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PHOTOVOLTAIC (SOLAR) PANELS - TYPICAL DETAILS

PROJECT: Proposed works to Wootton Changing Room
ADDRESS: Wootton Changing Rooms, Church Road,
Wootton, MK43 9EU

PROJECT NO: 21181
DATE: MAR 2023



Wootton Changing Rooms, Church Street, Wootton

INTRODUCTION

The client is applying for planning consent for a change of use and minor external alterations to an existing building. Part of the proposed works are to install photovoltaic panels (solar panels) to the roof in order to self-generate electricity to be used by the existing building.

At this stage of the project, it is not possible to confirm the exact specification or manufacturer of the proposed solar panels that are to be installed given the project details and technical design will need to be developed, the project tendered and the costs and contractor's proposals reviewed accordingly. Many similar applications have been dealt with in a similar manner where an indication of solar panels has been sufficient. The local authority will also note that the installation of solar panels falls under works that can be carried out under permitted development also and therefore should not result in any condition being attached to any decision notice.

The existing building will benefit from a roof-mounted solar mounted system with battery storage which is common across many buildings in the UK. An example of the typical solar panel details are contained within Appendix 1: Typical Solar Panel Details (or equal approved) and any decision should not be limited to the use of this specific supplier and should be treated as information only of the type of system that is proposed, for planning purposes only.

APPENDIX 1 – TYPICAL SOLAR PANEL DETAILS (OR EQUAL APPROVED)

MAXEON 6 SOLAR PANEL

450-475 W | Up to 22.3% Efficient



Ideal for commercial applications



White backsheet, silver frame

More Lifetime Energy

Designed to maximise energy generation through leading efficiency, enhanced performance in high temperatures, and higher energy conversion in low-light conditions like mornings, evenings and cloudy days.

Uncompromising Durability

Engineered to power through all types of weather conditions with crack-resistant cells and reinforced connections that protect against fatigue and corrosion, to an electrical architecture that mitigates the impact of shade and prevents hot-spot formation.



Superior Sustainability

Clean ingredients, responsible manufacturing, and lasting energy production for 40 years make SunPower Maxeon panels the most sustainable choice in solar.

SUNPOWER



The Industry's Longest Warranty

SunPower Maxeon panels are covered by a 40-year warranty¹ backed by extensive third-party testing and field data from more than 33 million panels deployed worldwide.

Product and power coverage	40 Years
Year 1 minimum warranted output	98.0%
Maximum annual degradation	0.25%



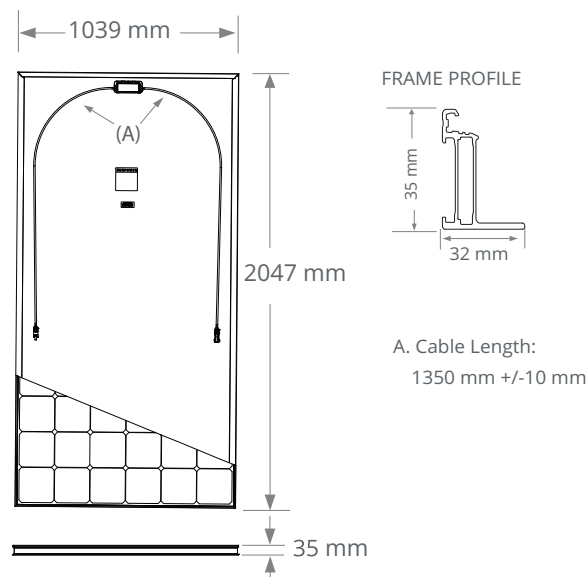
Learn more about the SPR-MAX6-XXX-COM
sunpower.maxeon.com

MAXEON 6 POWER: 450-475 W | EFFICIENCY: Up to 22.3%

Electrical Data			
	SPR-MAX6-475-COM	SPR-MAX6-460-COM	SPR-MAX6-450-COM
Nominal Power (P _{nom}) ²	475 W	460 W	450 W
Power Tolerance	5/0%	5/0%	5/0%
Panel Efficiency	22.3%	21.6%	21.2%
Rated Voltage (V _{mpp})	43.9 V	43.2 V	42.8 V
Rated Current (I _{mpp})	10.82 A	10.64 A	10.52 A
Open-Circuit Voltage (V _{oc}) (+/-3%)	52.6 V	52.5 V	52.4 V
Short-Circuit Current (I _{sc}) (+/-3%)	11.57 A	11.54 A	11.51 A
Max. System Voltage	1500 V IEC		
Maximum Series Fuse	20 A		
Power Temp Coef.	-0.29% / °C		
Voltage Temp Coef.	-0.239% / °C		
Current Temp Coef.	0.057% / °C		

Warranties, Certifications and Compliance	
Standard Tests ³	IEC 61215, IEC 61730
Quality Management Certs	ISO 9001:2015, ISO 14001:2015
Ammonia Test	IEC 62716
Desert Test	IEC 60068-2-68, MIL-STD-810G
Salt Spray Test	IEC 61701 (maximum severity)
PID Test	1500 V: IEC 62804
Available Listings	TUV
IFLI Declare Label	First solar panel labeled for ingredient transparency and LBC-compliance. ⁴
Cradle to Cradle Certified™ Bronze	First solar panel line certified for material health, water stewardship, material reutilisation, renewable energy & carbon management, and social fairness. ⁵
Green Building Certification Contribution	Panels can contribute additional points toward LEED and BREEAM certifications.
EHS Compliance	RoHS, OHSAS 18001:2007, lead free, REACH SVHC-163

Operating Condition And Mechanical Data	
Temperature	-40°C to +85°C
Impact Resistance	25 mm diameter hail at 23 m/s
Solar Cells	72 Maxison 6 Cells
Tempered Glass	High-transmission tempered anti-reflective
Junction Box	IP-68, EVO2, 3 bypass diodes
Weight	22.7 kg
Max. Load ⁶	Wind: 2400 Pa, 244 kg/m ² front & back Snow: 5400 Pa, 550 kg/m ² front
Frame	Class 2 silver anodised



Please read the safety and installation instructions.
Visit www.sunpower.maxeon.com/int/PVInstallGuideIEC
Paper version can be requested through
techsupport.ROW@maxeon.com

1 40-year warranty is not available in all countries or all installations and requires registration, otherwise our 25-year warranty applies. Service availability varies by country and installation provider.

2 Standard Test Conditions (1000 W/m² irradiance, AM 1.5, 25° C). NREL calibration Standard: SOMS current, LACCS FF and Voltage.

3 Class C fire rating per IEC 61730.

4 Maxison DC panels first received the International Living Future Institute Declare Label in 2016.

5 Maxison DC panels are Cradle to Cradle Certified™ Bronze -

www.c2ccertified.org/products/scorecard/e-series_xseries_solar_panels_-_sunpower_corporation.

Cradle to Cradle Certified™ is a certification mark licensed by the Cradle to Cradle Products Innovation Institute.

6 Safety factor 1.5 included.

Made in Malaysia (Cells)

Assembled in Mexico (Module)

Specifications included in this datasheet are subject to change without notice.

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View warranty, patent and trademark information at maxeon.com/legal.

SUNPOWER
FROM MAXEON SOLAR TECHNOLOGIES

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SUNPOWER

FROM MAXEON SOLAR TECHNOLOGIES

NEW REVISION: Z

Safety and Installation Instructions

for Europe, Asia, Australia, Latin America and Africa

This document applies to Maxeon PV Modules

Languages:

English
French
German
Italian
Spanish
Polish
Indonesian

Contents of this manual are subject to change without notice.

In case of inconsistencies or conflicts between the English version and any other versions of this manual (or document), the English version shall prevail and take control in all respects.

For the latest Europe, Asia, Australia, Latin America and Africa please refer to

www.sunpower.maxeon.com/int/PVInstallGuideIEC



Maxeon Solar Technologies, Ltd.

www.sunpower.maxeon.com

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English

French

German

Italian

Spanish

Polish

Indonesian

Safety and Installation Instructions

(English - IEC version)

This document includes references to Maxeon X-series (SPR-Xyy-xxx), P-Series (SPR-Py-xxx-UPP, SPR-Py-xxx-COM-M-BF, SPR-Py-xxx-COM-S-BF, SPR-Py-xxx-BLK, SPR-Py-xxx-COM-XS), SPR-MAX3-xxx, SPR-MAX5-xxx, SPR-MAX6-xxx PV Modules. Do not mix X, MAX3, MAX6, P3, P5 and P6 in one System. All module series does not require functional grounding and are compatible with transformer-less inverters (ref. section 4.1)

1.0 Introduction

This manual provides safety and installation instructions for IEC certified Maxeon photovoltaic modules carrying the TÜV logo on the product label (Figure 1).



