IRONRIDGE
Solar Mounting Made Simple

Ground Mounting System
Design Manual

IronRidge SGA (2 inch)

SPAN CHART & ENGINEERING GUIDE

SGA Maximum East-West Spans (feet)

Wind	Snow Psf	Tilt Angle 0°	5°	10°	15°	20°	25°	30°	35°	40°	45°
90 mph	0	9.5	9.7	8.3	8.0	7.6	7.2	6.9	6.8	6.9	6.9
	10	8.7	8.9	8.0	7.8	7.5	7.2	6.9	6.8	6.9	6.9
	20	7.6	7.7	7.1	7.0	6.7	6.5	6.4	6.3	6.3	6.4
	30	7.2	7.2	6.7	6.6	6.4	6.3	6.1	6.1	6.1	6.1
	40	6.6	6.7	6.2	6.2	6.0	5.9	5.7	5.7	5.7	5.7
	50	6.1	6.2	5.9	5.8	5.7	5.5	5.4	5.4	5.4	5.4
100 mph	0	8.7	8.9	7.5	7.3	6.9	6.6	6.3	6.2	6.2	6.3
	10	8.2	8.4	7.5	7.3	6.9	6.6	6.3	6.2	6.2	6.2
	20	7.3	7.4	6.7	6.6	6.4	6.2	6.0	5.9	6.0	6.0
	30	6.9	7.0	6.4	6.3	6.1	5.9	5.7	5.7	5.7	5.7
	40	6.4	6.4	6.0	5.9	5.7	5.6	5.4	5.4	5.4	5.4
	50	6.0	6.0	5.6	5.6	5.4	5.3	5.2	5.2	5.2	5.2
110 mph	0	8.4	8.7	7.3	7.1	6.7	6.4	6.1	6.0	6.0	6.1
	10	8.1	8.2	7.3	7.1	6.7	6.4	6.1	6.0	6.0	6.1
	20	7.2	7.3	6.6	6.5	6.2	6.0	5.8	5.8	5.8	5.8
	30	6.8	6.9	6.3	6.2	6.0	5.8	5.6	5.6	5.6	5.6
	40	6.3	6.4	5.9	5.8	5.6	5.5	5.3	5.3	5.3	5.3
120 mph	0	7.8	8.0	6.8	6.5	6.2	5.9	5.6	5.6	5.6	5.6
	10	7.7	7.8	6.8	6.5	6.2	5.9	5.6	5.6	5.6	5.6
	20	6.9	7.0	6.3	6.2	5.9	5.7	5.5	5.5	5.5	5.5
	30	6.5	6.6	6.0	5.9	5.7	5.5	5.3	5.3	5.3	5.3
	40	6.1	6.2	5.7	5.6	5.4	5.2	5.1	5.1	5.1	5.1
130 mph	0	7.3	7.5	6.3	6.1	5.7	5.4	5.2	5.2	5.2	5.2
	10	7.3	7.4	6.3	6.1	5.7	5.4	5.2	5.2	5.2	5.2
	20	6.6	6.7	6.0	5.9	5.6	5.4	5.2	5.2	5.2	5.2
	30	6.3	6.4	5.8	5.6	5.4	5.2	5.1	5.0	5.1	5.1
	40	5.9	6.0	5.5	5.4	5.2	5.0	4.9	4.8	4.8	4.8

LOAD CONDITION ASSUMPTIONS

- N-S Pier Spacing = 7 feet 6 inches
- Shaded areas denote requirement for diagonal bracing
- Diagonal lines denote special requirement for rails – contact IronRidge
- Cross pipe splices not permitted in end spans or middle 1/3 of interior spans
- Topographic (wind) factor = 1.0 (no topographic effects)
- Exposure Category C
- Dead Load (weight) = 3psf

For installations that do not conform to the load condition assumptions above, please refer to www.ironridge.com for a more complete engineering analysis.

IronRidge SGA (3 inch)

SPAN CHART & ENGINEERING GUIDE

SGA Maximum East-West Spans (feet)

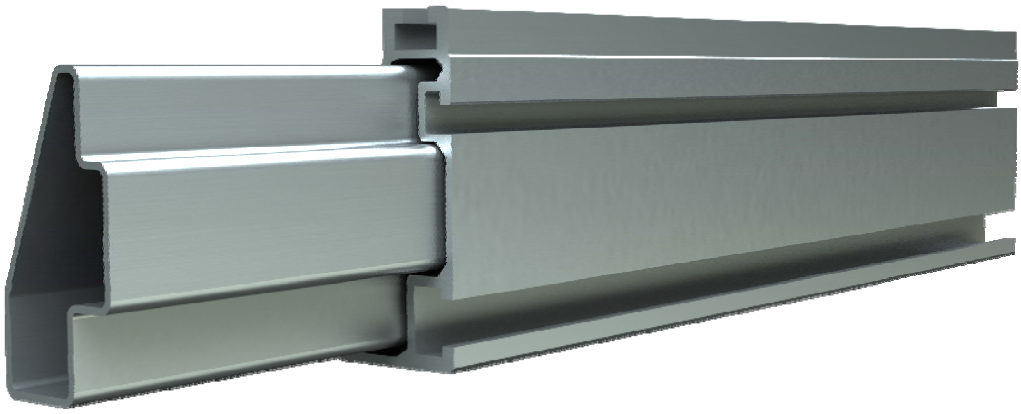
Wind	Snow Psf	Tilt Angle 0°	5°	10°	15°	20°	25°	30°	35°	40°	45°
90 mph	0	16.6	17.0	14.5	14.0	13.2	12.6	12.1	12.0	12.0	12.1
	10	15.3	15.5	14.0	13.7	13.1	12.6	12.1	12.0	12.0	12.1
	20	13.3	13.5	12.4	12.2	11.8	11.5	11.1	11.1	11.1	11.1
	30	12.5	12.7	11.8	11.6	11.2	11.0	10.7	10.6	10.7	10.7
	40	11.5	11.6	10.9	10.8	10.5	10.3	10.0	10.0	10.0	10.0
	50	10.7	10.8	10.3	10.1	9.9	9.7	9.5	9.5	9.5	9.5
100 mph	0	15.2	15.6	13.2	12.8	12.1	11.5	11.0	10.9	10.9	11.0
	10	14.4	14.7	13.1	12.8	12.1	11.5	11.0	10.9	10.9	11.0
	20	12.7	12.9	11.8	11.5	11.1	10.8	10.4	10.4	10.4	10.4
	30	12.1	12.2	11.2	11.0	10.7	10.4	10.1	10.0	10.0	10.1
	40	11.2	11.3	10.5	10.3	10.0	9.8	9.5	9.5	9.5	9.5
	50	10.4	10.5	9.9	9.7	9.5	9.3	9.1	9.0	9.1	9.1
110 mph	0	14.7	15.2	12.8	12.4	11.7	11.1	10.6	10.5	10.6	10.6
	10	14.2	14.4	12.8	12.4	11.7	11.1	10.6	10.5	10.6	10.6
	20	12.5	12.7	11.6	11.3	10.9	10.6	10.2	10.2	10.2	10.2
	30	11.9	12.0	11.0	10.8	10.5	10.2	9.9	9.8	9.8	9.9
	40	11.0	11.2	10.3	10.2	9.9	9.6	9.4	9.3	9.3	9.4
120 mph	0	13.7	14.1	11.8	11.5	10.8	10.3	9.8	9.7	9.8	9.8
	10	13.4	13.7	11.8	11.5	10.8	10.3	9.8	9.7	9.8	9.8
	20	12.0	12.2	11.0	10.8	10.3	10.0	9.7	9.6	9.6	9.6
	30	11.4	11.6	10.6	10.3	10.0	9.6	9.3	9.3	9.3	9.3
	40	10.7	10.8	9.9	9.8	9.4	9.2	8.9	8.9	8.9	8.9
130 mph	0	12.7	13.1	11.0	10.6	10.0	9.5	9.1	9.0	9.1	9.1
	10	12.7	13.0	11.0	10.6	10.0	9.5	9.1	9.0	9.1	9.1
	20	11.5	11.7	10.5	10.2	9.8	9.5	9.1	9.0	9.1	9.1
	30	11.0	11.2	10.1	9.9	9.5	9.2	8.9	8.8	8.9	8.9
	40	10.3	10.5	9.5	9.4	9.0	8.8	8.5	8.5	8.5	8.5

LOAD CONDITION ASSUMPTIONS

- N-S Pier Spacing = 7 feet 6 inches
- Shaded areas denote requirement for diagonal bracing
- Diagonal lines denote special requirement for rails – contact IronRidge
- Cross pipe splices not permitted in end spans or middle 1/3 of interior spans
- Topographic (wind) factor = 1.0 (no topographic effects)
- Exposure Category C
- Dead Load (weight) = 3psf

For installations that do not conform to the load condition assumptions above, please refer to www.ironridge.com for a more complete engineering analysis.

XRS Splice
Installation Guide Addendum



XRS Splice bars are structural elements that may be used to join two or more of the IronRidge XRS rails together to create a single, longer rail. Although the splice is structural, the installer must note that the joint will not be as strong as the rail itself.

Component List

The component list is indicated here for a single splice kit:

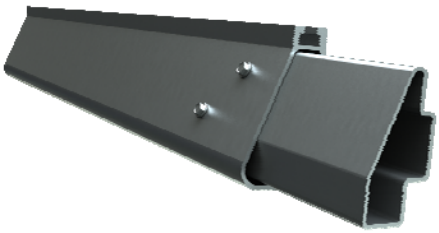
- Splice Bar (1), 51-7000-000
- 10-16x1/2", Self-drilling/tapping screws (4), 48-1016-500

Tools Required

The following tools are required to install the XRS splice correctly:

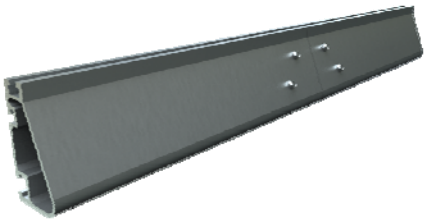
- Screw gun (cordless drill); 5/16 socket
- Tape measure (or Ruler)

Installation Instructions



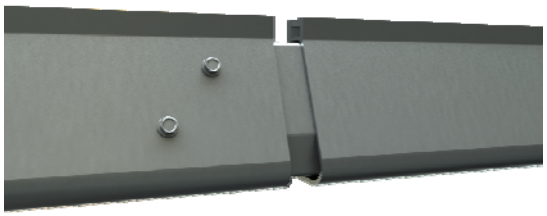
1) Slide the internal splice halfway into the internal cavity of the rail. It should extend approximately six (6) inches into the cavity of the XRS rail.
2) Using two of the self-drilling, self-tapping screws, secure the internal splice into the rail utilizing the screw pattern shown on the right.

3) The screws will drill through both the XRS rail and the splice into the cavity of the internal splice. In the cross-section diagram on the right, you'll notice how the screws pierce both the wall of the rail and the splice, securing the splice to the rail.
4) Slip the second rail over the internal splice until the two XRS rails are butting tightly and evenly together.
5) Drive two self-tapping screws through the second rail utilizing the same pattern from the first rail.
6) Repeat this procedure for any remaining splices.



