



SolarMountTM (E)volution

SOLARMOUNT (E)VOLUTION: THE BEST JUST GOT BETTER.

Engineering, Excellence, and Ease.

Performance Engineered for versatility and reduced installation time, SolarMount (E)volution offers unprecedented speed, ease, and flexibility.



INSTRUCTIONS FOR USERS
AND INSTALLATION GUIDE

 **UNIRAC[®]**
A HILTI GROUP COMPANY

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SOLARMOUNT (E)VOLUTION COMPONENTS



Beam

SolarMount (E)volution Beam = 2.2" Height



End Clamp

- (1) 5/16" - 8 Stainless steel serrated head hex bolt (minimum tensile strength - 70 ksi) Install to a torque of 10 ft-lbs
- (1) End Clamp



Flange Connection

- (1) 5/16" x 3-1/2" Zinc Plated Lag Bolt
- (1) Stainless steel washer
- (1) Flange Connector
- (1) Clip



Mid Clamp

- (1) 5/16" - 8 Stainless steel serrated head hex bolt (minimum tensile strength - 70 ksi) Install to a torque of 10 ft-lbs
- (1) Mid Clamp

Clamp Bolt Length (Inches)	Module Height (Inches)
1.25	0.95 to 1.60
1.75	1.45 to 2.00



Beam Splice / Lateral Retainer

- (4) Self-drilling screws (1-1/4"-20 hex washer head stainless steel: 70 ksi minimum tensile strength)
- (1) Beam Splice



OPTIONAL COMPONENTS



2-Piece Aluminum Standoff

- (2) 5/16 x 3-1/2" Zinc Plated Lag Bolt
- (1) 1 Flange Connection
- (1) 3/8" x 3/4" Hex Head Bolt
- (1) 3/8" x 1-3/4" EPDM Washer



PV Quick Mount

- (1) 5/16" x 3-1/2" Stainless Steel Lag Bolt
- (1) 5/16" Sealing Washer
- (1) 5/16" EPDM Washer
- (1) Flange Connection



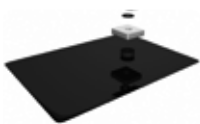
CreoTecc Tile Hook (Top)

- (2) 5/16" x 3-1/2" Zinc Plated Lag Bolt
- (1) 3/8-16 x 3/4" Hex Head Bolt
- (1) 3/8" Hex Head Nut



Leveling Components

- (1) Adjustable set of Leveling Components



Unirac Flat Flashing

- (1) 12" x 8" flashing with attached gasket
- (1) Aluminum square compression plate



ACECLAMP JR - Standing Seam Metal Roof Mounting Solution

PAGE

PLANNING YOUR SOLARMOUNT (E)VOLUTION INSTALL

Pre-Install Considerations

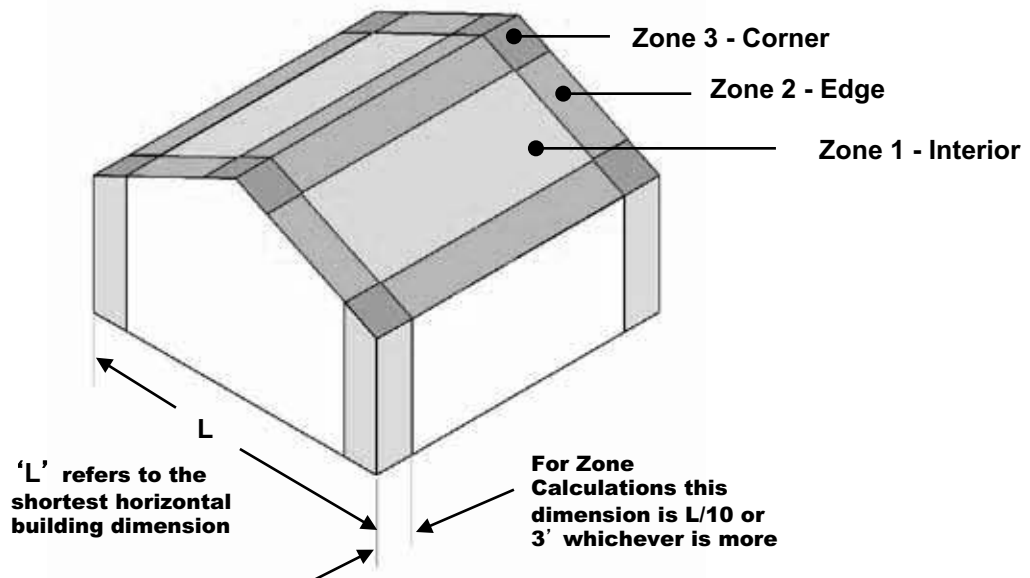
Unirac recommends the contractor or installer review all sections of this manual as early as possible in the design and planning process. Addressing these items early on will help in the design process and ensure a trouble free application.

