



Applied Energy Technologies

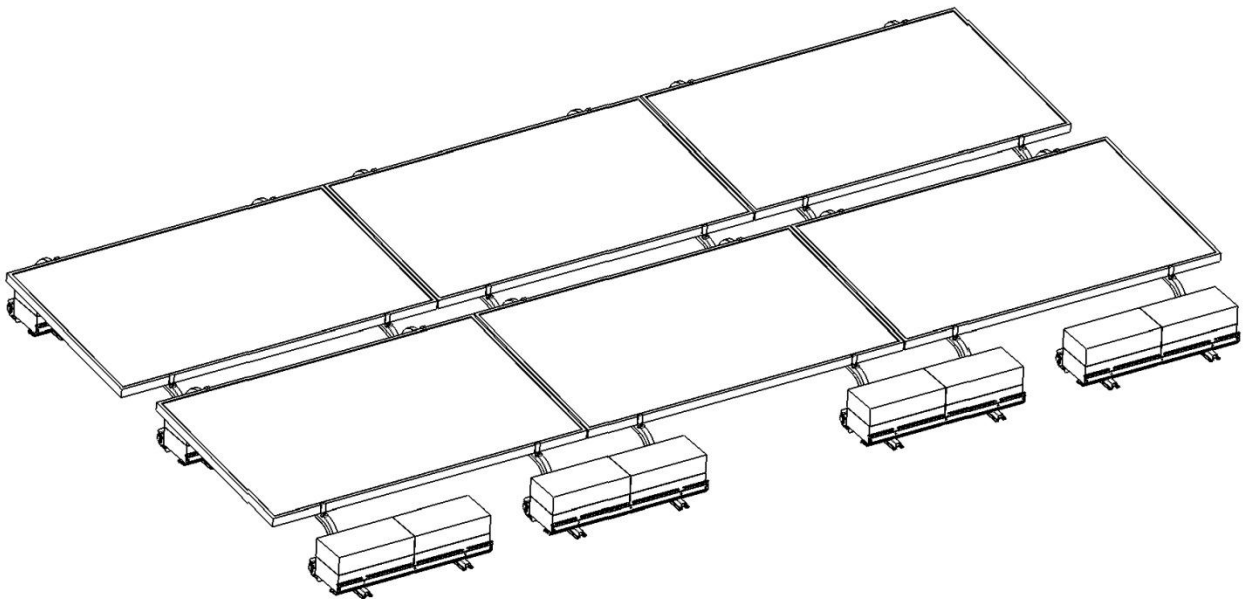
# Rayport™ • B

## *Reduced Row-Spacing 2*

### *Installation Guide*

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P/N: 80882 Rev: A

## 1. Installer Notes

Thank you for purchasing AET's Rayport™ flat roof top ballasted racking system manufactured in Maumee, Ohio. The system has been configured to accommodate both framed (30-51mm thick) or unframed modules with either one or two modules per support rail. Designed with the installer in mind, the Rayport™ system allows for a top down installation, common fasteners, and integrated grounding. The Rayport™ system has been ETL listed per the UL1703/2703 standards to withstand a load of 30 psf and a fuse rating of 25 amps. The Rayport™ racking system has been internally tested to withstand loads as high as 50 psf. (for loads above 50 psf an optional support arm is available).

**Warning:** Roofs that are intended to support the Rayport™ racking system should be classified with an A, B or C Fire Rating, depending on the regional location and codes.

## 2. Array Layout

$W_A$  = Array Width (east/west)

$W_M$  = Module Width (east/west dimension)

$C$  = Number of Columns

$G$  = Gap Between Modules (normally  $\frac{1}{4}$ " )

$$W_A = (W_M \times C) + (G \times (C - 1))$$

Assuming a 58.3" long module for the example below:

$$W_A = (58.3 \times 7) + (0.25 \times (7 - 1))$$

$$W_A = 409.6" \text{ or } 34.1 \text{ feet}$$

$L_A$  = Array Length (north/south)