Expansion Joints

For rows of panels exceeding 50 feet of rail, IronRidge recommends the utilization of expansion joints. Expansion joints prevent the potential buckling of rails due to thermal expansion. To create a thermal expansion joint, secure the splice bar into one of the rails as described above. Then slide the other rail over the splice bar, and leave the splice bar secured on one side only. Leave a ½" gap between the ends of the rails to allow for thermal expansion.



Installation Notes

1) Take care to make sure the splice does not occur in the middle 1/3 of the span between attachments. In situations where the actual span is less than the maximum allowable span, there may be more flexibility with the location of the splice bar. Please contact your local distributor for more information.
2) No splices are permitted in the end spans of a row. In other words, splices must be placed on the inside of the 2nd attachment (see diagram below).
3) Thermal expansion joints are not structural connections and should not be treated as such. It is recommended that modules not span over a thermal expansion joint. Panels should have end clamps on each side of the expansion joint. In addition, an extra attachment will need to be added to the long portion of the rail created by the break. This layout will allow for maximum density while allowing for thermal expansion.

BURNDY®

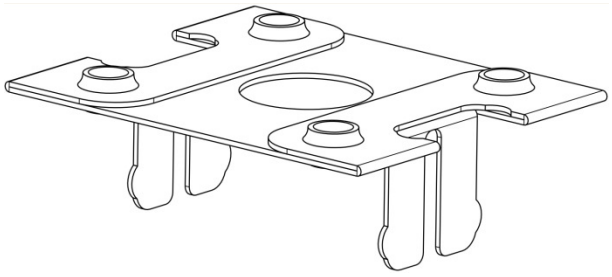
Experience. Technology. Answers.™

Washer, Electrical Equipment Bond
WEEB

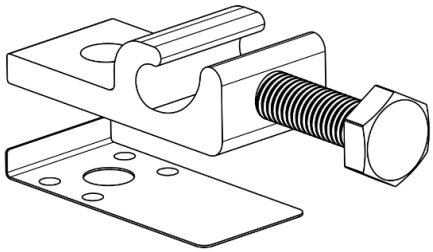
INSTALLATION INSTRUCTIONS
For IronRidge Light & Standard Series Rails Only

Please read carefully before installing.

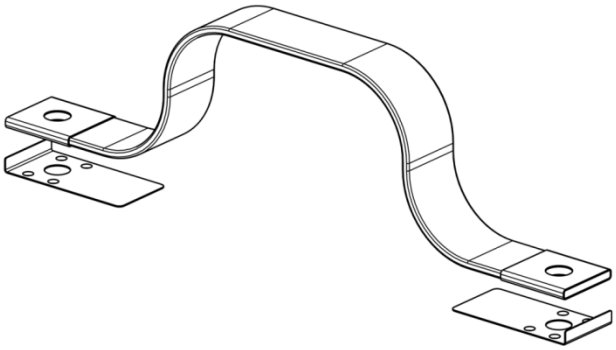
Burndy recommends that the sufficient details of the installation be submitted to the AHJ for approval before any work is started.



WEEB-DMC



WEEBLug-6.7



WEEB Bonding Jumper-6.7

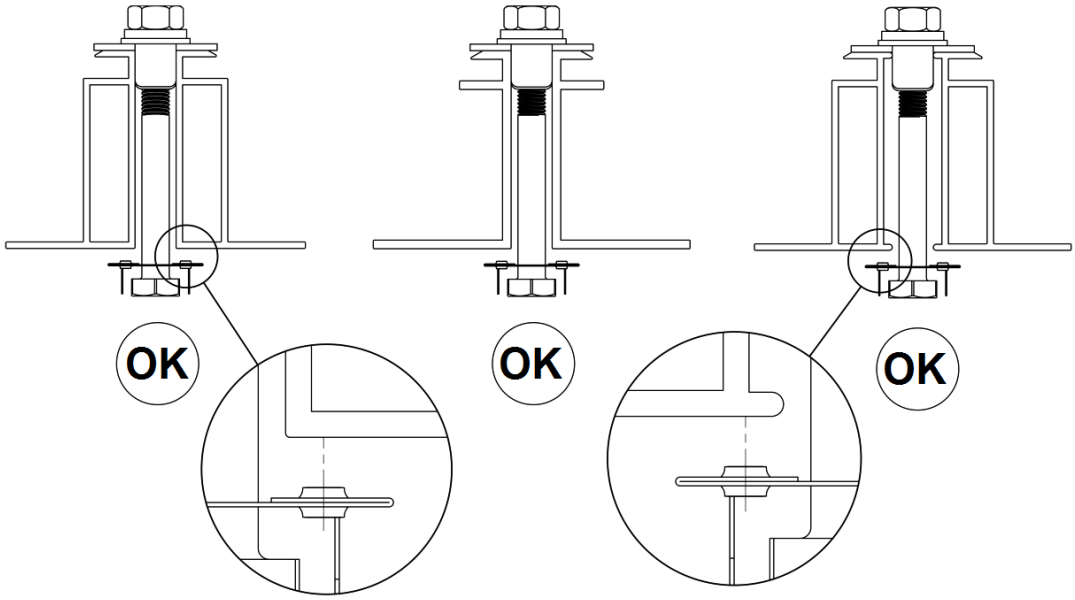
Products are tested to UL 467, CAN/CSA-C22.2 No. 41 US/ Canadian standards for safety grounding and bonding equipment.

WEEB COMPATIBILITY

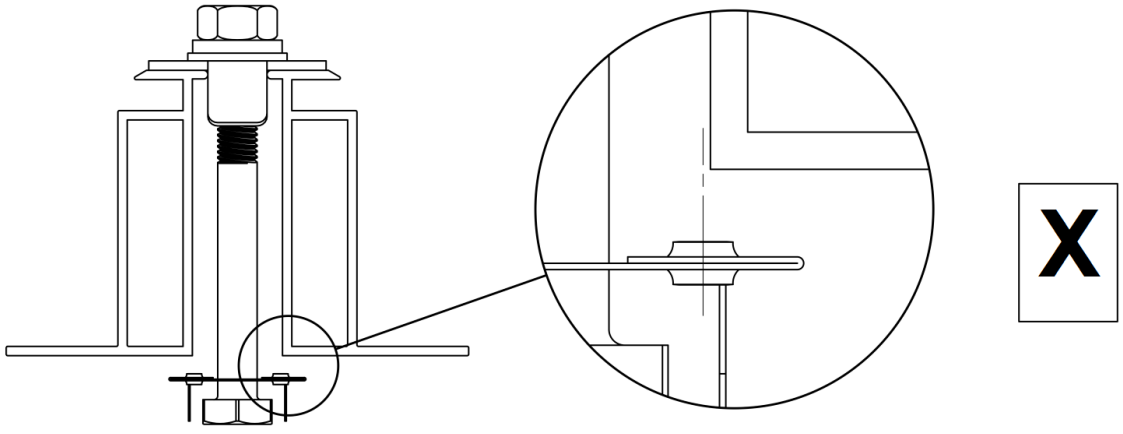
The WEEB family of products can be used to bond anodized aluminium, galvanized steel, steel and other electrically conductive metal structures. All installations shall be in accordance with NEC requirements in the USA and with CSA C22.1 in Canada. The WEEBs are for use with modules that have a maximum series fuse rating of less than 25A.

Standard Top Down Clamps

The WEEBs used for bonding the PV modules to the mounting rails are compatible with various cross-sections of module frames. The following are examples of module frames that are compatible. Notice that the WEEB teeth are positioned completely under the edge of the module frame.

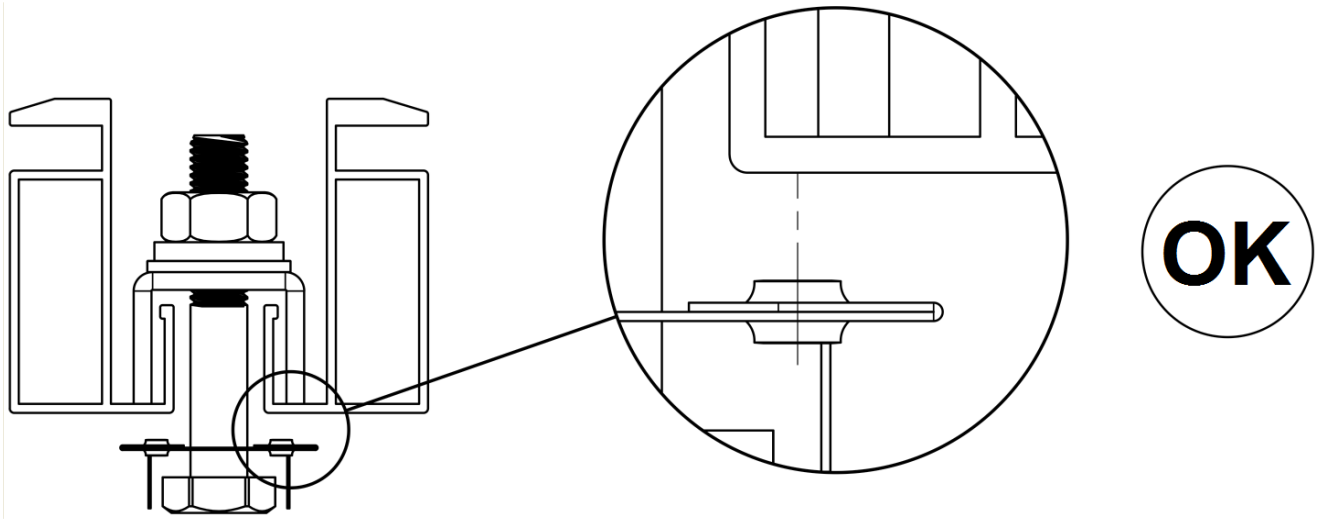


The following is an example of a module frame that is incompatible with the WEEB. The WEEB teeth are positioned only partially under the edge of the module due to the lip on the top edge of the module.



