



# SnapNrack™

## Solar Mounting Solutions

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### Series 200

Residential Ground Mount System  
Installation Manual

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[snapnrack.com](https://snapnrack.com)



2703 Listed — PV Mounting System

# An Intro to SnapNrack Series 200

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SnapNrack Series 200 PV Mounting System offers a straightforward, visually appealing, photovoltaic (PV) module installation system. This innovative system simplifies the process of installing solar PV modules, shortens installation times, and lowers installation costs.

SnapNrack systems, when installed in accordance with this manual, will be structurally adequate for the specific installation site and will meet the local and International Building Code. Systems will also be bonded to ground, under SnapNrack's UL 2703 Listing.

The SnapNrack installation system is a set of engineered components that can be assembled into a wide variety of solar mounting structures. It is designed to be installed by qualified solar installation technicians. With SnapNrack you will be able to solve virtually any PV module mounting challenge.

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# Certification Details

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SnapNrack Series 200 system has been evaluated by Underwriters Laboratories (UL) and Listed to UL /ANSI Standard 2703 for Grounding/Bonding and Mechanical Loading.

## Grounding/Bonding

The Series 200 system has been designed in compliance with UL Standard 2703 Section 9.1 Exception, which permits accessible components that **are not part of the fault current ground path to not be electrically bonded** to the mounting system. The UL Listing covers bonding for a load rating up to 45 psf. For more details on the integrated grounding functionality see the [Grounding Specifications](#) section.

This racking system may be used to ground and/or mount a PV module complying with UL 1703 only when the specific module has been evaluated for grounding and/or mounting in compliance with the included instructions. See the [Grounding Specifications](#) for the list of modules tested with the Series 200 system for integrated grounding.

Ground Lug has been evaluated to both UL 467 and UL 2703 Listing requirements.

Series 200 has been listed with a number of Module Level Power Electronic (MLPE) devices. A complete list can be found in the [Grounding Specifications](#) section.

The mounting system Bonding Listing is only valid when installed with a Non-Separately Derived PV system. The PV system is required to have a direct electrical connection to another source, such as connecting to the grid via a grid interactive inverter.

SnapNrack recommends that bare copper never come into contact with aluminum.

## Mechanical Loading

The Series 200 system is Listed for mechanical loading for different load ratings depending on the mounting configuration and PV module installed. For more details on the mechanical loading details see the [Mechanical Loading Specifications](#) section.

SnapNrack engineered systems should only be used with SnapNrack components and hardware. Any application outside of those specified in this Installation Manual and the Structural Engineering Report may void the warranty and structural certification could become invalid.

If the module clamps have been engaged and need to be loosened and reengaged, SnapNrack recommends moving the module frame 3mm to engage the bonding pin in a new location.

The UL Listing covers mechanical load ratings for the various module orientations and positive, negative, and down-slope ratings. These values can be found in the [Mechanical Loading Specifications](#) section.

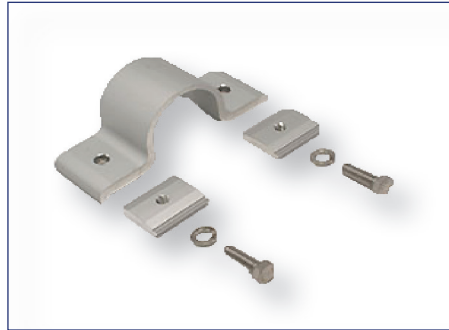
SnapNrack recommends a periodic re-inspection of the completed installation for loose components, loose fasteners, and any corrosion, such that if found, the affected components are to be immediately replaced.



## Structural Components



SnapNrack Ground Rail



SnapNrack Pipe Clamp Assembly



SnapNrack Adjustable End Clamp Assembly



SnapNrack Universal End Clamp



SnapNrack Mid Clamp



Hollaender Single Adjustable Socket Tee



Hollaender Double Adjustable Socket Tee



Hollaender Single Socket Tee

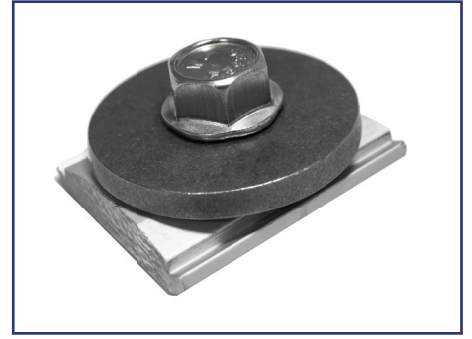
## Wire Management/Grounding Components



SnapNrack Wire Clamp



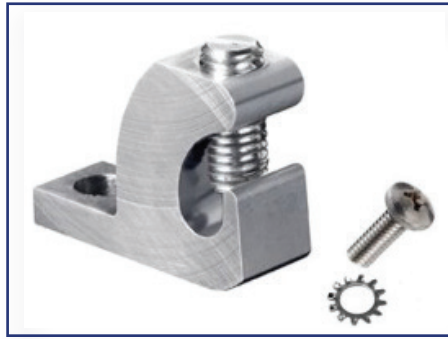
SnapNrack Wire Retention Clip



SnapNrack MLPE Attachment Kit



SnapNrack Ground Lug



IlSCO Lay-In Lug - GBL-4DBT

## Aesthetic Components



SnapNrack Ground Rail End Cap



Hollaender Plastic Plug End



Hollaender Aluminum Plug End

## Hardware Torque Specifications

Hardware Description	Torque Specification
Grounding Electrode Conductor to SnapNrack Ground Lug (6-12 AWG Solid Copper)	16 ft-lbs (192 in-lbs)
IlSCO Lay-in Lug GBL-4DBT to Rail	5 ft-lbs (60 in-lbs)
Grounding Electrode Conductor to IlSCO Lay-in Lug GBL-4DBT (10-14 AWG Solid Copper)	1.67 ft-lbs (20 in-lbs)
Grounding Electrode Conductor to IlSCO Lay-in Lug GBL-4DBT (8 AWG Stranded Copper)	1.04 ft-lbs (25 in-lbs)
Grounding Electrode Conductor to IlSCO Lay-in Lug GBL-4DBT (4-6 AWG Stranded Copper)	1.46 ft-lbs (35 in-lbs)
Adjustable End Clamp, Mid Clamp (Standard Stainless Steel Fasteners)	10+ ft-lbs (120+ in-lbs)
Adjustable End Clamp, Mid Clamp (Black Stainless Steel Fasteners)	8 ft-lbs (96 in-lbs)
Universal End Clamp	10 ft-lbs (120 in-lbs)
Hollaender Single Socket Tee, Single Adjustable Socket Tee, Double Adjustable Socket Tee	16 ft-lbs (192 in-lbs)
Pipe Clamp Assembly	12 ft-lbs (144 in-lbs)
SolarEdge Frame Mounted Bracket to Module Frame	7 ft-lbs (84 in-lbs)
MLPE Attachment Kit (Rail Mounted Bracket to Rail)	10 ft-lbs (120 in-lbs)
Enphase Frame Mounted Bracket to Module Frame	13 ft-lbs (156 in-lbs)

## Site Survey

- Measure the installation area and develop an accurate drawing identifying any obstacles such as buildings, ditches, and trees.
- Identify any access areas or keep-out areas as required by the local AHJ (i.e. easements).
- If terrain and/or soils conditions do not meet the minimum requirements set in the Series 200 Structural Engineering Report, consult a structural engineer.

## Design Guidance

1) Layout the array in the available installation area. Adjacent modules in the same column are spaced 1/2" apart. Adjustable End Clamps require an additional 1" of rail extending past module frame, while Universal End Clamps require no extra rail. When installing multiple columns of modules, a minimum spacing gap of 1/8" should be used between columns.

2) Review the shading pattern across the installation area from nearby structures, trees, etc.

### Design Note:

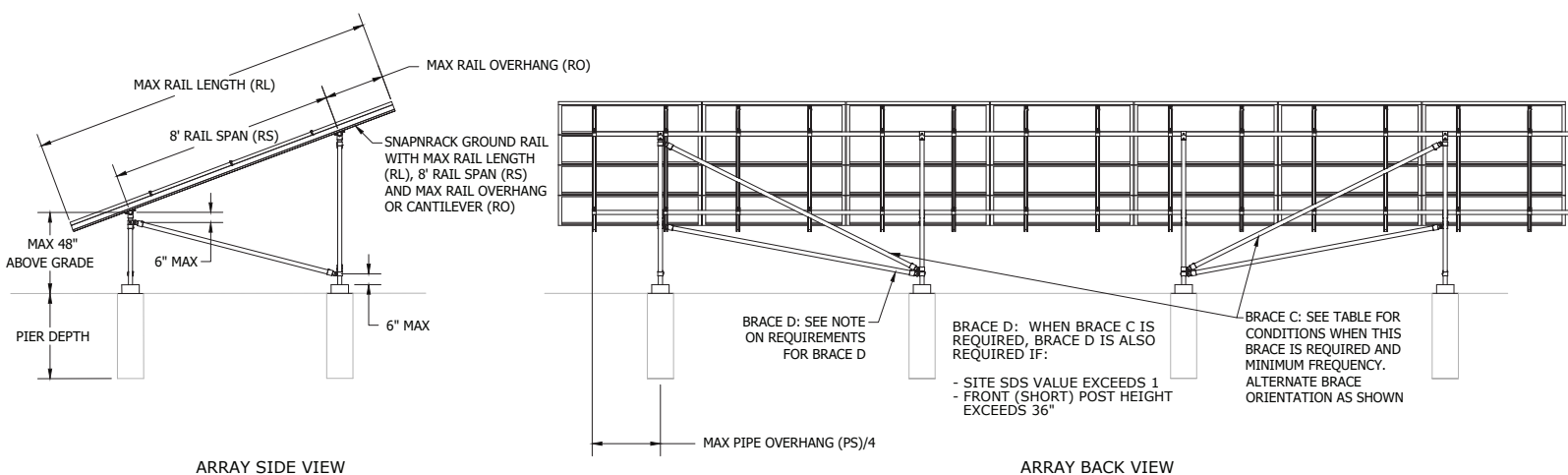
A shade analysis prior to the design as a part of the standard site analysis is recommended.

3) Determine site conditions for calculating the engineering values.

### Design Note:

Always confirm that site conditions and code versions comply with local AHJ requirements.

4) Reference site conditions and system specifications in Series 200 Structural Engineering Report to determine maximum pipe span and foundation requirements.



5) Confirm design complies with UL 2703 Listing for Mechanical Loading. For more details on the mechanical loading details see the [Mechanical Loading Specifications](#) section.

6) To simplify the design process and automatically generate a bill of materials for the mounting system, use the Series 200 Configuration Tool located on the SnapNrack website. Always refer to Approved Module Lists in Installation Manuals to ensure installation complies with UL 2703 Listing.

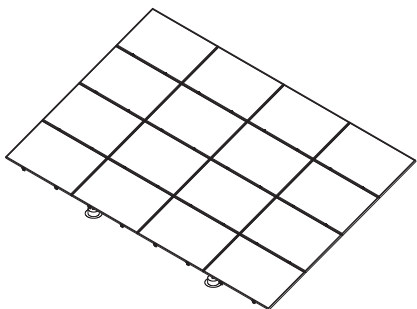
7) Insert SnapNrack installation details in to design set specific to the project requirements.



