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SunPower Performance and MAX

Photovoltaic Modules

Safety and Installation Instructions for Australia

Available Languages: English

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Safety and Installation Instructions (English - IEC Version)

001-15497 Revision AI (Australia)
PN 100657ss
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This document includes references to Performance and MAX modules:

Platform	Model	Power Range
P6 UPP	SPR-P6-xxx-COM-M-BF	xxx=510-555 in steps of 5
P6 COM-S	SPR-P6-xxx-COM-S-BF	xxx=470-510 in steps of 5
P6 BLK/COM-XS	SPR-P6-xxx-BLK, SPR-P6-xxx-COM-XS	xxx=380-420 in steps of 5
P6 COM-XS (1092)	SPR-P6-xxx-COM-XS	xxx=380-420 in steps of 5
P7 COM-S	SPR-P7-xxx-COM-S	xxx=520-560 in steps of 5
P7 COM-BLK	SPR-P7-xxx-BLK, SPR-P7-xxx-BLK-1500	xxx=427, 430-460 in steps of 5
P7 BLK-P	SPR-P7-xxx-BLK-P	xxx=485-520 in steps of 5
Performance 8	HSM-HHK-NM475	475
Performance 8 COM	HSM-GHJ-NMxxx	xxx= 580-590 in steps of 5
Performance 8 COM-L	HSM-GHJ-NMxxx	xxx= 595-610 in steps of 5
MAX	HSM-BE54-HD490-505	490-505 in steps of 5

Do not mix different models of Performance and/ or MAX modules in one system. All module series do not require functional grounding and are compatible with transformer-less inverters (ref. section 4.1)

This document describes the limited warranty, mounting configuration, handling, maintenance and cleaning of modules. Save this documentation for future reference and comply with all provided instructions.

For the latest revision, please refer to www.sunpowerglobal.com/au/documents
Contents of this manual are subject to change without notice.
SunPower Australia

www.sunpowerglobal.com/au

1.0 Introduction

This manual provides safety and installation instructions for IEC certified SunPower photovoltaic modules carrying the TUV logo on the product label (Figure below).

All instructions in this manual must be read and understood prior to the installation, operation, or maintenance of the modules. Failure to follow these instructions may result in personal injury, property damage, or system failure.
The installation and operation of PV modules involve electrical and mechanical work and must only be carried out by appropriately qualified and licensed personnel, in accordance with all applicable local standards and regulations. Installers are responsible for ensuring that the end user is informed of relevant safety, operation, and maintenance requirements.
For the purpose of this manual, the term "module" refers to one or more photovoltaic modules.

***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 SunPower Limited Warranty for PV Modules.**

1.1 Disclaimer of Liability

SunPower reserves the right to update this manual without prior notice. For the latest version, refer to: https://www.sunpowerglobal.com/au

This document is provided for guidance only and does not constitute a warranty of any kind.

Failure to install, operate, or maintain the modules in accordance with the instructions outlined in this manual may void the product warranty. SunPower does not accept liability for any loss, damage, or injury resulting from improper handling, installation, operation, or maintenance of the modules, including but not limited to product damage, personal injury, or property loss.

1.2 Conformity to International Electrotechnical Commission (IEC) standards

The products specified herein meet or exceed the requirements set forth by IEC 61215 and IEC 61730. Refer to Table 1 for the detailed certification information pertaining to each product. 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.

Table 1: Product Certification

IEC 61215/IEC 61730:2016	SPR-P6-xxx-COM-M-BF
IEC 61215:2021 / IEC 61730:2023	SPR-P6-xxx-BLK SPR-P6-xxx-COM-XS SPR-P6-xxx-COM-S-BF SPR-P7-xxx-COM-S SPR-P7-xxx-BLK SPR-P7-xxx-BLK-1500 SPR-P7-xxx-BLK-P HSM-HHK-NM475 HSM-GHJ-NMxxx HSM-BE54-HD490-505

1.3 Limited Warranty

Module limited warranties are described in the SunPower warranty document obtainable at www.sunpowerglobal.com/au. 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 SunPower installation instructions and operations and maintenance instructions of any type (as may be amended and updated from time to time at SunPower'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 SunPower; (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 SunPower's control.

2.0 Safety Precautions

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

2.1 General Safety

All safety instructions must be read and understood before installing, wiring, operating, or maintaining the modules.
SunPower modules comply with IEC 61215 and IEC 61730 standards and are classified as:

- Application Class A (suitable for public-access systems >50V DC or >240W)
- Safety Class II
- Fire Class C or higher

Modules generate direct current (DC) when exposed to light. Contact with live parts, including terminals, may result in serious injury or death, regardless of whether the module is connected.

Module frames and structures may have sharp edges that can cause injury. Always use appropriate personal protective equipment (PPE), including insulated gloves, safety helmet, safety footwear, insulated tools, and safety harnesses where required. Avoid loose clothing or tools that may cause entanglement.

General Safety Requirements

- Do not install or handle modules in hazardous conditions (e.g. strong winds, wet or sandy roofs).
- Do not modify the module, including drilling holes or damaging the frame coating, as this may reduce the load-bearing capacity of the frame and cause corrosion.
- There are no user serviceable parts within the module. Do not repair modules. Damaged modules must be disposed of by qualified organizations.
- Do not use modules with damaged glass, backsheet, or other components.
- 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.
- Do not stack heavy or sharp objects on modules.
- Do not lift via cables or junction boxes.
- Do not pull, bend, or damage cables or connectors, as this may damage the insulation and cause electric leakage, leading to electric shock.
- Do not insert conductive materials into connectors.
- Do not connect or disconnect modules under load or when its inverter is feeding in to the grid. Switch off the inverter before disconnecting, reinstalling or making any action with the modules.
- Do not concentrate light on the module.
- Do not carry modules on the head or back.
- During normal operation, modules should not be shaded by buildings, trees, vegetation, chimneys, towers, adjacent array modules, or other obstacles.
- Keep the junction box closed and protected from contamination, sunlight exposure, and water immersion.
- Do not allow the junction box or connectors to come into contact with chemicals such as sunscreen, greases, oily substances, organic solvents, other corrosive materials, or substances that may cause functional failure. If the junction box or connectors are contaminated, do not continue to use them.
- Do not block drain holes or allow water to pool in or near module frames.
- In case of fire, disconnect power before using water to extinguish.

2.2 Electrical Safety

Modules generate DC voltage when exposed to light. DC voltages ≥30V can be hazardous.

- Always use insulated PPE (gloves, footwear, tools) when handling modules to reduce the chance of accidental exposure to live circuits.
- Modules can generate voltage even when not connected to a load or external circuit.

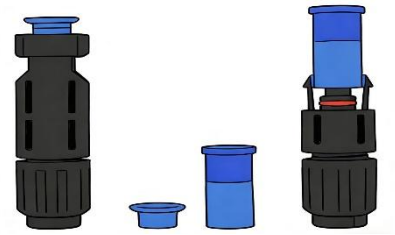
Modules do not have an on/off switch and can only be de-energized by:

- Fully covering them with opaque materials, or
- Placing single-glass modules face down on a flat surface
- For double-glass modules, both sides must be fully covered

Electrical Safety Requirements

- Do not disconnect connections under load to avoid arcing or electric shock.
- Ensure connectors are clean, dry, undamaged, and properly connected.
- Do not insert foreign objects or make improper connections.
- Connect modules as soon as possible after installation.
- Ensure connectors meet IP68 (IEC 60529) after connection.
- If connectors cannot be connected immediately or installation occurs in rainy or foggy conditions, it is

recommended to add a protective connector cover (as illustrated in the figure below).



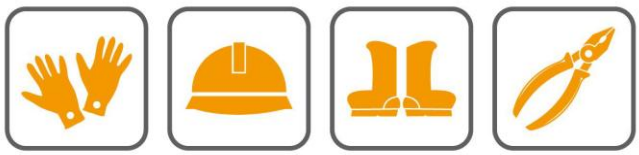
- For connectors, which are accessible to untrained people, it is imperative to use the locking connectors and safety clips, if applicable, in order to defend against untrained personnel disconnecting the modules once they have been installed.

Environmental & Operational Considerations

- Snow, water, and other reflective surfaces can increase irradiance on the module, raising output current.
- Low temperatures can increase output voltage.

Handling & Maintenance Safety

- Wear appropriate PPE when handling damaged modules.



- Perform installation and maintenance in dry conditions using dry tools.
- Follow the specified cleaning procedures as specified in this manual.
- Installation must be carried out under the supervision of a qualified electrician.
- Do not dispose of electrical equipment as general waste. Dispose of in accordance with local regulations to prevent environmental and health risks.

2.3 Transportation and Handling Safety

- Do not open packaging until modules reach the installation site.
- Transport modules correctly and protect packaging from damage.
- Do not exceed stacking limits indicated on packaging.
- Store packaging in a dry, ventilated, and weather-protected area before unpacking.
- Do not stand, sit, or place weight on modules or packaging.
- Avoid severe vibration or dropping the modules during handling.
- Only trained personnel should handle modules.

Manual Handling

- Use at least two people to carry modules.
- Lift modules by holding both sides of the frame.
- Do not carry modules on the back or using ropes.

2.4 Installation Safety

- Installation must comply with all applicable local laws and regulations, including building and construction permits where required.
- Installation must be performed by qualified personnel with PV installation experience.
- Always use appropriate PPE during installation. Avoid entanglement hazards.
- Do not wear metallic accessories or jewelry during installation or maintenance to reduce the chance of accidental exposure to live circuits.

Pre-Installation Checks

- Ensure modules and connectors are clean and dry.
- Inspect modules for damage, including:
    - Broken glass
    - Cracked cells
    - Scratches
    - Deformed mounting holes
    - Damaged junction boxes, labels, cables, or connectors
- Do not install damaged modules.

Installation Precautions

Do not stand on, walk, drop, and scratch or allow tools or objects to fall on the glass surface of the modules.

- Handle modules carefully, especially at corners.
- Ensure scaffolding is stable and includes anti-tipping measures.
- Use safety harnesses and comply with local safety regulations.
- Avoid standing below modules during installation to prevent injury from falling modules.

Roof Installations

- Assess building structure and fire rating before installation.
- Ensure the roof can support system loads, including module weight.
- Obtain structural approval from qualified engineers where required.

Use appropriate fall protection and access equipment when working at height.

2.5 Fire Safety

- Comply with all local fire safety regulations before installation.
- Roofs must use fire-resistant materials and allow adequate ventilation between modules and mounting surfaces.
- Maintain a minimum clearance of 10 cm between the module frame and roof surface for ventilation.
- Use appropriate protection devices (fuses, circuit breakers, grounding components) as required by local regulations.
- Ensure installation locations comply with safety requirements.

Fire Risk Prevention

- Do not install modules near open flames or flammable/explosive materials.
- Maintain a minimum separation distance of 30 meters from such hazards.
- Contact SunPower technical support if installation near such areas is required.

3.0 Electrical Characteristics

Modules of different models must not be used within the same photovoltaic (PV) system.

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. Always consult the module datasheets for detailed electrical specifications.

A photovoltaic module may produce more current and/or voltage than reported at STC. Sunny, cool weather and reflection from e.g. snow or water can increase current and power output. Therefore, the values of Isc and Voc 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. SunPower recommends the use of open-circuit voltage temperature coefficients listed on the datasheets when determining Maximum System Voltage.

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.

4.0 Electrical Connections

Incorrect polarity connections between arrays or strings may cause irreversible damage. Verify voltage and polarity of each string before connection.

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.

Each module is supplied with two factory-fitted DC cables and plug-and-play connectors.

Connector Requirements

- Only use connectors of the same brand and specification as those supplied with the module.
- Do not interconnect different connector types. 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.
- Connectors must be clean and dry and be fully engaged (audible "click"). Improper connections may cause arcing, damage, or fire.