1. Do a structural analysis of the roof to confirm it will support the design loads and weight of the planned installation. Also review the roof attachment inspection guidelines for your area.
2. Check the module manufacturer's installation guidelines to confirm warranty compliant module clamping before planning the array layout.
3. Make a draft plan of the roof and the planned layout to confirm the occupied roof area and address any roof obstacles or shading issues.

Roof Zones and Design Considerations

Zone 1 is generally a preferred install location due to greater span allowances and fewer attachments. Zones 2 & 3 are allowable, but shorter spans (more attachments) are generally required to address the design loads in those areas.

Plan the layout so the array does not overhang the edge of the roof or extend past the roof peak in any location! These deviations will generally not meet code requirements.



PLANNING YOUR SOLARMOUNT (E)VOLUTION INSTALL

⚠ NOTE: DO NOT attach rail directly to roof without flashing, standoff, ACECLAMP JR., or tile hook. See **Roof Attachment Options** on Page 6.

The installation can be laid out with beams parallel to the rafters or perpendicular to the rafters. Note that SolarMount (E)volution Beams make excellent straight edges for doing layouts.

Center the installation area over the structural members as much as possible.

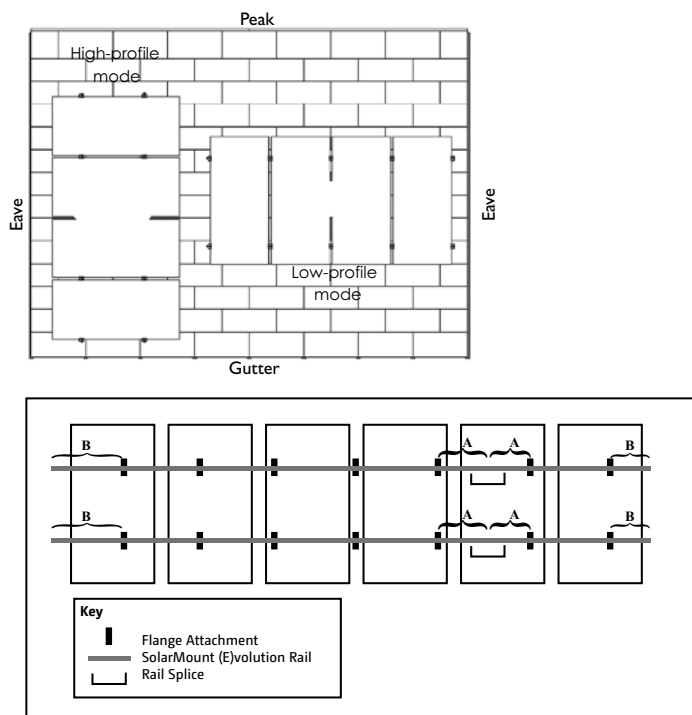
Leave enough room to safely move around the array during installation. Some building codes require minimum clearances around such installations, and the user should be directed to also check 'The Code'.

The width of the installation area equals the length of one module.

The length of the installation area is equal to:

- The total width of the modules,
- Plus 1 inch for each space between modules (for mid-clamp),
- Plus 3 inches (1-1/2 inch for each end clamps).

To speed installation, mark beam at approximate proper foot space before clicking connections to beam.



Dimension A: Beam cantilever limits apply at spliced overhangs.

