



SILVANTIS 72-CELL PHOTOVOLTAIC MODULES

P300 | M330/F330/D330

INSTALLATION GUIDE



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1.0 Introduction

The purpose of this guide is to provide general information regarding the proper installation and handling of SunEdison photovoltaic modules that serve residential, commercial, and industrial segments. System design, construction, and commissioning should be performed by qualified personnel only.

To ensure system integrity, designers, installers and operators must meet all mechanical and electrical requirements for the system and its components. It is the responsibility of the system designer and installer to ensure that all codes and requirements are followed as well.

Please review all the sections that pertain to the proper installation of the modules listed in this guide. The instructions detailed in this guide must be followed throughout the module's lifetime deployment. If you need additional information about the safe, proper use and handling of SunEdison photovoltaic module products, please contact SunEdison.

2.0 Photovoltaic Modules Product Code

Silvantis™ P300 Multicrystalline Modules					
P280ByC	P285ByC	P290ByC	P295ByC	P300ByC	P305ByC
Silvantis™ M330 Monocrystalline Modules					
M310ByC	M315ByC	M320ByC	M325ByC	M330ByC	M335ByC
Silvantis™ F330 Monocrystalline Modules					
F310ByC	F315ByC	F320ByC	F325ByC	F330ByC	F335ByC
Silvantis™ D330 Multicrystalline Modules					
D310ByC	D315ByC	D320ByC	D325ByC	D330ByC	D335ByC

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3.0 Module Overview

SunEdison Silvantis Photovoltaic modules consist of a series of electrically interconnected crystalline silicon solar cells that are sealed within a laminated sheet of tempered glass superstrate* and EVA/back-sheet substrate. These laminates are secured inside an aluminum frame to provide rigidity and a means for attachment to mounting sub-structures. The frames should not be modified or removed.

* Tempered glass may have AR coating.

- Photovoltaic modules are designed and constructed for outdoor use. Do not submerge modules in water at any time.
- The front and back of each module is labeled with a product bar code. Do not cover, remove or deface these labels. This may be required for product identification.
- Damage to the glass surface or the anti-reflective coating can impact the power output and overall efficiency of the system. Scratches, handling marks, or any damage to the glass surface must be avoided.
- For best performance and to avoid potential issues, keep the front side of the module clean and free of obstructions including covers, tape, adhesives, paint and debris.

3.1 Maintenance

Check modules, glass, and frames for damage. Regularly inspect all SunEdison solar modules for safe electrical connections, sound mechanical connections, and freedom from shading and corrosion. If dirt or debris buildup becomes excessive, periodically clean the glass only with a soft cloth using mild, non-abrasive detergent and water. When using mild cleaning liquids, a neutral pH in the range of 6.0 to 8.0 is recommended. Chemicals with pH less than 6.0 or greater than 8.0 should be avoided as it may damage the glass surface and or the AR coating. Please consult with system designer to decide the cleaning and inspection frequency according to local environmental conditions.

Do not power wash or use harsh cleaning materials or objects such as scouring powder, steel wool, scrapers, blades, or other sharp instruments to clean the glass surface of the module. Use of such materials will invalidate the product warranty.

WARNING: Use caution when cleaning the back surface of the module to avoid penetrating the substrate materials.

3.2 Storage, Unpacking and Handling

- Packaged modules must be stored in a dry and ventilated area.
- Packaged modules must not be exposed to rain, snow, hail or other environmental conditions that may compromise the packaging material and the modules.
- Packaged modules must be on appropriate provided pallets and must not be stacked more than two pallet high for storage.
- Once the modules are opened, store modules in a dry and ventilated room.
- Modules should never be stored in a wet environment.
- Upon unpacking, do not carry a module by its wires or junction box. Only carry a module by its frame with two or more people.
- Precaution should be taken to avoid damage to the glass surface with or without anti-reflective coating due to improper handling during storage or unpacking.
- Keep all electrical contacts clean and dry.
- All modules are manufactured with a sealed junction box and pre-attached cables and locking connectors. These components should not be modified or tampered with in any way.
- Do not allow unauthorized persons near the installation site or storage area of modules.
- Do not place modules on top of one another.
- Do not place any load on the module or twist the module frame.
- Do not stand, step, walk, or jump on the module.
- Do not drop or place objects on the modules such as tools.
- Do not handle modules with bare hands and avoid scratches, handling marks or any damage, especially to the front glass of the module, backsheet, or electrical components.
- Do not mark the modules with sharp instruments.
- Do not leave a module unsupported or unsecured.
- Do not modify module frames in any way.

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3.3 Safety

The following safety guidelines and best practices should be followed:

- All installations must be performed in compliance with all applicable regional and local electrical codes or other national or international electrical standards.
- Use insulated tools during installation, troubleshooting and maintenance of photovoltaic modules.
- Wear suitable protection to prevent direct contact with module's electrical output and mechanical sharp edges.
- Cover the front of the modules with an opaque material to stop production of electricity when installing or working with a module or wiring.
- Modules connected in a series should not be disconnected under illumination. Disconnecting modules under illumination may cause electrical arcing which may result in burns, fires or other problems.
- Follow industry best practices when commissioning, troubleshooting, disconnecting, or connecting a PV system.
- Troubleshooting should include planning, checking, disconnecting, cause seeking, replacement, and record keeping.
- Do not install or handle the modules or their components when they are wet or during periods of high wind.
- Do not attempt to disassemble, repair, or open any part of the module including junction box or sub components.
- Do not artificially concentrate sunlight on a module.
- Do not install or handle any broken modules. If a module is broken, or the back sheet is torn, contact with the surface or frame can cause an electrical shock.
- Do not wear rings, jewelry, watches, or other metallic items while working with photovoltaic modules.