Figure 1

Important! Please read this instruction sheet in its entirety before installing, wiring, or using this product in any way. Failure to comply with these instructions will invalidate the Maxeon Limited Warranty for PV Modules.

1.1 Disclaimer of Liability

The installation techniques, handling and use of this product are beyond company control. Therefore, Maxeon does not assume responsibility for loss, damage or expense resulting from improper installation, handling or use.

1.2 Conformity to International Electrotechnical Commission (IEC) standards

This product meets or exceeds the requirements set forth by IEC 61215 Edition 3-2016 for PV Modules, as well as IEC 61730 Edition 1 and 2 series for Class II applications. The IEC Standard covers flat-plate PV modules intended for installation on buildings and those intended to be freestanding. This product is not intended for use where artificially concentrated sunlight is applied to the module.

This manual shall be used in combination with industry recognized best practices. Modules should be installed by certified professionals only.

1.3 Limited Warranty

Module limited warranties are described in the Maxeon warranty document obtainable at www.sunpower.maxeon.com. Please read this document for more information.

Warranties do not apply to any of the following:

- PV Modules subjected to: (i) misuse, abuse, neglect or accident;
- (ii) alteration or improper installation (improper installation includes, without limitation, installation or array that does not comply with all Maxeon installation instructions and operations and maintenance instructions of any type (as may be amended and updated from time to time at Maxeon's sole discretion), and all national, state, and local laws, codes, ordinances, and regulations); (iii) repair or modification by someone other than an approved service technician of Maxeon; (iv) conditions exceeding the voltage, wind, snow load specifications; and any other operational specification; (v) power failure surges, lightning, flood, or fire; (vi) damage from persons, biological activity, or industrial chemical exposure; (vii) glass breakage from impact or other events outside Maxeon's control.

2.0 Safety Precautions

Before installing this device, read all safety instructions in this manual.

Danger! Module interconnects pass direct current (DC) and are sources of voltage when the module is under load and when it is exposed to light. **Direct current can arc across gaps and may cause injury or death if improper connection or disconnection is made, or if contact is made with module components that are damaged.** Do not connect or disconnect modules when current from the modules or an external source is present.

- Cover all modules in the PV array with an opaque cloth or material before making or breaking electrical connections.
- Do not disconnect any modules when its inverter is feeding in to the grid. Switch off the inverter before disconnecting, reinstalling or making any action with the modules.
- For connectors, which are accessible to untrained people, it is imperative to use the locking connectors and safety clips, if applicable, in order to defend against untrained personnel disconnecting the modules once they have been installed.
- All installations must be performed in compliance with all applicable regional and local codes.
- There are no user serviceable parts within the module. Do not attempt to repair any part of the module.
- Installation should be performed only by qualified personnel.
- Remove all metallic jewelry prior to installing this product to reduce the chance of accidental exposure to live circuits.
- Use insulated tools to reduce your risk of electric shock.
- Do not stand on, walk, drop, and scratch or allow objects to fall on the glass surface of the modules.
- Damaged modules (broken glass, torn back sheet, broken j-boxes, broken connectors, etc) can be electrical hazards as well as laceration hazards. Contact with damaged module surfaces or module frame can cause electric shock. Damaged modules should be immediately disconnected from the electric system. The module should be removed from array as soon as possible and contact the supplier for disposal instructions.
- Unconnected connectors must always be protected from pollution (e.g dust, humidity, foreign particles, etc), prior to installation. Do not leave unconnected (unprotected) connectors exposed to the environment. A clean assembly environment is therefore essential to avoid performance degradation.
- Do not allow the connectors to come in contact with chemicals such as greases, oils and organic solvents which may cause stress cracking.
- Do not install or handle the modules when they are wet or during periods of high wind.
- Do not block drain holes or allow water to pool in or near module frames
- Contact your module supplier if maintenance is necessary.
- Save these instructions!

3.0 Electrical Characteristics

The module electrical ratings are measured under Standard Test Conditions (STC) of 1 kW/m² irradiance with AM 1.5 spectrum and a cell temperature of 25 °C. Maxeon modules have specific electrical characteristics as shown on the datasheets.

A photovoltaic module may produce more current and/or voltage than reported at STC. Sunny, cool weather and reflection from snow or water can increase current and power output. Therefore, the values of I_{sc} and V_{oc} marked on the module should be multiplied by a factor of 1.25 when determining component voltage ratings, conductor ampacities, fuse sizes, and size of controls connected to PV output. An

additional 1.25 multiplier may be required by certain local codes for sizing fuses and conductors. Maxeon recommends the use of open-circuit voltage temperature coefficients listed on the datasheets when determining Maximum System Voltage.

4.0 Electrical Connections

Modules may be connected in series and/or parallel to achieve the desired electrical output as long as certain conditions are met. Please use only the same type of modules in a combined source circuit.

Even if allowed by local regulation, Plug and Socket connectors mated together in a PV system must be of the same type (model, rating) from the same manufacturer i.e. a plug connector from one manufacturer and a socket connector from another manufacturer, or vice versa, shall not be used to make a connection. Maxeon recommends that all wiring be double insulated with a minimum rating of 85° C (185° F). All wiring should use flexible copper (Cu) conductors. The minimum size should be determined by the applicable codes. We recommend a size not less than 4mm². The insulation type should be appropriate for the type of installation method used and must meet SCII (Safety Class II) and IEC 61730 requirements. To minimize the risk from indirect lightning strikes (Voltage surges), the system should be designed to avoid loops in the wiring.

Maxeon recommends a conservative minimum bending radius (R) 5x cable diameter must be maintained and must not be bent on the direct exit of the connector or junction box. Avoid exposure of electrical connections to direct sunlight and do not place the connector in a location where water could easily accumulate. Installers must refer to connector manufacturer's instruction for further installation and connection requirements.

Connectors are factory assembled with intentional gaps between the cable nut and the body of the connector. Do not retighten module connector nuts as this may lead to stress cracking of the connector assembly and will void the warranty.

4.1 System & Equipment Grounding

Please refer to the applicable regional and local codes on grounding PV arrays and mounting frames for specific requirements (e.g. lightning protection).

Module Types

SPR X, P series modules and our Maxeon and Performance Product Line are compatible with Transformer Less (TL) inverters, when used as an ungrounded PV source.

No frame grounding requirements (including functional frame grounding), but may be subjected to local regulation.

Functional system grounding of a polarity (positive or negative) is optional and may be subject to local requirements.

X Series:

SPR-Xyy-xxx SPR-Xyy-xxx-BLK SPR-Xyy-xxx-COM

P Series/ Performance Product Line:

SPR-P3-xxx-COM SPR-P3-xxx-COM-1500 SPR-P3-xxx SPR-P3-xxx-BLK
SPR-P5-xxx-UPP SPR-P6-xxx-COM-M-BF SPR-P6-xxx-COM-S-BF SPR-P6-xxx-BLK SPR-P6-xxx-COM-XS

Maxeon Product Line:

SPR-MAX3-xxx SPR-MAX3-xxx-BLK SPR-MAX3-xxx-BLK-R SPR-MAX3-xxx-R SPR-MAX3-xxx-COM SPR-MAX6-xxx SPR-MAX6-xxx-BLK, SPR-MAX6-xxx-COM

Note: If you are installing an older Module Type than above mentioned, please refer to different/previous applicable Safety and Installation Manual.

If you are doing a frame grounding connection, avoid the direct contact between Aluminum and Copper using an intermediate metal like stainless steel or tin.

4.2 Series Connection

The modules may be wired in series to produce the desired voltage output. Do not exceed the maximum system voltage specified in module datasheet.