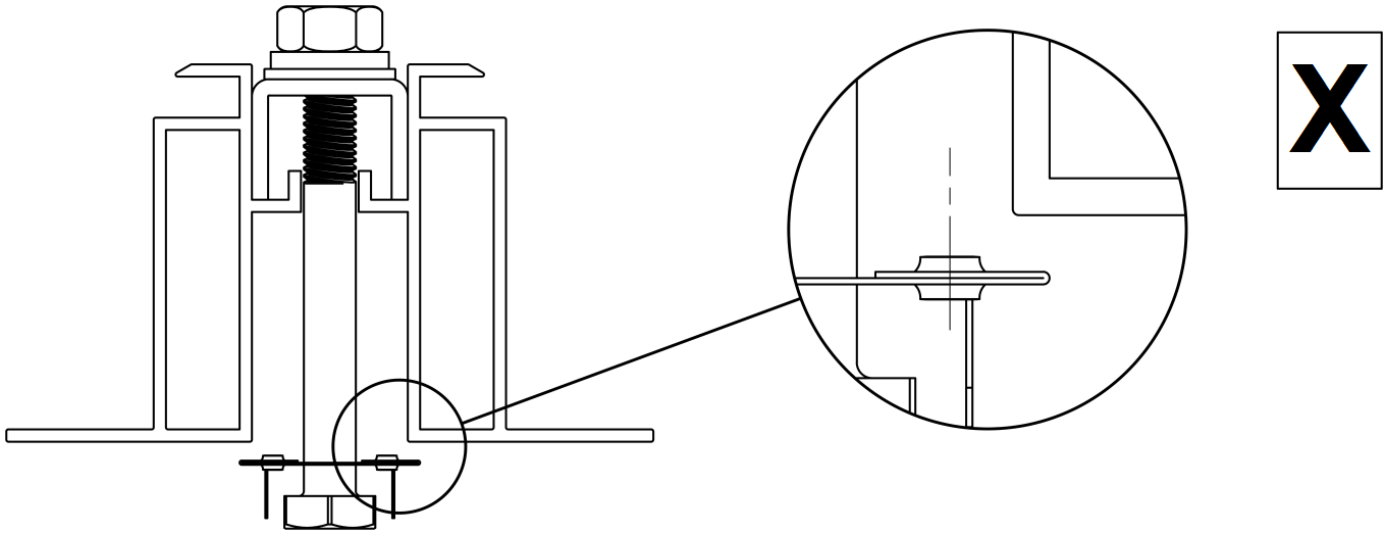
Top Down Clamps for Lipped Modules

The following are a few variations of lipped solar modules mounted with inverted U-shaped clamps. Notice that the force which the inverted U-shaped clamp exerts is in line with the WEEB teeth.



Low-Lipped Module

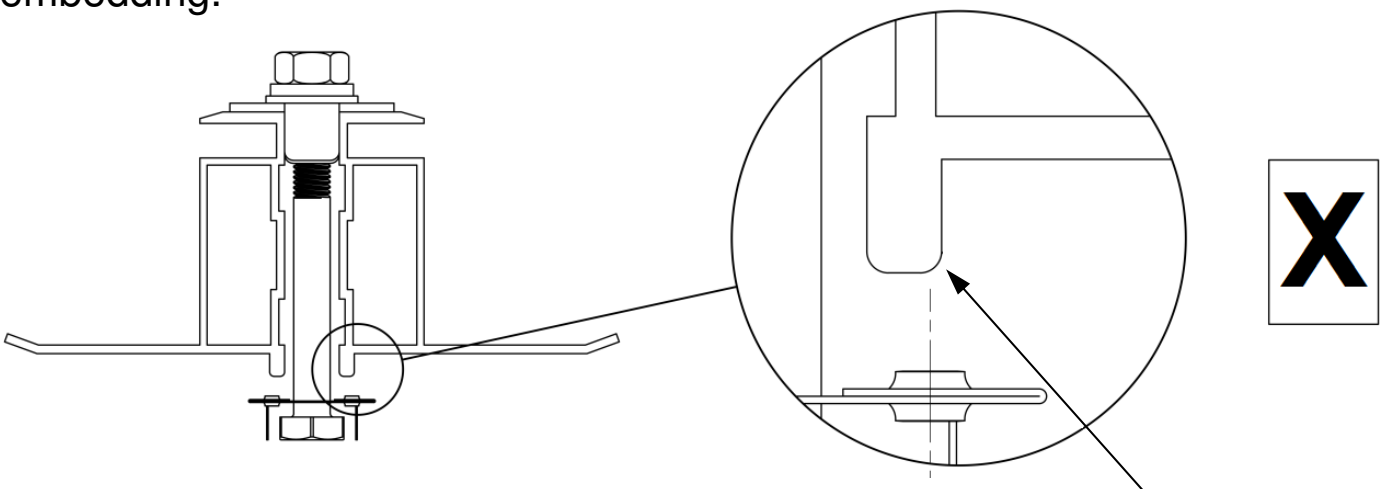
The WEEB-DMC is not compatible with high lipped modules. The WEEB teeth do not intersect with the solar module frame.



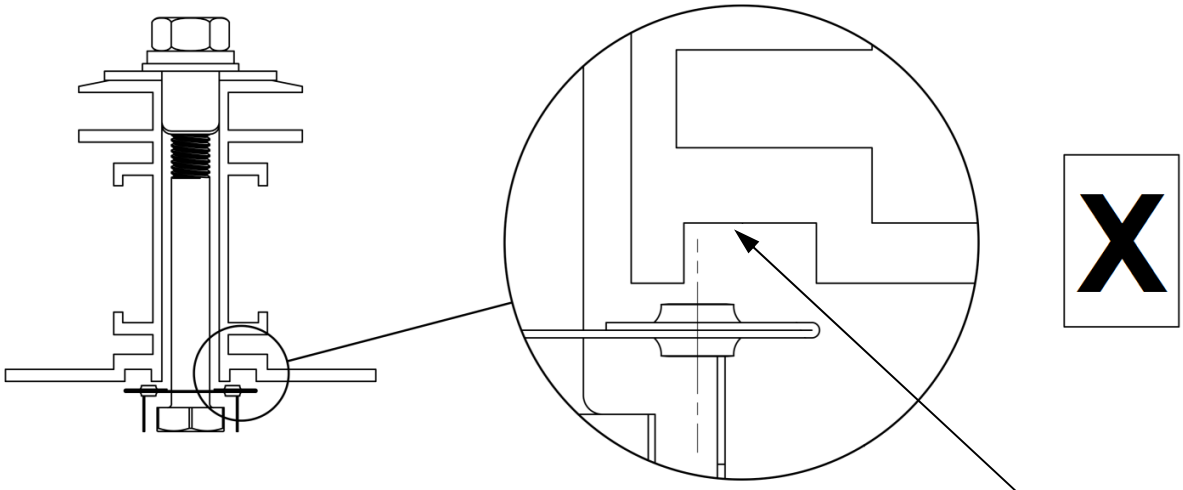
High-Lipped Module

WEEB COMPATIBILITY

Module frames like those shown here may have a ridge or lip on the bottom edge of the frame that would prevent the WEEB teeth from fully embedding.



Shown here is an example of a lip that will prevent the WEEB teeth from properly penetrating the module frame. This type of frame is not compatible with the WEEB.



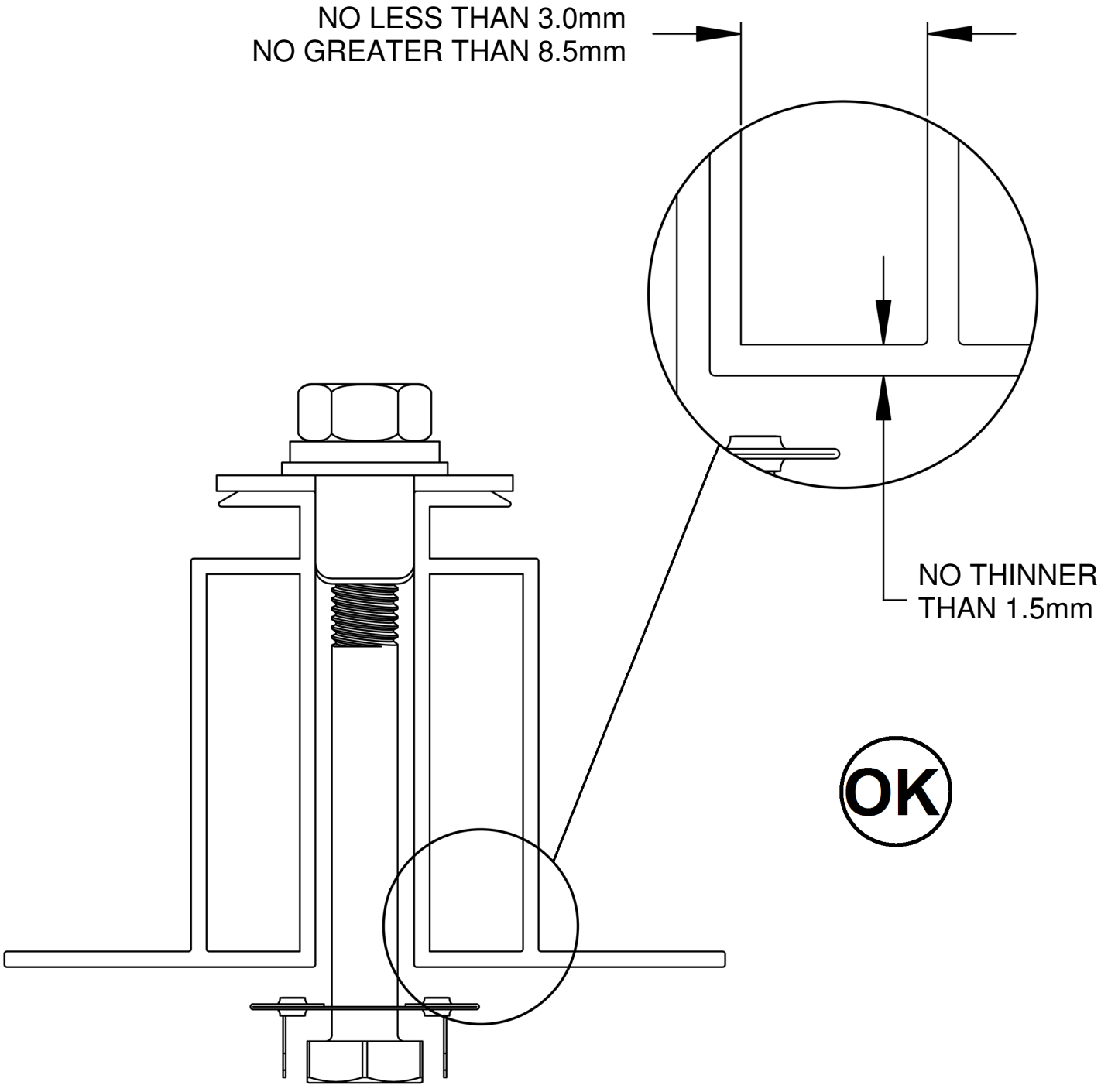
Shown here is an example of a groove that will prevent the WEEB teeth from properly penetrating the module frame. This type of frame is not compatible with the WEEB.