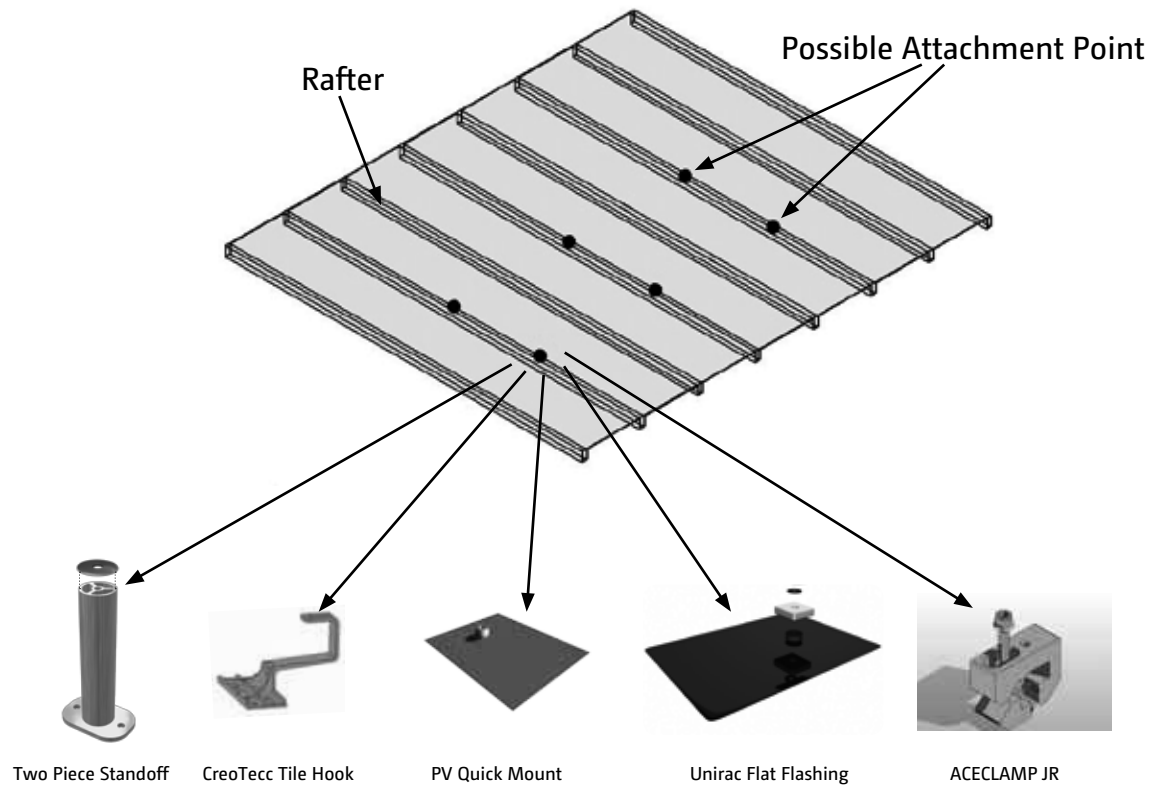
Note: There must be a minimum of TWO attachments on either side of a splice.

Dimension B: Maximum cantilever cannot exceed 1/3 the max span for your installation

1. Install Applicable Roof Attachment Option

Roof Attachment Options

There are many attachment methods available. Unirac recommends always attaching to a structural roof member such as a rafter. **Best practice requires that you use one of the attachment options below.**

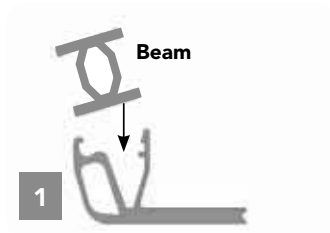


2. Snap Beam to Flange Connection

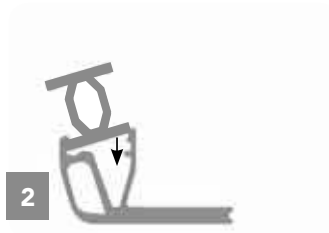


⚠ NOTE: Always engage the double-wall side before clicking connection into beam.
See below.

NOTE: Do not use connection if the engagement features on the connection are bent, damaged, or obstructed by debris.



1
insert flange of beam into
double-wall side of attachment



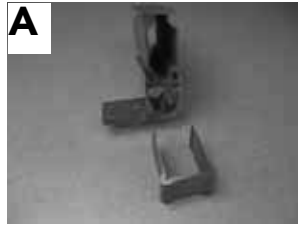
2
Rotate beam into attachment



3
Beam is secured when an
audible “click” occurs

⚠ NOTE: DO NOT re-use flange connections.

