



Zep System II

PV Module Installation Manual



Table of Contents

1.0 > Introduction	4
2.0 > Safety Precautions	4
2.1 > General Safety	4
2.2 > Installation Safety	5
3.0 > Zep System II Overview	5
4.0 > System Design and Layout	8
4.1 > Code Compliance Certification and Tables	8
4.2 > Array Layout & Bill of Materials	10
5.0 > Mechanical Installation	13
5.1 > Mechanical Installation Requirements	13
5.2 > Mechanical Installation Preparation	13
5.3 > Roof Layout Procedure	14
5.4 > Prepare Roof for Front Row Leveling Feet	15
5.5 > Interlocking the First Module Pair	16
5.6 > Wiring and Wire Management	17
5.7 > Leveling Foot Installation	18
5.8 > Completing the First Row	19
5.9 > Leveling the Row	20
5.10 > Drop in and Pivot Lock Procedure	20
5.11 > Installing Additional Rows	22
5.12 > Final Array Wiring and Wire Management	23
5.13 > Installing an Interlock at a Thermal Break	23
6.0 > Electrical Installation	24
6.1 > Electrical Installation Requirements	24
6.2 > Grounding System Installation	24
7.0 > Maintenance and Troubleshooting	26
7.1 > Module Removal Procedure	26
8.0 > Technical Support	27
9.0 > Limited Warranty	28



1.0 > Introduction

This manual details installation procedures for the Zep System II PV Module Installation System (Zep System II) and provides important safety information that the installer should read carefully in its entirety prior to installation. Failure to follow these instructions may result in death, bodily injury or property damage. Correct installation of Zep System II components will ensure reliable structural connections and proper ground bond means throughout the array and from the array to the equipment grounding conductor(s).

The components detailed in this manual include the Interlock, the Leveling Foot, the Ground Zep, the Zep Wire Clip, the Zep Comp Mount and the Zep Compatible Solar Module (Module). The word "Module" as used in this manual will refer specifically to a Zep Compatible PV Module – a PV Module containing the patented Zep Groove frame design licensed by Zep Solar to the PV Module manufacturer. All components covered in this manual are protected by US patent #7,592,537 and/or multiple pending US & International patents.

The Interlock conforms to UL Standard 1703 and is Listed by Intertek (ETL) with Control Number 4000321. The Ground Zep conforms to UL Standard 467 and is Listed by Intertek (ETL) with Control Number 4000321.

2.0 > Safety Precautions

WARNING: All instructions in this Installation Manual and all instructions in the installation manual provided by the manufacturer of the Module should be read and understood before attempting to install Zep System II. The installer assumes all risk of personal injury or property damage that might occur during the installation and handling of the components.

2.1 > General Safety

1. All installations must be performed in compliance with all applicable regional and local codes, such as the latest National Electric Code (USA), Canadian Electric Code (Canada) or other national or international electrical standards.
 2. Follow all safety precautions detailed in this Installation Manual as well as the Module installation manual.
 3. Comply with all applicable OSHA or equivalent safety standards including but not limited to the proper use of regulation fall protection equipment.
 4. Do not perform any installations in wet or windy conditions.
-



2.2 > Installation Safety

1. Check applicable building codes or refer to a structural engineer to ensure that the structure upon which the Zep System is being installed can properly support the array under live load conditions.
2. Ensure that all lag screws or alternative methods of attachment have adequate pullout strength and shear capacity for the application.
3. The Zep System must be installed over a fire resistant roof covering rated for its application.
4. The Interlock, Leveling Foot, and Ground Zep should be installed only with the use of the Zep Tool or Flat Tool provided by Zep Solar.
5. During the installation, wear suitable protection such as non-slip construction gloves to protect your hands from injury from sharp edges.
6. Do not expose the Modules to excessive loads or deformation such as twisting or bending.

3.0 > Zep System II Overview

Zep System II offers an ultra rapid method for installing and electrically grounding solar arrays. In addition to the application-specific attachment hardware, an entire array can be installed with only three parts—the Interlock, the Leveling Foot, and the Ground Zep. Zep Solar also offers accessory items such as the Zep Comp Mount and Zep Wire Clip.

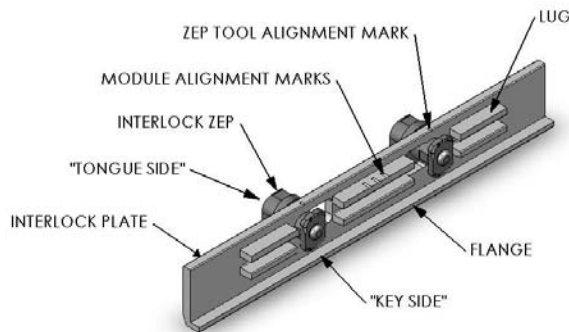


Figure 3.0A — Interlock

The Interlock installs in the nominal east-west dimension and provides both structural and ground bond connections in both east-west and north-south dimensions.

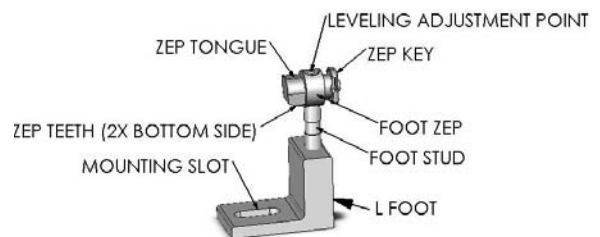


Figure 3.0B — Leveling Foot

The Leveling Foot installs into the Zep Grooves and resides at locations along the array's horizontal seams.

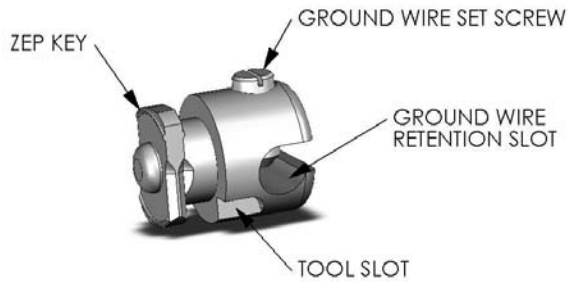


Figure 3.0C — Ground Zep

The Ground Zep rotates into the Zep Groove with a quarter turn and provides a ground bond connection from the array to the equipment grounding conductor(s).

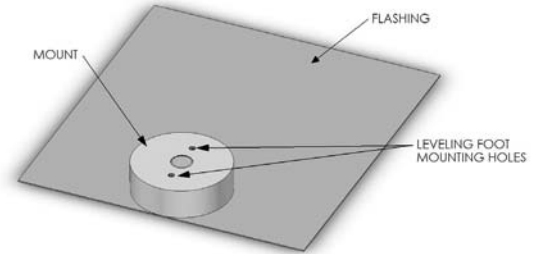


Figure 3.0E — Zep Comp Mount

The Zep Comp Mount provides a flashed attachment solution for composition shingle roofs. Refer to the Zep Comp Mount Installation Manual for installation instructions.



Figure 3.0D — Zep Wire Clip

The Zep Wire Clip snaps into the Zep Groove and provides a means for securing array wiring.



Zep systems can be installed in either landscape or in portrait orientation. Typical residential roofs have a high aspect ratio (length to width). As a result, typical roofs can accommodate larger arrays when installed in landscape orientation. Landscape installations therefore allow for more efficient use of space and can be installed faster and with greater spans between Interlocks.