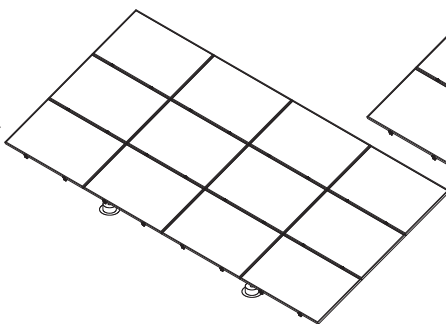
## ⚙️ Design Note:

Series 200 allows for multiple mounting configurations. Modules can be mounted in landscape (long side of module perpendicular to slope) or portrait (long side of module parallel to slope) orientations. Landscape orientation is recommended for maximum material efficiency. Standard Series 200 configurations include:

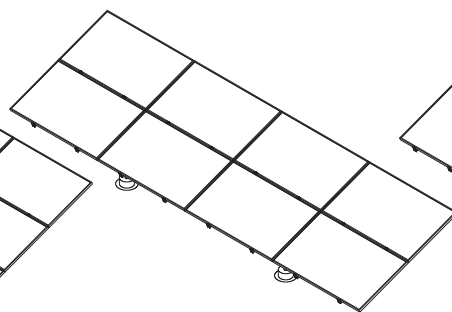
- Four modules in landscape
- Three modules in landscape
- Two modules in landscape
- Two modules in portrait



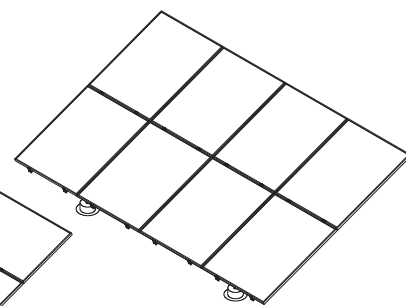
Four Modules in Landscape



Three Modules in Landscape



Two Modules in Landscape



Two Modules in Portrait

## ⚠️ Safety Guidance

- Before you dig any holes, contact all utilities in the area to locate any underground lines, pipes, and wiring.
- Always wear appropriate OSHA approved safety equipment when at active construction site
- Appropriate fall protection or prevention gear should be used. Always use extreme caution when near the edge of a roof
- Use appropriate ladder safety equipment when accessing the roof from ground level
- Safety equipment should be checked periodically for wear and quality issues
- Always wear proper eye protection

## System Layout

- 1) Stake corners of the array according to the plan layout.
- 2) Stake and mark locations of foundations based on design.

## ⚙️ Layout Note:

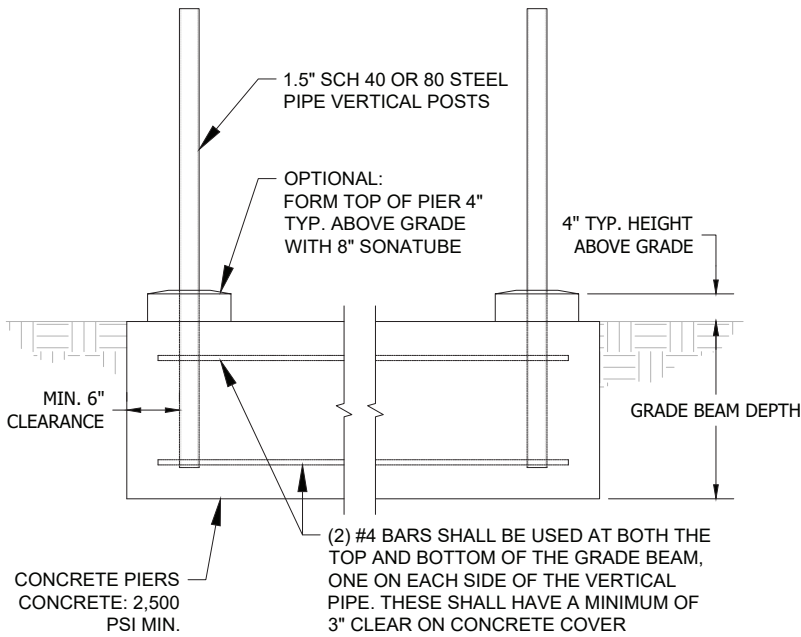
Ensure final foundation locations do not exceed the maximum pipe span and cantilever specified in the design.

## Required Tools

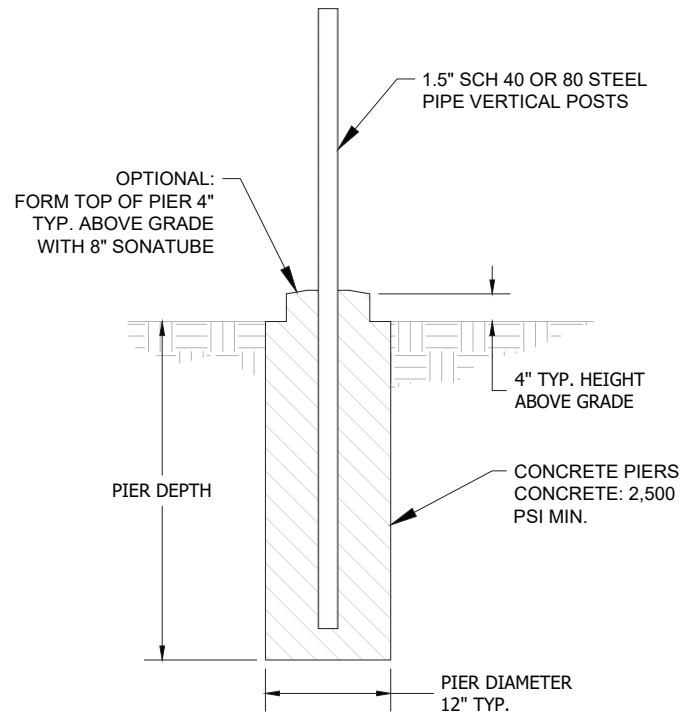
- 12" Diameter Excavation Drill Auger (Pier)
- Backhoe or Excavator with 12" Bucket (Grade Beam)
- Portable Band Saw (18 tpi)
- Concrete Mixer
- String Line
- Surveying Marker Pen or Paint
- Basic Concrete Tools

## Materials Needed

- Sched 40 or 80 1-1/2" Pipe w/ 1.9" Outside Diameter (Local Supplier)
- Rebar #4 (Grade Beam Only)
- Concrete/Concrete Mix
- Wood 2x4 for Bracing Pipes



Grade Beam Foundation Detail



Standard Pier Detail

## Conversion Chart for Pier to Grade Beam Footings

12" diameter Pier Depth	12" wide Grade Beams Depth (in)	18" wide Grade Beams Depth (in)	24" wide Grade Beams Depth (in)
3 ft	12	12	12
4 ft	17	15	13
5 ft	20	18	17
6 ft	24	22	20
7 ft	29	26	23

## INSTALLATION INSTRUCTIONS



1A) **12" Pier Option** - Using a 12-in diameter auger, excavate footings at marked locations to the depth required by the structural engineering.

### Install Note:

In areas subject to freezing, pier depths may increase to resist freeze heave. Always consult a structural engineer to confirm.



1B) **Grade Beam Option** - Using a backhoe or excavator, excavate footings at marked locations to the depth required by the structural engineering. Build rebar support structure in excavation, as specified in the Structural Engineering Report.

### Install Note:

Jigs can be used to locate and support vertical posts.



2) Pour mixed concrete (minimum 2500 psi) into excavated holes.

### Install Note:

Never use a sonotube in the footing and ensure concrete is in contact with soil.



3) Insert posts into wet concrete, ensuring that bottom of posts are not in contact with dirt. Set sonotubes at ground level centered around post and fill with concrete to create a pedestal above pier. Smooth concrete.

### Install Note:

Move posts up and down to ensure concrete fills inside of posts.



4) Use string line grid and post level to place verticals square and plumb. Support vertical posts while concrete cures.



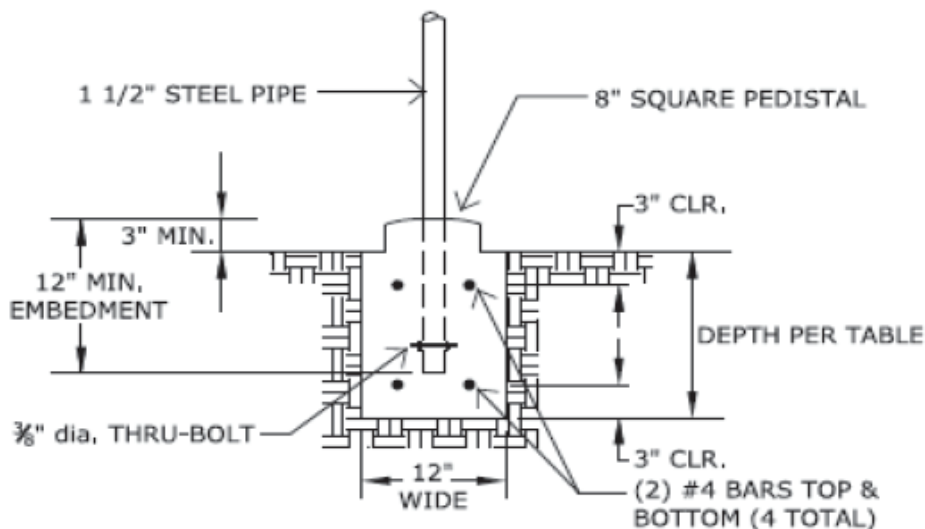
5) Once concrete is cured, determine the proper angle for the module array and calculate the length of the vertical posts, then cut posts to length.

### Install Note:

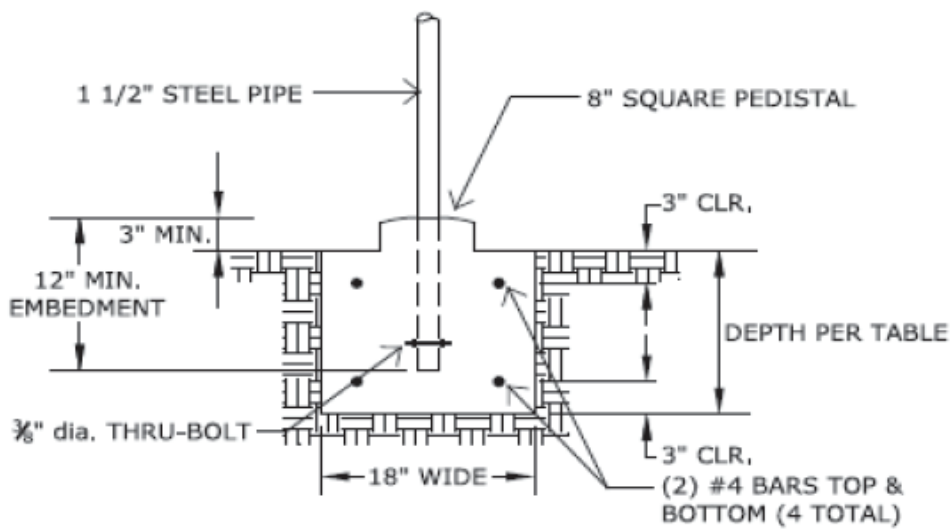
Maximum front post height is limited to 48" and maximum tilt angle is 45 degrees, measured from horizontal.

