



## Safety and Installation Instructions

*United States and Canada*

This document applies to all SunPower Modules  
listed in Section 3 of this document

**NEW:**

This document includes references to SunPower **N** PV Modules. **N-type** modules do not have grounding restrictions and are compatible with high-efficiency transformer-less inverters

SunPower Corporation  
[www.sunpowercorp.com](http://www.sunpowercorp.com)

## Safety and Installation Instructions

### (United States and Canada)

#### 1.0 Introduction

This manual provides safety and installation instructions for UL-listed SunPower photovoltaic (PV) modules (including the new **SunPower N modules**) carrying the UL logo on the product label (Figure 1).



Figure 1

**Important-!** Please read this instruction manual 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

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

#### 1.2 Underwriters Laboratories (UL) Listing Information

This product meets or exceeds the requirements set forth by UL1703 for PV Modules. This UL Standard covers flat-plate PV modules and panels intended for installation on buildings or those intended to be freestanding. To satisfy the listing for this product the modules must be mounted with a rack or standoff structure. The UL listing does not include integration into a building surface because additional requirements may apply. This product is not intended for use where artificially concentrated sunlight is applied to the module.

#### 1.3 Limited Warranty

Module limited warranties are described in full in the SunPower warranty certificates obtainable at [www.sunpowercorp.com](http://www.sunpowercorp.com). In summary, the Limited Warranties do not apply to any of the following:

PV modules which in SunPower's absolute judgment have been subjected to: misuse, abuse, neglect or accident; alteration, improper installation, application or removal. Including, but not limited to installation, application or removal by any party other than a SunPower authorized dealer; non-observance of SunPower's installation, users and/or maintenance instructions; repair or modifications by someone other than an approved service technician of SunPower; power failure surges, lightning, flood, fire, accidental breakage or other events outside SunPower's control.

## 2.0 Safety Precautions

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

**Danger!** Module interconnection cables 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 leads that are frayed or torn.** Do not connect or disconnect modules when current from the modules or an external source is present.

- Cover all modules in the PV array with an opaque cloth or material before making or breaking electrical connections.
- It is imperative use the supplied locking connectors and safety clips in order to defend against untrained personnel disconnecting the modules once they have been installed.
- All installations must be performed in compliance with the National Electrical Code (NEC) and any applicable local codes.

- There are no user serviceable parts within the module. Do not attempt to repair any part of the module.
- Installation should be performed only by authorized personnel.
- Remove all metallic jewelry prior to installing this product to reduce the chance of accidental exposure to live circuits.
- Use insulated tools to reduce your risk of electric shock.
- Do not stand on, drop, scratch, or allow objects to fall on modules.
- If the front glass is broken, or the back sheet is torn, contact with any module surface or module frame can cause electric shock.
- Broken j-boxes and/or broken connectors are electrical hazards as well as laceration hazards. The dealer or installers should remove the module from the array and contact the supplier for disposal instructions.
- Do not install or handle the modules when they are wet or during periods of high wind.
- Contact your module supplier if maintenance is necessary.
- Save these instructions!

## 3.0 Electrical Characteristics

The module electrical ratings are within 10% of UL's measured values under Standard Test Conditions (STC) of 1 kW/m<sup>2</sup> irradiance with Air Mass of 1.5 solar-spectral-irradiance-distribution and a cell temperature of 25° C. The electrical characteristics of SunPower modules are listed in Figure 2 of the appendix. If an installation involves a SunPower module which does not appear on this list please consult the product label on the back of the module or visit [www.sunpowercorp.com](http://www.sunpowercorp.com) for the product datasheet.

Bypass diodes for each module are rated and factory installed in the modules. The diodes are one of the following ratings:

1. 8A, 45 PIV (Peak Inverse Voltage) for 72 & 96 cell modules.
2. 12A, 200 PIV (Peak Inverse Voltage) for 96 (commercial use), 128 cell modules.

