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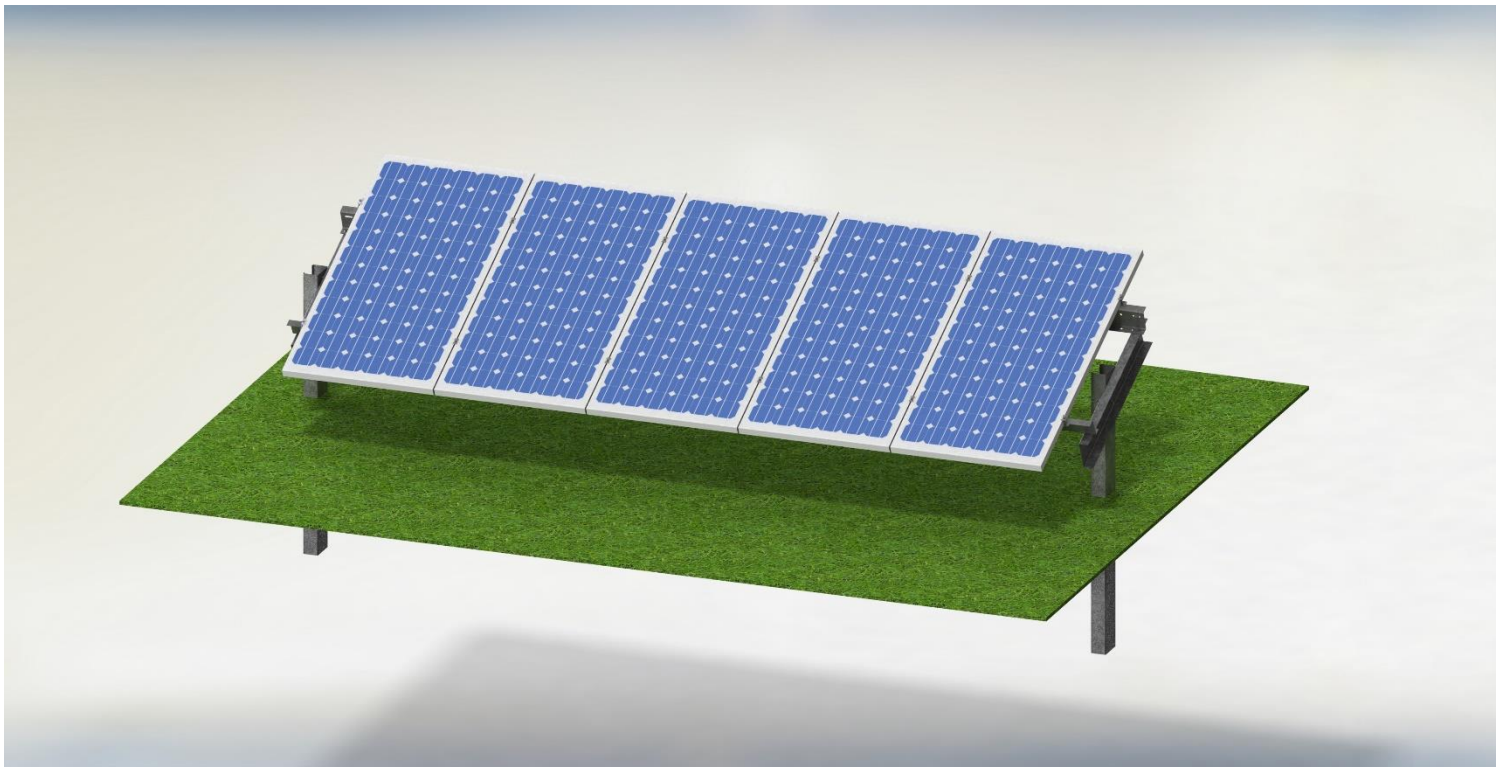
GENMOUNTS
SOLAR RACKING SYSTEMS

Genmounts Vector 1.0 (1 Column) Post Driven Installation Manual



GENMOUNTS®
SOLAR RACKING SYSTEMS

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Version 1.0

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WARNING

The Genmounts™ VECTOR 1.0 POST DRIVEN GROUND MOUNT racking system is engineered and tested to withstand specifications when installed properly. Failure to install properly may decrease the performance of the installation or void the warranty.

SAFETY

All regional safety requirements should be followed when installing Genmounts™ VECTOR 1.0 POST DRIVEN GROUND MOUNT racking.

All equipment/tools should be properly maintained and inspected prior to use. This installation manual is intended for use by professional installers with a working knowledge of construction principles.

1.0 Introduction

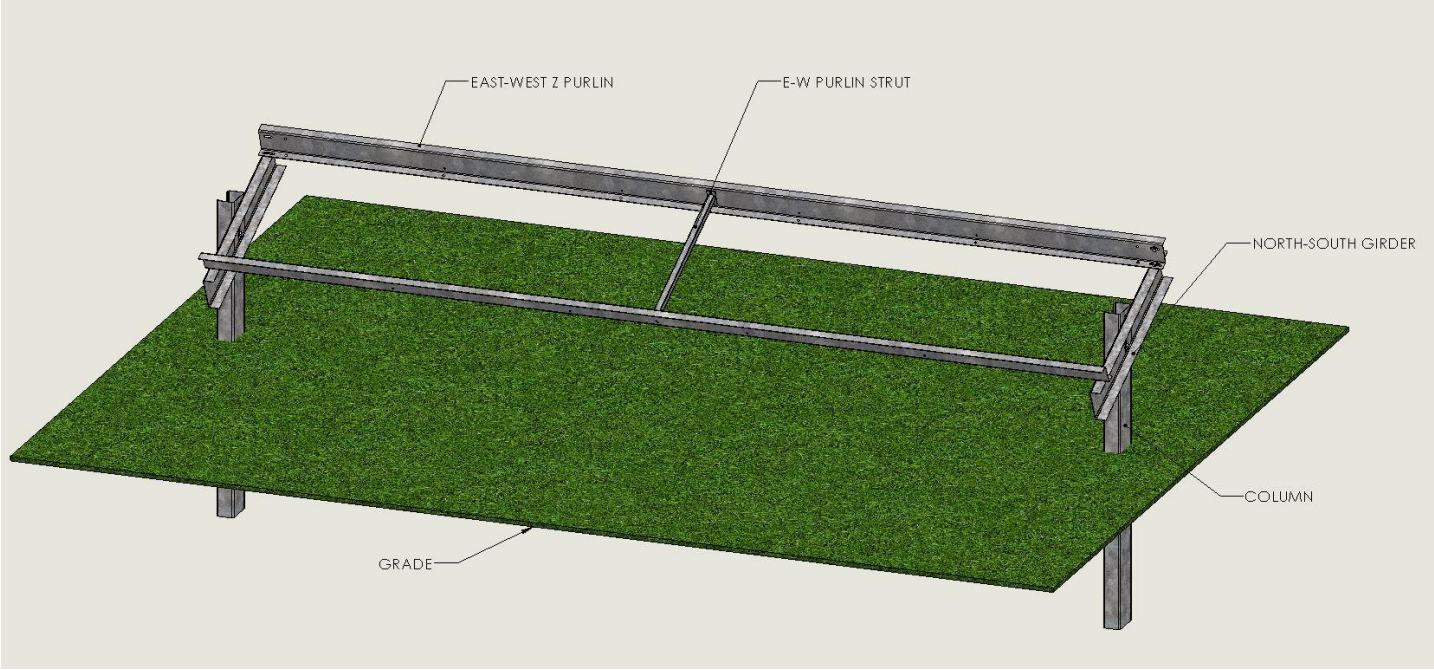
The purpose of this document is to provide instructions on how to properly install Genmounts™ VECTOR 1.0 Post Driven Ground Mount Racking System.