4.0 Mechanical Installation

4.1 Planning and Design

- Before installation, check to ensure all sub-structure will accommodate expected system loads. This includes and is not limited to roof, foundations, mechanical structure, and mechanical connections.
- For roof installations, utilize a fire-resistant roof covering rated for the application. A minimum clearance of 6 inches is required between the roof and bottom of the module frame.
- Mechanical structures should not contact the module backsheet under any expected load conditions
- Consider the following factors during system design, which will influence performance:
 - a. SunEdison solar modules produce the most power when they are pointed directly at the sun, and should be tilted for optimum system performance.
 - b. Proximity to obstructions such as: walls, buildings, trees, groundcover, snow cover, or dust and debris that have the potential to shade or damage the modules.
 - c. Elevated temperatures will decrease energy yield, so designs should ensure adequate airflow across the back of the module.
 - d. Allow a minimum spacing of 10 mm between modules for thermal expansion.

4.2 Module Installation Options for Mounting Locations

For bolt and clamp mounting locations and allowable load capacities, please refer to the table on pages 6-7.

- Each module should be mounted using four bolts through the mounting holes on the rear side of the module, or with four clamps over the front side.
- Depending on the desired load capability of the array, modules may be mounted either perpendicular or parallel to the structure rails. Clamps can be mounted anywhere inside of the safe mounting range for each case illustrated in the table on pages 6-7.
- If using bolts, four mounting holes are provided on the rear side the module frame as shown in Appendix 8.1. Use a bolt stack no smaller than ¼"-20 or M6, with two flat washers and a locking washer as shown in Appendix 8.2.
- To ensure an adequate clamping area, all clamps used must comply with the minimum clamping dimensions specified in Appendix 8.3. All fasteners used to fix the modules with clamps should be stainless steel, and no smaller than ¼"-20 or M6.
- To provide adequate fixing or clamping force, torque the minimum recommended fasteners to 6.2 - 8.9 N·m (4.6 - 6.6 ft·lb).
- All other structural dimensions, such as clamp and rail thickness, should be sized appropriately for the intended site load.

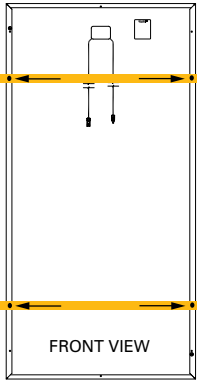
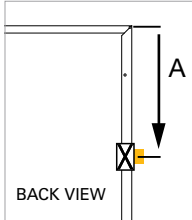
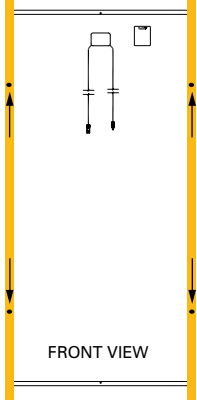
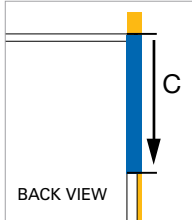
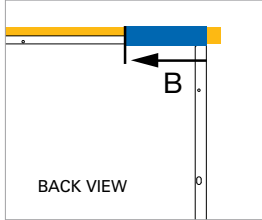
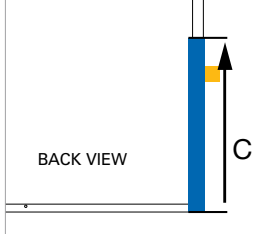
4.3 Module Installation Using Center Mounting Brackets

- Modules may also be mounted using center clamps as shown in Appendix 8.2, for use with trackers.
- Module clamps for center mounting must be based on SunEdison approved extrusion and hardware.
- For module loads higher than 2400 Pa, module clamps and hardware must be pre-approved by SunEdison.
- SunEdison approved center clamps utilizing M8 bolts are to be tightened to 9.2-11.9 N·m (6.8-8.8 ft·lbs).

4.4 Mechanical Installation Warnings

- Installation and maintenance should be performed by qualified personnel only.
- Use insulated tools during installation, troubleshooting and maintenance of photovoltaic modules.
- Installers should adhere to all applicable local, regional, and national codes and regulations when designing and constructing the photovoltaic system.
- Do not stand or walk on any surface of the modules. Do not place any objects or load on the surface of the modules.
- Precaution should be taken to avoid damage to the glass surface with or without anti-reflective coating due to improper handling during installation.
- Mechanical structures should not contact the module backsheet under any expected load conditions.
- Additional mounting holes may not be drilled in the frame, glass or backsheet.
- Ensure that frame weep holes (see Appendix 8.1) are not obstructed by the mechanical installation.
- Mechanical installation of the module shall not cause the frame to torque more than 1 1/2".
- A minimum clearance of 6 inches is required between the roof and bottom of the module frame.

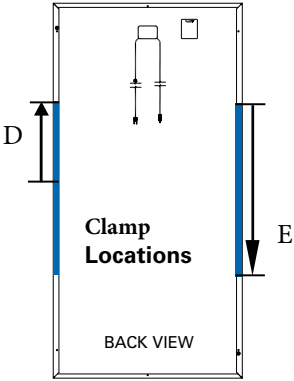
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MOUNTING CONFIGURATIONS						
	CASE 1		CASE 2		CASE 3	
MODULE ILLUSTRATION	 <p>Bolt Mount Locations</p> <p>FRONT VIEW</p>  <p>Clamp Mount Locations: Fixed clamp location for 5400 Pa front load</p> <p>BACK VIEW</p>		 <p>Bolt Mount Locations</p> <p>FRONT VIEW</p>  <p>Clamp Mount Locations: Clamp mount allowable range</p> <p>BACK VIEW</p>		<p>Clamp Mount Locations: Clamp mount allowable range Case 3, option 1</p>  <p>BACK VIEW</p> <p>OR Case 3, option 2</p>  <p>BACK VIEW</p>	
LOAD PARAMETERS	Maximum Rear Load: 2400 Pa or 50 psf	Maximum Front Load: 5400 Pa or 113 psf	Maximum Rear Load: 2400 Pa or 50 psf	Maximum Front Load: 5400 Pa or 113 psf	Maximum Rear Load: 2400 Pa or 50 psf	Maximum Front Load: 2400 Pa or 50 psf
DETAILS	<p>CASE 1: Structural rails running perpendicular to the length of the module should be fixed via bolts at the mounting holes between each long side frame, or Clamps can be mounted at the Fixed Clamp Mount location as shown in the color code key.</p>		<p>CASE 2: Structural rails running parallel to the length of the module should be fixed via bolts at the mounting holes on each long side frame, or Clamps can be mounted anywhere within the Clamp Mount Range as shown in the color code key.</p>		<p>CASE 3: Structural rails running perpendicular to the length of the module should be fixed via bolts at the mounting holes between each long side frame, or Clamps can be mounted anywhere within the Clamp Mount Range as shown in the color code key.</p>	