- Currently approved connectors are:

Manufacturer	Model
Stäubli	PV-KST4/6I-UR PV-KBT4/6I-UR
	PV-KST4-EV02/6I-UR PV-KBT4-EV02/6I-UR
	PV-KST4-EV02A/6I PV-KBT4-EV02A/6I
Zerun	Z4S-CT4D2
UKT	PV-CO02-xy
Tyco Electronics	PV4-S1F4 PV4-S1M4

The PV modules comply with Safety Class **II** standards, ensuring double or reinforced insulation to prevent electric shock and enhance overall safety during installation and operation. All wiring must comply with applicable electrical standards and regulations. Use PV-specific cables with rated DC voltage of 1500V. SunPower recommends that all wiring be double insulated with a minimum rating of 90° C (194° F). All wiring should have UV and weather resistance and use flexible copper (Cu) conductors. The minimum size should be determined by the applicable codes. We recommend a size not less than $4mm^2$. For flat roof installations, 4–6 mm² PV cables are recommended.

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.

SunPower 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. Cables should be routed in suitable conduits. 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.

To prevent current generation during installation or disassembly, cover modules fully with opaque material before disconnecting conductors.

4.1 System & Equipment Grounding

All module frames and mounting structures must be properly grounded in accordance with applicable electrical standards, regulations, and site-specific requirements at the installation location. Proper grounding is essential to reduce the risk of electric shock and provide lightning protection.

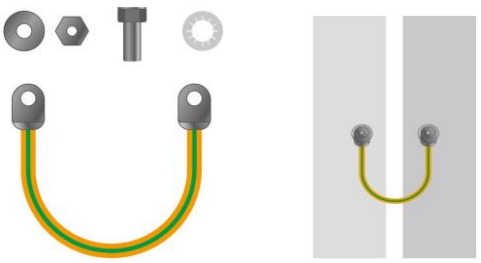
The grounding system must be connected to a suitable grounding electrode to ensure effective earthing. Ensure all connections are secure, continuous, and corrosion-resistant.

Module Frame Grounding

- Module frames are provided with pre-drilled holes marked for grounding.
- These holes are for grounding purposes only and must not be used for mounting.
- Do not drill additional holes in the frame, as this will void the product warranty.
- Unused mounting holes on the frame may be used for grounding where appropriate.
- Ensure the grounding connection makes full electrical contact with the frame and penetrates the protective surface layer.

Grounding Conductors

- Use 4–16 mm² copper grounding conductors to interconnect module frames and mounting structures.
- Ensure all connections are secure and mechanically robust.
- Adjacent module frames may be bonded using 4 mm² copper conductor via designated grounding points.



Install the grounding wire between adjacent module grounding holes using washers, a bolt, and a nut, and tighten securely.

Module Types

Performance and MAX 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.

P Series/ Performance Product Line:
SPR-P6-xxx-COM-M-BF SPR-P6-xxx-COM-S-BF SPR-P6-xxx-BLK SPR-P6-xxx-COM-XS SPR-P7-xxx-COM-S SPR-P7-xxx-BLK SPR-P7-xxx-BLK-1500 SPR-P7-xxx-BLK-P
HSM-HHK-NM475 HSM-GHJ-NMxxx

MAX Series Product Line:
HSM-BE54-HD490-505

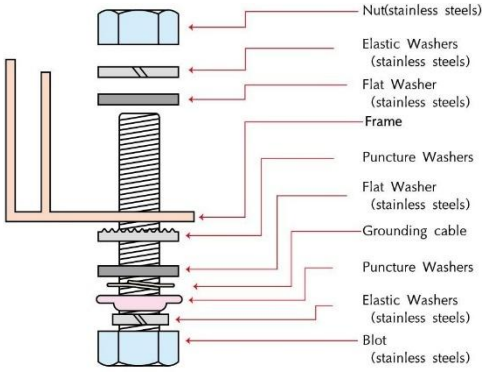
Note: If you are installing an older Module Type than above mentioned, please refer to different/previous applicable Safety and Installation Manual.

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.

4.1.1 Installation Methods

1. Grounding Wire with Bolt Connection

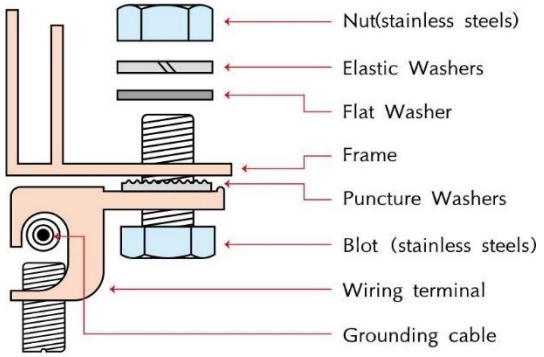
- Use stainless steel grounding bolts installed at designated grounding holes
- Assemble components in the order as illustrated in the Grounding Wire Installation Diagram.
- Tighten securely to ensure a reliable electrical connection



Grounding Wire Installation Diagram

2. Terminal Lug Connection

- Strip the grounding cable end to the required length without damaging the core conductor.
- Insert the cable into the terminal lug and secure using the fastening screw
- Attach the terminal lug to the module frame using stainless steel bolts and connectors as shown in the Terminal Lug Installation Diagram.
- Ensure a firm and conductive connection



Terminal Lug Installation Diagram

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. When connecting modules in series, ensure the total string voltage does not exceed:

- The maximum system voltage of the module
- The maximum input voltage of the inverter and other system component

It is recommended to use the following formula to calculate the maximum number of series-connected modules:

$$Max.System\ Voltage \geq N * Voc * [1 + TC_{VOC} * (T_{min} - 25)]$$

Where:

N: Number of series-connected modules

Voc: Open-circuit voltage of the module (refer to the product datasheet)

TC_{Voc}: Temperature coefficient of open-circuit voltage of the module (refer to the product datasheet)

T_{min}: Local minimum ambient temperature

The maximum number of modules connected in series per string must be determined by qualified design personnel in accordance with photovoltaic and electrical system design specifications of the installation location.

4.3 Parallel Connection

The modules may be combined in parallel to produce the desired current output. Before making parallel connection, confirm the voltage and polarity of each string. Do not connect strings with opposite polarity or if the voltage difference is greater than 10V. If abnormalities are detected, inspect the system configuration before proceeding.

Series strings must be fused prior to combining with other strings if the resulting maximum reverse current exceeds the fuse rating as shown in the datasheets.

To ensure compliance with the module's maximum series fuse rating, the maximum number of parallel-connected strings should be calculated using the following formula:

$$N \leq \frac{Fuse\ Rating}{Isc} + 1$$

Where:

N: Maximum number of parallel-connected strings

Fuse Rating: Maximum fuse rating value in an array string (refer to the product datasheet)

Isc: Module short-circuit current (refer to the product datasheet)

The calculated value shall not be exceeded.

Please refer to the applicable regional and local codes for additional fusing requirements and limitations on the maximum number of modules in parallel.

Bypass diodes are factory installed in the modules. The type and rating of the bypass diodes used are summarized in the following table.

Module	Type	Rating
HSM-HHK-NM475	Trench Schottky Bypass Diode	25A / 45V
HSM-GHJ-NMxxx	Trench Schottky Bypass Diode	30A / 45V

5.0 Module Mounting

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

5.1 Site Considerations

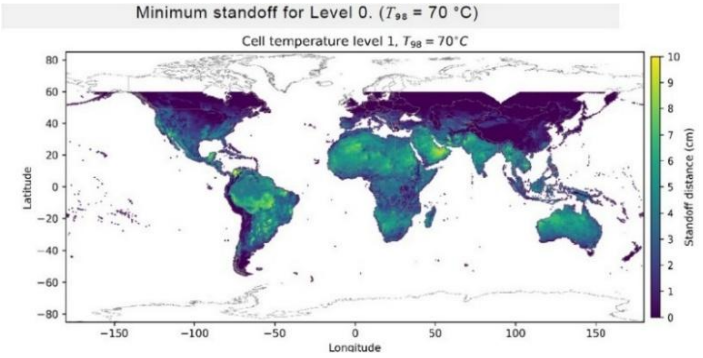
SunPower modules should be mounted in locations that meet the following requirements:

Operating Temperature: All SunPower modules must be mounted in environments within the following operating conditions:

Maximum Operating Temperature	+70 °C (+158 °F)
Minimum Operating Temperature	-40 °C (-40 °F)
Humidity	<85RH%
Altitude	≤2000m

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

Adequate ventilation should be provided behind or underneath the modules, especially in hot environments. It is recommended to install modules in environments where the ambient temperature ranges from -40°C to +40°C (monthly average minimum and maximum). The extreme operating ambient temperature range is **-40°C to +85°C**. The 98th percentile operational temperature of the module should not exceed 70°C under any mounting conditions. Refer to the following figure for Level 0 regions and its 98th percentile.



Source: IEC TS 63126 Edition 2

- Do not install modules in areas subject to submersion or continuous water exposure (e.g. sprinklers, fountains).
- For rooftop installations, maintain safe access clearance between the roof edge and the PV array. Verify roof load capacity and ensure compliance with structural requirements.
- In high wind or snow regions, ensure loads do not exceed the module's maximum rated load.
- In lightning-prone areas, appropriate lightning protection must be implemented.

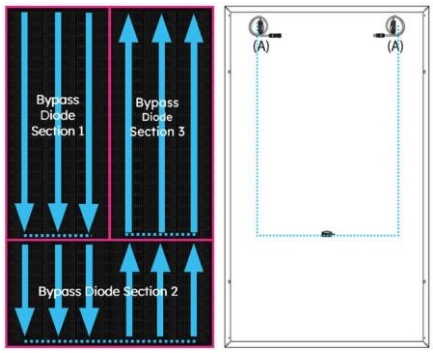
Modules should be installed in locations with maximum sunlight throughout the year and minimal shading. Even partial shading will reduce power output. Although modules are equipped with bypass diodes, shading can still affect the optimal performance and operational safety of modules. Shading should always be minimized as much as possible through site design and maintenance to maximize lifetime energy production. Prolonged shading may accelerate encapsulant material aging, cause long-term continuous heating of diodes, thereby significantly shortening the module service life and invalidating the limited warranty. Module damage or degradation caused by prolonged shading is not covered under warranty.

Shading is defined as Partial or Permanent. Partial Shade occurs infrequently – at certain times of the year or for a minimal duration during peak production hours. Sources include interrow shading, regular soiling, snow, and site

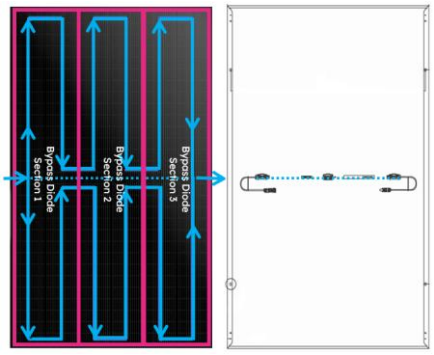
features. Permanent Shade regularly occurs for extended periods during peak production hours - such as installing panels directly behind a chimney or roof vent.

Bypass Diode Configuration and Shading Considerations

P7 and P8 COM Performance modules are equipped with three bypass diodes; with two located at the top and one at the bottom (See below figure). Due to their unique electrical circuitry, the module allows flexible installation orientation. Where temporary shading may occur on one side, the module may be flipped to limit shading to a single diode section and reduce performance impact.



P8 COM electrical circuitry



P8 RES electrical circuitry

P8 RES modules have a different internal circuitry design (see figure 4), with all three bypass diodes located centrally within the module. As a result, shading behavior differs from P8 COM modules.

When designing PV systems using P8 RES modules, installers must consider the diode layout and internal circuitry to minimize shading impact and optimize system performance.

Design Strength: SunPower 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 Appendix.

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 test method 8
- Ammonia Corrosion Resistance: IEC 62716 Concentration: 6,667ppm
- Modules are designed for a maximum altitude of 2000 m.a.s.l

Although modules comply with IEC 61701 salt spray testing, corrosion may still occur at the connection between the module frame and the structure, or at the grounding connection of the frame. Appropriate corrosion protection measures must be applied to these areas.

