Zep Solar

VERSION 2.0

Zep System II

PV Module Installation Manual

Use this manual for Zep Systems that use Type B Leveling Foot (ZS-LFB)

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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 Array Skirt, the Leveling Foot, the Interlock, the Hybrid Interlock, the Ground Zep, the Zep Wire Clip, the Type A Groove Adapter, the Type B Groove Adapter, and the Zep Compatible Solar Module (Module). The word "Module" as used in this manual will refer specifically to a Zep Compatible PV Module. 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. Zep Solar PV arrays are installed without the use of rails and therefore greatly simplify the process of installation. Zep Solar systems consist of Zep Compatible PV modules that are manufactured by various licensees of the Zep Groove module frame technology and Zep Solar hardware designed and manufactured by Zep Solar. Also, Zep System II interoperates with other third party Zep Compatible balance of systems components such as roof attachment hardware, module-level electronics, and electrical boxes.

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.

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.

3.1 > Components Overview

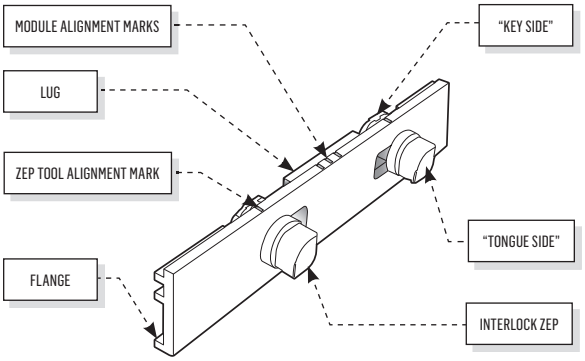


Figure 3.1A — Interlock

The Interlock provides nominal north-south and east-west structural and grounding connections at the corner points of PV modules, creating a structurally contiguous, hyper-bonded PV array. The Interlock as a ground bond means is ETL listed to UL 1703.

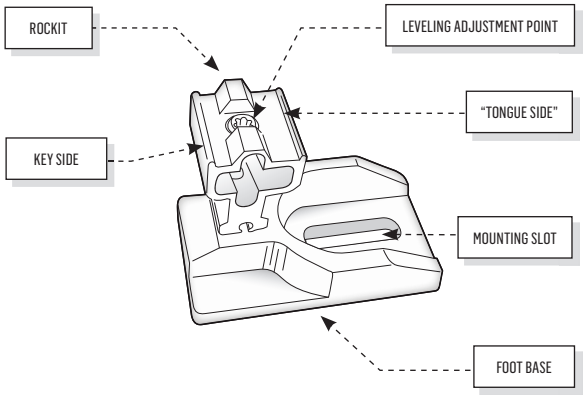


Figure 3.1B — Leveling Foot

The Leveling Foot mates to the Zep Groove of a Zep Compatible PV module and provides a means of attachment between the PV array and the mounting surface or attachment apparatus. Its threaded stud allows for easy adjustment of the array height – up to 1 ¼" of adjustability.

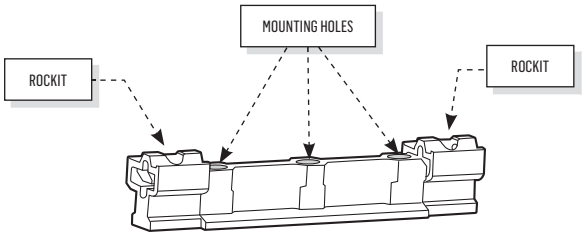


Figure 3.1C — Hybrid Interlock

The Hybrid Interlock functions as both Interlock and Leveling Foot for areas where the structural attachment falls at an Interlock location.

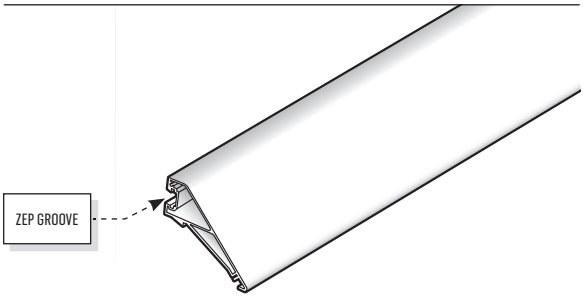


Figure 3.1D — Array Skirt

The Array Skirt facilitates easy front-row installation while providing a clean look at the front of the PV array (available in both clear and black finish).

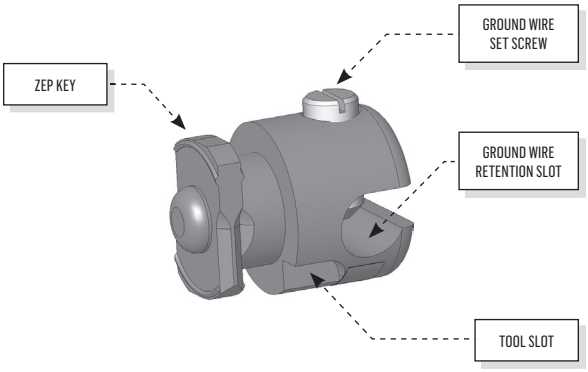


Figure 3.1E — Ground Zep

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).

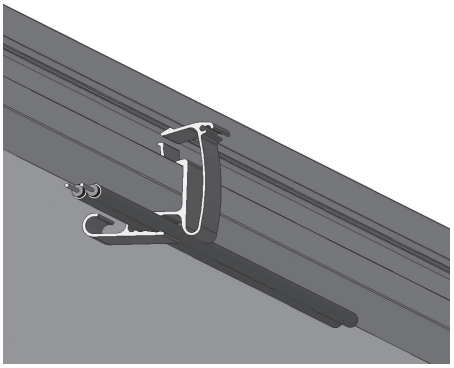


Figure 3.1F — Zep Wire Clip

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

3.2 > Zep System II Basics (Theory of Operation)

Zep System II operates in novel ways unlike typical mounting systems. Though the system is very simple to design and install, it is important to understand the unique characteristics of the way it operates prior to installing a system. The main differentiating characteristics of Zep System II are that (1) it is rail-free, (2) it is auto-grounding, (3) it is flexible in order to adapt to site-specific variables, and (4) it employs unique and precise mating techniques for joining components.

How is a Zep System II Array Supported?

Chief among Zep System II's distinctions is that it installs without the use of mounting rails by creating structural bonds between modules through the mating of Interlocks to the corner locations of each module's frame. This, in effect, causes a frame to act like a rail, thus leveraging the already present structural characteristics of the module frame and allowing the array to be self-supported.

How is a Zep System II PV Array Grounded?

Zep System II structural connections created by the Interlocks simultaneously establish a ground bond path between modules. The Key side of the Interlock Zeps, when rotated into the Zep Groove of a Zep Compatible PV module, cut through the anodized coating of the module frame to create a

solid conductive bond. When an adjacent module's groove is dropped onto the Tongue side of the Interlock Zep, the Tongue too cuts through the frame's anodized coating to create a solid conductive bond. This bond may be reversed and reset up to 50 times with no significant degradation of the ground bond connection.

How Does Zep System II Adapt to Variable Conditions?

Roofs and other mounting surfaces are not perfect planes. And because they are often not perfectly square, it is difficult to establish reference points from which to perfectly orient each module. Also, PV module outside-dimensions do not always perfectly match their mechanical specifications and are often not identical to each other. In essence, the installer's job is to mount a perfect-looking array on an imperfect structure using imperfect PV modules. In conventional systems, slight module misalignments or dimensional deviations force the misalignment of adjacent modules so that these slight misalignments are compounded throughout the array. The larger the array, the more difficult it is to counter this problem. Unlike rail-based systems, Zep System II PV arrays can be precisely installed square and in a level plane with very little effort required to achieve that goal. This is accomplished through built-in flexibility in the X, Y, and Z axes.