2.0 Product Overview

Genmounts™ Vector 1.0 solar racking system is a value engineered, easy to install solar mounting solution for residential, commercial and utility sized projects. Components are made from galvanized G90 steel, but custom materials and finishes can be used at the customers' request.

The key components of Genmounts™ VECTOR 1.0 POST DRIVEN GROUND MOUNT Racking System are the following:

Column
North-South Girder
East-West Z-Purlin
E-W Purlin Strut
Hardware



Features of the technologically advanced Genmounts™ Vector 1.0 system are:

1. Value engineered structural support members
2. Minimal parts and tools required
3. Low installation time & labor costs

3.0 Technical Specs

All components are made from corrosion resistant materials, with a product warranty of ten (10) years. Structural components are constructed from 50 ksi galvanized steel.

4.0 Installer Responsibility

The installer is responsible for the following:

- Complying with all applicable local or national codes including any that may supersede the relevant requirements stated in this manual
- Ensuring that the Genmounts™ system components are appropriate for the particular installation and the installation environment
- Ensuring that the selected site location can support the Genmounts™ Racking system under actual environmental loading conditions
- Using only Genmounts™ approved parts and installer–supplied parts as specified by Genmounts™. Substitution parts may void the warranty
- Ensuring safe installation of all electrical aspects of the Solar PV System
- Ensuring the installation shall be conducted by qualified service personnel only

General safety precautions:

Plan for safe practice during any installation activity with respect to hazards from tripping, falling, lifting, repetitive stress, and any overhead or electrical hazards. Refer to OSHA safety guidelines.

Metal components often have sharp edges. Handle carefully! Wearing gloves is good practice.

This document is not prescriptive regarding safety and does not purport to address all the safety concerns that may arise with its use. Contractors shall become familiar with all applicable safety, health and regulatory requirements before beginning work.
Electrical safety notice – The System is a mechanical system and contains no “live” parts. Mechanical installers and electricians shall coordinate in order to ensure that all personnel

are aware of electrical hazards that may result once panels have been placed on the racking structure.

5.0 Site Selection

Proper preparation of the site must be ensured for a well-performing system to be installed.

The Genmounts™ VECTOR 1.0 POST DRIVEN GROUND MOUNT system will typically be mounted on a flat surface or slightly graded surface facing South.

General guidelines include:

Choose a clear area free of shading
Prepare a well-drained location with minimal slope
Minimize drastic terrain and elevation changes
Proper subsurface investigation must be made to facilitate column design & installation method – ***TEST PILES AND PILE PULL TESTS GREATLY ENCOROUAGED***

6.0 Materials and Tools Required

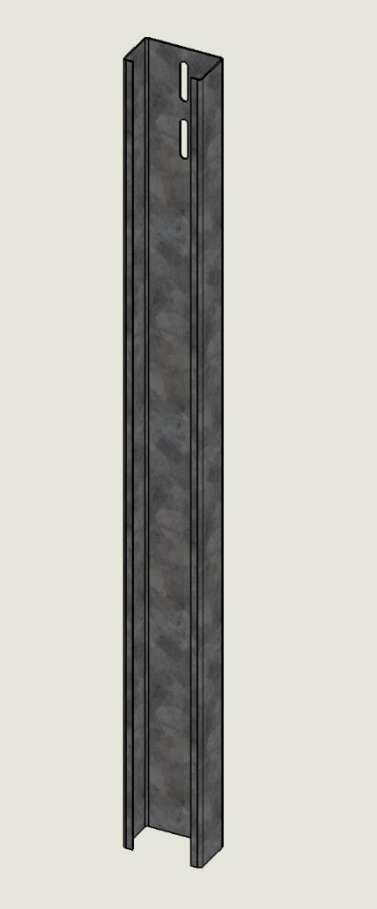
The following tools are required for the installation of the Genmounts™ VECTOR 1.0 POST DRIVEN GROUND MOUNT system:

- Open end, 15/16", 3/4", 1/2", 7/16" & 3/8" Box Wrench
- 15/16" & 3/4" Deep and Short Sockets (5/8" & 1/2" bolts)
- 3/8" & 7/16" Deep and Short Sockets (1/4-20" bolts)
- Impact drill (with multiple drivers)
- Adjustable Torque wrench
- String line & 4' level
- 30' tape measure

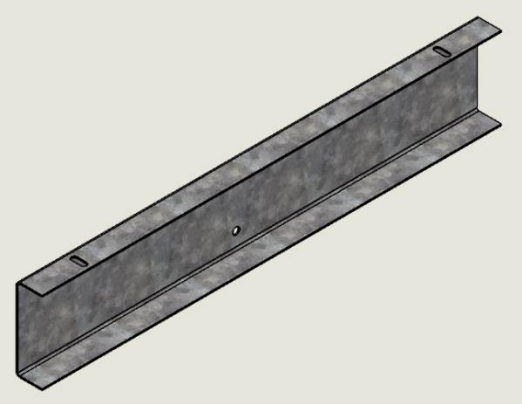
7.0 Component List

The Genmounts™ VECTOR 1.0 POST DRIVEN GROUND MOUNT system contains the following parts:

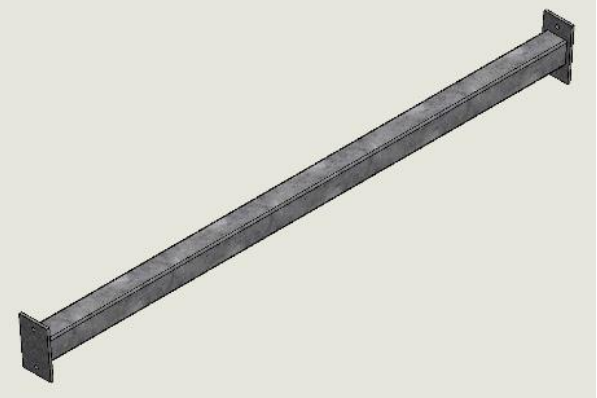
Column
North-South Girder
East-West Z-Purlin
E-W Purlin Strut
Top-Down Compression Bonding Mid Clamp
Top-Down Compression Bonding End Clamp
Hardware



Column

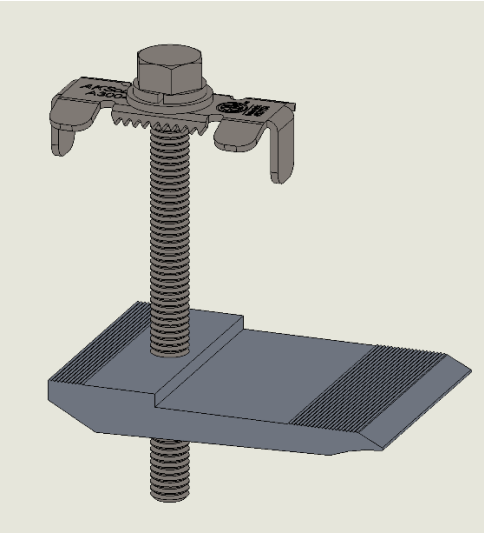


N/S Girder

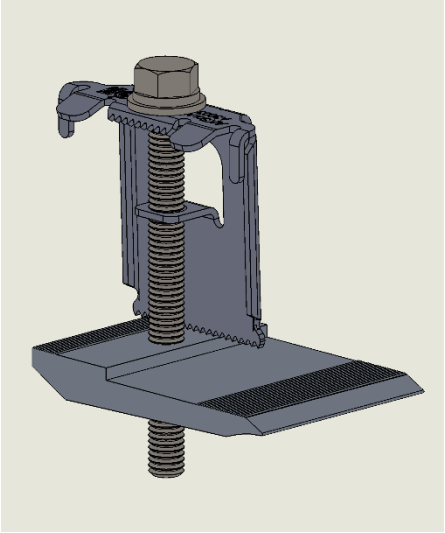


Purlin Strut

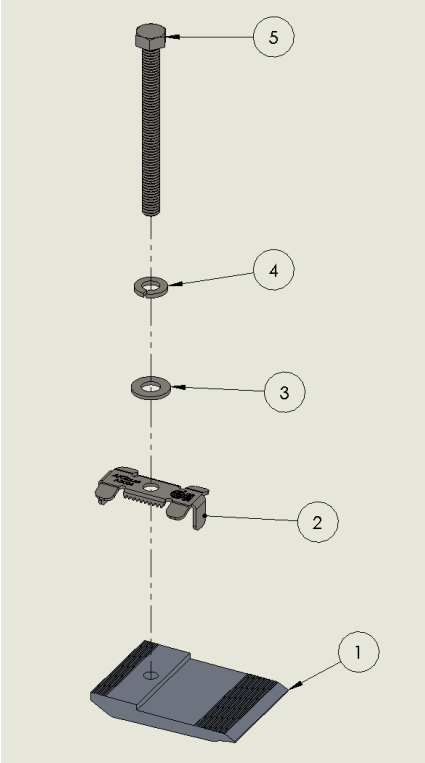
E/W Z-Purlin



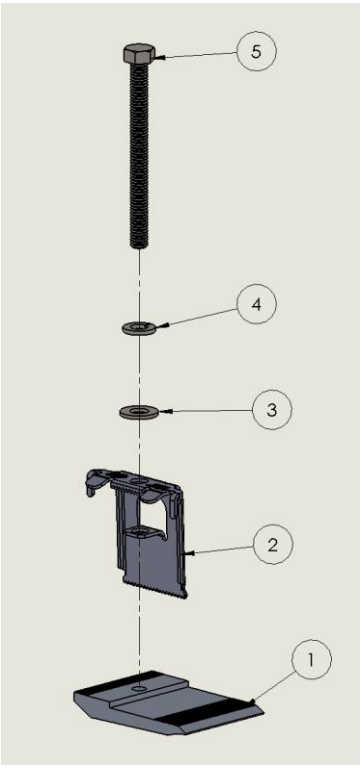
Top-Down Compression Bonding
Mid Clamp Assembly
(actual part may vary)



Top-Down Compression Bonding
End Clamp Assembly
(clamp specific to module frame thickness)



ITEM NO.	DESCRIPTION	QTY.
1	Clamp Retaining Clip	1
2	Bonding Mid Clamp	1
3	5/16" Flat Washer	1
4	5/16" Spring Lock Washer	1
5	5/16" Hex Bolt	1



ITEM NO.	DESCRIPTION	QTY.
1	Clamp Retaining Clip	1
2	Bonding End Clamp	1
3	5/16" Flat Wahser	1
4	5/16" Spring Lock Washer	1
5	5/16" Hex Bolt	1

8.0 Assembly, Installation, & Grounding Instructions

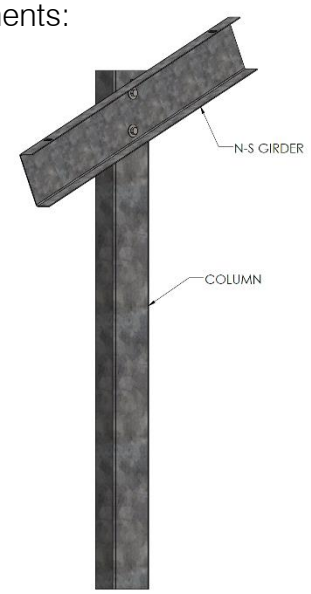
Assembly Overview:

Genmounts Vector 1.0 Series is comprised of “Starter Sections”, “Extension Sections” and “Cantilever Sections”.

