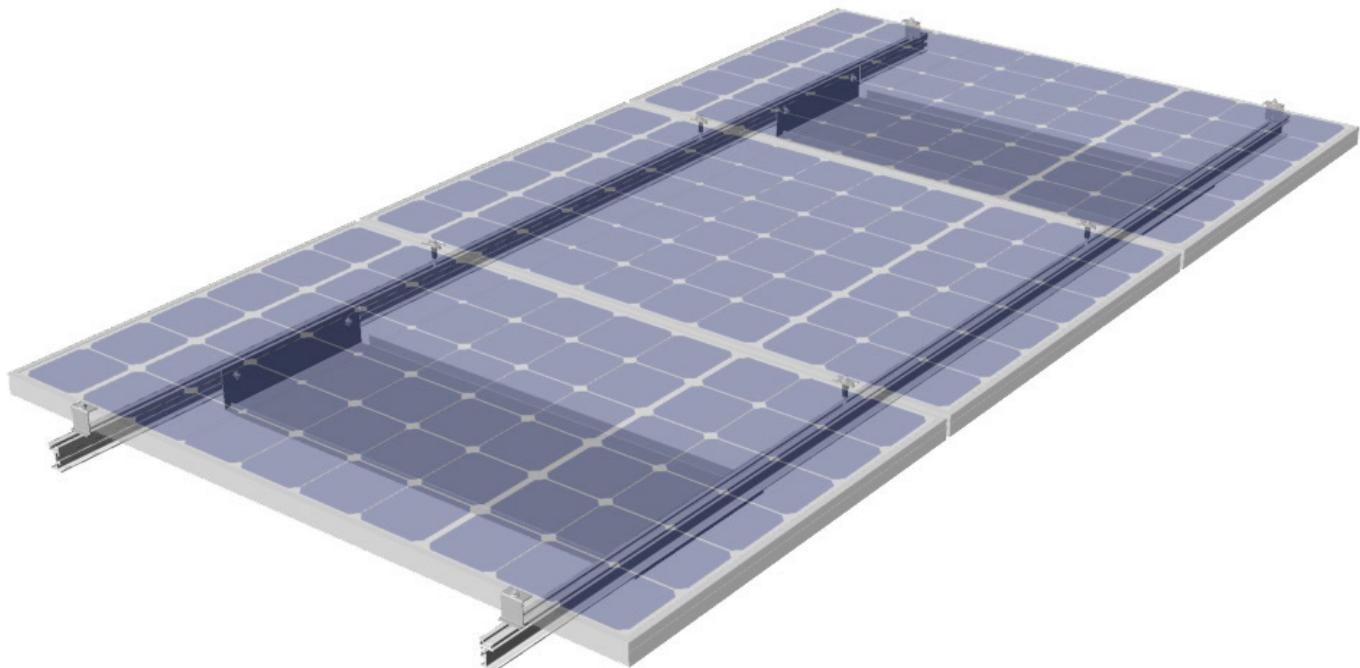




PREFORMED LINE PRODUCTS



BALLASTED POWER RAIL™

Assembly Instructions

step-by-step
assembly and installation

SAFETY CONSIDERATIONS

This application procedure is not intended to supersede any company construction or safety standards. This procedure is offered only to illustrate safe application for the individual.

FAILURE TO FOLLOW THESE PROCEDURES MAY RESULT IN PERSONAL INJURY OR DEATH.

Do not modify this product under any circumstances, except where noted in this application procedure.

This product is intended for use by trained technicians only. **This product should not be used by anyone who is not familiar with, and not trained to use it.**

When working in the area of energized lines, extra care should be taken to prevent accidental electrical contact. Be sure to wear proper safety equipment per your company protocol.

For proper performance and personal safety, be sure to select the proper size PREFORMED™ product before application.

PREFORMED products are precision devices. To ensure proper performance, they should be stored in cartons under cover and handled carefully.

Ballasted POWER RAIL™

About the product

The Ballasted POWER RAIL top-clamping PV module mounting system is engineered to reduce installation costs and provide maximum strength for flat roof mounting applications.

Designed with the professional PV solar installer in mind, the top-clamping rails utilize a single tool with a revolutionary RAD™ Fastener for faster bolt placement. The unique shape of the RAD provides an anti-rotation feature, locking the bolt in the proper orientation when installed. The high strength rigid rails also include an integral wiring channel for securing cables and providing a professional finish.

The Ballasted POWER RAIL Mounting System features aluminum Ballast Pans and factory applied EPDM roof protection.

For recommendations on a specific installation, please:

Visit preformed.com and select the Ballasted POWER RAIL RFQ Form.

Contact us by Phone: 800-260-3792

Send an Email request: info@plpsolar.com

About These Instructions

- Instructions do not include any information on the selection or installation of attaching hardware to be mounted to the roof substrate.
- These instructions are intended to be used by individuals with sufficient technical skills for the task. Knowledge and use of hand tools, measuring devices and torque values is also required.
- Included, are various Notes, Cautions, and Warnings that are intended to assist in the assembly process and/or to draw attention to the fact that certain assembly steps may be dangerous and could cause serious physical injury and/or damage to components. Follow the procedures and precautions in these instructions carefully.