A photovoltaic module may produce more current and/or voltage than reported at STC. Sunny, cool weather and reflection from snow or water can increase current and power output. Therefore, the values of I<sub>sc</sub> marked on the module should be multiplied by a factor of 1.25 when determining component ampacity ratings to comply with NEC, Article 690.8(A). An additional 1.25 multiplier may be required by the NEC for sizing fuses and conductors as described in NEC Section 690-8(B).

The maximum module string open circuit voltage (V<sub>oc</sub>) shall be calculated as the sum of the rated open-circuit voltage of the series-connected photovoltaic modules corrected for the lowest expected ambient temperature (NEC 2008, Article 690.7). One source for statistically valid, lowest-expected, ambient temperature design data for various locations is the ASHRAE Handbook — Fundamentals. These temperature data can be used to calculate maximum voltage using the manufacturer's temperature coefficients relative to the rating temperature of 25°C (NEC 2011, Article note to 690.7). SunPower recommends the use of open-circuit voltage temperature coefficients listed in Figure 2 of the appendix, when determining Maximum System Voltage

#### 3.1 Fire Rating

The module is Class C fire rated.

## 4.0 Electrical Connections

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

The connectors on SunPower modules ship with a locking safety clip, which once connected requires the use of a tool to disconnect module-to-module connections. This defends against untrained personnel disconnecting the modules when under load (which may cause injury or death as stated in Section 2.0) and complies with the NEC 2008 code for safety with PV connectors,

#### 4.1 Equipment Grounding

To reduce the possibility of electrical shock, ground the frame of the module or array before wiring the circuit using a grounding method that meets NEC requirements for grounding solar electrical systems. In order to install in accordance with the UL listing of this product, SunPower modules shall be grounded using grounding hardware that has been certified to

meet requirements for grounding systems in UL467, UL1703, or UL1741 on anodized aluminum frames. SunPower recommends using 1 of the following five methods of grounding the module frame. In addition, avoid corrosion due to the use of dissimilar metals (we suggest stainless steel between copper and aluminum).

- 1) Attach a ground conductor to a grounding lay-in lug mounted at one of the four designated 0.17" grounding holes on the module frame. Alternatively, any unused mounting hole can be used to mount the lug. Use a grounding lug such as Ilco GBL-4DBT, Burndy CL50-DB-T or Tyco Solklip 1954381-2, and stainless steel hardware (bolt, washers, and nut). A star washer should be used between the grounding lug and the module frame in order to break through the anodizing and establish electrical contact with the aluminum. The assembly must end with a nut and be torqued between 20 inch-pound to 25 inch-pound for a #10-32 bolt. A lock washer or other locking mechanism is needed to maintain tension between the bolt and the assembly. The copper conductor must be attached to the ground lug using the stainless steel set screw provided by the manufacturer. Please refer to NEC Article 690 on grounding PV arrays for specific requirements.
- 2) SunPower systems may also be grounded through the use of SunPower supplied "IFF clips" which are UL Listed (1703 and 1741). A minimum torque of 10 in-lbs is required for grounding, however higher torque values will be required to ensure structural integrity. General torque values are 35 to 45 in-lbs for a 1/4-20 or M6 bolt, but may be higher in specific applications. When using these clips, the array frame (racking) must be grounded in accordance with NEC Article 250. To ensure system safety and structural integrity, strict adherence to application-specific SunPower documentation is required.
- 3) The SunPower PV Grounding Clip may also be used only in applications where the modules are attached to a SunPower torque tube, #111380. This device consists of Rail Clip #1505-994, Retainer Bar #1504-979, Carriage Bolt (2) #1506-224, Nut (2) #1503-098, Lock Washer (2) #1503-099. Hardware must be torque to 120 in-lbs. The PV Grounding Clip has been evaluated for bonding to the Torque Tube for use with an over-current protective device rated 20 Amps maximum and a circuit capacity of 600 V, 5000 Amps
- 4) Sunpower modules may also be grounded through the use of an ETL Listed PV Attach Grounding washer #1508-666, which may be used only in applications where the modules are attached to a Sunpower Saddle #1508-738 or #1508-741 using a 1/4 inch rivet.
- 5) If the Unirac Solarmount system is used for mounting the modules, grounding is achieved using either the Wiley Electronics WEEB UMC or UGC-1 grounding clips in combination with UniRac's Mid or End clamps and 1/4-20 bolt and flanged nut, torqued to 120 in-lbs. If the Solarmount-I system is used grounding is achieved with the UniRac UGC-2 grounding clips in combination with UniRac's Mid or End clamps and Sliders with a 1/4-20 bolt and flanged nut torqued to 120 in-lbs. When using methods 2, 3, 4 or 5 the array frame (racking) must be grounded in accordance with NEC Article 250. To ensure system safety and structural integrity, strict adherence to application-specific SunPower documentation is required.