Mounting Color Code: ● Mounting Hole Location ■ Module Rail ☒ Fixed Clamp Mount ■ Clamp Mount Range

Fixed Clamp Mount location: A – 394 mm
Clamp mount allowable range: B – 248 mm
C – 444 mm



MOUNTING CONFIGURATIONS		
<p>CENTER MOUNT CLAMPING (AP90/ATI TRACKERS ONLY)</p> <p>CASE 4: A structural rail running perpendicular to the length of the module should be fixed between each long side frame. Clamps can be mounted at the Fixed Clamp Mount location as shown in the color code key.</p>	<p>CASE 3</p> <p>Maximum Rear Load: 2400 Pa or 50 psi</p> <p>Maximum Front Load: 5400 Pa or 113 psi</p>	

Mounting Color Code:  Clamp Mount Range

Clamp mount allowable range: D - 305 mm
E - 610 mm

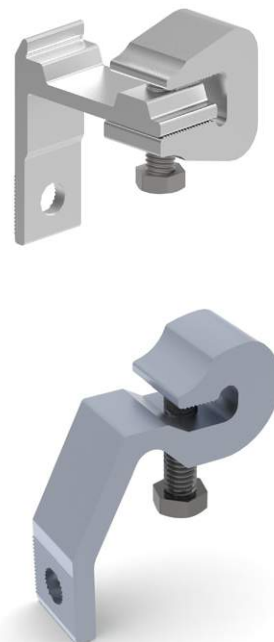
4.5 Additional Mounting Methods

Use of the PanelClaw system (Part Number 500000501 and 500000701) is permitted with SunEdison solar PV modules.

Structures manufactured by PanelClaw Inc. use a special clamp, or "claw" designed to attached to the flange of the PV module at all four corners, on the two short frame ends. PanelClaw is UL certified for electric bonding and grounding. See the PanelClaw installation guide for proper grounding management. For proper placement, attach a claw over the module frame flange at each of the four designated locations and tighten the screw so that the claws are flush with the long and short ends of the module flange. This mounting method has been tested to a maximum rating of 50 psf in the negative and positive direction. See case two and three from above as well as the PanelClaw installation guide for information on the installation of the clamps. The PanelClaw should only be used on modules with flanges of 30 mm.

Use of the SunEdison AP90 Single Axis Tracker is authorized for use as well. Please refer to the AP90 installation guide for specific instructions. Installation guides can be found on the SunEdison website www.sunedison.com.

Figure 1: Illustrations of the Panel Claw



5.0 Electrical Installation

5.1 Planning and Design

- All modules are manufactured with a sealed junction box and pre-attached cables and locking connectors. These components should not be modified or tampered with in any way.

Note: Installers shall ensure that the polarized locking connectors are from the same supplier when connected on the same string. Do not mix polarized interlocking connectors from different manufacturers—including connections at the inverter, combiner boxes, and modules. Doing so will void the warranty. Refer to section 8.4 for connector types.

- Ensure connectors are clean and dry before establishing connection.
- Ensure that all wire, fusing and disconnects are appropriately sized for the system design according to national, regional, and local codes.
- Electrical characteristics are within plus or minus 5% of rated values for I_{sc} , V_{oc} , I_{mpp} and V_{mp} . P_{max} ranges between $-0/+5W$ at standard test conditions (STC). However, modules will operate under conditions which may be significantly different than STC. SunEdison suggests multiplying specified ratings by a minimum of 1.25 or more when specifying the system and balance of system components. Refer to local codes before planning and design of the system.
- Determine the maximum number of modules connected in series using the following formula:

$$N_s = V_{maxs}/V_{ocm}$$

Where:

N_s equals the maximum modules in series

V_{maxs} equals the maximum system voltage

Please refer to module data sheet for actual V_{max} rating, as some models are rated for 1000 V UL and 1000 V IEC.

V_{ocm} equals the module open circuit voltage at coldest conditions for the site (refer to local codes)

WARNING: Installers shall adhere to all applicable local, regional, and national codes and regulations when designing and constructing the photovoltaic system

Note: In colder climates, it may be necessary to further reduce the maximum number of modules in series by using V_{ocm} at the minimum expected operating temperature.