$D_R$  = Repeating Rack Dimension

$R$  = Number of Rows

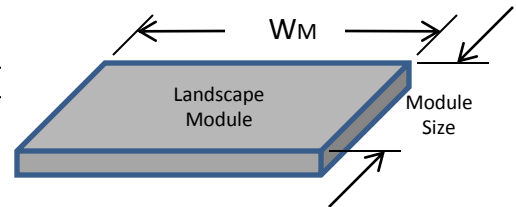
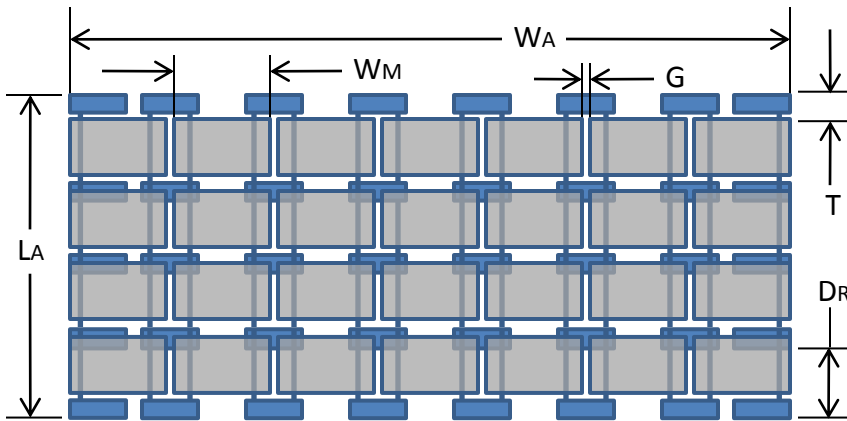
$T$  = Tray Dimension

$$L_A = (D_R \times R) + T$$

Assuming a standard reduced space 10° rail and narrow reduced space tray for the example below:

$$L_A = (55.5" \times 4) + 16.39"$$

$$L_A = 238.39" \text{ or } 19.86 \text{ feet}$$



Note: Typical module orientation is landscape

***The Repeating Dimension varies depending on the Support Rail and Ballast Tray utilized. The Repeating Dimension may be verified on the layout provided by AET.***

## 3a. Installation - Parts List

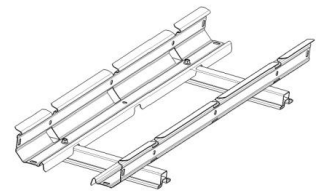
### Support Rail

*-Multiple design configurations are available based on customer design constraints.*



### Ballast Tray Assembly

*-Multiple design configurations are available based on customer design constraints.*



### Module Clamp, (6) per end module

ETL listed per UL1703/2703

*-Clamps available for modules ranging from 30-51mm thick.*



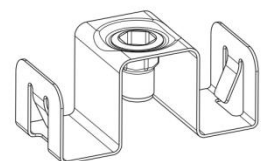
### Bolt

*1/4-20 Hex Flange HD w/ Lock Patch*



### Sliding Nut Retainer Assembly

*includes 1/4-20 Rivet Nut*



## 3b. Installation - Tool List

Layout/BOM from AET

Ballast / Support Rail Spacer Bar (Available from AET)

3/8" Socket w/ Ratchet or Impact Driver

100 ft. Tape Measure

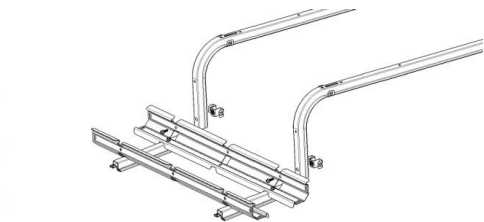
Mason String or Chalk Line

Industrial Adhesive (as needed)

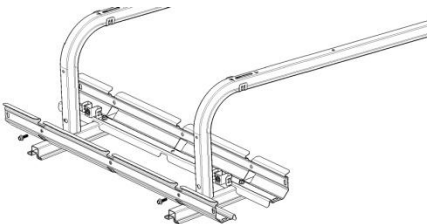
Torque Wrench

# 3c. Installation - Assembly

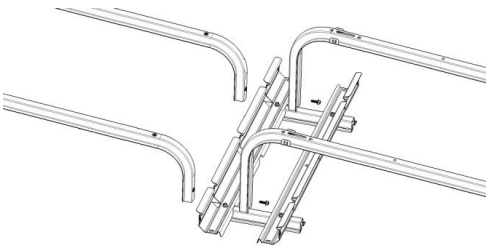
North Row Support Rail/Ballast Tray Position  
Prior to Assembly