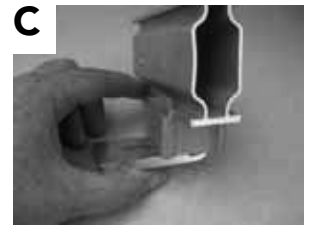
3. Snap Clip to Flange Connection



The clip is used to secure the attachment



Insert the clip onto either side of the attachment



Ensure clip is fully inserted into the attachment



4. If necessary, install Beam Splices using self-drilling screws




Retainer/splice may be installed on the top or bottom flange of the beam. At least 1 retainer must be placed over an attachment for each run of beams





A drill driver may be used to install the self-drilling screws. Over-tightening the screws will result in stripped threads.

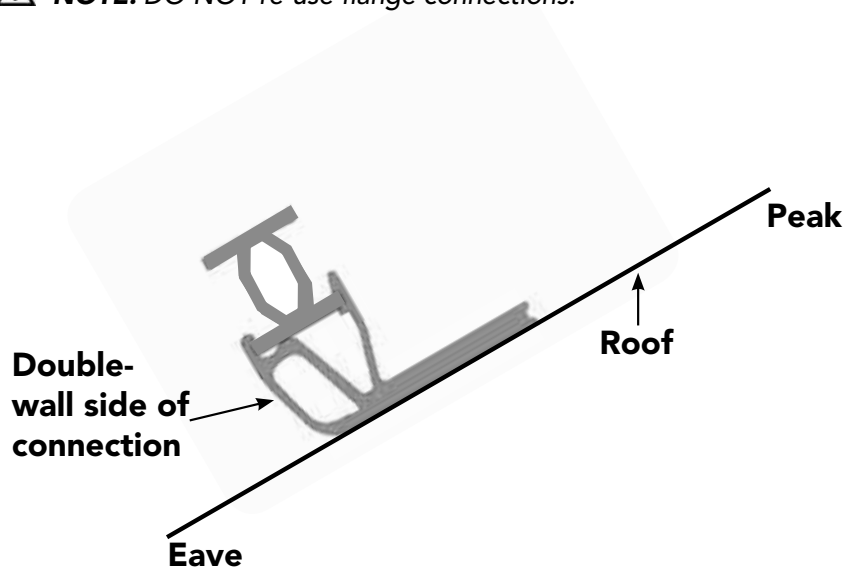
5. Loosely attach Flange Connections to roof attachments

 **NOTE:** DO NOT attach rail directly to roof without flashing, standoff, ACECLAMP JR., or tile hook. See *Roof Attachment Options* on Page 6.



 **NOTE:** When installing on pitched roof configurations, locate double-wall section of connection on the downhill side of roof slope.

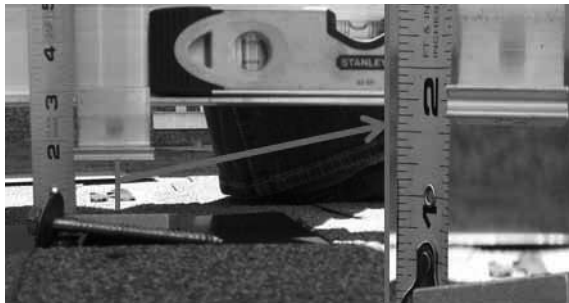
 **NOTE:** DO NOT re-use flange connections.



6. If leveling is needed, snap on Leveling Components. Tighten all connections to roof attachments



You can use a piece of SolarMount (E)volution rail to determine if leveling is needed.



There is about a one inch gap here. Leveling is needed.



Snap in Leveling Components as necessary. You can break them apart if needed.



Leveling complete. Tighten connection to roof attachment.