## GRADE BEAM FOOTING OPTIONS

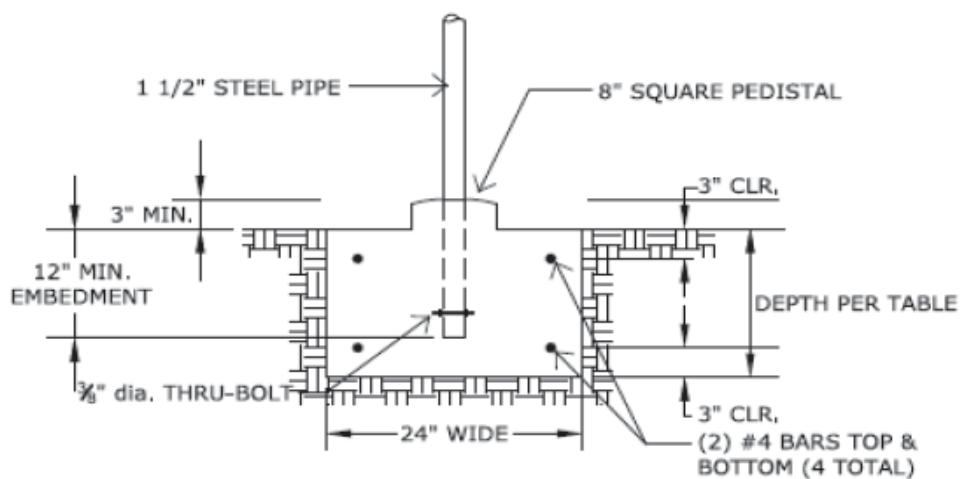
### 12" Wide Grade Beam Footing Option



### 18" Wide Grade Beam Footing Option



### 24" Wide Grade Beam Footing Option



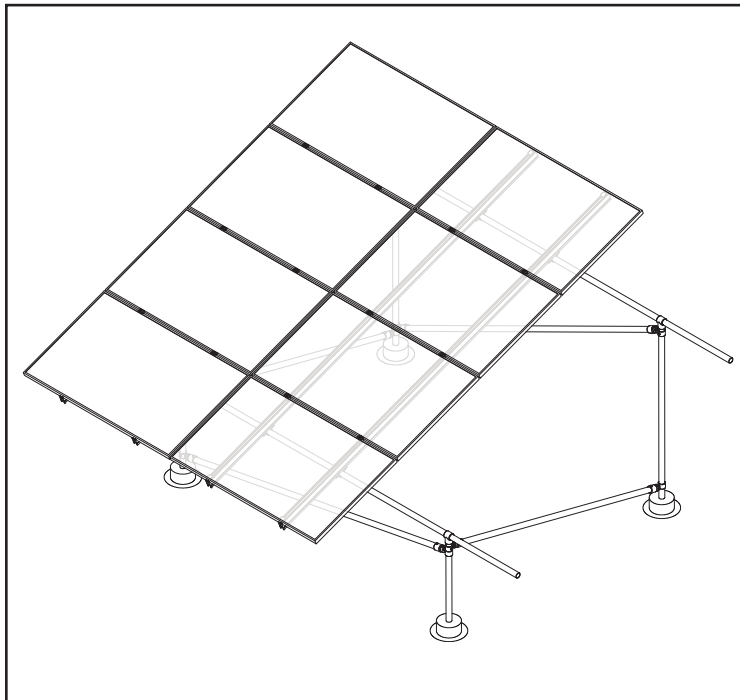


## Required Tools

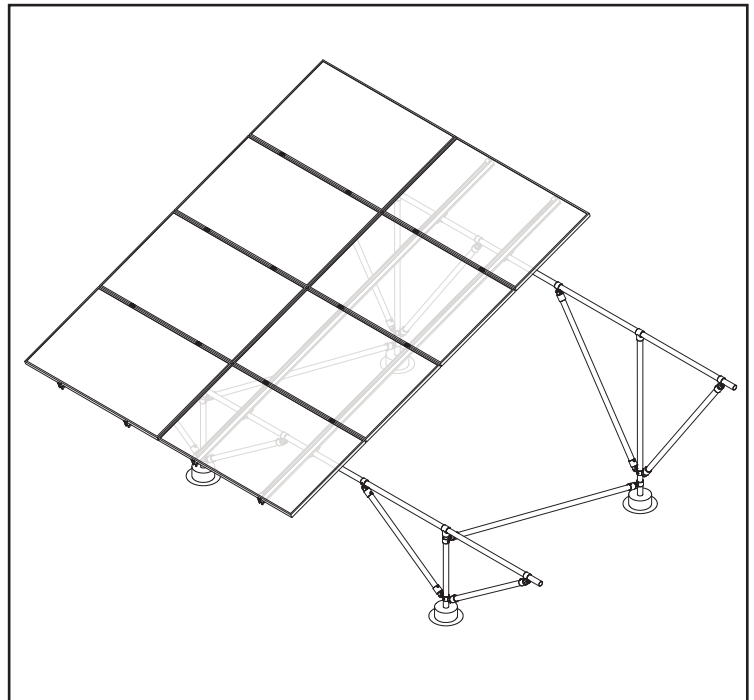
- 3/16" Allen Wrench
- Portable Band Saw
- Measuring Tape
- Cold Galvanizing Spray

## Materials Needed

- Sched 40 or 80 1-1/2" Pipe w/ 1.9" Outside Diameter (Local Supplier)
- Single Socket Tee
- Single Adjustable Socket Tee
- Double Adjustable Socket Tee
- Plug Ends



Standard Option



Braced Option

## INSTALLATION INSTRUCTIONS

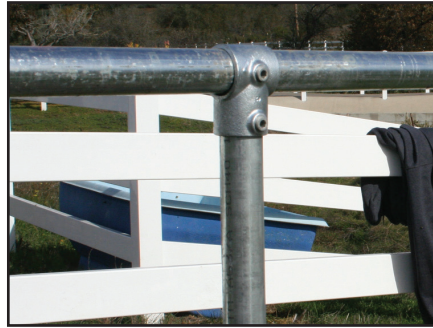


1) Determine the bracing requirements for the racking design and slide all necessary adjustable socket tee fittings onto vertical pipes.



### Install Note:

Bracing requirements can be found on Series 200 Configuration Tool output.



2) Slide the required number of single and any adjustable socket tee fittings onto horizontal pipes before installing onto verticals.



### Install Note:

Install plug ends in top of vertical pipes to prevent entry of water.

Use existing rigid threaded couplers to connect long sections of pipe together.



3) Install horizontal pipes onto verticals, and then check for array tilt consistency using a section of rail along the entire length of array.



### Best Practice:

Leave extra material on each end of horizontal pipes in case of errors.



4) Measure the distances between bracing fittings and cut braces to length, then install and tighten hardware on fittings.



### Install Note:

Braces E and F are to be attached to the horizontal pipes at  $1/3$  the distance between the two verticals.

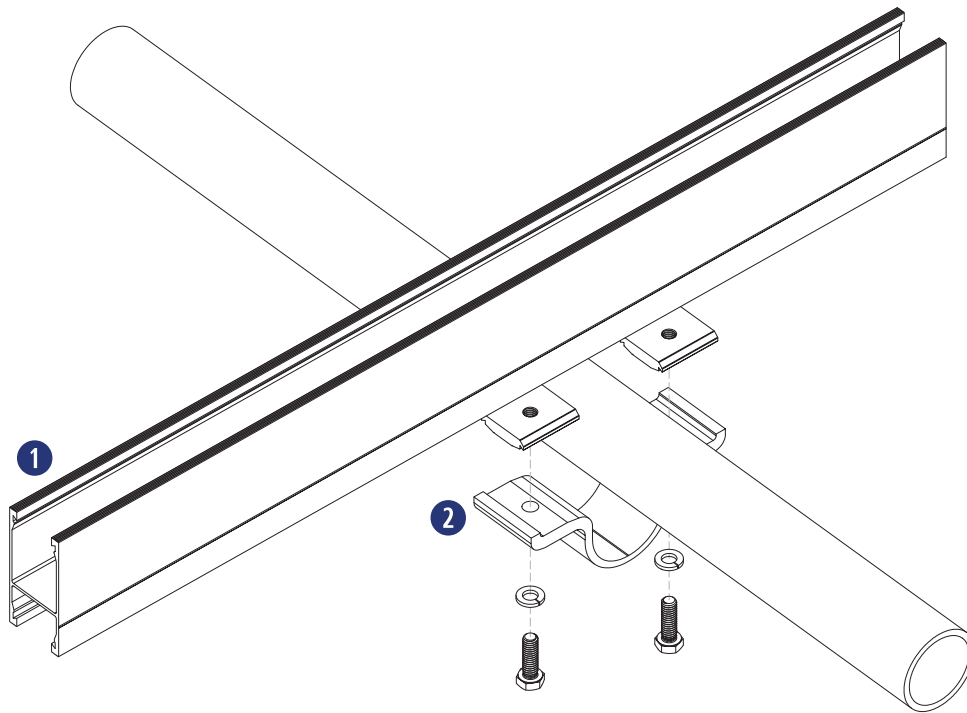
Online Configuration Tool conservatively estimates the brace lengths to ensure you purchase enough pipe, but actual field measurements should be taken and used.

## Required Tools

- Level
- Torque Wrench
- String Line or Spare Rail
- Socket Wrench
- Pitch Meter
- 1/2" Socket

## Materials Needed - Rail Installation

- ① Ground Rail
- ② Pipe Clamp Assemblies



Pipe Clamp to Rail Assembly

## INSTALLATION INSTRUCTIONS



1) Mark rail locations on lower horizontal pipe, using module dimensions as a guideline.



2) Place pipe clamps on horizontal pipes where markings were made for rails.



3) Attach rails with pipe clamps by snapping channel nuts in to bottom rail channel.



### Install Note:

Be sure to account for a small gap between module columns when marking rail locations.



4) Square and center end rails to horizontal pipes and tighten hardware to 12 ft-lbs, then run a string line to align and install remaining rails.

