INSTALLATION GUIDE

UL LISTED

PV MOUNTING SYSTEM

GRIPRAC™
Simple solar installation

System Variations

Seismic Attachment and Ballast Block Combination

Flash Belt Combination

U-Anchor Combination

East-West Layout

Tool Requirement

Caulking Gun w/ approved sealant

Chalk Line Reel

6mm & 8mm Metric Allen Key / 6mm &8mm Hexagonal Drive Bit

Construction Gloves

Construction Hart Hat

Construction Hart Hat

Drill with 7/32 Bit

Measuring Tape

7/16" & 1/2" Socket Head

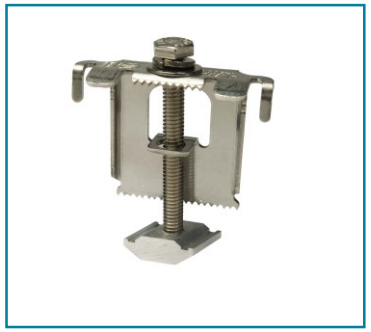
Safety Harness

Roofing Bar

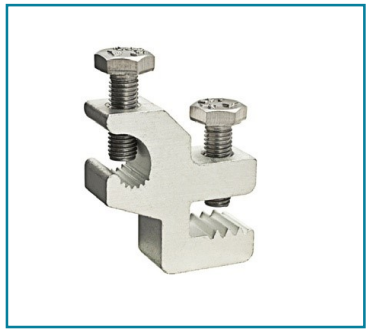
Toque Wrench

Component List

Solar Belt



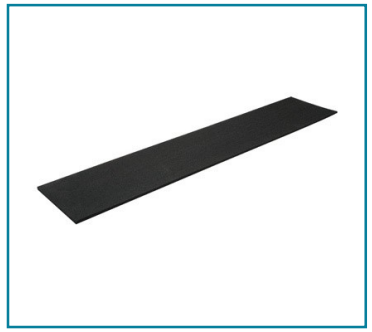
End Clamp



Ground Lug

Seismic Attachment

U-Anchor



Rubber Pad

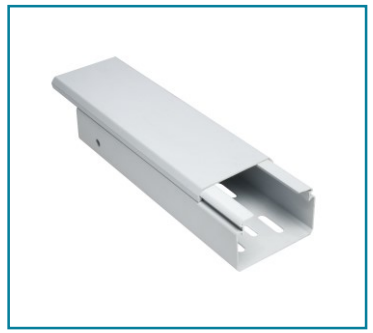
High Bracket

Mid Clamp

Frameless End Clamp

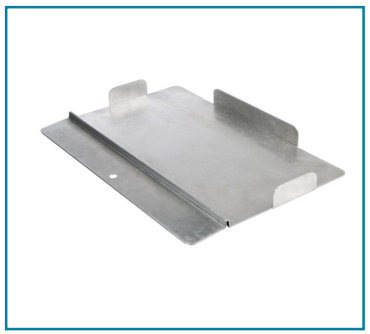
Flash Belt

Ballast Blocks



Wire Management

Low Bracket



Ballast Pan

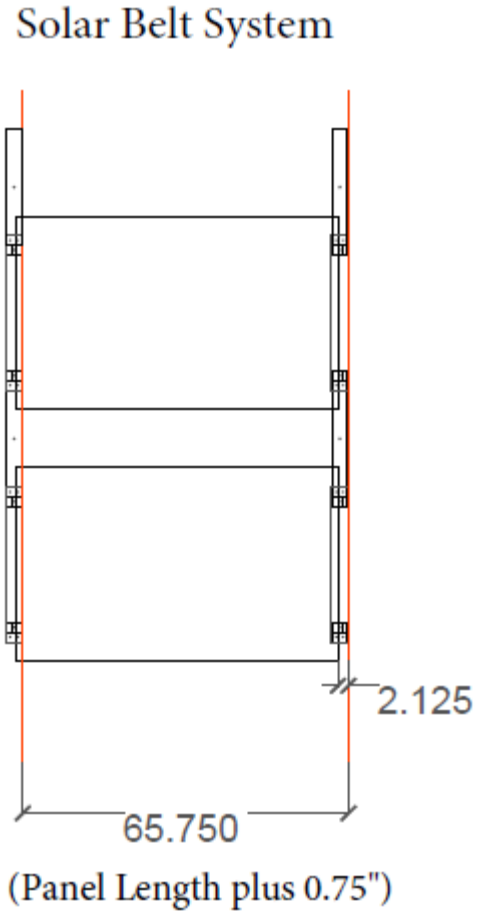
Frameless Mid Clamp

Connect Belt Extension

Wire Management

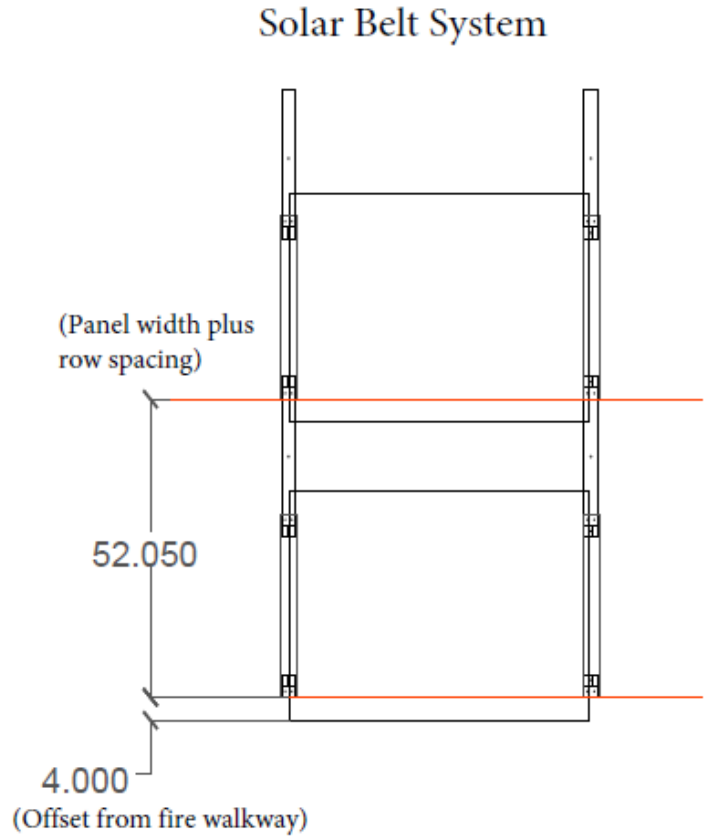
Wire Management

Planning A Layout



Vertical chalk lines will mark placement of the long edge of the ballast pan (or Solar Belt). When planning a layout, leave correct spacing from the edge of the panel to the edge of the ballast pan (or Solar Belt) to avoid encroaching into the fire walkways.

The first chalk line can run along the fire walkway border. Each subsequent vertical chalk line will be placed at a distance of: Panel Length + 0.75"



Horizontal chalk lines will mark placement of the short edge of the ballast pan(or Solar Belt).

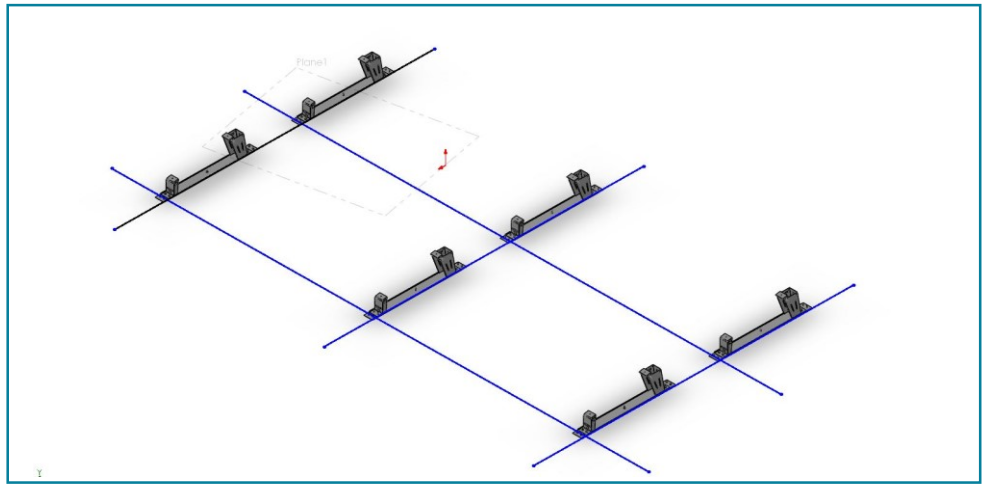
When planning a layout, leave correct spacing from the edge of the ballast pan (or Solar Belt) to the edge of the panel to avoid encroaching into the fire walkways (about 4" for typical 60 or 72 cell panel).

The first chalk line can run along the fire walkway border.