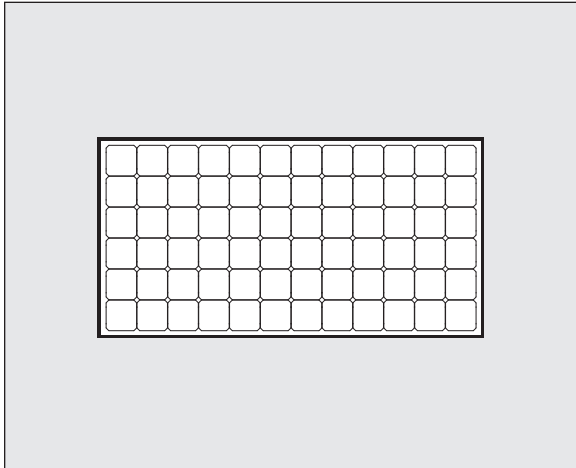


Figure 3.0F — Landscape Orientation

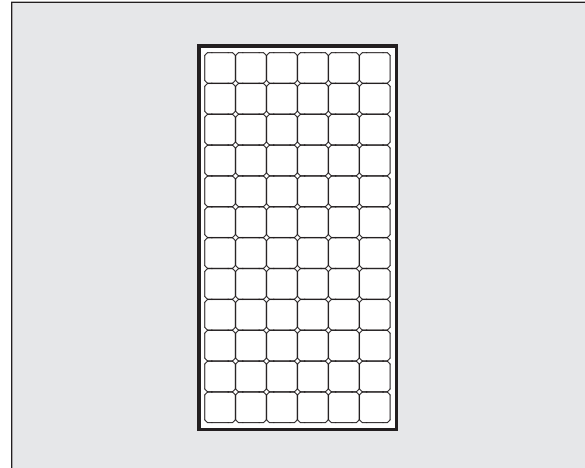


Figure 3.0G — Portrait Orientation

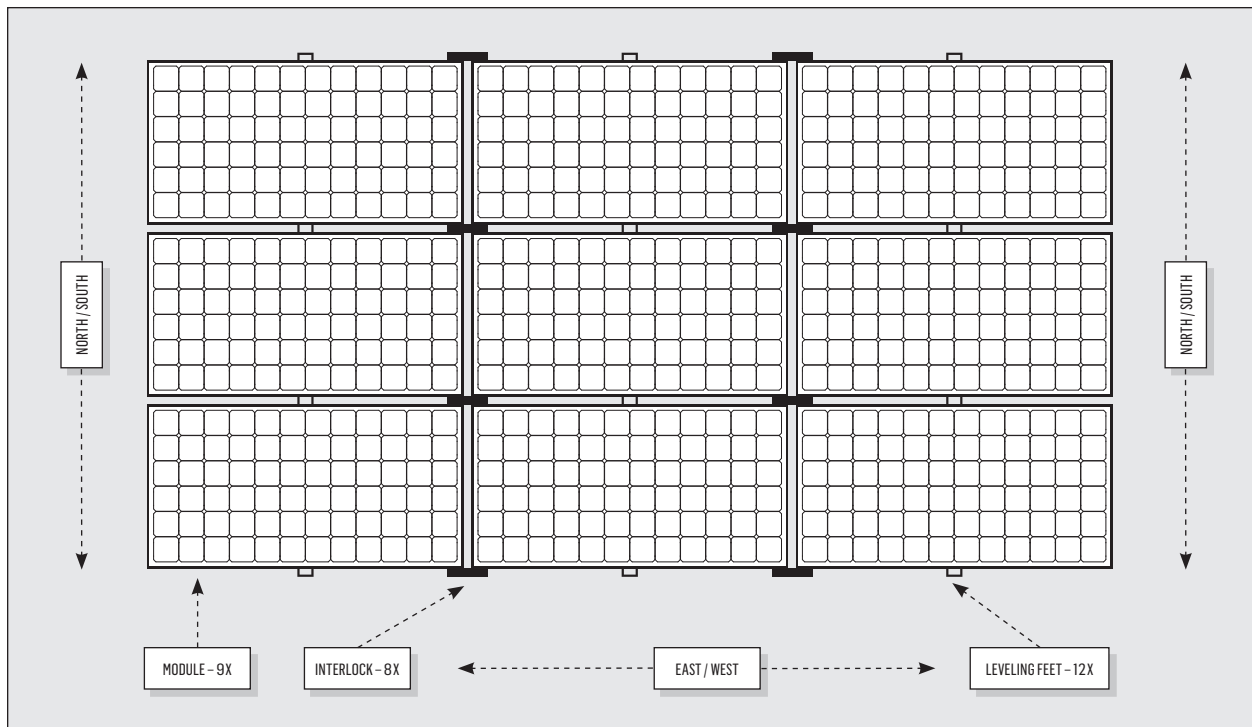


Figure 3.0H — Zep System Components in an Array

The array in the figure above consists of nine (9) Modules, eight (8) Interlocks, twelve (12) Leveling Feet and one (1) Ground Zep.

NOTE: Interlocks and Leveling Feet are always installed on the Module grooves running East-West.



An entire Zep array can be interconnected with the use of a single tool. Both the Zep Tool and the Flat Tool provide means for installing the Interlock, the Leveling Foot, and the Ground Zep. The Flat Tool provides a low-cost alternative to the Zep Tool and also functions to enable inter-Module removal. The Zep Tool can receive a T30 Torx bit for adjusting the height of the Leveling Feet.

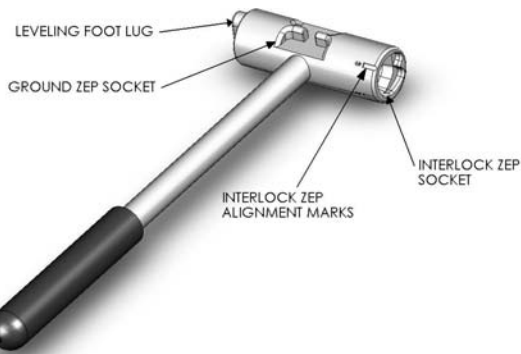


Figure 3.0I — Zep Tool



Figure 3.0J — Zep Flat Tool

4.0 > System Design and Layout

4.1 > Code Compliance Certification and Tables

Zep System II is in compliance with the structural requirements of the 2006 International Building Code and ASCE 7-05 based on the configurations and criteria provided in the Certification Letter and accompanying tables (go to: www.zepsolar.com/resources.html). These tables define the maximum leveling foot spacing requirements for a range of site-specific variables including Roof Pitch (Figure 4.1A), Wind Exposure Category (Figure 4.1B), Basic Wind Speed (www.windspeedbyzip.com or refer to your local jurisdiction), Roof Zone (Figure 4.1C), and Ground Snow Load (www.groundsnowloadbyzip.com or refer to your local jurisdiction). The tables assume that the Average Building Height is less than 30 feet (Figure 4.1D), Importance Factor is 1.0 (building is not a special occupancy structure such as a public school or public safety building), and the Topographic Factor is 1.0 (building is not on a bluff or near the top of a hill). Once you collect the site conditions for your project location, refer to the tables in the certification letter to determine the maximum allowable spacing between Leveling Feet. If your site conditions are outside the assumptions above, refer to ASCE 7-05 or contact a structural engineer for assistance.



Ratio-to-Pitch Conversions:

1:12	=	5 deg.
2:12	=	9 deg.
3:12	=	14 deg.
4:12	=	18 deg.
5:12	=	23 deg.
6:12	=	27 deg.
7:12	=	30 deg.
8:12	=	34 deg.
9:12	=	37 deg.
10:12	=	40 deg.
11:12	=	43 deg.
12:12	=	45 deg.

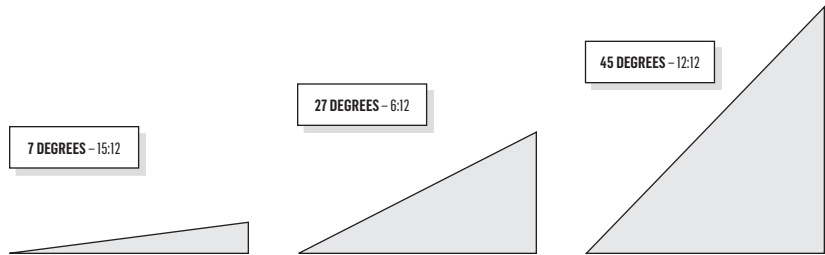


Figure 4.1A — Roof Pitch



B — Urban/Suburban



C — Open Terrain/Scattered Obstructions



D — Flat, Unobstructed Area

Figure 4.1B — Wind Exposure Categories

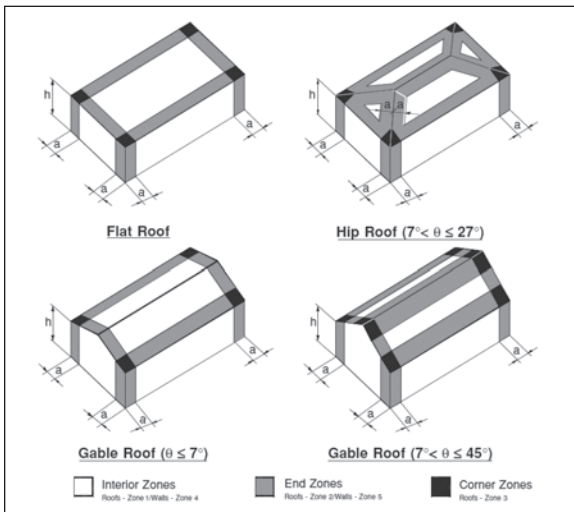


Figure 4.1C — Roof Zones – Interior, Edge, Corner

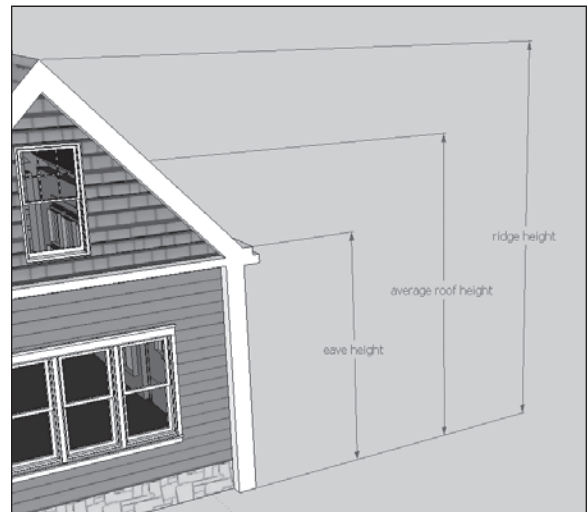


Figure 4.1D — Average Roof Height



4.2 > Array Layout & Bill of Materials

During the site visit, record information pertaining to the specific roof area where the Modules will be mounted. This includes roof azimuth angle, roof pitch, dimensions of the mounting area including all obstructions such as chimneys or vents, the rafter schedule, rafter lumber type if available, roofing material, and shading factor. Once you have this information, you can begin to create a layout diagram on paper or with a drawing program that identifies the placement of the array.

NOTE: Alternately, you can create your layout directly on the roof at the time of installation. However, since this method will not allow you to confirm the exact quantity of components ahead of time, it is recommended that you have extra hardware available to account for unforeseen layout configurations.

When determining the overall array dimensions, calculate $\frac{1}{2}$ " gaps per every vertical and horizontal Module seam.

Consider whether to mount the Modules in landscape or portrait orientation. As discussed above, landscape orientation usually offers an opportunity to fit more kilowatts of PV Modules on a typical roof. It will also allow for a more economical use of mounting hardware.

Figure 4.2A illustrates the Leveling Feet with circles at the intersections of the Module frame and the rafters and Interlocks have been indicated with rectangles where the corners of the Modules intersect.

On your diagram, draw your rafter layout and then superimpose a drawing of your array in its desired location. Locate an Interlock at every vertical seam in an east-west orientation as in Figure 4.2A. Then, mark the Leveling Feet locations according to the maximum allowable spacing determined by your span tables.

NOTE: It is not necessary to install Interlocks along the east and west edges of the array.

If the location of an Interlock prevents locating the Leveling Foot on a desired rafter, shift the Leveling Foot to the nearest adjacent rafter while maintaining span and cantilever requirements. This is indicated in Figure 4.2A with dashed circles where Leveling Feet have been relocated to the left due to an Interlock location conflict.



The maximum cantilever at the edge of the array is determined by multiplying the maximum span by 0.33. In the example below, the span between Leveling Feet is 48" which allows for a maximum cantilever of 16". It is recommended that Leveling Feet not be installed within 2" of the corner of the Module. Therefore, the allowable mounting zone for the last foot in a row (End-Foot Zone) is in an area within the cantilever allowance not including the last two inches of the Module. On the right side of Figure 4.2A, the cantilever originally exceeded the allowable value so Leveling Foot (solid circles) were placed on the rafters closest to the edge of the array to meet the cantilever requirements.