OR



Middle Row Support Rail/Ballast Tray Position  
Prior to Assembly



South Row Support Rail/Ballast Tray Position  
Prior to Assembly

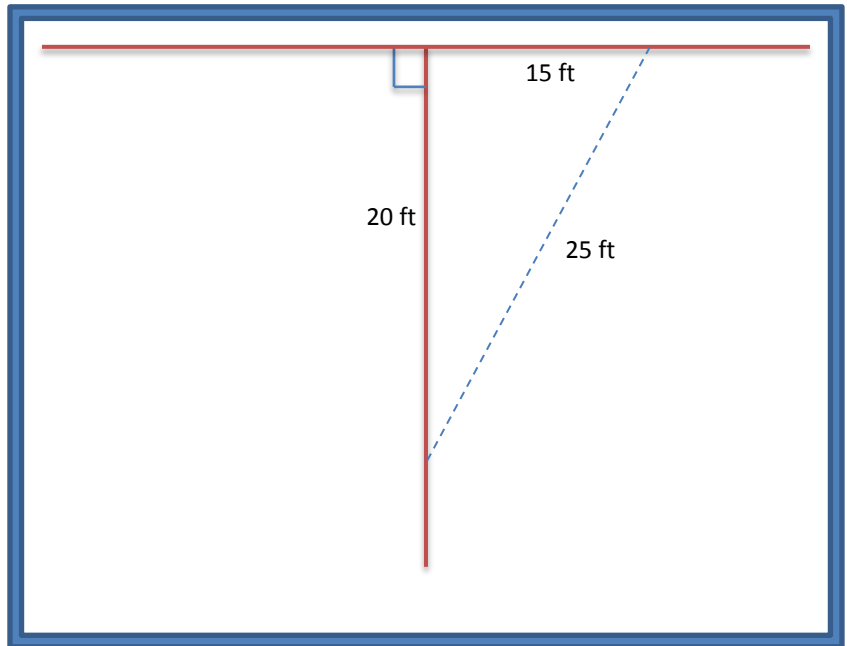


## 3c. Installation - Assembly

### 1. Establish perpendicular lines for array alignment

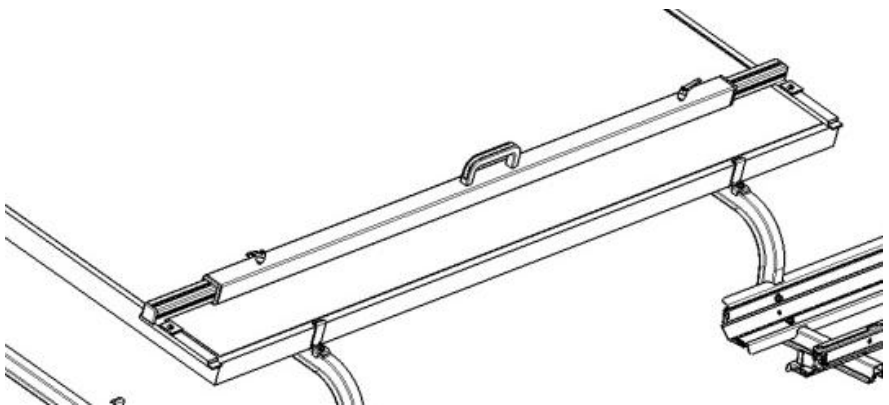
Using string or a chalk line, create a east/west line. Typically, this would be the front or rear of the PV array. Next, establish a north/south line perpendicular to the first line near the center of the array using a multiple of a 3-4-5 triangle. Larger triangles of 15-20-25 or 30-40-50 should be used for larger arrays.

It's important to perform the layout independent of existing building structure. Not all parapets or roof edges are square or parallel which may cause alignment issues with the PV array.