Important Note:

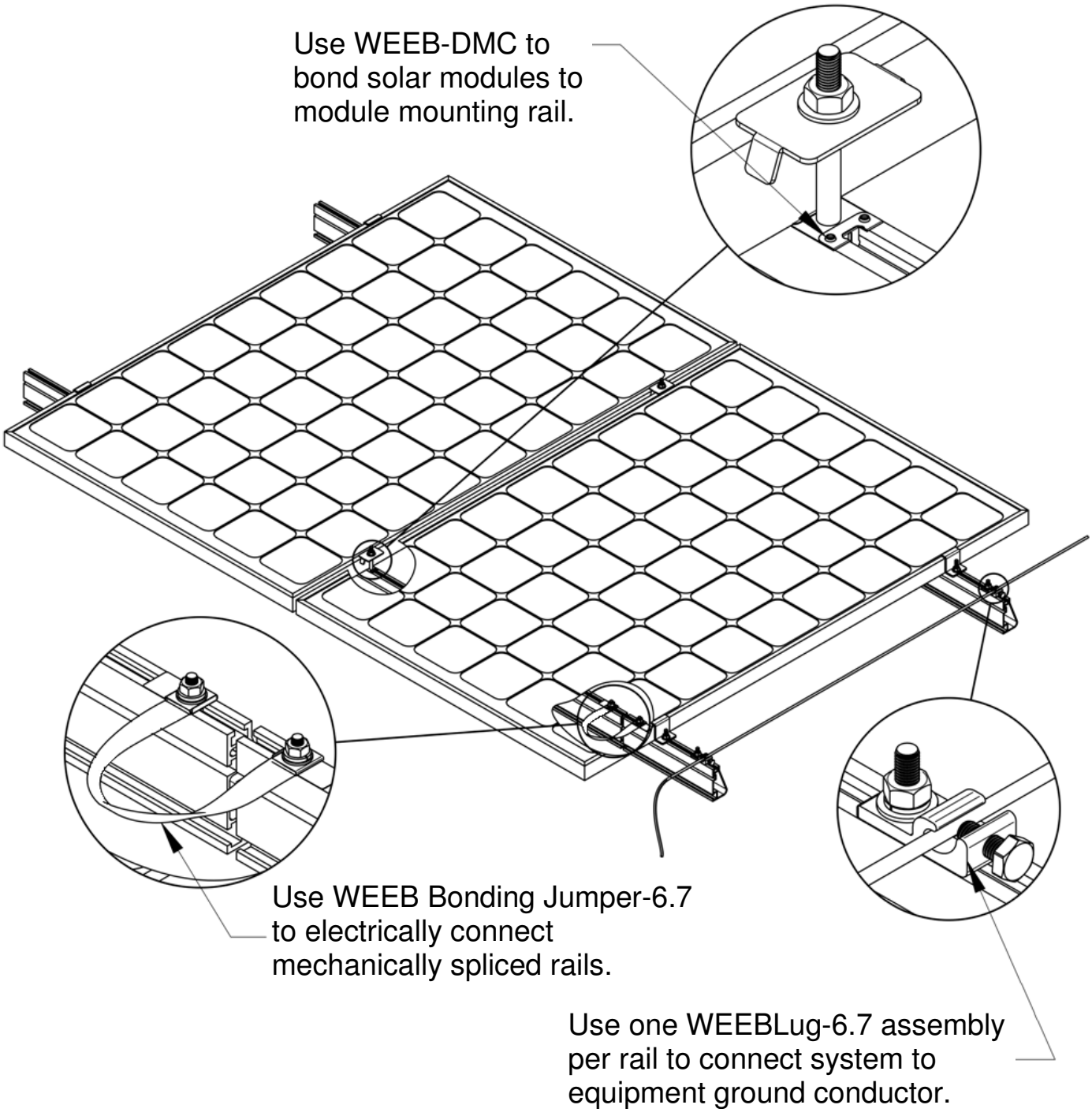
Inspect each module frame used with a WEEB to ensure that the bottom mounting face of the frame is flat, and that there are no hindrances to embedding WEEB teeth. Do not use a module with a frame that prevents the WEEB teeth from embedding fully.

WEEB-DMC on Boxed Module Frames

Certain module frames do not have enough structural strength to withstand the force required to embed a WEEB. These frames will deform and therefore not allow sufficient penetration of the WEEB teeth. The general requirements for minimum module frame thickness of "boxed" type module frames are illustrated below.



SYSTEM OVERVIEW

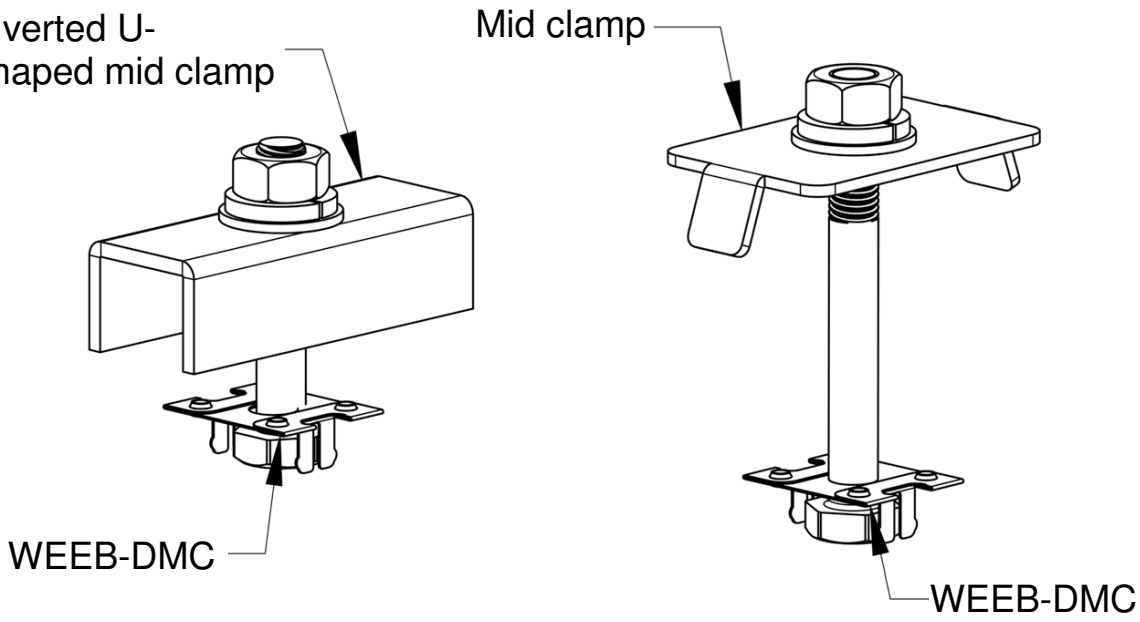


Important notes

1. **Use general purpose anti-seize compound on fastener threads when installing WEEBs.**
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. **WEEBs are intended for SINGLE USE ONLY. Functionality will not be guaranteed if reused.**