5.2 Module Wiring

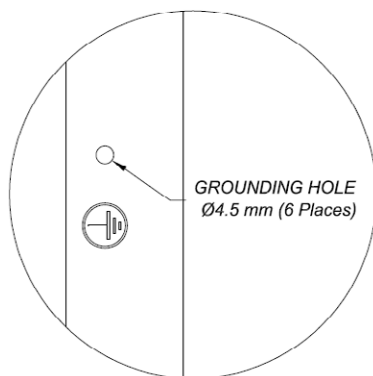
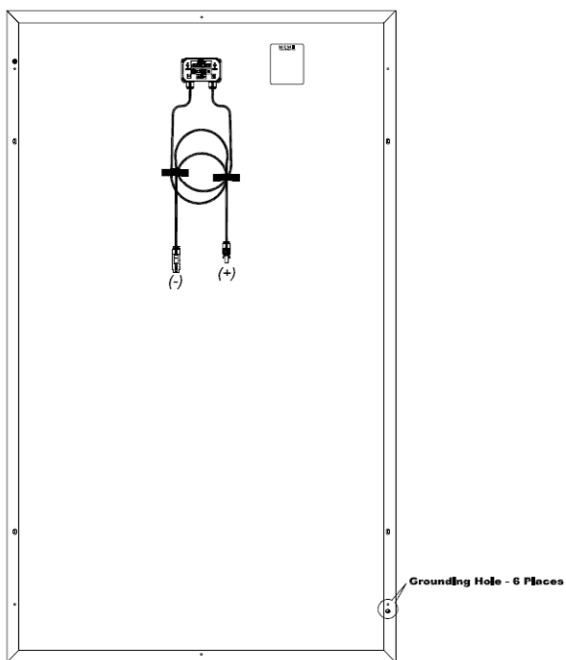
- The module includes wires and polarized locking connectors from the junction box on the back of the module. Field replacement of connectors or cables must be avoided and it will invalidate the product warranty. Polarized locking connectors of the same type and make are needed for all series string wiring. The maximum operating temperature of wires and connectors should not exceed 85°C.
- When installing panels in landscape orientation, use of the 1.3 meter lead lengths will ensure enough cable length to make adjacent, module-to-module, string connections, assuming a maximum spacing of 50 mm between adjacent modules.
- When installation panels in portrait orientation, use of the .55 or 1.0 meter lead lengths will ensure enough cable length to make adjacent, module-to-module, string connections, assuming a maximum spacing of 50 mm between adjacent modules.
- Always wire modules so that proper polarity is maintained. Avoid placing excessive tension on the cables.
- There is no limit to the maximum number of series strings that can be combined in parallel. However, when doing so, each string must include overcurrent protection with a maximum rating of 15A. SunEdison recommends the use of DC rated fuses or overcurrent protection devices with the appropriate maximum voltage rating.
- Do not connect modules directly to a parallel bus.
- The cross-sectional area of cable and the connector type must be selected to align with the overall system design and should include the maximum short circuit current of the system, maximum operating temperatures, and cable run lengths.
- For field connections, use at a minimum #12 AWG/4 mm² wires insulated for a minimum of 85°C. Use copper wire only.

5.3 Grounding

The frame of the PV module as well as any exposed metal components that can become energized by the PV system MUST be connected to an equipment grounding connector to prevent electrical shock. Refer to section 250 of the NEC for specific instructions on grounding. Even when local regulations, codes, or standards do not require safety related grounding, SunEdison highly recommends grounding all PV module frames in order to maintain a zero-voltage potential between electrically conductive equipment and the earth in all scenarios. Proper grounding is obtained by bonding all exposed metal equipment to each other by using a properly sized equipment grounding conductor (EGC).

SunEdison PV modules use a coated aluminum frame for corrosion resistance. In order to ensure proper grounding the coating must be punctured by the grounding method. A grounding wire composed of copper with a minimum gauge of 12 AWG is recommended to carry the electrical ground load. Consult applicable codes to see if a larger diameter conductor is required. The potential for corrosion due to the electrochemical reaction between two dissimilar metals in contact is minimized if the voltage potential between the two metals is low. The grounding method must not allow for the direct contact of dissimilar metals with the frame of the module, which would result in galvanic corrosion. UL 1703 recommends metal combinations not exceed a voltage potential of 0.5 Volts.

Figure 2: Image of the grounding holes



The frame has predrilled holes marked with a grounding sign as illustrated below. These holes should be used exclusively for grounding purposes, and may not be used for any other purpose. **Do not drill additional holes or modify existing holes in the frame.**

WARNING: Only negative grounding circuits (negative polarity to ground) shall be used within the array design. Transformerless inverters with floating grounding are not acceptable.

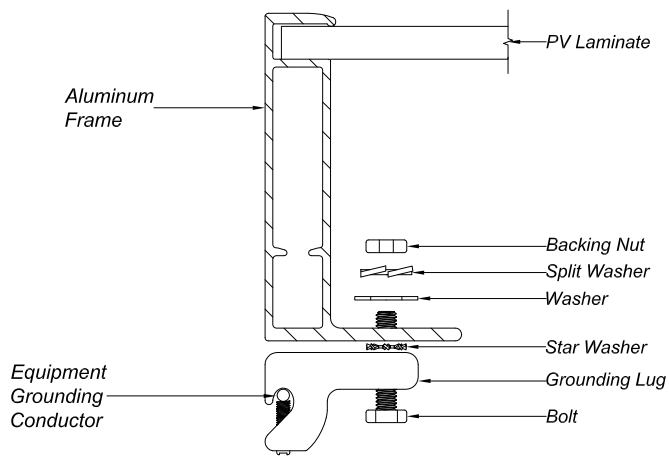
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5.3 Option A: Metal Lug

SunEdison recommends using a copper or tin plated grounding lug that is rated for outdoor use and uses no smaller than a #12 wire. The use of a copper split bolt connector is authorized for use as well.

- Attach the grounding lug to the frame as follows and shown below in Figure 3:

Figure 3: Grounding Lug Assembly



- Step 1:** Uses stainless steel metric/english set only. The following is the minimum hardware metric and english required by SunEdison.