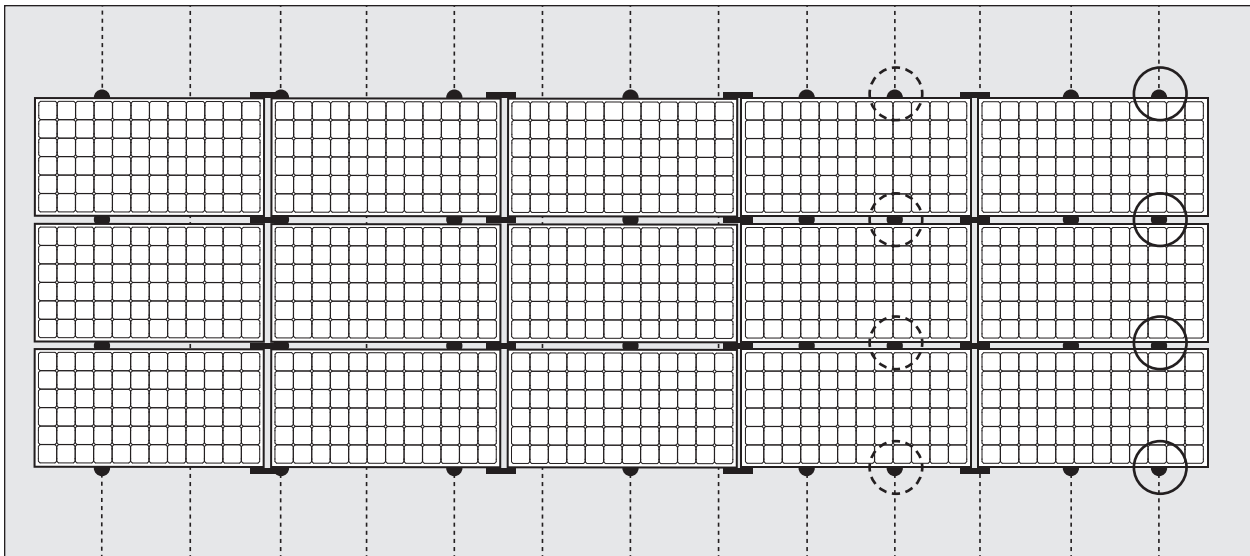


Figure 4.2A — Identifying Leveling Feet and Interlocks

If the maximum cantilever allowance cannot be met by adding another Leveling Foot, it may be necessary to shift the array to the East or West in order to support the array properly. In Figure 4.2B, distance A represents the Cantilever Allowance whereas distance B represents the area where a Leveling Foot can be attached (End-Foot Zone). In Figure 4.2B, example #1 illustrates proper placement, allowing the rafters to meet the cantilever requirements. In example #2, the right side of the row does not meet the cantilever requirements so the entire array would need to shift a few inches to the left in order to allow for proper support of the cantilevers.

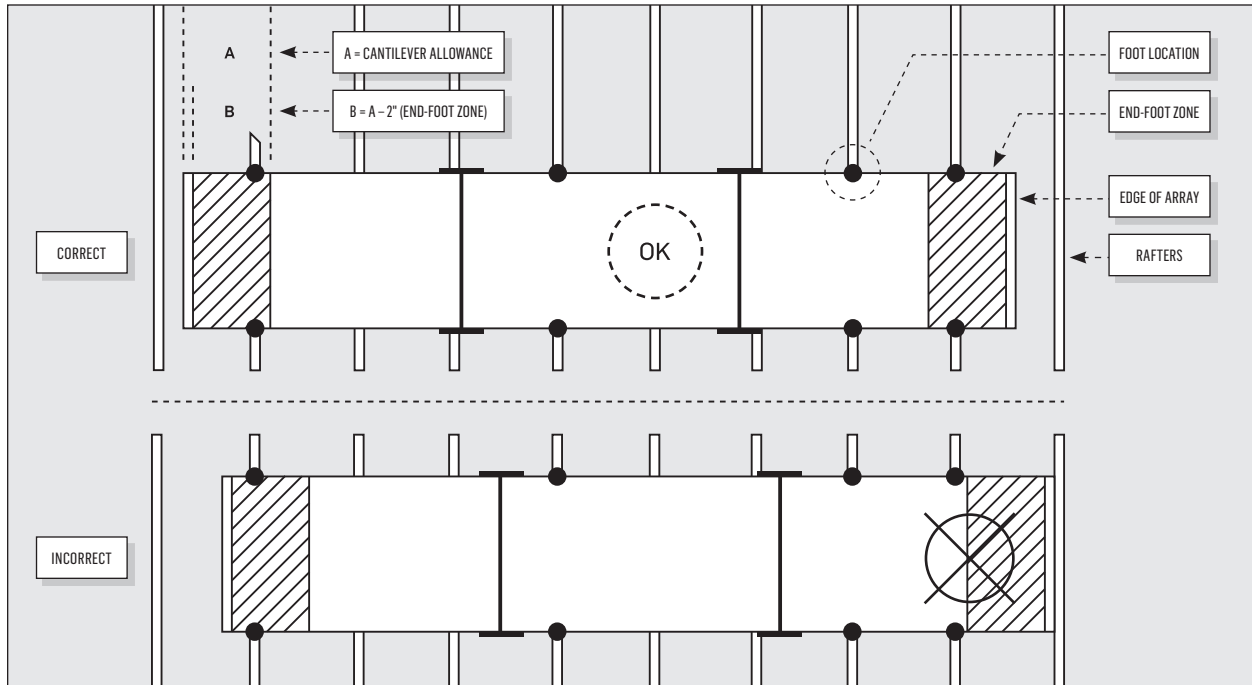


Figure 4.2B — Cantilever Allowance

After the array layout is determined, verify that thermal and ground bond allowances are not exceeded. The Zep array requires a thermal break at every sixth vertical Module seam as shown in Figure 4.2C. In order to accomplish a thermal break, the Interlocks installed at the thermal break must be only partially secured as per Section 5.13 below. Interlocks installed in this fashion do not carry the ground bond so each portion of the array to either side of the break requires its own Ground Zep as shown in Figure 4.2C. If the array exceeds 12 Modules high (per column) an additional thermal and ground break is required. One Ground Zep is required for each array portion segmented by thermal/ground breaks and a ground bond jumper must be installed between ground Zeps as described in Section 5.13 below.

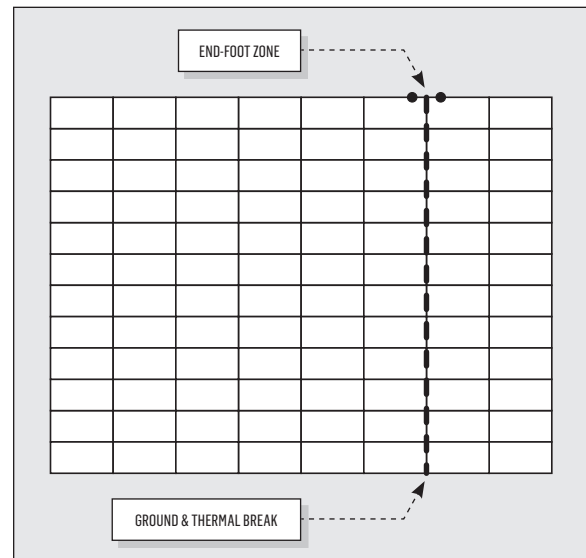


Figure 4.2C — Ground and Thermal Break

NOTE: Having configured the array, count the number of Interlocks, Leveling Feet, and Ground Zeps to create a core components bill of material.



5.0 > Mechanical Installation

The following instructions and accompanying figures describe and illustrate the mechanical installation of Zep System II. For the purpose of illustration, the drawings in this manual assume the use of Zep Comp Mount attachment hardware. However, Zep System II can be installed with the use of various application-specific attachment solutions including the Zep Comp Mount, the Zep Tile Mount, and various third party products such as S-5! Clips for standing seam metal roofs, hanger bolts, spanning rails, etc. Refer to the installation manuals of each attachment solution for detailed installation instructions prior to installing Zep System II. Zep System II can also be installed directly to a roof surface or a pre-engineered substructure such as a ground-mount support or parking lot shade structure. When mounting directly to a surface, ensure that proper waterproofing and/or attachment methods are used.

5.1 > Mechanical Installation Requirements

1. The array of Modules must be mounted to the roof with Zep Leveling Feet and suitable roof attachment devices to maintain the waterproof integrity of the roof. The system designer and/or installer are responsible for load calculations and proper quantity and locations of the Zep Leveling Feet. Local wind loading and snow loading should be accounted for in the system design.
2. The mounting system design shall comply with all local building codes.
3. A minimum gap of 0.25" between Modules is required to allow for thermal expansion.
4. The Zep System must not be immersed in water or constantly exposed to water spray.

5.2 > Mechanical Installation Preparation

1. Gather all necessary tools for the Zep System installation including the following:
 - a. Zep Tool and/or Zep Flat Tool for installing and removing Interlocks, Leveling Feet, and Ground Zeps on the Zep Groove.
 - b. T30 Torx bit (comes with Zep Tool) for Leveling Foot height adjustment.
 - c. Flat bladed screwdriver for fastening the equipment grounding wire to the Ground Zep.
 - d. Chalk Line and tape measure to mark the Module layout and roof rafter positions.
 - e. Power drill with pilot drill bit and impact driver to properly fasten lag screws to the structural support members.
2. Supply all installation personnel with appropriate safety gear including personal protection equipment (eye protection, footwear, hard hat, etc.) and fall protection gear (harness, anchor, rope or retractable lanyard, etc.)



3. Ensure you have received all the necessary system components based on the system design drawings.
4. Collect the design drawings and structural design calculation results to determine the location of the array and the attachment points based on the site conditions

5.3 > Roof Layout Procedure

1. Determine the exact roof location and layout for the Modules and Zep Leveling Feet as specified in the design drawings. It is the responsibility of the installer to verify that the roof structure is adequate for the system design.
2. Mark the perimeter of the array to verify that the location of the array is consistent with the design drawings and confirm that the array will not be unnecessarily shaded (Figure 5.3A).
3. Locate the rafters and snap chalk lines to identify their locations (Figure 5.3B).
4. Snap a chalk line across the lower edge of the array to establish the relative location of the lower edge of the array. (Figure 5.3C).