4.3 Parallel Connection

The modules may be combined in parallel to produce the desired current output. Series string must be fused prior to combining with other strings if the resulting maximum reverse current exceeds the fuse rating as shown in the datasheets. Bypass diodes are factory installed in the modules. Please refer to the applicable regional and local codes for additional fusing requirements and limitations on the maximum number of modules in parallel.

5.0 Module Mounting

The Maxeon **Limited** Warranty for PV Modules is contingent upon modules being mounted in accordance with the requirements described in this section.

5.1 Site Considerations

Maxeon modules should be mounted in locations that meet the following requirements:

Operating Temperature: All Maxeon modules must be mounted in environments within the following maximum and minimum operating temperatures:

Maximum Operating Temperature	+85 °C (+185 °F)
Minimum Operating Temperature	-40 °C (-40 °F)

Care should be taken to provide adequate ventilation behind the modules, especially in hot environments.

Shading: Modules should be installed so that permanent shading of cells is avoided and partial shading that may occur during certain times of the day or year is minimized. Permanent shading is defined as shade that is cast over the same position (of constant area) of the solar module throughout the generation hours of the day. Shading may induce in certain cases strong energy production reduction, even in case of small shading and should be avoid as much as possible, specially at mid-day when the production is maximum.

Design Strength: Maxeon modules are designed to meet a positive or negative (upward and downward, e.g. wind) withstanding test pressure load and a negative (or downward, e.g. static load or snow load) withstanding test pressure load, as per IEC 61215, when mounted in the configurations specified in Section 5.2 and Tables 1.2 or 1.3 below.

When mounting modules in snow prone or high wind environments, special care should be taken to mount the modules in a manner that provides sufficient design strength while meeting local code requirements.

Additional authorized Operating Environments:

Modules can be mounted in the following aggressive environment according to the test limits mentioned below (available upon request)
Salt mist corrosion testing: IEC 61701 Severity 6

Ammonia Corrosion Resistance: IEC 62716 Concentration: 6,667ppm

Excluded Operating Environments:

Certain operating environments are not recommended for specific Maxeon modules and are excluded from the Maxeon **Limited** Warranty for these modules.

No Maxeon module should be mounted at a site where it may be subject to direct contact with salt water, or other aggressive environment.

Modules should not be installed near flammable liquids, gases, or locations with hazardous materials; or moving vehicles of any type.

Performance Series Mounting Orientation

Performance Series (P-Series) modules are designed to be installed in landscape orientation. In landscape orientation, P-series modules maintain higher power under row to row shading and edge soiling.

5.2 Mounting Configurations

Mounting system must provide a flat plane for the modules to be mounted on and must not cause any twist or stress to be placed on the Module, even in case of thermal expansion.

Modules may be mounted at any angle from horizontal to vertical. Select the appropriate orientation to maximize sunlight exposure. Maxeon recommends for a good performance of the system (reduction of soiling effect/water pooling) a minimum of 5° tilt angle. The cleaning frequency must be increased for modules installed with a very low angle.

Commercial modules (96 & 128 cells) frames have permanently attached stacking pins located a 20mm zone on the long side frame at 388-408 mm ("D" area in Figure 2). Mounting system hardware used with commercial modules must account for the presence of these stacking pins (see Table 2).

Specific information on module dimensions and the location of mounting and grounding holes is provided in Figures 2 and Table 2.

In order to prevent water from entering the junction box, which could present a safety hazard, modules should not be mounted such that the front/top glass faces downward (e.g., on a tracking structure that positions the module with the junction box facing skyward during sleep mode).

We also want to remind that the watertightness is not ensured by the modules but by the mounting system and that drainage should be well designed for Modules.

Clearance between the module frames and structure or ground is required to prevent wiring damage and allows air to circulate behind the module. The recommended assembling clearance between modules installed on any mounting system is a minimum of 5 mm distance.

When installed on a roof, the module shall be mounted according to the local and regional building and fire safety regulations. In case the module is installed in a roof integrated PV-System (BIPV), it shall be mounted over a watertight and fire-resistant underlayment rated for such application

Modules mounting systems should only be installed on building that have been formally considered for structural integrity, and confirmed to be capable of handling the additional weighted load of the Modules and mounting systems, by a certified building specialist or engineer.

Mounting system supplier shall manage the galvanic corrosion which can occur between the aluminium frame of the Modules and mounting system or grounding hardware if such devices is comprised of dissimilar metals.

The module is only certified for use when its factory frame is fully intact. Do not remove or alter the module frame. Creating additional mounting holes or removing the stacking pins may damage the module and reduce the strength of the frame, therefore are not

allowed. Using mounting Clamps or clips with additional grounding bolts or grounding metal sheets could be in compliance with this Safety and Installation Instructions manual subject to conditions of Section 4.1

Modules may be mounted using the following methods only:

- 1) **Frame Holes:** Secure the module to the structure using the factory mounting holes. Four M6 or M8 stainless steel bolts, with nuts, washers, and lock washers are recommended per module. Bolts to be fasten according to racking supplier recommendations. Refer to Table 2 for the module dimensions and mounting hole locations. (Please refer to the arrows on the Table 2, E1&E2&E3&E4).
- 2) **Pressure Clamps or Clips:** Mount the module with the opposite clips on the longer and/or shorter side of the frame of the module. The clips allowed location should be according to Table 1.1. Installers should ensure the clamps are of sufficient strength to allow for the maximum design pressure of the module. Clips and clamps are not provided by Maxeon. Clamps must apply force collinear with the 'wall' of the module frame and not only to the top flange. Clamps shall not apply excessive force to the top frame, warp the top flange, or contact the glass-these practices void the module warranty and risk glass breakage. Figure 1a illustrates locations for top frame clamp force. Avoid clamping within 50mm of module corners to reduce risk of frame corner deflection and glass breakage. When clamping to the module frame, torque should never exceed 15 N.m to reduce chances of frame deformation, if the clamp datasheets show a specific torque value which is lower than 15 Nm the installer should follow the torque value which ever is more stringent. A calibrated torque wrench must be used. Mounting systems should be evaluated for compatibility before installing specially when the system is not using Clamps or clips. Please contact Maxeon for the approval of the use of non-standard pressure clamps or clips where torque values are higher than otherwise stated.

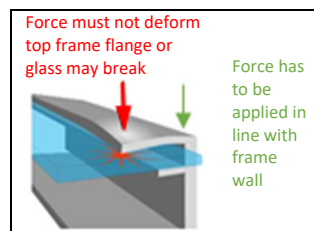


Figure 1a: Clamp Force Locations

torque should never exceed 15 N.m to reduce chances of frame deformation, if the clamp datasheets show a specific torque value which is lower than 15 Nm the installer should follow the torque value which ever is more stringent. A calibrated torque wrench must be used. Mounting systems should be evaluated for compatibility before installing specially when the system is not using Clamps or clips. Please contact Maxeon for the approval of the use of non-standard pressure clamps or clips where torque values are higher than otherwise stated.

Minimum clamp width allowance is $\geq 35\text{mm}$, and for corner clamping the minimum clamp width is: $\geq 50\text{mm}$. Clamps should not be in contact with the front glass and clamps should not deform the frame.

Maxeon does not recommend nor endorse the application on the modules of clamps which, as part of their grounding or earthing function, have teeth or claw features (see Figure 2) which may, individually or cumulatively, cause the module breakage due to (and without limitation):

- i) the grounding features touching the front glass which is incorporated into the module due to the position of such grounding feature,
- ii) the shape, the position or the number of the grounding features deforming the module top frame, or
- iii) the clamp being over-torqued during the installation.

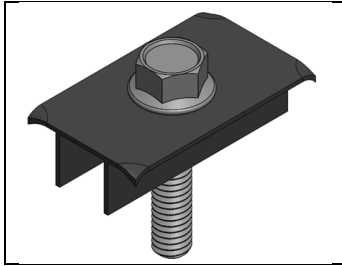


Figure 2

Maxeon shall not be liable for any damages or losses whatsoever arising from the use by the Installer of any such clamps on its modules, and disclaims all warranties, express or implied, applicable to those modules should

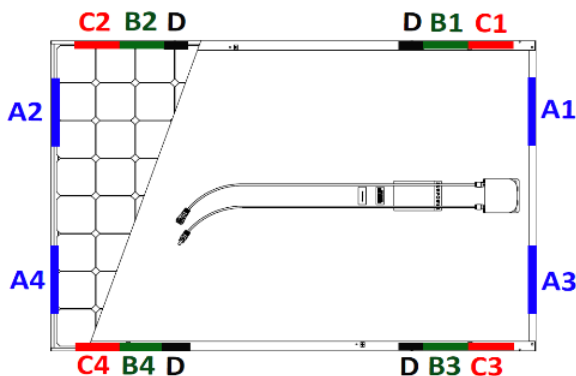
they be damaged in any way by such clamps. Therefore, the use of the above mentioned clamps by the Installer is at the Installer's sole risks.