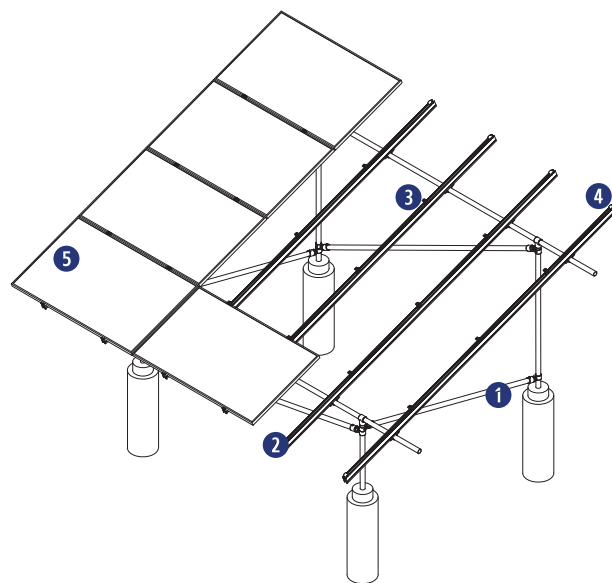


## Required Tools

- Torque Wrench
- Socket Wrench
- 1/2" Socket

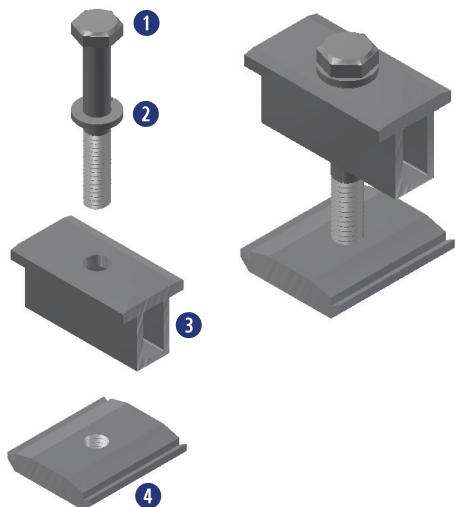
## Materials Needed - Module Installation

- 1 Pre-Installed SnapNrack Pipe Structure
- 2 Pre-Installed SnapNrack Rails
- 3 SnapNrack Mid Clamp Assemblies
- 4 SnapNrack End Clamp Assemblies
- 5 PV Modules



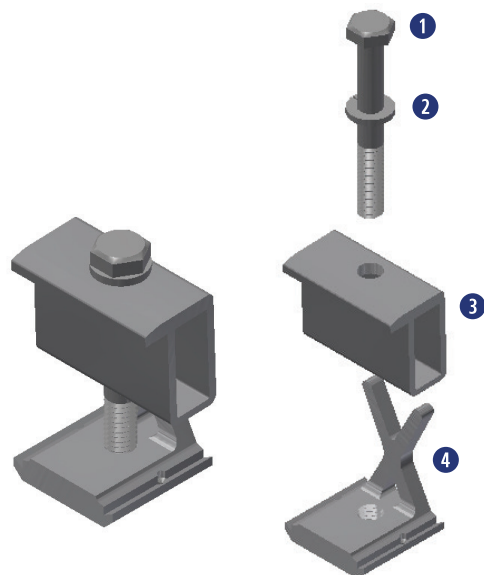
## Mid Clamp Assembly

- 1 (1) 5/16"-18 SS HCS Bolt
- 2 (1) 5/16" SS Split Lock Washer
- 3 (1) SnapNrack Mid Clamp
- 4 (1) 5/16"-18 SnapNrack Channel Nut



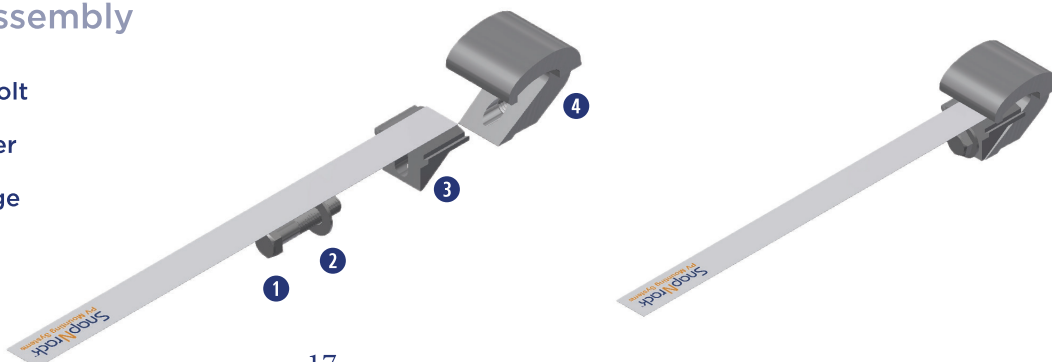
## Adjustable End Clamp Assembly

- 1 (1) 5/16"-18 SS HCS Bolt
- 2 (1) 5/16" SS Split Lock Washer
- 3 (1) SnapNrack Adjustable End Clamp Top
- 4 (1) SnapNrack Adjustable End Clamp Bottom



## Universal End Clamp Assembly

- 1 (1) 5/16"-18 X 1-1/2" SS HCS Bolt
- 2 (1) 5/16" X 3/4" SS Flat Washer
- 3 (1) SnapNrack Universal Wedge
- 4 (1) SnapNrack Universal Wave

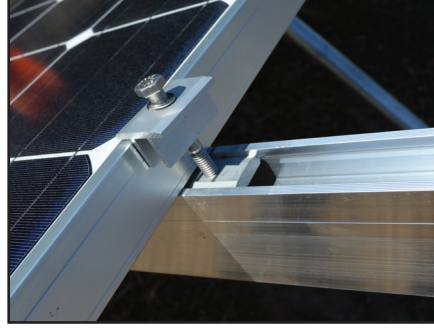


## INSTALLATION INSTRUCTIONS

### SnapNrack Mid Clamp



1) Snap the channel nut into the top channel of the rail.



2) Slide the mid clamp flush to the module with the top lip of the mid clamp over the top edge of the module frame, then place the next module flush to the other side of the mid clamp.



3) Tighten hardware, torque silver hardware to 10+ ft-lbs and black hardware to 8 ft-lbs.



#### Install Note:

Mid clamps are Listed with and without springs.



#### Install Note:

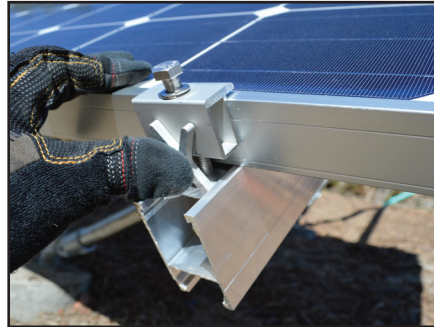
Take care to avoid having wires pinched between modules and rails, as this can lead to system failure and be dangerous.

Mid clamps create 1/2" gap between modules.

### SnapNrack Adjustable End Clamp



1) Snap the clamp channel nut into the top channel of the rail.



2) Slide the clamp flush to the module with the top lip of the end clamp over the top edge of the module frame.



3) Tighten hardware, torque silver hardware to 10+ ft-lbs and black hardware to 8 ft-lbs.



#### Install Note:

Adjustable End Clamps require 1" of extra rail to extend past the end of the module frame.



#### Install Note:

Take care to avoid having wires pinched between modules and rails, as this can lead to system failure and be dangerous.

## INSTALLATION INSTRUCTIONS

### SnapNrack Universal End Clamp



1) Slide the Universal End Clamp (UEC) into the end of the rail.



2) Lift the module and slide the clamp far enough under the module to pass the lip of the bottom edge of the module frame.



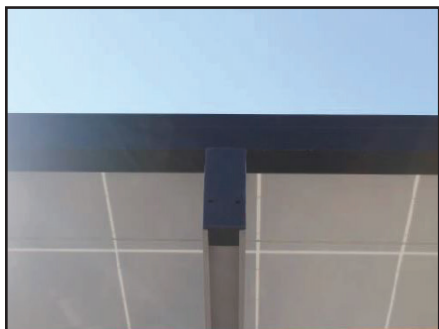
3) Use the pull tab to hold the UEC taut towards the end of the rail and tighten hardware to 10 ft-lbs.

#### Install Note:

Take care to avoid having wires pinched between modules and rails, as this can lead to system failure and be dangerous.

#### Install Note:

Rail can be cut flush to the module using the UEC Rail Cutting Tool.



4) Install rubber end cap to finish.

#### Install Note:

Modules will need to be grounded separately when Universal End Clamps are the only type of clamp attaching a module.

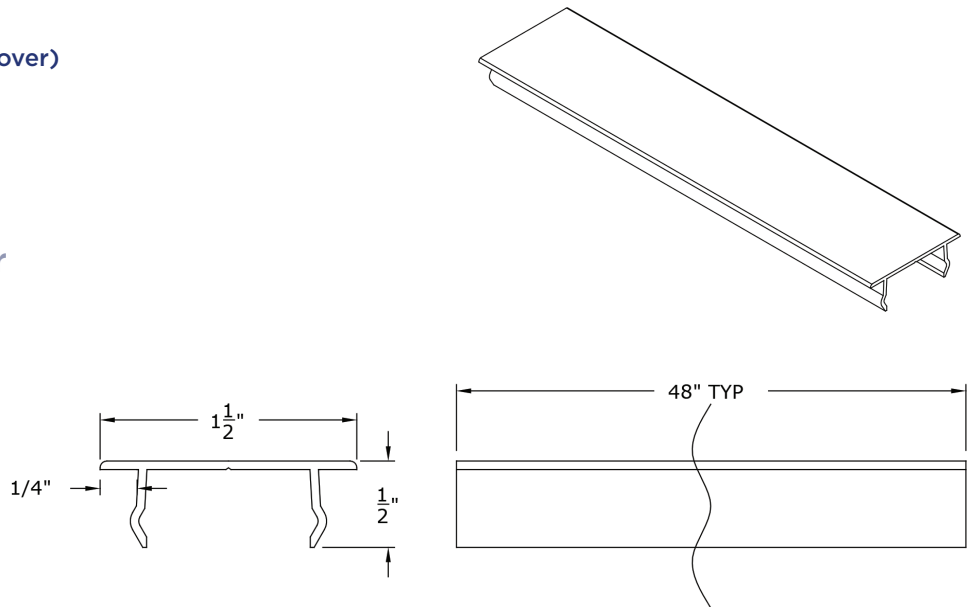
## Required Tools

- Reciprocating Saw or Chop Saw (Rail Cover)
- Socket Wrench (Wire Clamp)
- 1/2" Socket (Wire Clamp)

## Materials Included - Rail Cover

- ① (1) SnapNrack 48" Rail Cover

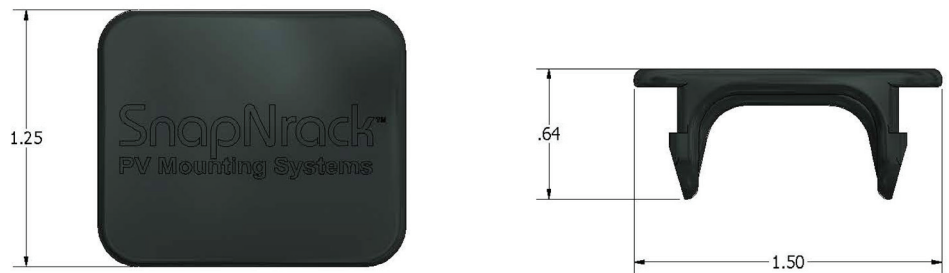
**Application Note:**  
Install to protect any conductors that are exposed to sunlight that are not approved for use in UV light.