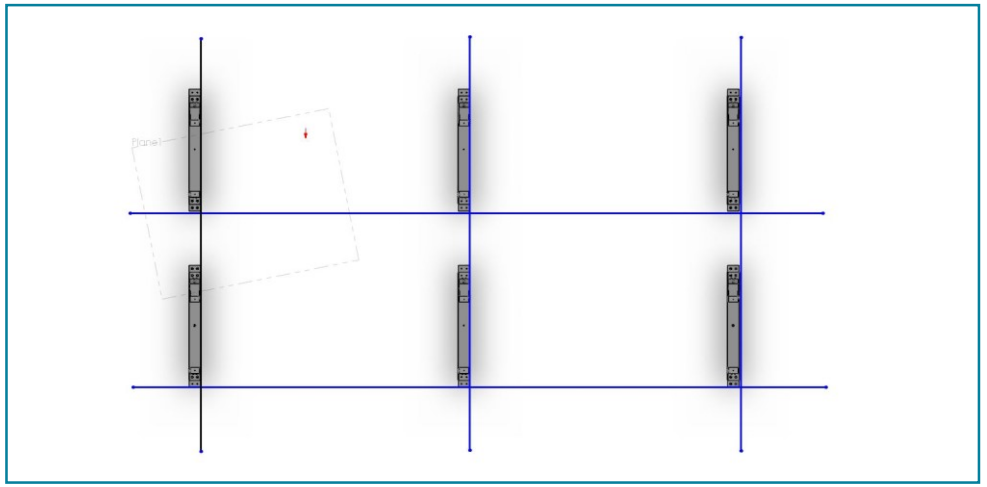
Each subsequent vertical chalk line will be placed at a distance of: Panel Width + * Pre-determined Row Spacing*

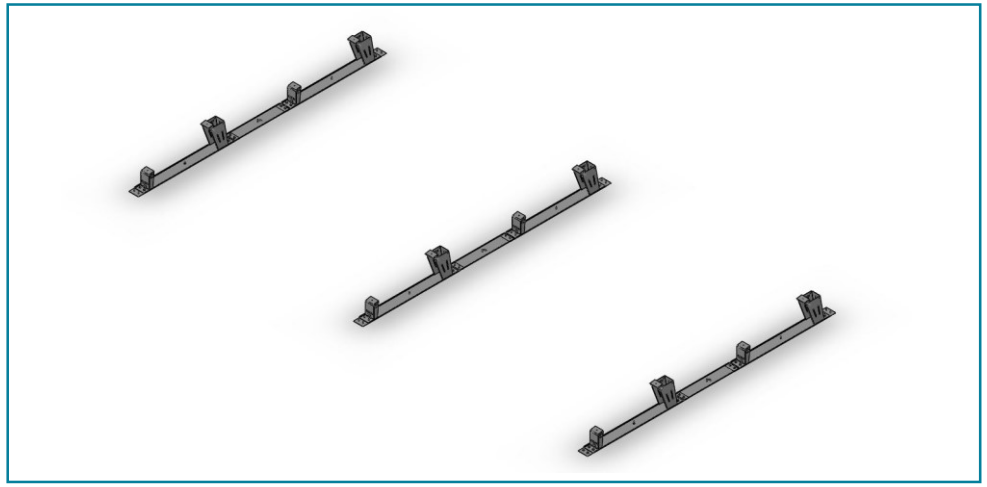
Row spacing depends on system tilt, array azimuth, and project site location.

Belts and Brackets

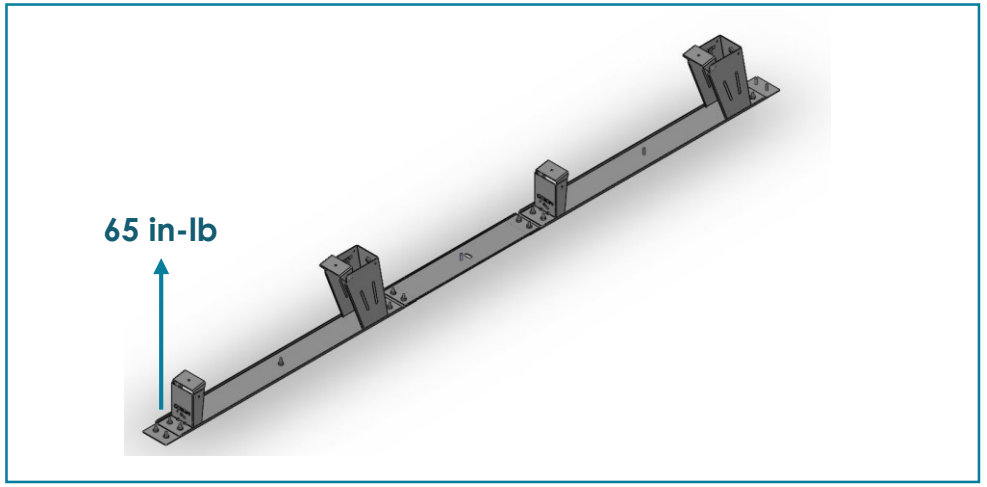


Align pre-assembled High, Low Bracket and solar belt combination with pre-drawn chalk lines.



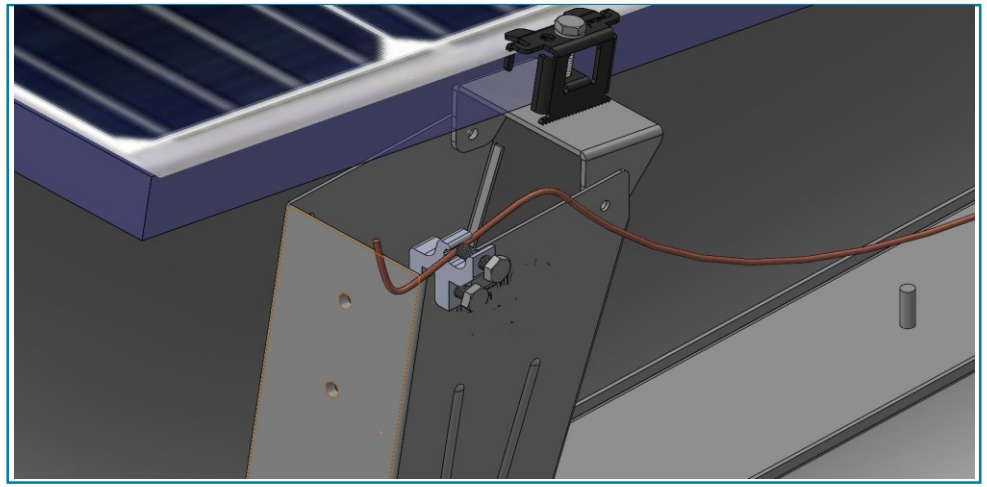


Add Connect Belts between each row over the top of the brackets on the PEM Studs. Add a **1/4-20 Stainless Steel Serrated Hex Flange Nut** to each PEM Stud and tighten to **65 in-lb**.



Seismic attachment plates, U-Anchors or Flash Belts have been predetermined, attach to connect belts before installing between rows. See Page 9 "Securing System" of this manual.

Ground Lugs



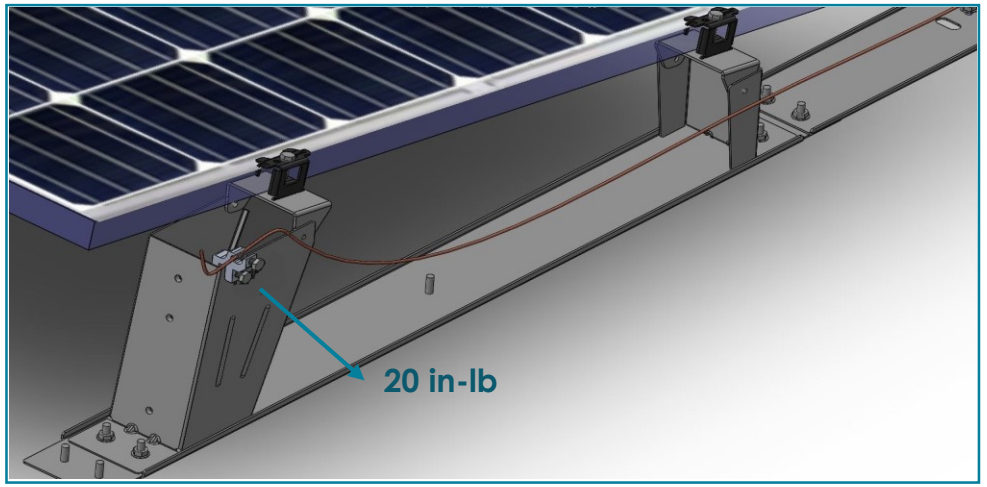
Ground lugs should be placed before PV Modules are installed. Apply lug to the edge of a high or low bracket as shown above.

The rest of the system will be bonded through integrated grounding methods:

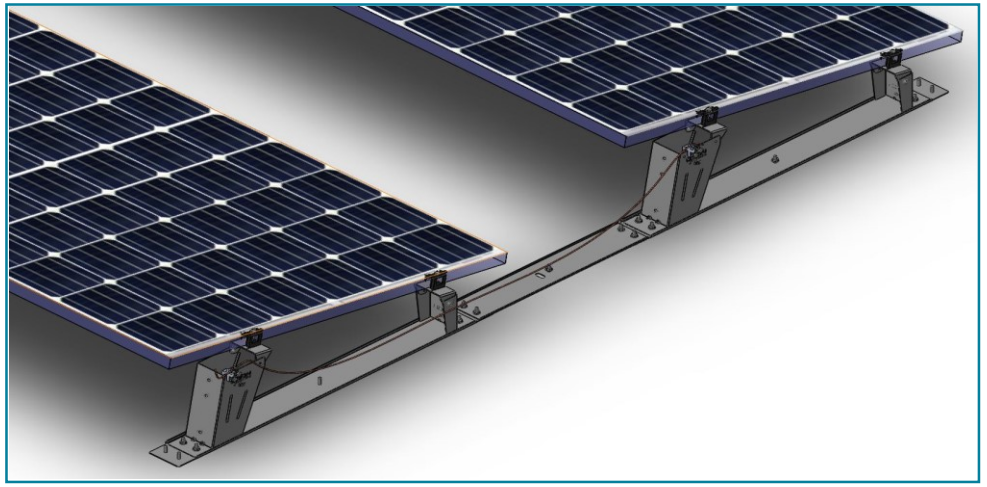
-Grounding Mid Clamps

-Grounding End Plates

-Serrated Hex Flange Nuts



As a general rule, one SGB-5 Lug is required for every **56 modules** in array.
Bolts should be torqued to **20 in-lb**.



Grounding method used in accordance with the **National Electrical Code, ANSI/NFPA 70.**
Orion's Belt System is evaluated for module-to-system bonding, only, to **UL 2703**.