7. Install additional Beam Splices directly over Flange Connections to act as lateral retaining clips



⚠ NOTES ON THERMAL EXPANSION:

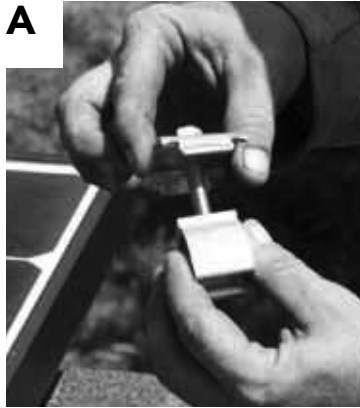
SOLARMOUNT (E)VOLUTION is designed to minimize the effects of thermal expansion by allowing the beams to expand and contract independently between connections and attachments. To minimize the effect of thermal expansion, restrict continuous beam lengths to 36 feet or three standard beam lengths.

⚠ NOTE ON SPLICES:

Please refer to technical datasheets for recommended distances between splices.

8. Install modules using Mid and End Clamps

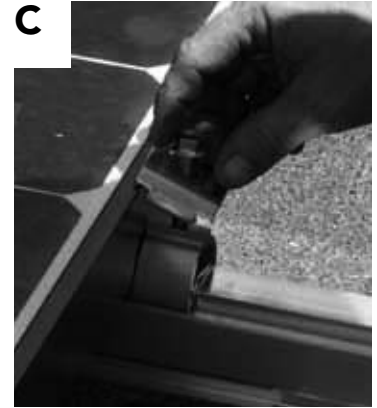
Mid Clamp



Ensure mid clamp is oriented properly with the “teeth” overhanging the module

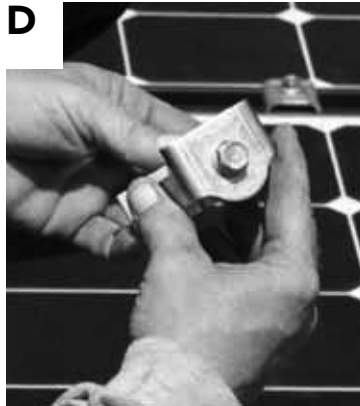


Install clamps as shown in figure 9A through 9C

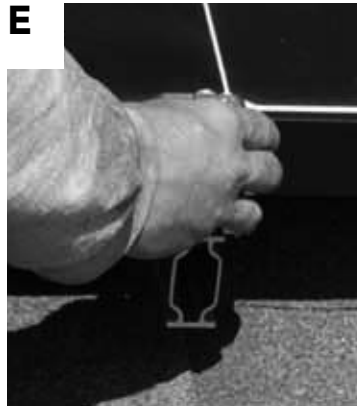


Slide both modules into place before tightening mid clamp

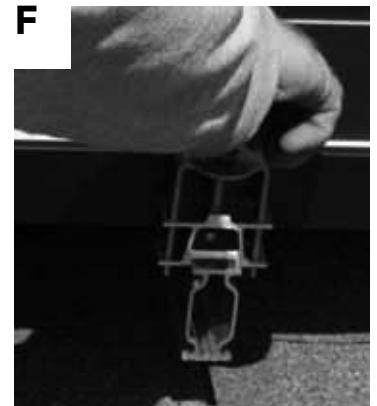
End Clamp



Ensure end clamp is oriented properly with the “teeth” overhanging the module



Slide end clamp over the end of beam



Tighten end clamp

ELECTRICAL CONSIDERATIONS:

SolarMount (E)volution is intended to be used with PV modules having a system voltage less than or equal to 600 VDC. A minimum 10 AWG copper grounding conductor should be used to ground the system, according to the National Electric Code and the authority having jurisdiction.

Bonding components compatible with SolarMount (E)volution:

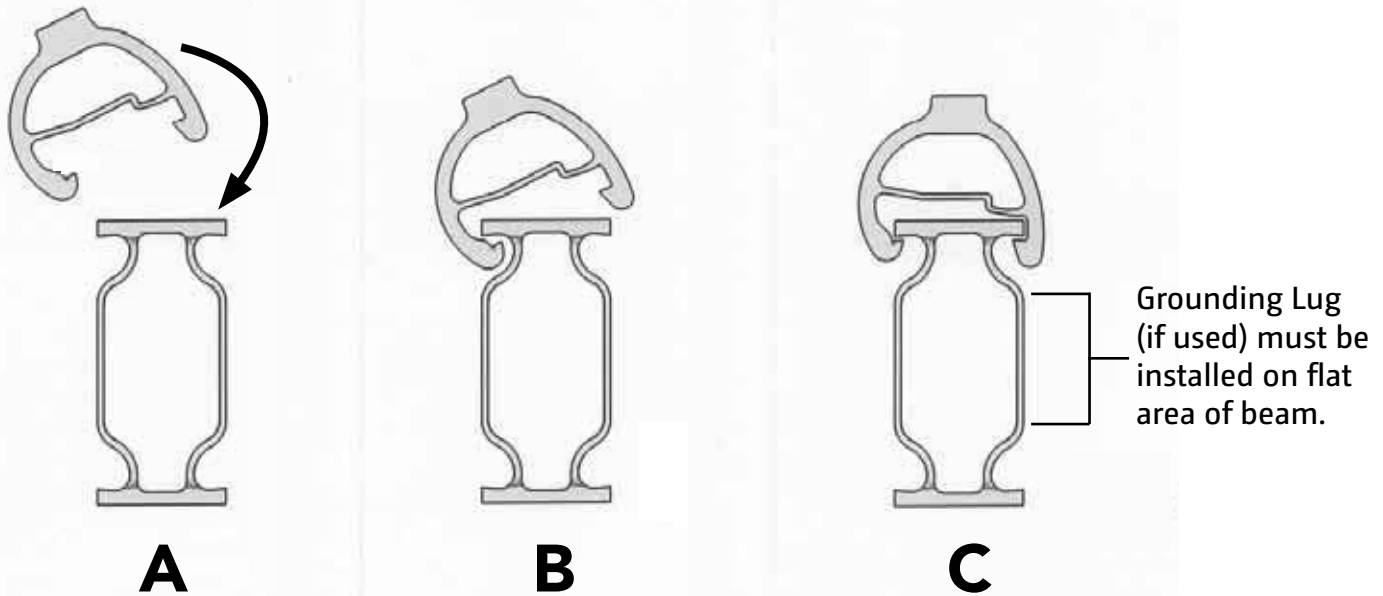
- **Wiley WEEBlug** (P/N 980011). Torque for 1/4" mounting hardware is 10 ft.-lbs.
- **IlSCO lay-in lug** (P/N GBL-4DB). Torque for 10-32 mounting hardware is 5 ft.-lbs.

SolarMount (E)volution Beams are anodized to AA-M12 or AA-M12C22A24.

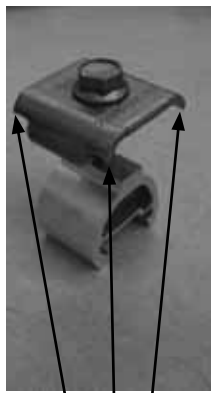
Modules should be secured with a minimum of four clamps. Mid clamps may be shared between two modules. The maximum length of installed PV module is 85".

The maximum module width and maximum distance between roof attachments are supplied in the engineering charts for SolarMount (E)volution.

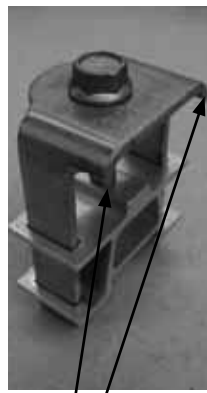
9. Clamp Installation Detail



⚠ NOTE ON MID AND END CLAMPS: Teeth on Mid and End Clamps provide module to module bonding as required by Underwriters Laboratory. A complete grounding solution must comply with local code and inspection requirements. See also ELECTRICAL CONSIDERATIONS on p. 12 and GROUNDING CONSIDERATIONS on p. 14.



