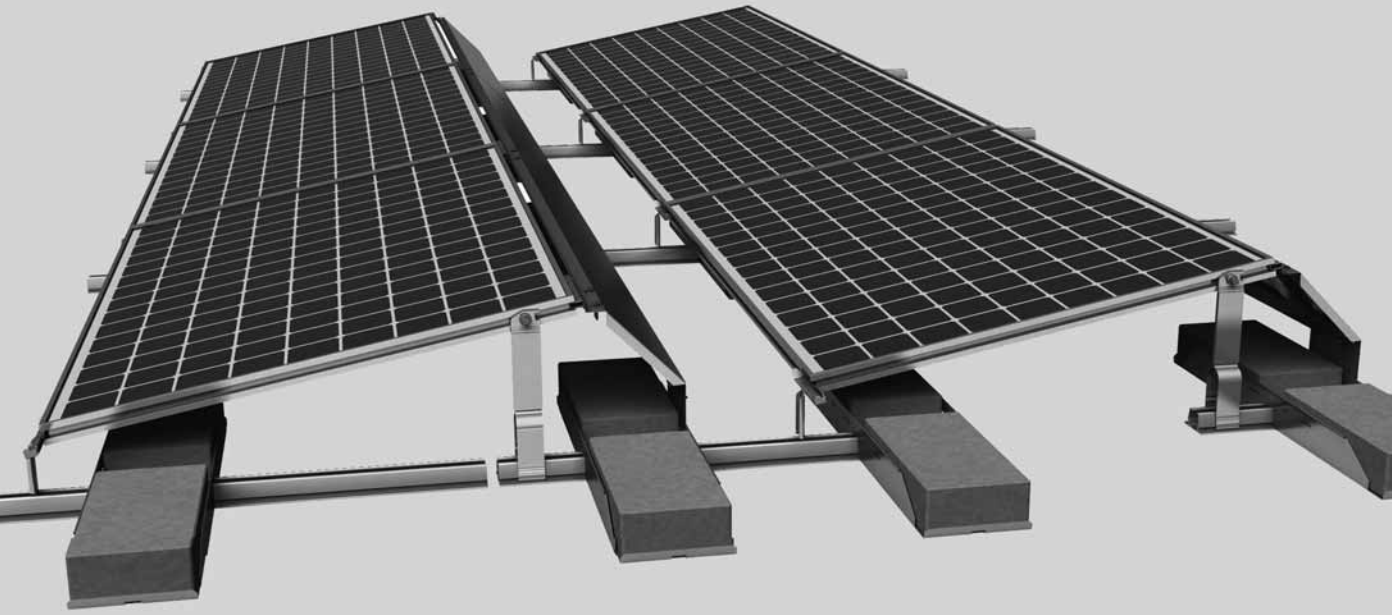
ZepSolar

800-0354-001 REV. A



ZS Aero

FOR COMMERCIAL FLAT ROOFS
Installation Manual (USA)

THIS MANUAL CONTAINS SAFETY, INSTALLATION, CONFIGURATION AND TROUBLESHOOTING INSTRUCTIONS FOR YOUR ZS AERO (USA). ZEP SOLAR, INC. RECOMMENDS THAT YOU SAVE THIS MANUAL IN A READILY ACCESSIBLE LOCATION SHOULD YOU EVER HAVE ANY QUESTIONS ABOUT YOUR ZS AERO.

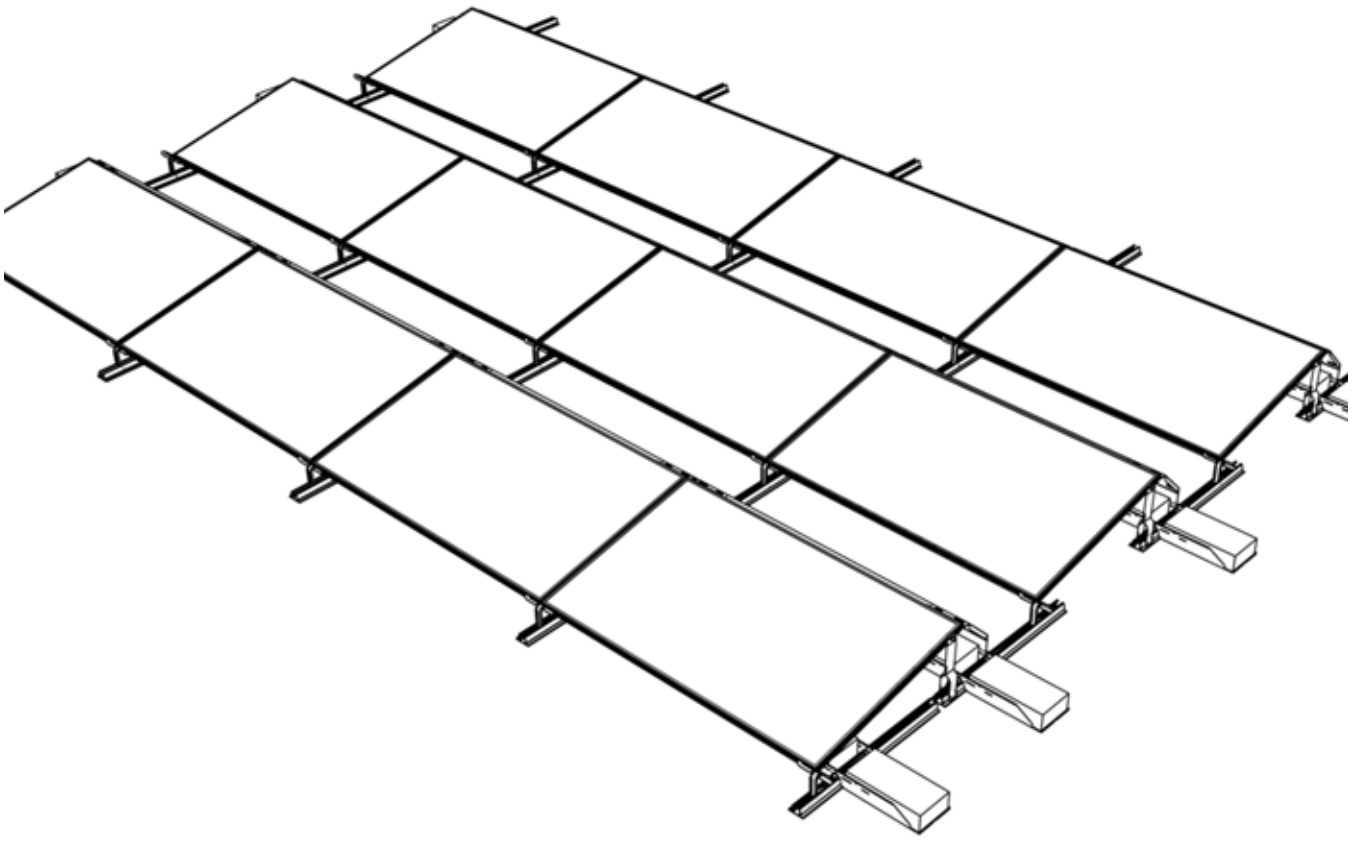
WARRANTY VOID IF NON-ZEP-CERTIFIED HARDWARE IS ATTACHED TO THE ZEP GROOVE OF A ZEP-COMPATIBLE PV MODULE FRAME.

Table of Contents

1.0

Getting Started

ZS Aero from Zep Solar, Inc. offers the fastest and least expensive way to mount commercial rooftop PV arrays on flat roofs using a series of drop-in and quarter-turn connections to greatly accelerate the process. Structural and grounding connections are accomplished using very few parts and no mounting rails. The simplicity of installation delivers labor and logistics savings.



1.1 - ZS Aero Overview

ZS Aero from Zep Solar, Inc. is designed for use on flat roofs. The ballasted mounting system preserves waterproofing by eliminating the need to drill through the roof and also offers high wind resistance. The low number of parts and elimination of fixed mounting rails makes installation much faster and easier than comparable systems; just lay out a few lines, and place the first Row Connectors in their locations. The Rear Legs twist and snap into place in both the Zep-compatible PV modules and Row Connectors and ensure a uniform 11-degree array angle for increased power production. Ballast Pans fit over the Row Connectors to secure the array to the roof, and Wind Diffusers streamline the array to increase wind resistance. Most components snap together and provide both tactile and audible feedback to indicate proper installation.

1.2 - Features & Benefits

ZS Aero offers the following features and benefits:

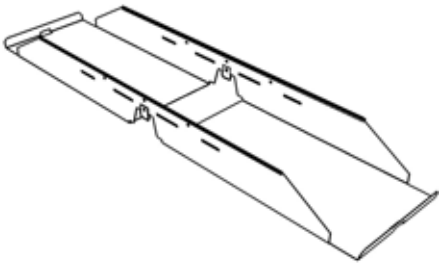
- **Rapid installation:** Installation is fast and easy from planning to assembly. Only a few basic lines need to be laid out and components simply drop in and-or twist into place with quarter turns. Tactile snaps and audible clicks tell you when parts are properly installed. No special tools are required to assemble the array.
- **Ultra-low parts count:** Only 10 separate components are required to build a complete array in addition to the PV modules and ballast blocks. Components do not need to be cut or fastened to the roof.
- **Drop-in connections:** PV modules drop into the Front Legs. Rear Legs twist into place on the modules and drop onto the Row Connectors. Ballast Pans drop over the Row Connectors. Ballast blocks drop into the Ballast Pans.
- **Compatible with high-wind and seismic Zep accessories:** ZS Aero is rated to wind speeds in excess of 100 miles per hour. Additional ballasting options are available for installations in high-wind areas. Additional accessories available from Zep Solar, Inc. can be purchased to increase both wind loading and seismic loads.
- **11-degree tilt angle:** The built-in 11-degree angle helps maximize solar power production while preventing power-robbing debris from accumulating on the modules.
- **Ground Zep:** A Ground Zep connects each row of the array to electrical grounding. The grounding system has been tested to UL 467 as a grounding and bonding device. ZS Aero offers ultra-low resistance grounding that is 10x better than UL minimum criteria.
- **Automatic Grounding:** ZS Aero is self-grounding. There is no need to separately ground each module or component parts. Just add one Ground Zep to the end of each row.