- 3) **End Mount:** End mounting is the capture mounting of the length of the module's shorter frames with clamps on each shorter sides of the frame. Three different configurations are possible: 1) with two mounting rails under the complete length of each shorter side of the Modules, (See Table 1.2), 2) with two mounting rails parallel to the long side of the Modules (See Table 1.2) and 3) without any mounting rail (See Table 1.2). The end-mounting rails and clips or clamps (identified as A_(1&2&3&4) in Table 1.1) must be of sufficient strength to allow for maximum designed test pressure of the module. Verify this capacity with the mounting system of vendor before installation.
- 4) **Hybrid Mount:** Combination with clamps or clips located on longer or shorter sides of Modules are also possible, see Table 1.2 for allowed configurations. In any case, four clamping points are needed.
- 5) **Maxeon specified or Maxeon supplied mounting systems.** Modules mounted with strict adherence to Maxeon documentation, using hardware systems supplied by or specified by Maxeon.

Figure 2 and Table 1.1 below demonstrate the mounting locations and Tables 1.2 and 1.3 give allowed load ratings (designed test value) for Maxeon modules.

Figure 2: Mounting Zone locations for Maxeon modules

For P3-COM, MAX3 96, 104, 112 cells and MAX6 66 cells:



For 128 cells, P-Series and MAX5/MAX6 Commercial:

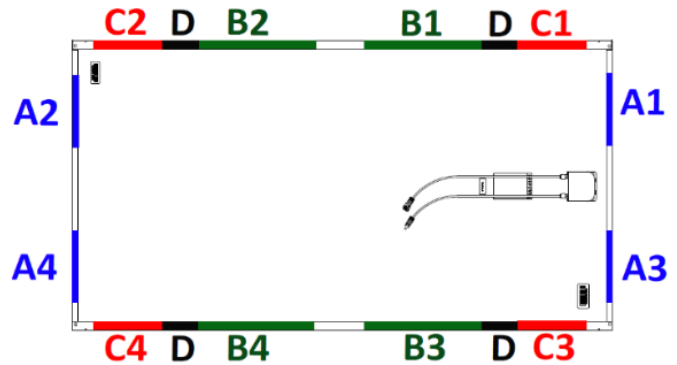


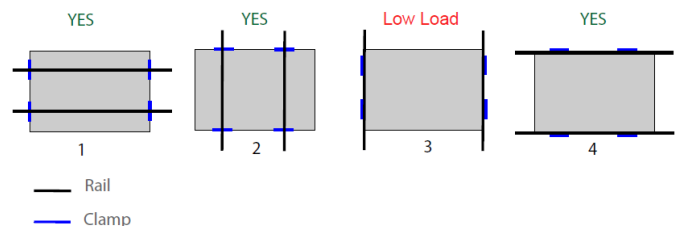
Table 1.1: Approved module clamping/direct fixation zones

Module Configuration		Mounting zone distance from corner in (mm) ¹			Frame holes E
Module size	Frame type	A (1&2&3&4)	B (1&2&3&4)	C (1&2&3&4)	
96 cells, 104 cells (MAX3), 112 cells and P3 RES+	G3 (Black) Silver & G4.1 & G4.2 & G4.3	50-350	150-380	50-150	As per Drawing in the Table 2
112 AC ready	G5.2	50-350	272-453	50-272	
128 cells	G4 & G4.1	50-350	408-880	50-375	
P3-COM	G4.2 & G4.3	50-350	408-833	50-375	
MAX6 (66 cells)	G5.2	50-350	265-514	50-265	
MAX6 COM (72 cells)	G4.2 & G5.6	50-350	296-536	50-296	

D - There is a 20mm zone at 388-408mm from the corner where mounting is not allowed due to the module stacking pin feature. Applicable to 128 and 96 cell commercial only.

1) No part of the module clamp may extend beyond this area.

Figure 3: Mounting Configurations



Configurations 1 and 2 show mounting with rail support, 3 and 4 show mounting without rail support. In "With Rail Support" the rails becomes conventional or rails transverse while "Without Rail Support" becomes end mounted in long or short side. In the case when the glass deflects it would not deflect in the rails for additional support.

Table 1.2: Mounting Zone Design Load Ratings for Racking system without rail support underneath the module. Refer to configuration 3 and 4 in Fig.3

Module Configuration		Wind (up & down) / Snow (down) (units in Pa) (***)			
Module size	Frame type	End Mount A (1&2&3&4)	Frame Holes E (1&2&3&4)	B (1&2&3&4)	C _(1&2&3&4) or B + C (B _{1&3} + C _{2&4} or B _{2&4} + C _{1&3}) Or A + B (A _{1&3} + B _{2&4} or A _{2&4} + B _{1&3}) Or A + C (A _{1&3} + C _{2&4} or A _{2&4} + C _{1&3})
96 cells	G3 Black & Silver	2400/ 2400 ^(*)	2400/ 5400	2400/ 5400	2400/2400
104 cells (MAX3) and 112-cells (MAX3)	G4.2	1800/ 1800			
112 AC Ready	G5.2	1800/ 1800	3600/ 3600	2400/ 2400	1800/1800
P3 RES+	G4.3	1300/ 1600	1600/ 2400	1600/ 2400	1300/ 1600
128 cells	G4 & G4.1	Not applicable (**)	2400/ 5400	3600/ 3600	2400/2400
P3-COM	G4.2 & G4.3	1600/ 1600	1600/ 2400	1600/ 2400	1600/1600
MAX6 (66 cells)	G5.2	1600/ 1600	3600/ 3600	3600/ 3600	1600/1600
MAX6-COM (72 cells)	G5.6	1067/ 1200	3600/ 3600	3600/ 3600	1600/1600

(*): 5400Pa is allowed with clamps and mounting rails along the longer side of the frame

(**): 2400/2400Pa are allowed with clamps and mounting rails along the longer side of the frame

For Rooftop application 1200/1200Pa is allowed with only clamps

(***) Safety factor of 1.5 included

Table 1.3: Mounting Zone Load Ratings for Racking system with rail support. Refer to Configuration 1 and 2 in Fig.3

Module Configuration		Wind (up & down) / Snow (down) (units in Pa) (***)	
Module size	Frame type	B (1&2&3&4)	C (1&2&3&4)
96 cells and P3 BLK	G3 (Black & Silver) & G4.1 & G4.2	2400 / 5400	2400 / 2400
104 cells (MAX3) and 112-cells (MAX3)	G4.2	3600/5400	
112 AC Ready	G5.2	2800/3600	1800/1800
P3 RES+	G4.3	1600/3600	1600/3600
128 cells	G4 & G4.1	3600 / 5400	2400/ 3600
P3-COM	G4.2 & G4.3	2000/2400	1600/2400
MAX6 (66 cells)	G5.2	3600/6000	2800/2800
MAX6 COM (72 cells)	G5.6	3000/5400	2400/2400