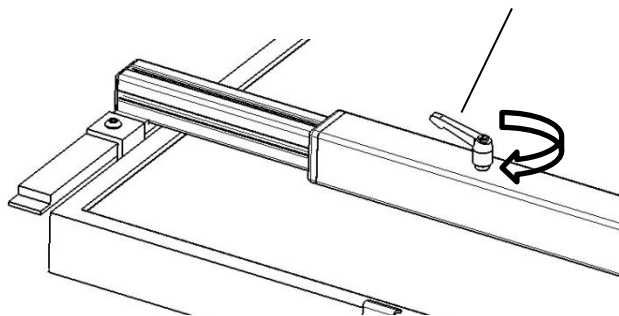


### 2. Setting the Spacer Bar

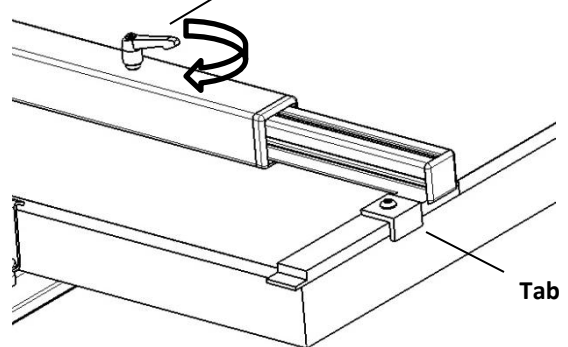
Loosen both Lever Knobs on the Spacer Bar to allow the ends to slide freely. Place the Spacer Bar on the east/west dimension of the module. The two small tabs on the ends of the Spacer Bar should nest tightly against the module. Lock the ends of the Spacer Bar by tightening the Lever Knobs. **Note:** The Spacer Bar adds an additional  $\frac{1}{4}$ " to the overall length of the module. **This spacing is required between modules for thermal growth.**



Lever Knob



Lever Knob



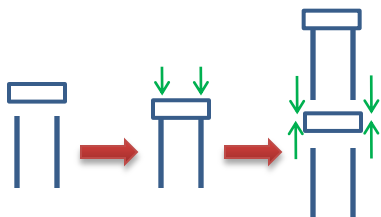
Tab

## 3c. Installation - Assembly

### 3. Assemble racking units

Assemble (2) support rails to (1) ballast tray using ¼-20 bolts. Attach (2) additional support rails and a ballast tray as shown. The ballast tray is sandwiched between the support rails in the middle rows.

**Note:** Torque all fasteners to 60 in-lb (5 ft-lb).



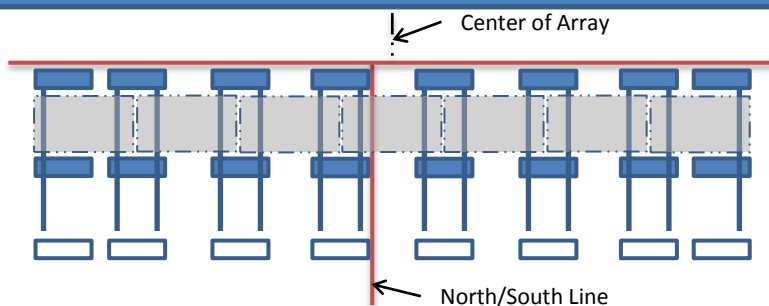
### 4. Positioning the first racking units

Starting from the optimal North/South line location, position the first rack assembly so the ballast tray ends align to the North/South construction line and the ballast tray front align with the East/West line that were established in step 1. Once the first assembly is in position add ballast blocks to the first two trays. Using the Spacer Bar that was set to length in step 2, position the next assembly by placing the Spacer Bar into the corresponding notches in the trays, as shown.

**Note:** The spacing between assemblies will be closer together on the extreme east and west ends of the array, as shown below.

### 5. Layout first two rows of racking

Repeat steps 3 and 4 for the number of racking units required for an entire row of modules. The number of rack assemblies required is one more than the number of modules in a row. For example, 7 modules in a row requires 8 columns of rack assemblies.