1.3 - Components

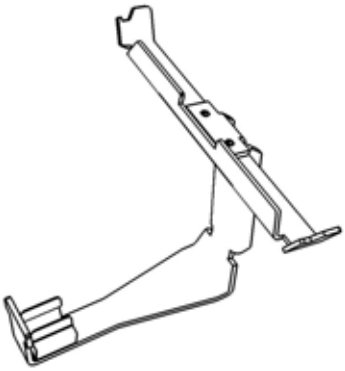
ZS Aero consists of the following components (PV modules and ballast blocks not shown):

Row Connector

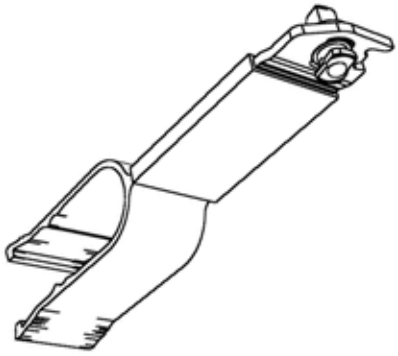
Ballast Pan



Front Leg

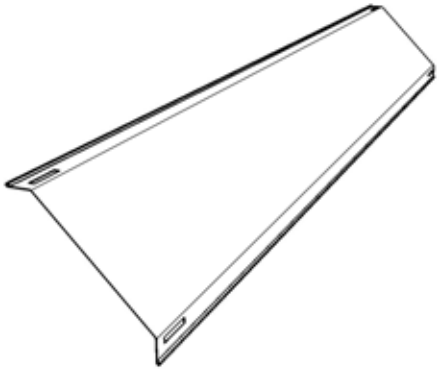


Rear Leg

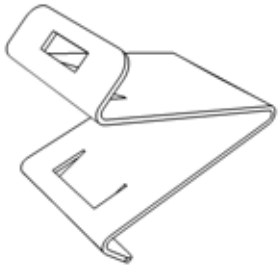


Diffuser Support

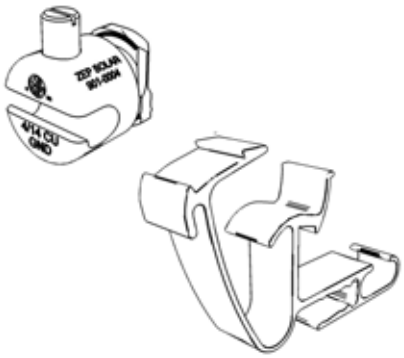
Wind Diffuser



Diffuser Clip



Ground Zep & Wire Clip



1.4 - Additional Items

You will also need the following additional items:

- **Cinder blocks:** You will need two (2) 26-pound cinder blocks, nominal dimensions 4”x8”16” per Ballast Pan.
- **Zep Tool:** The Zep Tool is used for Ground Zep installation and module removal.
- **Rear Leg Removal Tool:** This tool is used with a #55 Torx bit to remove Rear Legs when servicing a module.

Zep Tool

Rear Leg Removal Tool

1.5 - For Further Information

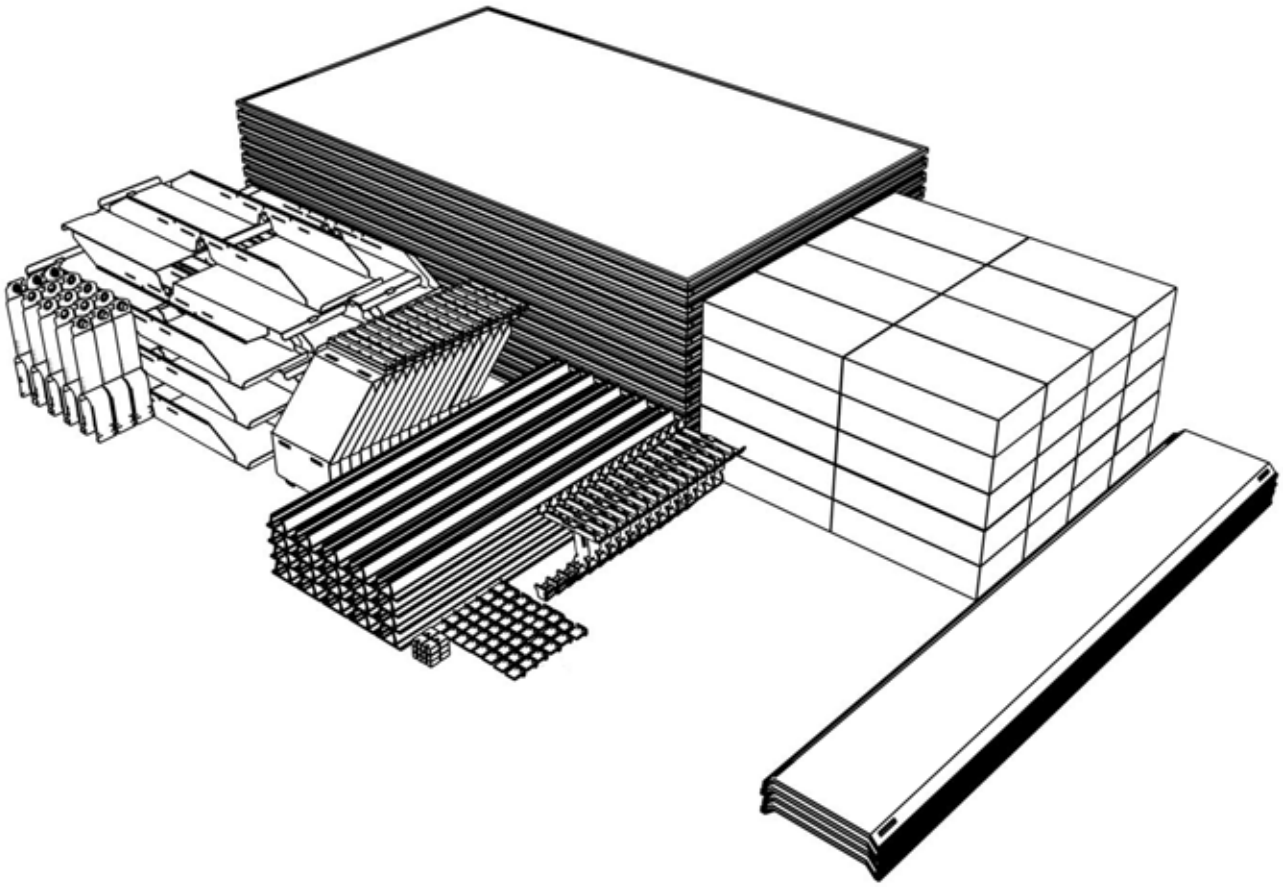
Additional information about ZS Aero is available online at www.zepsolar.com. The available resources include:

- **Datasheet:** The ZS Aero datasheet contains technical details and specifications.
- **Videos:** Watch installation tutorials to further familiarize yourself with the installation process.
- **Distributors:** Locate a Zep Solar distribution partner who can supply you with Zep Solar parts and accessories for all of your solar needs. The Zep Solar, Inc. web site also includes links to manufacturers of Zep-compatible PV modules.
- **Supplemental documentation:** Additional documentation varies by product and may include engineering certifications, supplemental installation instructions, updates, and more. You may also download CAD models of Zep Solar parts to help you design your array.
- **Training:** Zep Solar, Inc. offers training sessions that provide hands-on opportunities to use the products and ask questions.
- **Support:** See the support options available to you and get the help you need.
- **Contact:** Contact Zep Solar, Inc. for any information that you are not able to obtain using the available online resources.

2.0

Safety Precautions

All instructions in this Installation Manual and all instructions in the installation manual provided by the PV module manufacturer must be read and understood before attempting to install ZS Aero. 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

- 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.
- Follow all safety precautions contained in both this Installation Manual and the module installation manual.
- Always comply with all applicable OSHA or equivalent safety standards including but not limited to the proper use of regulation fall-protection equipment.
- Do not perform any installations in wet or windy conditions.