> Module Positioning is Flexible (X, Y-axis Adjustability)

With Zep System II, X and Y-axis flexibility is possible because each module can be set slightly off-axis to account for the above mentioned variables. By making minor adjustments at the module level, the installer can keep the array in alignment with system-level reference points such as a lower-edge chalk line and by sighting along seams and edges to keep the array "looking good." This freedom allowed in the positioning of PV modules is a result of a unique system feature as described below.

Interlocks, Hybrid Interlocks, and Leveling Feet all contain tongues that mate with the Zep Grooves of Zep Compatible PV modules. A defining characteristic of the tongue-to-groove connection is that the tongue can seat at variable positions with respect to the groove – i.e. the tongue can be fully or partially pushed into the groove and still accomplish a solid structural and ground bond connection. Because of this freedom, a module can be rotated slightly out of axis – thus allowing for independent module-level adjustments.

> PV Array Can be Easily Leveled (Z-axis Adjustability)

Zep System II PV arrays can be easily leveled by rotating the studs of the Leveling Feet. The Leveling Feet can be adjusted up or down over a range of 1 ¼" in order to achieve a perfect-looking array.

How Do Zep System II Components Mate?

Whereas Zep System II is flexible in order to adapt to variable conditions, it also employs specific

and precise methods of mating components as described below.

> Key Side/Tongue Side

The Interlock, the Hybrid Interlock, and the Leveling Feet all have a Key side for locking into the Zep Groove, and a Tongue side for receiving drop-in connections from a Zep Groove. The Interlock has Zeps which each have a Key side and a Tongue side and the Hybrid Interlock and Leveling Feet each have Rockits that also have a Key side and a Tongue side. As a rule, the Tongue side always faces the direction of the module to be dropped in.

> Interlock Installation

The Key sides of the Interlock are rotated into the Zep Groove with the use of the Zep Tool. After engaging the Interlock, Key side first, into the Zep Groove at a > 15° angle, the Zeps are rotated from position 1 to position 3. Precise alignment of the 3rd timing mark on the Zep Tool with the timing mark on the Interlock is critical to ensure proper mating of the Zep Groove in subsequent installation steps.

> Hybrid Interlock Installation

The Hybrid Interlock is installed by rocking the Key sides of its Rockits into the Zep Groove with the use of the Zep Tool.

> Leveling Foot Installation

The Leveling Foot can be installed by hand by rocking the Key side of its Rockit into the Zep Groove.

> Dropping In

Zep Compatible PV modules are installed with a drop in action. A module is dropped in by setting its Zep Groove on the Tongues of the Leveling Feet, Interlock and/or Hybrid Interlock at a >15° angle and rotating downward while applying a downward pressure.

4.0 > System Design

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 with accompanying span tables (www.zepsolar.com/resources.html) and also the Zep Solar web-based design tool, aptly named the Zepulator (www.zepulator.com), The span tables and design tool define the maximum leveling foot spacing requirements and maximum cantilever allowances for a range of site specific variables (Basic Wind Speed, Exposure Category, Ground Snow Load, Importance Factor and Topographic Factor) as well as building specific variables (Average Roof Height, Least Horizontal Building Dimension, Roof Slope, Attachment Type, Rafter Dimensions, Rafter Spacing and Mounting Area). Once you collect the site conditions for your project location, refer to the tables in

the certification letter or enter your variables in the Zepulator to determine the maximum allowable spacing between Leveling Feet. If your site or building conditions are outside the assumptions on the span tables or outside the allowable ranges on the Zepulator, refer to ASCE 7-05 or contact a structural engineer for assistance.

4.1 > Determine Method for Calculating Design Loads

Determining allowable foot spacing and cantilever allow a system layout and bill of materials to be created. There are two methods for calculating the design loads that will determine allowable foot spacing and cantilever.

1. **Span Tables:** Zep Solar publishes an engineering certification letter that contains span tables that determine allowable foot spacing and cantilever based on site specific variables. The engineering certification letter can be found on the resources page of the Zep Solar website at: http://zepsolar.com/resources.
2. **Zepulator:** The Zepulator online design tool (www.zepulator.com) also determines allowable foot spacing and cantilever based on site specific information. It also allows modification of the assumptions from the engineering certification letter and span tables to obtain results that are more customized to the site conditions. With the Zepulator, you can also build a basic layout, create a bill of materials and print load calculations to use for permit submittal packages. If your site conditions are outside the selectable range of the Zepulator, refer to ASCE 7-05 or contact a structural engineer for assistance.

4.2 > Gather Site Information

Allowable foot spacing and cantilever are based on design loads that are derived from site specific variables as described below. The span tables are configured to factor basic wind speed, exposure category, ground snow load, roof slope, and roof zone. However, the engineering certification letter details assumptions for other site specific variables. If using the span tables, it should be verified that all variables are within the assumed allowable ranges defined in the engineering certification letter. If using the Zepulator, the tool will prompt you to enter site variables as defined below.

Basic Wind Speed

American Society of Civil Engineers (ASCE 7-05) defines the Basic Wind Speed as the nominal design 3-second gust wind speed in miles per hour at 33 ft. above ground for Exposure C category over a 50-year mean recurrence interval. Refer to Fig. 6-1 in ASCE 7-05 for special wind regions. If uncertain, contact your Authority Having Jurisdiction (AHJ) to verify the Basic Wind Speed for the

specific site of your project.

Exposure Category

The exposure of a building is based on ground surface roughness that is determined from natural topography, vegetation and construction facilities. Select the most appropriate exposure category as defined by ASCE 7-05. Exposure Category B includes urban and suburban areas, wooded areas or other terrain with numerous obstructions nearby; Exposure Category C includes flat open country, grasslands, and all water surfaces in hurricane prone regions with scattered obstructions; Exposure Category D includes flat, unobstructed areas and water surfaces outside hurricane prone regions.

B — Urban/Suburban

C — Open Terrain/Scattered Obstructions

D — Flat, Unobstructed Area

Figure 4.2A — Wind Exposure Categories

Ground Snow Load

Ground snow loads are used in the determination of design snow loads for roofs. Determine the ground snow load for your specific site by referring to Fig. 7-1 of ASCE 7-05 or contacting your local AHJ.

Importance Factor

The importance factor of a building is determined by the degree of hazard to human life that the building represents in the event of failure. If the building represents a low hazard to human life (Occupancy Category I) such as an agricultural facility or mini storage unit, use an importance factor of 0.87 or 0.77 in hurricane regions where wind speeds can be greater than 100 mph. If on the other hand a building represents a substantial hazard to human life (Category III) such as schools or day care facilities or the structure is designated as an essential facility (Category IV) such as hospitals, fire stations or emergency shelters, use 1.15 as the importance factor. All other buildings (Category II) use an importance factor of 1.0.