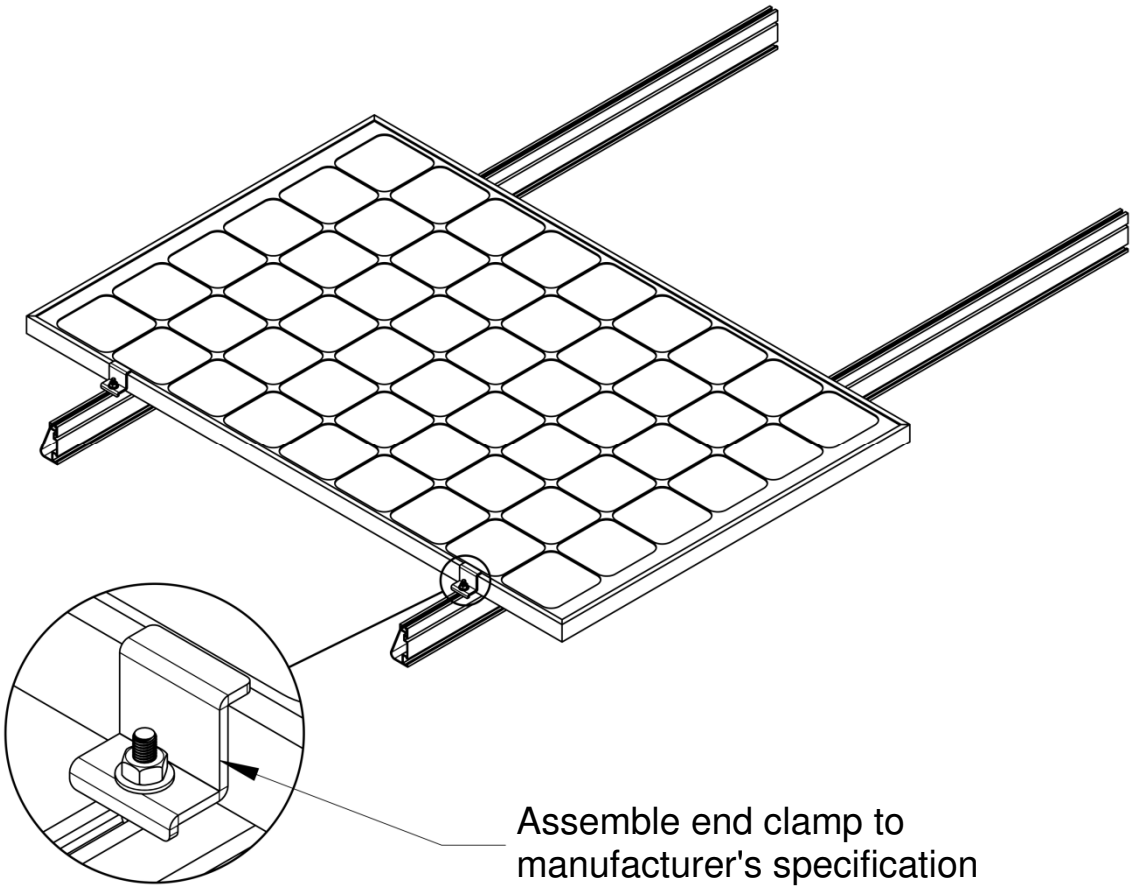
WEEB-DMC ASSEMBLY

1



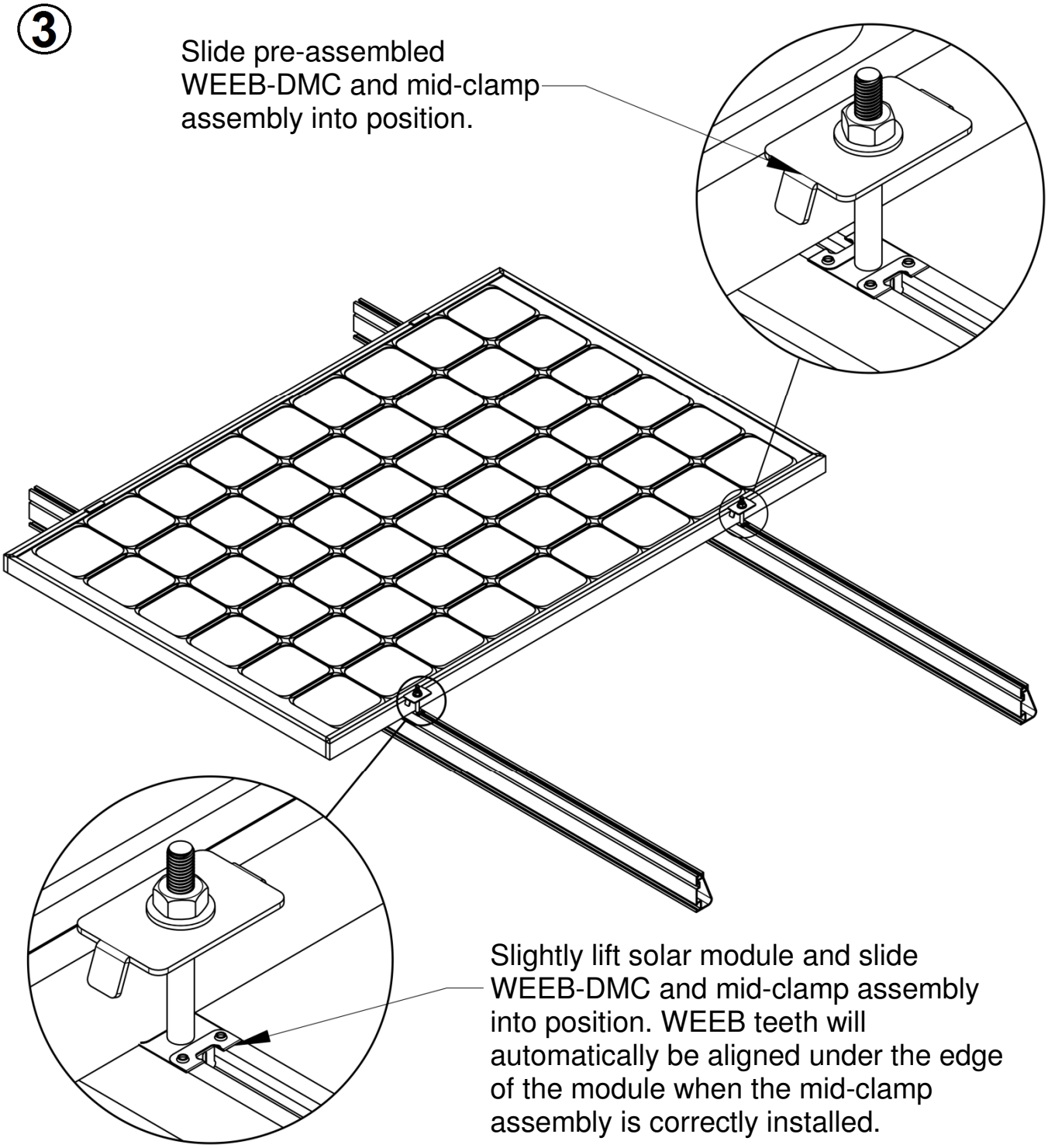
Pre-assemble WEEB-DMC to mid-clamp assembly as shown. Pre-assembling WEEB-DMC to mid-clamp assembly will contain the small individual parts, reducing the possibility of losing parts during installation.

2



③

Slide pre-assembled WEEB-DMC and mid-clamp assembly into position.



Slightly lift solar module and slide WEEB-DMC and mid-clamp assembly into position. WEEB teeth will automatically be aligned under the edge of the module when the mid-clamp assembly is correctly installed.

Important note:

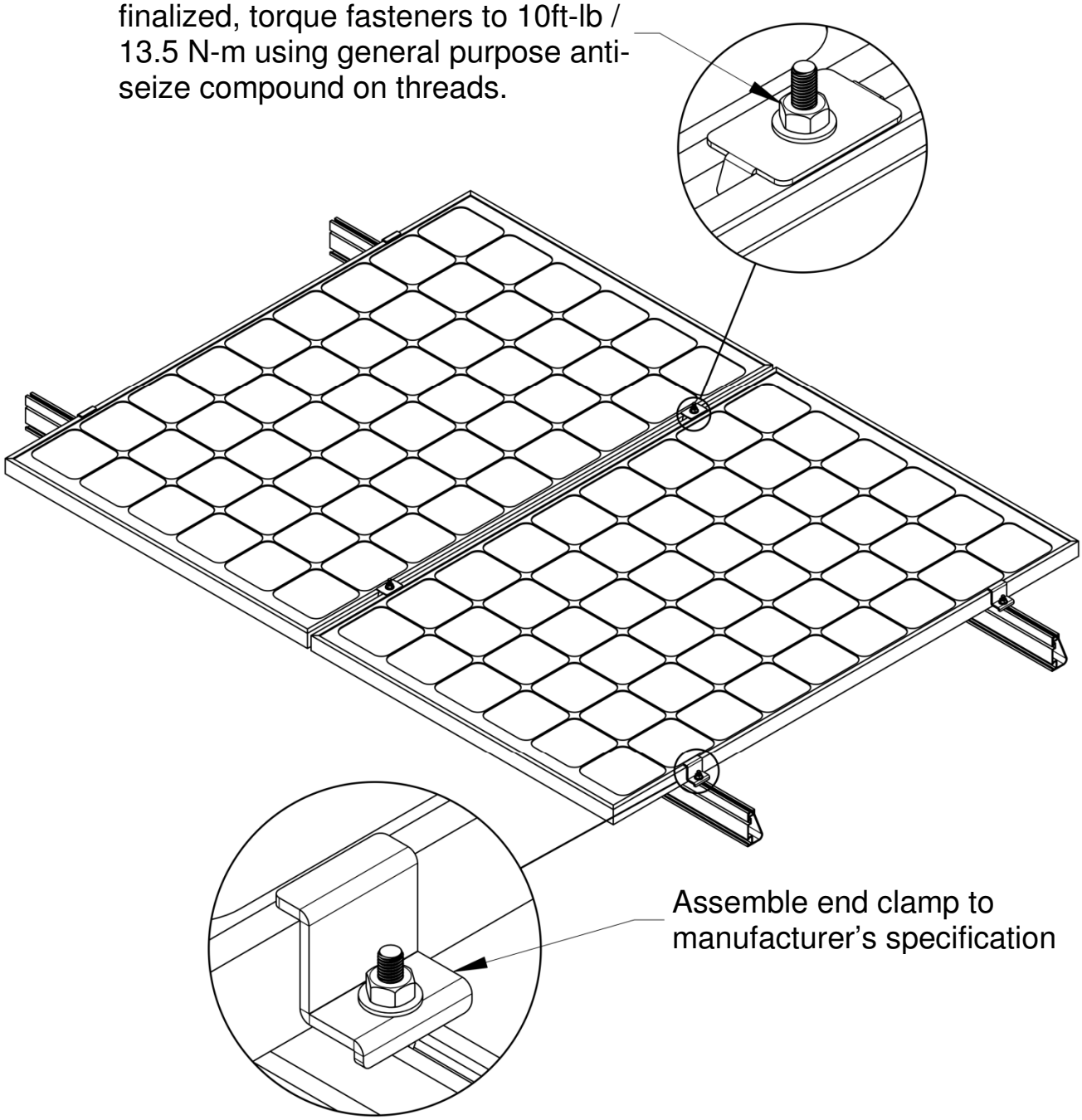
To correctly install mid clamp assembly, ensure that the bolt is perpendicular to the mounting rail. To correctly install WEEB-DMC, ensure that both sides of the solar modules are completely positioned against the mid-clamp. Refer to WEEB compatibility page for illustrations. Visually check that WEEBs are properly positioned.

Important note:

WEEBs are for SINGLE USE ONLY! Do not torque fasteners down if position of solar modules is not finalized. Only slightly tighten fasteners to keep modules in place.

④

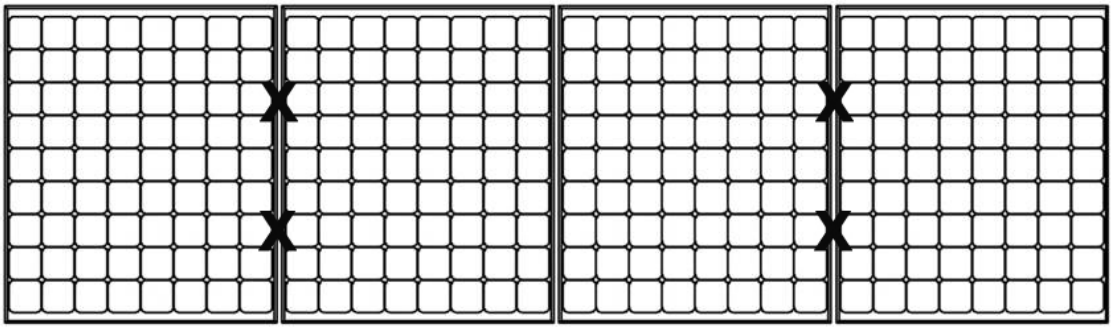
When position of solar modules is finalized, torque fasteners to 10ft-lb / 13.5 N-m using general purpose anti-seize compound on threads.