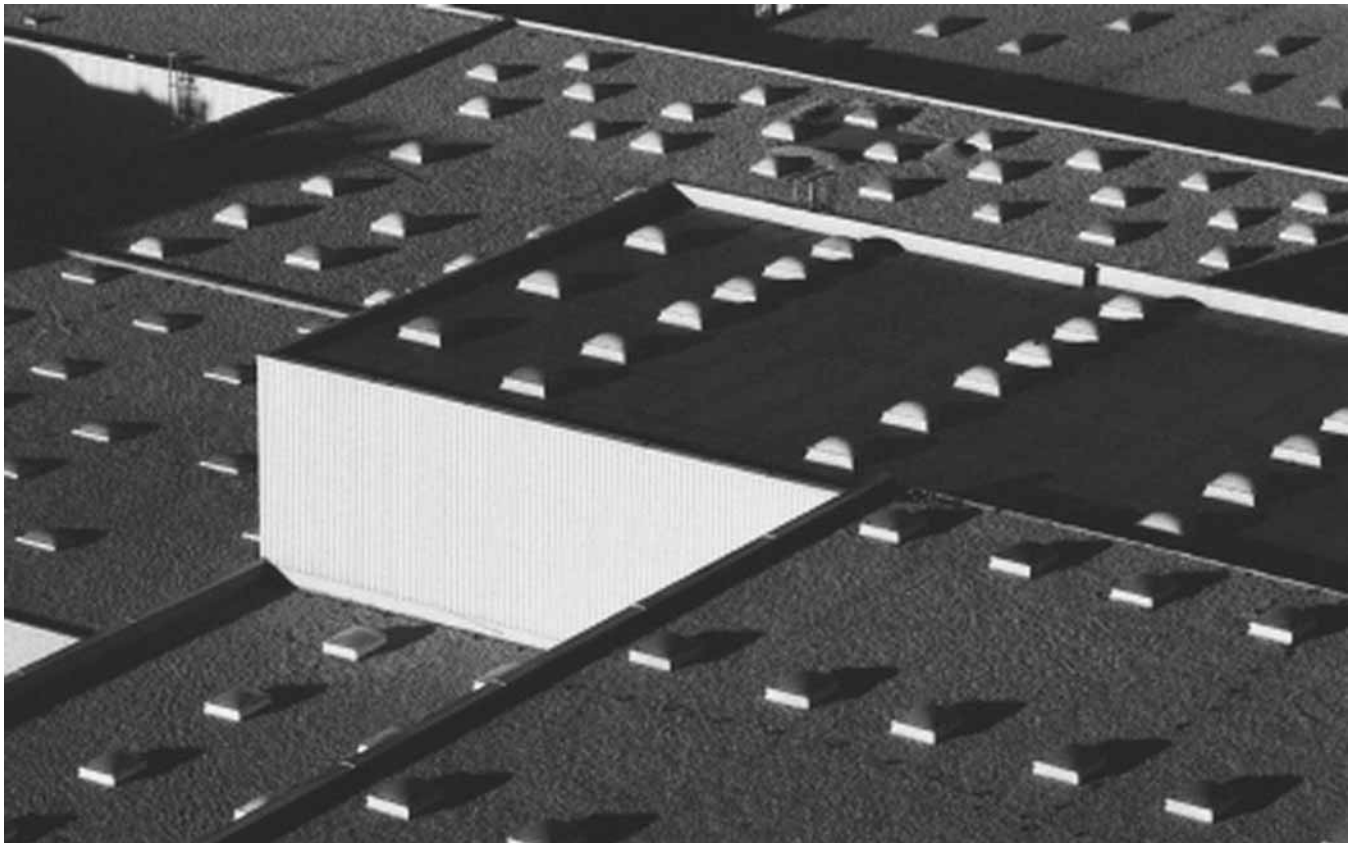
2.2 - Installation Safety

- The installation must conform to the details on the Project Assessment Package and Design Guidelines provided by Zep Solar, Inc.
- All installation and servicing must be performed by qualified personnel. You are responsible for ensuring that all personnel are properly trained and licensed.
- You are responsible for knowing and following all applicable codes and regulations and for obtaining all required permits and inspections.
- Check applicable building codes or refer to a structural engineer to ensure that the structure upon which ZS Aero is being installed can properly support the array under live load conditions.
- ZS Aero must be installed over an appropriately rated fire resistant roof covering.
- The front and Rear Legs must be fully engaged with both the PV modules and Row Connectors. You will feel a snap and hear a click when legs are properly installed.
- Always use appropriate personal protective equipment (PPE) such as goggles, gloves, hard hat, etc. as needed and as required by local regulations and best practices.
- Never expose the PV modules to excessive loads or deformation such as twisting or bending.
- Some components may be heavy and/or bulky. Always use proper lifting and carrying techniques when handling components and materials at the job site.
- The installation process involves working around high-voltage electrical equipment. Follow applicable safety regulations and best practices to avoid creating an electrocution hazard.
- The installation process requires working on roofs. Follow applicable safety regulations and best practices to avoid a fall. Use caution to prevent objects from falling or dropping off the roof area. Cordon off ground areas directly below roof-related work when possible.

3.0

System Design Process

ZS Aero is designed for use on flat roofs. This chapter provides a high-level overview of the process of assessing and planning a prospective ZS Aero installation. Each installation is unique and has unique requirements that go beyond the high-level overview included in this manual. Please contact Zep Solar, Inc. for more details.



3.1 - The Site Planning Process

In order to determine if ZS Aero is appropriate for a specific project, please follow the design process detailed below:

1. Contact Zep Solar, Inc. and ask to speak to a member of our Sales team. You will be asked some basic questions about your project to assess whether ZS Aero is appropriate for your site and building conditions. Please be prepared to discuss project location, system size, module type, roof height, slope, membrane type, etc. to help determine initial feasibility.
2. If the project meets the initial qualifications, you will receive a Site Assessment Form to complete and return to Zep Solar, Inc. along with photos of the site and roof and your proposed array layout.
3. Once Zep Solar, Inc. receives your completed Site Assessment package, a member of our Applications Engineering department will review your documents and create a Project Assessment Package including a Bill of Materials once the project has been approved.

CAUTION - The installation must conform to the details on the Project Assessment Package and Design Guidelines provided by Zep Solar, Inc. Failure to do so may void your warranty and may lead to premature system failure, resulting in property damage and/or personal injury.

3.2 - Assessment Information

Each site assessment form (Step 2, above) must include the following information:

- Site location
- Project Information (installation date, size in kW, PV module make/model/quantity)
- Site details (wind speed, snow, distance from shore, exposure, occupancy, seismic)
- Building and roof details (dimensions, slope, age, roof type, etc.)
- Any additional pertinent information

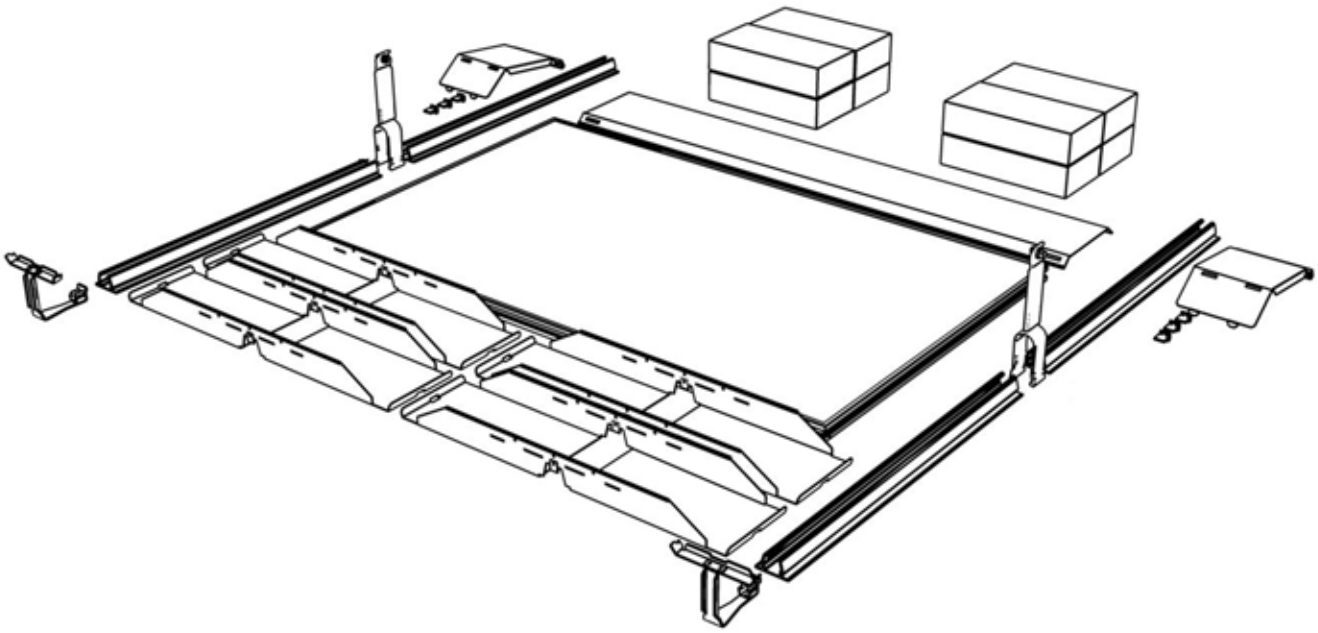
3.3 - Getting Started

Please contact Zep Solar, Inc. to begin planning your ZS Aero installation if you have not done so already. Contact information can be found online at www.zepsolar.com.

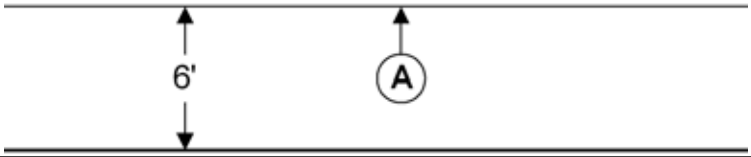
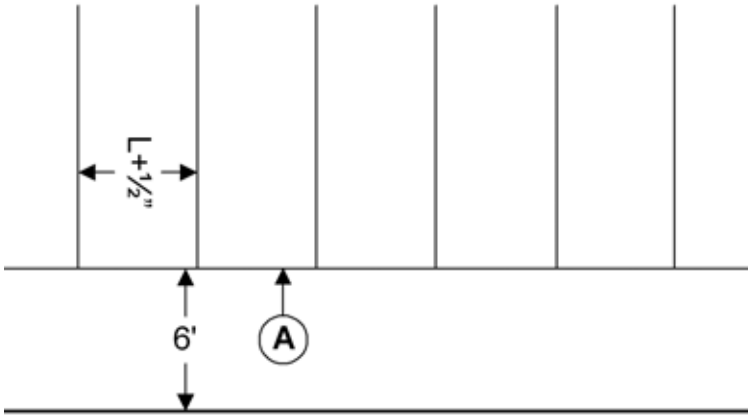
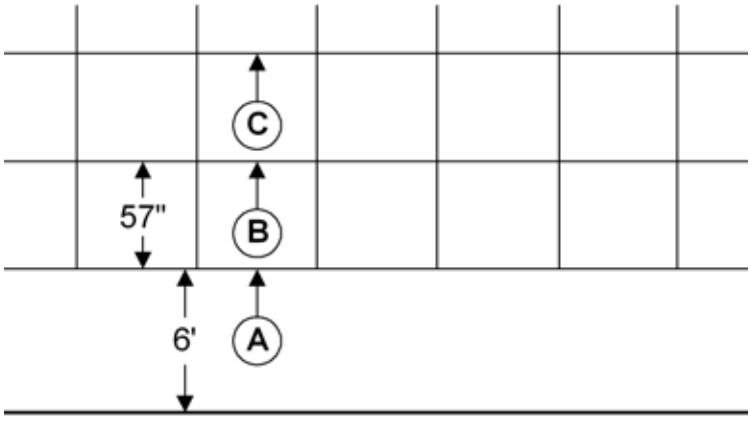
4.0