Table 1.4: Mounting Zone Load Ratings for Performance Modules

Applicable Products ²	Mounting Zone	Distance from corner (mm)	Wind (up & down) / Snow(down) (units in Pa) ³	Mounting Method
P3 UPP (2066 x 1160 x35mm)	A	183-283	1600/2400	Clamp
	B	466-566	1600/3600 ⁴	
	C	783-833	1600/1600	
	D	260-320	1600/1600	
	E	465-565	1600/2400	
	Frame Holes ²	383 (1300)	1600/1600	Bolt
		504 (1058)	1600/3600	
		683 (700)	1600/1600	
833 (400)				
P5 UPP & P6 COM-M (2384 x 1092 x 35mm)	A	50-546	800/1600	Clamp ⁶
	B	546-692	1600/3600 ⁴	
	C	692-1042	1333/3600	
	D	0-323	933/933	Clamp ⁷
	E	546-692	1600/3600	Clamp ⁸
	F	546-692	1600/2000	Clamp ⁹
	G	0-323	933/933	Clamp ¹⁰
	Frame Holes ²	492 (1400)	1600/3600	Bolt ⁵
		642 (1100)	1600/3600	
992 (400)		1160/1160		
P6 RES BLK & COM-XS (1808 x 1086 x 30mm) & (1808 x 1092 x 30mm)	A	50-402	1333/1333	Clamp ⁶
	B	402-502	1600/3600	
	B2	217-617	1333/1800	
	C	502-754	1200/1333	
	D	221-321	1066/1066	Clamp ⁷
	E	402-502	1200/1800	Clamp ⁸
	F	50-100	1300/1300	Clamp ⁹
	G	0-221	1066/1066	Clamp ¹⁰
P6 COM-S (2185 x 1092 x 35mm)	A	50-496	1066/1200	Clamp ⁶
	B	496-596	1600/3600	
	C	596-942	1066/1600	
	D	223-323	933/1600	Clamp ⁷
	E	496-596	1200/1867	Clamp ⁸
	F	50-100	1066/1200	Clamp ⁹
	G	0-100	666/800	Clamp ¹⁰
		100-323	1066/1066	
	Frame Holes ²	1100(392)	1600/3600	Bolt
1400(542)		1600/3600		

2 Refer to Table 2 for different mounting hole locations

3 Safety Factor 1.5 included

4 IEC validated

5 Minimum washer size of 24mm in diameter is required.

6 Long Side Mounting, Rails Perpendicular to Mounting Frame

7 Short Side Mounting, Rails Parallel to Mounting Frame

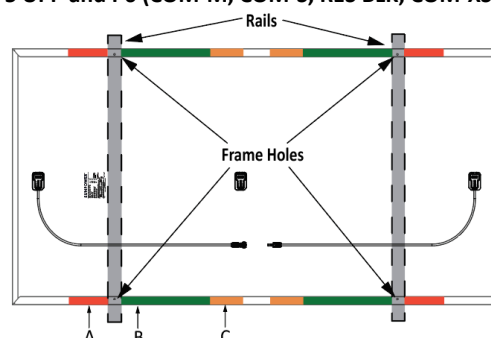
8 Long Side Mounting, Rails Parallel to Mounting Frame

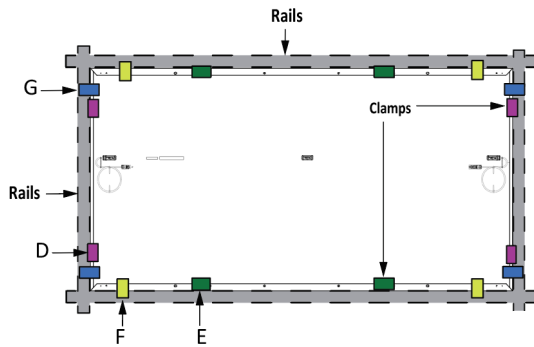
9 Long Side Mounting, Point Supported (Bottom Flange Mounting)

10 Corner Mounting (Short Side), minimum of 50mm clamp is required.

Figure 4: Mounting Zone Locations for Performance modules

For P3, P5 UPP and P6 (COM-M, COM-S, RES BLK, COM-XS)





5.3 Ground Mount Applications for Bifacial modules

Various environmental and installation parameters affect bifacial gain. Albedo is a measure of the amount of light reflected from the ground surface. A higher albedo factor will increase irradiance on the backside and result in higher bifacial gain of the module. The surface conditions, month of the year, time of day, GHI and DNI both influence the amount of incident rear side irradiance.

Maxeon recommends to check with solar module mounting hardware supplier in order to determine the Structure Shading factor of your particular installation. The Structure Shading Factor varies with racking system design, irradiance, albedo and height of module installation above ground and has an overall impact on the rear side irradiance mismatch.

The Rearside mismatch losses are proportional to the albedo, height of the modules above ground and structure shading factor. The irradiance non-uniformity on the rear side results in mismatch generally as the albedo increases and installation height of the modules are lower to the ground.

5.4 Rooftop Applications for Bifacial modules

Bifacial modules use direct, reflected or diffuse sunlight at the rear side to generate additional power. Therefore, it is recommended to use bifacial modules installed on flat roof applications.

In order to maximize the bifacial gain at the rooftop applications the following parameters listed below should be considered:

- Surface Albedo
- Roof Integrity
- Module Tilt Angle
- Module Elevation
- Structural Backside Shading

The bifacial modules can be mounted both landscape or portrait orientation as shown in Appendix section.

When installing a bifacial module on a roof, check applicable building codes and ensure that the roof construction and the structural load calculations of the building are suitable.

Bifacial gain tends to be most effective with a higher tilt angle.

As the tilt angle and the module elevation from the underlying surface increases, more reflected light and diffuse light can be captured by the module. The mounting rails shall be designed to limit the rear side shading as much as possible. Obstacles between modules and the ground should be avoided as much as possible in order to increase the bifacial gain.

5.5 Bifacial Electrical Considerations

The overall electrical bifacial gain is determined by the combination of surface albedo, irradiance, module tilt angle, shading losses from the rear side, rear side mismatch and module elevation above ground. Please refer to the Maxeon datasheet for the electrical outputs with respect to the overall bifacial gain. Please utilise a suitable performance software package to simulate the overall bifacial gain.

5.6 Handling of Modules during Installation

Do not place modules face forward in direct contact with abrasive surfaces like roofs, driveways, wooden pallets, railings, stucco walls, etc...

The module front surface glass is sensitive to oils and abrasive surfaces, which may lead to scratches and irregular soiling.

During storage, modules need to be protected from rain or any kinds of liquids. Required storage temperature is between 10°C to 40°C in a dry environment (humidity between 30 to 80%). Do not store modules outdoor to avoid moisture and wet conditions.

Modules that feature antireflective coated glass are prone to visible finger print marks if touched on the front glass surface. Maxeon recommends handling modules with anti-reflective glass with gloves (no leather gloves) or limiting touching of the front surface. Any finger print marks resulting from installation will naturally disappear over time or can be reduced by following the washing guidelines in Section 6.0 below. Any module coverage (colored plastic tarps or similar) during installation can lead to permanent front glass discoloration and is not recommended. The use of vacuum lifting pads can cause permanent marks on the front glass. Never lift or move the module using the cables or the junction box under any circumstances.

Shading incidence need to be avoided during PV system operation. The system is not supposed to be energized until the mounting scaffolding, fences or railing have been removed from the roof.

Systems should be disconnected in any cases of maintenance which can cause shading (e.g. chimney sweeping, any roof maintenance, antenna/dish installations, etc).