Required Tools

- 1/2" wrench or socket for 5/16" module clamp hardware
- Torque wrench
- Ratchet wrench
- Ratchet extension bar
- Tape Measure
- Square

WARNING

1. Preformed Line Products (PLP) is not liable for, and makes no warranty on, expressed or implied, the suitability of roofing, in situ weatherproofing materials, effect of adjacent buildings and/or equipment geometry, and other installation issues which are outside of PLP's scope. PLP's sole liability is if its product is defective. Please contact the roofer or warranty holder of the roof or building envelope system prior to the installation of a solar structural array, to confirm acceptance and compatibility of the penetration, attachment, and roof contact methods provided and/or proposed in this manual.
2. PLP offers no liability/warranty on any racks not installed to approved layout by PLP. Furthermore, PLP has no obligation to evaluate adjacent building or equipment geometry that may affect the wind dynamics and pressures exerted on the solar array and disclaims any liability related thereto.
3. The Ballasted POWER RAIL system is to be installed over adhered or fixed roof surfaces only.

If additional roof protection materials are added under the Ballasted POWER RAIL structure, including slip sheets, drain mats or sacrificial layers, those materials must either be adhered to the main roofing material or trimmed to fit only under the Ballasted POWER RAIL rails and ballast trays.

4. Stainless Steel hardware can gall when tightened too quickly. Installer should use a Silver Grade anti-seize compound prior to assembling any stainless steel hardware. Do not use an impact driver. All other driver types should be set to low speed settings.
5. Periodic re-inspection is a recommended system maintenance procedure to check for any loose components and any corrosion. If any loose components or any corrosion is found, the affected components are required to be replaced immediately, with the original mounting system manufacturer's component parts.

Ballasted POWER RAIL™ Ratings

The Ballasted POWER RAIL™ conforms to ANSI/UL UL2703 (2015) Standard for Safety First Edition: Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for use with Flat Plate PV Modules and Panels.

Electrical

Note: Electrical installations must be in accordance with the National Electric Code ANSI / NFPA 70. Contact your local Authorities Having Jurisdiction (AHJ) for additional details.

Max Overcurrent Protective Device (OCPD)

Rating: 25A

Equipment Grounding Conductor Sizing

Module Fuse Rating	Copper Wire Size
<15 AMPS	#14 AWG 90°C
<20 AMPS	#12 AWG 90°C
20-60 AMPS	#10 AWG 90°C

Splice Plates

Splice Plates have been tested per UL2703 Bonding & Grounding requirements without the use of Bonding Jumpers.

See the assembly procedures for proper assembly.

Module Clamps

Module clamps have integrated grounding and have been tested to UL2703.

See Module Compatibility List for list of approved modules.

Module Orientation: Portrait or Landscape

Fire Class Resistance Rating

The system fire class rating is only valid when the installation is conducted strictly in accordance with this manual.

The assembly is to be mounted over a fire resistant roof covering rated for the application.

Meets the requirements of Class A Fire Rating for Low Slope Symmetric Mount Applications when using Type 1 Listed Photovoltaic Modules. This system was evaluated with a 5" gap between the bottom of the module and the roof's surface. Per Section 31.2.2.1 of UL2703, this product can be installed with any gap stated in the manufacturers installation instructions.

Structural Certification

Mechanical Load Rating: Exceeds the minimum design load rating of UL2703 section 21.4 (30 psf downward, 30 psf upward, and 13.67 psf downslope) load. Actual system capacity defined by span/cantilever carts and/or configuration tools with PE review.