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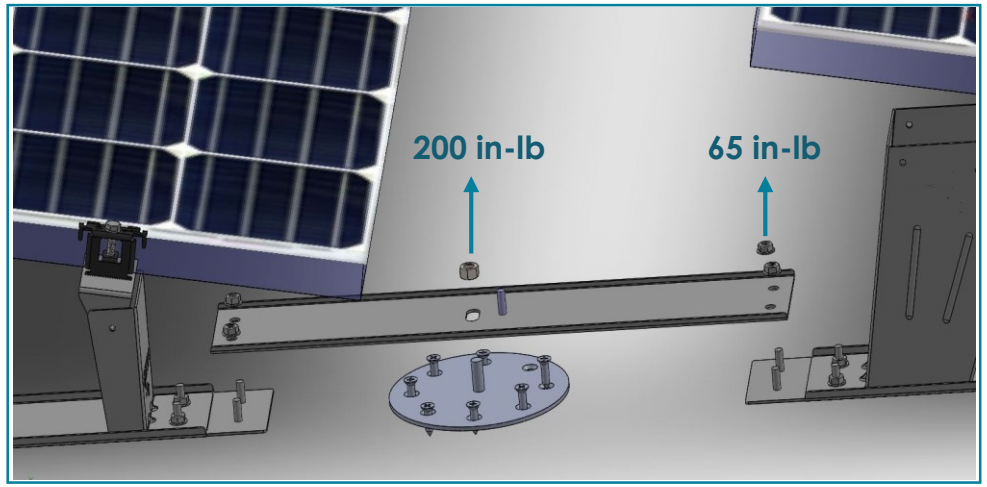
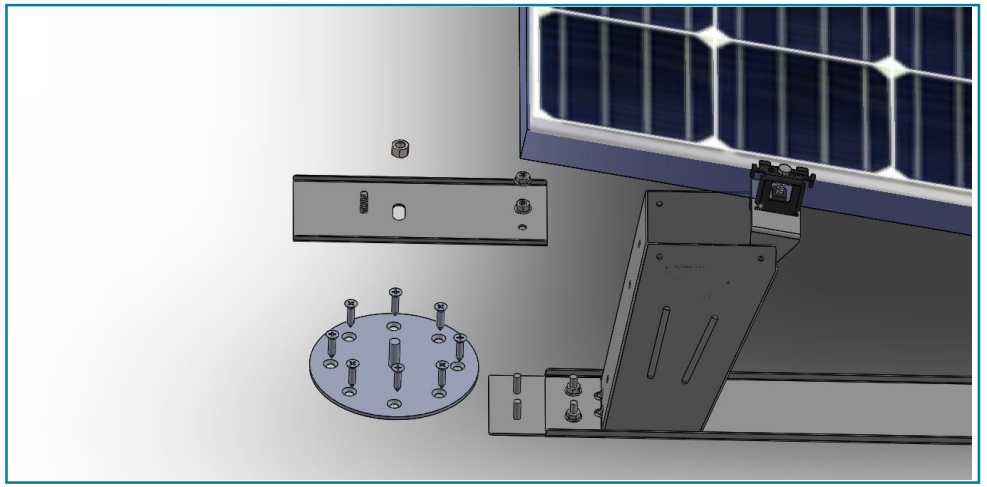
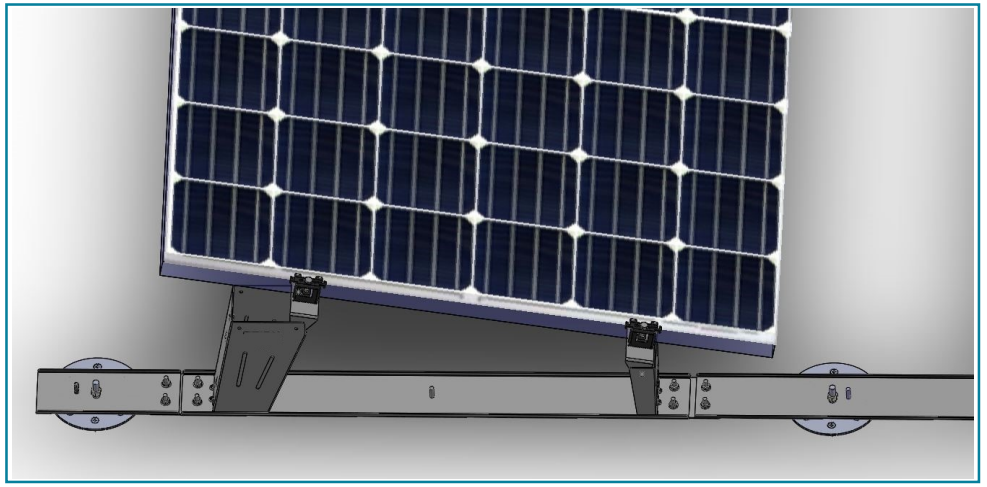
Securing System – Seismic Plate



The Seismic Attachment Plate (SAP) is connected to the system through the center hole of the Connect Belt and Connect Belt Extension. Not every Connect Belt will need an SAP. Consult a qualified structural engineer to determine quantity and placement of SAPs. Tighten **3/8 Serrated Hex Flange Nut** to **200 in-lb.**

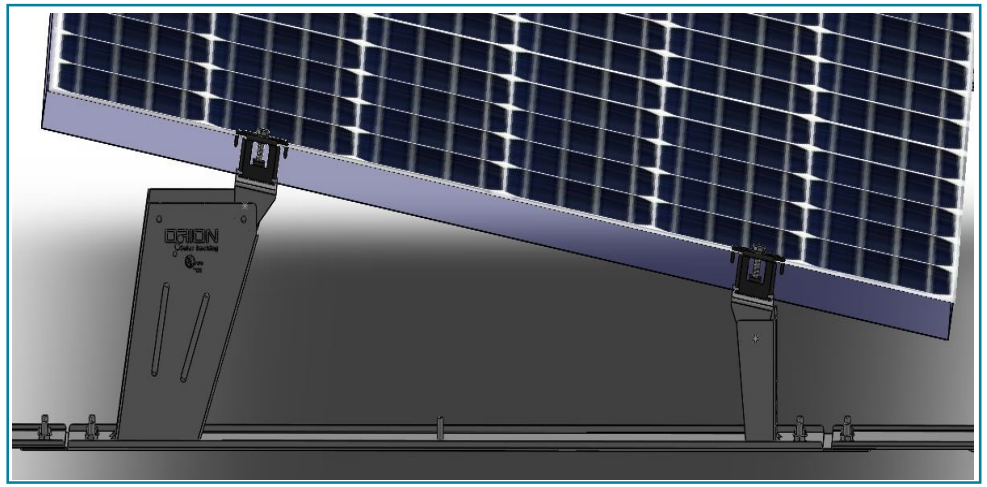


Replace the connect belt /connect extension on the system and secure the **1/4-20 Serrated Hex Flange Nuts** to **65 in-lb**.

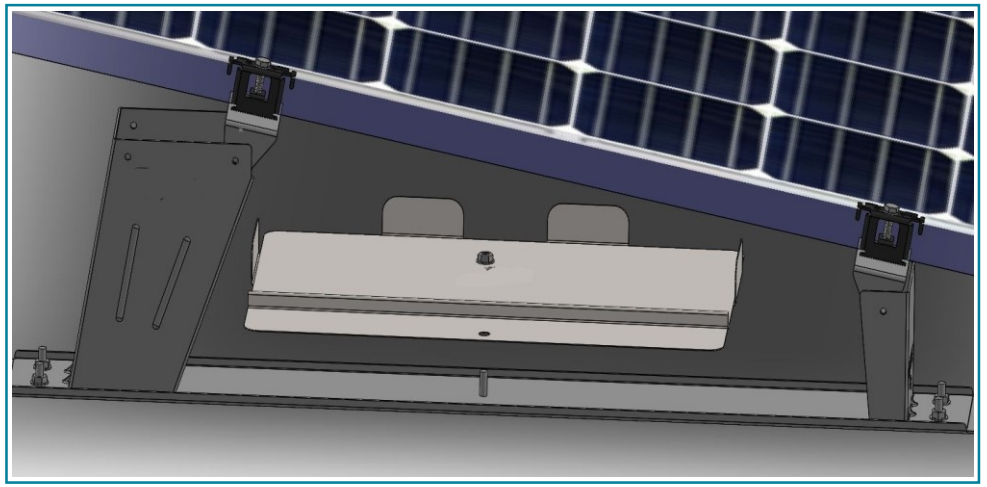


Insert **6 x roof appropriate fasteners** through the holes in the SAP. Consult a qualified roofer and/or structural engineer to determine roof appropriate fasteners. Seismic Attachment