Installation

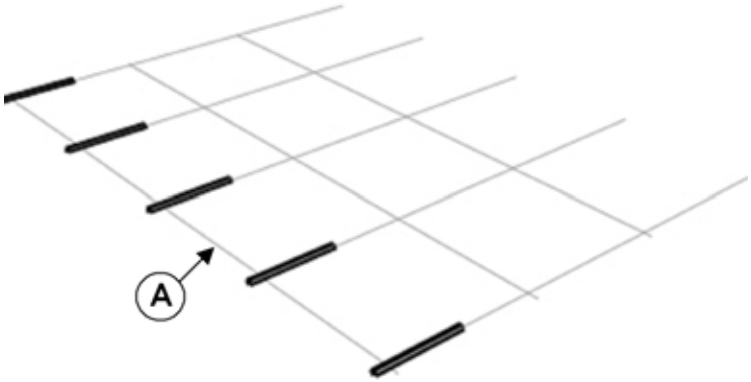
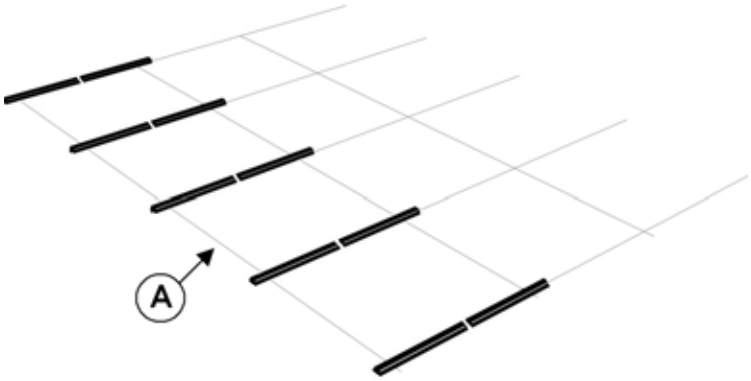
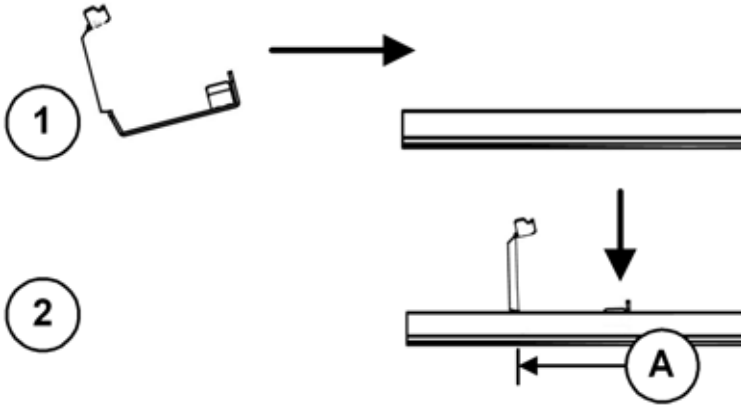
This chapter guides you through the ZS Aero installation process. Please read this chapter in its entirety to familiarize yourself with the process before beginning the installation. You may also visit www.zepsolar.com to view videos and other training materials. Be sure that the installation site has been completely prepped before beginning the installation.



4.1 - STEP 1: Formulas & Layout Lines

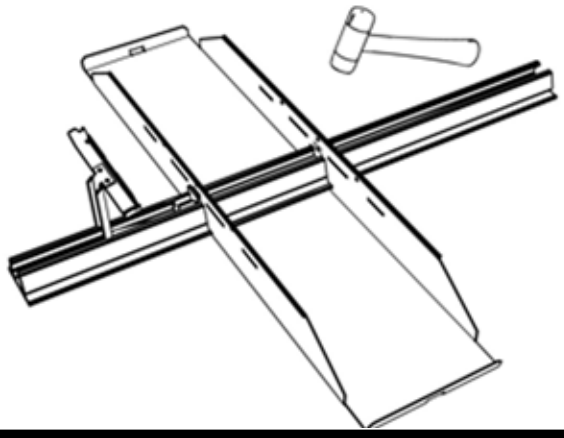
1-A: Lay out initial East/West line.	
Both Line A and the edge of the array must be at least 6’ from roof edge.	
1-B: Lay out North/South lines.	
Module length (L) + ½” O.C.	
1-C: Lay out additional rows.	
Distance equals: 57” (+/- 3”) This is the spacing from the Front Leg of one row to the Front Leg of the next row.	

4.2- STEP 2: Placing Row Connectors

2-A: Place first row along North/South lines.	
Line up a few inches ahead of line A. Work from West to East	
2-B: Place second row behind first row.	
The second row of connectors should be spaced 2" behind the first row.	
2-C: Install Front Legs in Row Connectors.	
Insert at about 13 degrees. Line up with the bend on Line A, then snap into place.	

2-D: Install the first row of Ballast Pans.

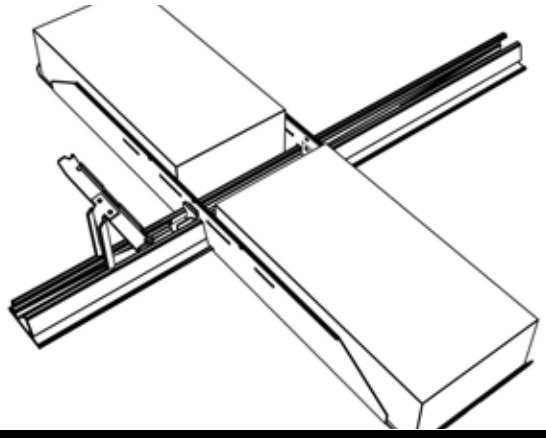
Tap into place with rubber mallet to achieve grounding connection.



2-E: Place two cinder blocks in each Ballast Pan.

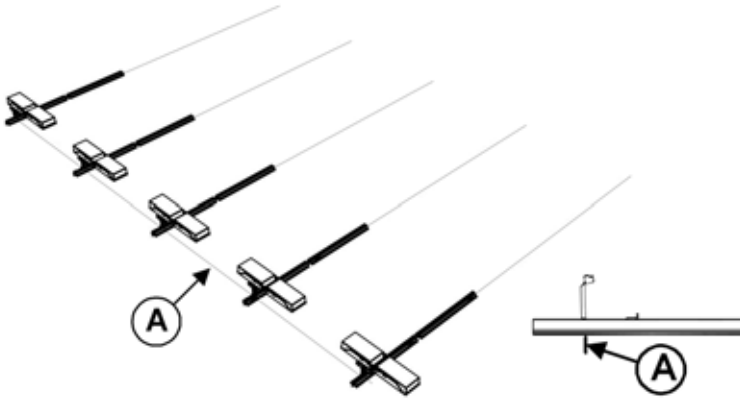
4”x8”x16” nominal dimensions.

26lbs. per block.

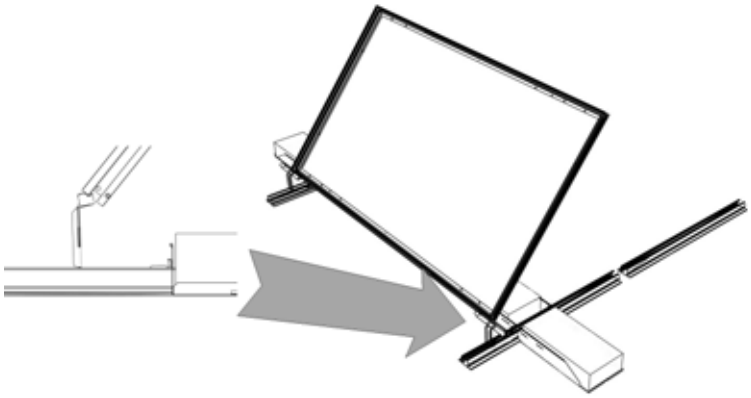
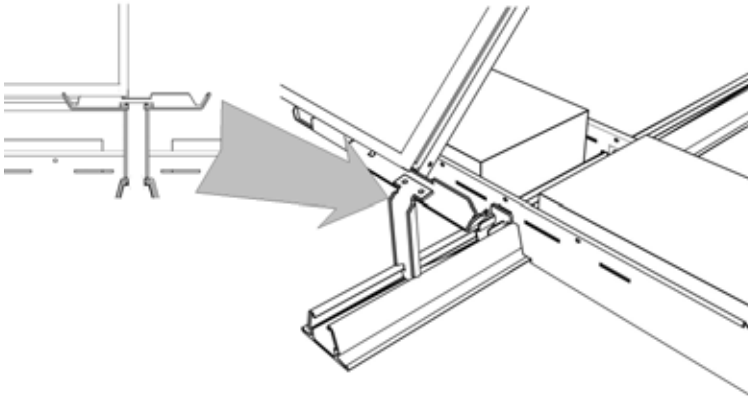
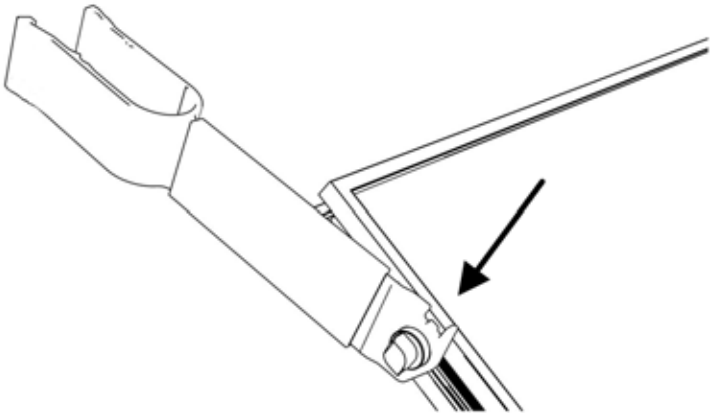


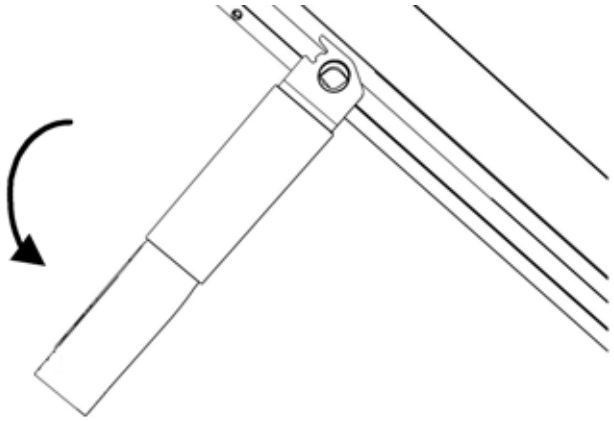
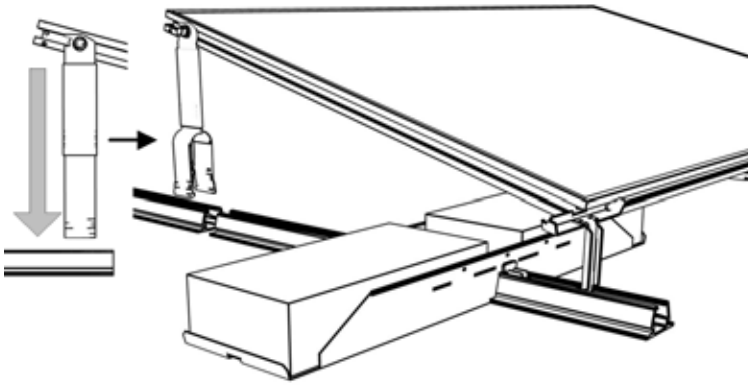
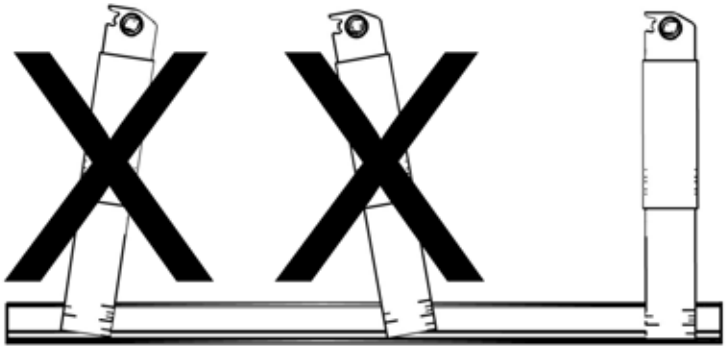
2-F: Ensure Row Connectors are properly aligned.