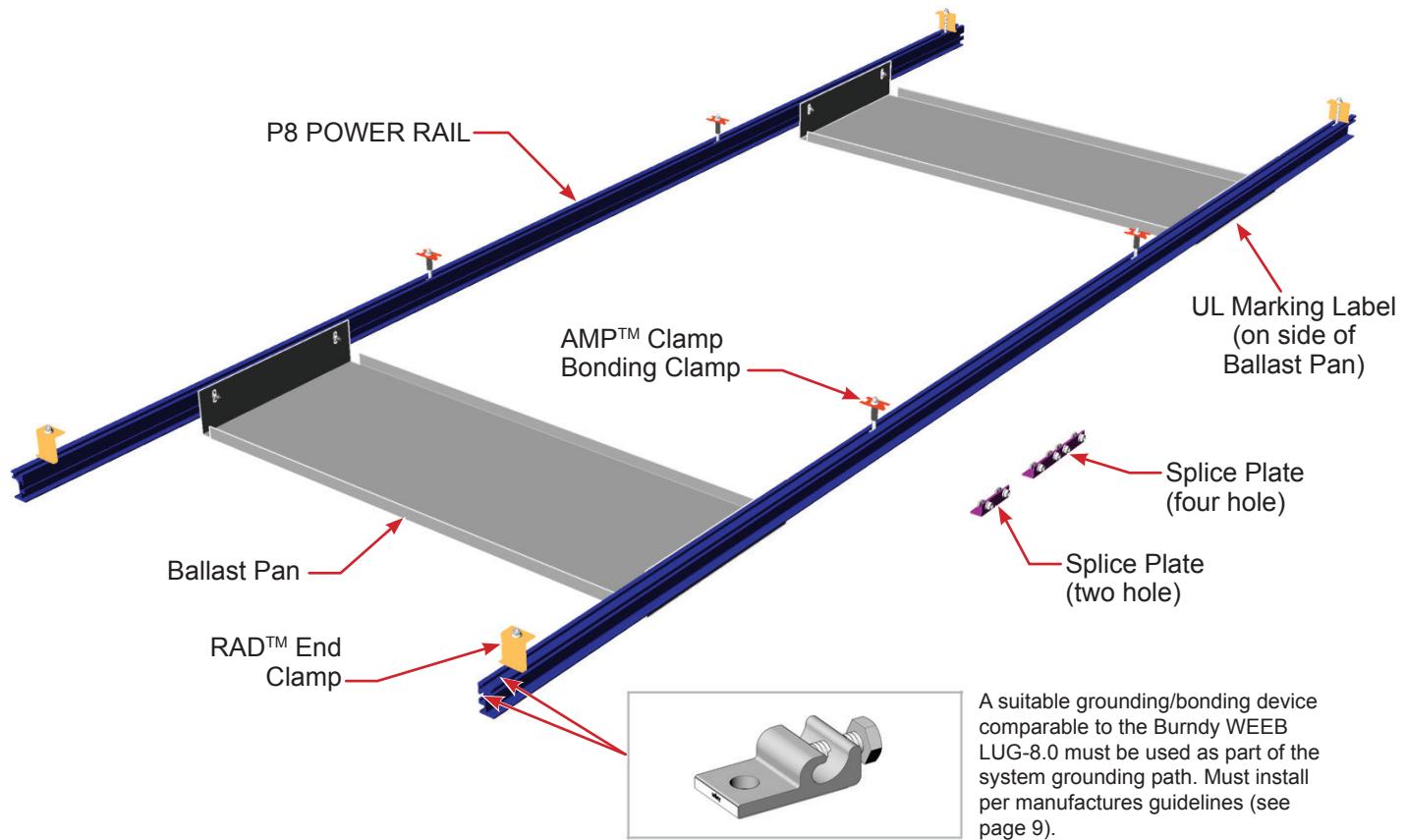
Marking

Product markings identified per UL2703 are to be located in a location that is readily accessible for inspection.

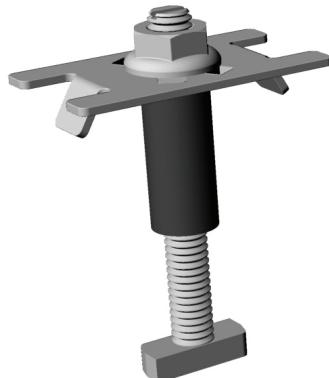
Periodic Inspection

Periodic re-inspection is a recommended system maintenance procedure to check for loose components or corrosion. If any loose components and/or corrosion is found, the affected components are required to be replaced immediately with the original mounting system manufacturer's component parts.

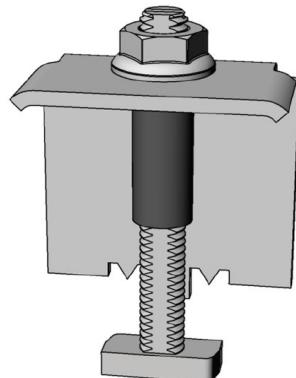
Ballasted POWER RAIL™ Main Components



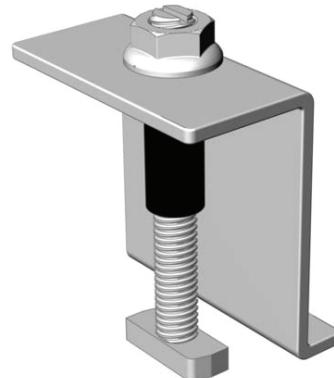
There are five main components and attaching hardware.



Factory Assembled
AMP Clamp
Bonding Clamp



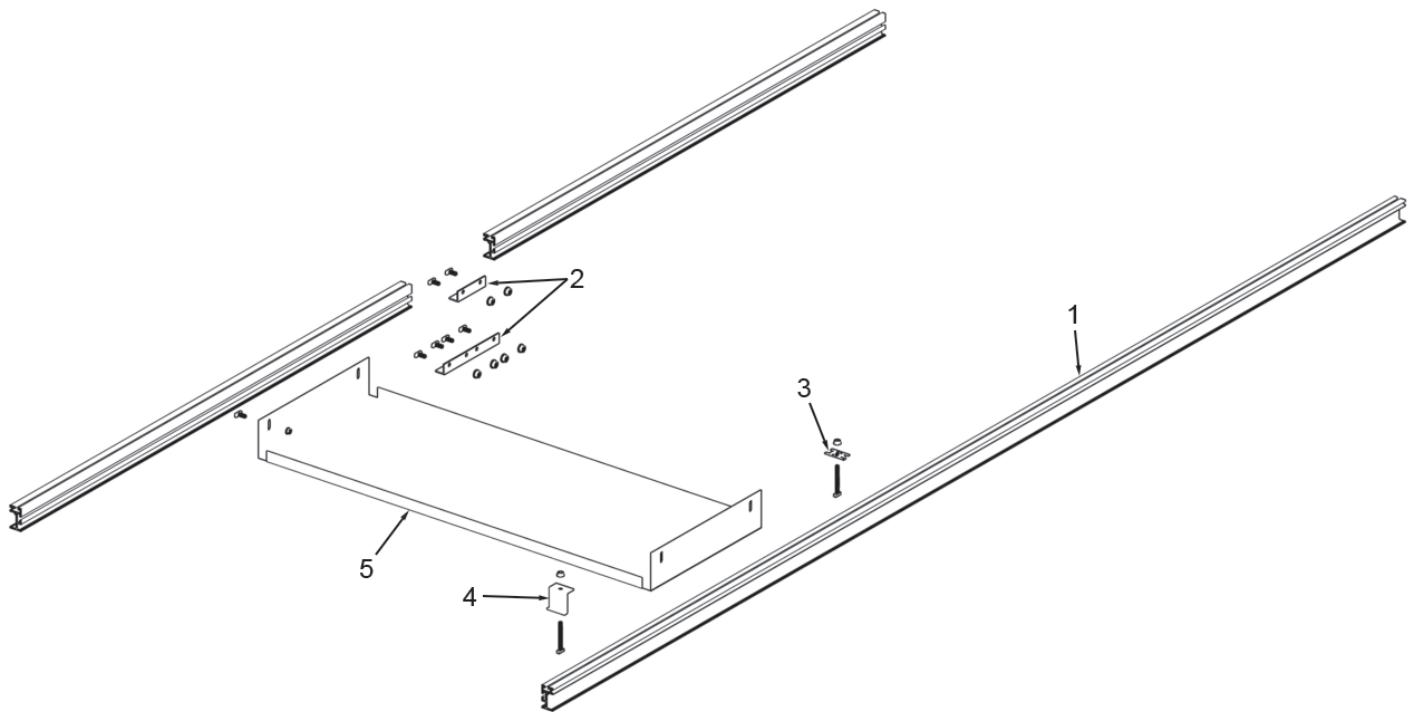
*Factory Assembled
(patented)
RAD Grounded End Clamp