Modules can be installed in freshwater floating or fishery-solar applications as well as on land installations 50–500 m away from the seaside. However, when installing modules in areas within this distance range, the connectors need to be protected or dust/water plugs should be added. After removing the dust/water plugs, they must be connected immediately, and other anti-corrosion measures should be taken to prevent related components from rusting.

Excluded Operating Environments:

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

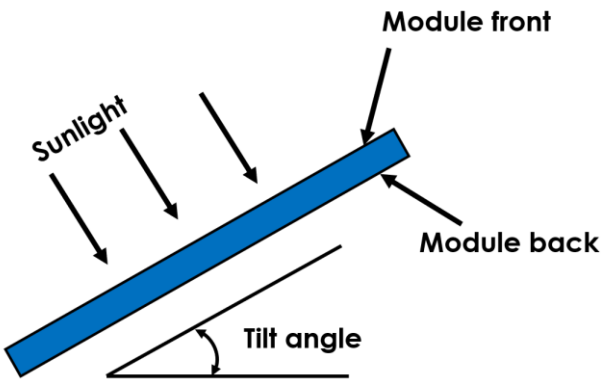
- It is strictly prohibited to install modules near open flames or flammable liquids, gases or explosive hazardous materials; or moving vehicles of any type.
- It is strictly prohibited to install in highly corrosive environments, including exposure to salt or salt spray, acid rain, salt water, active chemical vapors or other corrosive substances.

Performance Series Mounting Orientation

Performance Series (P-Series) can be installed in landscape or portrait. For optimum performance in commercial applications please consider installing 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.



Tilt angle: The tilt angle is defined as the angle between the module surface and the horizontal plane. Maximum power output is achieved when the module faces the sun directly. The optimal tilt angle should be selected based on site-specific conditions.

- In Northern Hemisphere, modules should face south.
- In Southern Hemisphere, modules should face north.

Modules may be mounted at any angle from horizontal to vertical. Select the appropriate orientation to maximize sunlight exposure. SunPower recommends a minimum tilt angle of 10° to allow natural cleaning by rain, reducing module maintenance. This also allows accumulated water on the module surface to drain away, preventing long-term water pooling that can leave marks on the glass and potentially affect the module's appearance and performance.

Tilt angles below 10° may result in dust accumulation, particularly at the lower edge of the module, leading to reduced power output and increased risk of hot spots, affecting module safety. For installations with tilt angles of less than 10°, we recommend installing water guide clips at the lower edge of the module or using anti-dust accumulation modules (Note: Anti-dust accumulation modules must be installed vertically to be effective). The cleaning frequency must be increased for modules installed with a very low angle. The final tilt angle must comply with applicable local regulations, standards, and system design requirements, or follow installer recommendations.

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

5.3 Mechanical Installation

Precautions

Installation must be performed by qualified personnel and comply with all applicable local regulations and electrical standards.

Pre-Installation Checks

- Inspect modules for damage, including glass breakage, cracked cells, scratched backsheet, deformed mounting holes, junction box detachment or cover loss, nameplate detachment or loss, damaged cables or connectors.
- Do not install damaged modules. Contact SunPower if defects are identified.
- Remove all protective materials (corner protectors, tapes) before installation.
- Ensure modules and electrical components are clean and dry to avoid corrosion. Modules with corroded connectors must not be used.

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).

It should be noted that the watertightness is not ensured by the modules but by the mounting system and that drainage should be well designed for Modules.

Handling, Protection and Installation Safety

- Do not install or handle modules in rain, snow, strong wind, or other adverse conditions.
- If modules are wet (e.g. after rain or dew), take precautions to prevent moisture ingress into connectors.
- Installation must be carried out by two or more people. Single-person handling is prohibited.
- Do not stand on modules.
- Do not wear metal accessories during installation to avoid piercing the modules and causing electric shock hazards.
- Cover modules with opaque material during installation and wiring to prevent current generation.
- Keep unauthorized personnel away from the installation area.
- Do not drop tools or objects onto modules as this may cause visible or invisible damage to the module.
- Do not scratch modules against hard surfaces or objects (e.g. brackets), ensuring the integrity of the module frame protective layer and glass surface coating.
- Do not loosen, remove or unscrew the factory fasteners and screws of the modules, as this may reduce the module load or even cause them to fall.
- Do not drill, modify, or alter any part of the module. SunPower's limited warranty will be invalidated.
- Avoid damaging the glass or backsheet when fixing modules to the brackets with bolts.

- Do not use damaged modules; exposed surfaces may present electric shock hazards.

Cabling

- Use UV-resistant cable ties or clips to secure cables to the mounting structure (frame or bracket, rails).
- Route cables to avoid direct sunlight exposure, water accumulation, and mechanical damage.
- The cable length of the junction box should be selected according to the installation method.
- Remove temporary cable ties/clips before wiring and replace with suitable ones.
- Minimize cable loops or arc coils to reduce lightning-related risks.
- For bifacial modules, avoid shading the rear side cells.
- If the system circuit is connected to the load, do not unplug the connectors.

Installation Environment & Structure

- Ensure scaffolding is stable and secured against tipping. Use safety harnesses in accordance with local regulations.
- Avoid standing below modules during installation to prevent injury from slipping modules.
- Install modules immediately after unpacking; do not leave unpacked modules exposed.
- Maintain safe working clearance between roof edge and module array; install safety barriers where possible.
- Verify the roof load capacity of the building before installation.
- Ensure drainage holes in module frames are not blocked under any circumstances.
- Do not install modules near flammable gases.
- Install lightning protection in areas with frequent lightning activity.

Environmental Limitations

- Do not install modules in strong winds, heavy rain, snow or other adverse weather conditions.
- Modules comply with IEC 61701 salt spray testing; however, corrosion protection measures must still be applied where required. Modules must not be submerged or exposed to water (pure or salt water) for extended periods, such as fountains, waves, etc.
- Modules may be installed in freshwater floating or fishery-solar applications. Land installations 50–500 m from the coastline. However, in such environments, protective measures must be taken to protect connectors appropriately from corrosion. If installation is within ≤50 m of coastline, consult SunPower before installation to confirm the product installation plan.

Installation Instructions

Modules must be installed in accordance with the specified installation methods in this manual to maintain IEC compliance. Modules can be connected to the bracket system using mounting holes on the frame, clamps, or embedded systems. If alternative installation methods are used, written approval must be obtained from SunPower; otherwise, warranty may be void.

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 and the roof surface should be minimum of 100 mm distance.

The recommended assembling clearance between modules installed on any mounting system is a minimum of 10 mm distance.

Damage caused by incorrect installation methods or use of unsuitable accessories, will void the SunPower limited warranty.

Mechanical Load Requirements

The loads stated in this manual are maximum test values. For installation methods that comply with local laws and regulations, a safety factor of 1.5 needs to be considered when calculating the maximum allowable design load, with the formula as follows:

Mechanical Load = Design Load × 1.5 (safety factor)

The project design load must be determined based on structure type, installation location, applicable standards and local climate conditions.

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. For the Australian Market, Building Integrated PV Module installations must comply with the requirements of the National Construction Code and AS/NZS 5033.

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. Consult a qualified structural engineer or refer to local building codes for load calculations.

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 are comprised of dissimilar metals. The module is only certified for use when its factory frame is

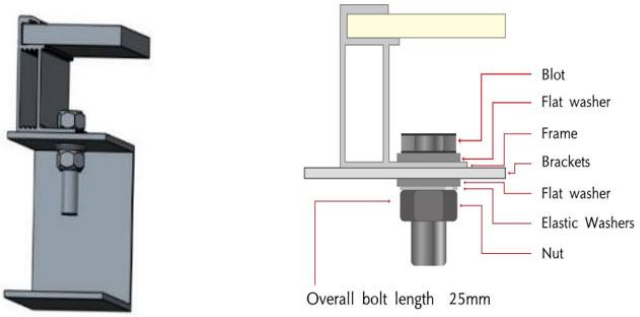
fully intact. Do not remove or alter the module frame. Creating additional mounting holes or removing the stacking pins may damage the module and reduce the strength of the frame, therefore are not allowed. Using mounting Clamps or clips with additional grounding bolts or grounding metal sheets could be in compliance with this Safety and Installation Instructions manual subject to conditions of Section 4.1

Installation Methods

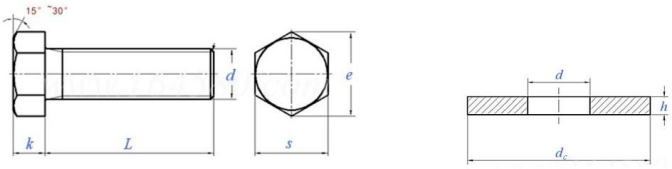
Modules may be mounted using the following methods only:

1) **Frame Holes:**

Each module frame is provided with four Ø9×14 mm mounting holes for secure attachment to the support structure to optimize its load-bearing capacity. Use corrosion-resistant (stainless steel) fasteners. 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. In high wind or snow load areas, it is recommended to use rectangular flat washers and self-locking nuts (consult SunPower if required). Refer to Appendix for the module dimensions and mounting hole locations.



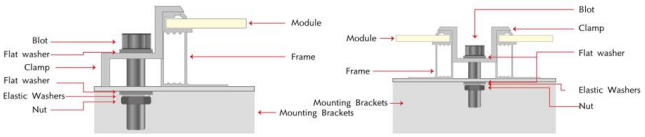
Bolt Installation Diagram

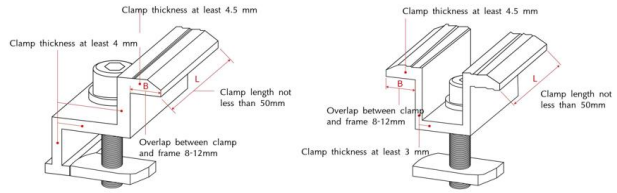


2) **Pressure Clamps or Clips**:

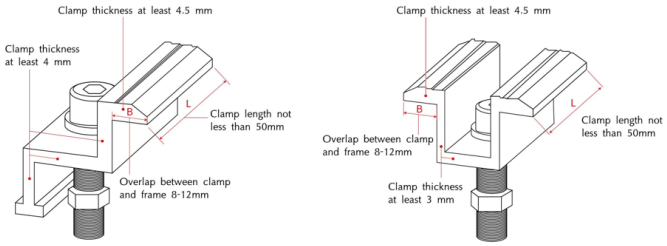
SunPower recommends clamps compatible with at least M8 bolts. Clamps must resist deformation and corrosion under load. Recommended specifications: length ≥ 50 mm, thickness ≥ 4 mm, material 6005-T6 (Rp0.2 > 225 MPa, Rm ≥ 265 MPa). The clamp must overlap the module frame (surface A) by 8–12 mm. Final clamp selection must ensure secure and reliable installation.

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 Appendix. 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 SunPower.



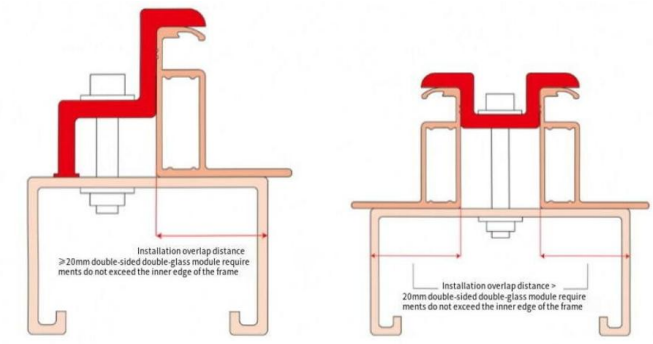


Clamp Installation Diagram 1 (Installed with Plastic Wing Nuts on U-shaped Steel Rails)



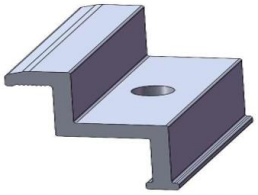
Clamp Installation Diagram 2 (Installed with Nuts on C-shaped Steel Rails)

For installation methods where the mounting rails are parallel to the module frame, ensure that the module frame and rails are fully overlapped or the overlap depth is >20mm. (As shown in the figure below)

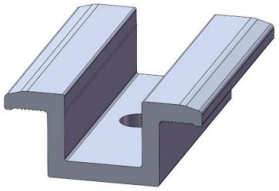


Due to variations in clamp design and their impact on wind load performance, clamps recommended by SunPower should be used. Custom clamps may be used where they ensure secure fixing and prevent module detachment from the mounting structure.