Metric set

- Stainless Steel Bolt M4
- Stainless Steel Nut M4
- Stainless Steel Flat Washer M4
- Stainless Steel Spring Washer M4
- Stainless Steel Lock-Toothed Washer M4
- Stainless Steel Slotted Washer M4

English set

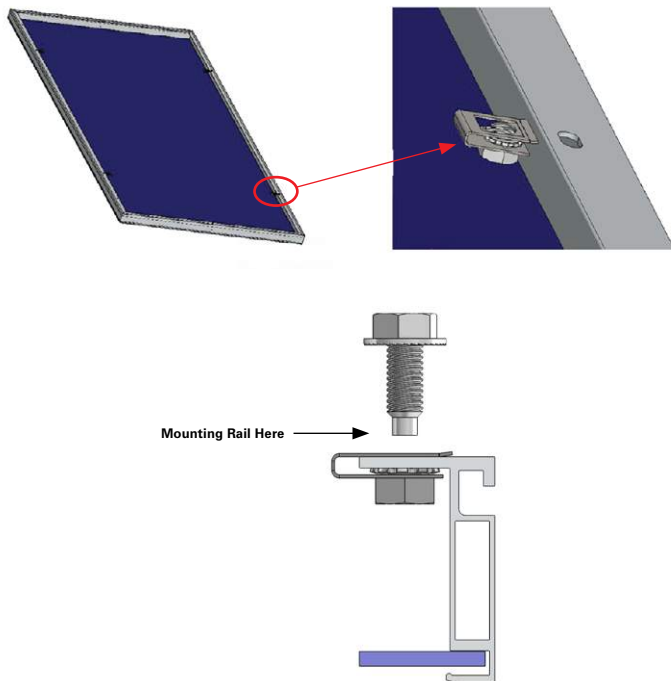
- Stainless Steel Bolt #8-32
- Stainless Steel Nut #8-32
- Stainless Steel Flat Washer #8-32
- Stainless Steel Spring Washer #8-32
- Stainless Steel Lock-Toothed Washer #8-32
- Stainless Steel Slotted Washer #8-32

- Step 2:** Place the grounding lug over the grounding hole on the exterior of the module frame.
- Step 3:** Place a star washer directly between the bottom of the grounding lug and the exterior surface of the frame.
- Step 4:** Place a bolt through the lug, star washer and frame grounding hole.
- Step 5:** Secure the lug to the frame using a flat washer, split washer and nut.
- Step 6:** Torque the bolt stack to approximately 1.5-2.3 N·m (or 1.1-1.7 ft·lbs) to ensure the star washer scratches the anodized frame.

5.3 Option B: Racking Manufacturer Integrated Grounding Methods

SunEdison modules can be grounded by bonding PV modules to a grounded racking system. Integrated grounding methods must be appropriately certified to UL standards and must be in accordance with the specified instructions of the respective manufacturer. SunEdison recommends using its internally developed integrated grounding clip, PN: 720256 with its piloted bolt, PN: 720230. The grounding clip utilizes a 304 stainless steel KEP nut to make the ground connection, and the Geomet finished bolt carries the current to the grounded structure.

Figure 4: Grounding Lug Assembly

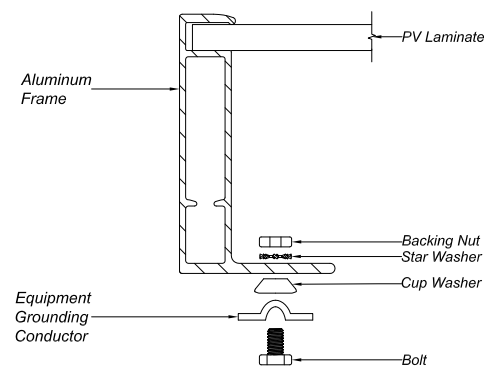


If the clip is not available, SunEdison also recommends using the BURNDY WEEBs integrated rack grounding, part numbers WEEB-ADC, WEEB-ADR, WEEB-WMR1, and WEEB-WMR2. These devices use 304 stainless steel and electrically grounds the module to the supporting structure and contain specialized teeth to penetrate anodized aluminum for a proper electrical connection to the supporting structure. Should you choose a rack integrated method that is not approved by UL please contact SunEdison before proceeding to determine compatibility.

5.3 Option C: Bolt Wire Assembly

- Step 1:** A grounding bolt assembly, of at least minimum recommended size (see Option A) must be attached at one of the designated aforementioned grounding hole locations. Using only stainless steel hardware, insert a stainless steel bolt first through the stainless steel cup washer, and then through the grounding hole.
- Step 2:** Loosely add a stainless steel backing nut and a toothed lock washer to the bolt.
- Step 3:** Bend the EGC into an Omega (Ω) shape to tightly fit between the partially installed bolt head and cup washer. The EGC shall be exclusively in contact with the steel.
- Step 4:** Tighten the bolt to approximately 35 in-lbf (4 N·m) of torque. The toothed washer must penetrate the coated aluminum.
- Step 5:** Route the correctly sized EGC wire in such a way to avoid contact with the module's frame.

Figure 5: Bolt Wire Assembly



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5.3 Option D: Alternative Grounding

- All other code compliant frame grounding methods that are certified to UL contact SunEdison for approval.

5.4 Electrical Installation Warnings

- Installation and maintenance should be performed by qualified personnel only.
- Use insulated tools during installation, troubleshooting and maintenance of photovoltaic modules.
- Installers should adhere to all applicable local, regional, and national codes and regulations when designing and constructing the photovoltaic system.
- Photovoltaic modules produce DC electrical energy from light. When illuminated, each module can have a DC potential of greater than 45V and should be handled with care.
- Disconnecting modules under illumination may cause electrical arcing which may result in burns, fires, or other problems. Modules connected in series should not be disconnected under illumination.
- Always use a wire management system that keeps wires and cables out of direct contact with edge surfaces which could cut or damage the insulation. Do not allow wires to rest on the ground or roof surface.
- The module junction box should not be opened or modified in any way in the field.
- Do not use mirrors, lenses, or other techniques to magnify or concentrate additional light on the module.