*Factory Assembled
(patented)
RAD End Clamp

*Either end clamp is approved for this mounting system

Ballasted POWER RAIL™ Parts Identification



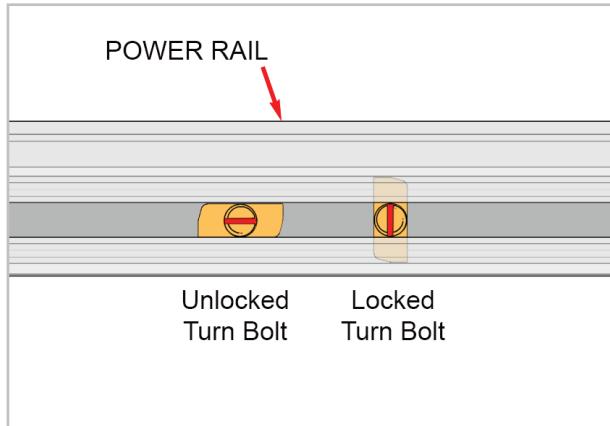
Item	Description	Qty
1	POWER RAIL P8	2 per Rail Set
2	Splice Plate, two or four Hole, (5/16" x 3/4") turn bolts, flange nuts	1 per rail joint
3	AMP™ Clamp, (5/16" x *) RAD™ bolt, flange nut	2 per 3/8" gap between modules
4	RAD End Clamp, (5/16" x *) RAD bolt, flange nut	4 per Rail Set
5	Ballast Pan	Design Specific
*2", 2-1/4", 2-1/2", or 2-3/4" bolt. Length is dependent on depth of PV Module frame		
Notes		
1. Install Mid Clamp with AMP Clamp RAD bonding Mid Clamp		
2. Option to install Universal End Clamp, End Clamp with carriage bolt, RAD End Clamp, or RAD Grounded End Clamp.		

Installation

Step 1: Splicing POWER RAIL™ with Splice Plates

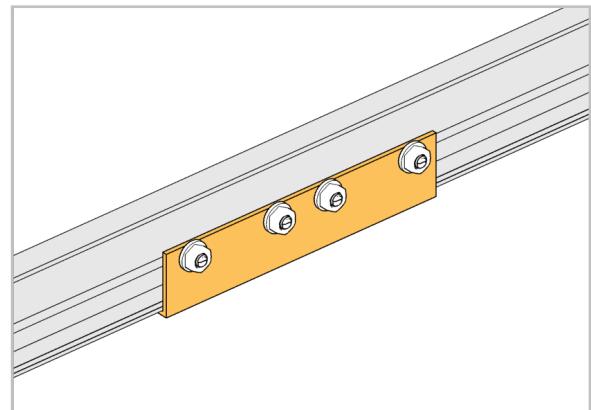
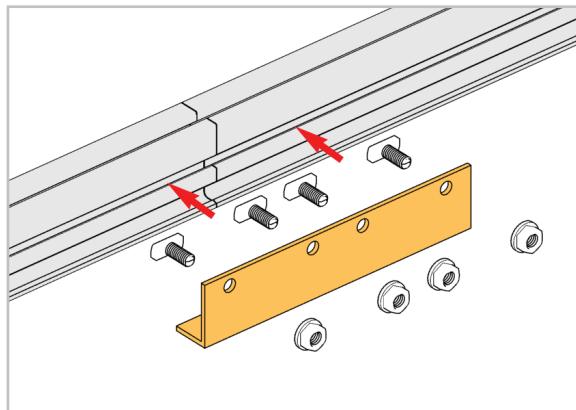
NOTE:

Turn bolts must be locked into the channel by rotating clockwise 90-degrees. Use the indicator slot on the threaded end to identify whether or not the bolt has been locked.



NOTE:

In some cases it may be necessary to splice sections of POWER RAIL using Splice Plates.