For large-format modules in high load conditions, or where short-side mounting or enhanced load performance is required, reinforced clamps such as hooked or curved clamps are recommended to ensure adequate load performance. Refer to the drawings below for typical hooked clamp designs.



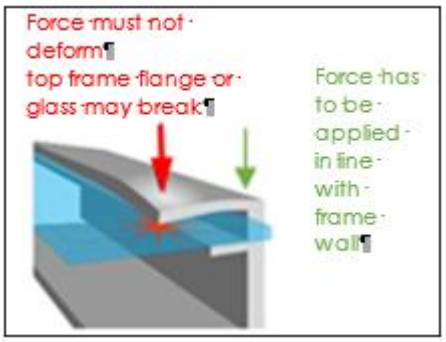
Hooked Edge Clamp



Hooked Middle Clamp

Note: If detailed design dimensions of clamp mounting parts are required for engineering design matching, please contact SunPower personnel.

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, deform the frame, cast shadows, or extend beyond the module edge. The module frame must not be modified. - these practices void the module warranty and risk glass breakage. The Figure below illustrates locations for top frame clamp force.



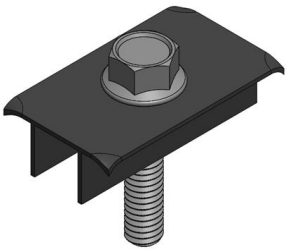
Avoid clamping within 50mm of module corners to reduce risk of frame corner deflection and glass breakage. Use a minimum of four clamps per module, with additional clamps as required based on wind and snow loads. For steel frame modules, ensure mounting holes are not partially obstructed by the mounting beam. Clamps must be secured to the module frame using the specified tightening torque to prevent frame deformation:

- M8 bolts: 16–20 N·m
- M6 bolts: 9–12 N·m

A calibrated torque wrench must be used. Mounting systems should be evaluated for compatibility before installing especially when the system is not using Clamps or clips. Minimum clamp width allowance is ≥35mm, and for corner clamping the minimum clamp width is:

≥50mm. Clamps should not be in contact with the front glass and clamps should not deform the frame. SunPower 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 4) 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.



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: with two mounting rails under the complete length of each shorter side of the Modules, with two mounting rails parallel to the long side of the Modules without any mounting rail (Appendix). The end-mounting rails and clips or clamps 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.

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. SunPower 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 Rear side 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.

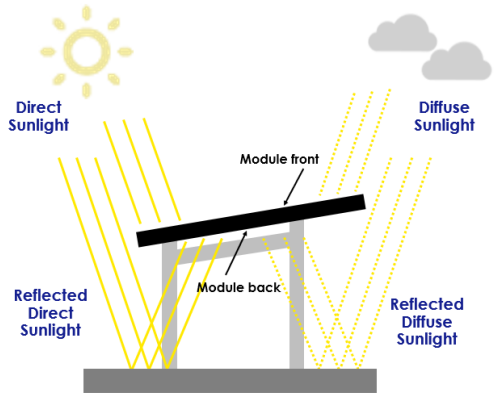
In order to maximize the bifacial gain at the rooftop applications the following parameters listed below should be considered:

- 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



In bifacial modules, the side identified as the module front is the primary light-receiving surface and is intended to face the sun during installation. The side identified as the module back is the rear light-receiving surface designed to collect reflected and scattered irradiance.

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 SunPower datasheet for the electrical output with respect to the overall bifacial gain. Please utilize 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 -20°C to 50°C in a dry environment (humidity < 85%). 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. SunPower recommends handing modules with antireflective 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.

Ties or tapes used to secure cables are designed for transportation. They are not designed to comply with local requirements for securing PV cable to the array, and may cause shading on bifacial panels reducing performance.

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

Regular inspection and maintenance are required to ensure safe operation and optimal performance of the modules.

⚠ Warning:

Before performing any maintenance, the PV system must be shut down. Failure to do so may result in electric shock, fire, or other serious hazards. SunPower 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 or more according to environmental conditions. Inspect for the following:

Module Condition

- Dirt, debris, or shading on the module surface
- Glass damage or breakage
- Discoloration (note: minor color variation due to anti-reflective coating is normal)
- Signs of overheating, burning, or backsheet damage (e.g. bulging, burn-through)
- Delamination, bubbles, or corrosion of internal components

Mechanical and Electrical Integrity

- Tightness of mounting bolts and structural connections
- Condition of cables and wiring
- Grounding continuity

Cables and Connectors

- Junction box sealing (cracks or gaps)
- Connector condition (loose, deformed, corroded, aged, or melted)
- Secure cable connections

If any abnormalities are identified, the module must be assessed by qualified maintenance personnel. Do not attempt repairs. Cover modules with opaque material during maintenance to prevent electrical hazards.

Cleaning

Cleaning may improve performance, particularly in low rainfall (less than 46,3cm (18,25 inches)), or dusty environments. While rainfall may be sufficient in some regions, cleaning at least once per year is recommended, with higher frequency where required. Consult your dealer or supplier about recommended cleaning schedules for your area.

Cleaning Guidelines

- Perform cleaning in the early morning or evening, when module temperature is low
- Ensure the system is isolated before cleaning
- Use potable, non-heated water (soft water recommended, pH 6–8)
- Normal water pressure is sufficient; high-pressure cleaning may be used within limits:
  - Maximum 4 MPa (HQ) or up to 100 bar at ≥50 cm distance (AU)
- Use a soft sponge or cloth to clean the glass surface
- For stubborn dirt, fingerprints, stains, or accumulations of dirt on the front surface, 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.

Cleaning Restrictions

Do not use:

- Abrasive or harsh materials (e.g. scouring powder, steel wool, brushes, scrapers, blades). Use of such materials or cleaning without consultation will invalidate the product warranty.
- Acidic or alkaline cleaners
- Spinning brushes or dry cleaning methods as this may damage AR coating on the module surface
- Do not clean:
  - Backsheet, cables, or connectors with water
  - Damaged modules (broken glass or exposed wiring)
- Avoid:
  - Applying excessive local pressure
  - Cleaning in extreme weather conditions

Additional Considerations

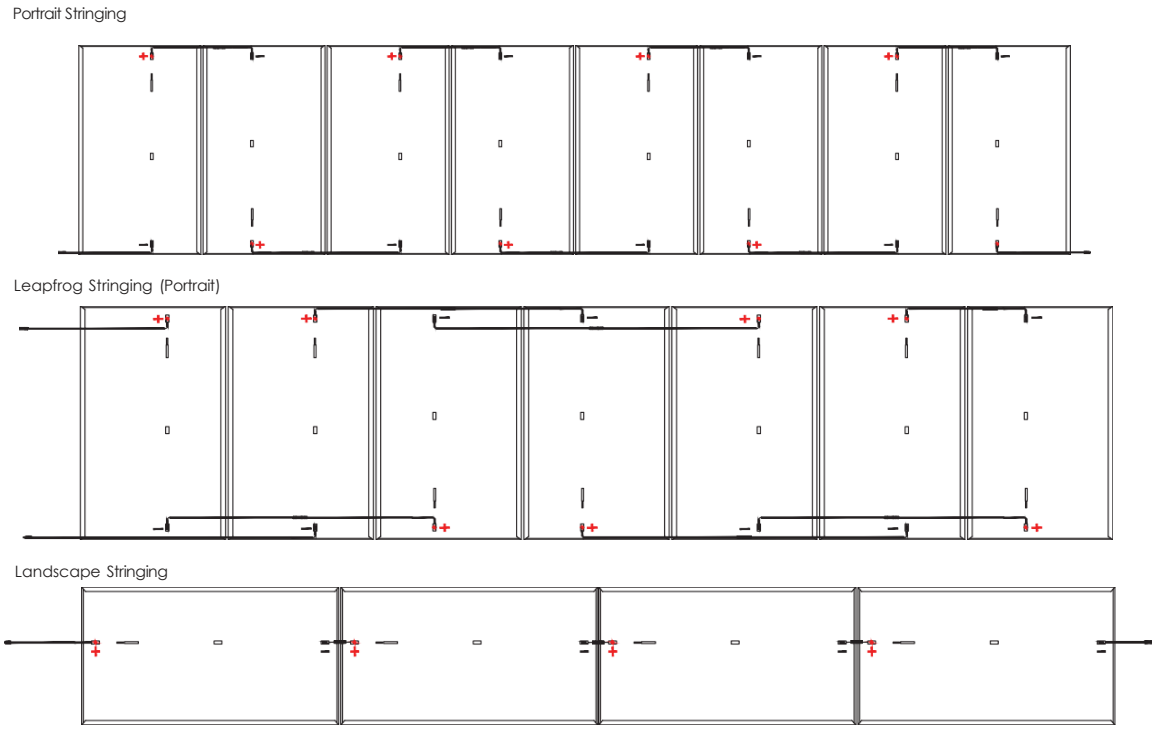
- Remove snow promptly to prevent damage from accumulation and freezing
- Avoid damaging the backsheet during cleaning

General Notes

- Maintenance must be performed by qualified personnel
- Any non-standard maintenance procedures should be approved by the supplier or distributor
- Contact the supplier for guidance if maintenance requirements are unclear,

Recommended Cable Management

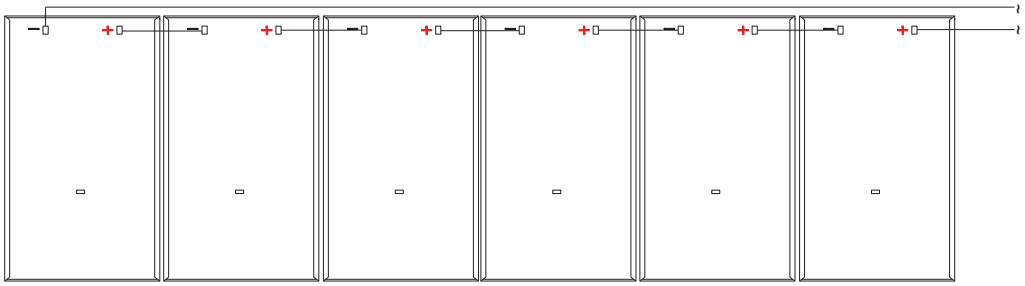
Performance 6 Product Line:



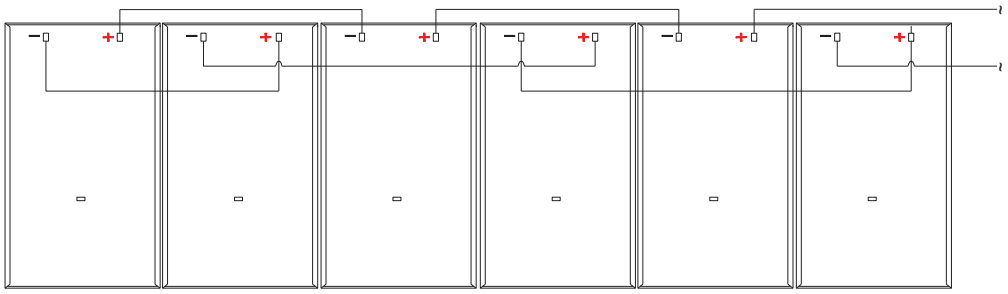
*The image above is for illustration purposes only

Performance 7 Product Line:

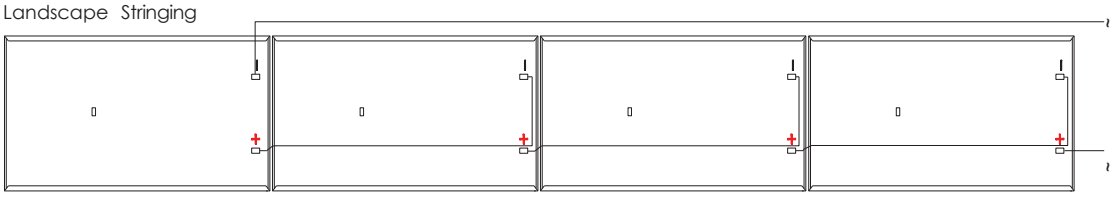
Portrait Stringing



Leapfrog Stringing (Portrait)



Landscape Stringing



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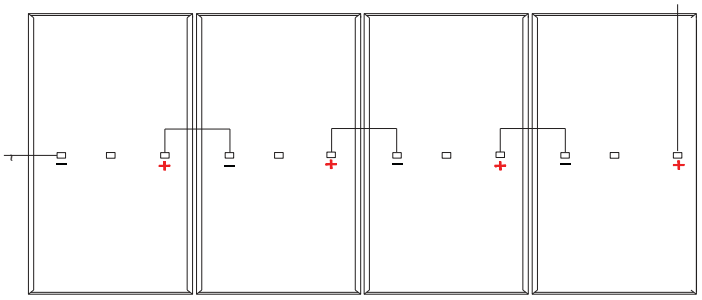
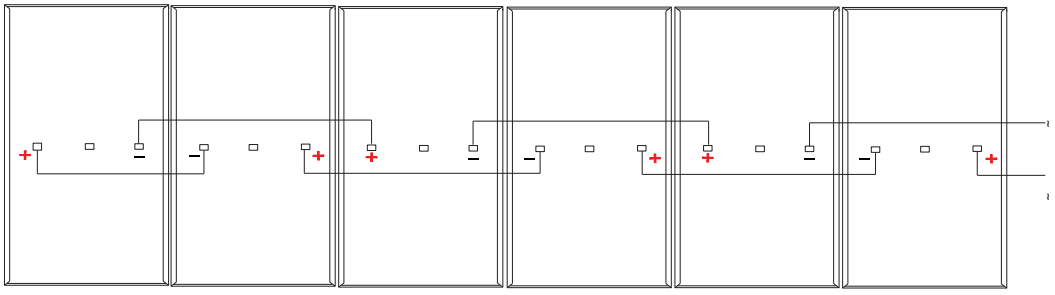
SunPower Performance 8 (HSM-HHK-NM475)
SunPower MAX (HSM-BE54-HD490-505)

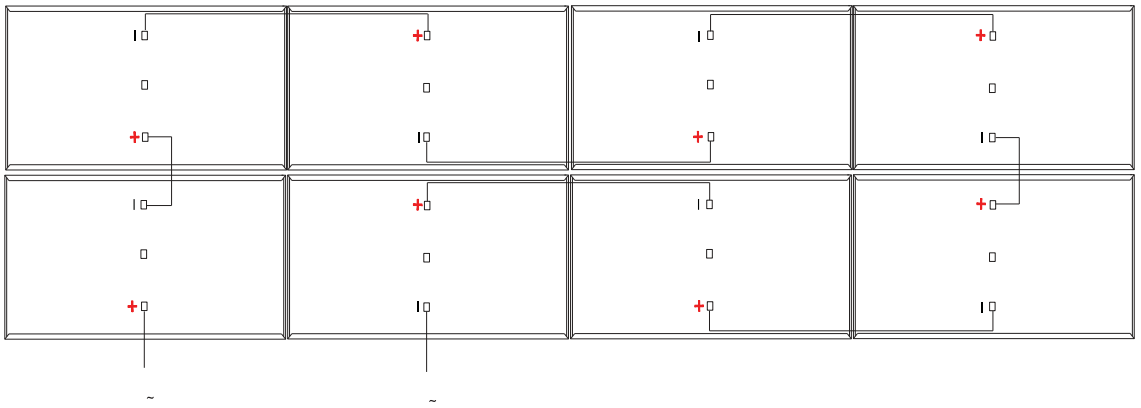
Portrait Stringing



Leapfrog Stringing (Portrait)



Landscape Stringing



*The image above is for illustration purposes only

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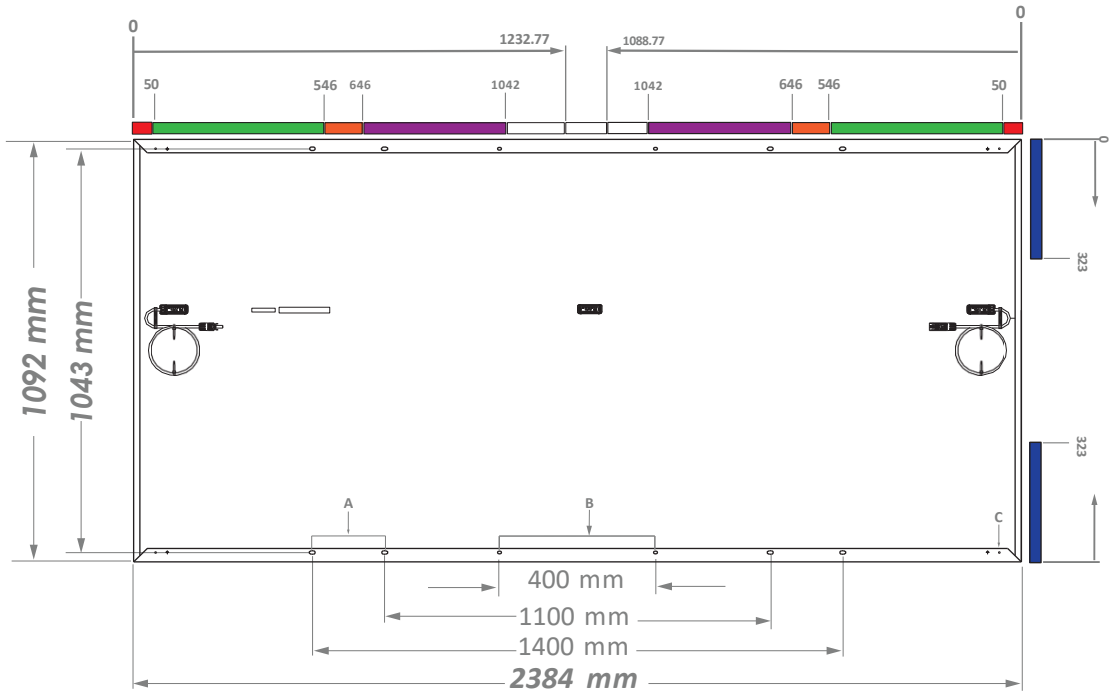
SunPower Performance 6 Bifacial Solar Panel
SPR-P6-XXX-COM-M-BF
(xxx = 510 - 555 in steps of 5)

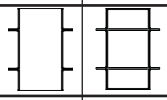
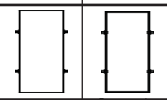
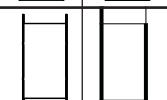
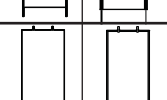
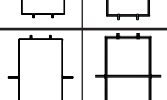
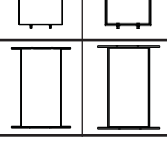
Nameplate is placed on rear side of the module



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

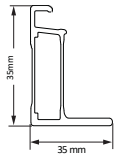
A - SLOT Holes (8X 14mm (L) x 9mm (W), R3.5mm)
B - Mounting Holes (4X 10mm (L) x 7mm (W), R6.8mm)
C - Ground Holes (4X Ø 4.2mm)

TOP CLAMPS

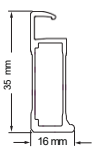
Mounting Configuratin Description 1	Mounting Configuration Diagram: Front View	Mounting Configuration Diagram: Back View	Mounting Zone Locations (distance from corner in mm)	Test Load 2 Downward/Upward (Pa)	Design Load 3 Downward/Upward (Pa)
Long Side Mounting, Rails Perpedincular to Mounting Frame			50 - 546	+2400/-1200	+1600/-800
			546 - 646 4	+5400/-2400	+3600/-1600
			646 - 1042	+2400/-2000	+1600/-1333
Long Side Mounting, Point Supported 5			50 - 150 8	+1800/-1800	+1200/-1200
			546 - 646 8	+3000/-2400	+2000/-1600
Long Side Mounting, Rails Parallel to Mounting Frame 6			50 - 546 8	+5400/-1200	+3600/-800
			546 - 646 8	+5400/-2400	+3600/-1600
Short Side Mounting, Point Supported (End Mount) 5			0 - 323 8	+1400/-1400	+933/-933
Short Side Mounting, Point Supported with Rail (End Mount)			0 - 323	+3600/-2400	+2400/-1600
Short Side Mounting, Rails Parallel to Mounting Frame (End Mount)			0 - 223 8	+1400/-1400	+933/-933
			223 - 323 8	+2400/-1200	+1600/-800

GEN 4.3 FRAME PROFILE

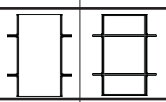
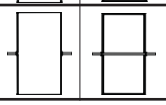
SIDE FRAME PROFILE



END FRAME PROFILE



BOLTS 7

Mounting Configuratio n Description 1	Mounting Configuration Diagram: Front View	Mounting Configuration Diagram: Back View	Mounting Zone Locations (distance from corner in mm)	Test Load 2 Downward/Upward (Pa)	Design Load 3 Downward/Upward (Pa)
Long Side Mounting, Rails Perpedincular to Mounting Frame			1400mm Holes	+5400/-2400	+3600/-1600
			1100mm Holes	+5400/-2400	+3600/-1600
			400mm Holes	+2400/-2000	+1600/-1333
Center Mounting (1x Portrait Tracker)			400mm Holes	+1800/-1800	+1200/-1200

1 In the cases where hybrid mounting is necessary (combination of long and short side mounting), the lowest design values should be considered as allowable design load.
2 Test loads are for information purposes only, design loads should be considered for the project design.
3 Design Load considers 1.5 Factor of Safety, Test load = Design load x 1.5. Product Warranty covers only design load values. The design loads listed in this table supersede all other loads that may be defined by other parties, unless there is a formal authorization by Maxeon.
4 IEC validated.
5 Same design loads are acceptable for bottom flange mounting systems.
6 Range indicates positioning of the clamp and not the rails.
7 Minimum of 24mm in diameter washer size is required.
8 PV modules may experience slight deflection in certain end-mount applications due to weight distribution. Such deflection does not impact reliability or performance; however if the panels must appear flat for aesthetic purposes, alternate mounting is suggested.

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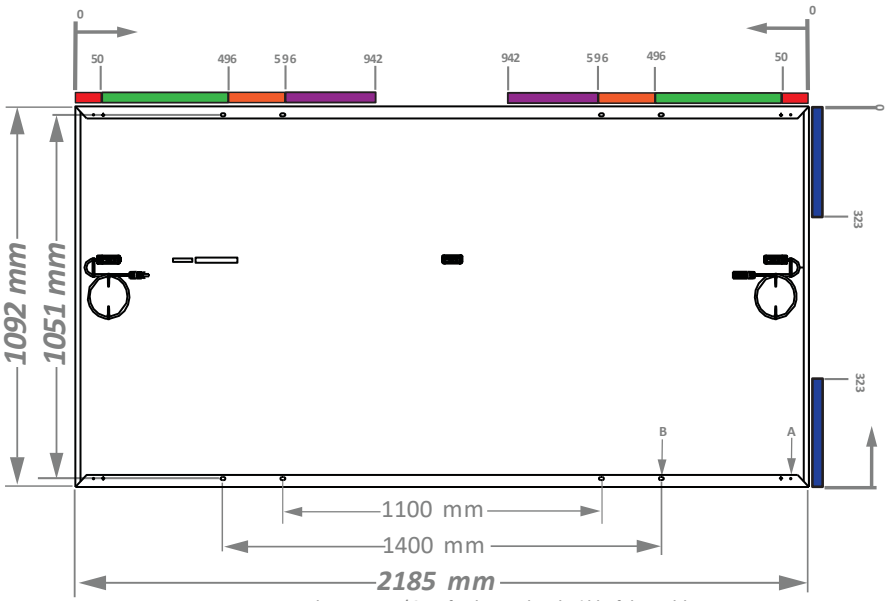
SunPower Performance 6 Bifacial Solar Panel
SPR-P6-XXX-COM-S-BF
(xxx = 470 - 510 in steps of 5)

Nameplate is placed on rear side of the module

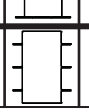
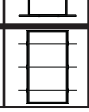


Measurement Tolerances are +/-3mm for the Length and Width of the module.