6.0 Maintenance

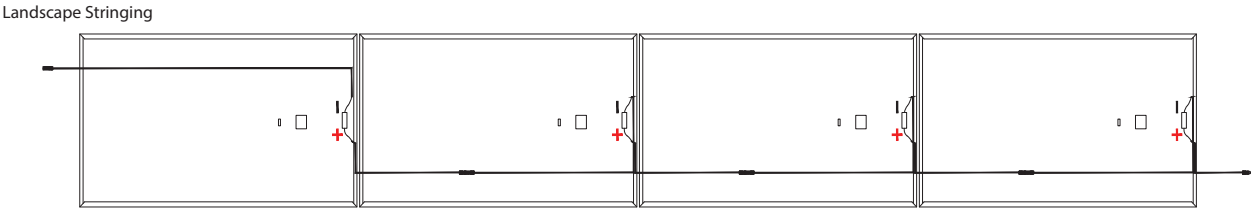
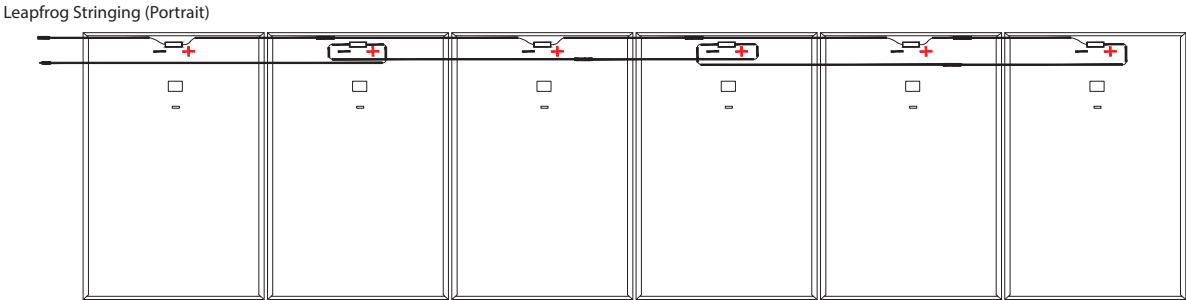
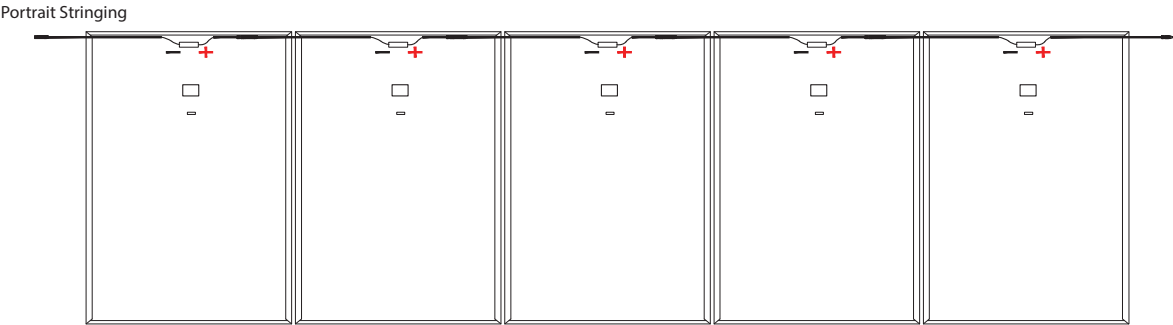
Maxeon recommends visual inspection on a regular basis of all modules for safe electrical connections, sound mechanical connection, and free from corrosion. This visual inspection should be performed by trained personnel. The standard frequency is once a year according to environmental conditions, periodic cleaning of modules is recommended but is not required. Periodic cleaning has resulted in improved performance levels, especially in regions with low levels of annual precipitation (less than 46,3cm (18,25 inches)). Consult your dealer or supplier about recommended cleaning schedules for your area.

To clean a module, wash with potable, non-heated, water. Normal water pressure is more than adequate, but pressurized water up to 100 bar (min.50 cm distance) may be used. Maxeon recommends using a large hosepipe and not to perform cleaning at high outside temperatures. Fingerprints, stains, or accumulations of dirt on the front surface may be removed as follows: first rinse off area and let soak for a short period of time (5 mins). Re-wet and use a soft sponge or seamless cloth to wipe glass surface in a circular motion.

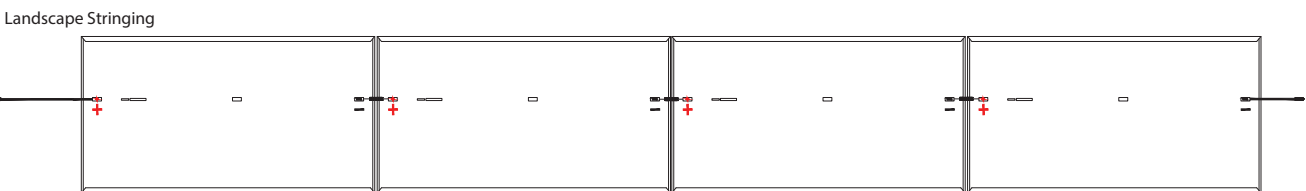
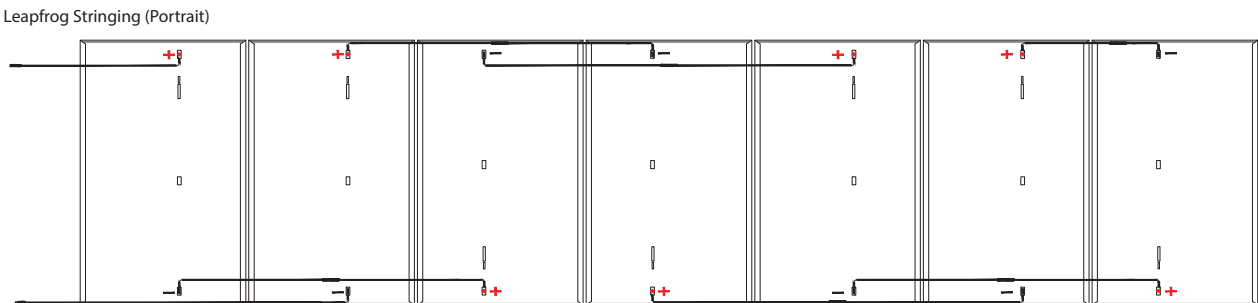
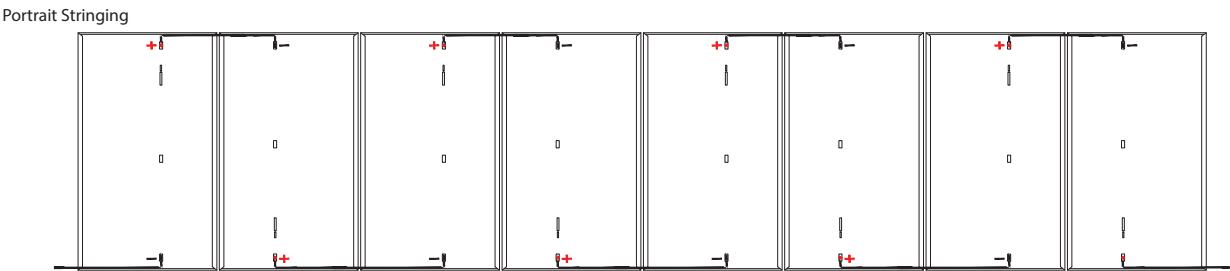
Fingerprints typically can be removed with a soft cloth or sponge and water after wetting. Do not use harsh cleaning materials such as scouring powder, steel wool, scrapers, blades, or other sharp instruments to clean the glass surface of the module. Use of such materials or cleaning without consultation will invalidate the product warranty. As dry cleaning is also risky for Anti-Reflective (AR) coated module surface, spinning brush is not recommended for module cleaning.

Recommended Cable Management

Maxeon Product Line:

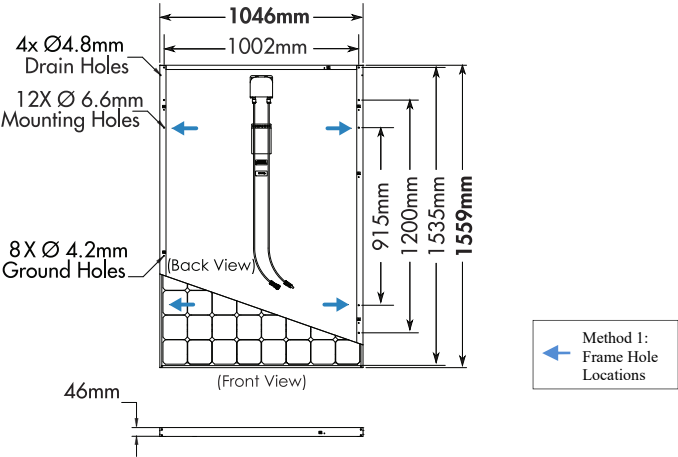
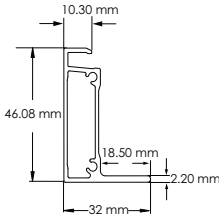
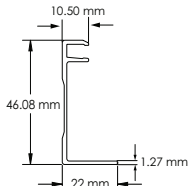
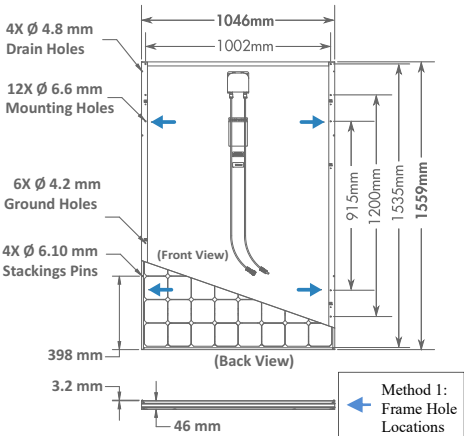
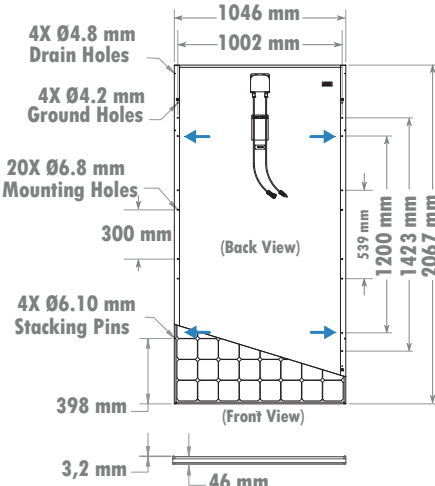
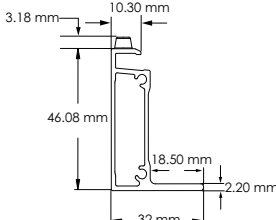
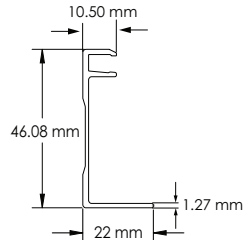