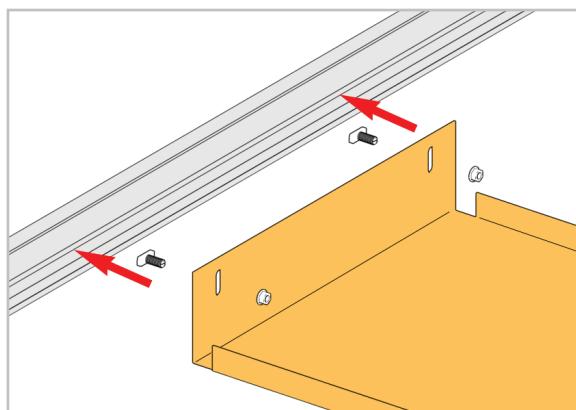
Splice Plates come in two configurations, 2-hole or 4-hole (above is a 4-hole). Insert 5/16" x 3/4" Turn Bolts into POWER RAIL and rotate 90-degrees to lock Turn

Bolts in place. Align Splice Plate with the center of the splice and secure to POWER RAIL with 5/16" Flange Nuts. **Torque to 15 ft.-lbs.**

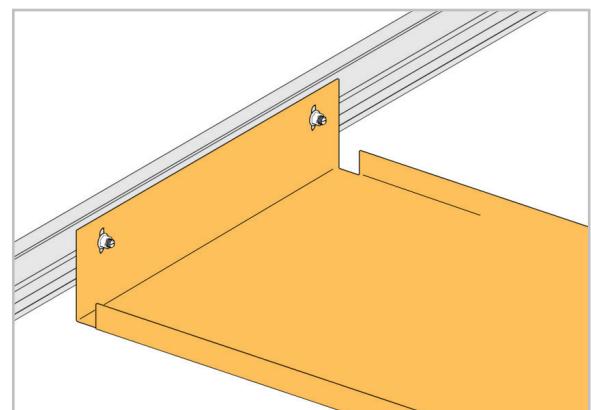
Step 2: Attach POWER RAIL to Ballast Pans

NOTE:

Refer to job specific drawings for Ballast Pan positioning.



Position Ballast Pans along Rails as shown on the job specific drawings. Install the Rails flush or just above the top edge of the Pans. Utilize the slotted mounting holes of the Pans as needed to compensate for undulations on the roof surface and ensure the Modules lay flat on the



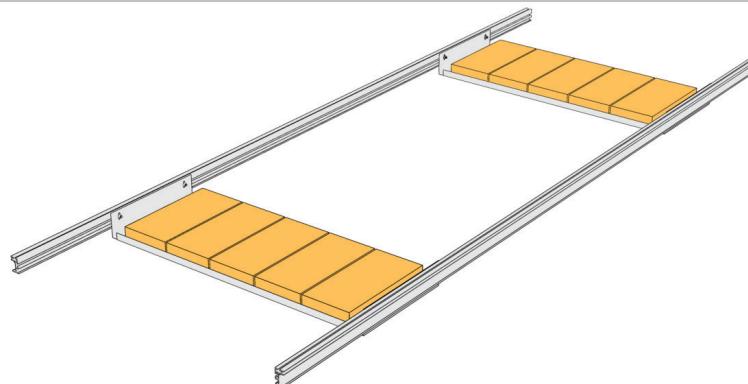
Rails. Insert 5/16" x 3/4" Turn Bolts into POWER RAIL and rotate 90-degrees to lock in place. Align Ballast Pan with Turn Bolts and secure to POWER RAIL with 5/16" Flange Nuts. **Torque to 15 ft.-lbs.**

Installation

Step 3: Weighting Ballast Pans

NOTE:

Block weight and size may vary based on site conditions. Please contact us for site-specific wind tunnel evaluation and block specification.



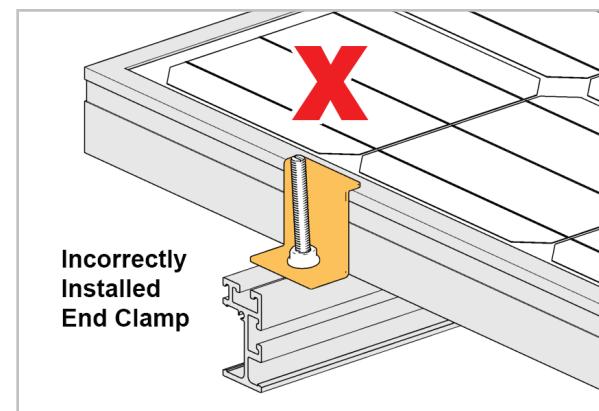
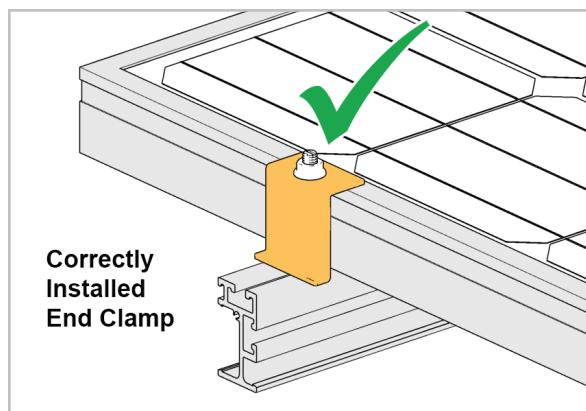
Job specific Ballast requirements have been calculated based on uplift and drag force data gathered from full-scale wind-tunnel testing.

Be certain to use enough blocks to meet or exceed the job specific ballast requirements. Line each of the Ballast Pans completely with the blocks.