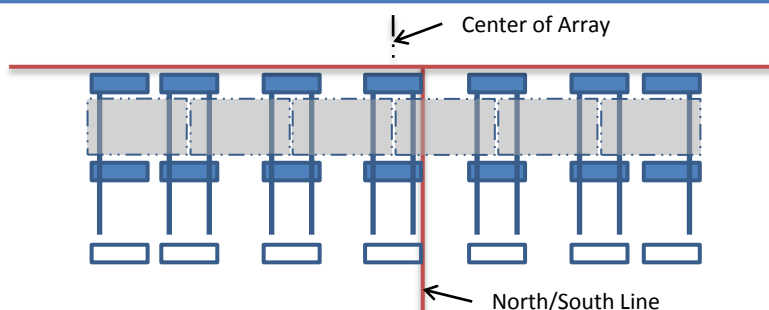


**Odd number of modules centered per row:**

Ballast tray end alignment to North/South line.

**Formula for North/South line from Array Center or Optimal location:**  
(see page #3 for reference)

**Distance from the East/West edge of the Array to North/South Line:**  
= (# of Modules)x(WM + 0.25") ± (½WM) ± 16"



**Even number of modules centered per row:**

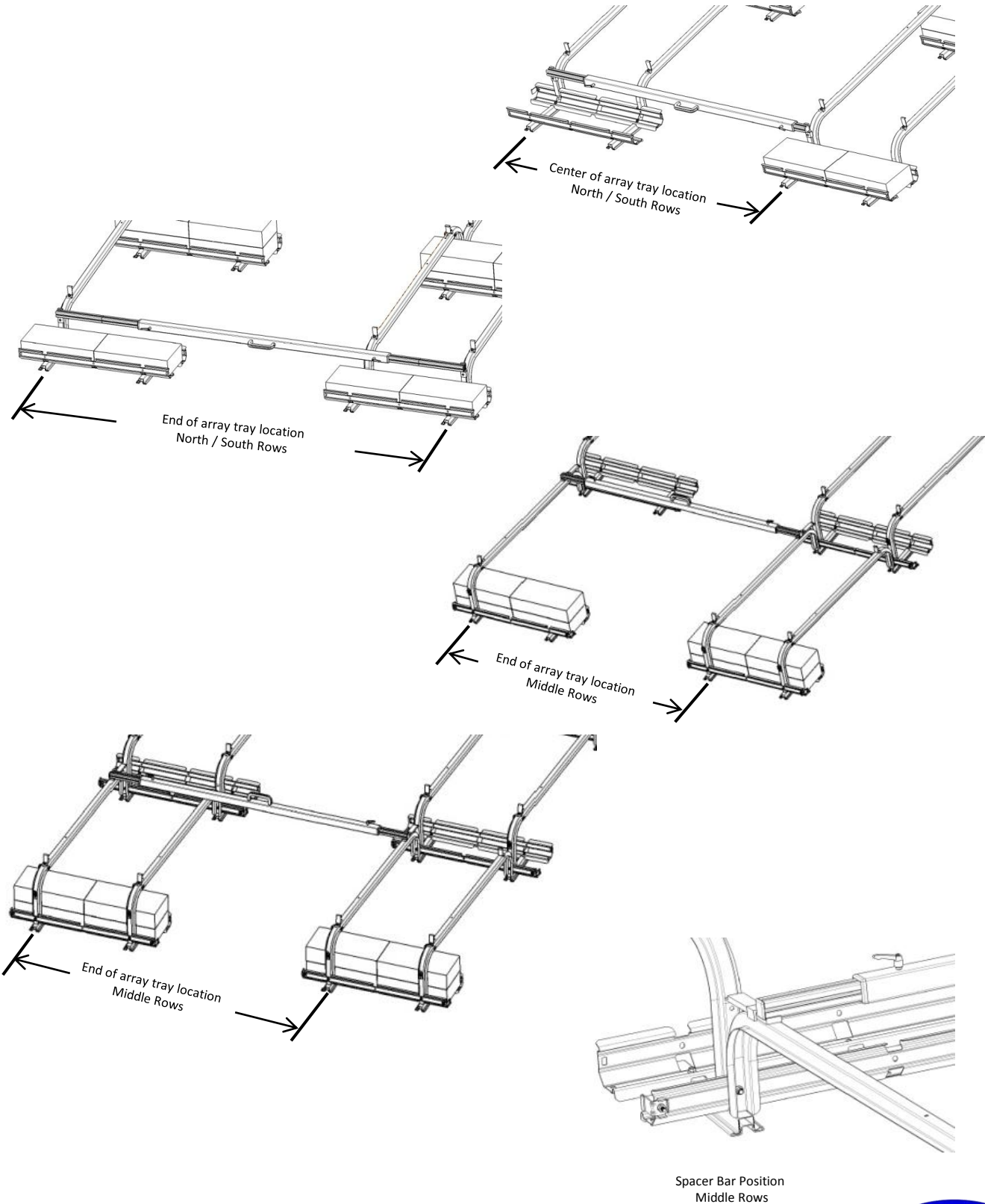
Ballast tray end alignment to North/South line.