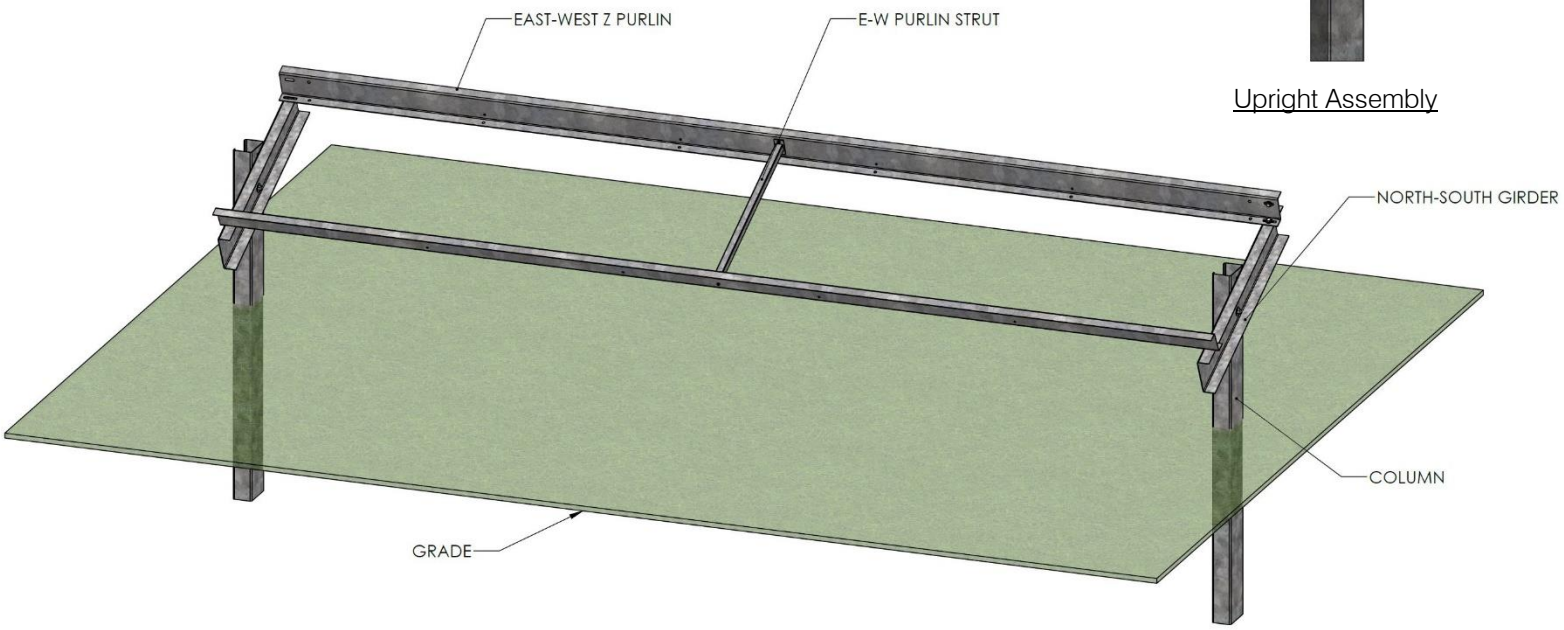
Starter Section assemblies are comprised of the following structural components:

- (2x) Upright Assemblies
  - Each Upright Assembly:
    - Column
    - N-S Girder
    - Corresponding hardware
- (2x) East-West Z Purlin (208 inches long)
- (1X) E-W Purlin Strut
- Corresponding Hardware

- Starter Assemblies can be used as standalone 5 module sections or beginning of continuous row of modules.