Assemble end clamp to manufacturer's specification

⑤ WEEB-DMC LAYOUT

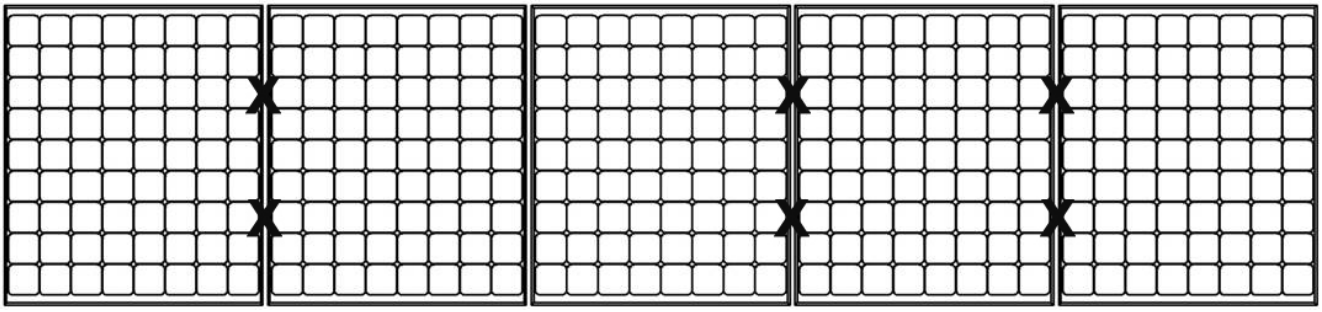
EVEN NUMBER OF MODULES IN ROW



X DENOTES PLACES TO INSTALL WEEB-DMC

C X R = 4 X 1
WEEB-DMC NEEDED = C X R = 4 X 1 = 4

ODD NUMBER OF MODULES IN ROW



X DENOTES PLACES TO INSTALL WEEB-DMC

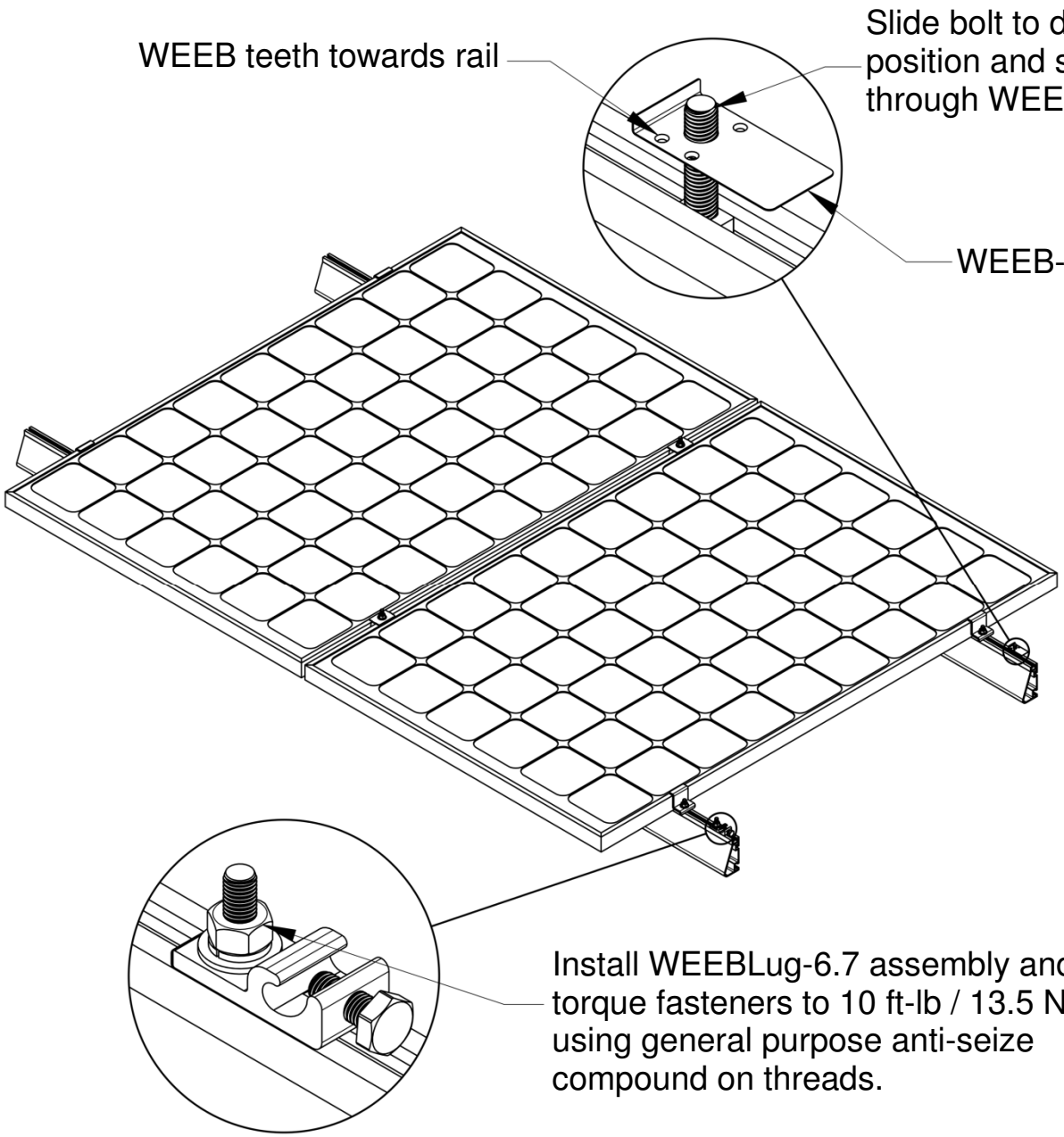
C X R = 5 X 1
WEEB-DMC NEEDED = [C+1] X R = [5+1] X 1 = 6

Note:

When replacing a single faulty module, also remove the adjacent module which contacts the same WEEBs as the faulty module. This will ensure that there are never ungrounded modules in the array.

WEEBLUG ASSEMBLY

⑥

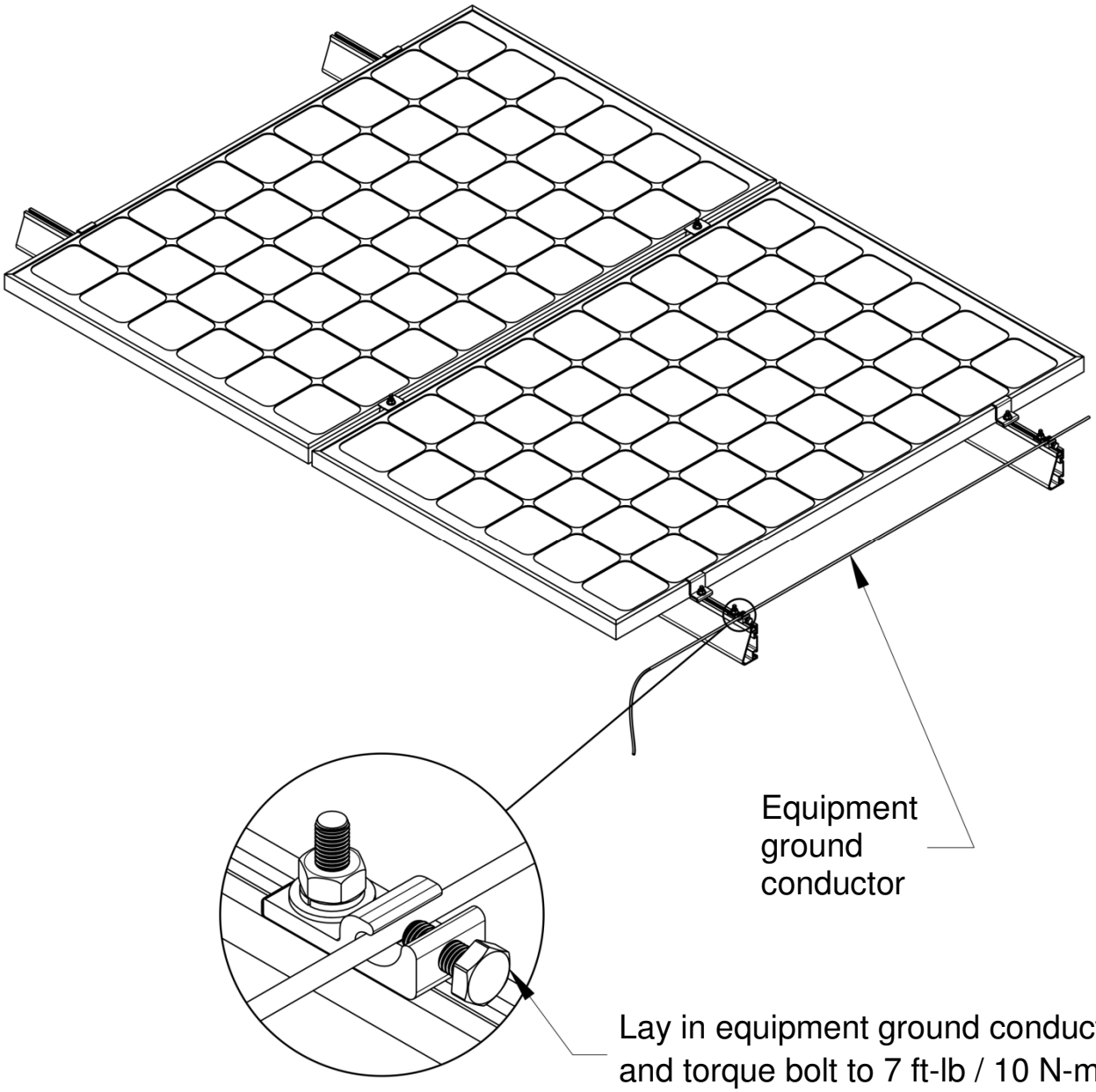


Important note:

1. **WEEB-6.7 that sits under the WEEBLug is for SINGLE USE ONLY! Ensure position is correct before tightening.**
2. **The WEEBLug-6.7 may be used with a maximum equipment ground wire of 6 AWG.**