The bends in the Front Legs should be on Line A (see Step 2-C).

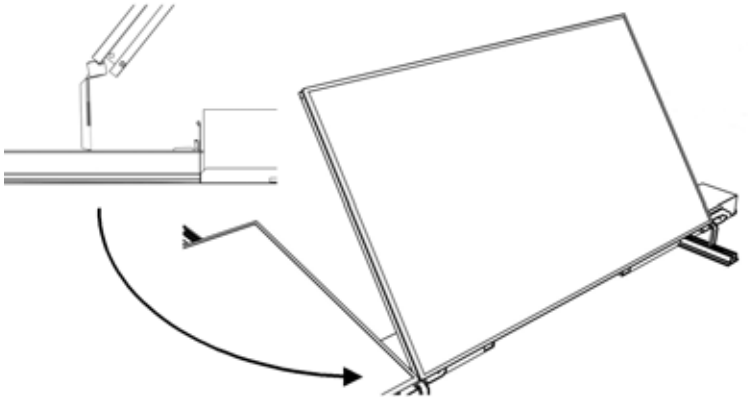
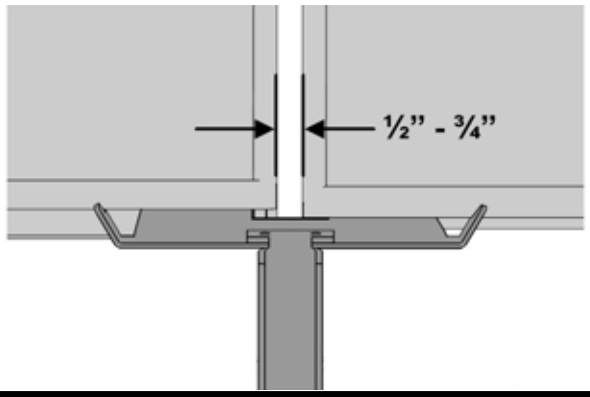
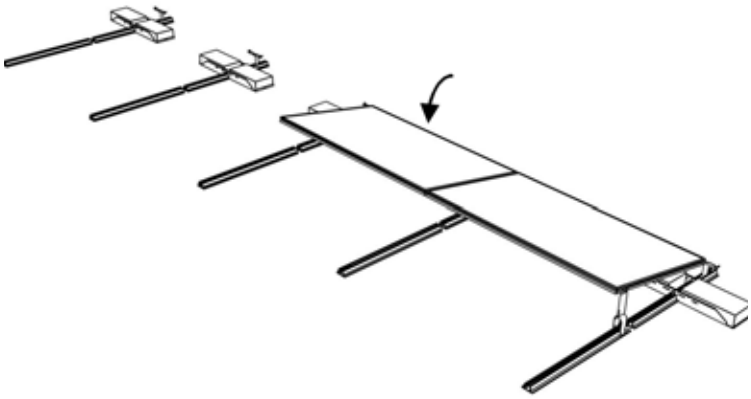


4.3 - STEP 3: Installing the First Module

3-A: Lower module onto Front Legs.	
Tabs in legs hook into groove in module.	
3-B: Verify module position.	
Place inside corner over Front Leg rivet.	
3-C: Insert outside Rear Leg.	
Insert the Key side of the Rear Leg into the module groove. Leg should be approximately 4" from the corner of the module.	

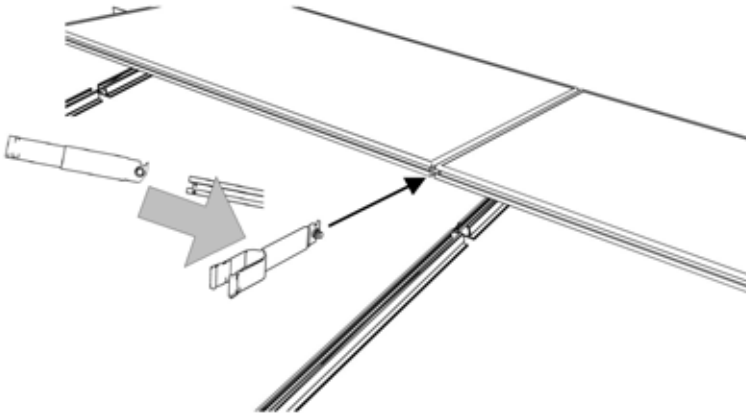
3-D: Rotate outside Rear Leg.	
Twist the Rear Leg in the downward direction.	
3-E: Lower module into position.	
Place Rear Leg about 1" from end of second Row Connector. Snap into place about 1" from end of second Row Connector.	
3-F: Verify Rear Leg placement.	
Leg must be vertical and snapped in.	

4.4 - STEP 4: Installing the Next Modules

4-A: Lower the next module over the Front Legs.	
Tabs in legs hook into groove in module.	
4-B: Verify spacing.	
Module corner should be over rivet in Front Leg, 1/2” to 3/4” from previous module.	
4-C: Lower module into position.	
Lower to same angle as previous module.	

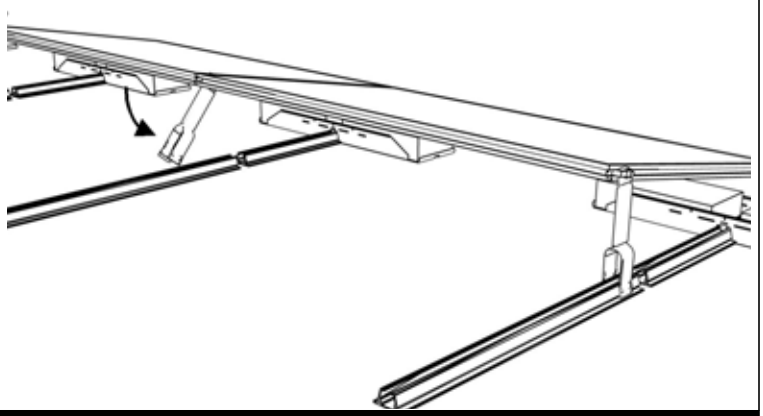
4-D: Insert Rear Leg.

The Key side of the Rear Leg should be on the left side of the installer.



4-E: Twist Rear Leg downward into place.

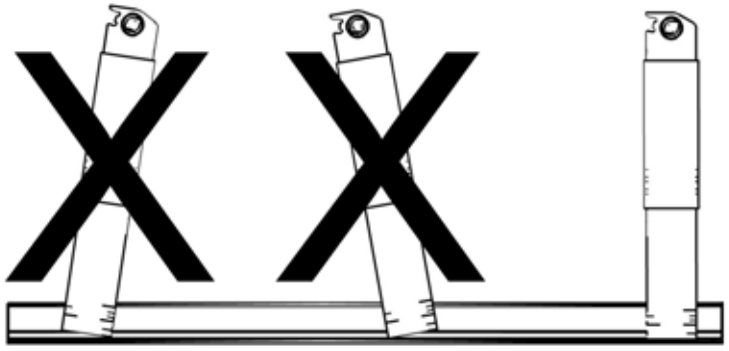
Align with other Rear Leg.

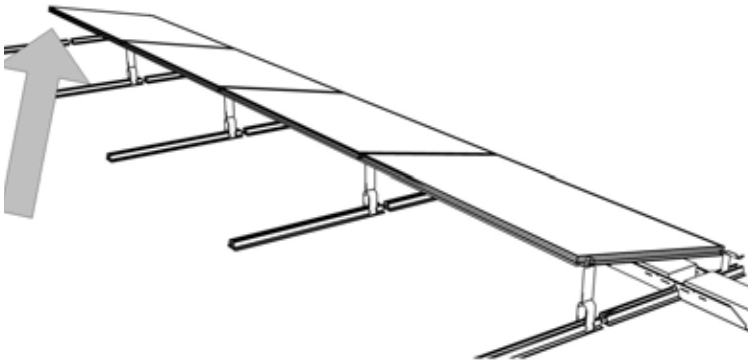
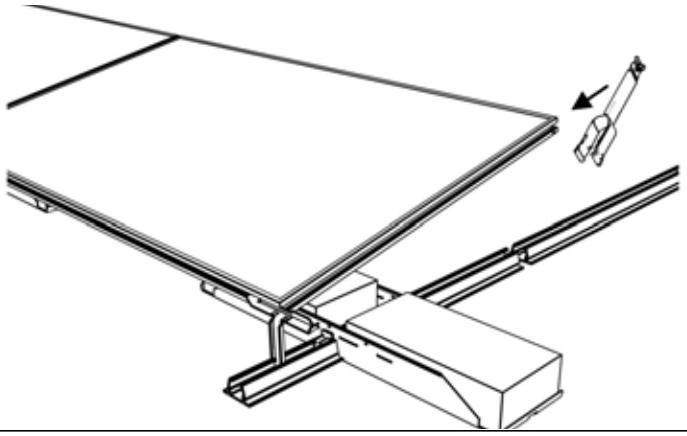


4-F: Snap Rear Leg into second Row Connector.