Dimensioned 48" Rail Cover

## Materials Included - Wire Retention Clip

- ① SnapNrack Wire Retention Clip



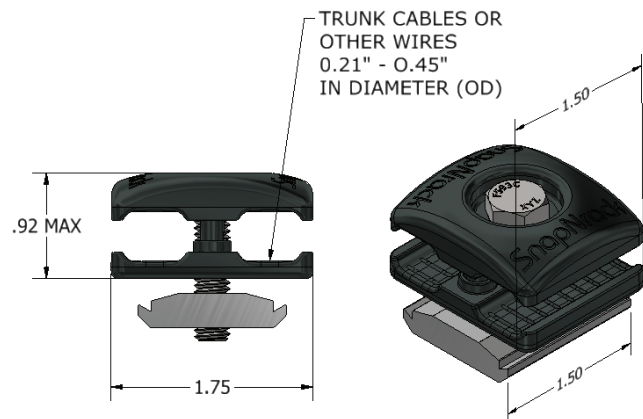
Dimensioned Wire Retention Clip

**Application Note:**  
Install as necessary to manage and safely retain conductors within SnapNrack rails.

## Materials Included - Wire Clamp

- ① (1) SnapNrack 4-Wire Clamp, Trunk Cable Clamp, or Universal Wire Clamp

**Application Note:**  
Install as necessary to secure cables and conductors running from rail to rail, or transitioning out/in from a rail channel

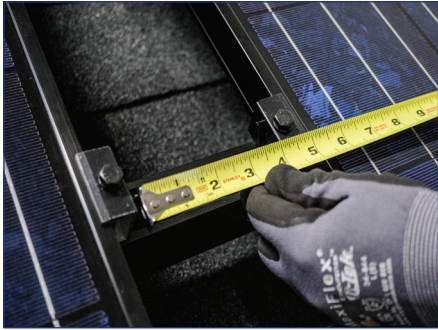


Dimensioned Universal Wire Clamp Assembly



## INSTALLATION INSTRUCTIONS

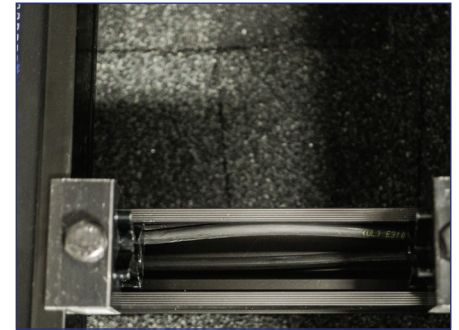
### SnapNrack 48" Rail Cover



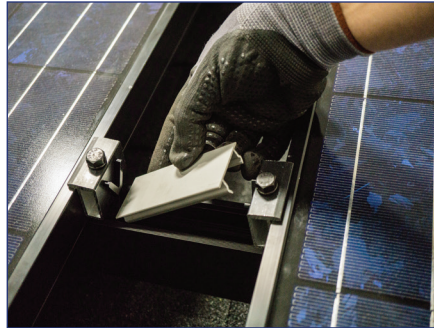
1) Measure the length of the SnapNrack 48" Rail Cover that is needed.



2) Cut the rail cover to length, then remove any sharp edges.



3) Place all electrical conductors in the bottom of the rail channel.



4) Snap Rail Cover into place, enclosing all conductors inside of rail channel.

#### Install Note:

SnapNrack Rail Cover is designed to stay in place once installed, use a flat blade screw driver if it needs to be relocated or removed.

## INSTALLATION INSTRUCTIONS

### SnapNrack Wire Retention Clip



1) Place all electrical conductors in the bottom of the rail channel.



2) Install the Wire Retention Clip by snapping it into place on the rail.

### SnapNrack 4-Wire, Trunk Cable, or Universal Wire Clamp



1) Snap Wire Clamp into top or side rail channel.



2) With Wire Clamp loose, place conductors or cables in slots.



3) Tighten Wire Clamp with 1/2" socket, ensure cables and conductors are aligned in the clamp slots.



4) 4-Wire Clamp intended for PV Wire conductors, Trunk Cable Clamp intended for trunk cables, Universal Wire Clamp intended for both PV Wire conductors and AC trunk cables.

#### Install Note:

Conductors of different types should be placed under separate Universal Wire Clamps.



#### Install Note:

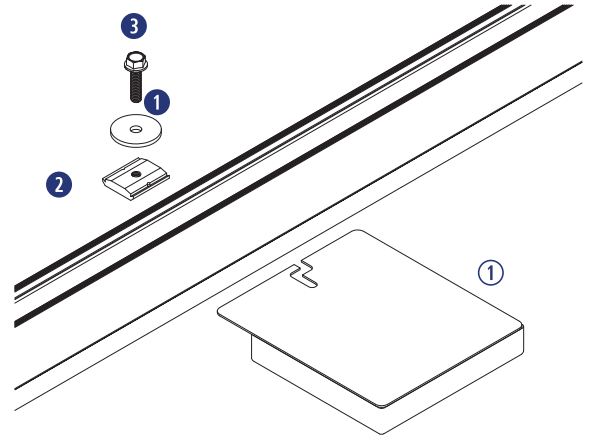
Wire Clamps can be rotated and oriented in any direction.

## Required Tools

- Torque Wrench
- Socket Wrench
- 1/2" Socket

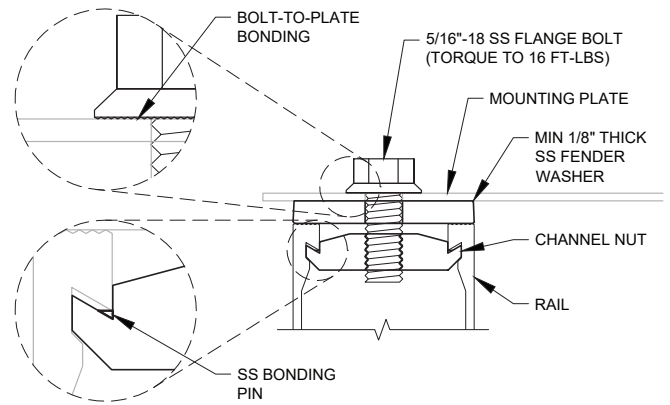
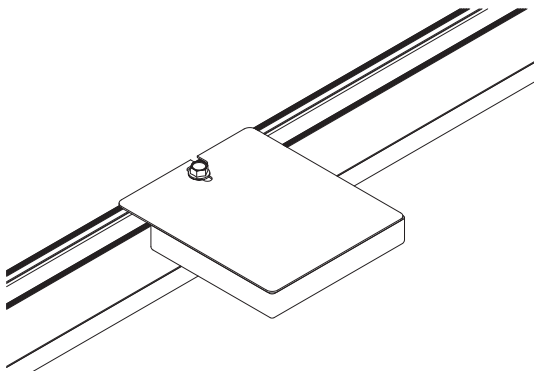
## Materials Included - MLPE Rail Attachment Kit

- ① (1) 5/16" X 1-1/2" X 0.125" SS Fender Washer
- ② (1) SnapNrack Channel Nut
- ③ (1) 5/16"-18 X 1-1/4" SS Flange Bolt



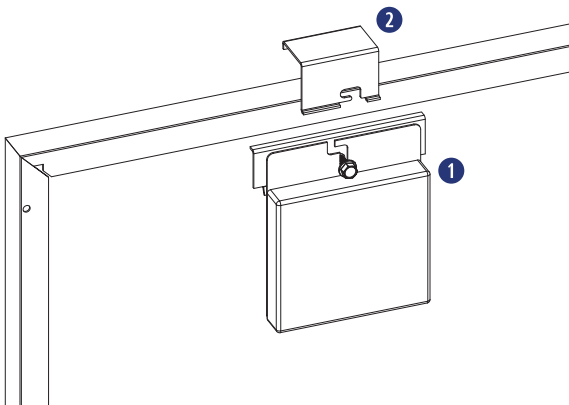
## Other Materials Required

- ① (1) MLPE Unit



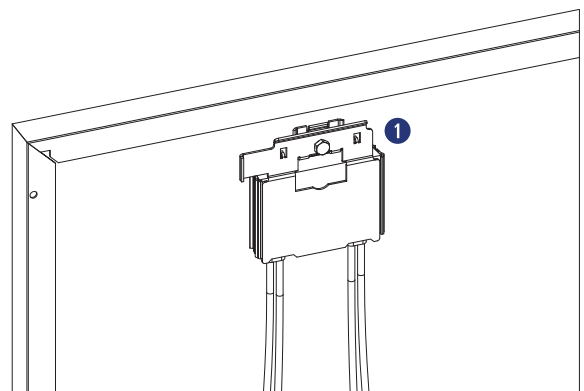
## Materials Needed - Enphase Frame Mount

- ① (1) Enphase Microinverter
- ② (1) Enphase Frame Mount



## Materials Needed - SolarEdge Frame Mount

- ① (1) SolarEdge Optimizer  
w/ Frame-Mounted Module Add-On





## INSTALLATION INSTRUCTIONS - MLPE RAIL ATTACHMENT



1) Snap the SnapNrack MLPE Rail Attachment Kit channel nut into the desired location on the rail where the microinverter will be installed.



2) Install the microinverter mounting plate onto the bolt of the MLPE Rail Attachment Kit, ensuring that the large fender washer is between the rail and mounting plate.

### Install Note:

Bolt and washers may need to be removed and then replaced.



3) Tighten hardware, torque silver hardware to 10 ft-lbs.

### Install Note:

MLPE Attachment Kits are approved for bolt lengths between 1" and 1.5" long.

## INSTALLATION INSTRUCTIONS - SOLAREEDGE FRAME MOUNT



1) Locate the SolarEdge optimizer with Frame-Mounted Module Add-On at a location on the module frame that will not interfere with the SnapNrack rail.



2) Install the optimizer mounting plate onto the module frame and tighten hardware to 7 ft-lbs.



3) Connect the module leads to the input connectors on the optimizer.

### Install Note:

Refer to the SolarEdge optimizer Frame-Mounted Module Add-On installation guide for additional instructions.

## INSTALLATION INSTRUCTIONS - ENPHASE FRAME MOUNT



1) Locate the Enphase Frame Mount bracket clamp at a location on the module frame that will not interfere with the SnapNrack rail.



2) Slide the microinverter unit onto the bracket clamp, then move it slightly to the left.



3) Tighten hardware to 13 ft-lbs

### Install Note:

The microinverter mounting flange should be on the outside of the module frame.



4) Connect the module leads to the microinverter DC connectors.

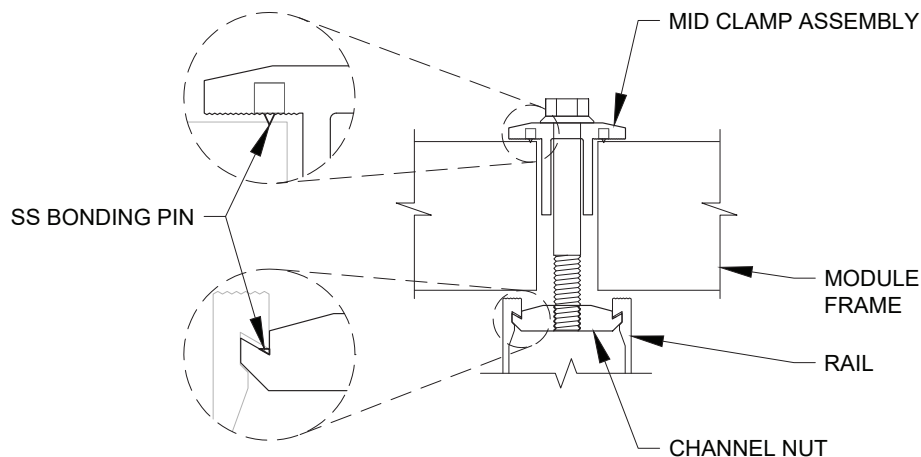
### Install Note:

Refer to the Enphase Frame Mount installation guide for additional instructions.