**Formula for North/South line from Array Center or Optimal location:**  
(see page #3 for reference)

**Distance from the East/West edge of the Array to North/South Line:**  
= (# of Modules)x(WM + 0.25") ± 16"



### 3c. Installation - Assembly

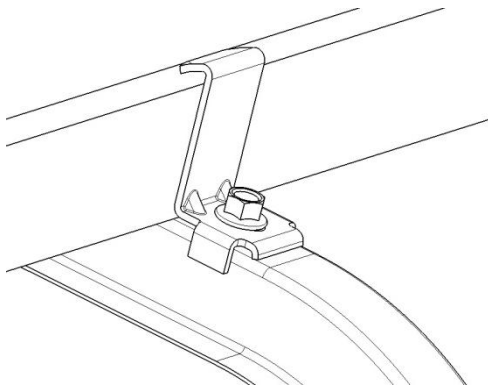


### 3c. Installation - Assembly

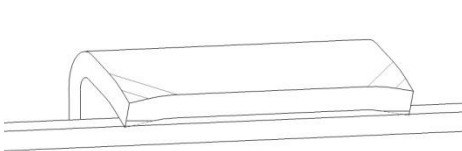
#### 6. Begin to install first row of modules

Load the ballast trays with the specified number of ballast bricks per AET supplied layout. Ballast should be added to the trays in front and behind the module prior to installing the module. Once the four corners around the module have been secured with ballast, the module can be installed using the provided ¼-20 bolts and Module Clamps. Torque fasteners to 60 in-lb (5 ft-lb).

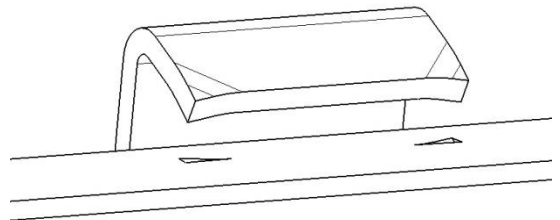
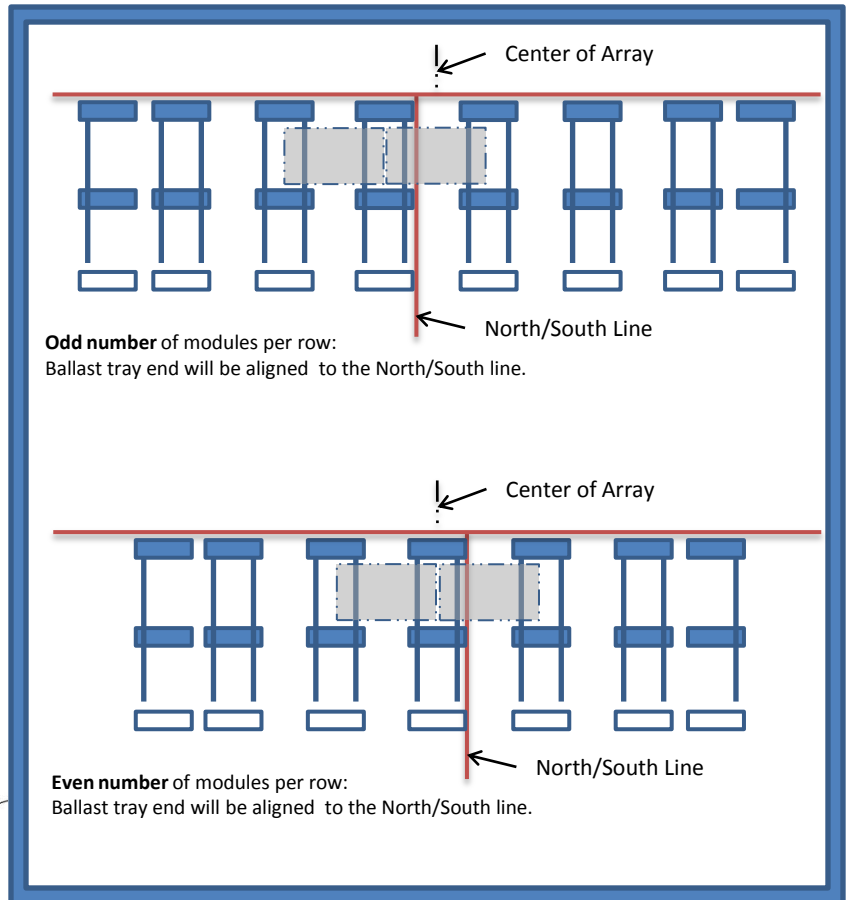
**Note:** Grounding of the module has been integrated into the module clamp and has been ETL listed per UL1703/2703 standards.