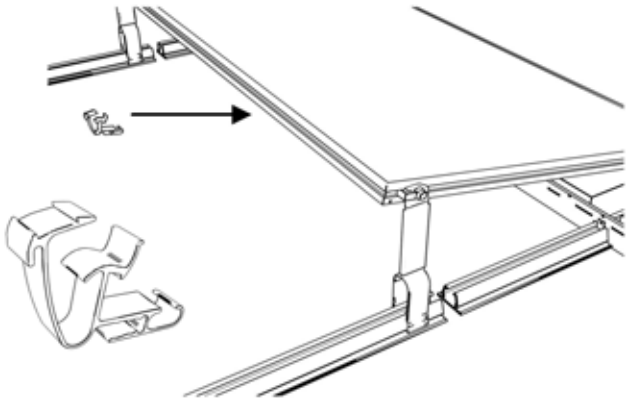
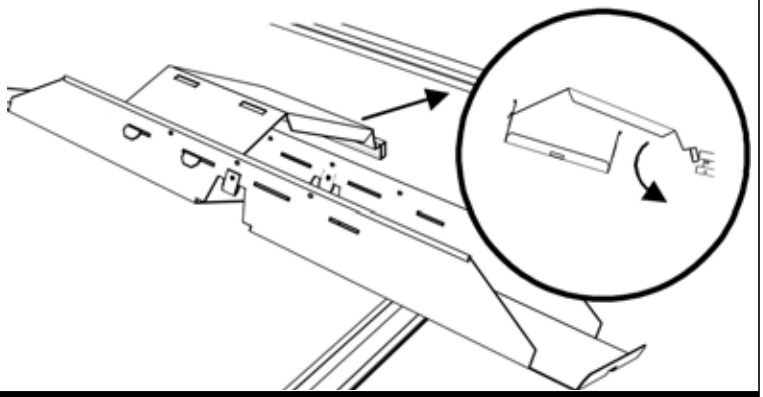
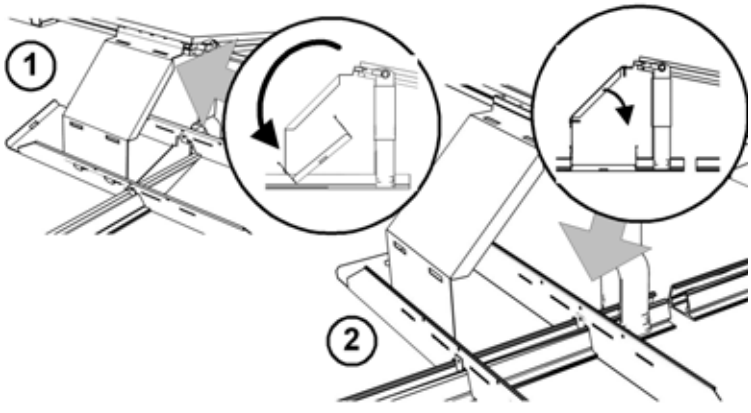
Place Rear Leg about 1" from end of second Row Connector.

Snap into place.



4-G: Repeat 4-A through 4-F for rest of the row.	
Do not insert final Rear Leg yet.	
4-H: Insert final Rear Leg with the leg reversed.	
Insert the Key side of the Rear Leg into the module groove. Rotate the Rear Leg downward into place. Snap onto second Row Connector.	

4.5 - STEP 5: Finishing the First Row

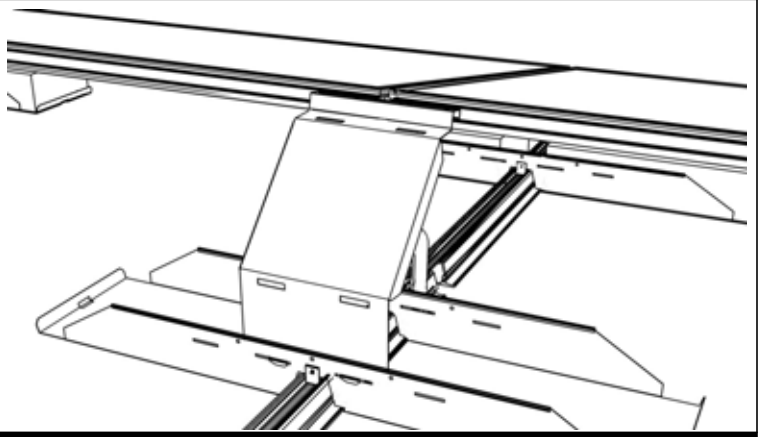
5-A: Wire the PV modules.	
Use Zep Wire Clips if desired. Insert the Wire Clip into the module groove and then press into place.	
5-B: Add outside Diffuser Supports.	
Secure to the inboard holes in the Ballast Pans. Hook diffuser tabs into slots in Ballast Pan, then insert the Diffuser Support into the module groove.	
5-C: Secure the outside Ballast Pans to the Row Connector.	
Tap Ballast Pans into place with rubber mallet to achieve grounding connection	

5-D: Add inside Diffuser Supports.

See Steps 5-B and 5-C.

Secure to the center holes in the Ballast Pans.

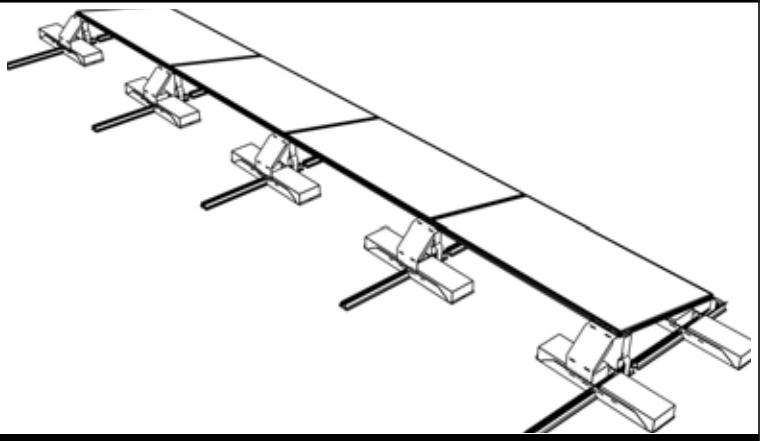
Tap Ballast Pans into place with rubber mallet to achieve grounding connection.



5-E: Add second row ballast blocks.

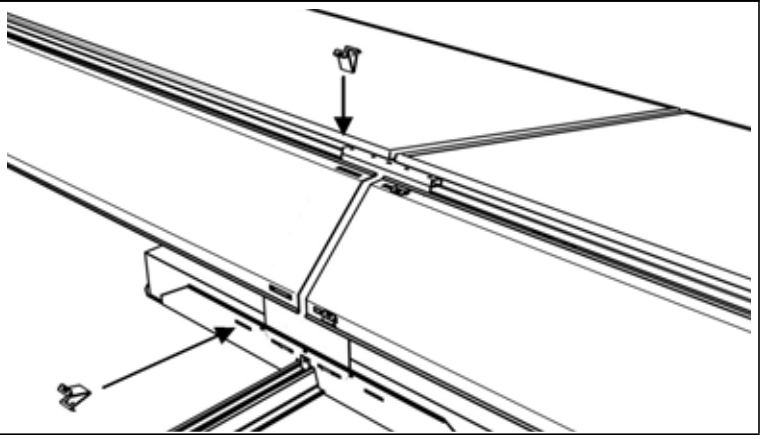
4”x8”x16” nominal dimensions.

26lbs. per block.



5-F: Add Wind Diffusers.

Clip into place.

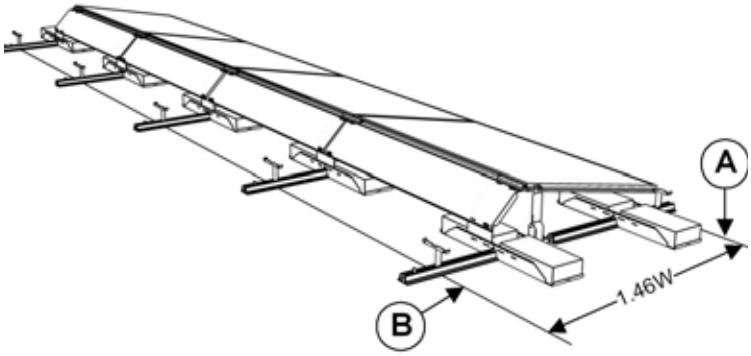


4.6 - STEP 6: Starting the Next Row

6-A: Install Front Legs for next row.

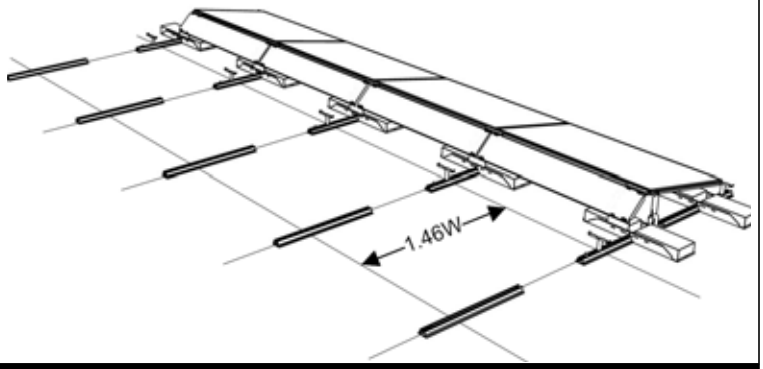
Slide from back of Row Connectors and then press into place. (See Step 2-C.)

Align bend in leg with Line B. (See Step 1.)



6-B: Add Row Connectors for next row.

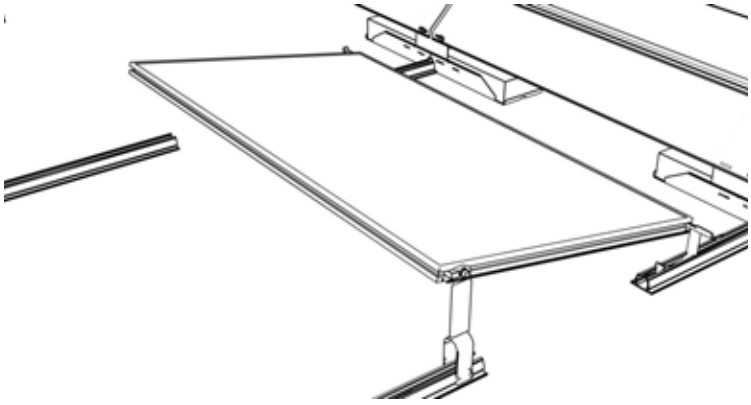
These Row Connectors are spaced 20" from the preceding row.