NOTE: Depending on the attachment solution being utilized, the chalk line may represent various possible alignment points. For instance, with the Zep Comp Mount, this line will represent the lower edge of the flashing whereas with a direct mount installation the lower chalk line will determine the location of the "toe" of the front row Leveling Feet.

5. Mark the intersection of the lower edge chalk line and the rafter marks where Zep Leveling Feet will be installed per the approved system design.
6. Confirm that Leveling Foot locations will not interfere with the placement of the Interlocks. Modify Leveling Foot locations as needed (refer to design drawing).

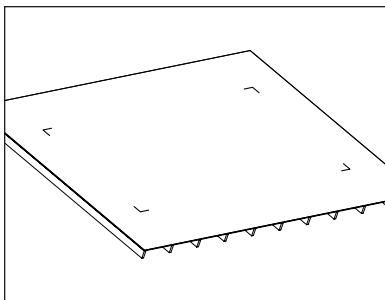


Figure 5.3A

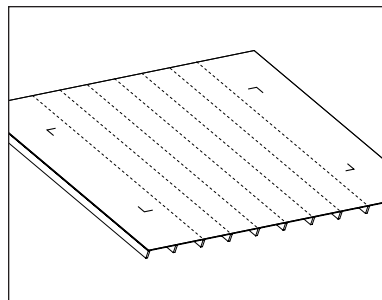


Figure 5.3B

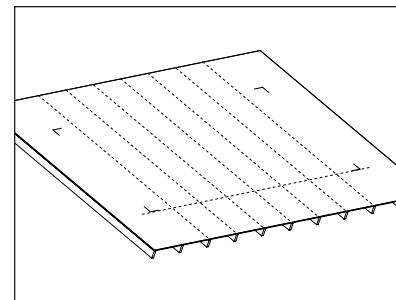


Figure 5.3C



5.4 > Prepare Roof for Front Row Leveling Feet

For the front row, Leveling Feet are oriented with the “toe” facing down roof (for all other rows, the “toes” face up-roof). Once the location of the front row Leveling Feet have been identified, mark and then drill pilot holes in the locations where the lag screws will attach to the roof. For a direct mount installation, this will be the lag that is installed through the oval slot of the Leveling Foot. Use a stainless steel lag screw ($\frac{5}{16}$ " shaft with sufficient thread depth to satisfy the uplift point load force requirements) along with a fender washer. For other attachment methods, see product instructions for proper installation procedures.

NOTE: DO NOT secure the Leveling Foot to the roof or attachment hardware at this time. The Leveling Foot must be installed in the Module groove prior to securing to the roof or attachment hardware.

NOTE: If using accessory roof attachment hardware such as Zep Comp Mount, the Zep Tile Mount, and various third party products such as S-5! Clips for standing seam metal roofs, hanger bolts, spanning rails, etc., it may be desirable to install all of the attachment hardware prior to the installation of the Module array. In this case, it is important to determine the north-south spacing of attachment points as follows (Figures 5.4A, 5.4B):

Landscape Orientation: Row 1 to Row 2 = **Module width** + $\frac{5}{8}$ " + 3"
Row 2 to Row X = **Module width** + $\frac{5}{8}$ " (same for all other rows)

Portrait Orientation: Row 1 to Row 2 = **Module length** + $\frac{5}{8}$ " + 3"
Row 2 to Row X = **Module length** + $\frac{5}{8}$ " (same for all other rows)

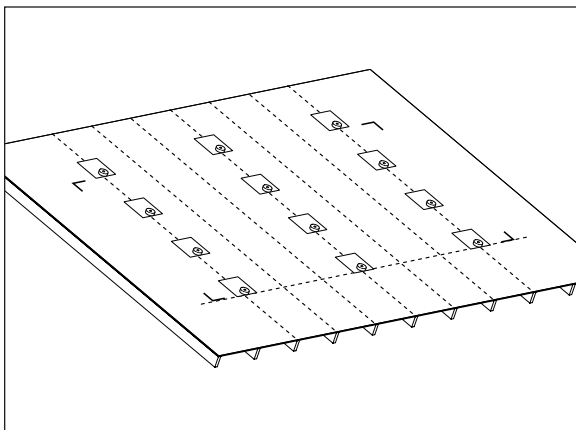


Figure 5.4A

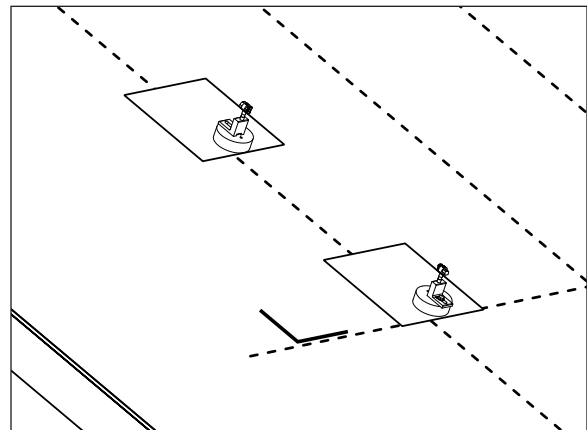


Figure 5.4B



All measurements are from the center of the accessory roof attachment hardware that will attach to the center of the Leveling Foot slot. The measurement between Row 1 and Row 2 requires an additional three (3) inches to account for the fact that the leveling feet face down roof on the first row and up roof on all other rows (Figure 5.4B)

5.5 > Interlocking the First Module Pair

1. Bring the first two Modules on the roof and set them down end-to-end in landscape orientation or side-to-side in portrait orientation near the SW or SE area of the array (Figure 5.5A). These instructions assume that you are starting at the SW corner of the array area. Module junction boxes should be oriented per system design to allow for ease of Module interconnections.
2. Insert the Interlock Assembly in the bottom groove between the Module pair, spacing the Modules $\frac{1}{2}$ inch apart using the two outside alignment marks on the Interlock Assembly (Figure 5.5B).

NOTE: It is generally much easier if you DO NOT pick up the Modules, but rather leave them on the roof and insert the Interlock by holding the tongues of the Interlock Zeps.

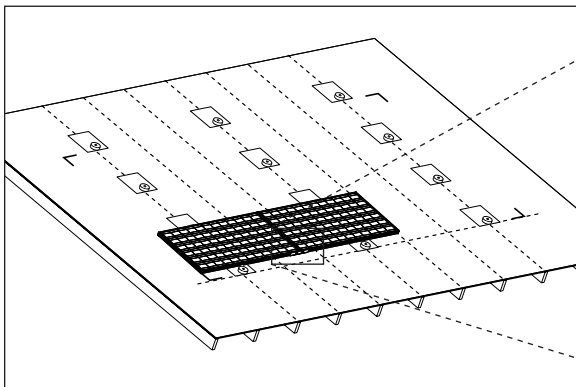


Figure 5.5A

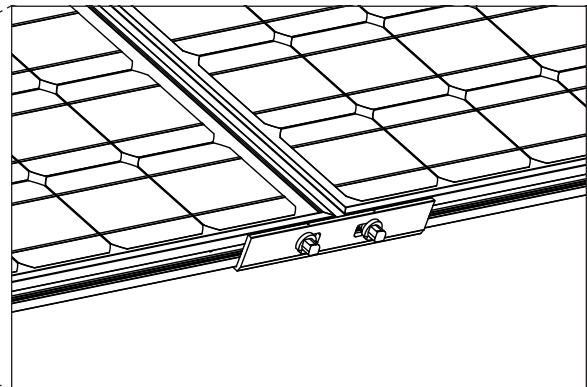


Figure 5.5B

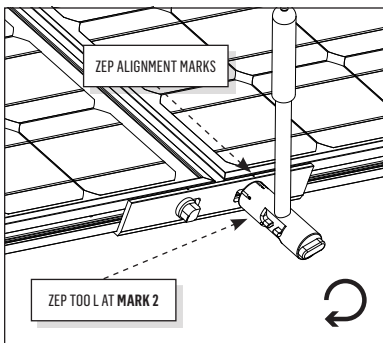


Figure 5.5C — Step 1

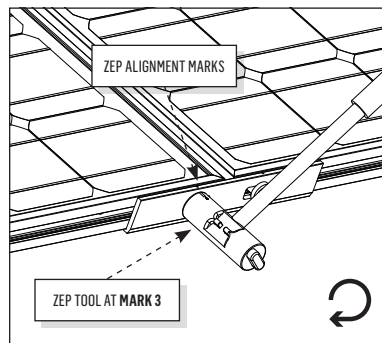


Figure 5.5D — Step 2

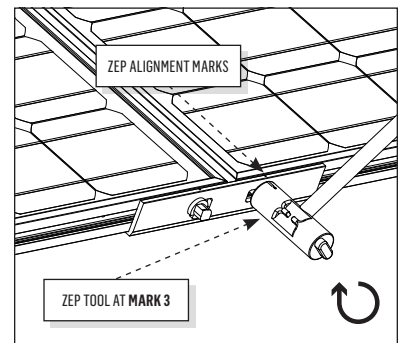


Figure 5.5E — Step 3



The Zep Tool is designed to engage and rotate to positions labeled 1, 2, or 3 based on the alignment of the mark on the Interlock with the numbered alignment marks on the Zep Tool. Engage the Zep Tool on one of the Interlock Zeps in position #1 then use the Zep Tool to turn the Interlock Zep *clockwise* until Alignment Mark #2 on the tool is lined up with the alignment mark on the Interlock (Figure 5.5C). Next, turn the other Interlock Zep *clockwise* a full $\frac{1}{4}$ turn until Alignment Mark #3 is lined up with the alignment mark on the Interlock (Figure 5.5D). Lastly, engage the Zep tool on the first Interlock Zep and continue to turn clockwise until Alignment Mark #3 is lined up with the alignment mark on the Interlock (Figure 5.5E)

NOTE: It is important to NOT over or under-rotate the Interlock Zep since the drop-in action on the tongues (when installing the next row above) may be difficult unless both Interlock Zeps are properly aligned.