## 4.2 System Grounding

- Review the following tables for the proper grounding techniques to use for the installation of your SunPower PV system.

Module Name/Grounding key	
New SPR modules are compatible with Transformer-less (TL) inverters, when used as an ungrounded PV source. They have no system grounding restrictions	Standard SPR module systems must be installed with positive ground (see instruction below)
SPR-XXXNE-WHT-D	SPR-XXXE-WHT-D
	SPR-XXX-WHT-D
SPR-XXXNE-BLK-D	SPR-XXXE-BLK-D
	SPR-XXX-BLK-D

### • Standard modules grounding reference

**Important!** For optimal performance, SunPower PV modules must only be used in configurations where the positive polarity of the PV array is connected to ground. **Failure to comply with this requirement will reduce the performance of the system and invalidate SunPower's Limited Power Warranty for PV Modules.**

For more information on grounding the system correctly, visit our website at [www.sunpowercorp.com/inverters](http://www.sunpowercorp.com/inverters) or contact SunPower technical support at 1-877-SUN-0123.

### 4.3 Series Connection

The modules may be wired in series to produce the desired voltage output. Do not exceed the maximum system voltage shown in Figure 2.

### 4.4 Parallel Connection

The modules may be combined in parallel to produce the desired current output. Each series string or module may be required to be fused prior to combining with other strings. Figure 2 describes the maximum fuse size allowed (number of modules which can be connected in parallel and protected by one fuse). Please refer to the NEC Article 690 for additional fusing requirements.

## 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 that ensure SunPower modules will operate within the following maximum and minimum operating temperatures:

Maximum Operating Temperature	+85 ° Celsius, +185 ° Fahrenheit
Minimum Operating Temperature	-40 ° Celsius, -40 ° Fahrenheit

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

**Design Strength:** SunPower modules are designed to meet a maximum positive (or upward, e.g. wind) and negative (or downward, e.g. static load) design pressure of 2400 Pa (Pascals; 245 kg/m<sup>2</sup>) when mounted in **all** of the mounting configurations specified in Section 5.2. Design strength of 2400 Pa corresponds approximately to a wind speed of 130 km/h (81 mph), as tested

per IEC 61215. The SunPower modules have also been evaluated to UL1703 for a positive or negative design load of 30 psf.

SunPower modules are designed to meet a maximum negative (or downward, e.g. snow load) of 5400 Pa (Pascals; 550 kg/m<sup>2</sup>) for the following mounting configurations **only** when mounted in adherence to Section 5.2 below. 5400 Pa design strength has been verified by SunPower and TUV.

- 1) 72 cell modules with dimensions of (1559mm x 798mm) meet 5400 Pa in the following mounting configurations described in Section 5.2 below
  - a. Frame Holes
  - b. Pressure Clamps or Clips
  - c. End Mount
- 2) 96 cell modules with dimensions of (1559mm x 1046mm) meet 5400 Pa in the following mounting configurations described in Section 5.2 below
  - a. Frame Holes
  - b. Pressure Clamps or Clips

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.

#### Excluded Operating Environments & Reconfigurations

Certain operating environments are not recommended for SunPower modules, and are excluded from the SunPower Limited Warranty of these modules. Request the regional dealer to contact SunPower if there are any unanswered questions concerning the operating environment.

When the PV modules are not generating power they must remain in the system grounding mode with which they were installed, or in a floating mode. When the modules are not generating power, the process of disconnecting the installation from its commissioned ground or float then connecting an outside voltage source to the modules, will void the module product warranty.