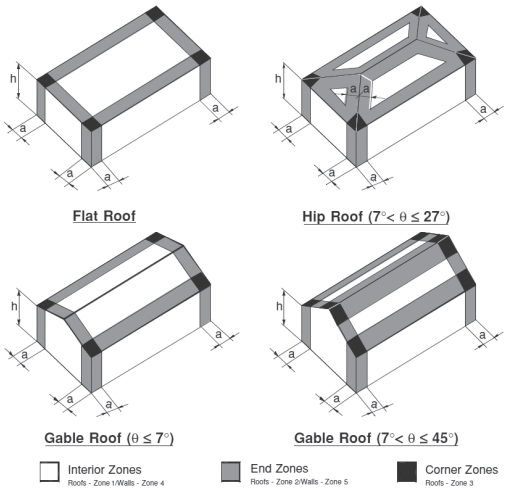
Topographic Factor

When a building is located on isolated hill, ridge or escarpment that is unobstructed by other similar topographic features, then a topographic factor greater than 1.0 is used to account for the wind speed-up effects. Otherwise use a topographic factor value of 1.0.

4.3 > Gather Building Information

While on site, gather the following information that will be used to determine design loads and system layout and configuration:

1. Average Roof Height
2. Least Horizontal Dimension
3. Roof Zones
4. Roof Slope
5. Roof Type
6. Attachment Type
7. Rafter Dimensions
8. Rafter Spacing
9. Determine (measure) Mounting Area



4.4 > Create Array Layout and Bill of Material

Creating an array layout and bill of material can be done manually or with the use of the Zepulator online design tool. If using the Zepulator, go to www.zepulator.com. If configurating you array manually, follow the instructions below.

Locate The Array

As a starting point for creating your array layout, determine the module manufacturer and model and the length and width of that module. Next, determine number of modules, row/column configuration, and module orientation. Zep System II arrays can be installed in both lasscape and portrait orientations.

Next, determine the overall array dimensions – calculating a ½" gap around each module at every vertical and horizontal Module seam. After determining the location of the array, determine what roof zones the array is in and note any modules that are in edge or corner zones.

Configure the Components

After determining allowable span and cantilever, layout the locations of the Leveling Feet accordingly. The maximum cantilever at the edge of the array is determined by multiplying the maximum span by 0.33. In the example below, the maximum foot spacing 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 4.4A, the cantilever originally exceeded the allowable value so Leveling Feet (solid circles) were placed on the rafters closest to the edge of the array to meet the cantilever requirements.

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 4.4B, distance A represents the Cantilever Allowance whereas distance B represents the area where a Leveling Foot can be attached (End-Foot Zone). In Figure 4.4B, 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.

Identify Interlock Locations

Locate Interlocks at in a nominal east-west orientation at every module corner excluding corners that are located at the nominal east and west edges of the array.

Identify Hybrid Interlock Locations

If the location of an Interlock prevents locating the Leveling Foot on a desired rafter, simply replace the Interlock with a Hybrid Interlock or shift the array to the east or to the west until all the conflicts have been eliminated.

Identify Thermal Expansion Joint Locations

After the array layout is determined, verify that thermal expansion and ground bond allowances are not exceeded. The array requires a thermal expansion joint at every sixth vertical Module seam. In order to accomplish a thermal expansion joint, the Interlocks installed at the expansion joint must be only partially attached 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 expansion joint requires its own Ground Zep. If the array exceeds 12 Modules high (per column) an additional thermal expansion joint and ground break is required. One Ground Zep is required for each array portion segmented by thermal expansion joints/ground breaks and a ground bond jumper must be installed between Ground Zeps.

Calculate Bill of Material

After configuring the components, count each component to create a bill of material. **Note:** Often times the actual roof dimensions and rafter or purlin schedules differ from the information collected during the site visit and layout modifications are necessary. For this reason, it is recommended that you have extra hardware (10%) available to account for unforeseen changes in layout configurations.