A - Grounding Holes (4X Ø 4.2mm)

B - Mounting Holes (8X 9mm (L) x 14mm (W), R4.5mm)

TOP CLAMPS

Mounting Configuration Description 1	Mounting Configuration Diagram: Front View	Mounting Configuration Diagram: Back View	Mounting Zone Locations (distance from corner in mm)	Test Load 2 Downward/Upward (Pa)	Design Load 3 Downward/Upward (Pa)
Long Side Mounting, Rails Perpendicular to Mounting Frame			50 - 496	+1800/-1600	+1200/-1066
			496 - 596	+5400/-2400	+3600/-1600
			596 - 942	+2400/-1600	+1600/-1066
Long Side Mounting, Point Supported 4			50 - 496 6	+2400/-1600	+1600/-1066
			496 - 596 6	+3000/-2400	+2000/-1600
			596 - 942 6	+2000/-1600	+1333/-1066
Long Side Mounting, Rails Parallel to Mounting Frame 5			50 - 496 6	+2800/-1800	+1867/-1200
			496 - 596 6	+2800/-1800	+1867/-1200
			596 - 942 6	+2800/-1800	+1867/-1200
Short Side Mounting, Point Supported (End Mount) 4			0 - 100 6	+1200/-1000	+800/-666
			100 - 323 6	+1600/-1600	+1066/-1066
Short Side Mounting, Rails Parallel to Mounting Frame (End Mount)			223 - 323 6	+2400/-1400	+1600/-933
Long Side Mounting, Rails Perpendicular to Mounting Frame			Outer Clamps: 496 - 596 Middle Clamps: 1042 - 1142	+6000/-3100	+4000/-2066

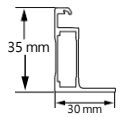
1 In the cases where hybrid mounting is necessary (combination of long and short side mounting), the lowest design load values should be considered as allowable design load.

2 Test loads are for information purposes only, design loads should be considered for the project design.

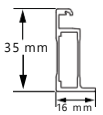
3 Design Load considers 1.5 Factor of Safety, Test load = Design load x 1.5. Product Warranty covers only design load values. The design loads listed in this table supersede all other loads that may be defined by other parties, unless there is a formal authorization by Maxeon.

GEN 4.3 FRAME PROFILE

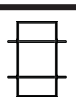
SIDE FRAME PROFILE



END FRAME PROFILE



BOLTS

Mounting Configuration Description 1	Mounting Configuration Diagram: Front View	Mounting Configuration Diagram: Back View	Mounting Zone Locations (dist from crn in mm)	Test Load 2 Downward/Upward (Pa)	Design Load 3 Downward/Upward (Pa)
Long Side Mounting, Rails Perpendicular to Mounting Frame			1100mm Holes	+5400/-2400	+3600/-1600
			1400mm Holes	+5400/-2400	+3600/-1600

4 Same design loads are acceptable for bottom flange mounting systems.

5 Range indicates positioning of the clamp and not the rails

6 PV modules may experience slight deflection in certain end-mount applications due to weight distribution. Such deflection does not impact reliability or performance; however if the panels must appear flat for aesthetic purposes, alternate mounting is suggested.

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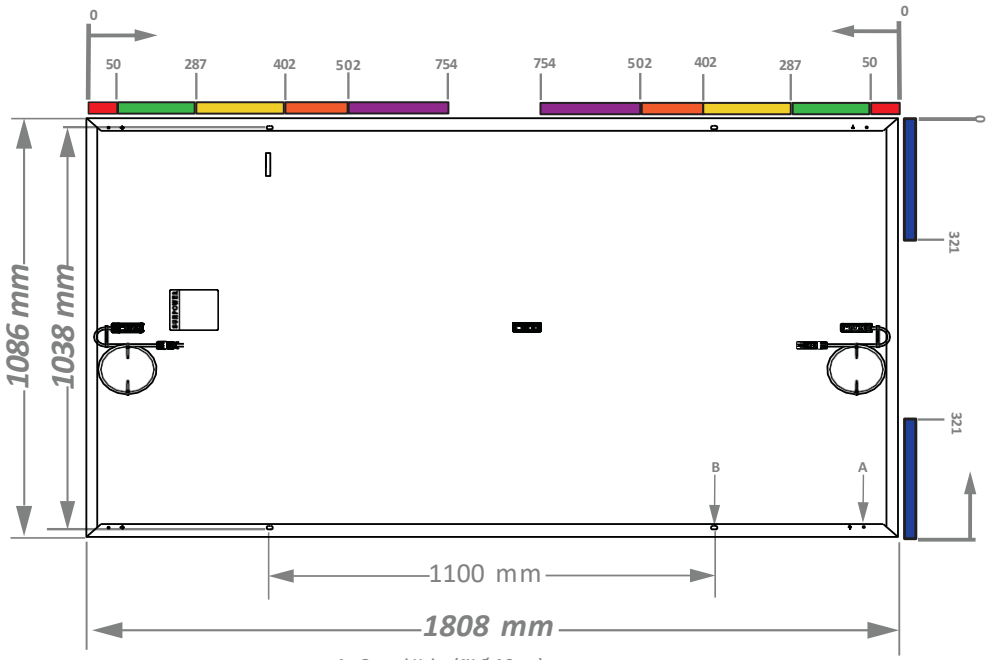
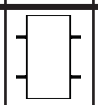
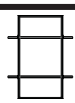
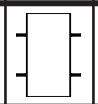
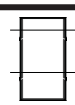
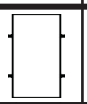
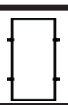
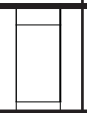
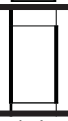
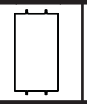
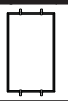
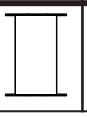
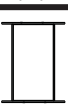
SunPower Performance 6 Residential and Commercial Solar Panel (SPR-P6-XXX-BLK, SPR-P6-XXX-COM-XS) (xxx = 380 - 420 in steps of 5)



A - Ground Holes (4X Ø 4.2mm)
B - Mounting Holes (4X 9mm (W) x 14mm (L), R4.5mm)

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

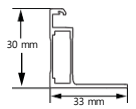
TOP CLAMPS

Mounting Configuration Description [1]	Mounting Configuration Diagram: Front View	Mounting Configuration Diagram: Back View	Mounting Zone Locations (distance from corner in mm)	Test Load [2] Downward/Upward (Pa)	Design Load [3] Downward/Upward (Pa)
Long Side Mounting, Rails Perpedincular to Mounting Frame			217 - 617	+2700/-2000	+1800/-1333
Long Side Mounting, Rails Perpedincular to Mounting Frame			50 - 287	+2000/-2000	+1333/-1333
			287 - 402	+2700/-2000	+1800/-1333
			402 - 502	+5400/-2400	+3600/-1600
			502 - 754	+2000/-1800	+1333/-1200
Long Side Mounting, Point Supported [4]			50 - 402 [6]	+2000/-2000	+1333/-1333
			402 - 502 [6]	+2000/-2400	+1333/-1600
			502 - 754 [6]	+1400/-1800	+933/-1200
Long Side Mounting, Rails Parallel to Mounting Frame [5]			50 - 402 [6]	+2800/-1800	+1867/-1200
			402 - 502 [6]	+2800/-1800	+1867/-1200
			502 - 754 [6]	+2800/-1800	+1867/-1200
Short Side Mounting, Point Supported (End Mount) [4]			0 - 221 [6]	+1600/-1400	+1067/-933
			221 - 321 [6]	+1800/-1200	+1200/-800
Short Side Mounting, Rails Parallel to Mounting Frame (End Mount)			0 - 221 [6]	+1400/-1400	+933/-933
			221 - 321 [6]	+1600/-1600	+1067/-1067

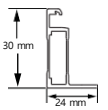
1 In the cases where hybrid mounting is necessary (combination of long and short side mounting), the lowest design load values should be considered as allowable design load.
2 Test loads are for information purposes only, design loads should be considered for the project design.
3 Design Load considers 1.5 Factor of Safety, Test load = Design load x 1.5. Product Warranty covers only design load values. The design loads listed in this table supersede all other loads that may be defined by other parties, unless there is a formal authorization by Maxeon.
4 Same design loads are acceptable for bottom flange mounting systems.
5 Range indicates positioning of the clamp and not the rails
6 PV modules may experience slight deflection in certain end-mount applications due to weight distribution. Such deflection does not impact reliability or performance; however if the panels must appear flat for aesthetic purposes, alternate mounting is suggested.

GEN 4.4 FRAME PROFILE

SIDE FRAME PROFILE



END FRAME PROFILE



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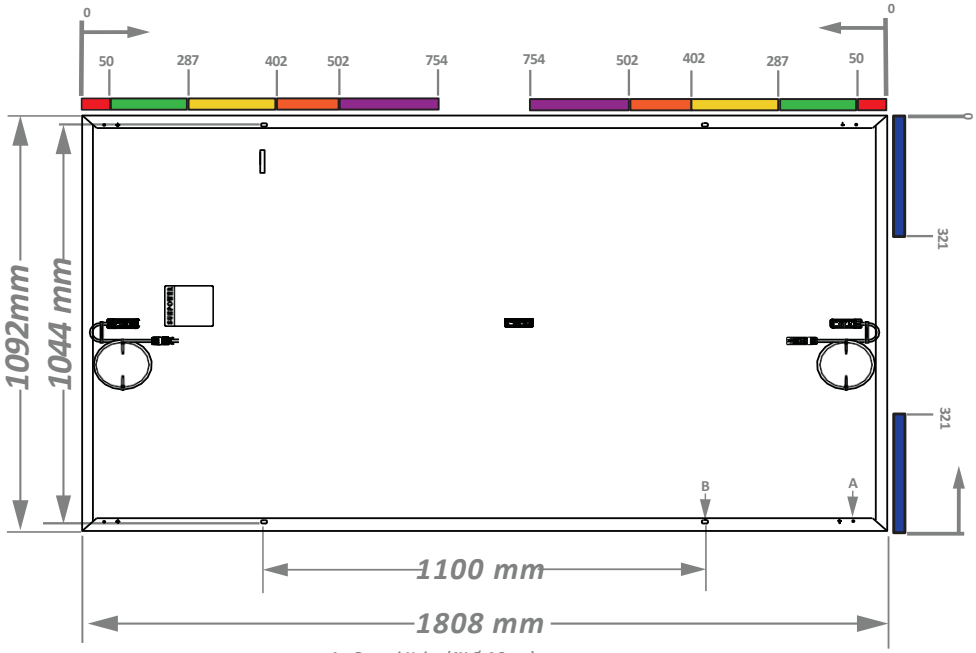
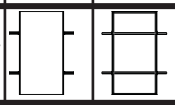
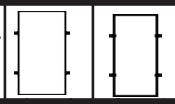
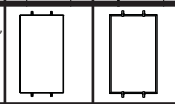
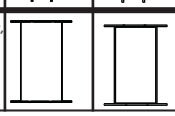
SunPower Performance 6 Commercial Solar Panel
SPR-P6-XXX-COM-XS (1092mm)
(xxx = 380 - 420 in steps of 5)



A - Ground Holes (4X Ø 4.2mm)
B - Mounting Holes (4X 9mm (W) x 14mm (L), R4.5mm)

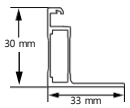
Measurement Tolerances are +/-3mm for the Length and Width of the module.