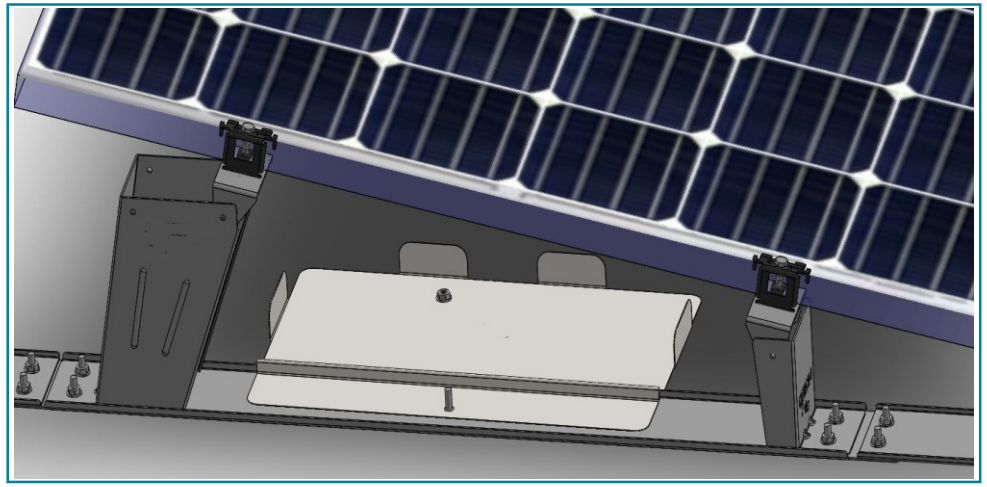
Securing System – Ballast Blocks



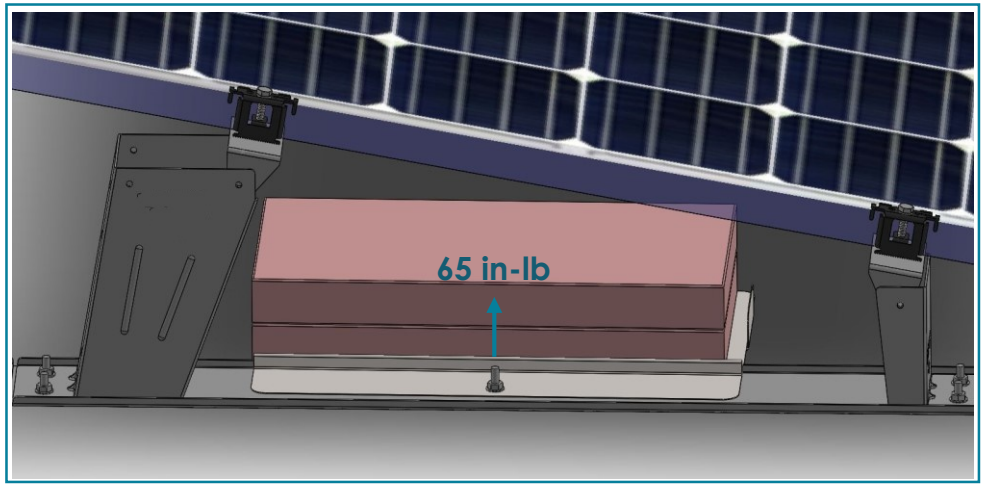
Locate ballast blocks locations on plan set.



Place the Side Ballast Pan over the Solar belt.



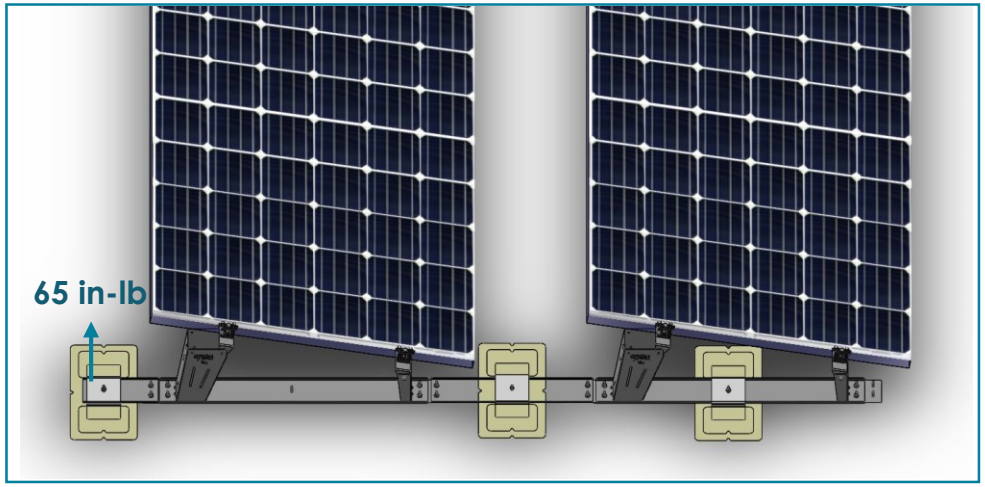
Insert **Nuts** into the threaded PEM Nuts in the top of each side ballast pan as shown and tighten to **65 in-lb.**



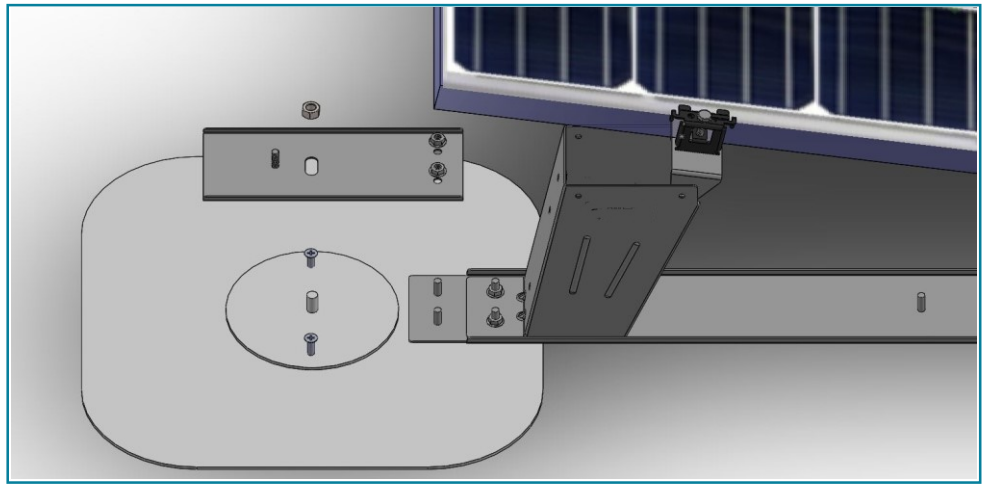
Securing System – Flash Belt

1. Install Racking System
2. Locate attachment point (See racking install plans)
3. Clean roof membrane
4. Install barbed seam plate and fastener (To be purchased separately -See Roofing Manufacturer for Fastener and Plate Type)
5. Weld bottom tab in of FlashBelt place on both sides of connection rack. Make sure weld from near the center or clad metal out towards the outer edge.
6. Weld top tab. Weld from inside weld to outside.
7. Probe all welds after finishing to insure proper installation

Insert **Bolts** into the **threaded PEM Nuts** in the top of each flash belt as shown and tighten to **65 in-lb.**



Securing System – U Anchor

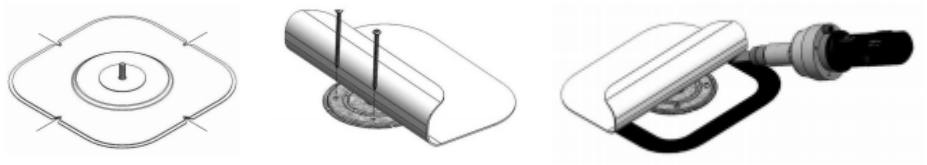


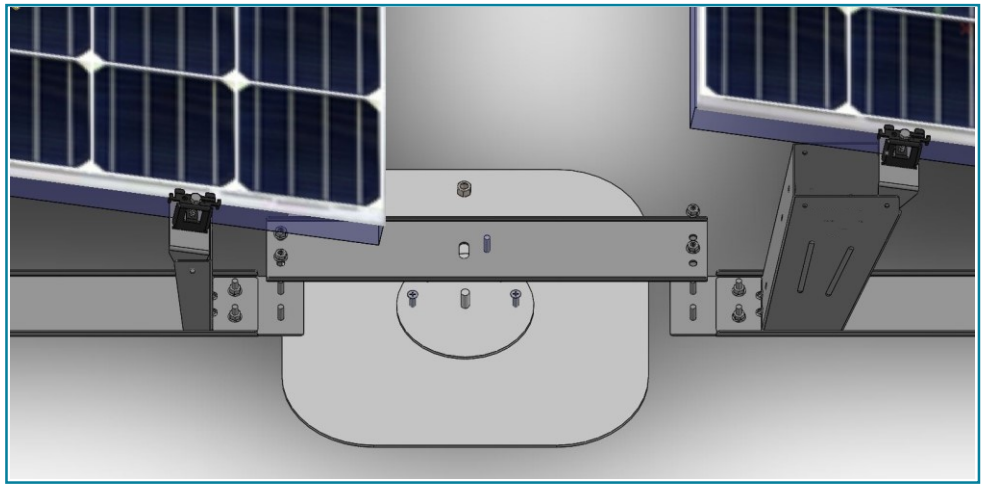
1. Prepare the roof surface by removing all loose debris and clean the area in accordance with the roofing manufacturer recommendations.

2. Place the U-Anchor over the roof membrane and align as per engineering requirements using the notched alignment marks on each side of the membrane cover. Fasten using 2-4 fasteners as specified.

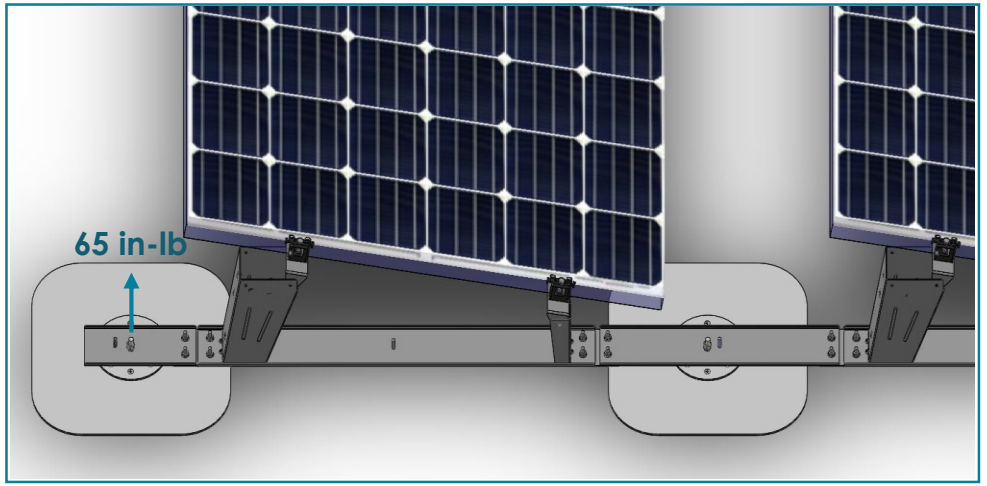
3. Hot air weld the entire perimeter edge of the U-Anchor membrane cover to the roof surface below. (Weld should be consistent with the roofing manufacturer recommendations or a minimum 1.5 inches whichever is greater)