Module Clamp installed with ¼-20 bolt.



Installed position with integrated pierce points penetrating the anodize frame coating.

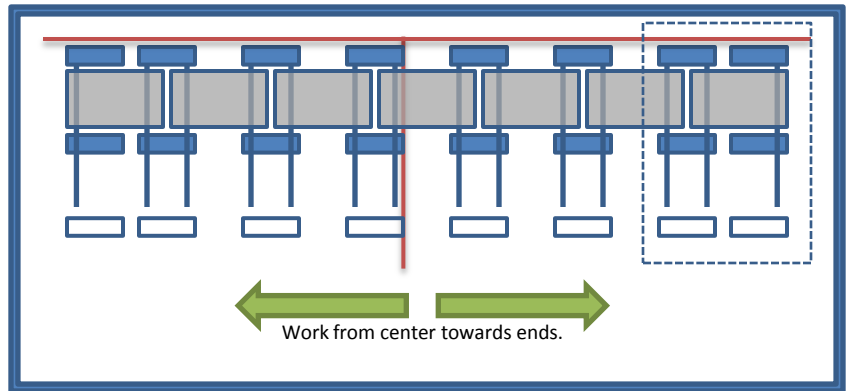


Resulting penetrating points through the anodize frame coating.

## 3c. Installation - Assembly

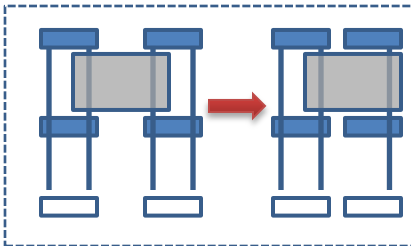
### 7. Finish installing modules in 1st row

Working from the center out towards the sides, continue spacing the rack assemblies with the spacer bar and installing ballast in the trays. Follow with the installation of the modules prior to moving on to the next row. There should be approximately  $\frac{1}{4}$ " gap between modules.



### 8. End module racking location

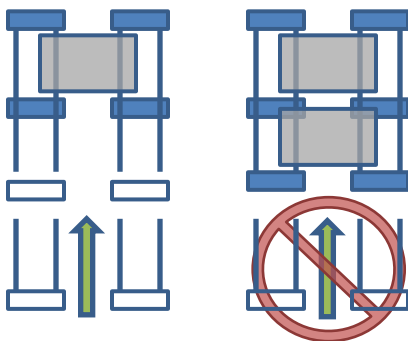
The end columns located at the extreme east and west of the system array may be located entirely under the last modules (as shown below and on page #7). This will cause three support rails to be located under the end modules in each row.