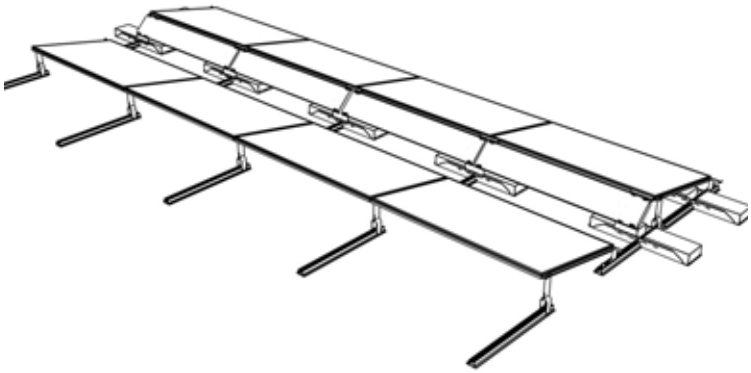
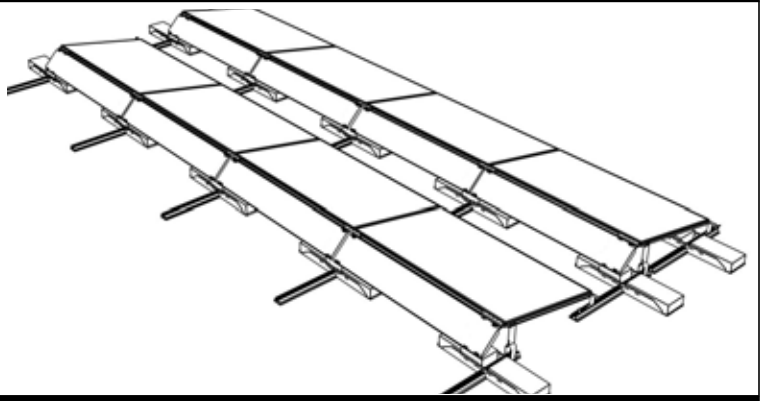
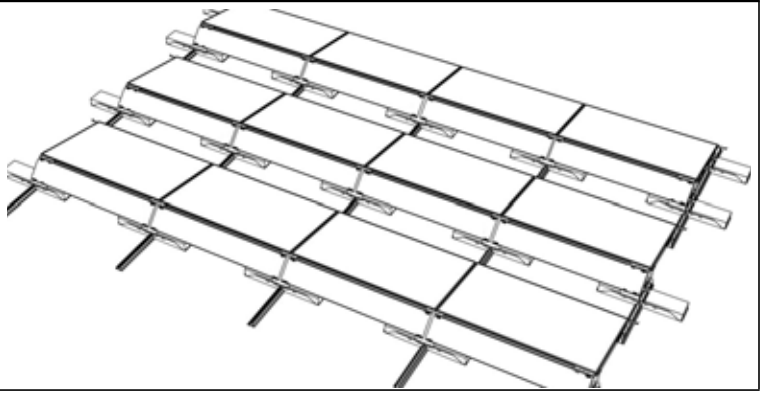
6-C: Add first module.

Complete Steps 3-A through 3-G, above.

Add a Ground Zep to the outside edge of the first module to ground the row. (See Step 8.)



4.7 - STEP 7: Completing the Next Row

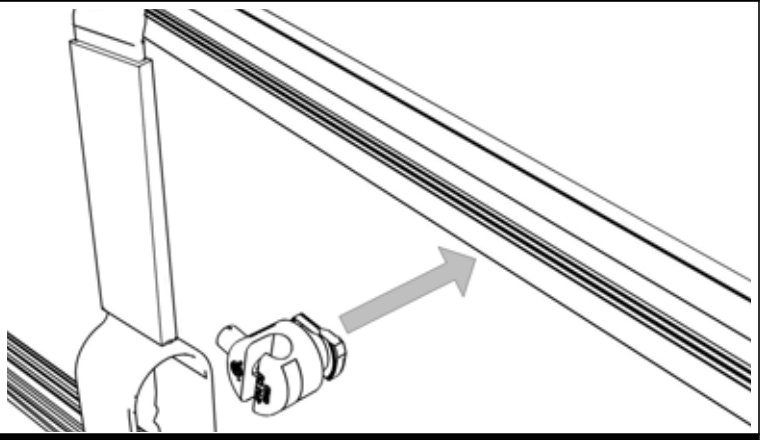
7-A: Add modules and legs to the row.	
Complete Steps 4-A through 4-I, above.	
7-B: Finish the row.	
Complete Steps 5-A through 5-F, above	
7-C: Add new row (s).	
Complete Steps 6-A through 6-C, above to start the row. Align the Front Legs with Line C or next E/W line. Install the modules, Ballast Pans, ballast blocks, and Wind Diffusers as described above.	

4.8 - STEP 8: Grounding

8-A: Insert a Ground Zep into the module.

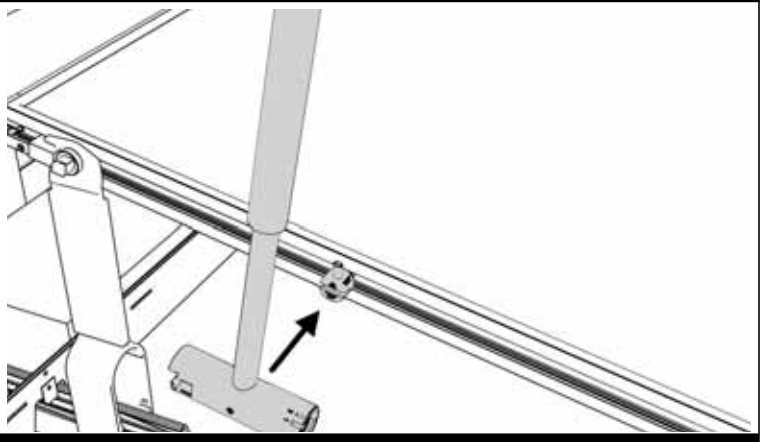
Grounding during installation ensures that each module is grounded for technician safety.

Insert the Ground Zep into the module groove with the set screw at the 9 o'clock position.



8-B: Lock the Ground Zep into place.

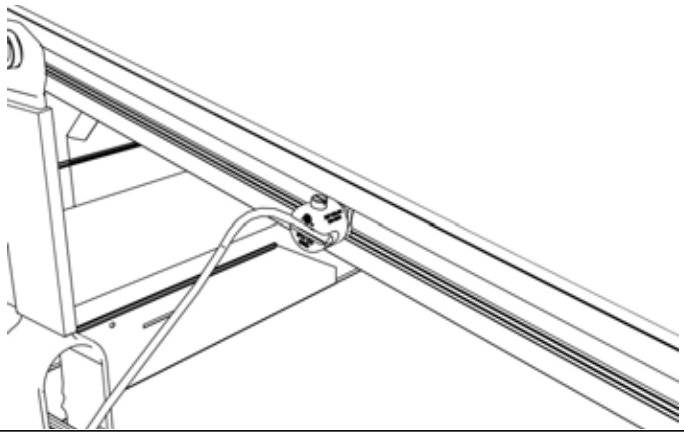
Rotate the Ground Zep 1/4" turn clockwise using a Zep Tool.



8-C: Connect the first Ground Zep to the building ground.

Connect the first Ground Zep to the building ground. Torque ground wire as follows:

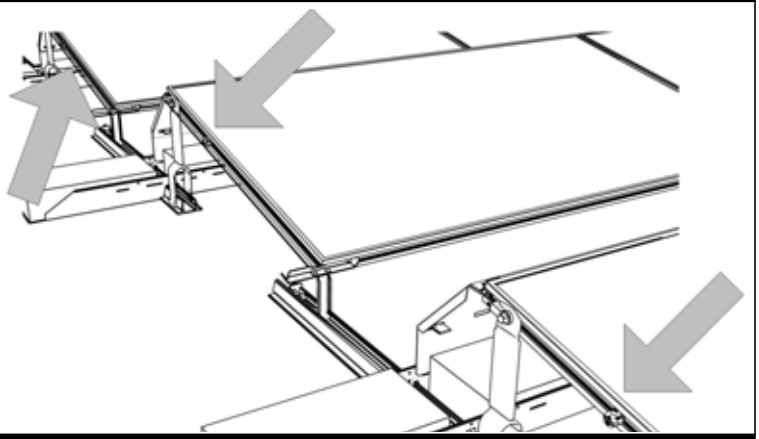
- 14-10AWG:40 inch-lbs.
- 8AWG: 45 inch-lbs.
- 6-4AWG: 50 inch-lbs.



8-D: Use one Ground Zep per row.

Install and connect the Ground Zep when installing the first module on each row.

Grounding during installation ensures that each module is grounded for technician safety.

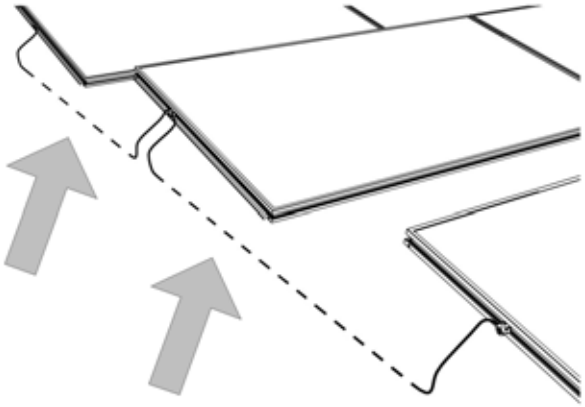


8-E: Connect all rows together in a “daisy chain.”

Follow all applicable building codes. Torque ground wire as follows:

- 14-10AWG:40 inch-lbs.
- 8AWG: 45 inch-lbs.
- 6-4AWG: 50 inch-lbs.

Illustration is for example purposes only.



