire Rating Class: Fire Rating Type 1, Fire Rating Class C

Dimensions: 1956mm x 992mm x 40mm

Weight: 23 Kg.

Bypass Diodes: 3 Bypass Diodes

Bypass Diodes modules contain [Peak Inverse voltage – 40V, Forward Current- 16 A] diodes in the junction box. Rated electrical characteristics are within $\pm 10\%$ of measured values at standard test condition of $1000\text{W}/\text{M}^2$, 25°C cell temperature and air mass 1.5 Solar spectral irradiance.

7.3 INVERTER SELECTION AND COMPATILITY

When installed as per IEC norms and regulations, MxPower Solar module normally do not need to be electronically connected to earth and can operate with either galvanic ally isolated (with transformer) and transform less invertors. If the system is located in hot and very humid locations and if the maximum Vdc is more than 600V, then galvanic ally isolated invertors with transformers must be used and the negative pole of the array must be connected to earth. If a transformer less inverter is used in hot humid climatic locations, the installer should ensure the right active negative earthing kit is installed by consulting and having assurance from the inverter supplier.

08. MAINTENANCE AND CARE

- Well – designed PV plant requires minimum maintenance; however with further maintenance the performance and the reliability of the system can be improved.
- Yearly maintenance by a trained professional is usually advised.
- Check that the mounting structures are properly laid and modules are held tightly and in accordance with the mounting instructions given above.
- Ensure no part of the light falling area of the module is shaded, any leaves/ trees or any object which causes shading has to be removed accordingly.
- Ensure all the cable assembly is tight and no part of cable assembly will be exposed to water logging.
- Check that the string fuses in each non/earthed pole are in operation.
- For cleaning of the solar PV Modules, clean the modules using a soft module cleaning kit. A soft cloth with mild soft detergent can be used as an alternative. Use water only with the same temperature as the module else thermal shocks can be created and can damage the module. Ensure the module is cleaned without causing any damage like micro- crack, etc. to the module.
- Always recommended to have the module clean and tidy for maximum power generation from the solar PV module.
- The Back surface of the solar module doesn't require any specific cleaning unless any dirt or debris is stuck on the back sheet. While cleaning the dirt on the back sheet avoid using any sharp object, which can damage the substrate material and cause a slit.

09. END OF LIFE – PRODUCT RECYCLING

After end of useful life, products should be recycled in a useful & ecofriendly way.

10. WARNING

There is no serviceable part associated with the solar PVModule. If you have any doubts that your installation is not working properly or may not work properly, please contact your installer immediately.

- Contact MxPower Solar sales / services team at: www.mxpowersolar.com
- Submit the Customer Feedback from at: www.mxpowersolar.com

Our technical service representative will get in touch with you shortly.

WARNING: While performing any electrical maintenance, the system must be completely shut down and should be performed by experts. Failure to comply to norms may result in lethal shocks, burns and sometimes even death.