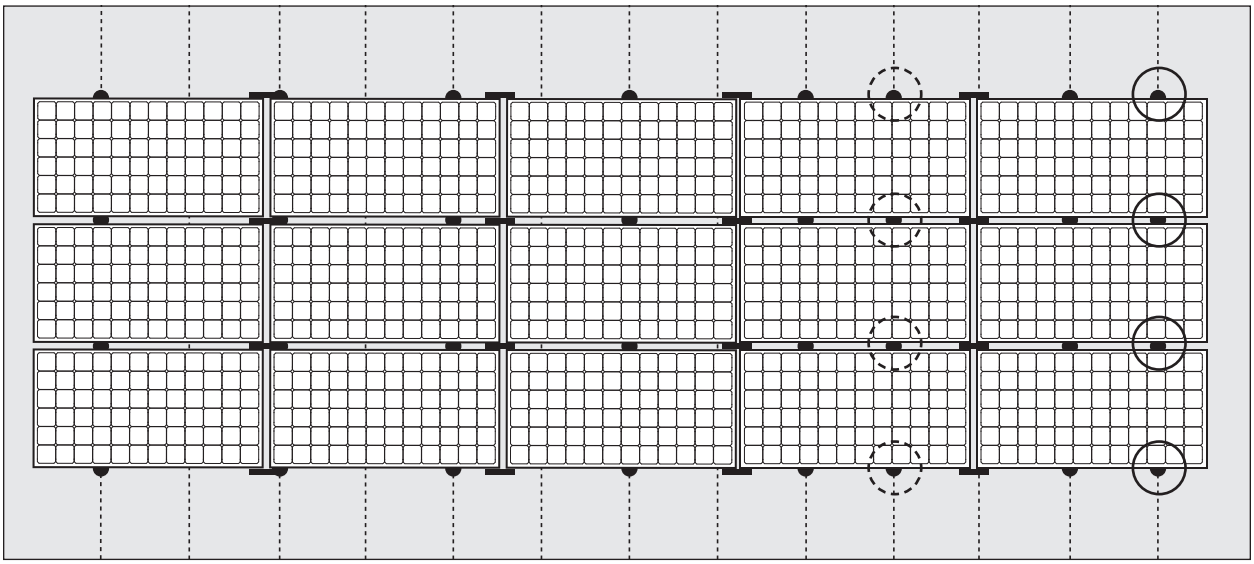


Figure 4.4A — Identifying Leveling Feet and Interlocks

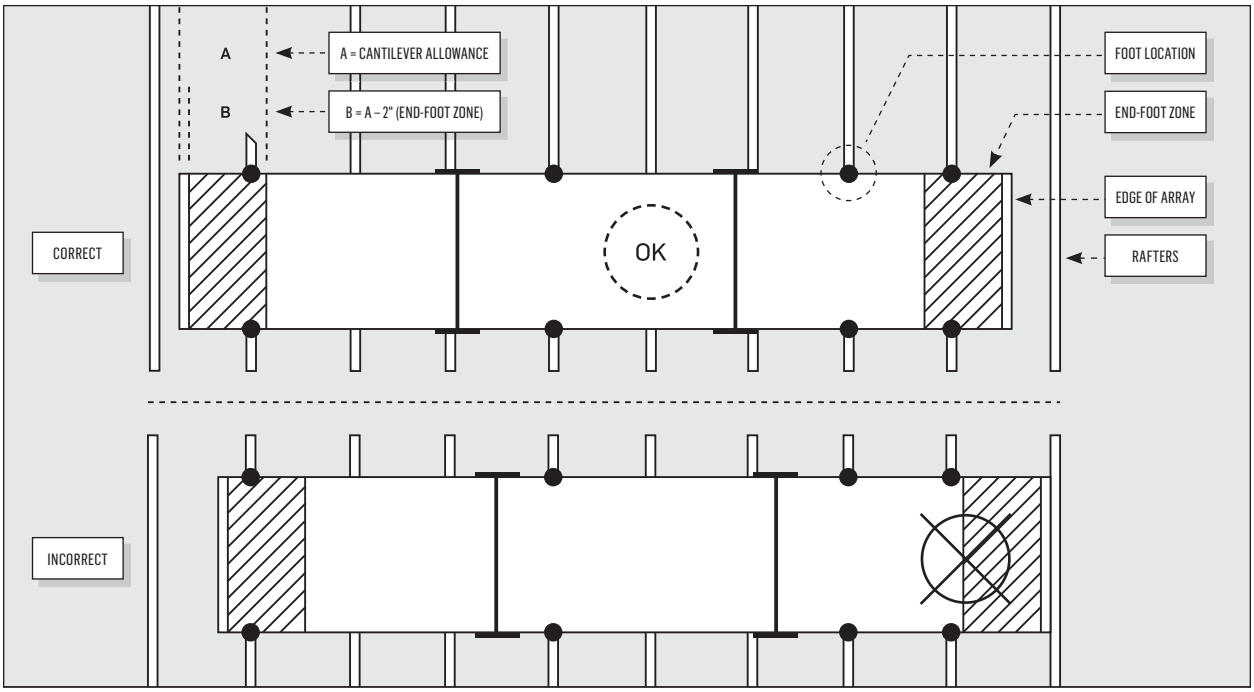
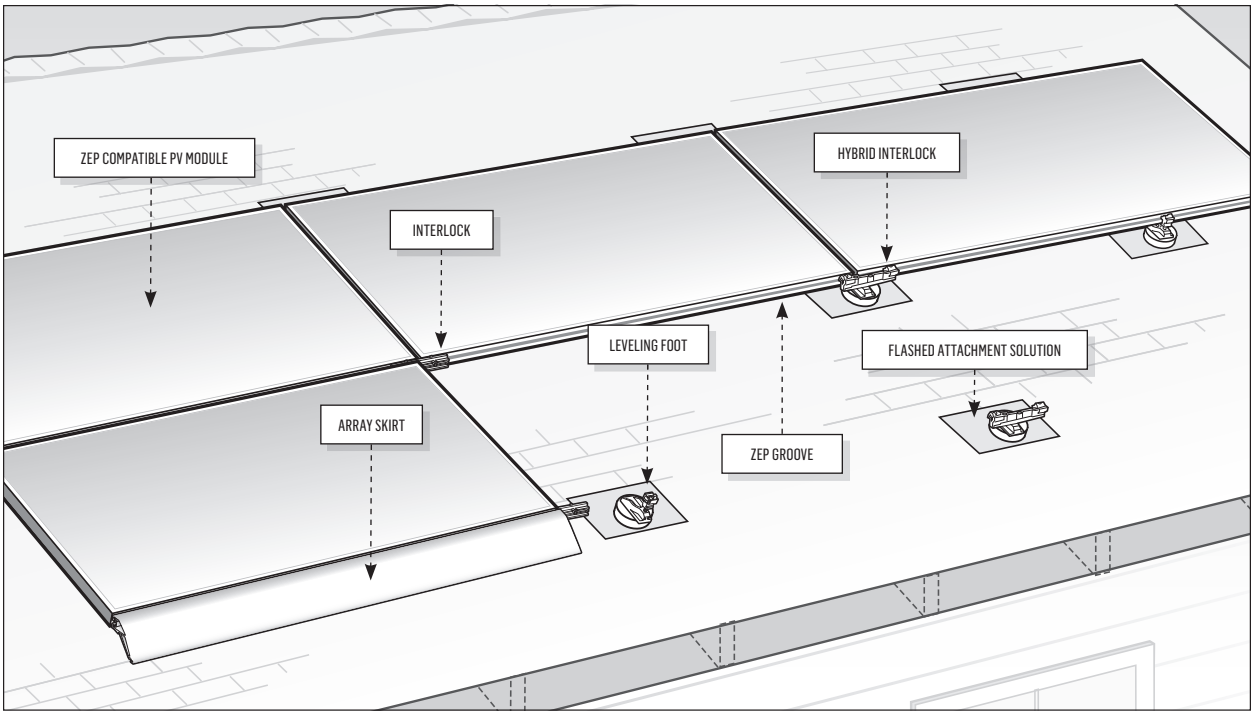


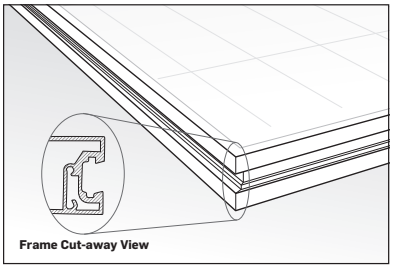
Figure 4.4B — Cantilever Allowance

5.0 > Mechanical Installation

This section details the procedure for installing a Zep System II PV array. For illustration purposes, the figures show the use of the Comp Mount flashed attachment solution. However, this section does not intend to provide instructions on how to install the Comp Mount. For instructions on how to install the Comp Mount, visit the Resources page of the Zep Solar website at www.zepsolar.com/resources.

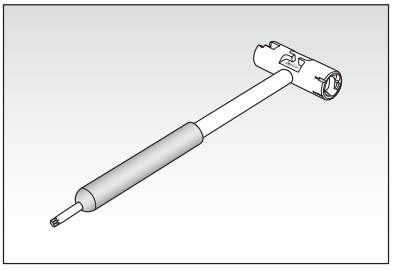


Zep Groove



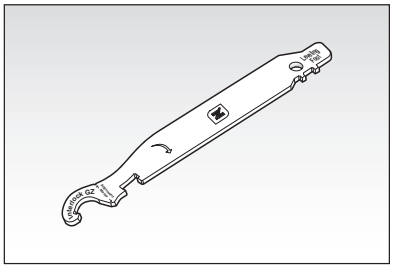
Zep System II is installed with Zep Compatible PV modules whose frames have been manufactured with the **Zep Groove**.

Zep Tool



The **Zep Tool** is used to install the Interlock, Leveling Foot, Hybrid Interlock, and Ground Zep. It also receives a T30 Torx bit for easy array leveling.