TOP CLAMPS

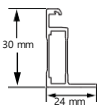
Mounting Configuration Description [1]	Mounting Configuration Diagram		Mounting Zone Locations (distance from corner in mm)	Test Load[2] Downward/Upward (Pa)	Design Load[3] Downward/Upward (Pa)
	Front View	Back View			
Long Side Mounting, Rails Perpedincular to Mounting Frame			217 - 617	+2700/-2000	+1800/-1333
Long Side Mounting, Rails Perpedincular to Mounting Frame			50 - 287	+2000/-2000	+1333/-1333
			287 - 402	+2700/-2000	+1800/-1333
			402 - 502	+5400/-2400	+3600/-1600
			502 - 754	+2000/-1800	+1333/-1200
Long Side Mounting, Point Supported[4]			50 - 402[6]	+2000/-2000	+1333/-1333
			402 - 502[6]	+2000/-2400	+1333/-1600
			502 - 754[6]	+1400/-1800	+933/-1200
Long Side Mounting, Rails Parallel to Mounting Frame[5]			50 - 402[6]	+2800/-1800	+1867/-1200
			402 - 502[6]	+2800/-1800	+1867/-1200
			502 - 754[6]	+2800/-1800	+1867/-1200
Short Side Mounting, Point Supported (End Mount)[4]			0 - 221[6]	+1600/-1400	+1067/-933
			221 - 321[6]	+1800/-1200	+1200/-800
Short Side Mounting, Rails Parallel to Mounting Frame (End Mount)			0 - 221[6]	+1400/-1400	+933/-933
			221 - 321[6]	+1600/-1600	+1067/-1067

GEN 4.4 FRAME PROFILE

SIDE FRAME PROFILE



END FRAME PROFILE



1 In the cases where hybrid mounting is necessary (combination of long and short side mounting), the lowest design load values should be considered as allowable design load.
2 Test loads are for information purposes only, design loads should be considered for the project design.
3 Design Load considers 1.5 Factor of Safety, Test load = Design load x 1.5. Product Warranty covers only design load values. The design loads listed in this table supersede all other loads that may be defined by other parties, unless there is a formal authorization by Maxeon.
4 Same design loads are acceptable for bottom flange mounting systems.
5 Range indicates positioning of the clamp and not the rails
6 PV modules may experience slight deflection in certain end-mount applications due to weight distribution. Such deflection does not impact reliability or performance; however if the panels must appear flat for aesthetic purposes, alternate mounting is suggested.

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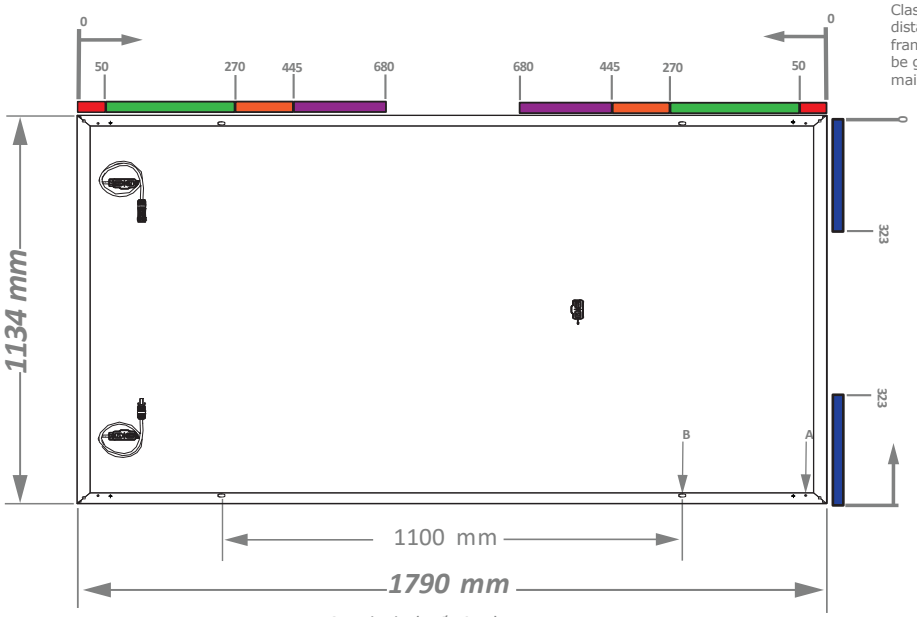
SunPower Performance 7 Residential Solar Panel
SPR-P7-XXX-BLK, SPR-P7-XXX-BLK-1500
(xxx = 427, 430 - 460 in steps of 5)

Nameplate is placed on rear side of the module

Bypass Diodes = 3
Tjmax = 200°C
Rated Current = 30A

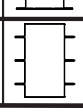
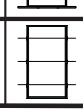
Dual glass modules are Fire Class (UL790) rating A. The distance between module frame and roof surface must be greater than 10cm to maintain this rating.



A - Ground Holes (4X Ø 4.2mm)
B - Mounting Holes (4X 9mm (W) x 14mm (L), R4.5mm)

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

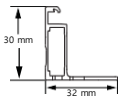
TOP CLAMPS

Mounting Configuration Description	Mounting Configuration Diagram: Front View	Mounting Configuration Diagram: Back View	Mounting Zone Locations (distance from corner in mm)	Test Load[2] Downward/Upward (Pa)	Design Load[3] Downward/Upward (Pa)
Long Side Mounting, Rails Perpedincular to Mounting Frame			50 - 270	+3000/-2475	+2000/-1600
			270 - 445	+5400/-2475	+3600/-1600
			445 - 680	+4000/-2475	+3000/-1600
Long Side Mounting, Point Supported[4]			50 - 270[6]	+3000/-2400	+2000/-1600
			270 - 445[6]	+3600/-2400	+2400/-1600
			445 - 680[6]	+2700/-2400	+1800/-1600
Long Side Mounting, Rails Parallel to Mounting Frame[5]			50 - 270[6]	+3000/-2400	+2000/-1600
			270 - 445[6]	+3600/-2400	+2400/-1600
			445 - 680[6]	+3000/-2400	+2000/-1600
Short Side Mounting, Rails Perpendicular to Mounting Frame (End Mount)			0 - 323	+3000/-1700	+2000/-1133
Short Side Mounting, Point Supported (End Mount)[4]			0 - 100[6]	+2400/-1700	+1600/-1133
			100 - 323[6]	+1200/-1200	+800/-800
Short Side Mounting, Rails Parallel to Mounting Frame (End Mount)			223 - 323[6]	+2700/-1700	+1800/-1133
Long Side Mounting, Rails Perpedincular to Mounting Frame			Outer Clamps: 397 - 497 Middle Clamps: 845 - 945	+6000/-3100	+4000/-2066

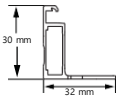
1 In the cases where hybrid mounting is necessary (combination of long and short side mounting), the lowest design load values should be considered as allowable design load.
2 Test loads are for information purposes only, design loads should be considered for the project design.
3 Design Load considers 1.5 Factor of Safety, Test load = Design load x 1.5. Product Warranty covers only design load values. The design loads listed in this table supersede all other loads that may be defined by other parties, unless there is a formal authorization by Maxeon.

GEN 4.4 FRAME PROFILE

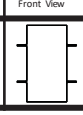
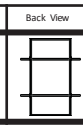
SIDE FRAME PROFILE



END FRAME PROFILE



BOLT

Mounting Configuration Description	Mounting Configuration Diagram: Front View	Mounting Configuration Diagram: Back View	Mounting Hole Location (distance from corner in mm)	Test Load[2] Downward/Upward (Pa)	Design Load[3] Downward/Upward (Pa)
Long Side Mounting, Rails Perpedincular to Mounting Frame			1100mm Holes	+6000/-4000[7]	+4000/-2667

4 Same design loads are acceptable for bottom flange mounting systems.
5 Range indicates positioning of the clamp and not the rails
6 PV modules may experience slight deflection in certain end-mount applications due to weight distribution. Such deflection does not impact reliability or performance; however if the panels must appear flat for aesthetic purposes, alternate mounting is suggested.

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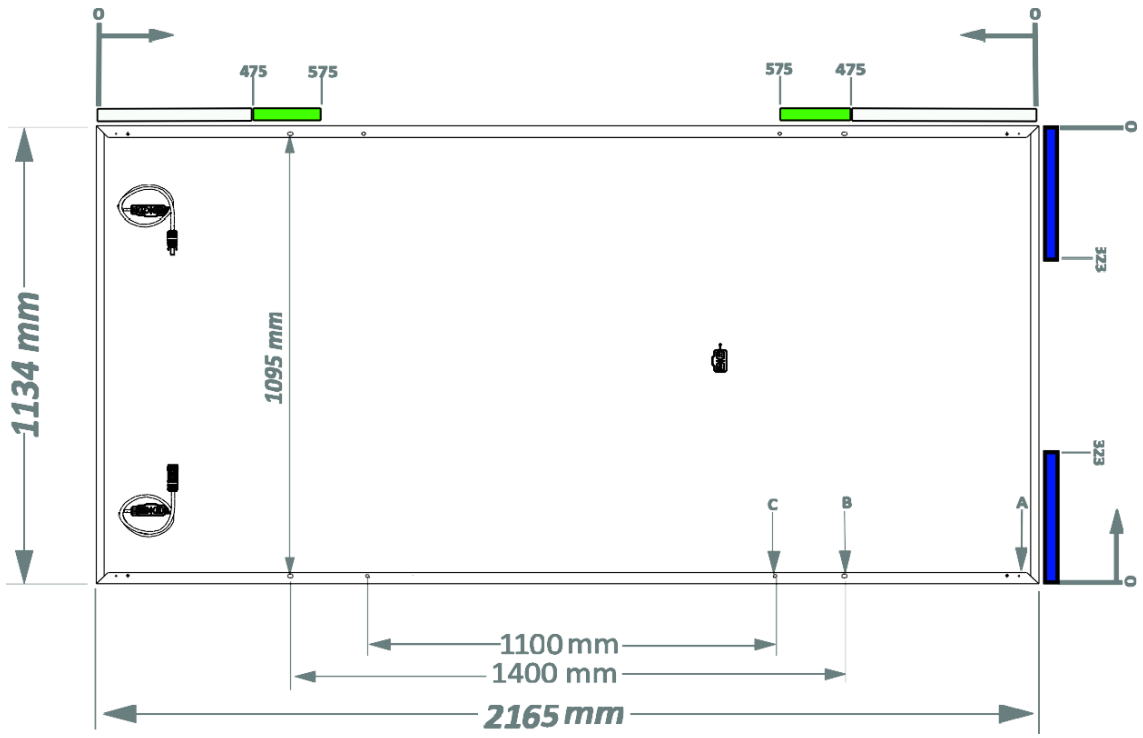
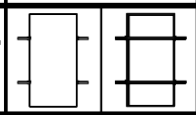
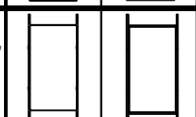
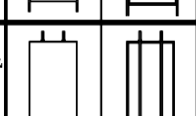
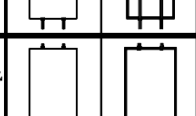
SunPower Performance 8 COM Bifacial Solar Panel
HSM-GHJ-NMXXX
(xxx = 580 - 610 in steps of 5)



A - 4X Ground Holes (Ø 4.2mm)
B - 4X Mounting Holes (9mm x 14mm)
C - 8x Mounting Holes (7mm x 10mm)

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

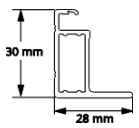
TOP CLAMPS

Mounting Configuration Description[1]	Mounting Configuration Diagram		Mounting Zone Locations (distance from corner in mm)	Test Load[2] Downward/Upward (Pa)	Design Load[3] Downward/Upward (Pa)
	Front View	Back View			
Long Side Mounting, Rails Perpedincular to Mounting Frame			475 - 575	+5400/-2400	+3600/-1600
Long Side Mounting, Rails Parallel to Mounting Frame[4]			475 - 575[5]	+3600/-2400	+2400/-1600
Short Side Mounting, Rails Perpendicular to Mounting Frame (End Mount)			0 - 323	+2400/-1700	+1600/-1133
Short Side Mounting, Point Supported (End Mount)[6]			0 - 323[5]	+1200/-1200	+800/-800

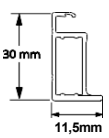
1 In the cases where hybrid mounting is necessary (combination of long and short side mounting), the lowest design load values should be considered as allowable design load.
2 Test loads are for information purposes only, design loads should be considered for the project design.
3 Design Load considers 1.5 Factor of Safety, Test load = Design load x 1.5. Product Warranty covers only design load values. The design loads listed in this table supersede all other loads that may be defined by other parties, unless there is a formal authorization by TCL.

