POWER RAIL™
Commercial Mounting System
XD, UD, LD, and MD Rails

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.

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

<table>
<thead>
<tr>
<th>Module Fuse Rating</th>
<th>Copper Wire Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;15 AMPS</td>
<td>#14 AWG 90°C</td>
</tr>
<tr>
<td>&lt;20 AMPS</td>
<td>#12 AWG 90°C</td>
</tr>
<tr>
<td>20-60 AMPS</td>
<td>#10 AWG 90°C</td>
</tr>
</tbody>
</table>

Splice Plates

Splice Plates have been tested per UL2703 Bonding & Grounding requirements without the use of Bonding Jumpers. See assembly procedures for proper assembly.

Module Clamps

Module clamps have integrated grounding and have been tested to UL 2703. 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 assembly instructions.

The assembly is to be mounted over a fire resistant roof covering rated for the application. Meets the requirements of Class A Steep Slope Flush-Mounting Applications when using Type 1, Listed Photovoltaic Modules.

Testing conducted with a 5” Gap (distance between roof covering and PV module frame) per UL1703 allows the system to be installed with any gap per manufacturer’s instructions. Steep Slope refers to roofs with slopes greater than or equal to 2:12.

Structural Certification

Mechanical Load Rating: Exceeds the minimum design load rating of UL2703 section 21.4. Certification for 30 psf downward, 15 psf upward, and 5 psf downslope. Actual system capacity defined in span/cantilever charts and/or 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.
About the product

The POWER RAIL top-clamping PV module mounting system is engineered to reduce installation costs and provide maximum strength for parallel-to-roof or tilt up 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 POWER RAIL Mounting System features the industry’s broadest selection of mounting supports, designed for secure and water-tight attachments to any roof style.

For recommendations on a specific installation, please:
Visit preformed.com and select the POWER RAIL Configuration Design Tool.
Contact us by Phone: 800-260-3792
Send an Email request: info@PLPSolar.com

About these instructions:

- The instructions do not include any information on the selection or installation of attaching hardware to be mounted to the roof substrate.
- Begin after all roof mounted attaching hardware has been installed and secured to the roof substrate.
- The instructions show the installation of the POWER RAIL Mounting System on a Universal Mounting Base.
- The 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 inch wrench or socket for 5/16 inch hardware
- Torque wrench
- Ratchet wrench
- Ratchet extension bar
There are five main components and attaching hardware.

Rail Profiles
It's critical to know your Rail Profile and to match the spacing on the Mounting Base Brackets (MBB's) to fit the Rail.
Identifying the Components

Mounting Base Bracket’s (MBB’s)

MBB’s are rail dependent and available in two configurations, XD/UD and LD/MD.
MBB’s are adaptable for use on all four rail types: XD, UD, LD, or MD.
At right are the two MBB types and their corresponding Rail Clamp positions for each of the four rail types.

Note: Hardware must be grade 5 or equivalent. Hardware type (Hex Bolt, Carriage Bolt, RAD Bolt, etc.) is application dependent.

Module Clamps - Factory Assembled

AMP Clamp
Module Bonding Mid Clamp
Module Bonding End Clamp
End Clamp

Rail Splice Plate

UL Marking Label
NOTE

If Splice Plates are installed prior to Rail installation, the installation must be a three person activity, taking care not to damage Splice Plates during Rail installation.

Do not place Splice Plates directly over supporting structures such as Mounting Brackets, Strongbacks, Purlins, etc.

If necessary, Rails are spliced using a Splice Plate and self tapping hardware. Splicing can be done either before or after the Rails are installed. Install the Splice Plates with 1/4" x 3/4" self drilling screws until they bottom against the Splice Plate.
2 Attaching the Mounting Base Bracket (MBB) to the Mounting Surface

Install the Rail Base and Rail Clamp as shown above. Prior to Rail installation, hand tighten the hardware. After the Rail is installed, tool tighten and **Torque to 15 ft.-lbs.**

3 Attaching the Rail to the Mounting Base Bracket (MBB)

Install the Rail ensuring that it nests into the MBB Rail Base as shown. Rotate the MBB Rail Clamp 180 degrees, nesting it onto the opposite side of the Module Rail. Torque the two 5/16" Flange Nuts to **15 ft.-lbs.**
**Install the Modules**

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**CAUTION**

This is a two person activity. In addition to the difficulties associated with working on a sloped rack, 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.

**Module Clamps**

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.

**End Clamps**

Maximum Clamp Force on Module

Correctly Installed End Clamps

Correctly Installed End Clamp

Correctly Installed AMP Clamp

Correctly Installed End Clamp

Maximum Clamp Force on Module

End Clamp Correctly Installed

End Clamp Correctly Installed

Install End Clamps by pushing the RAD Bolt tightly against the module frame. There should not be a visible gap between the RAD Bolt and the Module Frame.