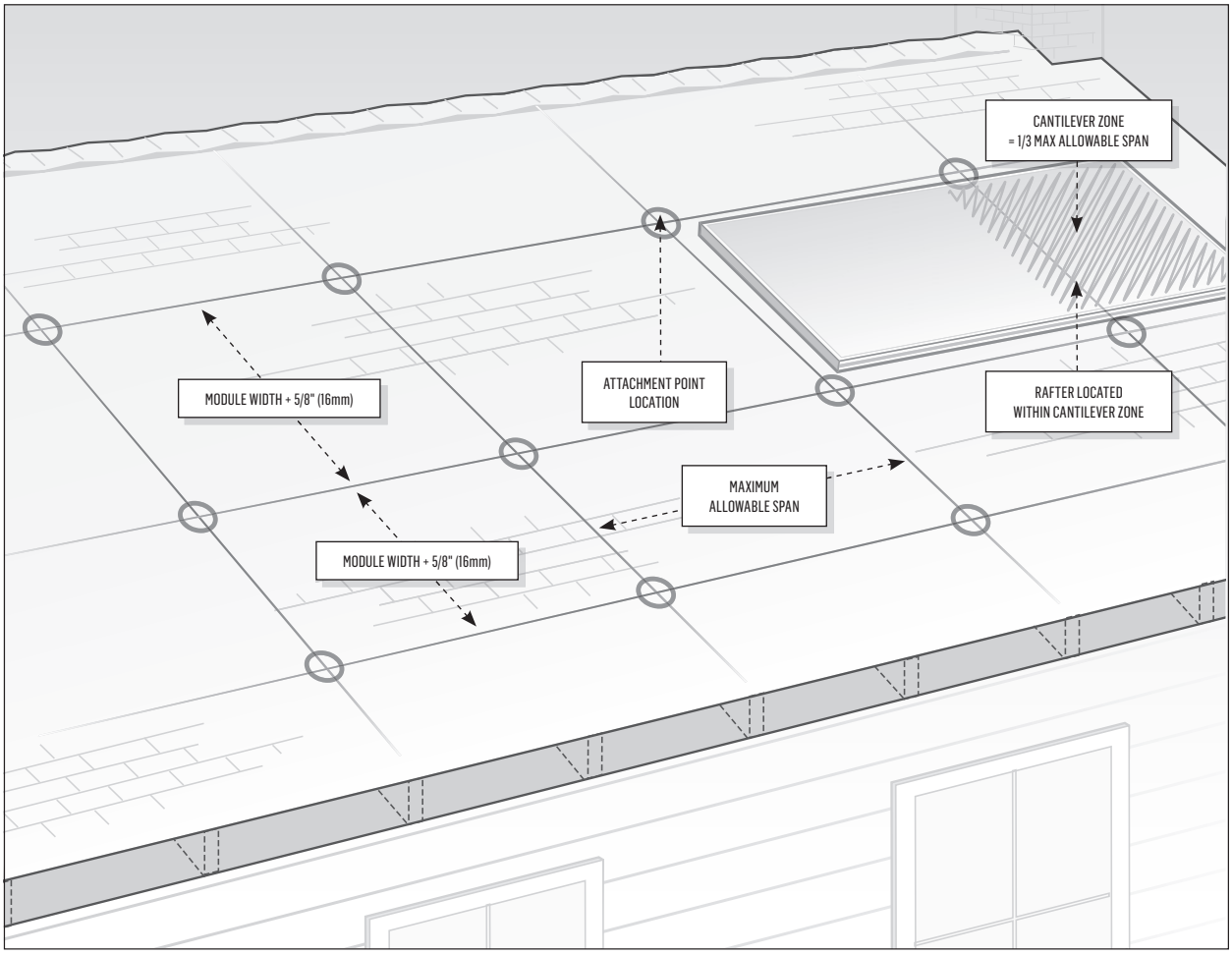
Flat Tool



The **Flat Tool** is used to remove an Interlock between two modules for the purpose of module or Array Skirt removal.

Step 1: Array Layout

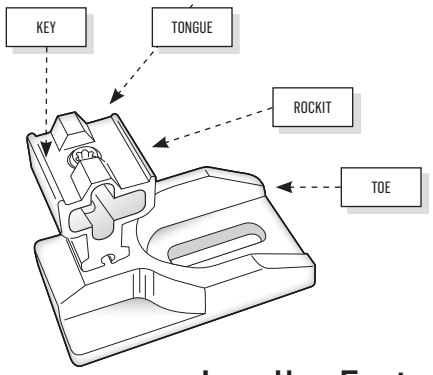
1. Visit: www.zepsolar.com, and click the “Zepulator” link in the upper, right-hand corner, to access the Zepulator online design tool. The Zepulator will assist with your layout design, specify attachment-point span and cantilever allowances, and generate a bill of materials for your project.
2. Obtain your PV module dimensions in order to determine north-south spacing of foot locations. North-South spacing equals your module width plus ⅝".
3. Once you have determined your north-south spacing and your allowable foot spans and cantilevers, determine your roof attachment point layout accordingly. Check to make sure that there is a rafter located within the allowable cantilever at both east and west edges of the array. If not, adjust array location east or west.
4. After attachment point locations have been determined, snap chalk-lines to mark rafter locations (north-south) and the locations of each row of attachment points (east-west).



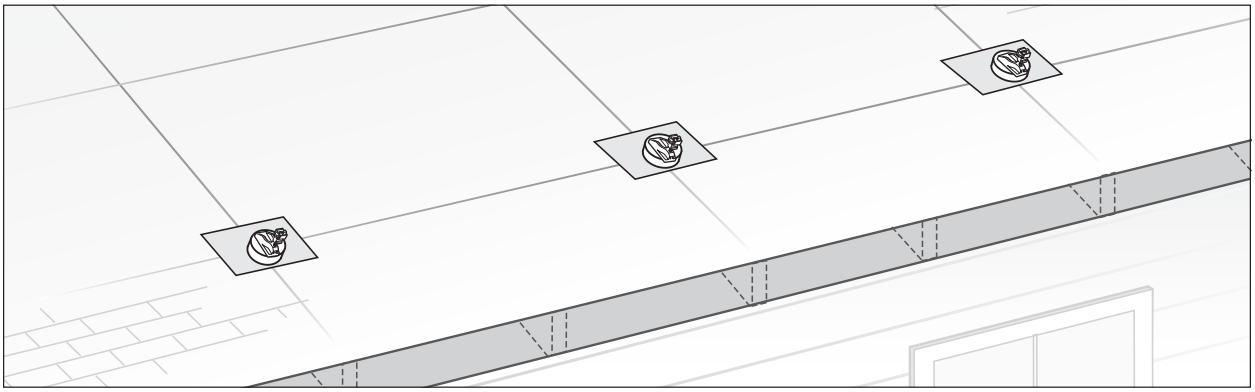
Step 2: Install Front-row Leveling Feet

Install front-row Leveling Feet with Toe and Tongue-side up-roof. Attach to the roof framing or flashed attachment hardware according to job requirements. This Guide illustrates Leveling Feet installed on Comp Mount flashings.

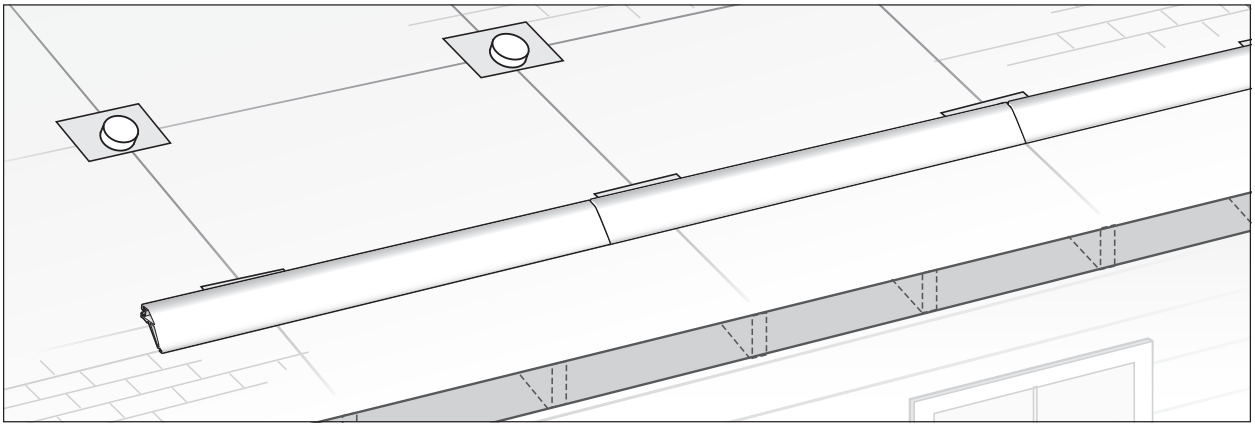
For complete instructions on layout and installation procedures for Comp Mounts, see the Comp Mount Instructions on the Resources page of the Zep Solar website at: www.zepsolar.com/resources.html