Bonding Tooth

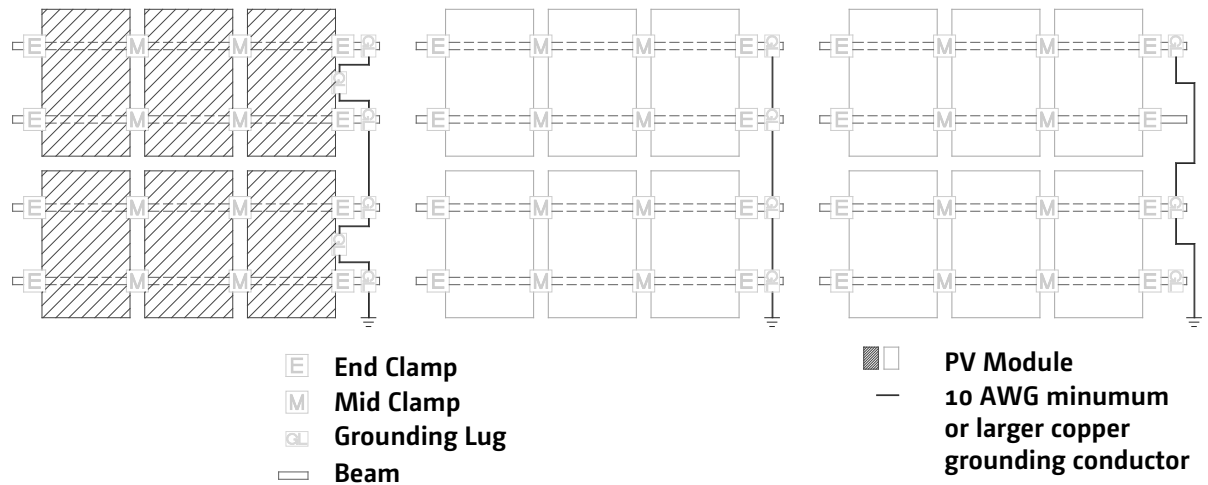


Bonding Tooth

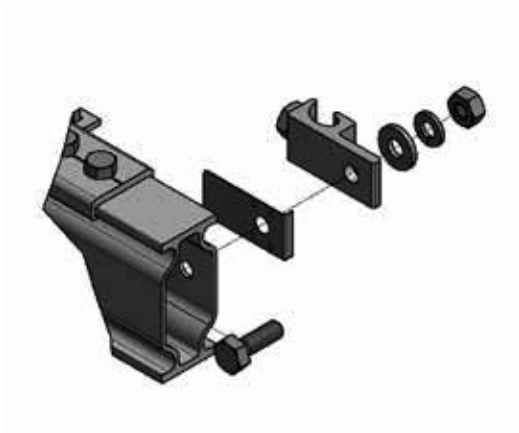
GROUNDING CONSIDERATIONS

Bonding and Grounding Diagram

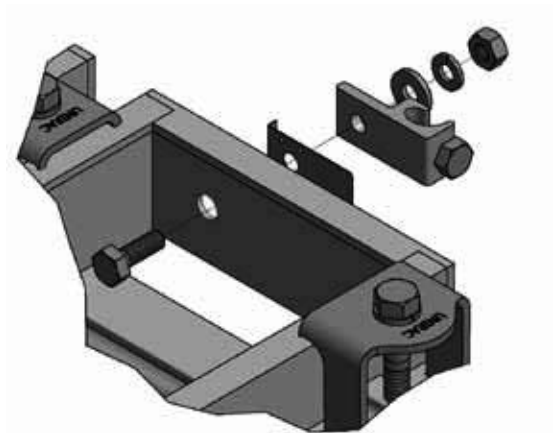
Left: Dark finish racking
Center: Mill finish, option 1
Right: Mill finish, option 2