3. Repeat the Interlock installation (Steps 1 – 3) on the upper edge of the Module pair.

5.6 > Wiring and Wire Management

1. Connect the Module leads together according to the system design drawing once the Modules have been connected with an Interlock.
2. Use Zep Wire Clips to properly manage series and home run wires while protecting them from damage. Insert the Zep Wire Clip into the Module groove (Figure 5.6A) then lay the conductors

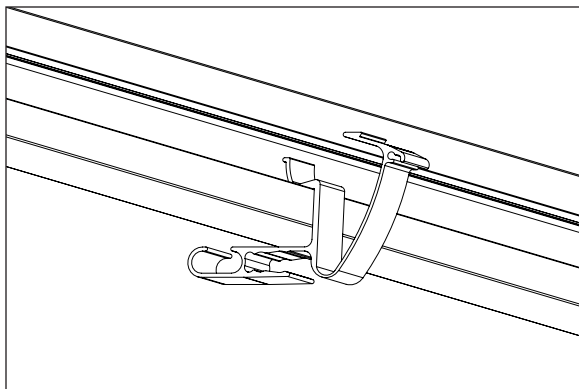


Figure 5.6A

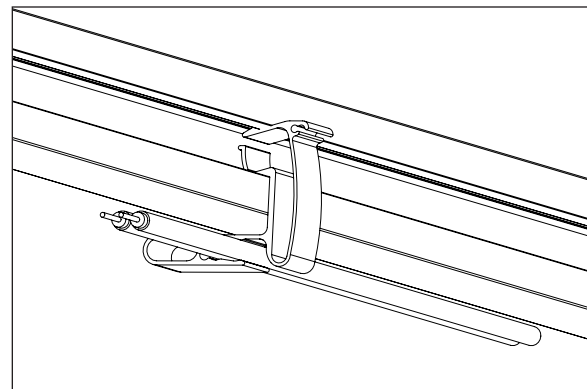


Figure 5.6B

into the wire clip housings so that they are properly secured (Figure 5.6B).

3. Continue to connect and manage Module leads as new Modules are installed.



5.7 > Leveling Foot Installation

1. With two installers, one above and one below the Module pair, load a Leveling Foot into the Zep Tool (Figure 5.7A). Use the array perimeter marking and the rafter chalk line to identify where to place the Module and Leveling Foot according to the system design. Both installers should then simultaneously insert their Leveling Foot into the bottom and top of the Module groove, key first (See Figure 3.0B), at the 3 o'clock position (Figure 5.7B).

NOTE: There is no need to measure exactly where to insert the Foot Zep: just “eyeball” the location approximately above the rafter or attachment device. If you are off by a small margin, you can swing the base of the Foot to align it with the rafter location.

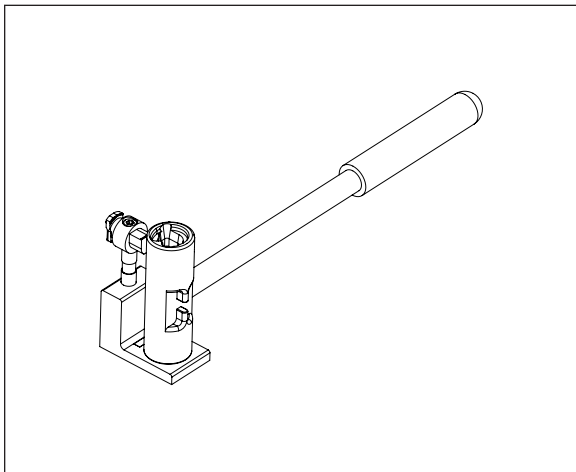


Figure 5.7A

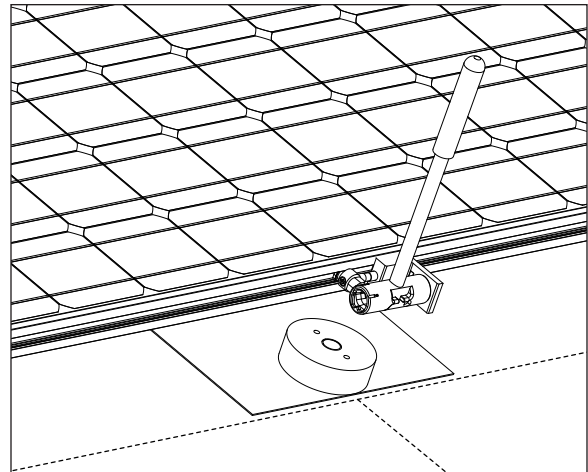


Figure 5.7B

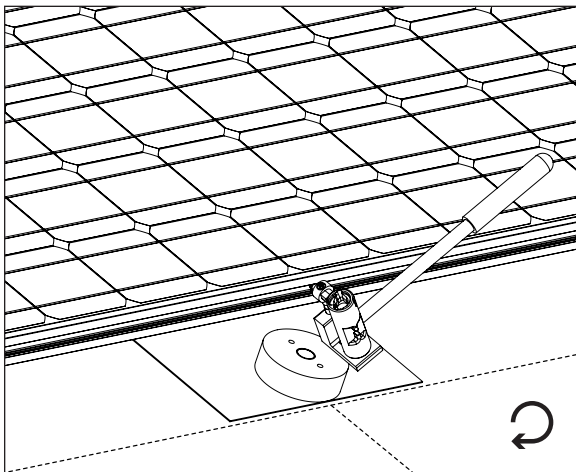


Figure 5.7C

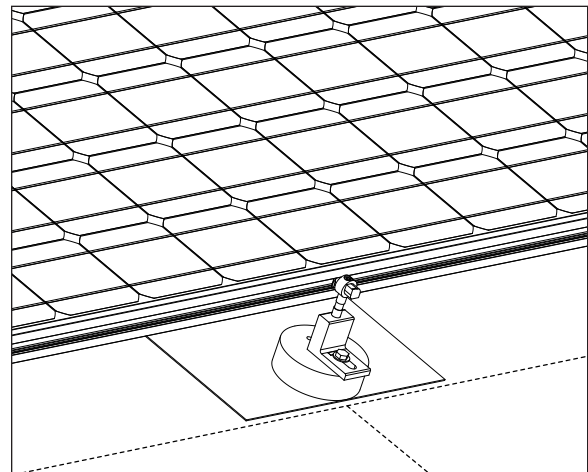


Figure 5.7D



2. Use the Zep Tool to rotate the Leveling Foot 90° *clockwise* until the base of the foot is parallel with the roof surface (Figure 5.7C). With the fastener appropriate to mounting method being utilized, secure the Leveling Foot to the mounting surface or attachment hardware.

NOTE: It is important to NOT over or under-rotate the Leveling Foot since the drop-in action on the tongue for that Leveling Foot may be difficult unless the stud is oriented perpendicular to the Module frame.

5.8 > Completing the First Row

1. Lay out the next Module on the roof spaced ½" from the previously attached Module pair.
2. Attach the Leveling Foot Zep to the Module groove on top and bottom of the frame immediately above the attachment point to the roof or attachment hardware and loosely secure the Leveling Feet to the roof (Fig. 5.8A).
3. Install the Interlocks where the Modules join in the East-West direction on the top and bottom of the row (Figure 5.8B). Tighten the lower Leveling Foot to the roof or attachment hardware.
4. Repeat for the remaining Modules in the first row.

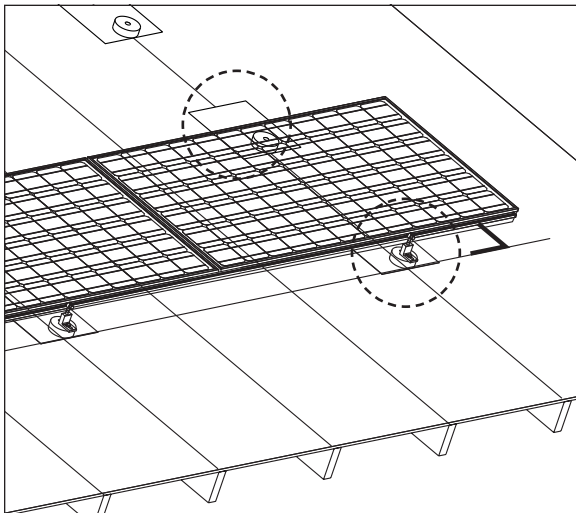


Figure 5.8A

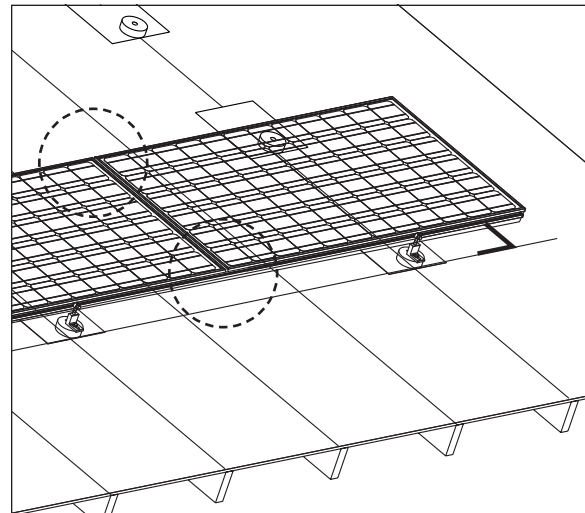


Figure 5.8B



5.9 > Leveling the Row

1. Once the row has been completed, attach all the Leveling Feet on the upper row to the roof or to their respective attachment hardware.
2. Next, use a laser level, string line or careful eye to determine if height adjustment is necessary (Figure 5.9A). Use the Zep Tool or a drill with a T30 Torx bit to raise (*counter-clockwise*) or lower (*clockwise*) the height at the Leveling Foot (Figure 5.9B).