GROUND CONDUCTOR ASSEMBLY

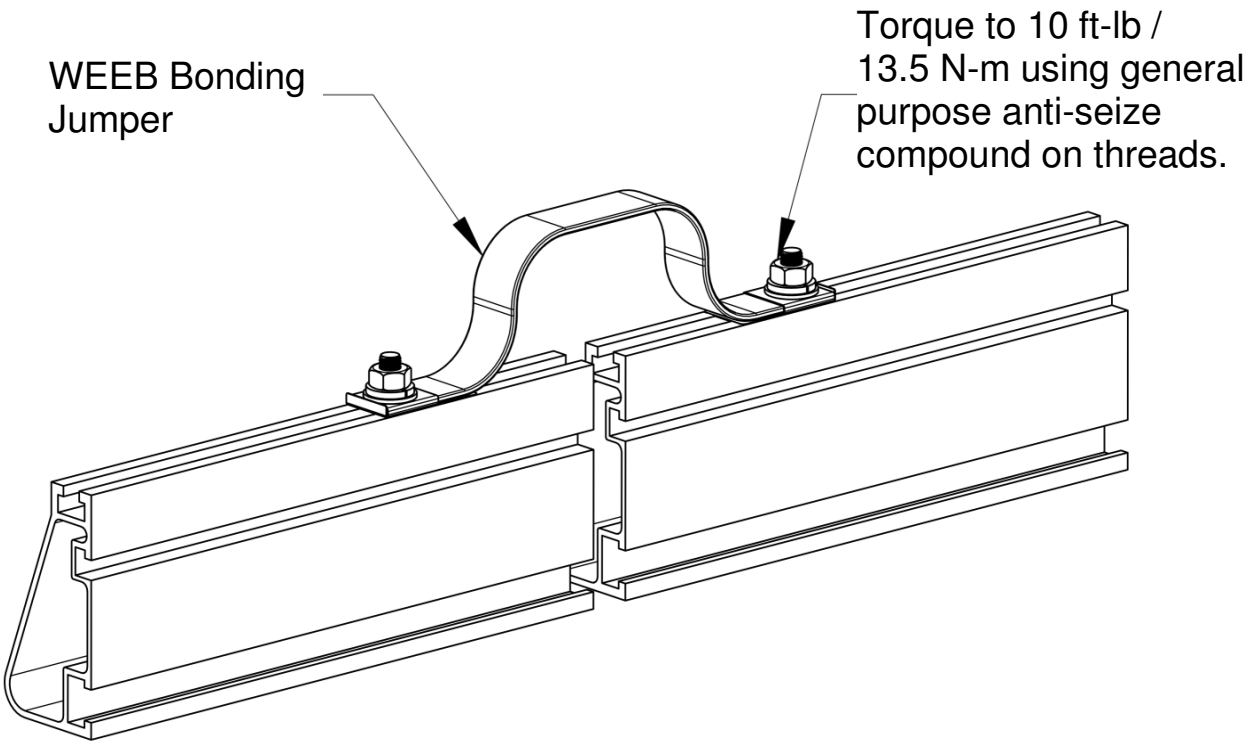
⑦

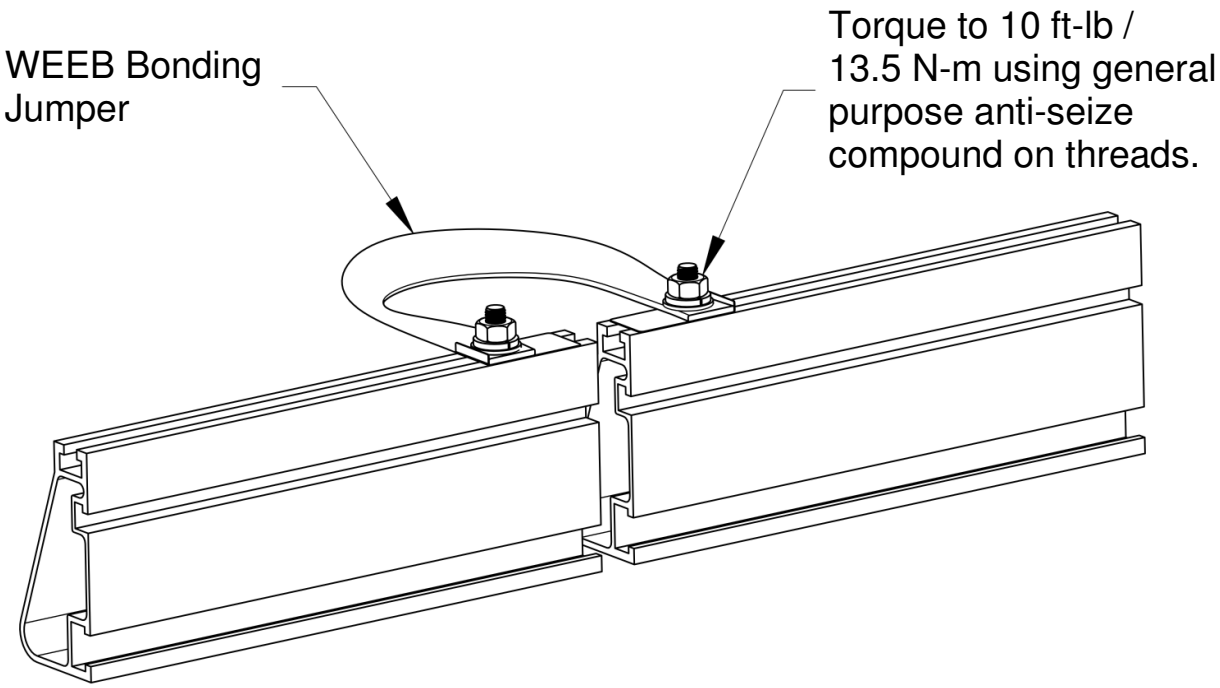


WEEB BONDING JUMPER-6.7 ASSEMBLY

⑧

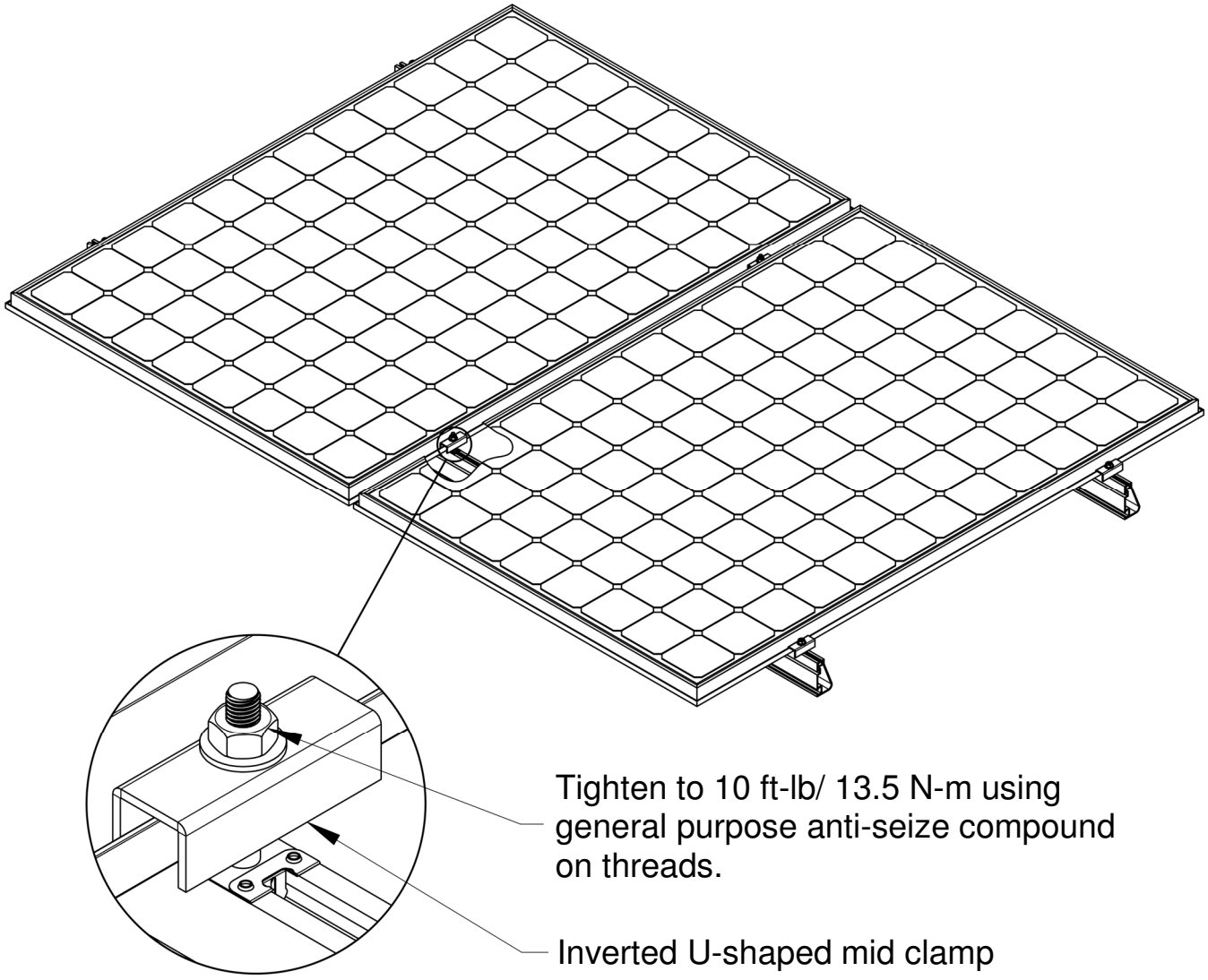
The flexible WEEB Bonding Jumper can be mounted on all rail splices including expansion joints in different ways shown below.





Route WEEB Bonding Jumper as shown above if the edge of solar module lands between two splice rails.

LOW LIPPED MODULE INSTALLATION



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Application Note

Compatible Racking Makes/Models for Mounting Enphase Microinverters

Purpose

This document is not intended to be an exclusive list of racking manufacturers. It lists products that have been verified either through field installations or the evaluation of actual racking samples in the Enphase mechanical lab. Section 1 lists products that work without modification, using the racking manufacturer's standard hardware. Section 2 includes products that are known to work after modification or by adding a custom adapter. Section 3 lists manufacturers that are shipping the Enphase Microinverter as part of a factory assembled proprietary racking/module solution.

Grounding Options

The ground clamp provided on the mounting flange of the Enphase Microinverter accepts #10 through #6 AWG grounding electrode conductors. As an alternative to installing a continuous grounding electrode conductor connected to each Microinverter chassis, a grounding washer may be used to ground the Microinverter to grounded racking. CSA recently completed the evaluation and approval of the Wiley Electronics "WEEB" grounding washers for use with the Enphase Microinverter. Where the compatible racking models have listed grounding washers available, the Wiley Electronics part numbers have been included in the tables below.

Section 1 - No Modification Required

AEE

Module Rail	Fastener Information	Grounding Washer
SnapNRack	Slide nut with 5/16 hex head bolt	WEEB-PMC

Conergy

Module Rail	Fastener Information	Grounding Washer
Suntop	Quickstone slide nut with M8 socket head cap screw	WEEB-CMC

Direct Power and Water

Module Rail	Fastener Information	Grounding Washer
Power Rail	¼" hex head bolt, washer, nut, for top rail mount	WEEB-DMC

IronRidge

Module Rail	Fastener Information	Grounding Washer
Light Rail XRL	¼" hex head bolt, washer, nut, for top rail mount	WEEB-DMC
Standard Rail XRS	¼" hex head bolt, washer, nut, for top rail mount	WEEB-DMC

Krannich Solar

Module Rail	Fastener Information	Grounding Washer
K2 Systems	Slide nut with M8 socket head cap screw	WEEB-KMC

mounts4solar

Module Rail	Fastener Information	Grounding Washer
Rail 6.0	M8 SS Hammer Head Bolt	

NCP Solar

Module Rail	Fastener Information	Grounding Washer
	Slide nut with 5/16" socket head cap screw	WEEB-11.5

ProSolar

Module Rail	Fastener Information	Grounding Washer
Rooftrac	Slide nut with 5/16" hex head bolt	WEEB-PMC

Schuco

Module Rail	Fastener Information	Grounding Washer
SolarEZ	ezUniversal Screws (M8x14) ezAnchor Blocks	WEEB-SMC

Sollega

Module Rail	Fastener Information	Grounding Washer
InstaRack	Top Spring Nut with 5/16" hex head bolt	WEEB-DMC

Unistrut

Module Rail	Fastener Information	Grounding Washer
1-5/8", 1-1/4", 13/16", metal framing system	Channel nut with either 1/4" or 5/16" hex head bolt	

Unirac

Module Rail	Fastener Information	Grounding Washer
Solarmount Light	¼" hex head bolt, washer, nut, for top rail mount	WEEB-DMC
Solarmount Standard	¼" hex head bolt, washer, nut, for top rail mount	WEEB-DMC
Solarmount HD	¼" hex head bolt, washer, nut, for top rail mount	WEEB-DMC
Clicksys	Enphase mounting kit – 008010M-0024	

Section 2 – Modification or Custom Adapter Required

Unirac Sunframe

The Unirac Sunframe racking system secures the PV modules with a cap strip along the entire top edge of the racking instead of a typical bolt and clamp bracket arrangement. The Enphase Microinverters can be attached to the racking flange that supports the underside of the PV module by adding mounting holes and a flat adapter plate for the microinverter to attach to.

Sunlink

When ordering a Sunlink Tilt Access™ system, specify that it is for an Enphase Microinverter installation. Sunlink will add microinverter mounting holes to the "Spar" extrusion. The mounting holes would be located at per module spacing for the M190, M210 microinverters, or at every other module spacing for the D380.

Section 3 – Factory Installed Assemblies

Akeena Andalay

The Akeena Andalay system makes use of a proprietary PV module frame that allows the PV modules to be assembled to each other without the use of standard module racking. The Enphase Microinverter is factory mounted directly to the underside of the PV module frame and shipped as a one PV module, one Microinverter assembly.

Ready Solar

The Ready Solar "Solar in a Box" system makes use of a proprietary PV module frame weldment that supports 3 PV modules per frame. The Enphase Microinverters are factory installed to a rail behind the modules and shipped as part of a complete 3 PV module, frame, Microinverter assembly.