Upright Assembly

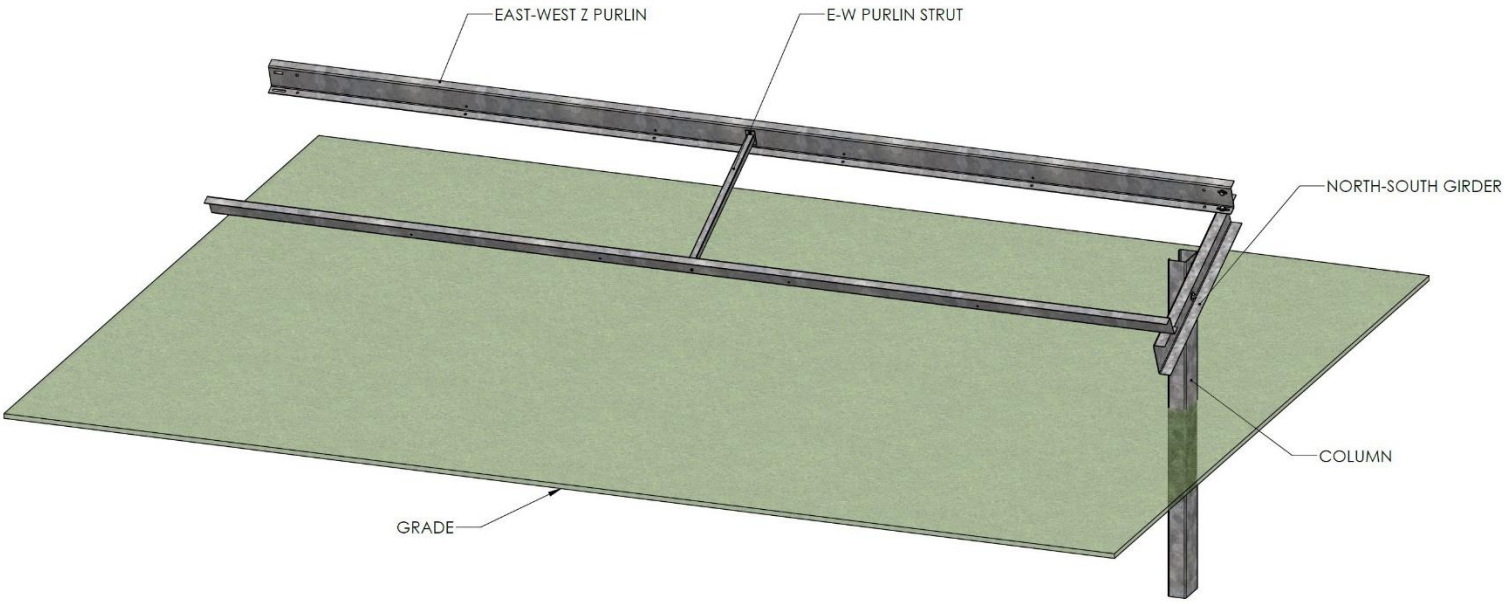


Assembled Stater Section

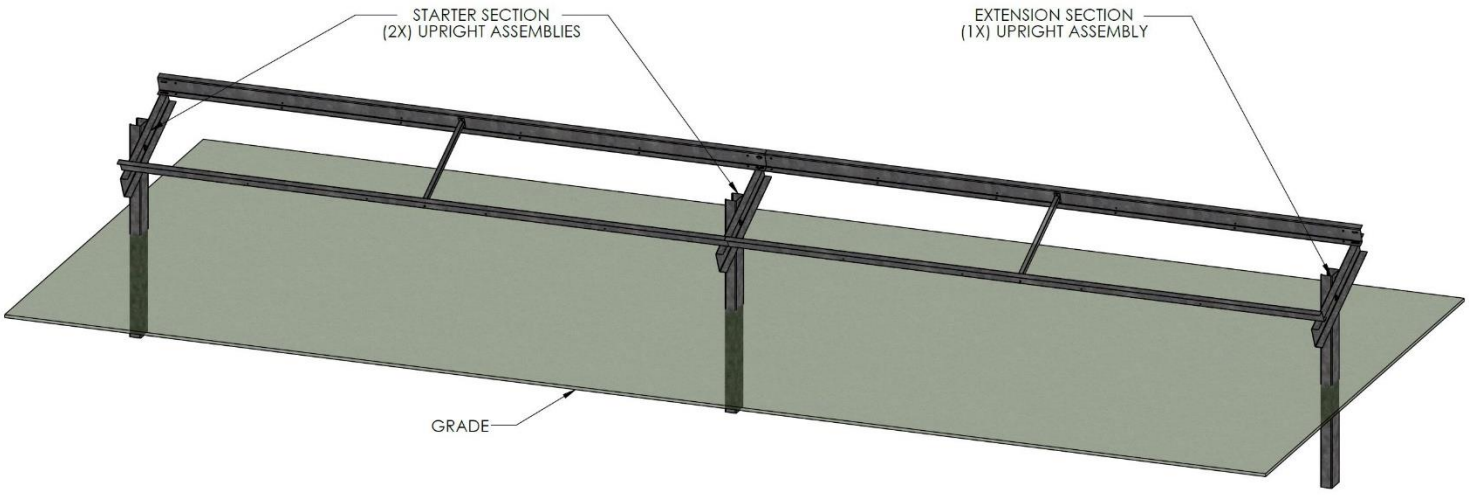
Extension Section assemblies are comprised of the following structural components:

- (1x) Upright Assemblies
    - Each Upright Assembly:
        - Column
        - N-S Girder
        - Corresponding hardware
- (2x) East-West Z Purlin (208 inches long)
- (1X) E-W Purlin Strut
- Corresponding Hardware

Extensions Section assemblies are utilized for adding to a continuous row of modules. Extensions Section assemblies cannot be used as standalone sections.

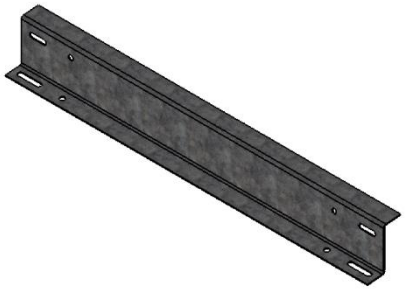


Assembled Racking with Starter and Extension Section Assemblies

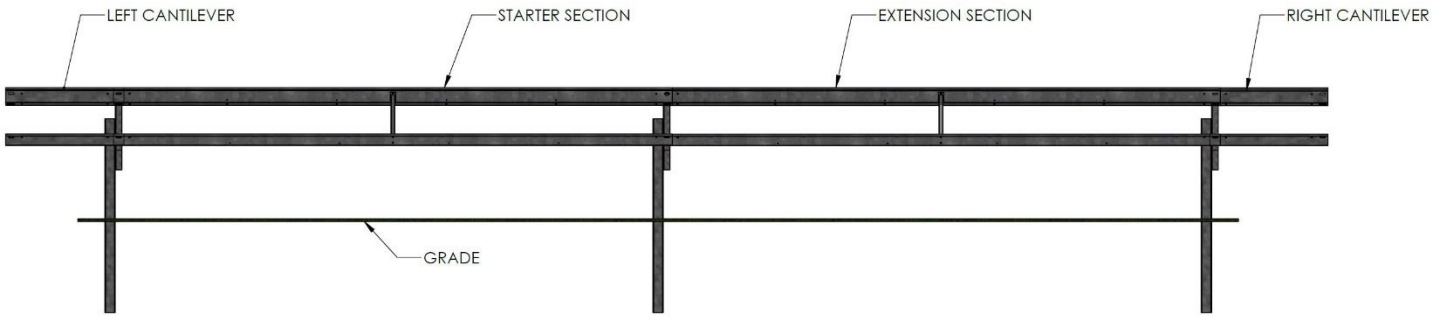


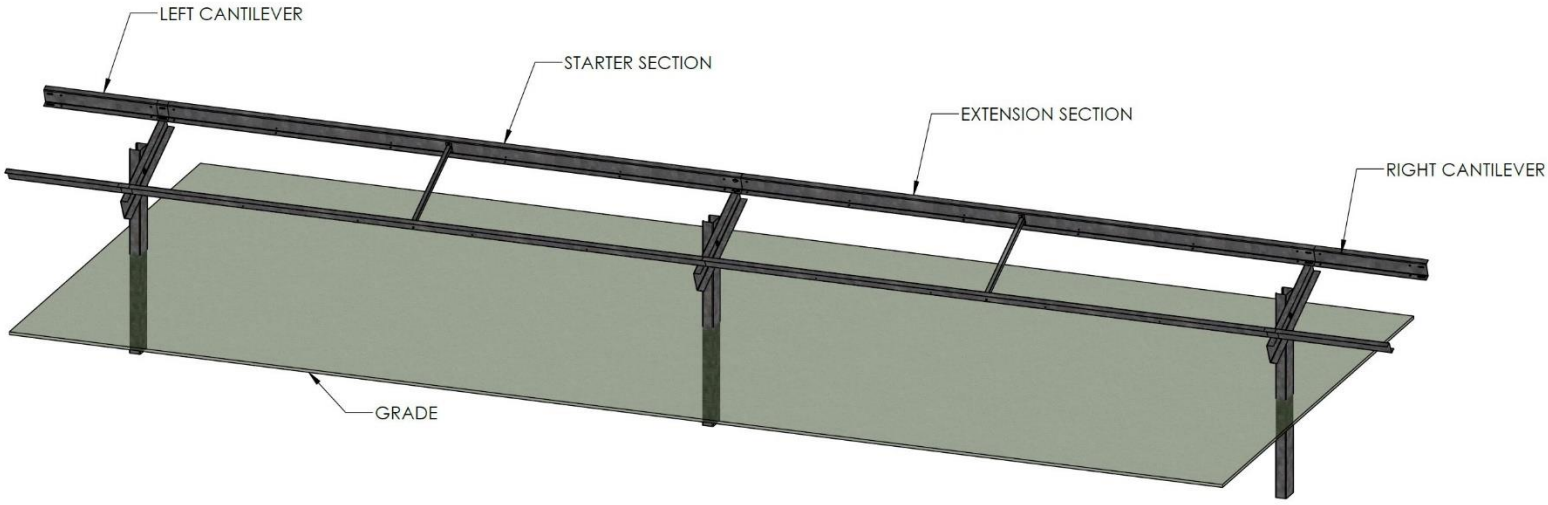
Cantilever Section assemblies are comprised of the following structural components:

- (2x) East-West Z Purlin Cantilevers (44 inches long)
- Corresponding Hardware
- See cantilever assembly instructions on page 19.