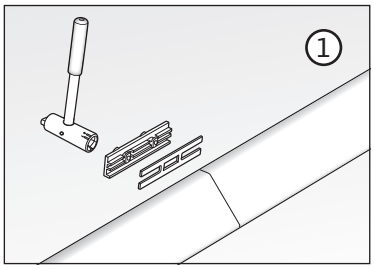
Leveling Foot



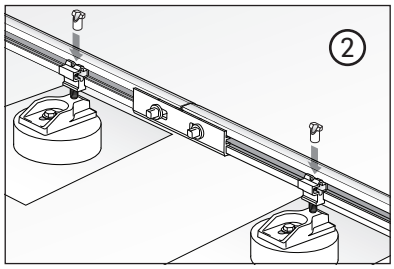
Step 3: Install Array Skirt



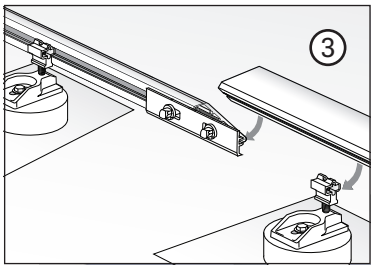
(If you do not wish to use the Array Skirt, couple the first two modules together along their upper and lower edges following the interlocking procedure on Page 19. Drop the coupled modules onto the west-most set of Leveling Feet, according to the drop-in procedure outlined on page 18, and proceed with instructions.)



With the Spacer between the Array Skirt and the Interlock, interlock the first two sections of skirt together. Install the Interlock (see page 18).



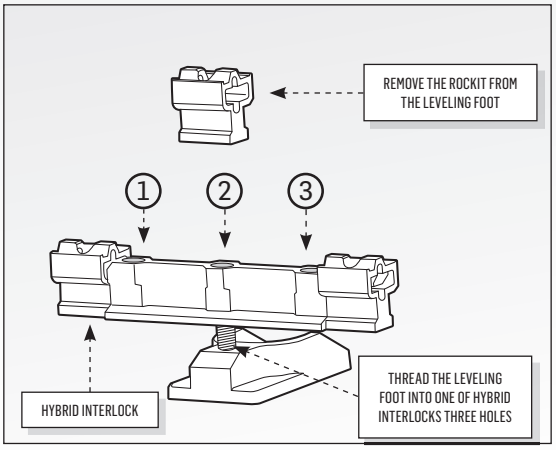
Attach these sections to the front row leveling feet by resting on the key and rotating downward. To lock the skirt in place, push jams into Rockit.

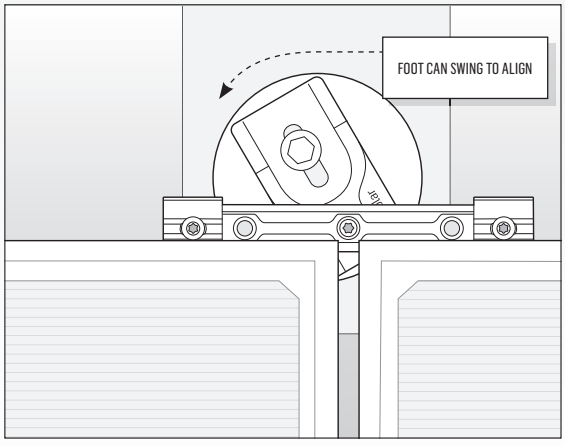


Attach additional sections by butting the joints together, and rotating downward into place. After all sections are installed, level the Array Skirt (see page 19).

Hybrid Interlock

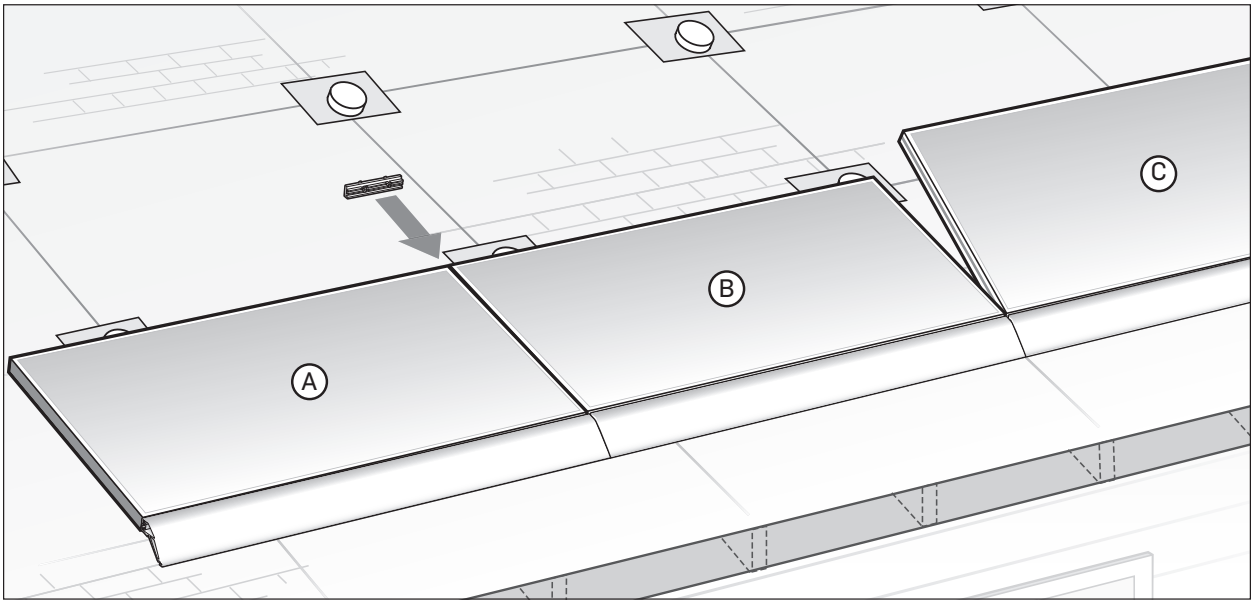
If, at any time during the course of the installation, there is a need to install a Leveling Foot at an Interlock location, the upper portion of the Leveling Foot (known as the Rockit) is removed and replaced with a Hybrid Interlock. The Hybrid Interlock will then serve as both a Leveling Foot and an Interlock. There are three holes in the Hybrid Interlock to choose from when connecting the Foot Stud. The Foot Stud is threaded into the hole that allows the Foot to reach the rafter, or flashed attachment assembly, while allowing the Hybrid Interlock to be installed in the center-most position with respect to the module or Array Skirt seam.

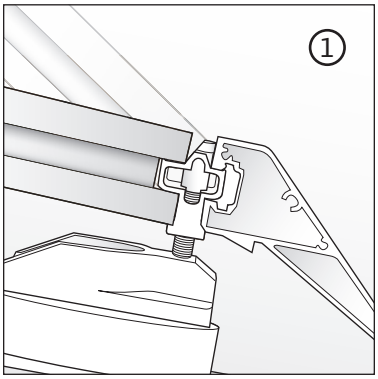




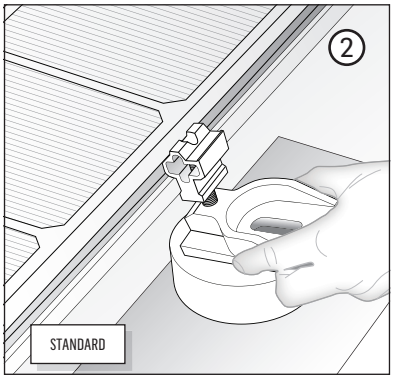
Rock the Key side of the Hybrid Interlock into the Zep Groove of a module pair or Array Skirt in the same fashion as you would the Leveling Foot (see page 18). Because there are two Rockits per Hybrid Interlock, it may be necessary to use the Zep Tool to provide extra leverage when installing.