Solar Red

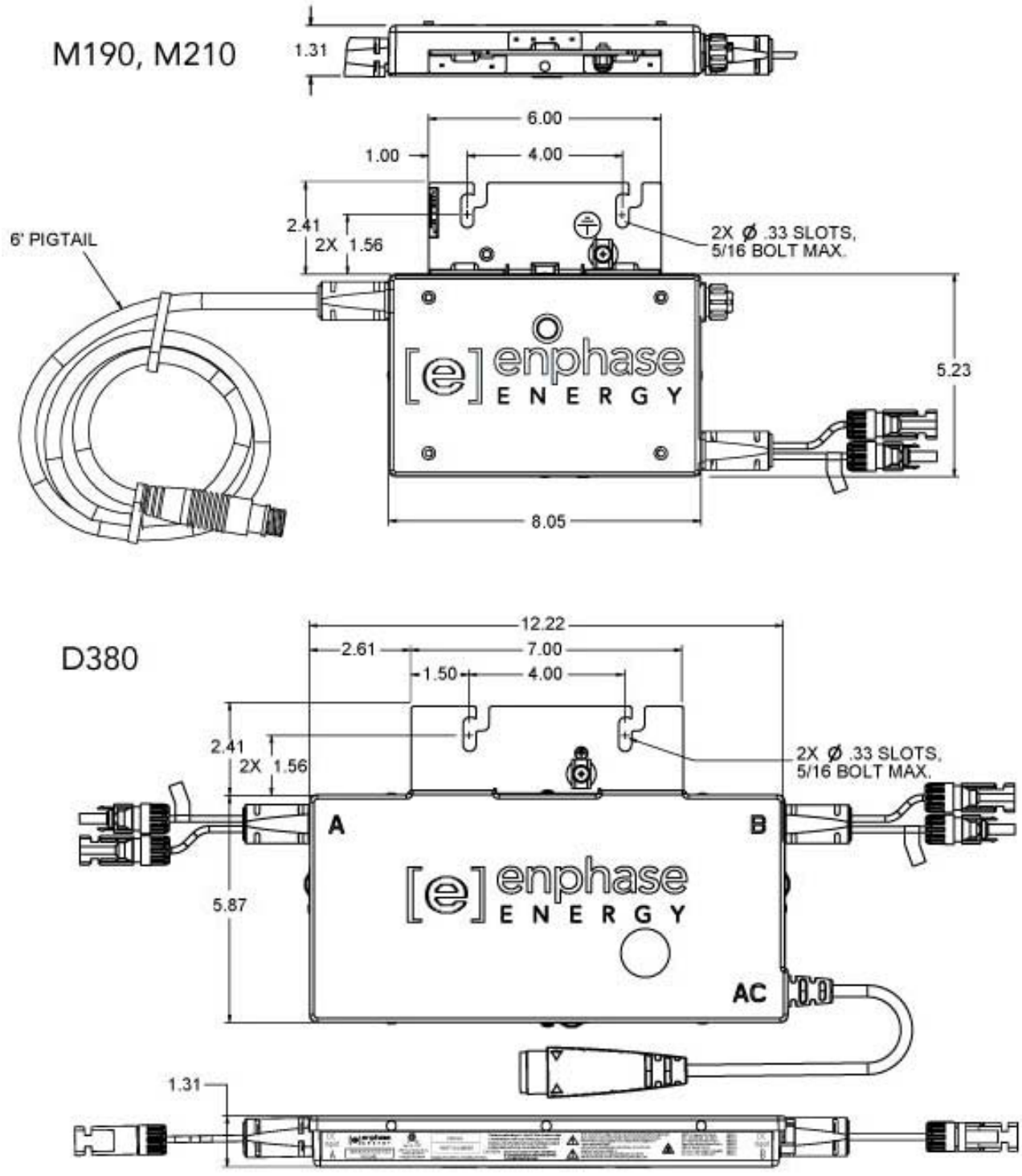
The Solar Red PV module mounting system makes use of proprietary brackets that are factory mounted to standard PV module frames and mate to a proprietary roof bracket. The Enphase Microinverter is factory mounted to the "Panel Lower Mount" and ships as part of a PV module, panel lower mount, panel locking mechanism assembly.

Zep Solar

The Zep Solar system makes use of a proprietary PV module frame that allows the PV modules to be assembled to each other without the use of standard module racking. The Enphase Microinverter is factory mounted directly to the underside of the PV module frame and shipped as a one PV module, one Microinverter assembly.

M190, M210, D380 Dimensions

If a specific racking model is not listed in this document, the drawing below can be used to verify compatibility.



We continue to evaluate racking models for compatibility. Please check the Enphase Energy website for product updates and announcements or contact Customer Service regarding a specific racking compatibility:

Enphase Energy website: http://www.enphaseenergy.com

Enphase Customer Service:
http://www.enphaseenergy.com/support/technicalsupport.cfm

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Advancing Renewable Technology

Frequently Asked Inspection Questions

What is a WEEB?
The WEEB (Washer, Electrical Equipment Bond) is the first production part specifically intended for use in grounding photovoltaic systems. There is a family of WEEB parts, one for each kind of photovoltaic mounting system. The WEEBs are used to bond photovoltaic modules to the mounting structure. A ground is connected to the resulting composite structure so that the photovoltaic modules are also grounded. This is more technically described in NEC sections 250.136 and 250.134 and discussed at the company website, http://www.we-llc.com/WEEB_nec.html.

Are WEEBs listed?
Yes, all WEEBS meet ANSI/UL 467, standard for grounding and bonding equipment. Testing was performed by Intertek ETL. The WEEB are listed to US and Canadian standards. A copy of the certificate is available online at http://www.we-llc.com/PDF/ETL mark.pdf

Why UL 467 and not UL 1703, standard for photovoltaic modules?
ANSI/UL 1703 only covers photovoltaic modules. Since the WEEB parts involve both module and mounting system, the more general standard, ANSI/UL 467 is required. Also, since ANSI/UL 467 was written with AC systems in mind it is a much more severe specification. All WEEBs are tested to carry a current of 1530 Amperes for 6 seconds. This is much more than any photovoltaic module can source and is why the WEEBs offer better lightning protection than previous grounding methods.

Why not just use the commonly available grounding lugs?
The lugs are not listed for use in the manner they are commonly installed.

One popular method of grounding photovoltaic modules is to attach a lug to each module, then run a ground conductor between all the lugs. Ilsco and Burndy make a direct burial rated lug, listed to ANSI/UL 467 which is often used. In testing to ANSI/UL 467 for these lugs, the lugs are bolted to a steel plate. The majority of conduction is through the lug and not through the mounting bolt. Some installers instead use a #8 stainless steel screw to mount the lugs and rely on the screw to conduct current from the top of the lug, through the screw, into the module. The NEC does not permit a conductor to be other than copper or aluminum. One might consider the lug/screw combination to be one part; however, the screw is not provided by the lug manufacturer but by third party suppliers who have not had the lug/screw combination part listed.

Testing at Wiley Electronics LLC shows that if the third part suppliers were to have the lug/screw combination parts tested to ANSI/UL 467, they would only be rated for use with a 10 AWG wire maximum. This limitation is due to the high resistance of the stainless steel screw.

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How can an installation using WEEBs be verified?

We suggest measuring electrical resistance. This directly verifies the ground connection without the need for visual inspection. We recommend using an ohm-meter set to its lowest scale. Safety pins are a convenient extension to the ohm-meter leads. The sharp points can penetrate non-conductive aluminum oxide layers and be easily stored.

1. Verify module frames are connected

a) Select two modules at random.

b) Verify that the ohm-meter and probes are functioning.

Scratch through the anodized layer of the first module frame at two points and verify that continuity exists between the two points. Repeat for a second module frame.

c) Verify continuity between the scratched points of the two module frames.

d) Repeat steps (a) – (d) for a statistically significant number of other pairs of modules.

2. Verify modules are connected to mounting rails

a) Select a module and mounting rail at random.

b) Verify that the ohm-meter and probes are functioning.

Scratch through the anodized layer of the module at two points and verify that continuity exists between the two points. Repeat for the mounting rail.

c) Verify continuity between the scratched points on the module and mounting rail.

d) Repeat steps (a) – (c) for a statistically significant number of other modules and mounting rails.

3. Verify mounting rail is grounded

a) Select a rail at random.

b) Verify that the ohm-meter and probes are functioning.

Scratch through the anodized layer of the mounting rail at two points and verify that continuity exists between the two points.

c) Verify continuity between one of the scratched points and the equipment ground conductor.

d) Repeat steps (a) – (c) for a statistically significant number of other mounting rails.

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Servicing a grounded array

Section 60.48 of the National Electric Code states that

“Where the removal of equipment disconnects the bonding connection between the grounding electrode conductor and exposed conducting surfaces in the photovoltaic source or output circuit equipment, a bonding jumper shall be installed while the equipment is removed.”

In rail mounted systems, each WEEB connects to two modules as is shown in figure 1. If the two WEEBs between the modules are removed in order to remove one of the modules, then the ground to the other module would be disturbed. To prevent this from happening, before a module is serviced, a new WEEB should be added at the far end of the module which is not being removed. This is shown as a circle in the figure. The additional WEEB connection will ensure that ground is present during the service operation.

AUTHORIZATION TO MARK

This authorizes the application of the Certification Mark(s) shown below to the models described in the Product(s) Covered section when made in accordance with the conditions set forth in the Certification Agreement and Listing Report. This authorization also applies to multiple listee model(s) identified on the correlation page of the Listing Report.

This document is the property of Intertek Testing Services and is not transferable. The certification mark(s) may be applied only at the location of the Party Authorized To Apply Mark.

Control Number: 3098177 **Authorized by:** for Michelle Lake

William T. Starr, Certification Manager

This document supersedes all previous Authorizations to Mark for the noted Report Number.

Intertek Testing Services NA Inc.
165 Main Street, Cortland, NY 13045
Telephone 800-345-3851 or 607-753-6711 Fax 607-756-6699

Applicant:	Wiley Electronics, LLC	**Manufacturer:**	Wiley Electronics, LLC
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Email:		**Email:**	

Party Authorized To Apply Mark: Same as Manufacturer
Report Issuing Office: Cortland, NY

Standard(s):	UL Standard for Safety for Grounding and Bonding Equipment, UL 467, 9th Edition and Grounding and Bonding Equipment, CSA C22.2 #41, 5th Edition, September 2007
Product :	Bonding Devices
Models:	Bonding Devices Model numbers WEEB-9.5, WEEB-9.5NL, WEEB-CL, WEEBL-6.7, WEEBL-8.2, WEEBL-8.0, WEEB-DMC, WEEB-PMC, WEEB-CMC, WEEB-SMC, WEEB-Bonding Jumper-6.7, WEEB-Bonding Jumper-8.0, WEEB-Bonding Jumper-8.2, WEEB-KMC, WEEB-UGC2, WEEB-UMC, WEEB-DPF, WEEB-11.5, WEEBWMC, WEEB-CSG and Double Wedge Solar Giant.