6.0 Disclaimer of Liability

The information in this manual is based on SunEdison's knowledge and experience and is believed to be accurate. However, all information in this manual (without exception) including recommendations and specifications does not constitute a warranty, expressed or implied. SunEdison reserves the right to change the manual, the module, or specifications without prior notice.

The product warranty shall be VOID if handling and installation of the product does not conform to SunEdison's written installation instructions, or if the product has been reworked, repaired or otherwise modified in a manner not previously authorized by SunEdison in writing, or if the product is installed in an environment for which it was not designed. SunEdison shall not be liable for special, indirect, consequential, contingent or incidental damages related to or arising from the installation or use of the product by purchaser under any circumstances.

SunEdison Modules are certified by:



SunEdison assumes no responsibility for any product application or use which is beyond SunEdison's direct control. SunEdison does not accept responsibility and expressly disclaims liability for loss, damage, or expense arising out of or in any way connected to such installation, operation or maintenance of the product.

International Product Certifications:

Certification	<ul style="list-style-type: none">• IEC 61215 certified by TÜV SÜD• IEC 61730 certified by TÜV SÜD to ensure electrical safety• Stringent outgoing quality acceptance criteria benchmarked to industry standards• UL 1703 listed by CSA for US and Canada
Environmental	AB8 (-50°C to +40°C)
Fire Resistance Rating	Class C

IEC 61215, IEC 61730, CE, UL 1730, and Safety Class II certifications ensure that SunEdison solar products operate safely and comply with global electrical, performance, reliability, and fire safety codes.



7.0 Mechanical and Electrical Parameters and Specifications

7.1 Silvantis P300 Details

SILVANTIS P300 MULTICRYSTALLINE MODULES

P280BMC	P285BMC	P290BMC	P295BMC	P300BMC	P305BMC
P280BCC	P285BCC	P290BCC	P295BCC	P300BCC	P305BCC
P280BDC	P285BDC	P290BDC	P295BDC	P300BDC	P305BDC

TEMPERATURE COEFFICIENTS AND PARAMETERS

Nominal Operating Cell Temperature (NOCT) (°C)	46 ± 2
Temperature Coefficient of Pmax (%/°C)	-0.45
Temperature Coefficient of Voc (%/°C)	-0.33
Temperature Coefficient of Isc (%/°C)	+0.066
Operating Temperature (°C)	-40 to +85
Maximum System Voltage (V)	1000 (UL & IEC)
Limiting Reverse Current (A)	8.40
Maximum Series Fuse Rating (A)	15
Power Range	-0/+5

Temperature coefficients may vary by ±10%

ELECTRICAL CHARACTERISTICS

Model #	P280ByC	P285ByC	P290ByC	P295ByC	P300ByC	P305ByC
Rated Maximum Power Pmax (W)	280	285	290	295	300	305
Open-Circuit Voltage Voc (V)	44.0	44.4	44.7	45.1	45.3	45.4
Short Circuit Current Isc (A)	8.60	8.65	8.71	8.95	9.00	9.05
Module Efficiency (%)	14.3	14.6	14.8	15.1	15.4	15.6
Max Power Point Voltage Vmpp (V)	34.7	34.9	35.4	35.7	36.0	36.3
Max Power Point Current Impp (A)	8.08	8.16	8.20	8.26	8.34	8.41

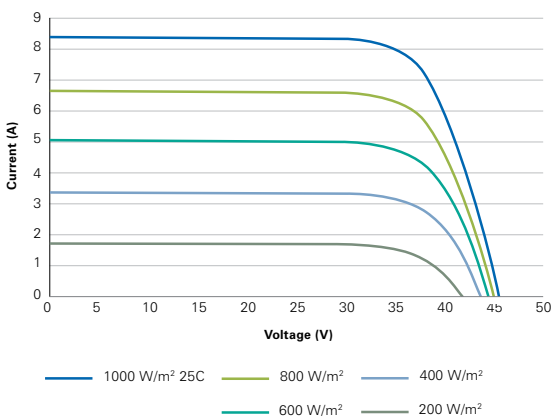
All electrical data at STC: 1000 W/m², AM1.5, 25°C

Electrical characteristics measurement tolerance is ±5% and power is -0/+5 W

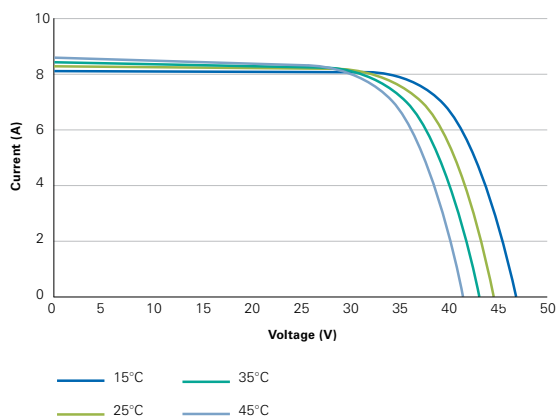
y indicates manufacturing location: M = Malaysia, C = Canada, D = Europe, T = Taiwan, P = PRC, X = Mexico

Listed specifications are subject to change without prior notice.