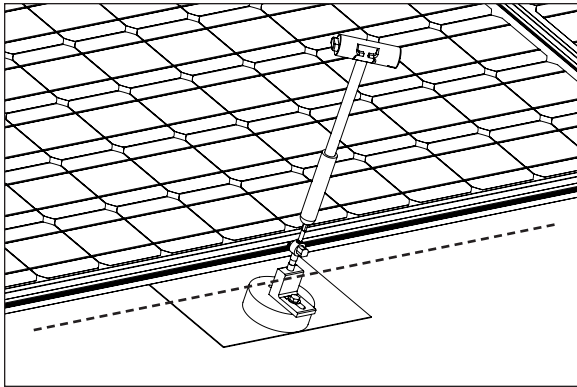


Figure 5.9A

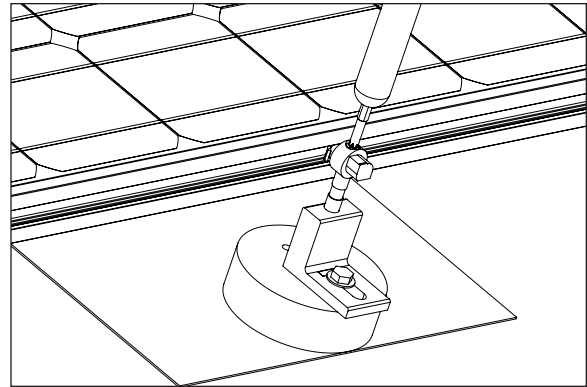


Figure 5.9B

5.10 > Drop in and Pivot Lock Procedure

1. Moving up to the next row, rest the edge of the next Module on the top of the Foot Zeps (Figure 5.10A). In order for the Zep tongue to fully seat into the Module groove, the Module should cover about half of the top of the foot stud prior to starting the drop in and pivot lock procedure (Figure 5.10B).

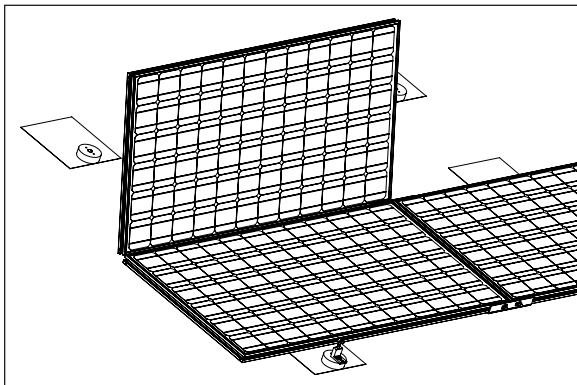


Figure 5.10A

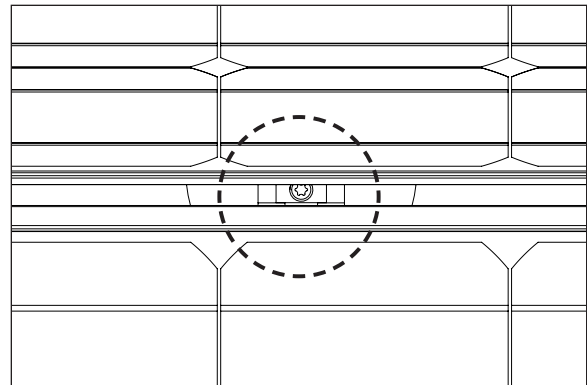


Figure 5.10B



2. Lower the Module grooves onto the Zep Tongues and rotate downward, applying pressure toward the tongues when the Modules reach an angle of approximately 15 degrees from the roof (Figure 5.10C and Figure 5.10D).

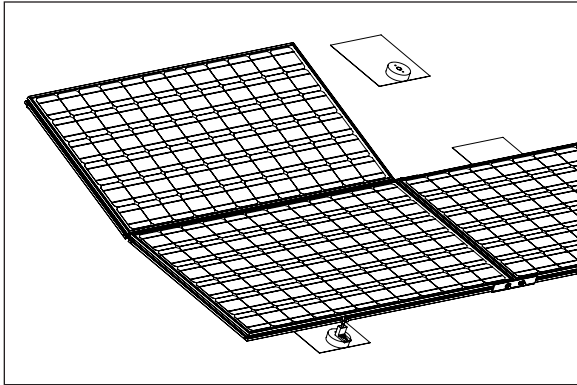


Figure 5.10C

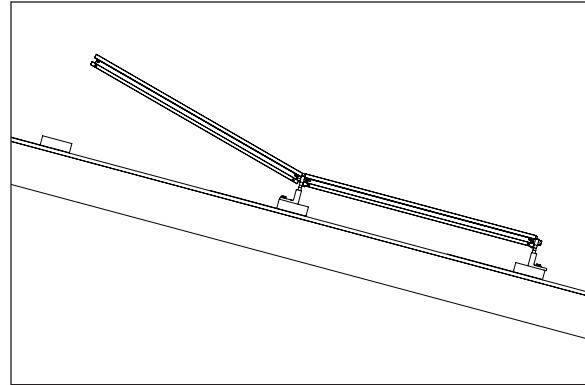


Figure 5.10D

3. Proceed to lower all the way to the surface of the roof while continuing to apply pressure toward the tongues (Figure 5.10E and Figure 5.10F). If the newly installed Module does not fully seat into the Zeps, bring it back up to 15 degrees and apply pressure once again to fully seat it.

NOTE: Zep System II has been designed to take up tolerance from Module to Module so the Zep Groove may engage the tongue at varying depths in order to allow for tolerance take up and/or slight Module rotation to maintain overall squareness of array.

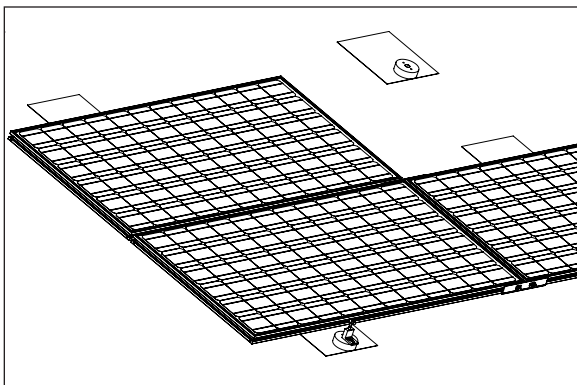


Figure 5.10E

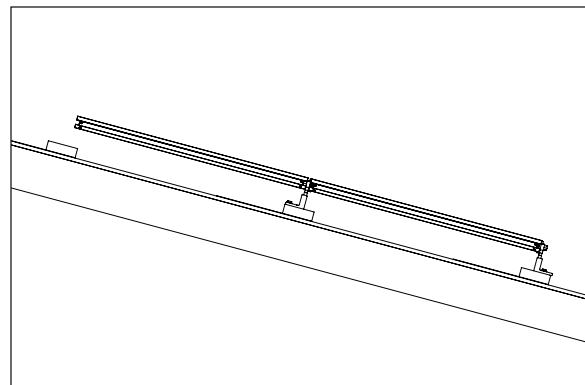


Figure 5.10F



4. Install the Leveling Feet along the top of the row according to the design drawings and rest it on the roof or attachment hardware. Check that the Module is seated onto the Zep tongues at the desired location. If there is a gap that is not needed to take up tolerances (Figure 5.10G), lift the Module to 15° and re-seat while applying pressure towards the Zeps.

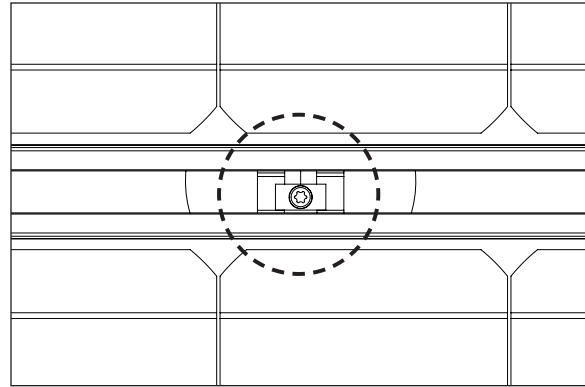


Figure 5.10G

5.11 > Installing Additional Rows

1. Continue to install the remaining Modules in the new row using the "Drop in and Pivot Lock Procedure" (Section 5.10) and attach all Leveling Feet (Section 5.7) according to design drawings.
2. Once all Modules and Leveling Feet have been installed in the row, attach the Leveling Feet to the roof attachment hardware or directly to the roof using appropriate hardware and then level the row as needed (Section 5.9).

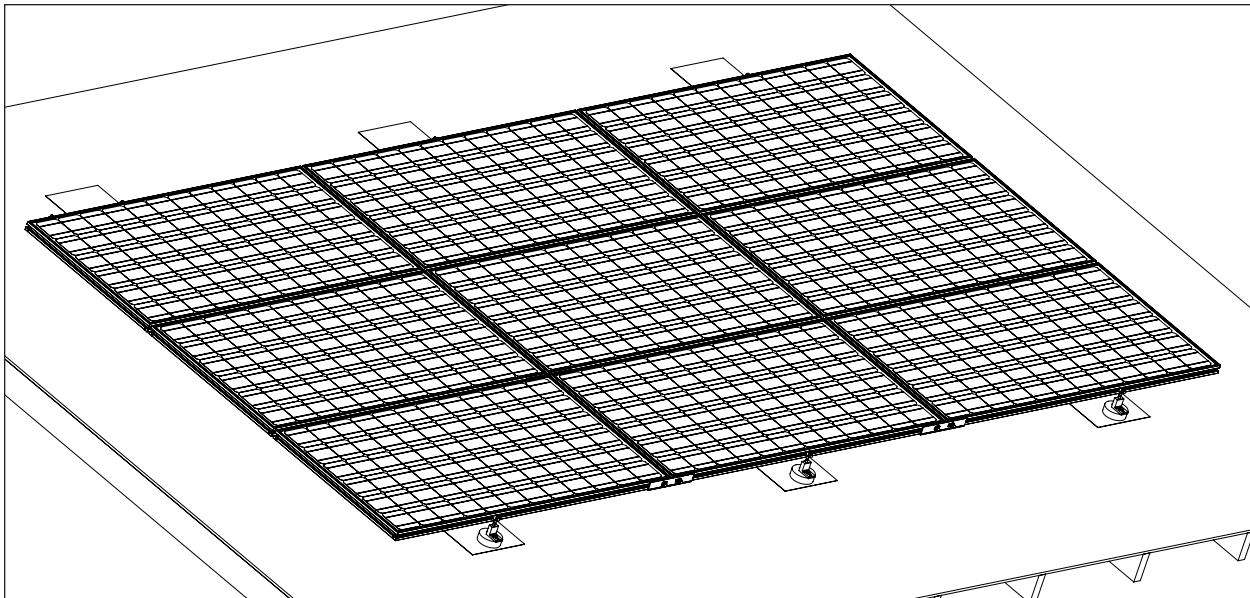


Figure 5.11A — Full Module Array



5.12 > Final Array Wiring and Wire Management

1. Complete all Module string connections and properly manage all the conductors using Zep Wire Clips (Section 5.6).
2. Run all homerun cables back to your roof-mounted junction box including the equipment grounding conductor, ensuring the system is properly grounded to national and local code standards.