4. Ensure a proper seal has been achieved by probing the perimeter edge using an approved seam probe

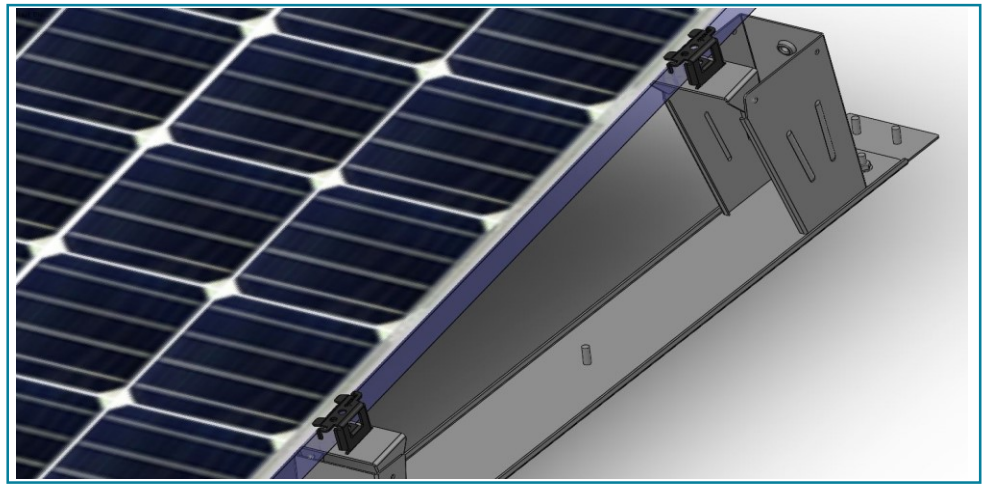




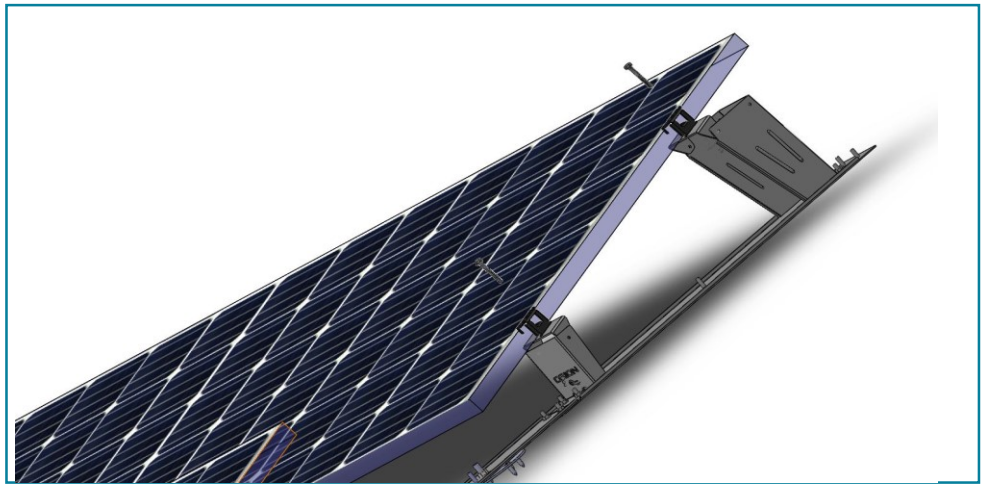
Insert **Bolts** into the threaded PEM Nuts in the top of each U-Anchor as shown and tighten to **65 in-lb.**



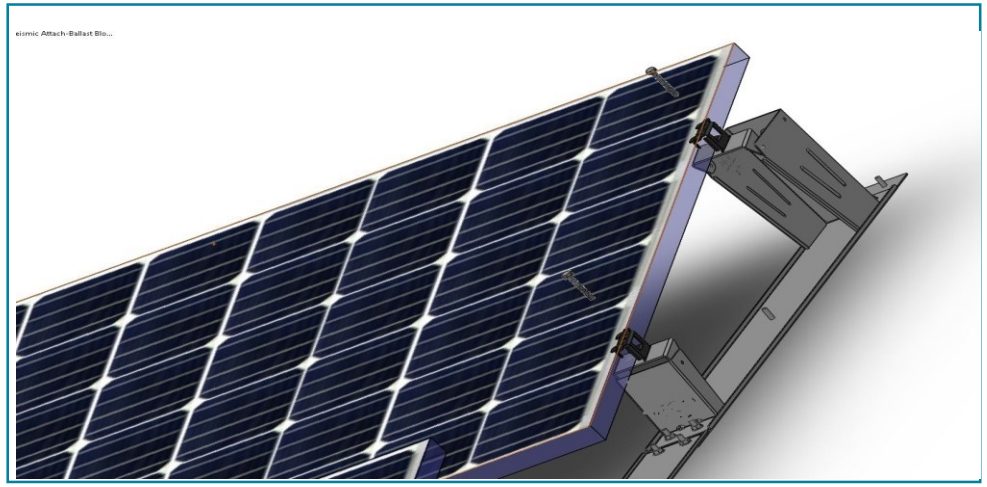
Mounting Module and Installing End Clamps



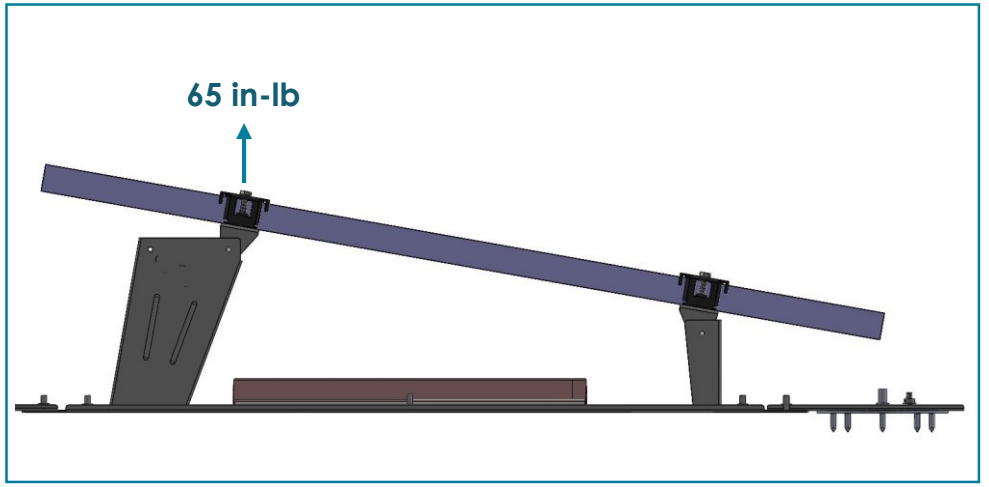
Place PV Module on brackets and line Grounding End Clamps up to span both brackets..



Insert **1/4-20 x 2" Stainless Steel Hex Cap Bolts** with stainless steel flat and lock washers into the two holes in the Grounding End Ground.

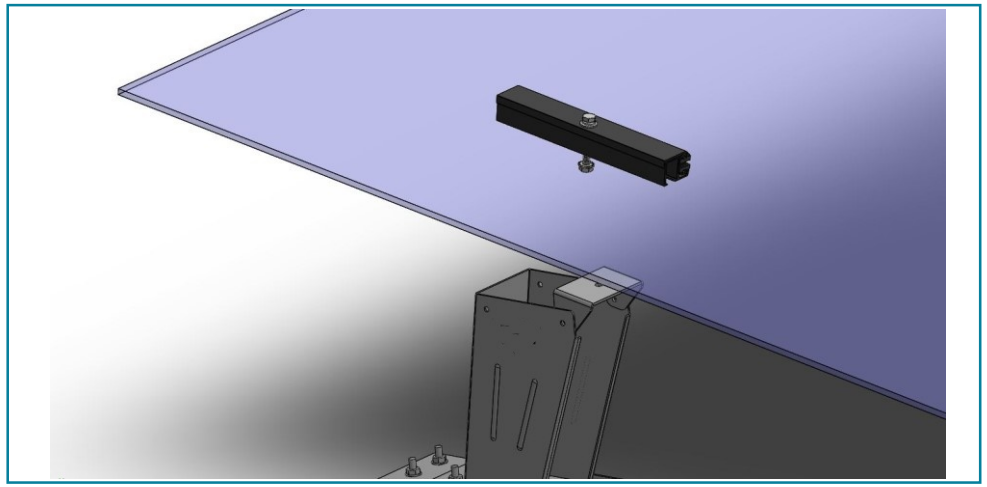


Insert Bolts into the threaded PEM Nuts in the top of each bracket as shown and tighten to **65 in-lb.**

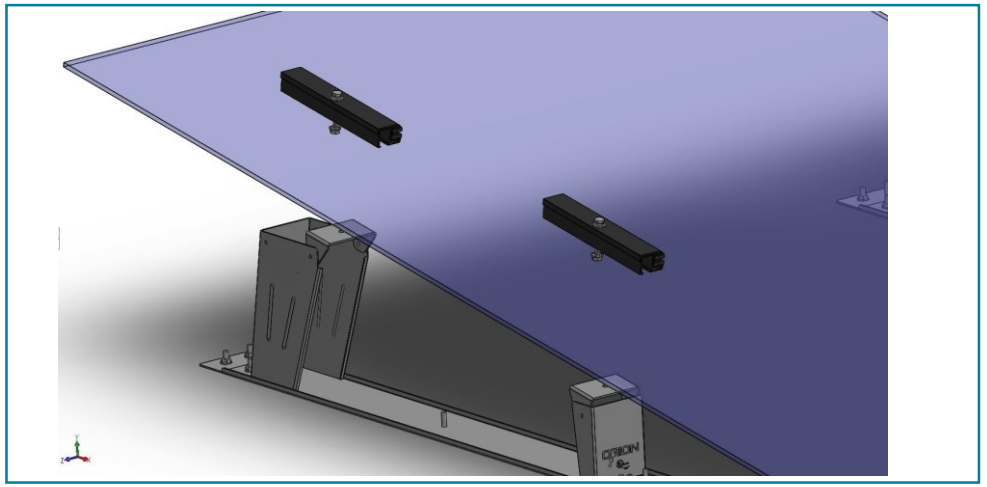


Panel should be centered over brackets with equal overhang on each side.