### 9. Build additional rows of racking

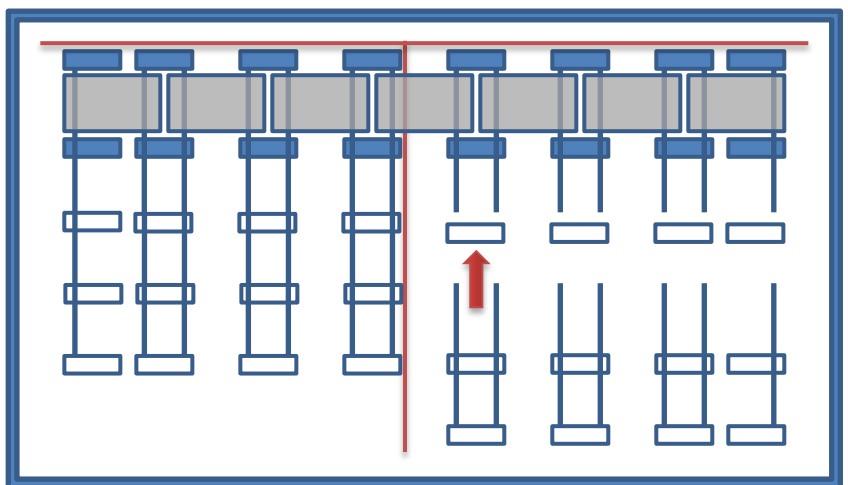
Additional rows of racking can now be assembled.

Note: Connect the support rail and ballast tray assemblies prior to installing ballast bricks.



CORRECT

NOT  
CORRECT



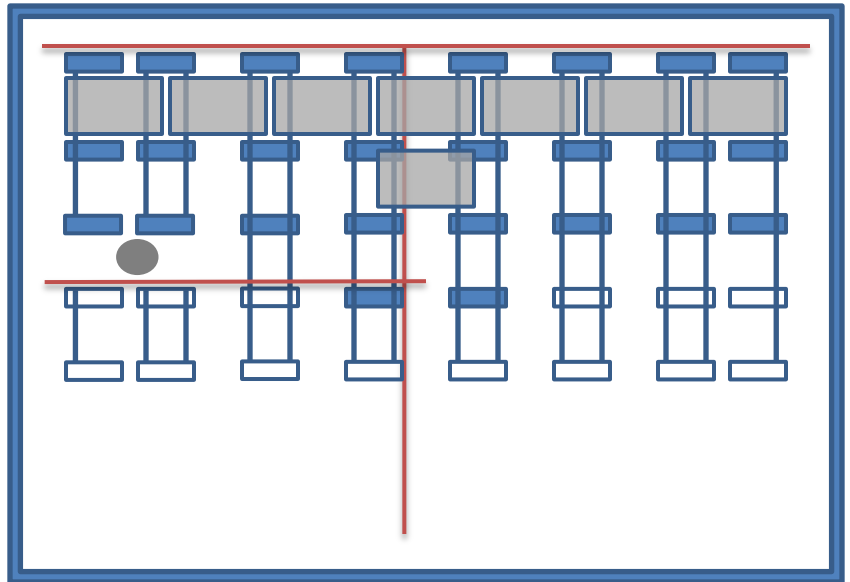
## 3c. Installation - Assembly

### 10. Install second row of modules

Now that the third and fourth rows of racking are assembled, position and ballast each tray as described in steps 4 and 5. The second row of PV modules can now be installed starting from the center of the array.

### 11. Working around roof obstructions

Multiple string or chalk lines should be created to maintain the racking alignment.



### 12. Complete the module installation

Once the last row of modules and ballast have been installed, the modules can be wired and the rack can be grounded.

Holes for grounding lugs (Weeb Lug 6.7 or equivalent) are provided on the back of every support rail, see figure shown to the right. However, due to the design of the racking, grounding wire only needs to be installed every 20 rows in the N and S direction. Only one rail per tray in the row being grounded is required to use a lug. When links in columns of racking are removed due to roof obstructions, grounding lugs are needed to link the racking back to the system.