## System Bonding Methods

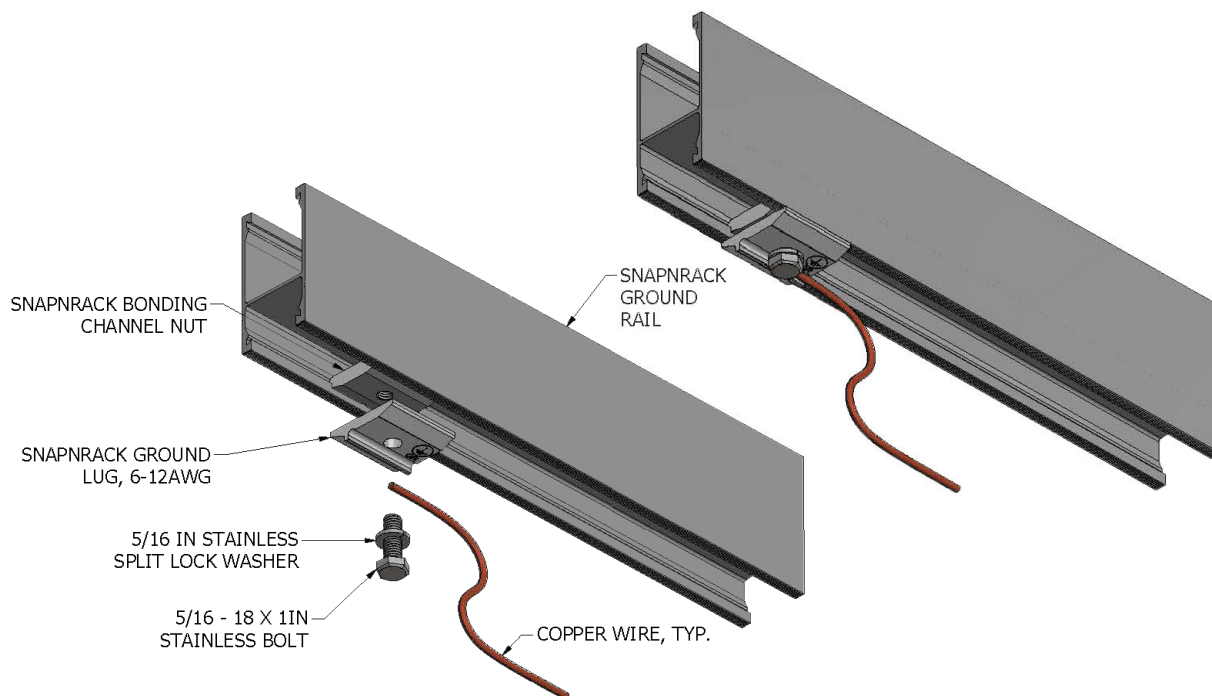
- 1 SnapNrack Mid Clamp
- 2 SnapNrack Adjustable End Clamp
- 3 SnapNrack Pipe Clamp
- 4 Hollaendar Pipe Fittings



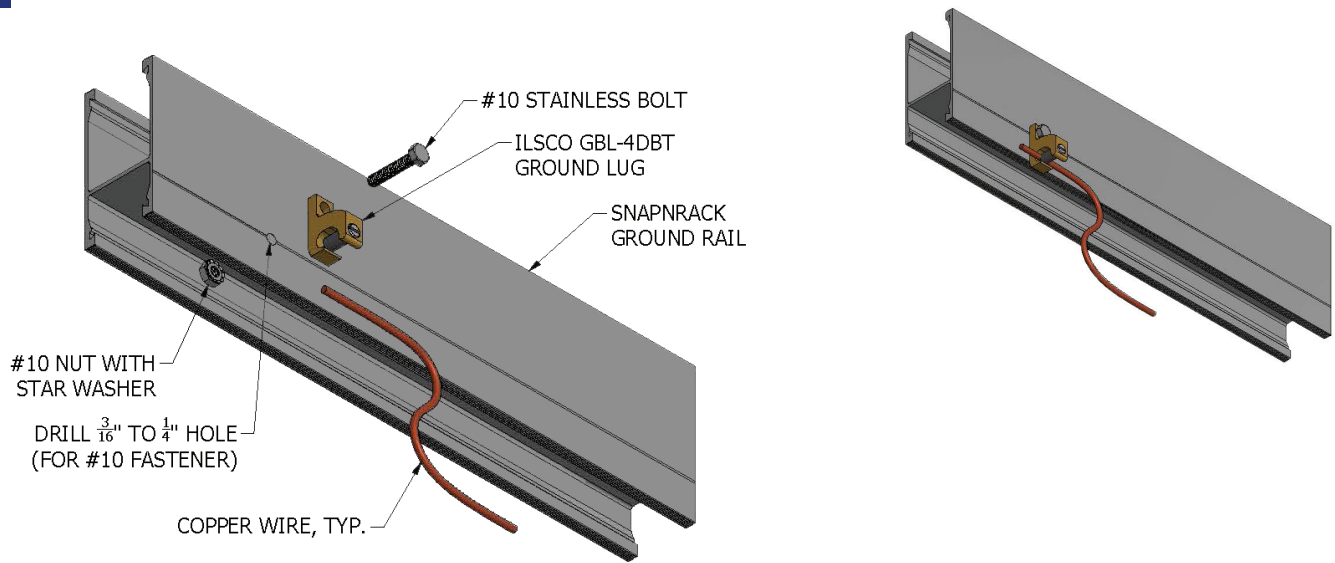
### Note:

SnapNrack module clamps contain a SnapNrack Channel Nut with integral bonding pins in assembly to properly bond the system (except Universal End Clamps).