Performance Product Line:

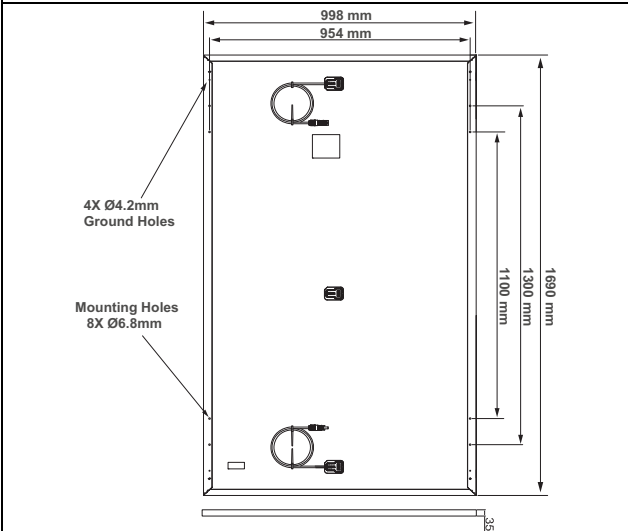
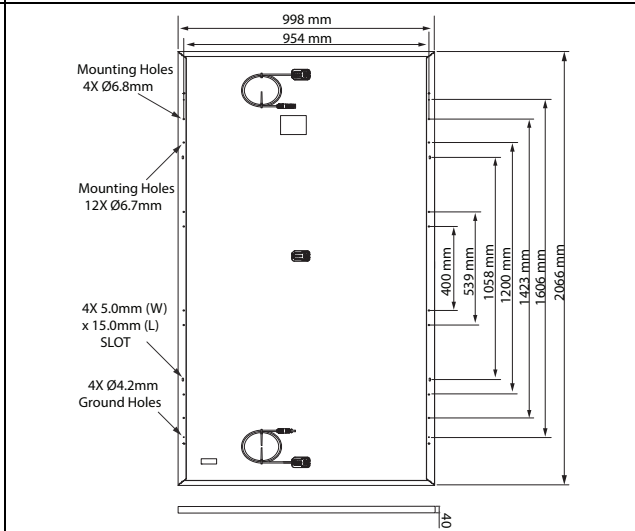
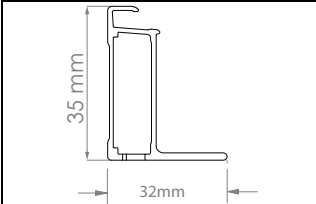
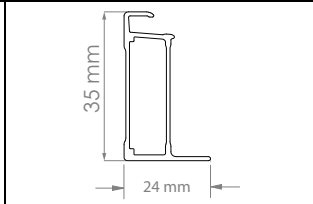
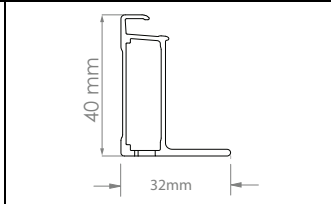
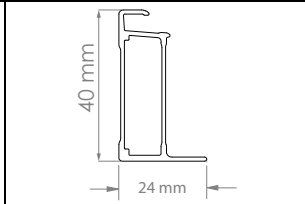
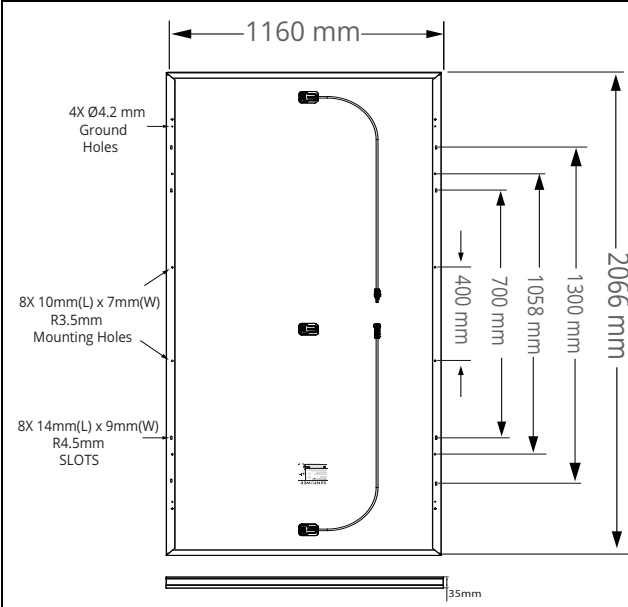
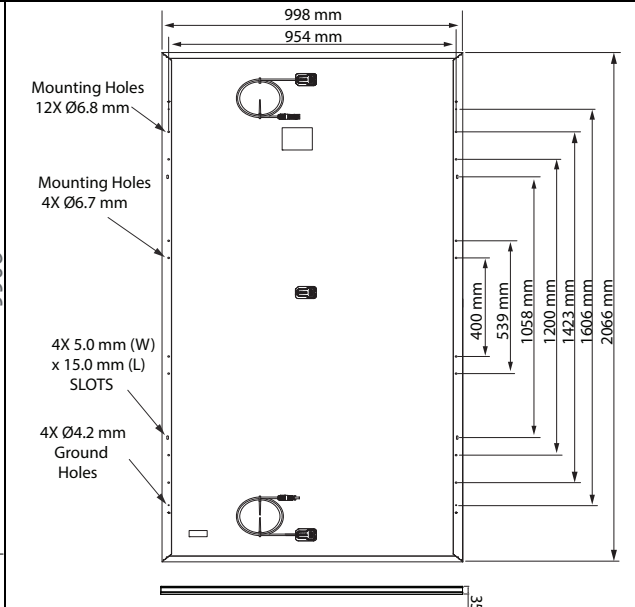
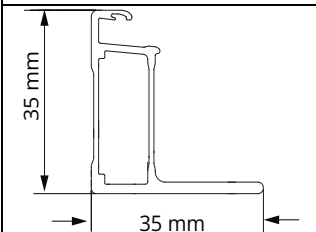
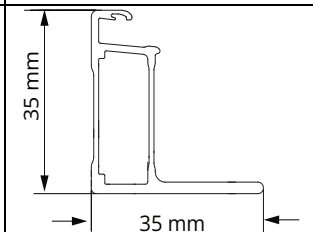
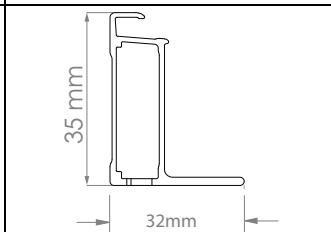
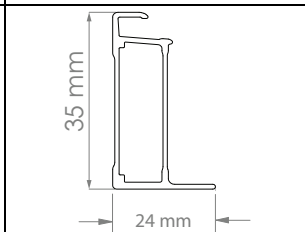


*The image above is for illustration purposes only

Table 2: Module Frame Details

Platform	Module mounting and ground hole detail		Frame Profile
RESIDENTIAL G3 FRAME ONLY			
Residential Modules	96 CELL MODULE FRAME DETAIL		SIDE FRAME PROFILE
			
			END FRAME PROFILE
			
FOR COMMERCIAL (SILVER FRAME) MODULES ONLY, INCLUDES STACKING PINS			
Commercial Modules	96 CELL COMMERCIAL MODULE	128 CELL COMMERCIAL MODULE	SIDE FRAME PROFILE
			
			With Stacking Pins
			END FRAME PROFILE
			

Measurement Tolerances are +/-3 mm for the Length and Width of the Module.