FRAME PROFILE

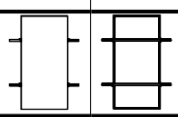
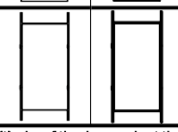
LONG FRAME PROFILE



SHORT FRAME PROFILE



BOLTS

Mounting Configuration Description[1]	Mounting Configuration Diagram		Mounting Hole Location	Test Load[2] Downward/Upward (Pa)	Design Load[2] Downward/Upward (Pa)
	Front View	Back View			
Long Side Mounting, Rails Perpedincular to Mounting Frame			1400mm Holes	+5400/-2400	+3600/-1600
Long Side Mounting, Rails Parallel to Mounting Frame			1400mm Holes	+3600/-2400	+2400/-1600

4 Range indicates positioning of the clamp and not the rails
5 PV modules may experience slight deflection in certain end-mount applications due to weight distribution. Such deflection does not impact reliability or performance; however if the panels must appear flat for aesthetic purposes, alternate mounting is suggested.
6 Same design loads are acceptable for bottom flange mounting systems.

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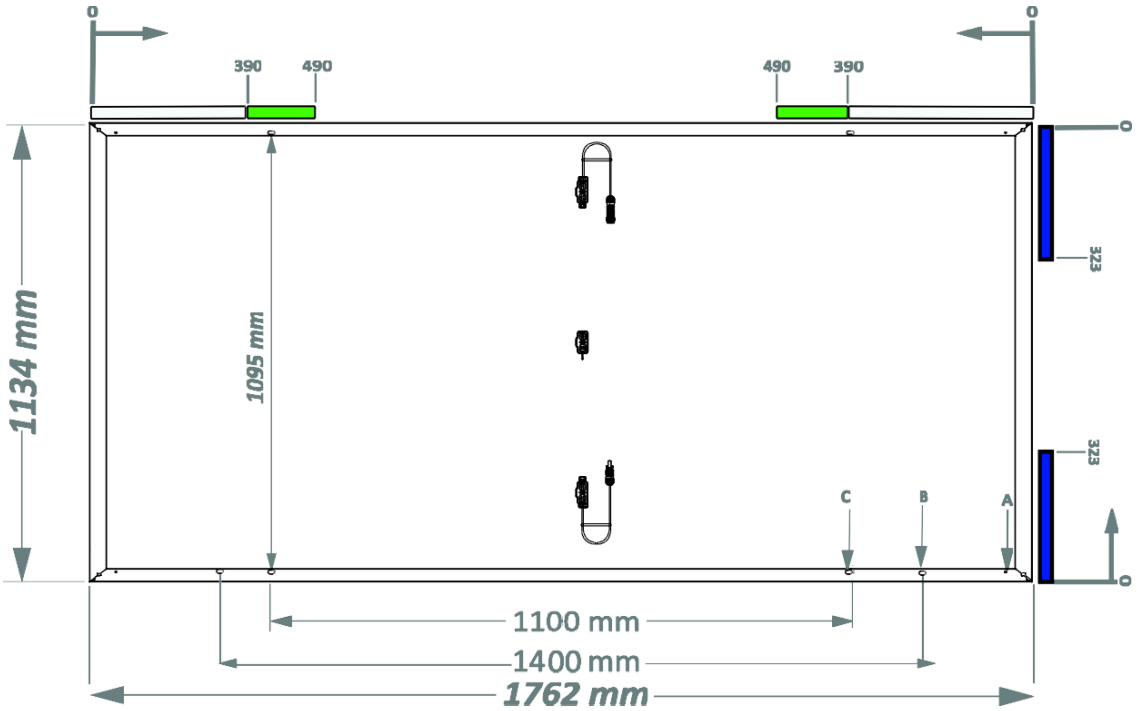
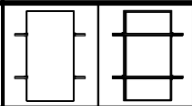
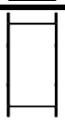
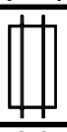
SunPower Performance 8 Solar Panel
HSM-HHK-NM475



A - 4X Ground Holes (Ø 4.2mm)
B - 4X Mounting Holes (9mm x 14mm, R4.5mm)
C - 4X Mounting Holes (9mm x 14mm, R4.5mm)

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

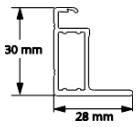
TOP CLAMPS

Mounting Configuration Description [1]	Mounting Configuration Diagram		Mounting Zone Locations (distance from corner in mm)	Test Load [2] Downward/Upward (Pa)	Design Load [3] Downward/Upward (Pa)
	Front View	Back View			
Long Side Mounting, Rails Perpedincular to Mounting Frame			390 - 490	+5400/-2400	+3600/-1600
Long Side Mounting, Rails Parallel to Mounting Frame [4]			390 - 490 [5]	+3600/-2400	+2400/-1600
Short Side Mounting, Rails Perpendicular to Mounting Frame (End Mount)			0 - 323	+3000/-1700	+2000/-1133
Short Side Mounting, Point Supported (End Mount) [6]			0 - 100 [5]	+2400/-1700	+1600/-1133
			100 - 323 [5]	+1200/-1200	+800/-800

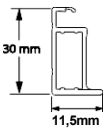
1 In the cases where hybrid mounting is necessary (combination of long and short side mounting), the lowest design load values should be considered as allowable design load.
2 Test loads are for information purposes only, design loads should be considered for the project design.
3 Design Load considers 1.5 Factor of Safety, Test load = Design load x 1.5. Product Warranty covers only design load values. The design loads listed in this table supersede all other loads that may be defined by other parties, unless there is a formal authorization by TCL.

FRAME PROFILE

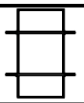
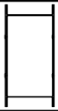
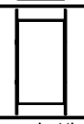
LONG FRAME PROFILE



SHORT FRAME PROFILE



BOLTS

Mounting Configuration Description [1]	Mounting Configuration Diagram		Mounting Hole Location	Test Load [2] Downward/Upward (Pa)	Design Load [2] Downward/Upward (Pa)
	Front View	Back View			
Long Side Mounting, Rails Perpedincular to Mounting Frame			1100mm Holes	+5400/-2400	+3600/-1600
Long Side Mounting, Rails Parallel to Mounting Frame			1100mm Holes	+3600/-2400	+2400/-1600

4 Range indicates positioning of the clamp and not the rails
5 PV modules may experience slight deflection in certain end-mount applications due to weight distribution. Such deflection does not impact reliability or performance; however if the panels must appear flat for aesthetic purposes, alternate mounting is suggested.
6 Same design loads are acceptable for bottom flange mounting systems.

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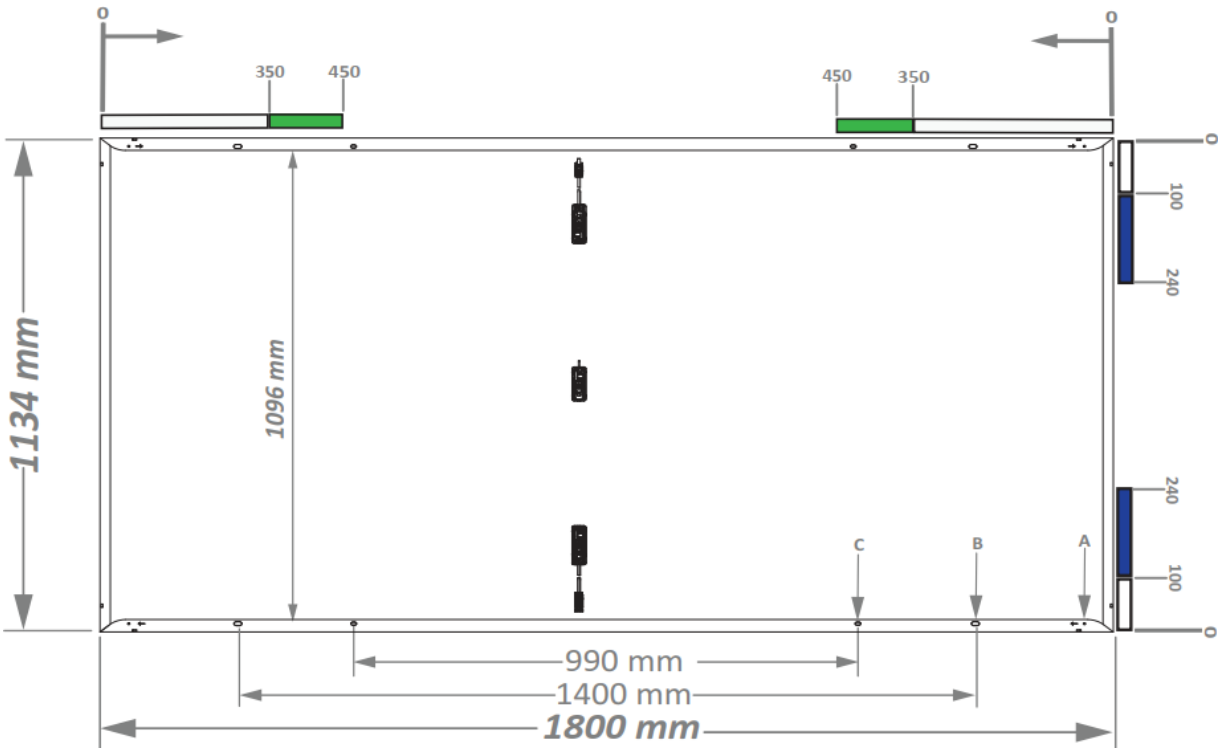
HSM-BE54-HD490-505



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

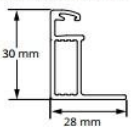
A - 4X Ground Holes (Ø 4.2mm)

B - 4X Mounting Holes (14mm X 9mm)

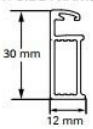
C - 8X Mounting Holes (10mm x 7mm)

FRAME PROFILE

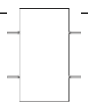
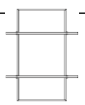
LONG SIDE FRAME PROFILE



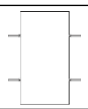
SHORT SIDE FRAME PROFILE



TOP CLAMPS

Mounting Configuration Description[1]	Mounting Configuration Diagram		Mounting Zone Locations (distance from corner in mm)	Test Load[2] Downward (Pa) Upward (Pa)	Design Load[3] Downward (Pa) Upward (Pa)
	Front View	Back View			
Long Side Mounting, Rails Perpendicular to Mounting Frame			350-450	+5400 -2400	+3600 -1600
Short Side Mounting, Rails Parallel to Mounting Frame (End Mount)			100-240	+1600 -1600	+1067 -1067

BOLTS

Mounting Configuration Description[1]	Mounting Configuration Diagram		Mounting Holes Locations (mm)	Test Load[2] Downward (Pa) Upward (Pa)	Design Load[3] Downward (Pa) Upward (Pa)
	Front View	Back View			
Long Side Mounting, Rails Perpendicular to Mounting Frame[7]			**1400**	+5400 -2400	+3600 -1600

1 In the cases where hybrid mounting is necessary (combination of long and short side mounting), the lowest design values should be considered as allowable design load.
2 Test loads are for information purposes only, design loads should be considered for the project design.
3 Design Load considers 1.5 Factor of Safety, Test load = Design load x 1.5. Product Warranty covers only design load values. The design loads listed in this table supersede all other loads that may be defined by other parties, unless there is a formal authorization by TCL.

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