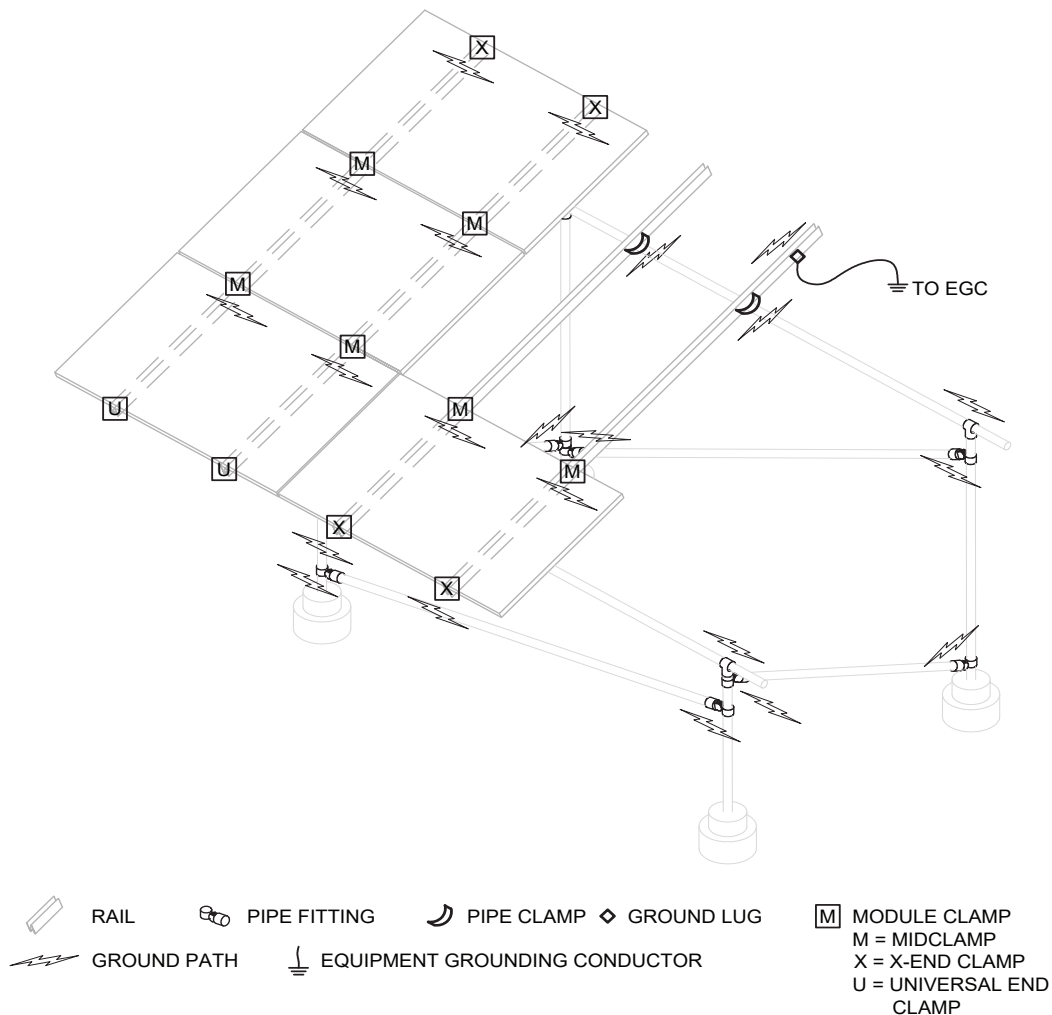
## SnapNrack Ground Lug Assembly



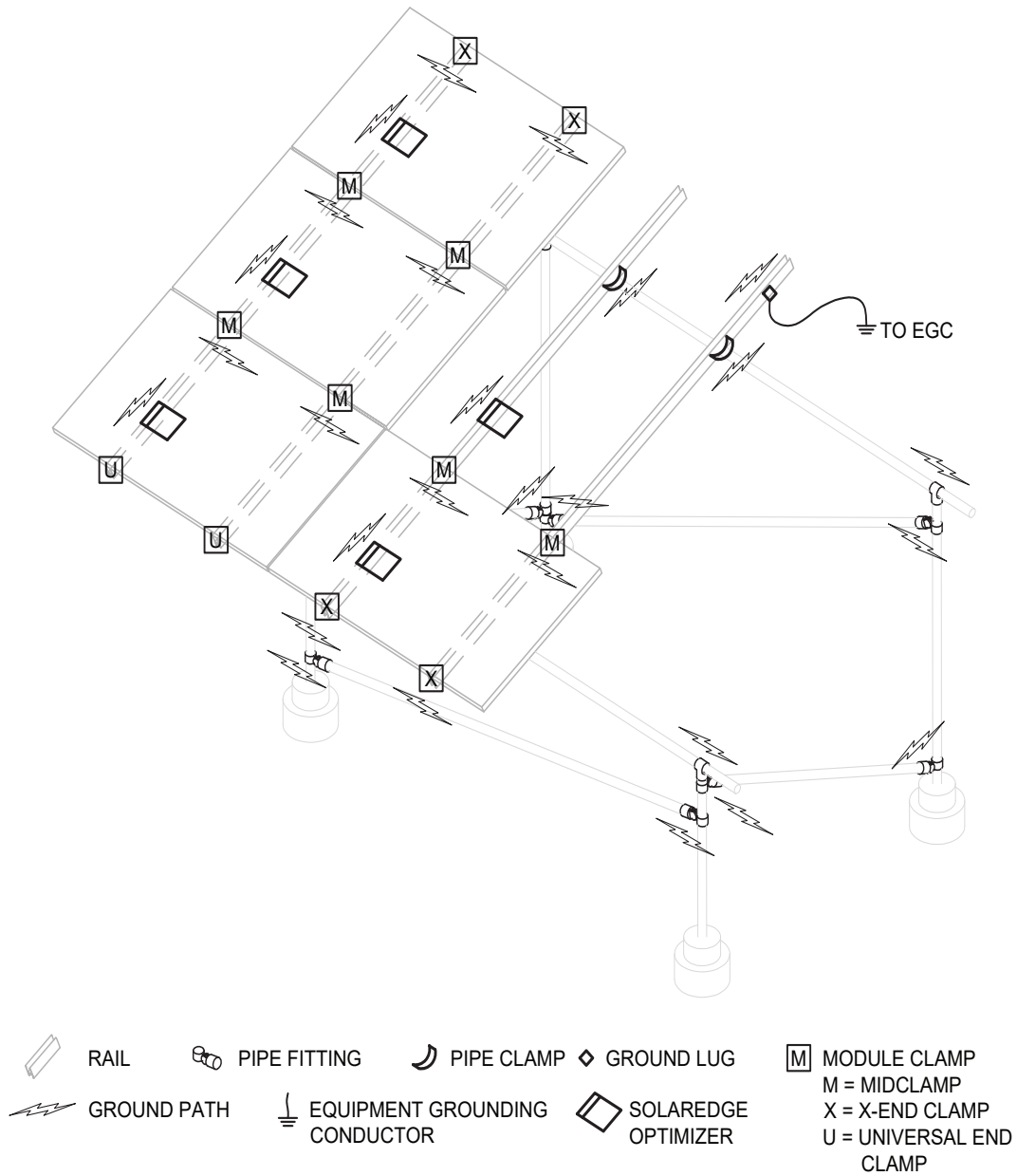
## Ilsco Lay-in Lug Assembly



## Ground Path Details



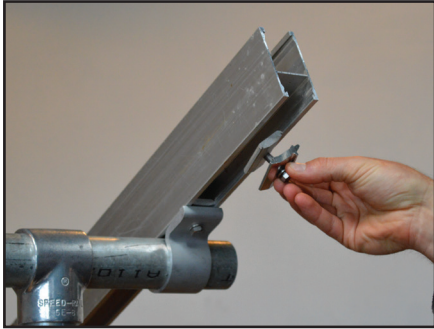
## Ground Path Details - SolarEdge



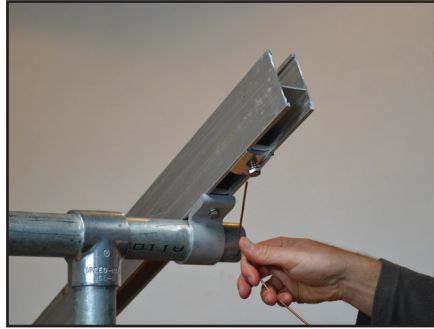


## INSTALLATION INSTRUCTIONS

### SnapNrack Ground Lug



1) Snap the SnapNrack Ground Lug into the rail channel on **one rail per array**.



2) Place grounding conductor into slot underneath split ring washer.



3) Tighten hardware to a minimum of 16 ft-lbs.



#### Install Note:

SnapNrack Ground Lug may be used in top or bottom channel, and may be rotated 90 degrees relative to slot to facilitate running copper across top of rails.



#### Install Note:

SnapNrack Ground Lug only Listed for use with 6-12 AWG solid copper conductor.





## INSTALLATION INSTRUCTIONS

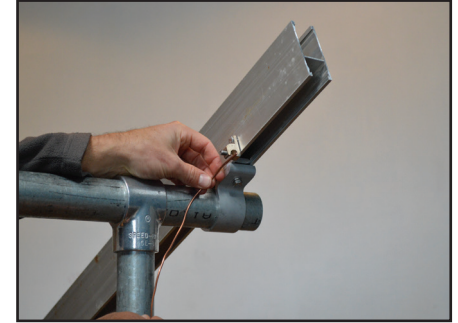
### IlSCO Lay-In Lug



1) Drill and deburr a 3/8" hole in either side of the rail for the IlSCO lug to attach to, place the bolt through the hole, and attach the lug assembly on **one rail per array**.



2) Place grounding conductor into slot.



3) Tighten set screw per IlSCO's recommendation (see below).



#### Install Note:

Torque rail connection to 5 ft-lbs.



#### Install Note:

Torque set screw to 20 in-lbs for #10-#14 solid and stranded copper, 25 in-lbs for #8 stranded copper, and 35 in-lbs for #4-#6 stranded copper.



#### Note:

- System has been evaluated to a maximum overcurrent device (OCD) protection level of 20 Amps.
- Universal End Clamp (UEC) does not bond module to rail. Be sure to separately ground any modules that are only secured by UECs, especially during servicing.
- SnapNrack Ground Lug: torque bolt to 16 ft-lbs. The Ground Lug may be used in top or bottom channel. It may be rotated 90 degrees relative to slot to facilitate running copper across top of rails.
- Grounding with a standard IlSCO GBL-4DBT Lug is a listed alternate and requires drilling of a hole in the rail.
- IlSCO hardware connection to rail: 5 ft-lbs. Torque for lug set screw: #10-#14 solid and stranded copper- 20 in-lbs, #8 stranded copper- 25 in-lbs, #4-#6 stranded copper- 35 in-lbs.

### DynoBond

R/C (QIMS2), DynoRaxx (E357716) photovoltaic bonding jumper cat. no. DynoBond is an optional component that may be used with this system. The DynoBond jumper has been evaluated to provide module to module bonding. The DynoBond device attaches to the frame flange of adjacent modules.

Series 200 has been tested with the following UL Listed modules:

The Series 200 System employs top-down clamps which have been evaluated for frame-to-system bonding, at specific mounting torques and with the specific modules listed below.

Manufacturer	Model	Wattage
Aptos Solar	DNA-120-MF23-XXX	320-340
	DNA-120-BF23-XXX	320-345
	DNA-144-MF23-XXX	390-410
	DNA-144-BF23-XXX	390-415
Boviet Solar	BVM6610P-XXX	225-275
	BVM6610M-XXX	235-280
	BVM6612P-XXX	270-330
	BVM6612M-XXX	280-340
Canadian Solar	CS6K-XXX-M	240-335
	CS6K-XXX-M-SD	240-305
	CS6K-XXX-P	220-320
	CS6K-XXX-P-SD	240-300
	CS6K-XXX-MS	240-335
	CS6P-XXX-M	200-300
	CS6P-XXX-P	200-300
	CS6P-XXX-P-SD	240-300
	CS6V-XXX-M	215-225
	CS6V-XXX-P	250-255
	CS6X-XXX-P	250-360
	CS3K-XXX-P	250-350
	CS3K-XXX-MS	280-345
	CS3U-XXX-MS	350-420
	CS3U-XXX-P	295-420
	CS1K-XXX-MS	285-345
	CS1H-XXX-MS	310-350
CS1H-XXX-MS-AB	310-350	
ET Solar	ET-P660XXXBB	200-265
	ET-P660XXXWB	200-265
	ET-P660XXXWW	200-265
	ET-P660XXXWWG	235-265
	P660XXXWB/WW	200-265
	P660XXXWWG	240-250
	M660XXXBB	250-265
	M660XXXWW	200-270
Hanwha Q Cells	Q.PEAK BLK-G3.1-XXX	245-295
	Q.PEAK G3.1-XXX	270-325
	Q.PLUS BFR-G3.1-XXX	270-325

Manufacturer	Model	Wattage
Hanwha Q Cells	B.LINE PLUS BFR-G4.1-XXX	245-295
	B.LINE PRO BFR-G4.1-XXX	245-295
	Q.BASE GY-XXX	245-295
	Q.PEAK BFR-G4-XXX	290-305
	Q.PEAK BFR-G4.1-XXX	285-295
	Q.PEAK BLK-G4.1-XXX	270-325
	Q.PEAK BLK-G4.1/TAA-XXX	270-325
	Q.PEAK G4-XXX	245-295
	Q.PEAK G4.1-XXX	270-325
	Q.PEAK G4.1/MAX-XXX	270-325
	Q.PEAK G4.1/TAA-XXX	270-325
	Q.PLUS BFR-G4-XXX	245-295
	Q.PLUS BFR-G4.1-XXX	245-295
	Q.PLUS BFR-G4.1/TAA-XXX	245-295
	Q.PLUS G4-XXX	245-295
	Q.PLUS GY-XXX	245-295
	Q.PLUS BFR-GY-XXX	245-295
	Q.PRO BFR-G4-XXX	245-295
	Q.PRO BFR-G4.1-XXX	245-295
	Q.PRO BFR-G4.3-XXX	245-295
	Q.PRO BFR-GY-XXX	245-295
	Q.PRO BLK-GY-XXX	245-295
	Q.PRO G4-XXX	245-295
	Q.PRO GY-XXX	245-295
	Q.PRO GY/SC-XXX	245-295
	Q.PEAK DUO-G5-XXX	290-360
	Q.PEAK DUO-BLK-G5-XXX	290-360
	Q.PLUS DUO-G5-XXX	290-360
	Q.PEAK DUO-G7-XXX	310-350
	Q.PEAK DUO-BLK-G7-XXX	290-350
	Q.PEAK DUO-G7.2-XXX	310-350
	Q.PEAK DUO-G6+-XXX	320-360
	Q.PEAK DUO-BLK-G6+-XXX	310-350
	Q.PEAK DUO-G6-XXX	320-360
	Q.PEAK DUO-BLK-G6-XXX	310-350
	Q.PEAK DUO-G8+-XXX	290-360
	Q.PEAK DUO-BLK-G8+-XXX	290-360
	Q.PEAK DUO-G8-XXX	290-360
	Q.PEAK DUO-BLK-G8-XXX	290-360
	Q.PLUS L-G4-XXX	280-355
Q.PLUS L-G4.1-XXX	280-355	

Manufacturer	Model	Wattage
Hanwha Q Cells	Q.PLUS L-G4.2-XXX	280-355
	Q.PEAK L-G4.1-XXX	330-390
	Q.PEAK L-G4.2-XXX	330-390
	Q.PLUS DUO-L-G5-XXX	340-425
	Q.PLUS DUO-L-G5.1-XXX	340-425
	Q.PLUS DUO-L-G5.2-XXX	340-425
	Q.PLUS DUO-L-G5.3-XXX	340-425
	Q.PEAK DUO-L-G5.2-XXX	360-425
	Q.PEAK DUO-L-G5.3-XXX	360-425
	Q.PEAK DUO-L-G7-XXX	360-415
	Q.PEAK DUO-L-G7.1-XXX	360-415
	Q.PEAK DUO-L-G7.2-XXX	360-415
	Q.PEAK DUO-L-G7.3-XXX	360-415
	Q.PEAK DUO-L-G6-XXX	375-425
	Q.PEAK DUO-L-G6.2-XXX	360-430
	Q.PEAK DUO-L-G6.3-XXX	360-430
	Q.PEAK DUO-L-G8-XXX	360-430
	Q.PEAK DUO-L-G8.1-XXX	360-430
	Q.PEAK DUO-L-G8.2-XXX	360-430
	Q.PEAK DUO-L-G8.3-XXX	360-430
	Q.PEAK DUO-G5/SC-XXX	290-360
	Q.PEAK DUO-BLK-G5/SC-XXX	290-360
	Q.PEAK DUO-G6+/SC-XXX	320-360
	Q.PEAK DUO-BLK-G6+/SC-XXX	310-350
	Q.PEAK DUO BLK-G6+/AC-XXX	340-350
	Q.PEAK DUO-ML-G9-XXX	370-390
	Q.PEAK DUO-BLK-ML-G9-XXX	365-385
	Q.PEAK DUO-G5/TS-XXX	290-360
	Q.PEAK DUO BLK-G5/TS-XXX	290-360
	Q.PEAK DUO-G6/TS-XXX	320-360
Q.PEAK DUO BLK-G6/TS-XXX	310-350	
Q.PEAK DUO-G6+/TS-XXX	320-360	
Q.PEAK DUO BLK-G6+/TS-XXX	310-350	
Hanwha SolarOne	HSL60P6-PB-2-XXXQ	230-270
	HSL60P6-PB-4-XXXQ	230-270
Heliene	60M-XXX	225-325
	60P-XXX	200-270
	72M-XXX	275-390
	72P-XXX	250-350