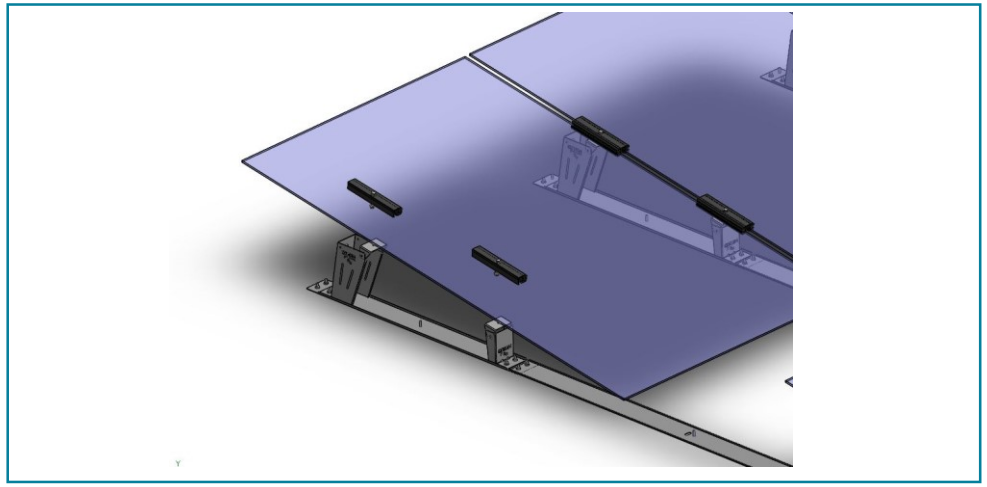
Mounting Module and Installing Frameless End Clamps



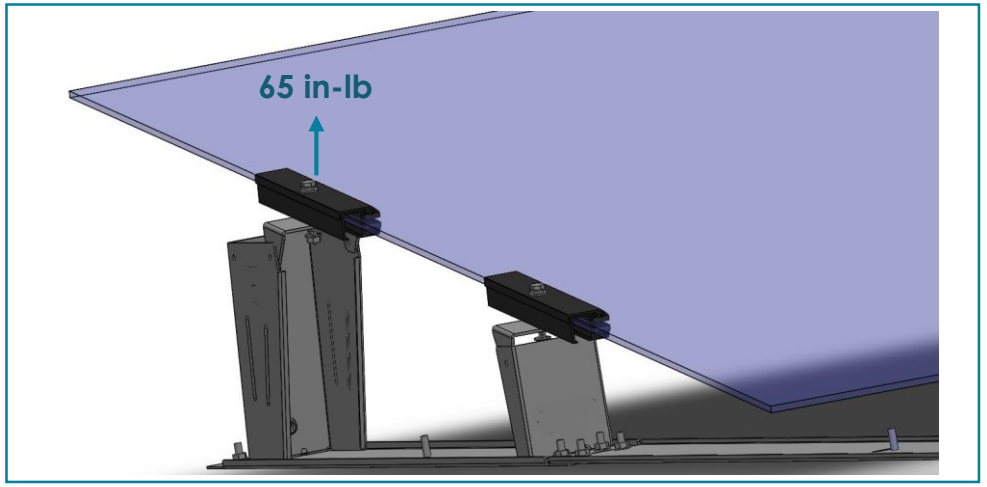
Place PV Module on brackets and line Grounding End Clamps up to span both brackets..



Insert **1/4-20 x 2" Stainless Steel Hex Cap Bolts** with stainless steel flat and lock washers into the two holes in the Grounding End Ground.

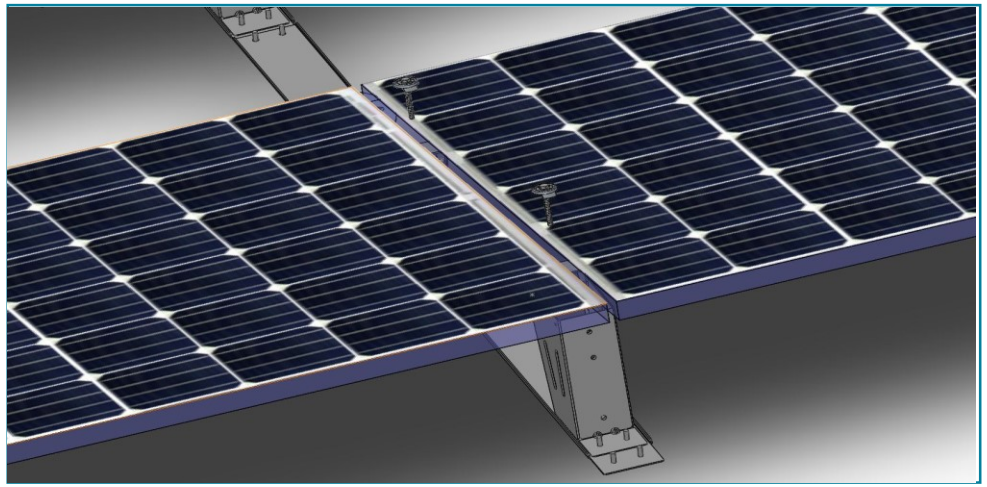


Insert Bolts into the threaded PEM Nuts in the top of each bracket as shown and tighten to **65 in-lb.**

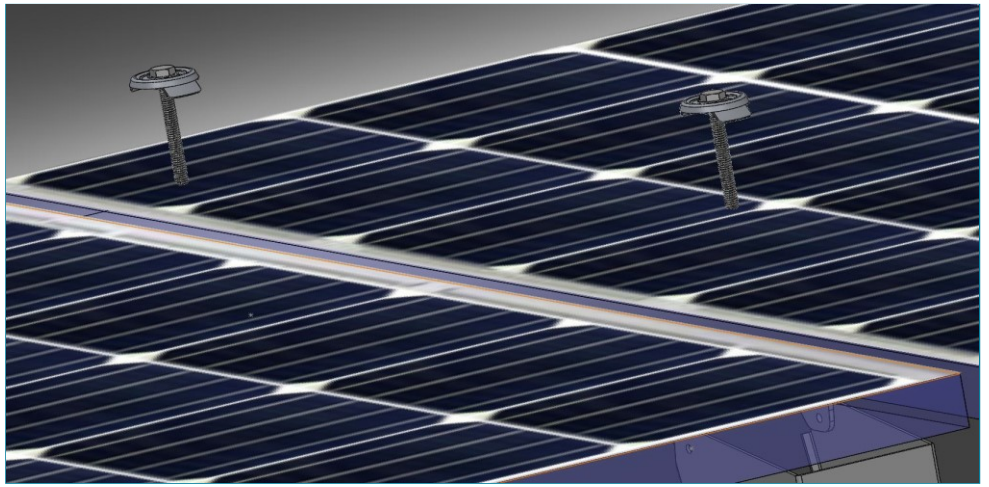


Panel should be centered over brackets with equal overhang on each side.

Mounting Module and Installing Mid Clamps

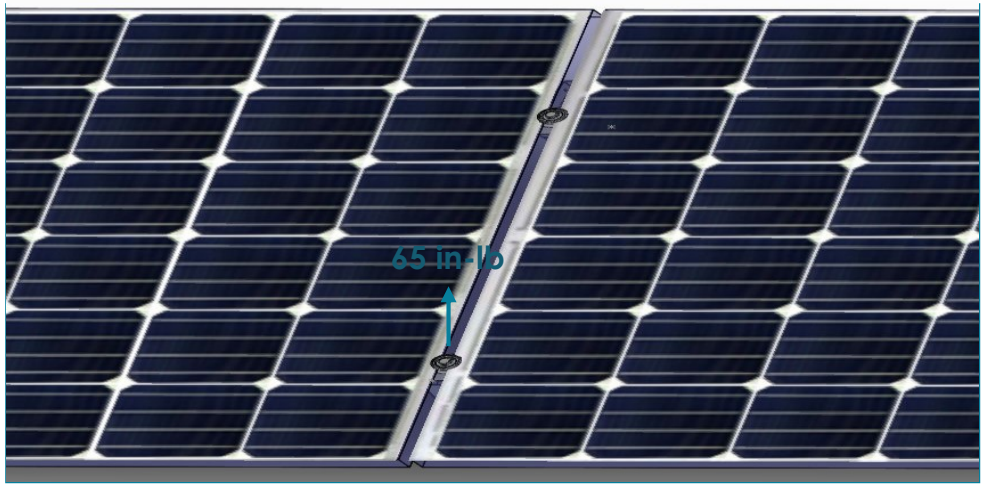


Place PV Module on brackets. Two Grounding Mid Clamps are required (one on each bracket).



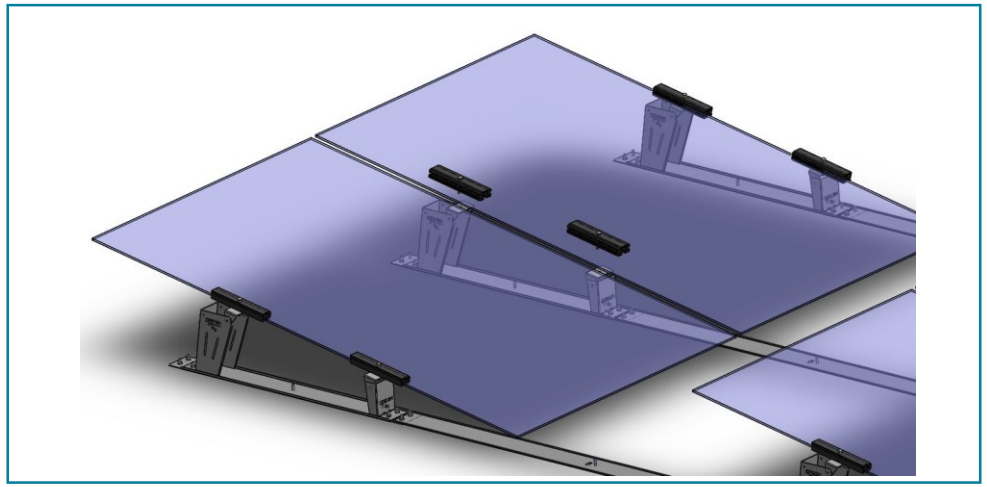
Insert **1/4-20 x 2" Stainless Steel Hex Cap Bolts** through one lock and one flat washer and then through the Stainless Steel Grounding Mid Clamp Cap.