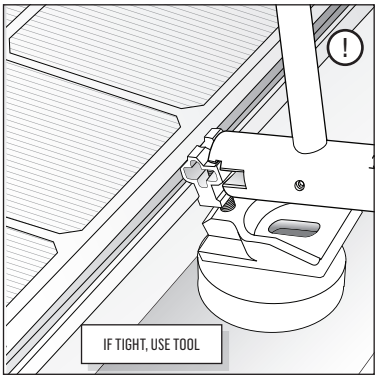
Step 4: Install First Row of Modules





Drop the first module into place by setting the Groove on the Tongue of the Leveling Foot and rotating downward while applying downward pressure.



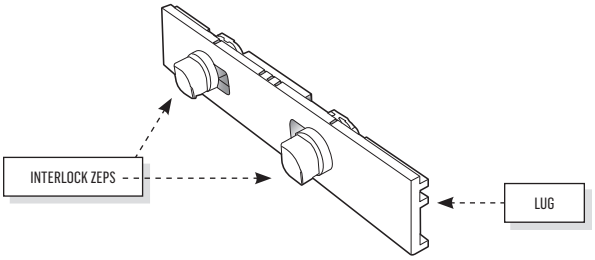


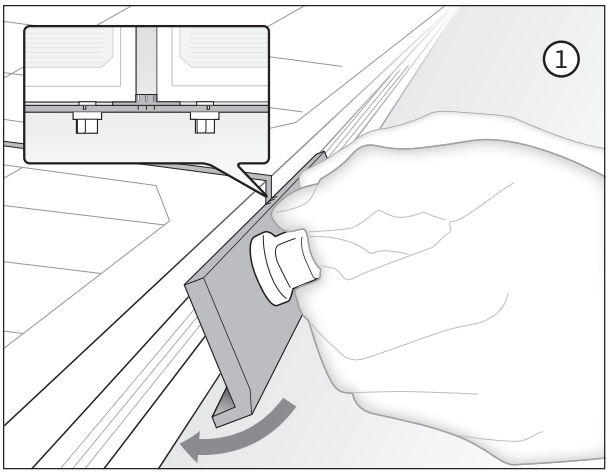
After dropping in the first module, install a Leveling Foot along the upper edge of the module over the attachment point. To install, engage the Key of the Leveling Foot into the Zep Groove at a 15˚ angle and rotate downward. Then, attach to the structure per job requirements. If there is too much resistance when trying to install by hand, use the Zep Tool to aid the installation.

Repeat this procedure with the second module, maintaining an approximate ½" between modules. Then, interlock modules (A) and (B) along their upper edge according to the procedure outlined on the following page. Connect and manage module wiring per job requirements.

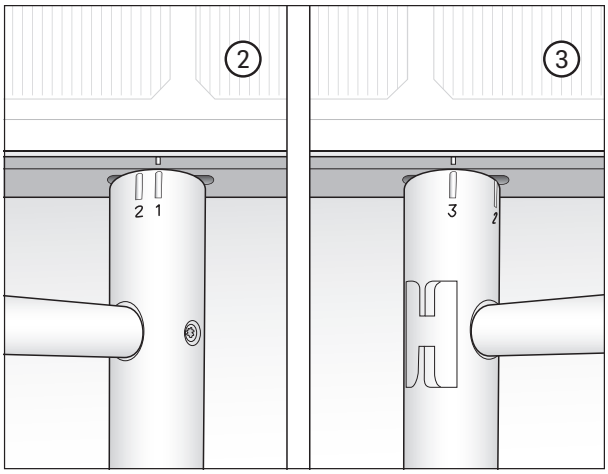
Step 5: Interlock Installation

The Interlock provides north-south and east-west structural and grounding connections, creating a structurally contiguous, hyper-bonded array. ETL listed to UL 1703.

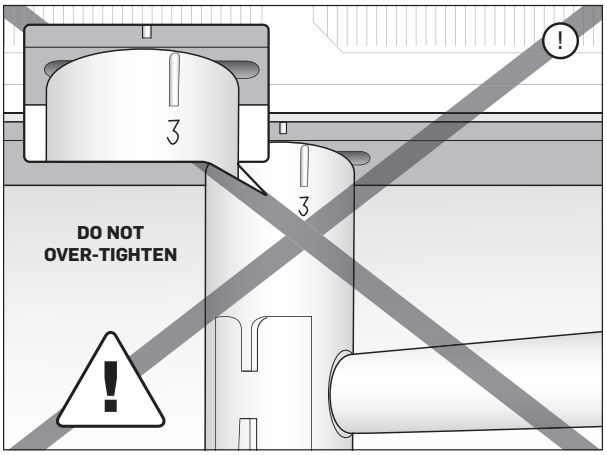




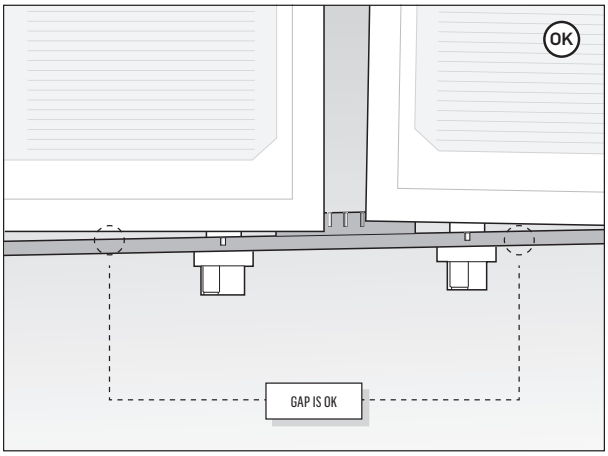
Estimating a ½" gap between modules, engage Interlock into groove at an angle. Push "lug" into groove with a sweeping forward/upward motion.



With Interlock engaged into Module groove, rotate each Interlock Zep from position **1** to position **3** while maintaining the ½" gap between modules.