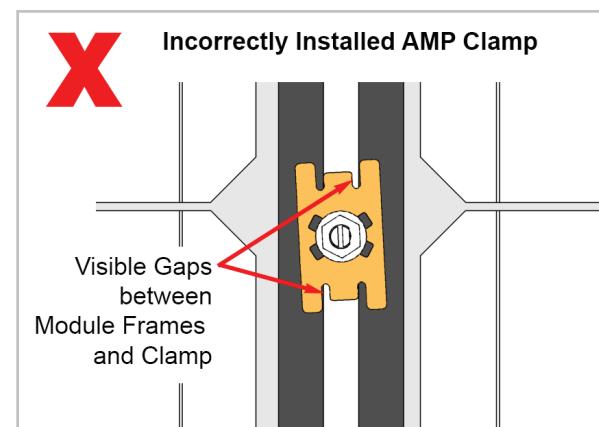
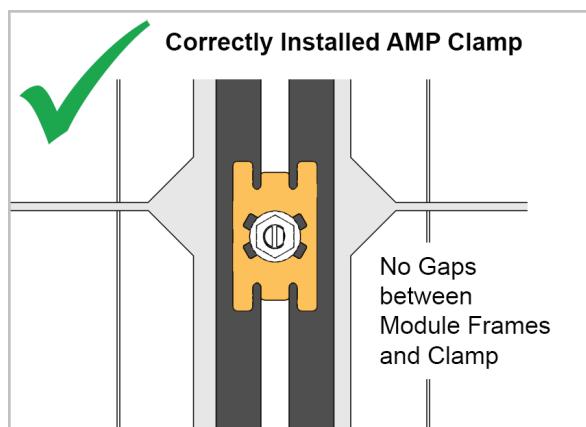
Step 4: Install the Modules

CAUTION

This is a two person activity. In addition to the difficulties associated with working on a sloped rooftop, PV Modules are heavy. One person should hold and align the modules while a second person secures modules with clamping hardware. Failure to do so could lead to serious personal injury and/or damaged components.



End Clamps must be installed as shown above left, not upside down as shown to the right.



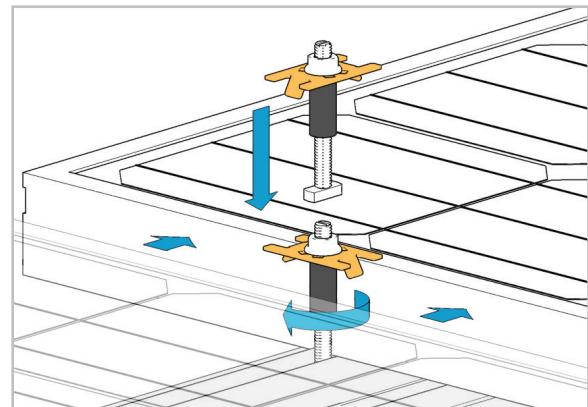
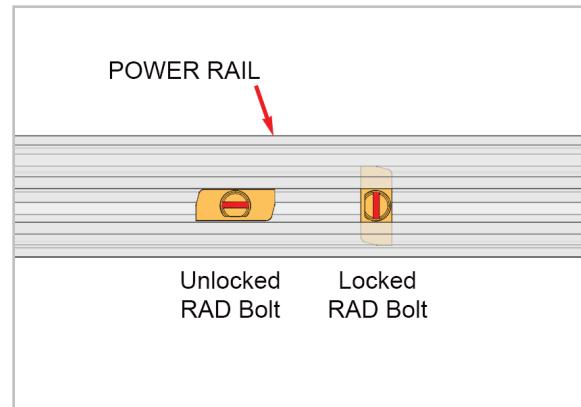
AMP Clamp bonding Mid Clamps must be installed as shown at above left and not as shown to the right. There cannot be any visible gaps between the bonding Mid Clamps and module frames.

Installation

Step 4: Install the Modules (cont.)

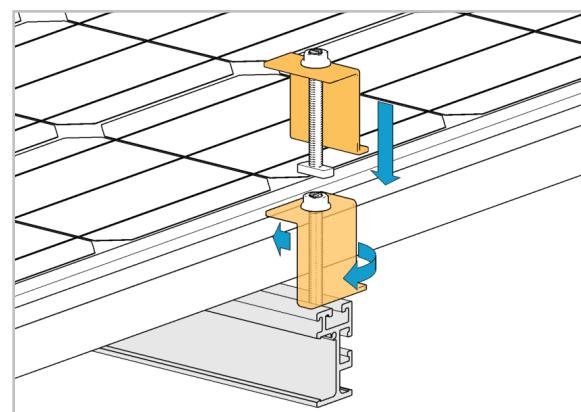
NOTE:

The RAD™ bolts used in the AMP™ Clamps and End Clamps must be locked into the channel by rotating clockwise 90- degrees. Use the indicator slot on the threaded end to identify whether or not the bolt has been locked.



AMP Clamp bonding Mid Clamps are inserted into the POWER RAIL and positioned between adjacent Modules. Insert the 5/16" RAD Bolt into POWER RAIL