5.13 > Installing an Interlock at a Thermal Break

Thermal breaks must be included at every sixth vertical (N-S) module seam as in Figure 4.2C. In order to accomplish a thermal break, Interlocks at the thermal break seam must be installed with only one of the Interlock Zeps rotated to position 3, leaving the other at position 1. If an interlock at the thermal break is within 2" of a Leveling Foot, tighten the Interlock Zep that is closest to the Leveling Foot in order to avoid conflict with the Leveling Foot in a fully expanded condition. Keep the selection of which Interlock Zep is tightened consistent throughout the thermal break. For instance, if the Zep on the east side of the Interlock is tightened on the thermal break's first Interlock, secure all east-side Zeps throughout that thermal break while leaving all west-side Zeps along the thermal break in their original position (position #1). This will allow the Interlock to slide with thermal expansion at the location of the un-rotated Interlock Zep. If the array requires two (N-S) thermal breaks, set the vertical seam module spacing at the thermal breaks to $\frac{3}{4}$ " (normal spacing is $\frac{1}{2}$ "). If the array requires more than two N-S thermal breaks, contact Zep Solar for engineering assistance. If a Module array is greater than 12 modules high (per column), a gap must be left between the 12th row and the additional rows above.



6.0 > Electrical Installation

Zep System II offers significant improvements over existing grounding systems because of its simplicity, redundancy, and ultra-low resistance connections. The Interlock Zep is tested and approved to UL 1703 standards. The ground bond is accomplished simultaneously as the structural connection is established by way of cutting teeth that penetrate the Module frame's anodized finish. The Interlocks are placed at every corner where the Modules meet and create both east-west and north-south ground bond connections. As a result, Zep System II has multiple redundant ground paths that are established as soon as the Interlocks are installed in the Module grooves. If it's mounted, it's grounded!

6.1 > Electrical Installation Requirements

1. The array of Modules must be grounded with a solid copper wire that is connected between the Ground Zep and a suitable earth ground.
2. Select a solid copper ground wire no smaller than 14 AWG (0.064") and no larger than 4 AWG (0.205"), sized accordingly for the photovoltaic system per the National Electric Code or equivalent electric code standards.
3. All Ground Wire shall have a temperature rating of at least -40C to +90C.
4. Zep System II components are only suitable for Modules with a series fuse rating of 15 Amps or less.
5. Tools required for the Zep System electrical installation are as follows:
 - a. Zep Tool for installing and removing Interlocks, Leveling Feet, and Ground Zeps.
 - b. Flat bladed screwdriver for fastening the ground wire to the Ground Zep.

6.2 > Grounding System Installation

1. When Interlocks are installed between Modules, they automatically create an electric bond between the Modules thus eliminating the need for ground lugs or other external grounding methods.
 2. For an array up to 6 columns x 12 rows, a single Ground Zep is required to ground the entire array. When installing arrays larger than 6 x 12, simply add a Ground Zep on each 6 x 12 sub-array and add a solid copper conductor to jumper across the sub-arrays (Refer to Figure 4.2C).
 3. To install the Ground Zep, insert the Ground Zep Key into the Module groove in its horizontal position (Figure 6.2A). Then insert the Ground Zep Socket portion of the Zep Tool into the Ground Wire Retention Slot of the Ground Zep (Figure 6.2B) and turn the Ground Zep 90 degrees clockwise to lock it into the groove (Figure 6.2C). This will establish a solid ground bond with the Module frame. After the Ground Zep is turned 90 degrees, the Ground Wire Set Screw should be pointing up.
-



4. Lay the solid copper ground wire into the Ground Wire Retention Slot and turn the Ground Wire Set Screw with a flat bladed screw driver until the wire is captured by the set screw (Figure 6.2D). Continue turning the set screw until the installation torque requirements of Table 6.2E are met.

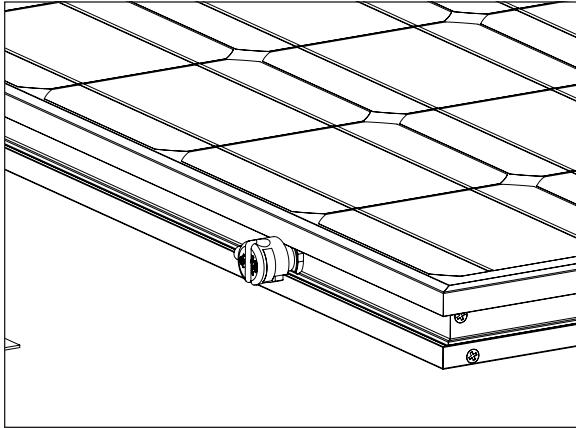


Figure 6.2A

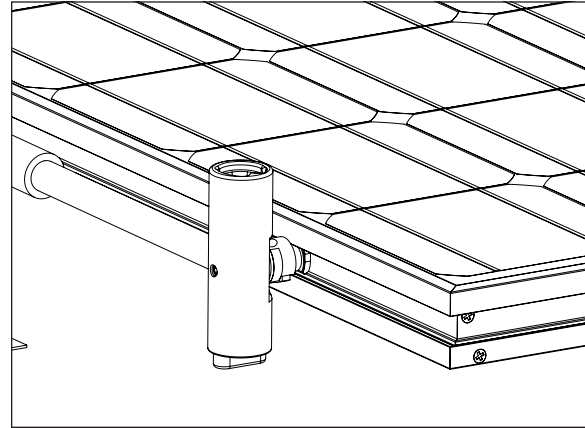


Figure 6.2B

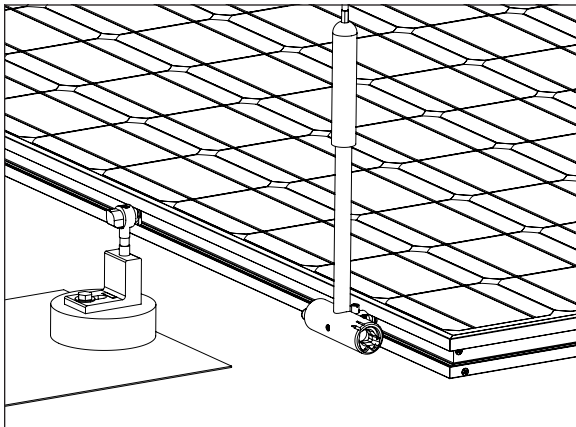


Figure 6.2C

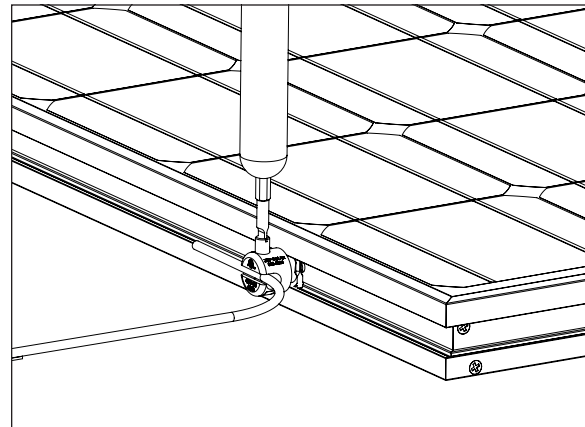


Figure 6.2D

Ground Wire AWG	Torque in In-Lbs.
14 AWG	40 LBS.
12 AWG	40 LBS.
10 AWG	40 LBS.

Ground Wire AWG	Torque in In-Lbs.
8 AWG	45 LBS.
6 AWG	50 LBS.
4 AWG	50 LBS.

Figure 6.2E — Set Screw Installation Torque Requirements



7.0 > Maintenance and Troubleshooting

7.1 > Module Removal Procedure

WARNING: DO NOT disconnect Module wires while system is in operation. Follow Module manufacture instructions for disconnecting Module wiring.

In order to remove a Module from the array, start at the top of the column where the Module is located and remove each Module, moving down the column, until you have removed the desired Module. Starting at the top, remove the two Interlocks connected to the top Module at the top edge (Figure 7.1A). Also remove any Leveling Feet connected to that Module. (Figure 7.1A) Then, making sure you have disconnected the wiring according to the Module manufacturer's instructions, remove the Module by pivoting it up and out, or reverse drop-in procedure (Figure 7.1B). Then, using the Flat Tool, rotate both Interlock Zeps from each of the Interlocks connected to the top edge of the second Module (going down the column) to positions #1 (Figure 7.1C). Once the Interlock Zeps have been rotated, place the Flat Tool in the gap between the two Modules, attach it between the Interlock lug and the flange (Figure 7.1D), and disengage the Interlock lugs from the Module groove by prying down on the Flat tool (Figure 7.1D). Next, slide the Interlocks to either side until the Interlock is no longer connected to two adjacent Modules (Figure 7.1E). It may be necessary to lightly tap the Interlock to cause it to slide. After removing any Leveling Feet connected to the next Module, and disconnecting Module wires, remove the next Module by pivoting up and out. Repeat this procedure going down the row until the desired Module is removed.