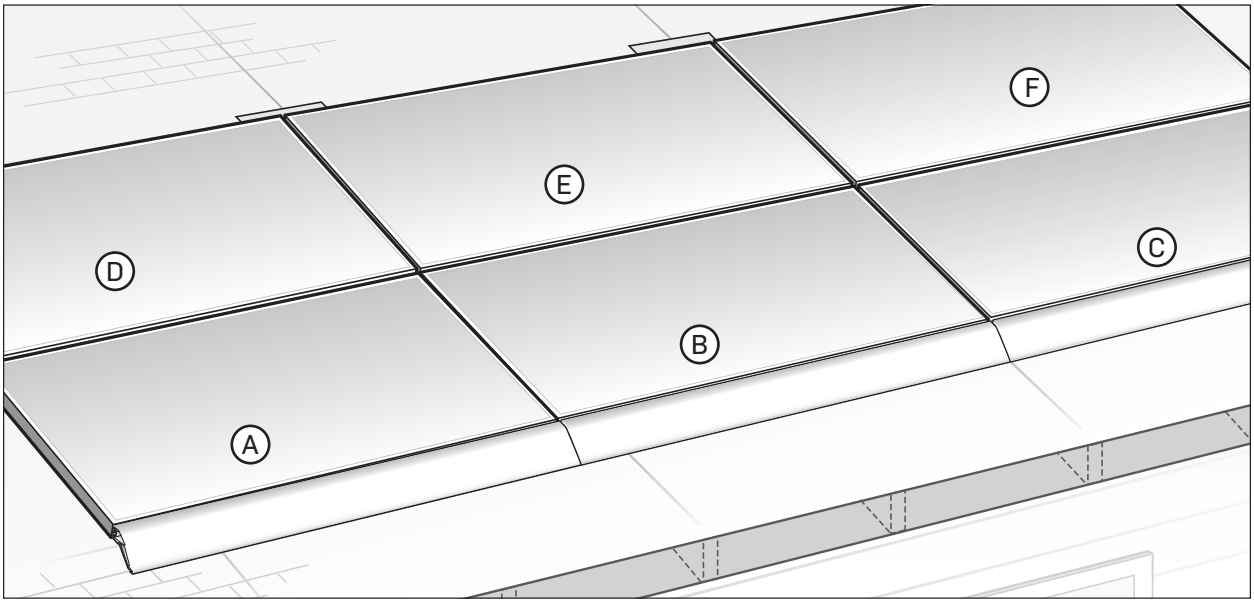


DO NOT over-rotate Interlock Zep. Stop rotating when position **3** is lined up with the alignment mark.



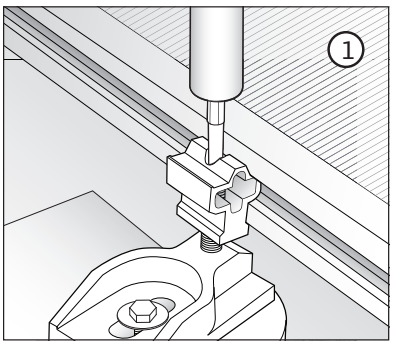
Note that a gap between Interlock and Module is ok. Also, Interlocks can be installed at an angle to take up variation in Module dimensions.

Step 6: Install Remaining Modules



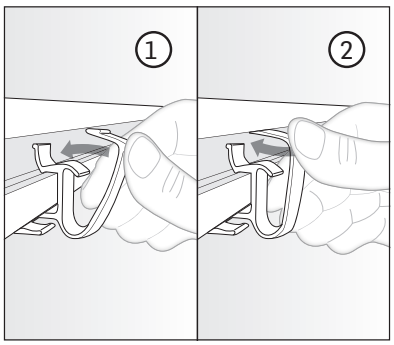
Install each additional module along the first row. Add Leveling Feet along the top edge of each module and an Interlock at each north-south seam as before. After completing the first row, check that the array is level and adjust the elevations of the Leveling Feet as needed according to the instructions below. Then repeat the module installation procedure for all subsequent rows until the array is completely installed.

Array Leveling

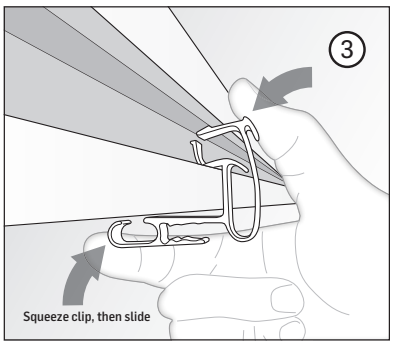


After Leveling Foot is attached to roof, adjust height of the array by rotating a #30 Torx bit (bit attaches to the handle end of the Zep Tool).

Wire Clip Installation



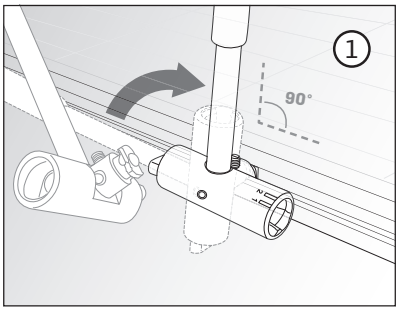
Fully push bottom portion of wire clip into Module groove. Then push top of wire clip inward until it clips into Module groove.



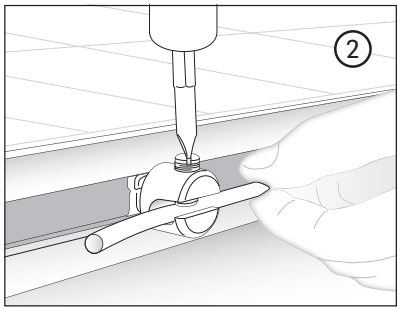
Once wires have been placed in wire clip, squeeze wire clip as shown above and slide along groove to achieve desired wire tension.

Step 7: Grounding

To connect the array to a grounding system, install a Ground Zep in the Zep Groove of a module. Install one Ground Zep for every section of array that is not conductively isolated by a thermal expansion joint (up to 72 modules per Ground Zep). See below for more information on thermal expansion joints.



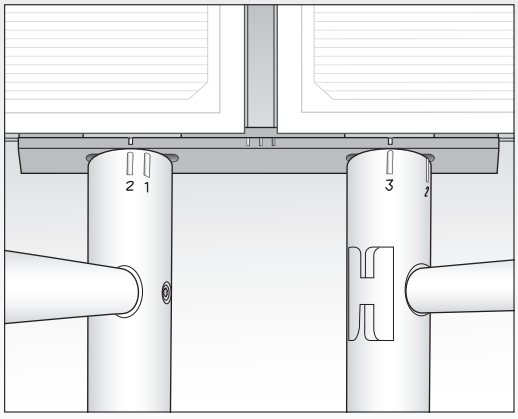
Use the Ground Zep "Driver" on the Zep Tool to push the Ground Zep "Key" into the Module groove. Rotate exactly one quarter turn **clockwise**.

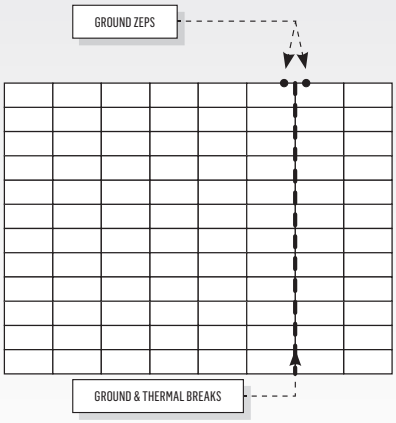


Push Equipment Grounding Conductor (EGC) into wire slot and tighten set screw to proper torque setting (see table to the right).

Ground Wire AWG	Torque in In-Lbs.
14 AWG	40 LBS.
12 AWG	40 LBS.
10 AWG	40 LBS.
8 AWG	45 LBS.
6 AWG	50 LBS.
4 AWG	50 LBS.

Thermal Expansion Joints





Thermal Expansion Joints allow for the expansion and contraction of metal under thermal conditions. An east-west run of modules that is greater than 6 module lengths (landscape) or 12 module widths (portrait) requires a Thermal Expansion Joint. To create a Thermal Expansion Joint, install an Interlock with one Interlock Zep rotated to position **3** while leaving the other at position **2**, allowing the Interlock to slide in response to thermal conditions.

6.0 > 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 war- rants 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 reason- able 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 refund 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 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 Product, 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.