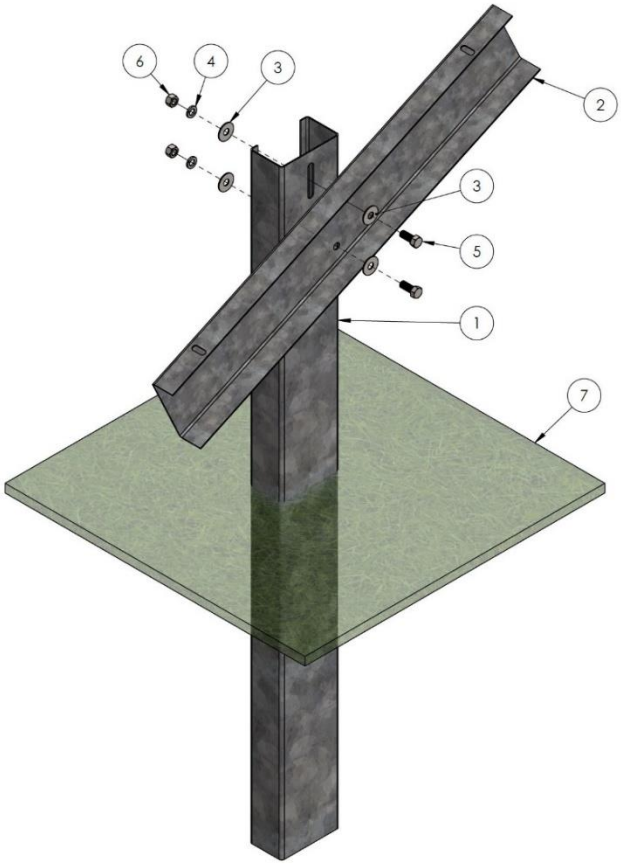
- Cantilever Sections can be installed on either side of Starter or Extension Sections See assembled overview below.

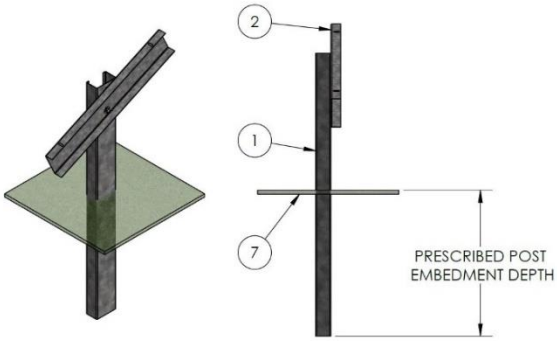




Step 1: Column location, installation, and Upright Assembly

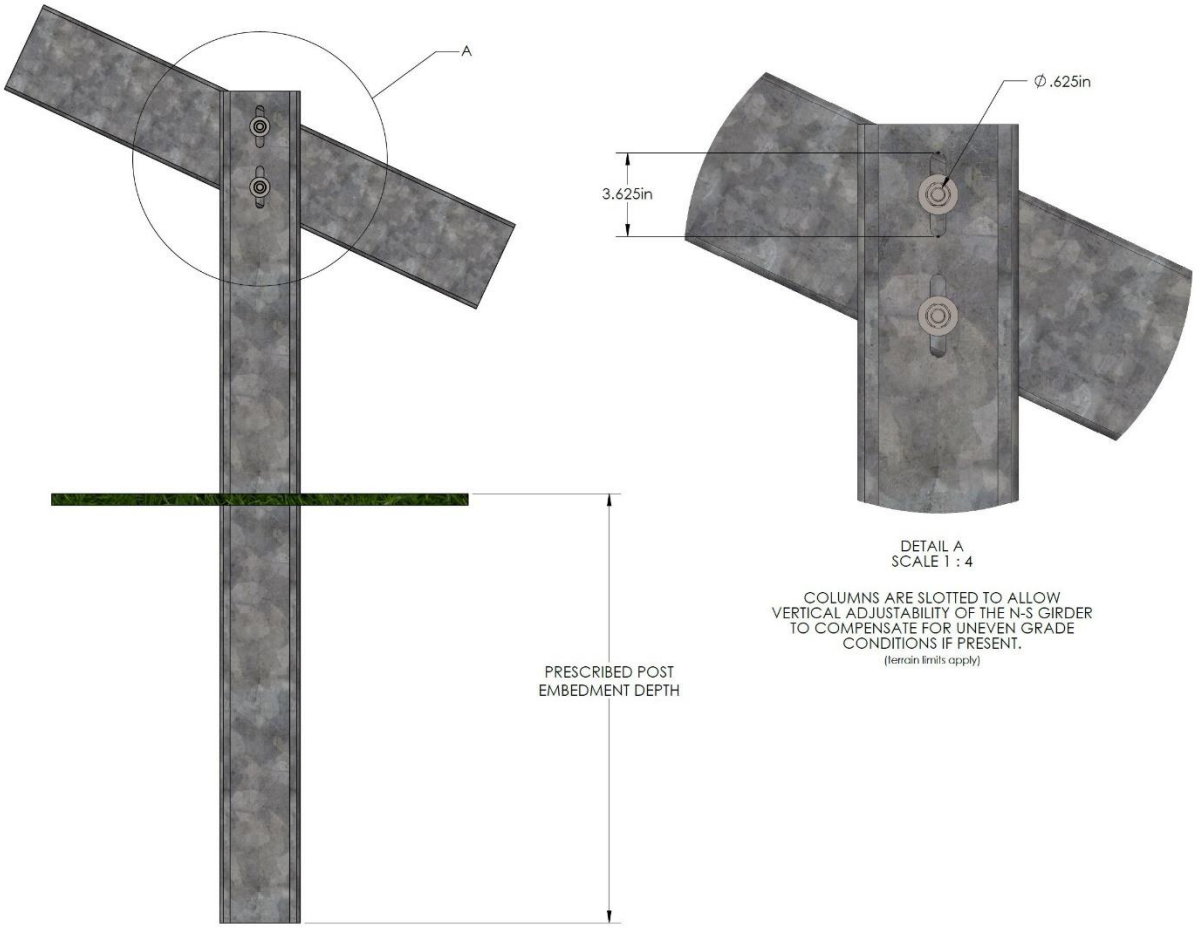
- Please refer to the site plan, column locations, and column foundation details in the site specific plan/calculations provided for each project. Possible column installation methods include:
    - Post Driven Pile (vibratory/impact hammer)
    - Concrete Encased/Footing Pile
    - Helical/Screw Pile
    - Ballast Block
- REH recommends having a site survey completed to locate and identify all post locations. Any obstructions should be documented and relayed to REH for design alterations.
    - Install N/S Girder to Column following the schematic below and torque hardware to 128 ft. lbs.:





ITEM NO.	DESCRIPTION	QTY.
1	Column	1
2	N-S Girder	1
3	5/8" Flat Washer	4
4	5/8" Spring Lock Washer	2
5	5/8" Hex Bolt	2
6	5/8" Hex Nut	2
7	Grade	1

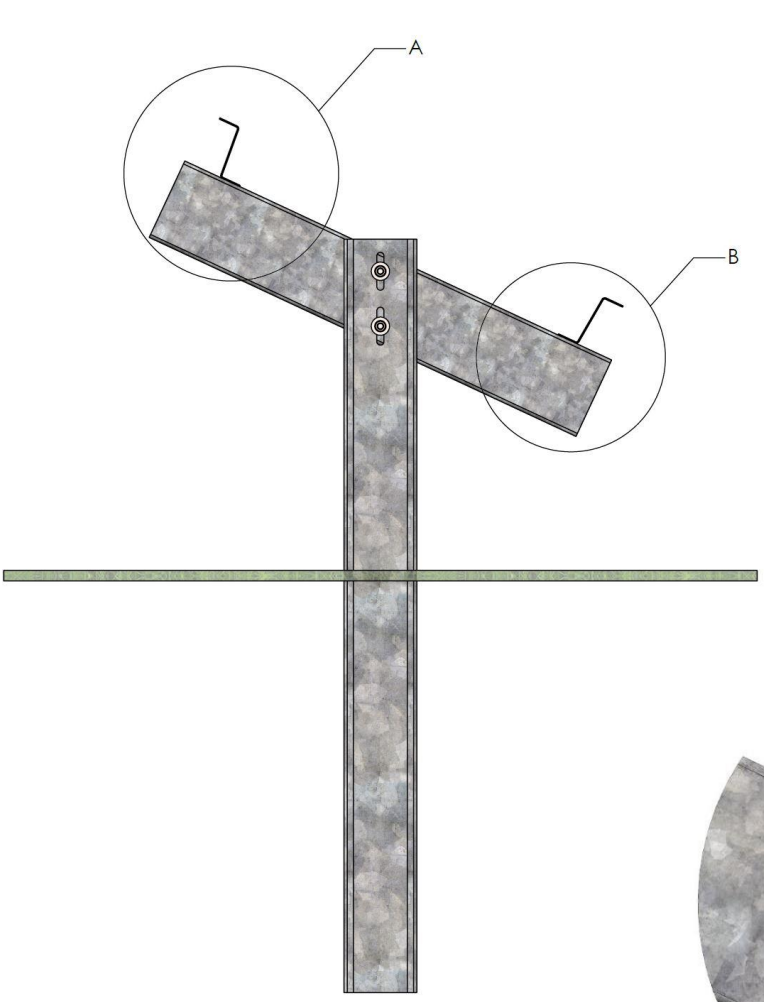
- Utilize the existing slots in the columns to vertically adjust the setting of the N-S Girder. (see image below for reference).
- Ensure hardware torque setting is achieved, if repositioning of girder is required.



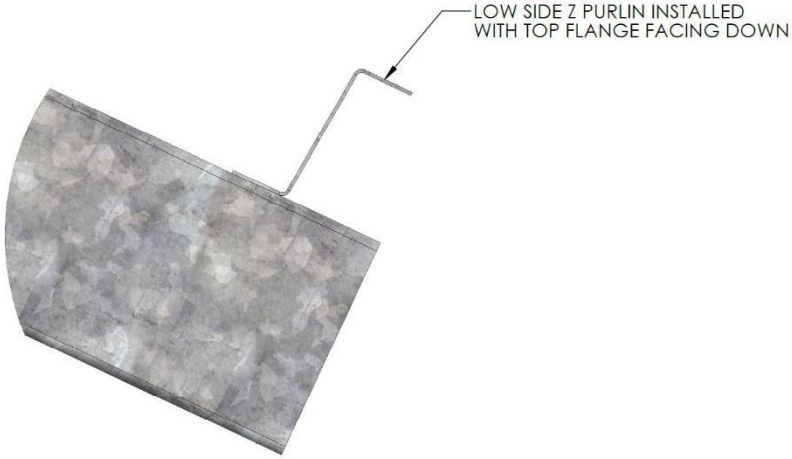
Step 2: Installing East-West Z Purlins

See image below for correct purlin installation orientation.

- Installed East-West Z Purlins create continuous mounting surface for module installation.