IV CURVES AT MULTIPLE IRRADIANCES [25°C]



IV CURVES AT MULTIPLE TEMPERATURES [1000 W/m²]



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7.2 Silvantis M330/F330/D330 Details

SILVANTIS M330 MONOCRYSTALLINE MODULES

M310ByC	M315ByC	M320ByC	M325ByC	M330ByC	M335ByC
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SILVANTIS F330 MONOCRYSTALLINE MODULES

F310ByC	F315ByC	F320ByC	F325ByC	F330ByC	F335ByC
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SILVANTIS D330 MONOCRYSTALLINE MODULES

D310ByC	D315ByC	D320ByC	D325ByC	D330ByC	D335ByC
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TEMPERATURE COEFFICIENTS AND PARAMETERS

Nominal Operating Cell Temperature (NOCT) (°C)	47 ± 2
Temperature Coefficient of Pmax (%/°C)	-0.45
Temperature Coefficient of Voc (%/°C)	-0.33
Temperature Coefficient of Isc (%/°C)	+0.05
Operating Temperature (°C)	-40 to +85
Maximum System Voltage (V)	1000 (UL & IEC)
Limiting Reverse Current (A)	9.10
Maximum Series Fuse Rating (A)	15
Power Range	-0/+5

Temperature coefficients may vary by ±10%

ELECTRICAL CHARACTERISTICS

Model #	M/F/D 310ByC	M/F/D 315ByC	M/F/D 320ByC	M/F/D 325ByC	M/F/D 330ByC	M/F/D 335ByC
Rated Maximum Power Pmax (W)	310	315	320	325	330	335
Open-Circuit Voltage Voc (V)	45.3	45.7	45.9	45.9	46.2	46.4
Short Circuit Current Isc (A)	9.16	9.23	9.26	9.27	9.28	9.29
Module Efficiency (%)	15.8	16.1	16.4	16.7	16.9	17.1
Max Power Point Voltage Vmpp (V)	36.2	36.6	37.0	37.3	37.7	37.9
Max Power Point Current Imp (A)	8.57	8.63	8.72	8.72	8.77	8.85

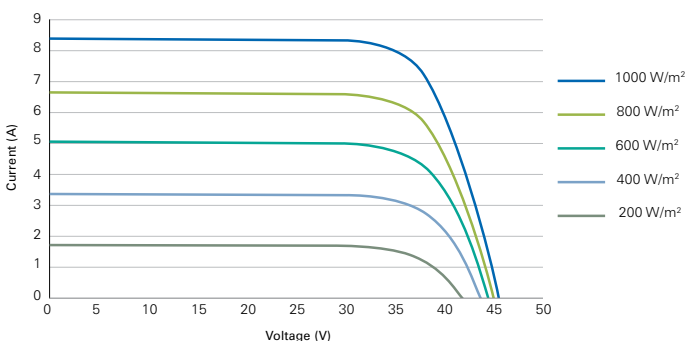
All electrical data at STC: 1000 W/m², AM1.5, 25°C

Electrical characteristics measurement tolerance is ±5% and power is -0/+5 W

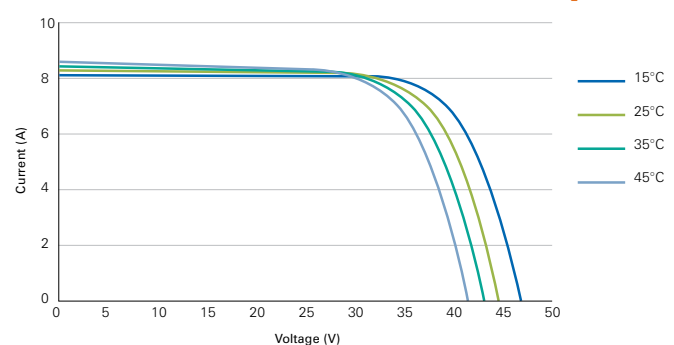
y indicates manufacturing location: M = Malaysia, C = Canada, D = Europe, T = Taiwan, P = PRC, X = Mexico

Listed specifications are subject to change without prior notice.

IV CURVES AT MULTIPLE IRRADIANCES [25°C]



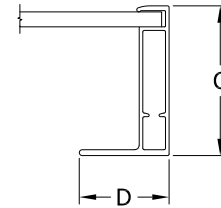
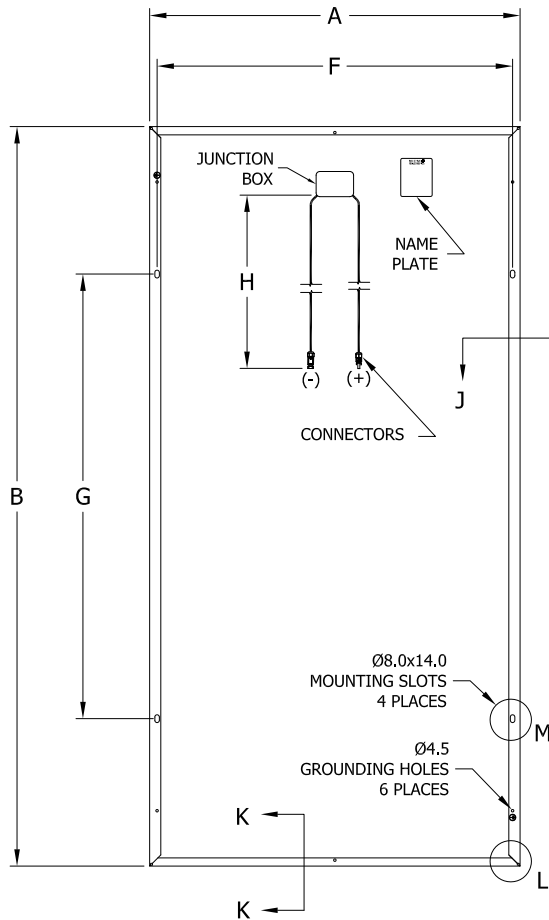
IV CURVES AT MULTIPLE TEMPERATURES [1000 W/m²]



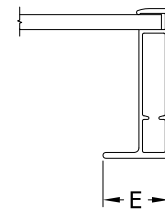
8.0 Appendix

8.1 Module Details

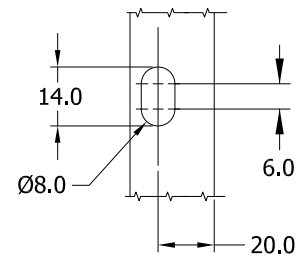
THE ENGINEERING DRAWING SHOWN BELONGS TO THE FOLLOWING LISTED SILVANTIS MODULE SERIES: P300 & M/D/F330