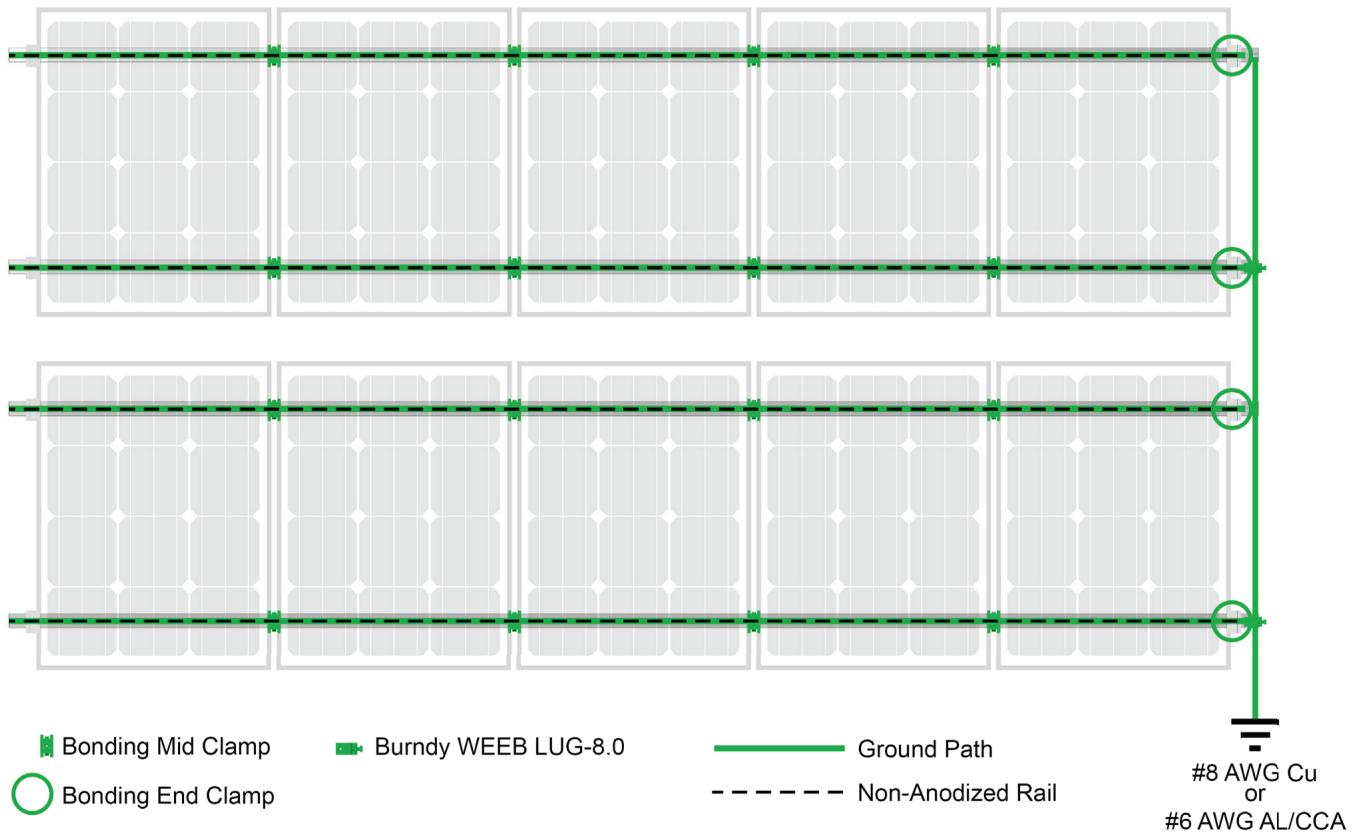
and rotate 90-degrees clockwise to lock the RAD Bolt within the POWER RAIL. Push Modules against AMP Clamp. Tighten 5/16" Flange Nut. **Torque to 15 ft.-lbs.**



RAD End Clamps are used on the outer Modules. Insert the 5/16" RAD Bolt into POWER RAIL and rotate 90-degrees clockwise to lock the RAD Bolt within the POWER RAIL. Secure with 5/16" Flange Nut.

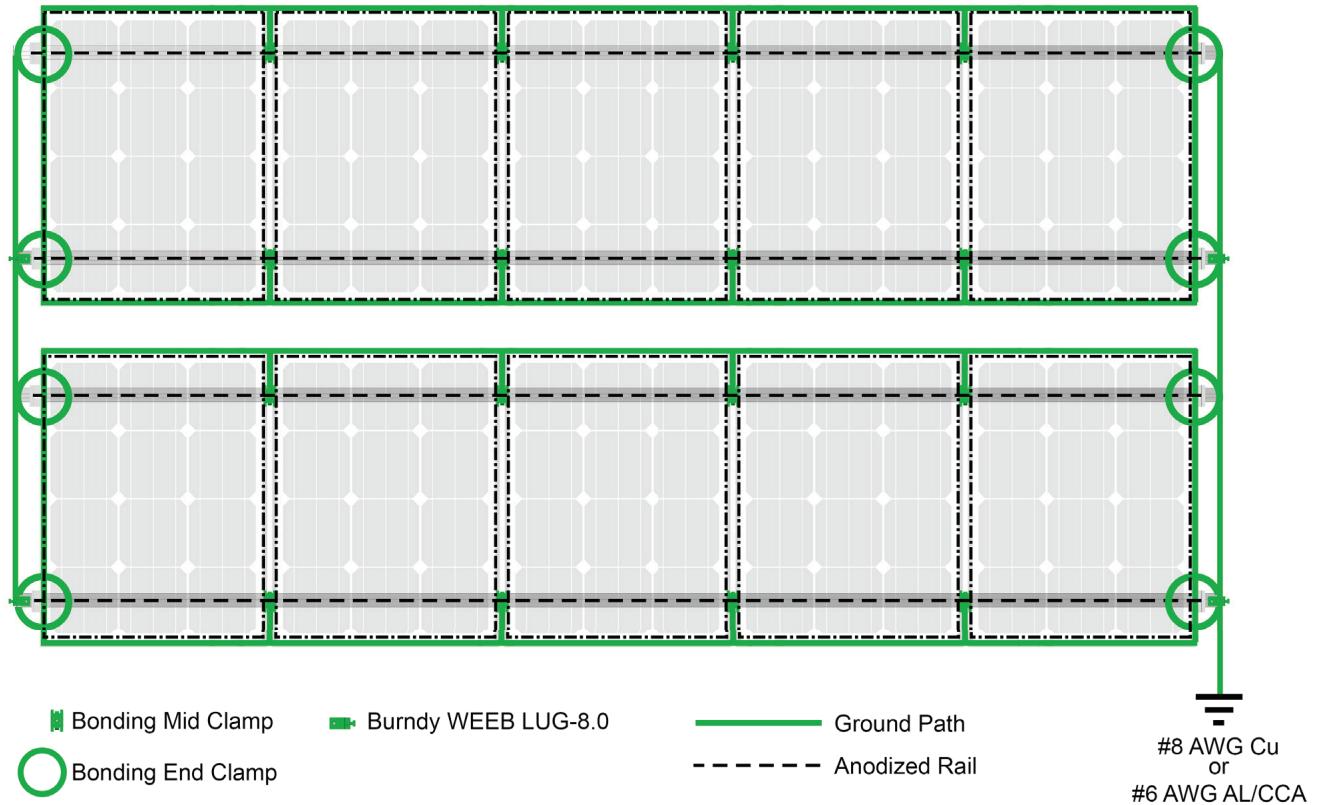
Torque to 15 ft.-lbs.