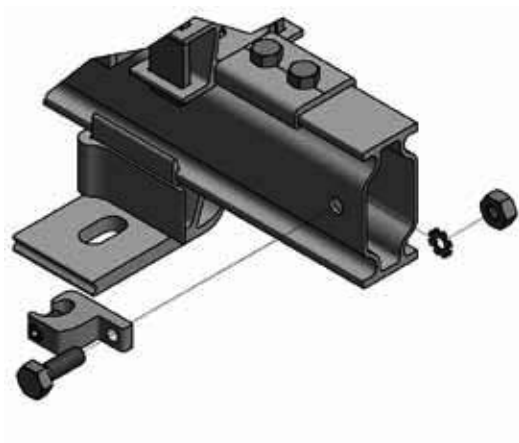
Installation of Lugs



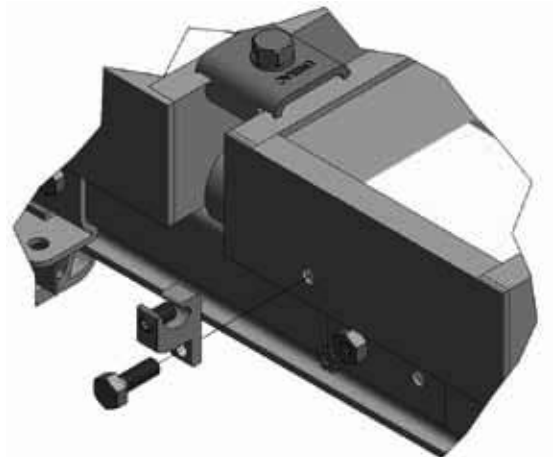
WEEB Lug on Beam



WEEB Lug on PV Module



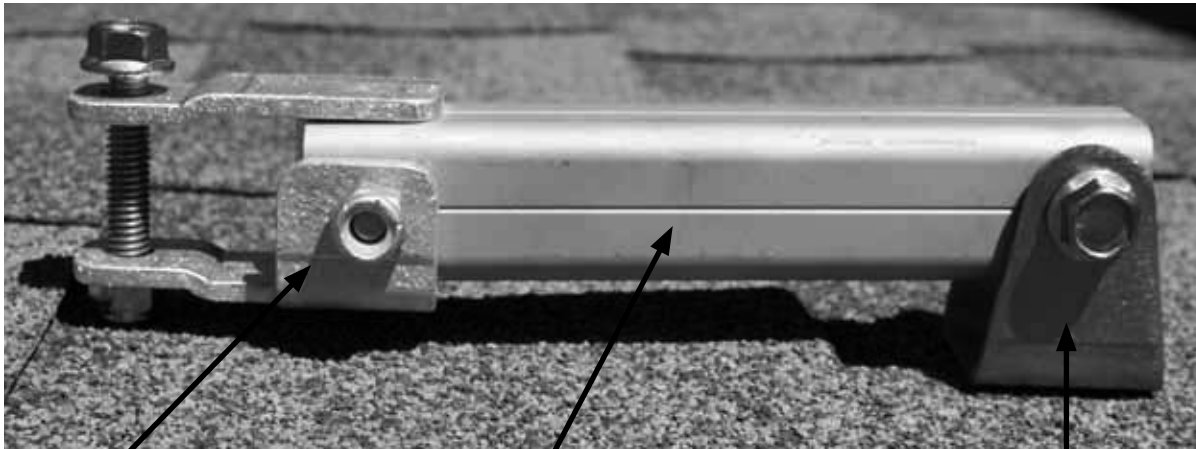
IlSCO Lug on Beam



IlSCO Lug on PV Module

TILT INSTALLATION OPTION

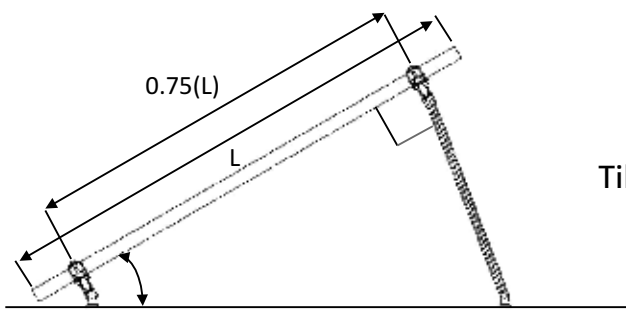
Tilt Leg Components



Cap

Tilt Leg

Foot



Tilt Geometry

L = Module Length perpendicular to rail

1. Attach Foot to all roof attachment points.

⚠ NOTE: DO NOT attach tilt leg directly to roof without appropriate flashing. See *Roof Attachment Options* on Page 6.



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- 2. Attach Cap to all lower Feet.
Attach Tilt Leg and Cap to all upper Feet.**



Lower Foot



Upper Foot

- 3. Insert SolarMount (E)volution Beam into Caps**



4. Mark and drill hole for fastening Beams to Caps

May remove Beam from Cap to make drilling easier, if necessary



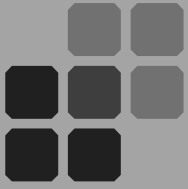
5. Fasten Beams to Caps



6. Install modules using Mid and End Clamps

See Pages 12-13 for details

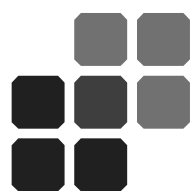




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