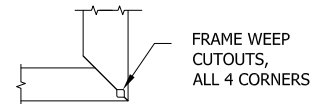
SECTION J-J
SIDE FRAME PROFILE



SECTION K-K
END FRAME PROFILE



DETAIL - M
MOUNTING HOLE



DETAIL - L
WEEP CUTOUT

PHYSICAL PARAMETERS

Dimension	MM	INCH
Module Dimensions		
A	990	39.0
B	1,976	77.8
C	50	2.0
D	30	1.2
E	22	0.9

Dimension tolerance range for:
A ± 3 mm, B ± 3 mm and C ± 0.3 mm

Dimension	MM	INCH
Mounting Hole Spacing		
F	950	37.4
G	1,188	46.8
Cable Length		
H *(BMC)	1,000	39.4
H (BCC)	1,300	51.2

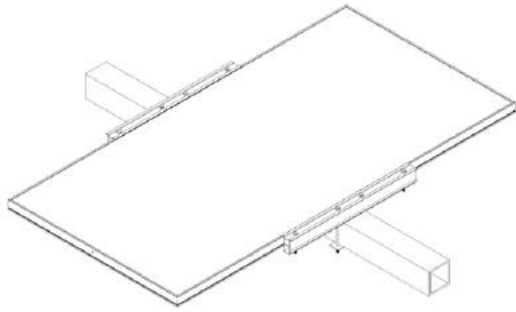
Cable length tolerance - 2.5 mm \pm 52.5 mm

*(1,300 [51.2] option available upon request, please contact your local sales representative for more information)

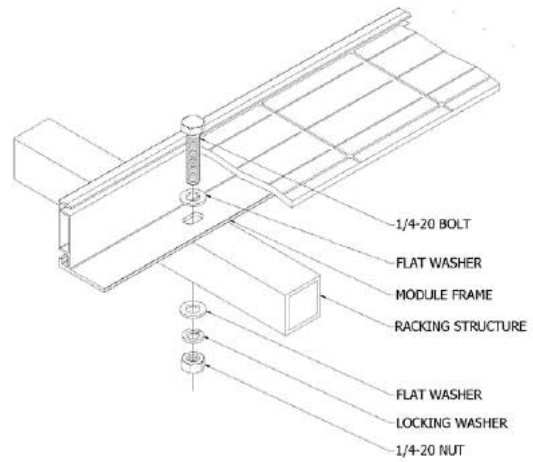
Module Weight (Kg)	22.0
Frame Material	Anodized Aluminum
Glass (mm)	3.2 Tempered ARC glass
Connector	S418 BizLink/ Amphenol PV Connector

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8.2 Center Clamp Module Installation Illustrations

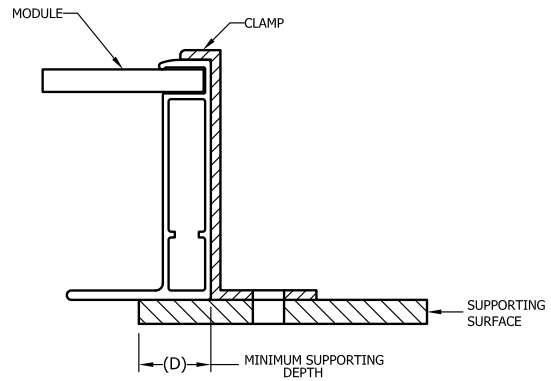
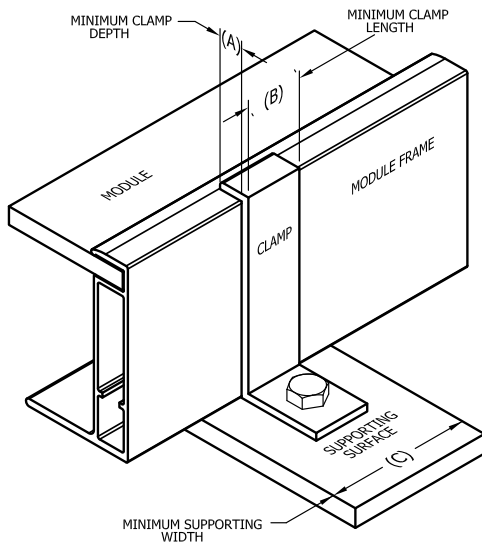


Center Mount Option



Bolt Stack Details

8.3 Module Clamp Drawings



PHYSICAL PARAMETERS

Dimension	MM	INCH
Module Clip Dimensions		
A	6.35	.03
B	38	1.5
Minimum Support Dimensions		
C	50	2.0
D	15	.06

8.4 Pre-mounted Cables and Connectors

Mounting Configuration	Pre-mounted Cables	Pre-mounted Connectors
Type	TUV – PV1-F & UL – PV wire	locking polarized connectors
Cross section	4.0 mm ²	4 mm dia.
Max. current	30 A at 85°C	IEC 25 A and UL 20 A
Max. system voltage	IEC 1000 V DC/ UL 1000 V	IEC 1000 V DC/ UL 1000 V
Temperature rating	–40°C to +90°C	–40°C to +85°C
Qualification	TUV 2PFG & UL PV wire	EN 50521 & UL for PV sys

Module Model Number	Connector Type
SE-MxxxByC-3w	S418 BizLink PV Connector
SE-MxxxByC-3z	Amphenol Helios H4 PV Connector
SE-DxxxByC-3w	S418 BizLink PV Connector
SE-DxxxByC-3z	Amphenol Helios H4 PV Connector
SE-FxxxByC-3w	S418 BizLink PV Connector
SE-FxxxByC-3z	Amphenol Helios H4 PV Connector

w can be 4, 5, 6, 7, 8, 9
z can be A or B

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Installation Notes



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