Grounding/Bonding Path Non-Anodized Rails



Grounding/Bonding Path Anodized Rails

To maintain a bonding path during maintenance within a module row it is recommended to install a ground wire at this end.

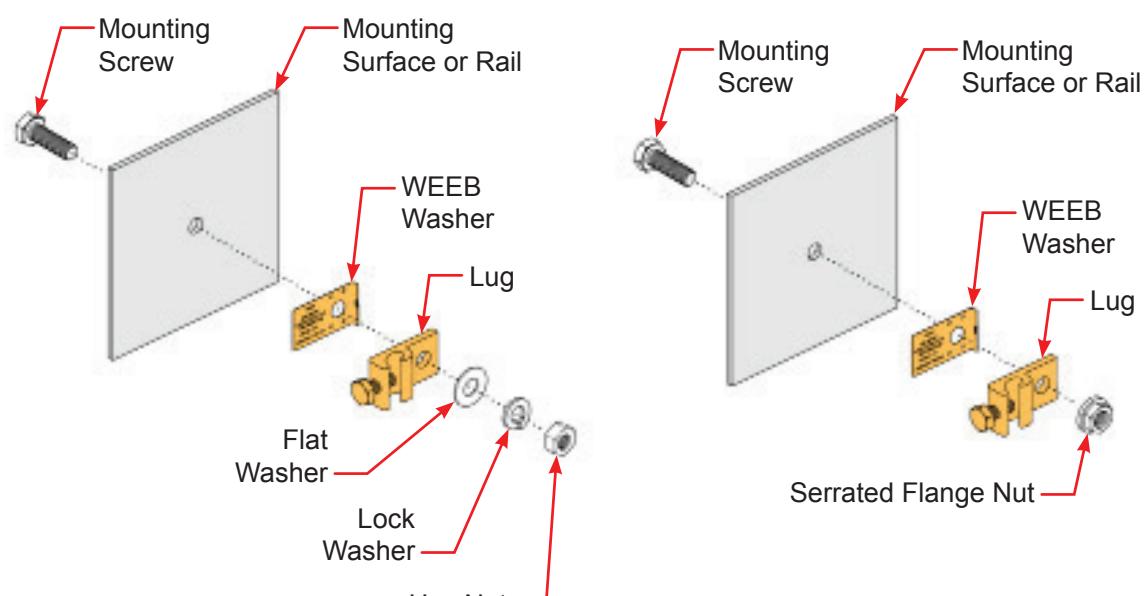


Installing a WEEB-LUG 8.0

IMPORTANT

Before installing, verify with the lug manufacturer for any updates or revisions to these lug installation instructions.

One of two mounting methods may be used; defined here as Methods A and B. Lug is suitable for use with 14-6AWG solid or stranded copper conductor when tightened to 5ft-lbs.



Mounting Method A

Mounting Method B

Cat No.	Max OCPD (A)	Mounting Surface					Mounting Screw		Mounting Hole Range	
		Min Profile (w x l)	Min Thick (in)	Max Thick (in)	Mtl	Surface Prep	Size	Tightening torque (lbs.-in)	Min (mm)	Max (mm)
WEEB-LUG-8.0	200	22mm x 20mm	.06"	.25"	AL	Anodized	5/16 M8	120	7.85mm	10mm
			.06"	.25"	Steel	Galvanized				

Table 1: Mounting Surface Requirements

IMPORTANT NOTES

1. Before installing, verify with the lug manufacturer for any updates or revisions to these lug installation instructions. The instructions on this page only address the WEEB-LUG-8.0 as found within the manufacturers (Burndy) document number 50016572 Rev E.
2. The NEC section 690.43 states, "Exposed non-current carrying metal parts of module frames, equipment, and conductor enclosures shall be grounded in accordance with 250.134 or 250.136 (A) regardless of voltage."
3. For Proper Equipment Grounding Conductor (EGC) and Overcurrent Protection Device (OCPD) sizing, refer to NEC sections 250.66, 250.122 and 250.166.

POWER RAIL™ Compatible Modules - these modules meet the UL2703 standard

Please reference application procedure SP3560 for POWER RAIL Compatible Modules.



PREFORMED LINE PRODUCTS

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