#### 5.2 Mounting Configurations

For a non-integral module, the assembly is to be mounted over a fire resistant roof-covering rated for the application. Modules may be mounted at any angle, from horizontal to vertical. Class C fire rating is maintained at all installation slopes. Select the appropriate orientation to maximize sunlight exposure. Specific information on module dimensions and the location of mounting and grounding holes is shown in (Figures 3, 4, and 5).

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

Clearance between the module frames and structure or ground is required to prevent wiring damage and allows air to circulate behind the module. For 128 cell modules a minimum of 4 inches of clearance is required, for all other modules a minimum of 1.5 inches is required between the module frame and structure or ground.

The module is only UL Listed for use when its factory frame is fully intact. Do not remove or alter the module frame. Creating additional mounting holes may damage the module and reduce the strength of the frame.

Modules may be mounted using the following methods only:

- 1) **Frame Holes:** Secure the module to the structure using the factory mounting holes. Four 1/4" stainless steel bolts, with nuts, washers, and lock washers are recommended per module. Refer to Figures 3, 4 and 5 for the module dimensions and hole locations. This method has been certified by a third-party organization according to UL 1703.
- 2) **Pressure Clamps or Clips:** Mount the module with the clips on the side frame of the module. The side frames are attached to the longer

sides of the module. The centerline of the clips should be 6" to 15" from the end of the side frame. Installers should ensure the clamps are of sufficient strength to allow for the maximum design pressure of the module.

- 3) **End Mount:** End mounting is the capture mounting of the length of the module's end frame to a supporting rail (The end frames are on the shorter dimensions of the module). The end-mounting rail and clips or clamps must be of sufficient strength to allow for the maximum design pressure of the module. Verify this capacity with the mounting system vendor before installation.
- 4) **Center Mount PV Grounding clip:** A PV Grounding Clip (as Described above in Section 4.1, item 3) may be used to clamp the bottom flange of the frame at the center of the long sides. Minimum clamping length shall be 6" on top of flange and 4" on bottom. The clamps must be of sufficient strength to allow for the maximum design pressure of the module. Verify this capacity with the mounting system vendor before installation.
- 5) **SunPower specified or SunPower supplied mounting systems:** Modules mounted with strict adherence to SunPower documentation, using hardware systems supplied by or specified by SunPower.

#### 5.3 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.

Modules that feature antireflective coated glass are prone to visible finger print marks if touched on the front glass surface. SunPower recommends handling modules with anti-reflective glass with 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. Product datasheets specify the glass type used by a particular module.

#### 6.0 Maintenance

Visually inspect all modules annually for safe electrical connections, sound mechanical connection, and freedom from corrosion. This visual inspection should be performed from ground level, unless performed by trained SunPower dealers or trained SunPower support personnel.

Periodic cleaning of modules is recommended, but is not required. Periodic cleaning has resulted in improved performance levels, especially in regions with low levels of annual precipitation (less than 18.25 inches (46.3cm)). Consult your dealer or supplier about recommended cleaning schedules for your area.

To clean a module, wash with potable, non-heated, water. Normal water pressure is more than adequate, but pressurized water up to 1500psi may be used. Fingerprints, stains, or accumulations of dirt on the front surface may be removed as follows: first rinse off area and let soak for a short period of time (5-minutes). Re-wet and use a soft sponge or seamless cloth to wipe glass surface in a circular motion. Fingerprints typically can be removed with a soft cloth or sponge and water after wetting. Do not use harsh cleaning materials such as scouring powder, steel wool, scrapers, blades, or other sharp instruments to clean the glass surface of the module. Use of such materials or cleaning without consultation will invalidate the product warranty.