Insert Bolts into the threaded PEM Nuts in the top of each bracket as shown and tighten to **65 in-lb.**

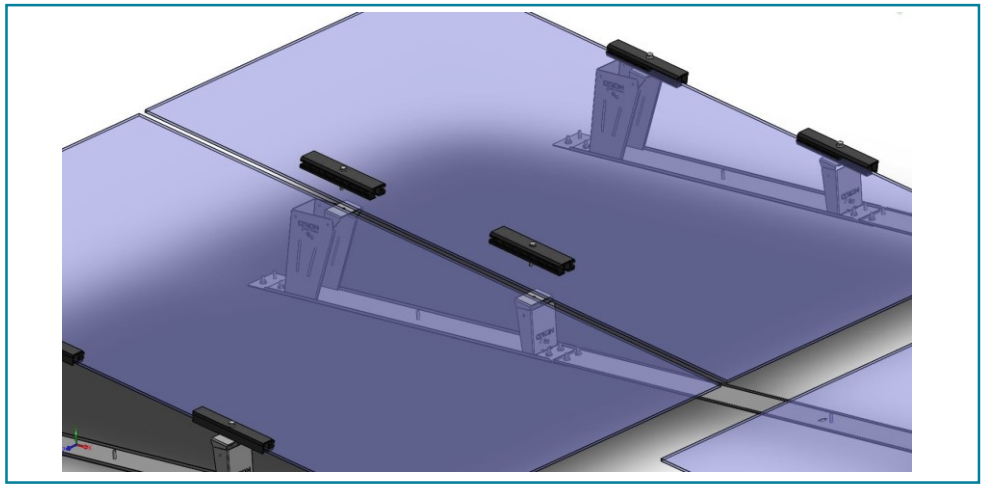


Place PV Module on brackets and line Grounding End Plate up to span both brackets.

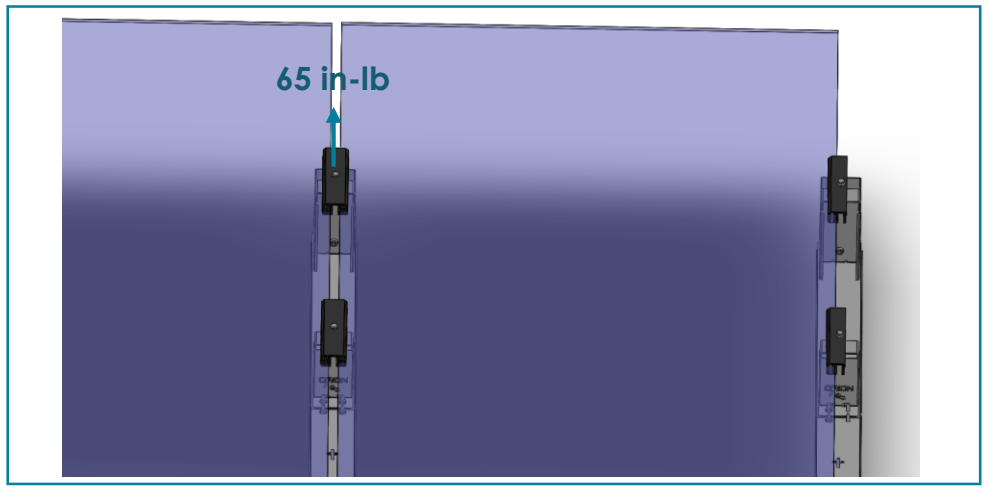
Mounting Module and Installing Frameless Mid Clamps



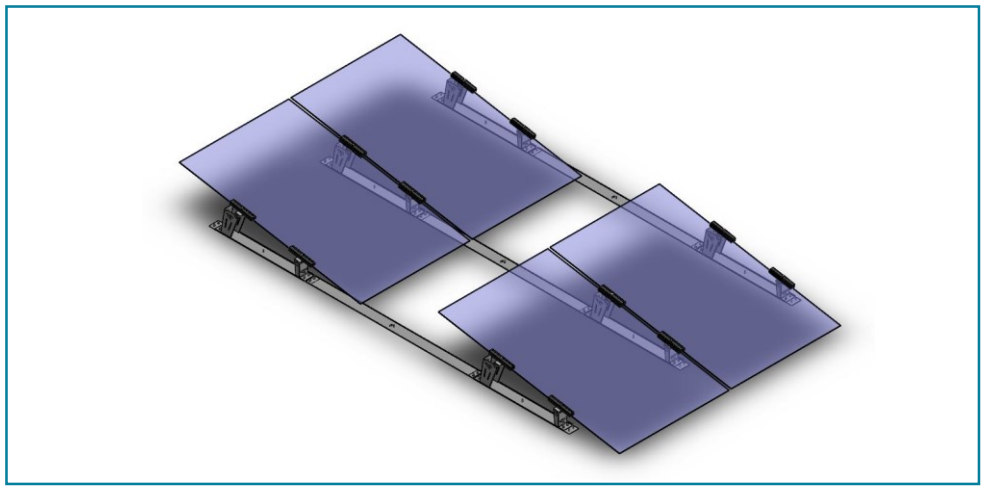
Place PV Module on brackets. Two Grounding Mid Clamps are required (one on each bracket).



Insert **1/4-20 x 2" Stainless Steel Hex Cap Bolts** through one lock and one flat washer and then through the Stainless Steel Grounding Mid Clamp Cap.

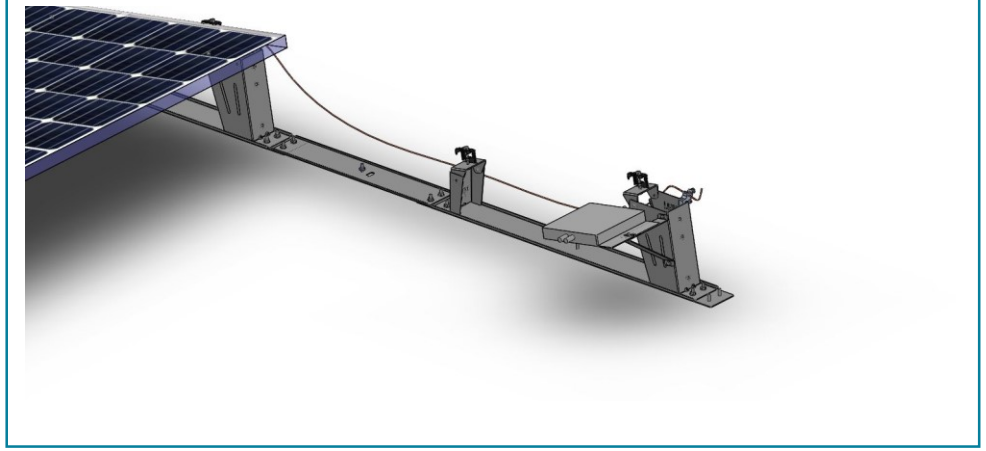


Insert Bolts into the threaded PEM Nuts in the top of each bracket as shown and tighten to **65 in-lb**.

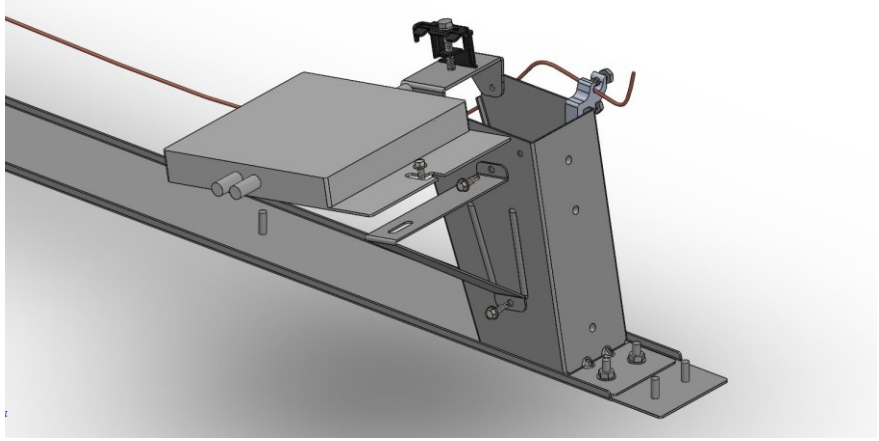


Place PV Module on brackets and line Grounding End Plate up to span both brackets.