Manufacturer	Model	Wattage
Hyundai	HiS-MXXXRG	235-275
	HiS-SXXXRG	245-295
	HiS-SXXXRW	250-265
	HiS-MXXXMG	210-270
	HiS-SXXXMG	220-275
JA Solar	JAM6-60-XXX/SI	250-270
	JAP6-60-XXX/3BB	235-265
	JAM60S09-XXX/PR	310-325
	JAM60S10-XXX/MR	330-345
	JAM60S10-XXX/PR	320-335
	JAM60S12-XXX/PR	305-320
	JAP72S01-XXX/SC	315-335
	JAM72S09-XXX/PR	370-395
	JAM72S10-XXX/MR	395-415
	JAM72S10-XXX/PR	380-405
	JAM72S12-XXX/PR	365-385
	JAP6(k)-72-XXX/4BB	305-325
	JAM60S17-XXX/MR	320-330
	Jinko Solar	JKMXXXM-60
JKMXXXM-60L		305-325
JKMXXXM-60HL		315-335
JKMXXXM-60HBL		310-330
JKMXXXP-60		200-290
JKMXXXP-60-J4		200-290
JKMXXXP-60-V		200-290
JKMXXXP-60B-J4		200-290
JKMXXXPP-60		200-290
JKMXXXPP-60-V		200-300
JKMXXXM-72		250-365
JKMXXXM-72L-V		370-390
JKMXXXP-72		250-360
JKMXXXP-72-V		250-360
JKMXXXPP-72		250-360
JKMXXXPP-72-V		250-360
JKMSXXXP-72		250-330
JKMXXXM-72HL-V		370-420
JKMXXXM-72HL-TV		380-410
Kyocera		KUXXX-6YYY
	KUXXX-8YYY	315-355



Manufacturer	Model	Wattage
LG	LGXXXN1C-A5	320-345
	LGXXXN1K-A5	310-355
	LGXXXQ1C-A5	340-385
	LGXXXQ1K-A5	315-375
	LGXXXS1C-A5	280-320
	LGXXXN2C-B3	330-340
	LGXXXN2W-B3	330-340
	LGXXXN1C-G4	280-340
	LGXXXN1K-G4	280-300
	LGXXXS1C-G4	250-300
	LGXXXN2C-G4	360-395
	LGXXXN2K-G4	360-385
	LGXXXN2W-G4	360-395
	LGXXXS2C-G4	300-360
	LGXXXS2W-G4	300-360
	LGXXXN1C-V5	325-355
	LGXXXN1W-V5	325-345
	LGXXXN2T-V5	385-430
	LGXXXN2T-J5	385-405
	LGXXXN1T-V5	310-340
	LGXXXA1C-V5	360-380
	LGXXXM1C-L5	355-370
	LGXXXM1K-L5	340-350
LGXXXN1C-N5	330-360	
LGXXXN1K-L5	310-335	
Longi	LR6-60-XXXM	270-300
	LR6-60BK-XXXM	270-300
	LR6-60HV-XXXM	270-300
	LR6-60PB-XXXM	280-320
	LR6-60PE-XXXM	280-320
	LR6-60PH-XXXM	280-320
	LR6-60HPB-XXXM	295-320
	LR6-60HPH-XXXM	300-320
	LR4-60HPB-XXXM	335-365
	LR4-60HIB-XXXM	335-365
	LR4-60HPH-XXXM	350-380
	LR4-60HIH-XXXM	350-380
	LR6-60HIH-XXXM	300-330
	LR6-60HIB-XXXM	295-320
	LR4-72HPH-XXXM	420-455

# Grounding Specifications

Manufacturer	Model	Wattage
Mission Solar	MSEXXXSO5T	260-290
	MSEXXXSO5K	270-290
	MSEXXXSQ5T	280-300
	MSEXXXSQ5K	285-305
	MSEXXXMM4J	320-330
	MSEXXXMM6J	320-330
	MSEXXXSO6W	320-340
	MSEXXXSO4J	320-350
	MSEXXXSO6J	320-350
	MSEXXXSQ6S	345-365
	MSEXXXSQ4S	345-365
	MSEXXXSR8K	315-335
	MSEXXXSR8T	310-330
	MSEXXXSR9S	375-400
	MSE60AXXX	290-315
	MSEXXXTS60	300-310
Panasonic	VBHNXXXKA01	310-325
	VBHNXXXKA02	310-325
	VBHNXXXSA16	320-325
	VBHNXXXKA03	310-325
	VBHNXXXKA04	310-325
	VBHNXXXSA17	325-335
	VBHNXXXSA18	325-335
	VBHN325SA17E	325-330
	VBHXXXRA18N	325-340
	VBHXXXRA03K	320-335
Phono Solar	PSXXXM-20/U	270-320
	PSXXXMH-20/U	270-320
REC	RECXXXPE	214-280
	RECXXXPE-BLK	214-280
	RECXXXTP	260-300
	RECXXXTP-BLK	260-300
	RECXXXTP IQ	260-300
	RECXXXTP2	260-300
	RECXXXTP2-BLK	260-300
	RECXXXNP	310-330
	RECXXXTP2M	300-315
	RECXXXTP72	330-345
	RECXXXPE72	295-325
	RECXXXPE72XV	295-325
	RECXXXTP2M 72	350-400
	RECXXXTP2M 72 BLK	350-400

# Grounding Specifications

Manufacturer	Model	Wattage
REC	RECXXTP2M 72 BLK2	350-400
	RECXXTP2SM 72	350-400
	RECXXTP2SM 72 BLK	350-400
	RECXXTP2SM 72 BLK2	350-400
	RECXXAA	340-380
	RECXXTP3M	295-340
Renesola	JCXXM-24/Bb	200-270
	JCXXM-24/BBh	235-370
Silfab	SLAXX-M	225-320
	SLAXX-P	225-275
	SSAXX-M	225-300
	SSAXX-P	225-270
	SILXXBL	280-330
	SILXXML	280-320
	SILXXNL	280-320
	SLGXX-M	265-380
	SLGXX-P	265-320
	SSGXX-M	265-360
	SSGXX-P	265-320
	SILXXNT	350-380
SILXXHL	265-320	
Solaria	Solaria PowerXT-XXR-PX	315-385
	Solaria PowerXT-XXR-BX	315-385
	Solaria PowerXT-XXR-AC	315-385
	Solaria PowerXT-XXR-PM	360-440
	Solaria PowerXT-XXR-PM-AC	360-440
SolarWorld	SWXX-Mono	200-300
	SWXX-Mono XL	320-350
Suniva	MVX-XXX-60-5-701	235-265
	MVX-XXX-60-5-7B1	235-265
	OPT-XXX-60-4-100	240-300
	OPT-XXX-60-4-1B0	235-300
	OPT-XXX-60-4-800	250-275
	OPT-XXX-60-4-8B0	250-275
Sunpower	SPR-EYY-###	225-250
	SPR-XY-###	233-274
	SPR-EYY-###	285-345
	SPR-XY-###	310-365
Talesun	TP660M-XXX	240-300
	TP660P-XXX	235-285
	TP672M-XXX	290-360
	TP672P-XXX	280-345

Manufacturer	Model	Wattage
Trina	TSM-XXXDD05(II)	260-300
	TSM-XXXDD05A.05(II)	260-300
	TSM-XXXDD05A.08(II)	260-300
	TSM-XXXDD05A.082(II)	260-315
	TSM-XXXPA05	215-260
	TSM-XXXPA05.05	215-260
	TSM-XXXPA05.08	215-260
	TSM-XXXPD05	240-280
	TSM-XXXPD05.002	215-275
	TSM-XXXPD05.05	240-280
	TSM-XXXPD05.05S	215-275
	TSM-XXXPD05.08	240-280
	TSM-XXXPD05.082	215-275
	TSM-XXXPD05.08D	245-275
	TSM-XXXPD05.08S	215-275
	TSM-XXXDD06M.05(II)	315-350
	TSM-XXXDE15H(II)	380-420
	TSM-XXXDE15M(II)	335-420
TSMXXXDD05H.05(II)	275-340	
Yingli	YLXXXA-29b	220-255
	YLXXXP-29b	215-260
Znshine	ZM6-60-XXX/M	295-330

Series 200 has been tested with the following Module Level Power Electronic (MLPE) devices:

The Series 200 System has been tested with the following UL/NRTL Listed Module Level Power Electronic (MLPE) Devices. The back plates of the MLPEs have been evaluated for bonding to Series 200 Ground Rail through the MLPE Attachment Kit.

AP Smart	RSD-S-PLC	
Celestica International	DG-006-F001201x	DG-006-F001401x
Delta Electronics	GPI00010105	
Enphase	C250	IQ7-60-2-US
	M215	IQ7-60-B-US
	M250	IQ7PLUS-72-2-US
	IQ6-60-2-US	IQ7PLUS-72-B-US
	IQ6PLUS-72-2-US	
Ginlong Technologies	Solis-RSD-1G	Solis-MLRSD-R2-1G
	Solis-MLRSD-R1-1G	

SolarEdge	P300-5NC4ARS	P405
	P320-5NC4ARS	P485
	P370-5NC4AFS	P505
	P400-5NC4AFS	P730
	P320	P800p
	P340	P850
	P370	P860
	P400	P950
	P401	
SMA	RSB-2S-US-10	
Tigo	TS4-R-F	TS4-R-S-DUO
	TS4-R-M	TS4-A-F
	TS4-R-O	TS4-A-2F
	TS4-R-S	TS4-A-O
	TS4-R-M-DUO	TS4-A-S
	TS4-R-O-DUO	

**Notes:**

AP Smart RSD-S-PLC, Ginlong Solis-MLRSD-R1-1G and Solis-MLRSD-R2-1G, and all Tigo models have not been investigated for bonding since the enclosures are constructed entirely of polymeric materials.

The SolarEdge P320 and P370 models are both frame mount and rail mount. All other PXXX series models are rail mount.

Functionality of these devices was not evaluated.

The UL Listing covers mechanical load ratings for the following module orientations and downforce, uplift, and down-slope ratings:

Span	Orientation	Direction	Load Rating (lb/ft <sup>2</sup> )
8 feet	Long Side Mounting	Downforce	46.7
		Uplift	32.1
		Down-Slope	52.4

Series 200 has been evaluated for Mechanical Loading with all UL/NRTL Listed Photovoltaic modules listed in this manual for the minimum mechanical load ratings per UL 2703.