- **Figures 2, 3, 4, and 5 are on the next pages.**

**Figure 2: Electrical Characteristics**

Module	At Standard Test Conditions (STC)									Basic Temperature Data				EFFICIENCY NUMBERS			
	Rated Power (W)	Power Tolerance (%)	Voltage at Rated Power (V <sub>mpp</sub> )	Current at Rated Power, I <sub>mpp</sub> (A)	Open Circuit Voltage (V <sub>oc</sub> )	Short Circuit Current, I <sub>sc</sub> (A)	Maximum Series Fuse (A)	Maximum System Voltage UL (V <sub>max</sub> )	Maximum System Voltage IEC (V <sub>max</sub> )	Current (I <sub>sc</sub> ) Temp. Coeff. (mA/°C)	Voltage (V <sub>oc</sub> ) Temp. Coeff. (mV/°C)	Power Temp. Coeff. (%/°C)	NOCT @ 20°C (Value +/- 2 °C)	Module Efficiency (%)	Cell Efficiency (%)	Peak Power per Unit Area (W/m <sup>2</sup> )	Peak Power per Unit Area (W/ft <sup>2</sup> )
SPR-435NE-WHT	435	+/- 5	72.9	5.97	85.6	6.43	20	600	1000	3.5	-235.5	-0.38%	45	20.1%	22.4%	201.2	18.7
SPR-425E-WHT	425	+/- 5	72.9	5.83	85.6	6.18	20	600	1000	3.5	-235.5	-0.38%	45	19.7%	22.4%	196.6	18.3
SPR-415E-WHT	415	+/- 5	72.9	5.69	85.3	6.09	20	600	1000	3.5	-235.5	-0.38%	45	19.2%	22.4%	191.9	17.8
SPR-410NE-WHT	410	+/- 5	72.9	5.62	85.3	6.01	20	600	1000	3.5	-235.5	-0.38%	45	19.0%	22.4%	189.6	17.6
SPR-400E-WHT	400	+/- 5	72.9	5.49	85.3	5.87	20	600	1000	3.5	-235.5	-0.38%	45	18.5%	22.4%	185.0	17.2
SPR-390E-WHT	390	+/- 5	72.9	5.35	85.3	5.72	20	600	1000	3.5	-235.5	-0.38%	45	18.0%	22.4%	180.4	16.8
SPR-327NE-WHT	327	+5/-3	54.7	5.98	65.1	6.46	20	600	1000	3.5	-176.6	-0.38%	45	20.1%	22.4%	200.5	18.6
SPR-325NE-WHT	325	+5/-3	54.7	5.95	65	6.33	20	600	1000	3.5	-176.6	-0.38%	45	19.9%	22.4%	199.3	18.5
SPR-320E-WHT	320	+5/-3	54.7	5.86	64.8	6.24	20	600	1000	3.5	-176.6	-0.38%	45	19.6%	22.4%	196.2	18.2
SPR-318E-WHT	318	+5/-3	54.7	5.82	64.7	6.2	20	600	1000	3.5	-176.6	-0.38%	45	19.5%	22.4%	195.0	18.1
SPR-315NE-WHT	315	+5/-3	54.7	5.76	64.6	6.14	20	600	1000	3.5	-176.6	-0.38%	45	19.3%	22.4%	193.2	17.9
SPR-315E-WHT	315	+5/-3	54.7	5.76	64.6	6.14	20	600	1000	3.5	-176.6	-0.38%	45	19.3%	22.4%	193.2	17.9
SPR-310NE-WHT	310	+5/-3	54.7	5.67	64.4	6.05	20	600	1000	3.5	-176.6	-0.38%	45	19.0%	22.4%	190.1	17.7
SPR-310E-WHT	310	+5/-3	54.7	5.67	64.4	6.05	20	600	1000	3.5	-176.6	-0.38%	45	19.0%	22.4%	190.1	17.7
SPR-308E-WHT	308	+5/-3	54.7	5.64	64.3	6.02	20	600	1000	3.5	-176.6	-0.38%	45	18.9%	22.4%	188.9	17.5
SPR-305NE-WHT	305	+5/-3	54.7	5.58	64.2	5.96	20	600	1000	3.5	-176.6	-0.38%	45	18.7%	22.4%	187.0	17.4