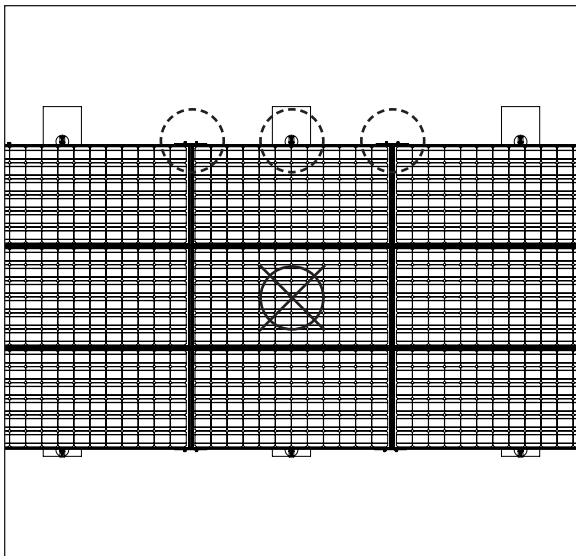


Figure 7.1A

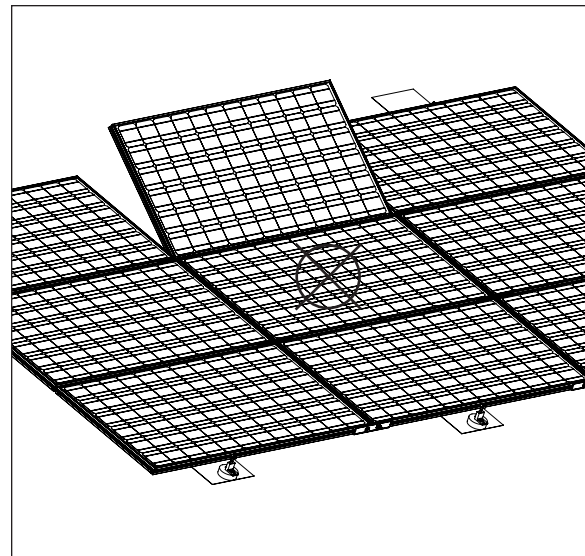


Figure 7.1B

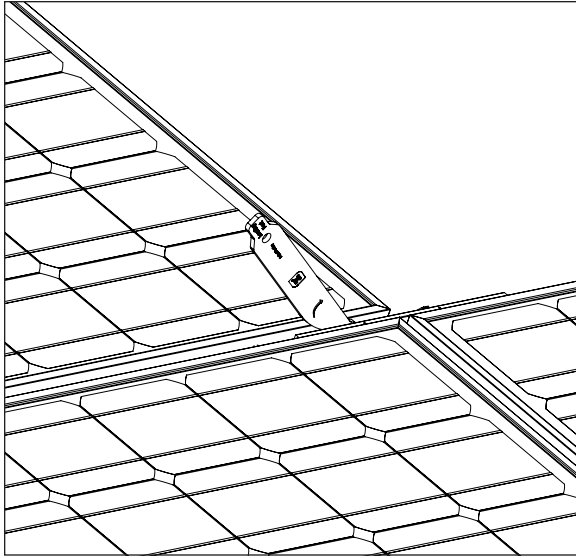


Figure 7.1C

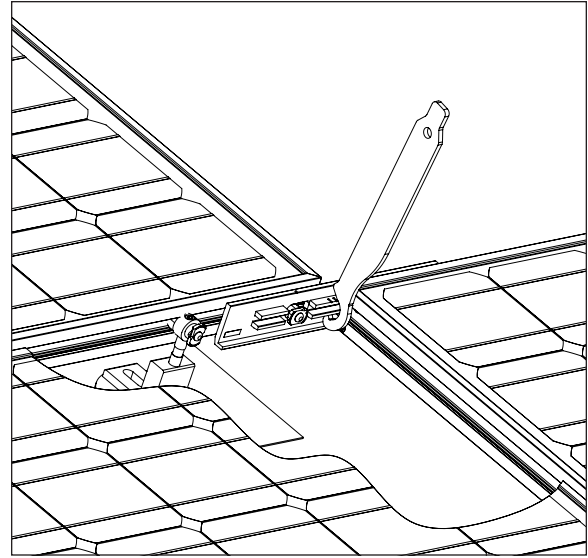


Figure 7.1D

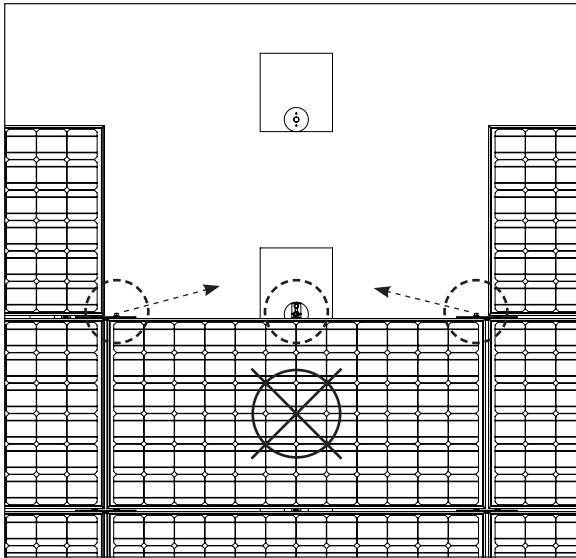


Figure 7.1E

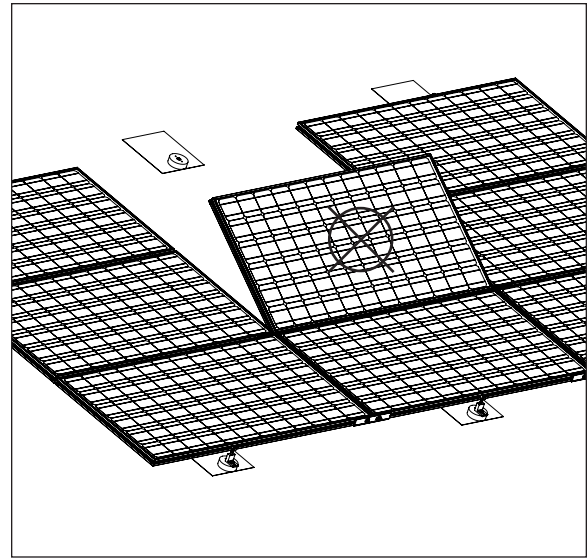


Figure 7.1F

8.0 > Technical Support

For questions regarding the design and installation of the Zep System II PV Module Installation System, please contact support@zepsolar.com or (415) 479-6900.



9.0 > Limited Warranty

What is Covered:

ZEP SOLAR, INC., a California corporation, (called "Zep Solar") with its principal place of business located at 161 Mitchell Blvd., Suite 104, San Rafael, California 94903 warrants to the original retail purchaser (called "Purchaser") of Zep Solar's solar panel rack products, manufactured by Zep Solar, (called "Products") that the structural components of the Products will be free from substantial defects in material and workmanship and that Product finish will be free from visible peeling, cracking or chalking under normal atmospheric conditions while the Products are installed at their original installation site provided that the Products were installed in accordance with Zep Solar's written installation instructions.

For How Long:

The warranty covering the structural components of the Products is made for ten (10) years and the warranty covering the anodized finish is made for five (5) years, from the earlier of 1) the date the installation of the Products is completed, or 2) thirty (30) days after the purchase of the Products by the original Purchaser.

What We Will Do:

ZEP SOLAR will, at its sole option either repair or replace any Products or components of the Products that fail to meet the performance standards set forth in this warranty on an exchange basis without charge. If ZEP SOLAR is unable to repair or replace a defective Product or component within a reasonable time, ZEP SOLAR will, at its sole and exclusive option, either replace the defective Product or component with a functionally equivalent Product or component without charge or re-fund the original price paid for the defective Product or component.

These are your sole and exclusive remedies for any breach of warranty.

What We Will Not Do:

ZEP SOLAR does not warrant that the Products will meet any specification, needs, or requirements that are not expressly set forth in the Zep Solar's technical product documentation.

The Finish Warranty does not apply to any foreign residue deposited on the finish. All installations in corrosive atmospheric conditions are excluded. The Finish Warranty is Void if, when cleaning or maintaining the Produce, the practices specified by AAMA 609 & 610-02 – "Cleaning and Maintenance for Architecturally Finished Aluminum" (www.aamanet.org) are not followed by Purchaser.



This Warranty does not cover damage to the Products that occurs during shipment, storage, or installation. This Warranty shall be VOID if the Product is not installed in accordance with Zep Solar's written installation instructions, if the Products are installed in an environment for which they were not designed, or if the Products have been modified, repaired, or reworked in a manner not previously authorized by Zep Solar in writing.

Zep Solar's Warranty covers only the Products and components provided by Zep Solar. Zep Solar makes no warranties or representations regarding any items or material provided by third parties. ANY IMPLIED WARRANTIES COVERING PRODUCTS INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED. ZEP SOLAR SHALL NOT IN ANY CASE BE LIABLE FOR SPECIAL, INCIDENTAL, CONSEQUENTIAL, INDIRECT OR OTHER SIMILAR DAMAGES ARISING FROM ANY BREACH OF THESE WARRANTIES EVEN IF ZEP SOLAR OR ITS AGENT HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

In no case shall ZEP SOLAR's liability exceed the purchase price paid for the defective Products or defective components.

How to Make a Warranty Claim:

If Purchaser believes that it has a claim for repair or replacement under this warranty, Purchaser must contact Zep Solar's Warranty Service Department within thirty (30) days of the end of the applicable warranty period to initiate the warranty claim process. Address all warranty claims to: Zep Solar, Inc., Warranty Service Department, 161 Mitchell Blvd., Suite 104, San Rafael, California 94903. Any claim under the above warranty must include proof of the date the Product installation was completed or the date of original Product delivery such as a copy of Purchaser's receipt or invoice.

Other Conditions:

This warranty allocates risks of product failure between Purchaser and Zep Solar. The warranty set forth above is in lieu of all other express warranties, whether oral or written. The agents, employees, distributors and dealers of Zep Solar are not authorized to modify this warranty nor to make additional warranties binding on Zep Solar. Accordingly, additional statements such as dealer advertising or presentations, whether oral or written, do not constitute warranties by Zep Solar and should not be relied upon as a warranty of Zep Solar. Zep Solar's product pricing reflects this allocation of risk and the limitations of liability in this warranty.

No action for any breach of this warranty may be commenced more than one (1) year following the expiration date of the above warranties.