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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.

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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.

CAUTION
If the Flange Nut has been removed from the assembly, add Pentrox-A on threads of RAD Bolt before re-installing Flange Nut.

CAUTION
Exceeding torque values can result in damage to Rail and/or Hardware.

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

Bonded End Clamp, L-Versions are used on the outer Modules. Insert the 5/16" RAD Bolt into Rail and rotate 90-degrees clockwise to lock the RAD Bolt within the Rail. Secure with 5/16" Flange Nut. Torque to 15 ft.-lbs.
Grounding/Bonding Path Non-Anodized Rails

To maintain a bonding path during maintenance within a module row, install a ground wire at this end.

Grounding/Bonding Path Anodized Rails

To maintain a bonding path during maintenance within a module row, 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.

NOTE
The Turn bolts used 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.

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

<table>
<thead>
<tr>
<th>Cat No.</th>
<th>Max OCPD (A)</th>
<th>Mounting Surface</th>
<th>Mounting Screw</th>
<th>Mounting Hole Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Min Profile (w x l)</td>
<td>Size</td>
<td>Tightening torque (lbs.-in)</td>
</tr>
<tr>
<td>WEEB-LUG-8.0</td>
<td>200</td>
<td>22mm x 20mm</td>
<td>.06&quot; x .25&quot;</td>
<td>AL Anodized</td>
</tr>
</tbody>
</table>

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.
## Compatible Modules - these modules meet the UL2703 standard

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.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Frame Thickness</th>
<th>Model</th>
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<tbody>
<tr>
<td>Boviet</td>
<td>35 mm</td>
<td>BVM6612M-365, BVM6612M-370, BVM6612M-375, BVM6612M-380</td>
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<tr>
<td>Canadian Solar</td>
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<td>CS6P-XXX, CS6P-XXXP, CS6P-XXXP-SD,</td>
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<td>Hanwha</td>
<td>32 mm</td>
<td>Q.Pro BFR-G4.x XXX, Q.Plus BFR-G4.x XXX, Q.Pro-G4.x XXX, Q.Plus-G4.x XXX, Q.Peak BLK G4.x XXX</td>
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<tr>
<td></td>
<td>35 mm</td>
<td>Q.Pro L-G4.x XXX, Q.Plus L-G4.x XXX, Q.Peak L-G4.x XXX, Q.Peak Duo BLK G5.x-XXX</td>
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<tr>
<td>Heliene</td>
<td>40 mm</td>
<td>60P-MIM, 60P, 72P</td>
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<td>JA Solar</td>
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<td>JAP72S01-XXX/SC</td>
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<tr>
<td>Japan Solar</td>
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<td>JS-XXXM-Li60, JPS-XXXM-60,</td>
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<td></td>
<td>40 mm</td>
<td>JS-XXXM-Li72, JPS-XXXM-72, JPS-XXXP-72</td>
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<tr>
<td>Jinko Solar</td>
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<td>JKMXXXPP-60-V, JKMXXXPP-72-V</td>
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<tr>
<td>Kyocera</td>
<td>46 mm</td>
<td>KUXXX-6BCA</td>
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<tr>
<td>LG</td>
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<td>LGXXXN1C-G3</td>
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<td>VBHNXXXSA11, VBHNXXXSA16</td>
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<td></td>
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<td>PS250-275P, PS330-360P</td>
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<td>REC Solar</td>
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<td>Solar World</td>
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<td>33 mm</td>
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<td>Suniva</td>
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<td>OPT-XXX-60-4-100</td>
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<td>OPT-XXX-60-4-100, OPT-XXX-72-4-100</td>
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<td>Sunpower</td>
<td>46 mm</td>
<td>SPR-XXXNE-WHT-D, X21-XXX-BLK, E20-Series, P17-Series, SPR-X22-XXX-COM</td>
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<tr>
<td>Suntech</td>
<td>40 mm</td>
<td>STPXXX-24 /Ve, STPXXX-24/Vem</td>
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<td></td>
<td>50 mm</td>
<td>STPXXX-24/Vd</td>
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<td>Topoint Solar</td>
<td>35 mm</td>
<td>JTM185-72M, JTM190-72M, JTM195-72M, JTM200-72M</td>
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<tr>
<td>Trina</td>
<td>40 mm</td>
<td>TSM-XXXPD1z4</td>
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<tr>
<td>Winaico</td>
<td>35 mm</td>
<td>WST_XXXPERC, WST-P6</td>
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