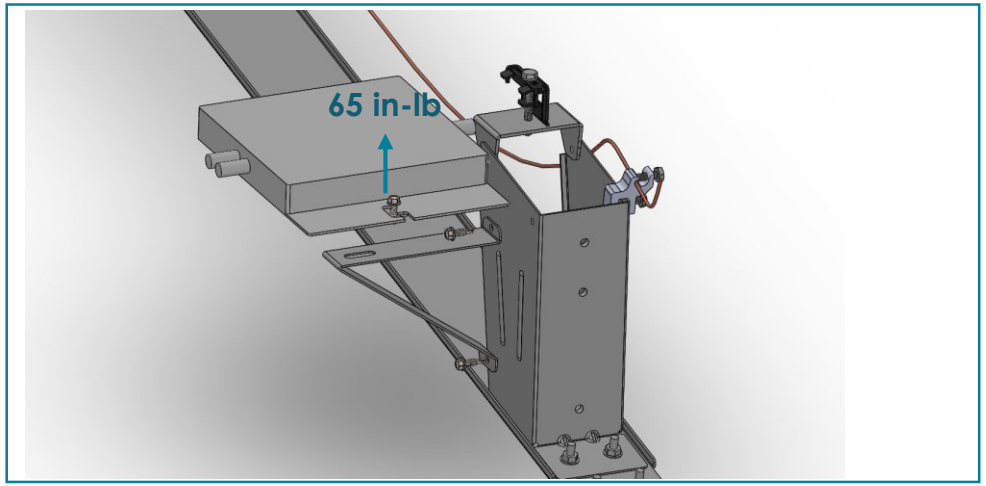
Accessory Mounting Plate



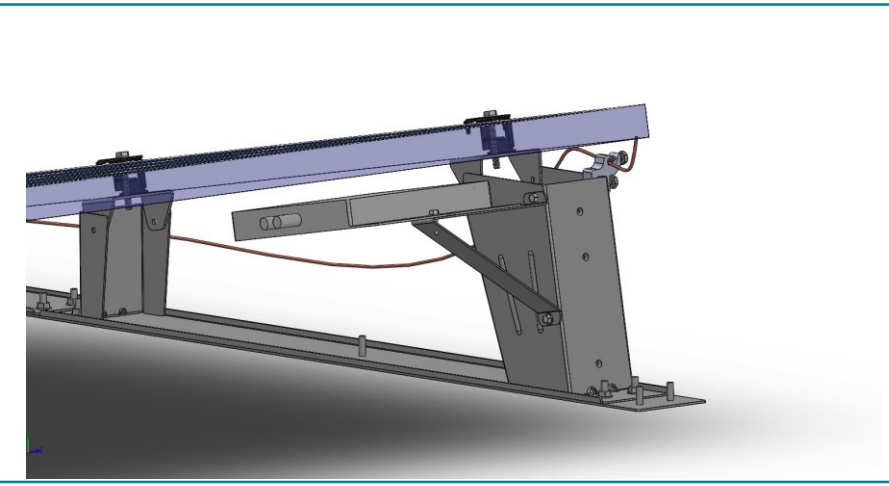
The Accessory Mounting Plate (AMP) should be attached to either side of the High Bracket using up to 4 x #10 Stainless Steel Self Tapping Sheet Metal Screws.



When choosing a position on the bracket, make sure that placement of ballast blocks or panels wont interfere with the attachment or the accessories being mounted to the attachment.

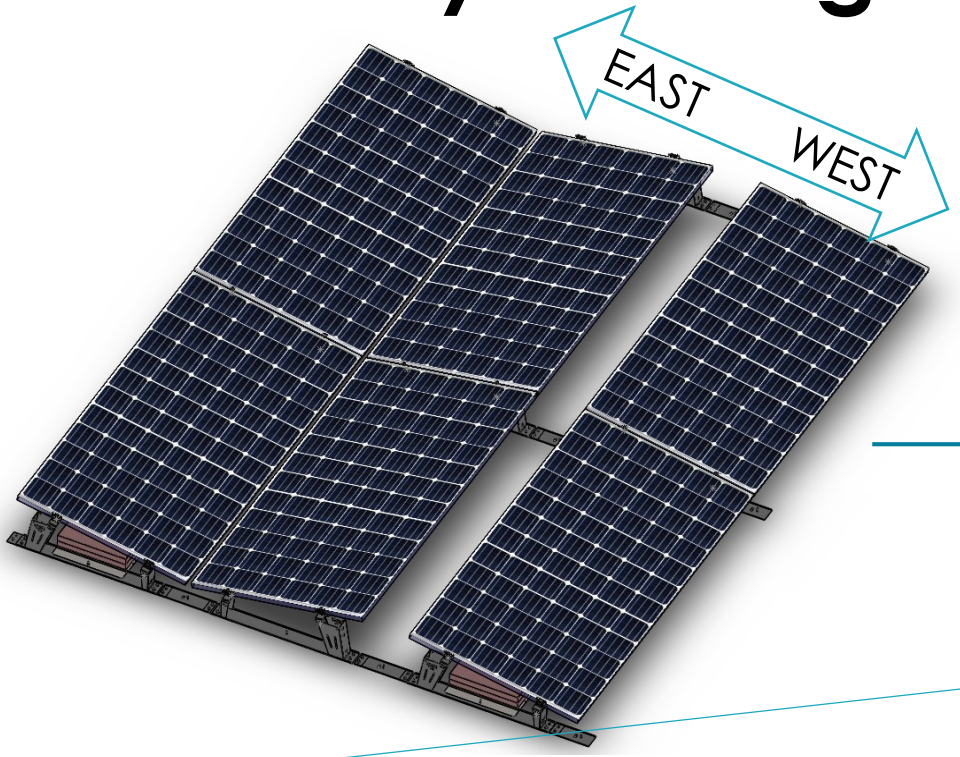


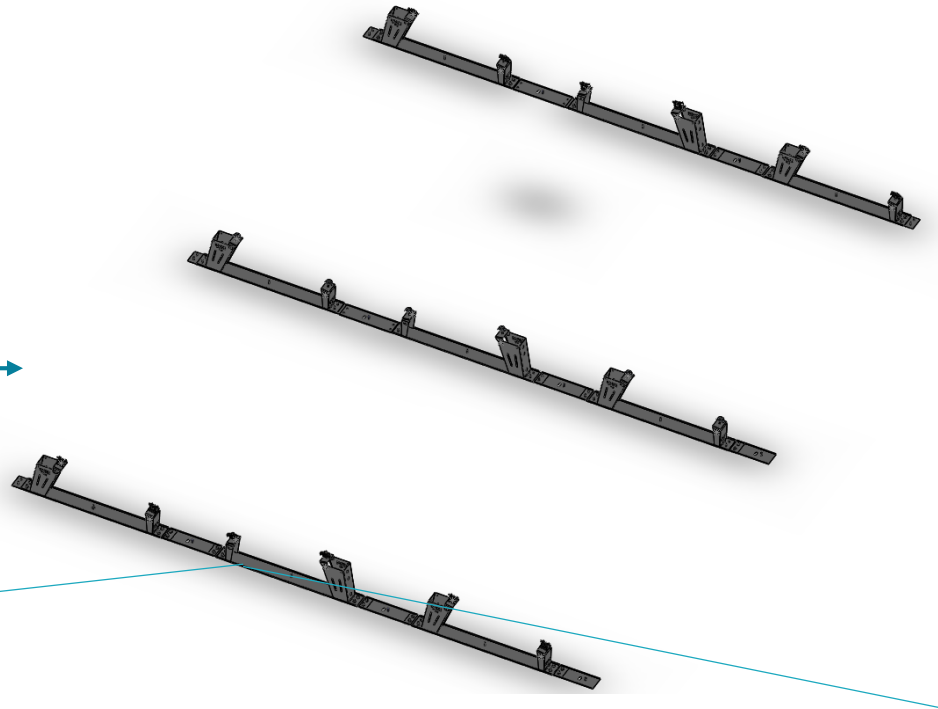
To attach an accessory to the AMP, use a 1/4-20 Stainless Steel Bolt with a Stainless Steel Star Lock Washer and a Stainless Steel Serrated Hex Flange Nut.

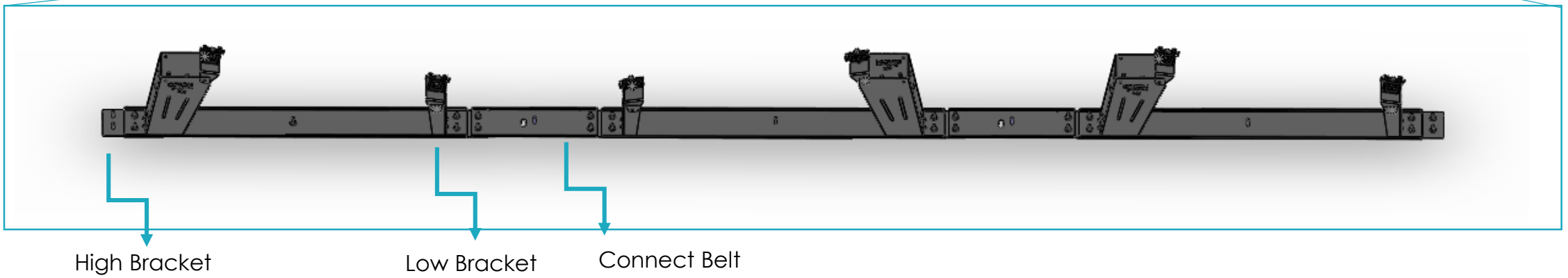


Attach the accessory using the slot on the top of the AMP. tighten bolt to **65 in-lb**.

East-West System High & Low Brackets Layouts







Intertek UL2703 - Approved Modules

Blue Sun Solar
- HEX5-BSMXXXM10-72HBD
- BVM6610M-XXX
- BVM6612M-XXX
- BVM6612P-XXX

Canadian Solar
- CS6U-XXXP
- CS6U-XXXM
- CS6U-XXXP(1500V)
- CS6U-XXXM (1500V)

Solar America
- S4AXXX-144MH10

Hanwha Q Cells
- Q.PLUS L-G4.2 XXX
- Q.PEAK L-G4.2 XXX
- P.PLUS L-G4.1 XXX
- Q.PLUS L-G4 XXX
- Q.PRO L-G4 XXX
- Q.PRO L-G4.1 XXX
- Q.PRO L-G4.2 XXX

Gstar
- GSP7G72M-XXXX

LG
- LG X2-XXX
- LGXXXN2T-A5
- LGXXXN2W-A5
- LGXXXN1C-V5
- LGXXXN1K-A5
- LGXXX1C-A5
- LGXXXS2W-A5
- LGXXXS2W-G4
- LGXXXN2T-J5

SunPower
- X-Series
- SPRxxxNE
- P Series
- SPR-XXX-COM

Solar World
- Sunmodule Pluse
- SW XXX Mono

Sunpreme
- Maxima GxB 360WB

Trina Solar
- TSM-PE14A
- TSM-DE15H(II)
- TSM-PD14
- TSM-DE14A(II) STD MONO
- TST-PE15H
- TSM-DE14A(II) PERC MONO

VSUN
- VSUN60X-XX
- VSUN72X-XX
- VSUN120X-XX
- VSUN144X-XX