Platform		Module mounting and ground hole detail						
FOR P3 MODULES								
Residential/ Commercial Modules	P3 BLK (GEN 4.3)		P3 COM (GEN 4.2)					
								
	SIDE FRAME PROFILE		END FRAME PROFILE		SIDE FRAME PROFILE		END FRAME PROFILE	
								
FOR P3 GEN 4.3 FRAME MODULES								
Commercial Modules	P3 UPP		P3 COM					
								
	SIDE FRAME PROFILE		END FRAME PROFILE		SIDE FRAME PROFILE		END FRAME PROFILE	
								

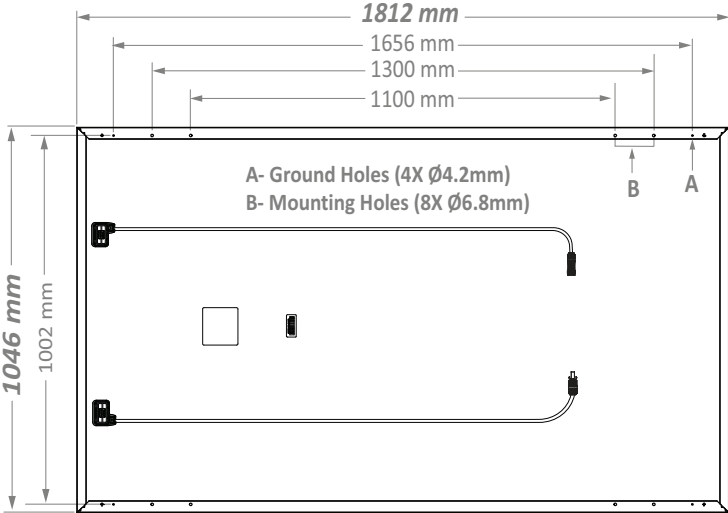
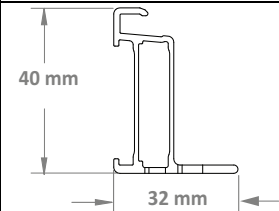
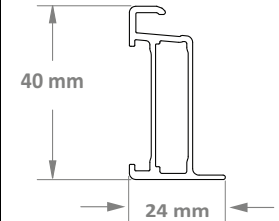
Platform	Module mounting and ground hole detail	Frame Profile
FOR P5 UPP & P6 BIFACIAL GEN 4.3		
Commercial Modules	2384 mm 1400 mm 1100 mm 400 mm 1092 mm 1043 mm 4x Ø4.2mm Ground Holes 4x 10mm (L) x 7mm (W) R3.5mm Mounting Holes 8x 14mm (L) x 9mm (W) R4.5mm SLOTS	SIDE FRAME PROFILE
		35 mm 35 mm
		END FRAME PROFILE
Commercial Modules	1690 mm 1500 mm 1300 mm 1100 mm 1046 mm 1002 mm 4x Ø 4.2 mm Ground Holes 8x Ø 6.8 mm Mounting Holes	SIDE FRAME PROFILE
		35 mm 32 mm
		END FRAME PROFILE
Commercial Modules	1690 mm 1500 mm 1300 mm 1100 mm 1046 mm 1002 mm 4x Ø 4.2 mm Ground Holes 8x Ø 6.8 mm Mounting Holes	SIDE FRAME PROFILE
		40 mm 32 mm
		END FRAME PROFILE
Commercial Modules	1690 mm 1500 mm 1300 mm 1100 mm 1046 mm 1002 mm 4x Ø 4.2 mm Ground Holes 8x Ø 6.8 mm Mounting Holes	SIDE FRAME PROFILE
		40 mm 32 mm
		END FRAME PROFILE

Platform	Module mounting and ground hole detail	Frame Profile
FOR 112c GEN 4.2 FRAME MODULES		
	Diagram showing the module layout for 112c GEN 4.2 frame modules. The module is rectangular with a width of 1812 mm and a height of 1046 mm. The mounting holes are spaced at 1656 mm, 1300 mm, and 1100 mm from the edges. The ground holes are spaced at 1002 mm from the edges. The module has 4x Ø 4.22 mm Grounding Holes and 8x Ø 6.80 mm Mounting Holes.	SIDE FRAME PROFILE Side frame profile showing a height of 40 mm and a width of 32 mm. END FRAME PROFILE End frame profile showing a height of 40 mm and a width of 24 mm.
FOR MAX6 66-CELL GEN 5.2 FRAME MODULES		
Residential/ Commercial Modules	Diagram showing the module layout for MAX6 66-cell GEN 5.2 frame modules. The module is rectangular with a width of 1872 mm and a height of 1032 mm. The mounting holes are spaced at 1100 mm from the edges. The ground holes are spaced at 40 mm from the edges. The module has Quarter Mount Holes and Ground Holes.	SIDE FRAME PROFILE Side frame profile showing a height of 40 mm and a width of 32 mm. END FRAME PROFILE End frame profile showing a height of 40 mm and a width of 24 mm.
FOR MAX6 72-CELL GEN 5.6 FRAME MODULES		
Residential Modules	Diagram showing the module layout for MAX6 72-cell GEN 5.6 frame modules. The module is rectangular with a width of 2047 mm and a height of 1039 mm. The mounting holes are spaced at 1983 mm, 1653 mm, 1423 mm, 1200 mm, and 400 mm from the edges. The ground holes are spaced at 96.50 mm from the edges. The module has 4x Ø 4.60mm MLSD Holes, 16x Ø 6.80 mm Mounting Holes, and 4x Ø 4.22 mm Ground Holes.	SIDE FRAME PROFILE Side frame profile showing a height of 35 mm and a width of 32 mm. END FRAME PROFILE End frame profile showing a height of 35 mm and a width of 32 mm.

Measurement Tolerances are +/-3 mm for the Length and Width of the Module.

Platform	Module mounting and ground hole detail	Frame Profile
FOR P6 COM-S BIFACIAL GEN 4.3		
Commercial Modules	2185 mm 1400 mm 1100 mm 1092 mm 1051 mm 4X Ø4.2 Grounding Holes 8X 9mm (W) x 14mm (L), R4.5 Mounting Holes	SIDE FRAME PROFILE 35 mm 30 mm
		END FRAME PROFILE 35 mm 16 mm
FOR P6 RES BLACK & COM-XS GEN 4.4		
Commercial Modules	1808 mm 1100 mm 1086 mm 1038 mm 4X Ø4.2 Grounding Holes 4X 9mm (W) x 14mm (L), R4.5 Mounting Holes	SIDE FRAME PROFILE 30 mm 33 mm
		END FRAME PROFILE 30 mm 24 mm
FOR P6 COM-XS GEN 4.4 (1092mm)		
Commercial Modules	1808 mm 1100 mm 1092 mm 1044 mm 2X Ø4.2 Grounding Holes 4X 9mm (W) x 14mm (L), R4.5 Mounting Holes	SIDE FRAME PROFILE 30 mm 33 mm
		END FRAME PROFILE 30 mm 24 mm

Measurement Tolerances are +/-3 mm for the Length and Width of the Module.

Platform	Module mounting and ground hole detail	Frame Profile
FOR 112c AC READY GEN 5.2 FRAME MODULES		
Residential Modules	 A- Ground Holes (4X Ø4.2mm) B- Mounting Holes (8X Ø6.8mm)	SIDE FRAME PROFILE 
		END FRAME PROFILE 

Measurement Tolerances are +/-3 mm for the Length and Width of the Module.