SPR-305E-WHT	305	+5/-3	54.7	5.58	64.2	5.96	20	600	1000	3.5	-176.6	-0.38%	45	18.7%	22.4%	187.0	17.4
SPR-300NE-BLK	300	+5/-3	54.7	5.49	64	5.87	20	600	1000	3.5	-176.6	-0.38%	46	18.4%	22.4%	184.0	17.1
SPR-300E-WHT	300	+5/-3	54.7	5.49	64	5.87	20	600	1000	3.5	-176.6	-0.38%	45	18.4%	22.4%	184.0	17.1
SPR-300E-BLK	300	+5/-3	54.7	5.49	64	5.87	20	600	1000	3.5	-176.6	-0.38%	46	18.4%	22.4%	184.0	17.1
SPR-295E-WHT	295	+5/-3	54.2	5.45	63.3	5.83	20	600	1000	3.5	-176.6	-0.38%	45	18.1%	22.4%	180.9	16.8
SPR-290NE-BLK	290	+5/-3	53.3	5.45	62.1	5.83	20	600	1000	3.5	-176.6	-0.38%	46	17.8%	22.4%	177.8	16.5
SPR-290E-WHT	290	+5/-3	53.3	5.45	62.1	5.83	20	600	1000	3.5	-176.6	-0.38%	45	17.8%	22.4%	177.8	16.5
SPR-290E-BLK	290	+5/-3	53.3	5.45	62.1	5.83	20	600	1000	3.5	-176.6	-0.38%	46	17.8%	22.4%	177.8	16.5
SPR-245NE-WHT	245	+5/-3	40.5	6.05	48.8	6.43	20	600	1000	3.5	-132.5	-0.38%	45	19.7%	22.4%	196.9	18.3
SPR-240NE-WHT	240	+5/-3	40.5	5.93	48.6	6.3	20	600	1000	3.5	-132.5	-0.38%	45	19.3%	22.4%	192.9	17.9
SPR-240E-WHT	240	+5/-3	40.5	5.93	48.6	6.3	20	600	1000	3.5	-132.5	-0.38%	45	19.3%	22.4%	192.9	17.9
SPR-238E-WHT	238	+5/-3	40.5	5.88	48.5	6.25	20	600	1000	3.5	-132.5	-0.38%	45	19.1%	22.4%	191.3	17.8
SPR-235NE-WHT	235	+5/-3	40.5	5.80	48.4	6.175	20	600	1000	3.5	-132.5	-0.38%	45	18.9%	22.4%	188.9	17.5
SPR-235E-BLK	235	+5/-3	40.5	5.80	48.4	6.175	20	600	1000	3.5	-132.5	-0.38%	46	18.9%	22.4%	188.9	17.5
SPR-235E-WHT	235	+5/-3	40.5	5.80	48.4	6.175	20	600	1000	3.5	-132.5	-0.38%	45	18.9%	22.4%	188.9	17.5
SPR-230NE-BLK	230	+5/-3	40.5	5.68	48.2	6.05	20	600	1000	3.5	-132.5	-0.38%	46	18.5%	22.4%	184.9	17.2
SPR-230E-WHT	230	+5/-3	40.5	5.68	48.2	6.05	20	600	1000	3.5	-132.5	-0.38%	45	18.5%	22.4%	184.9	17.2
SPR-225NE-WHT	225	+5/-3	40.5	5.55	48	5.925	20	600	1000	3.5	-132.5	-0.38%	45	18.1%	22.0%	180.9	16.8
SPR-225NE-BLK	225	+5/-3	40.5	5.55	48	5.925	20	600	1000	3.5	-132.5	-0.38%	46	18.1%	22.0%	180.9	16.8
SPR-225E-WHT	225	+5/-3	40.5	5.55	48	5.925	20	600	1000	3.5	-132.5	-0.38%	45	18.1%	22.0%	180.9	16.8
SPR-225E-BLK	225	+5/-3	40.5	5.55	48	5.925	20	600	1000	3.5	-132.5	-0.38%	46	18.1%	22.0%	180.9	16.8
SPR-217E-WHT	217	+5/-3	39.3	5.51	47	5.9	15	600	1000	3.5	-132.5	-0.38%	45	17.4%	20.6%	174.4	16.2
SPR-215E-WHT	215	+5/-3	39.3	5.47	47	5.86	15	600	1000	3.5	-132.5	-0.38%	45	17.3%	20.6%	172.8	16.1
SPR-214E-BLK	214	+5/-3	39.3	5.45	47	5.83	15	600	1000	3.5	-132.5	-0.38%	46	17.2%	20.6%	172.0	16.0

Figure 3: 72-cell.