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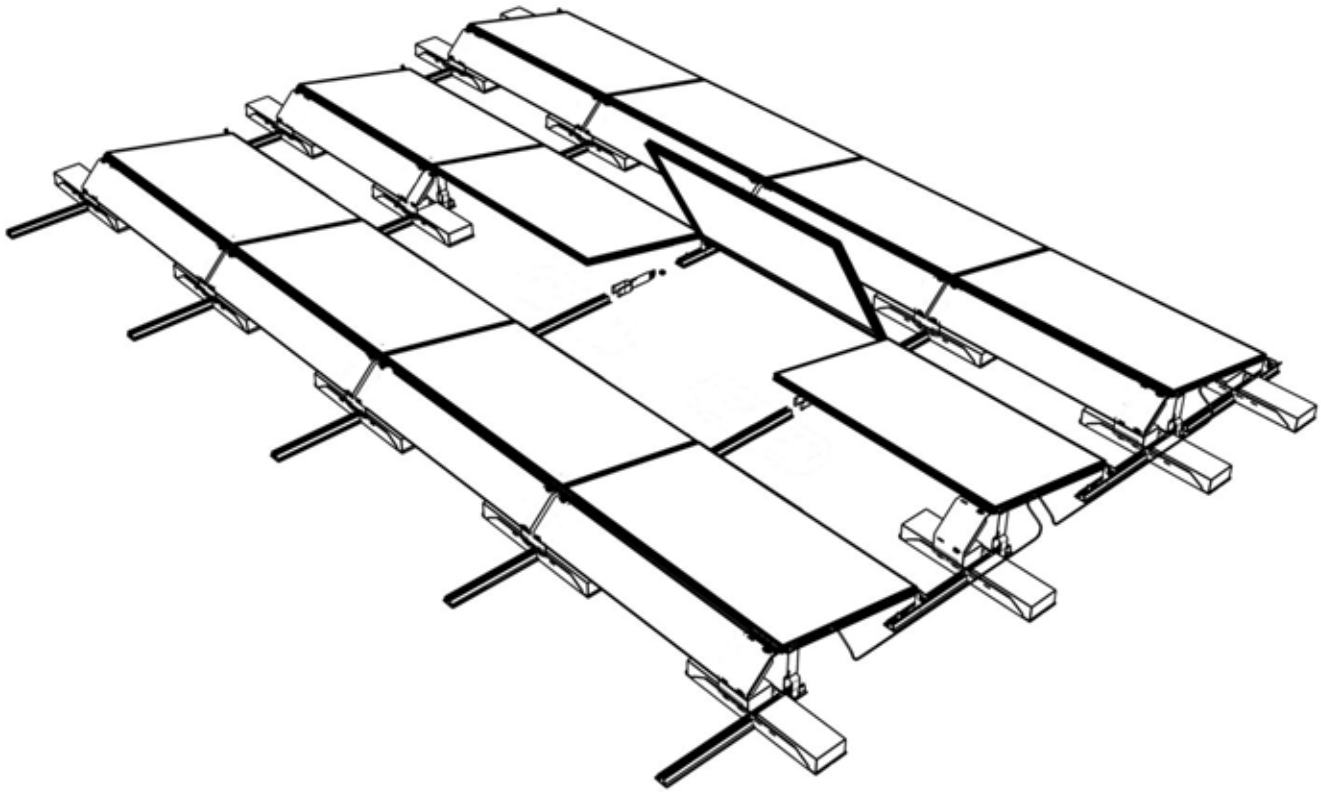
5.0

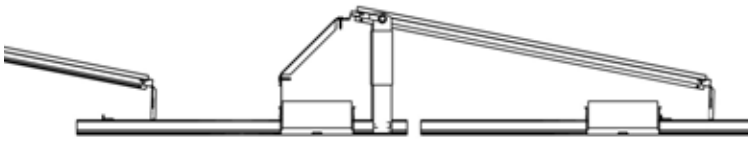
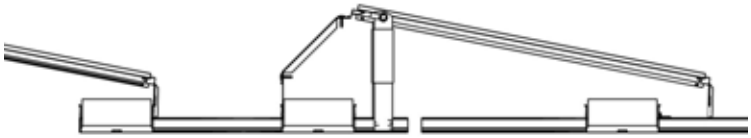
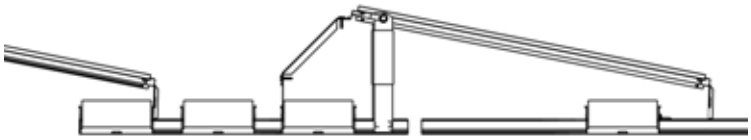
Options & Servicing

This chapter describes the various ballasting options available for ZS Aero. Adding ballast can increase wind resistance. Please contact Zep Solar, Inc. for detailed information about ballasting requirements for each specific site. This chapter also describes the process of removing a module for servicing or replacement. ZS Aero makes repairs fast and easy.



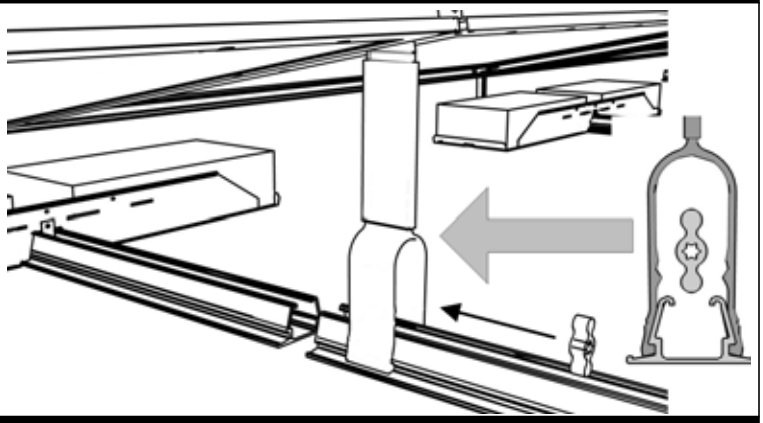
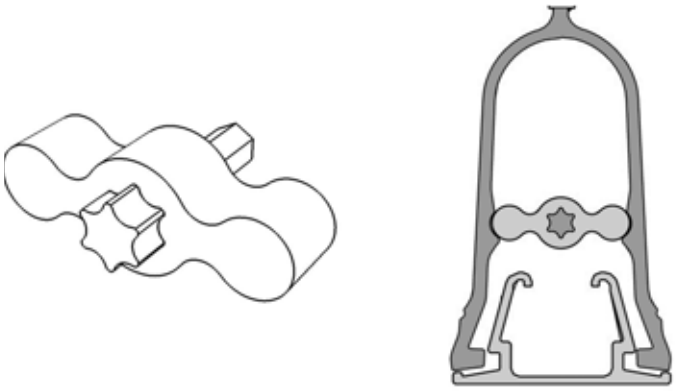
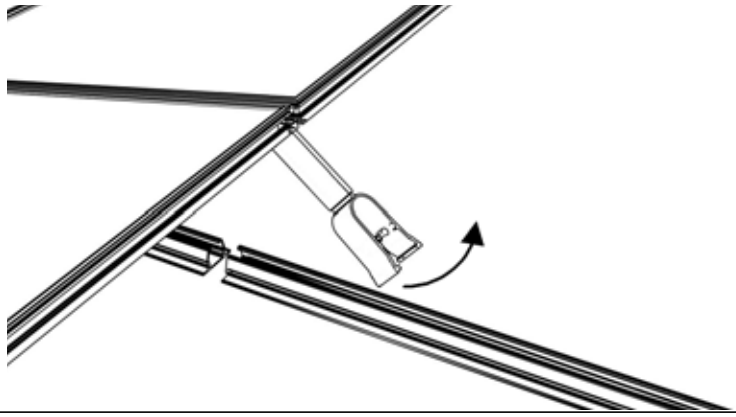
5.1 - Installation Options

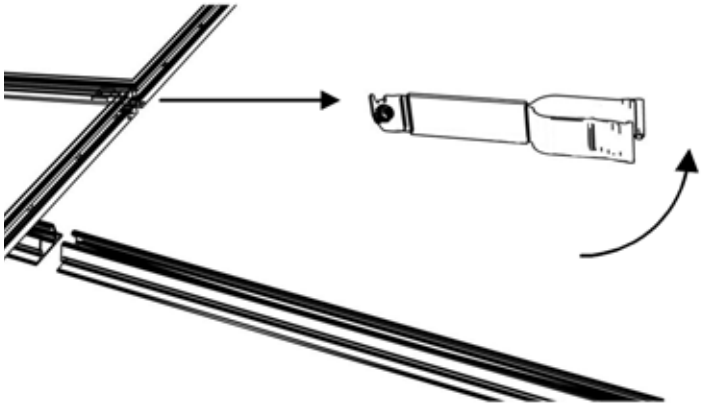
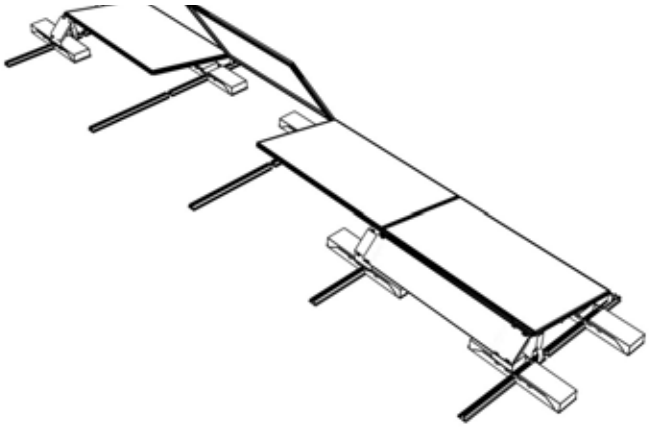
Additional ballast can be used to increase wind resistance.

Option A: Standard installation.	
The standard installation uses one set of Ballast Pans and blocks per Row Connector.	
Option B: Double ballast.	
If needed, install double ballast as shown.	
Option C: Triple ballast.	
If needed, install triple ballast as shown.	

5.2 - Servicing the Array

Remove the Wind Diffuser components and ballast blocks/pans before removing the module.

SVC-A: Insert Rear Leg Removal Tool into Rear Leg.	
End of tool should be vertical, as shown. Rear Leg Removal Tool fits on a #55 Torx head (see Step SVC-B).	
SVC-B: Twist Leg Removal Tool 90 degrees to spread Rear Leg.	
Rear Leg Removal Tool arms should be secure in Rear Leg, as shown. Remove Torx drive.	
SVC-C: Rotate Rear Leg.	
Rotate in direction shown.	

SVC-D: Slide Rear Legs out of module.	
Repeat Steps SVC-A through SVC-E to remove the other Rear Leg.	
SVC-E: Remove the module.	
Rotate module up and then lift up and away from Front Legs.	

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ZS Aero
for Commercial Flat Roofs
Installation Manual (USA)

800-0354-001 Rev. A

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