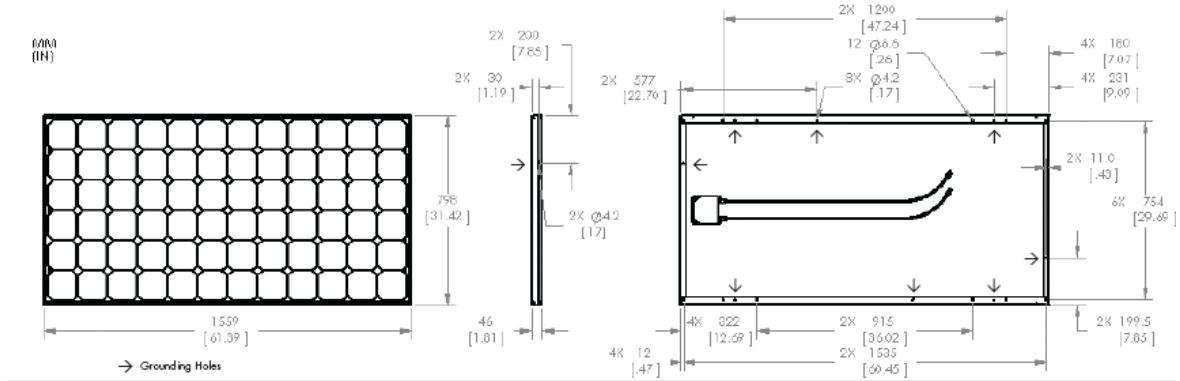


Figure 4: 96-cell (Note: Stacking pins are not included on all models – check the models datasheet for details).

- Grounding holes
- ⊕ Stacking pins

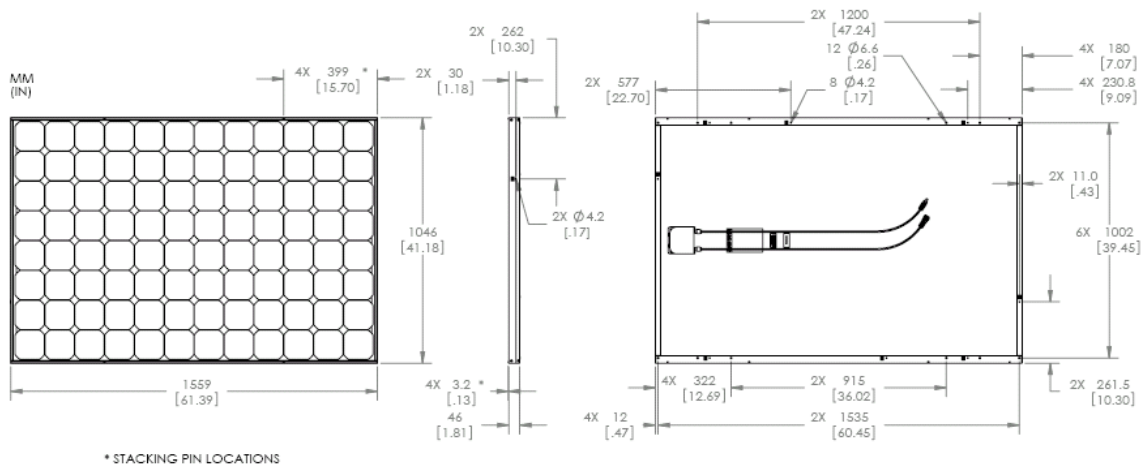


Figure 5: 128-cell.

- Grounding holes
- ⊕ Stacking pins