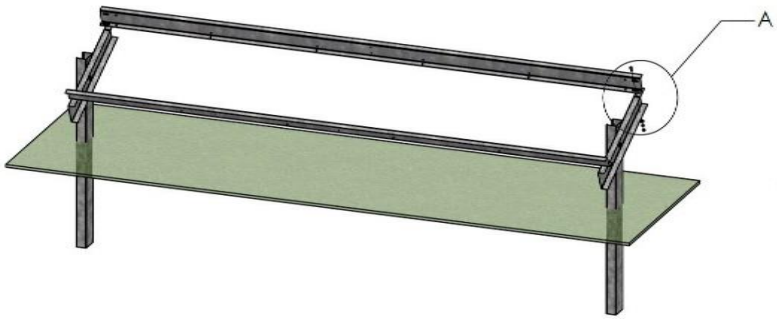
DETAIL A
SCALE 1 : 4

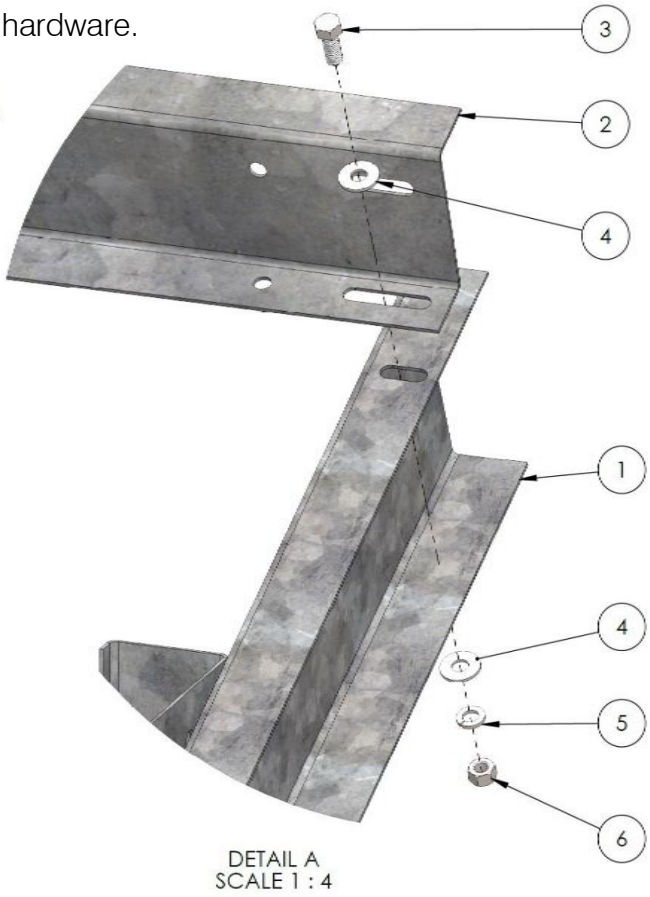


DETAIL B
SCALE 1 : 4

Starter Sections:

- Install ½" hardware as per sequence below. If installing single Starter Section without Extension Section, torque hardware to final torque value of 64 ft. lbs.
- If utilizing Extension Sections, leave hardware hand tight prior to Extension Section installation.
- Utilize the slot in the lower flange to secure hardware.



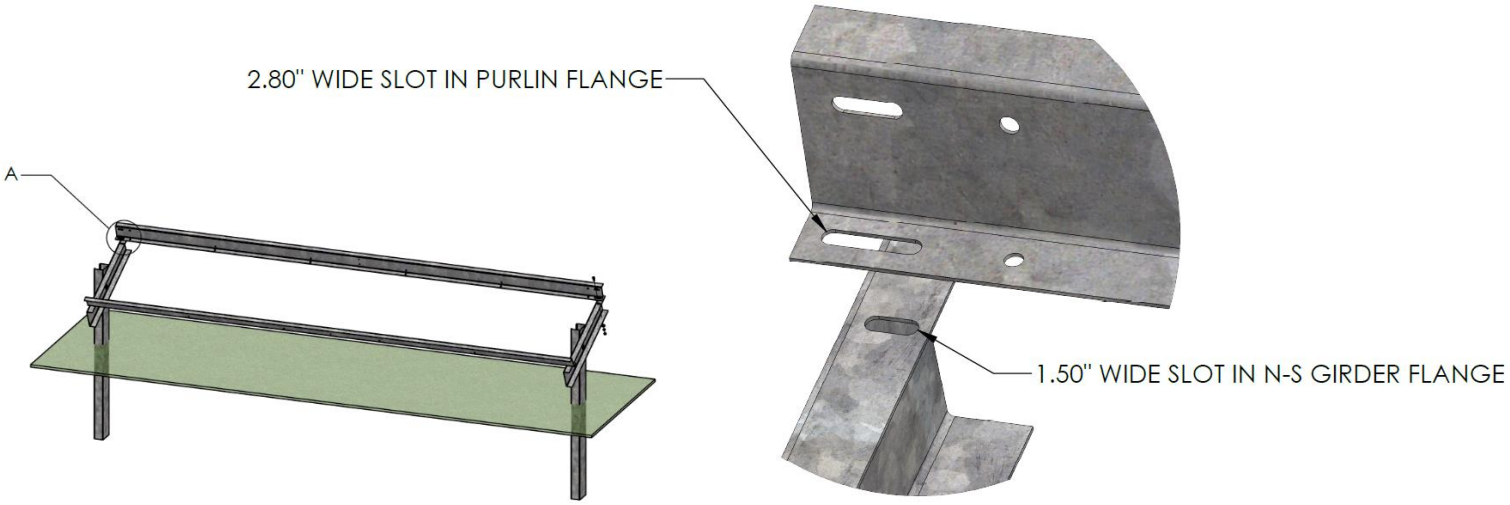


DETAIL A
SCALE 1 : 4

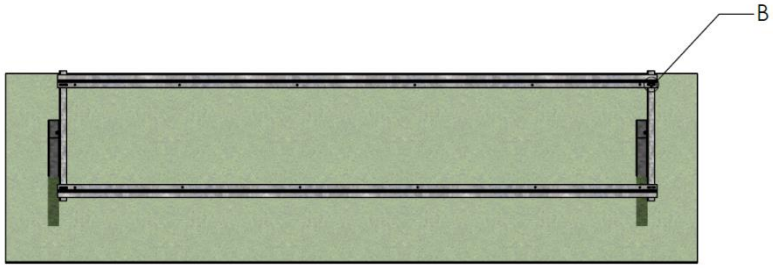
ITEM NO.	DESCRIPTION	QTY.
1	N-S GIRDER	1
2	E/W Z PURLIN	1
3	1/2" HEX BOLT	1
4	1/2" FLAT WHASER	2
5	1/2" SPRING LOCK WASHER	1
6	1/2" HEX NUT	1

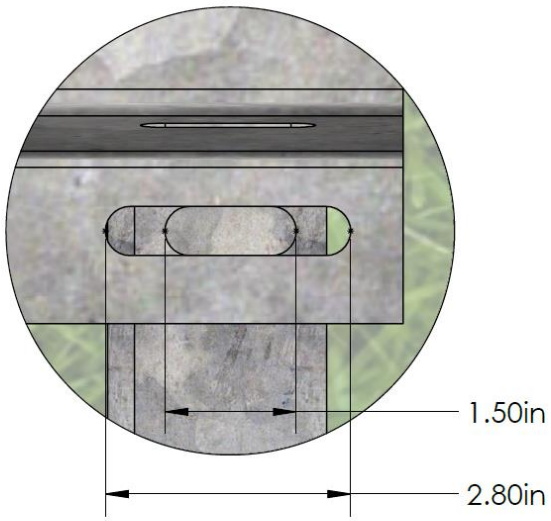
East-West Z Purlin Adjustability:

- The N-S Girder and East-West Z Purlins have been constructed to incorporate East-West adjustment slots as pictured below:



DETAIL A
SCALE 1 : 4



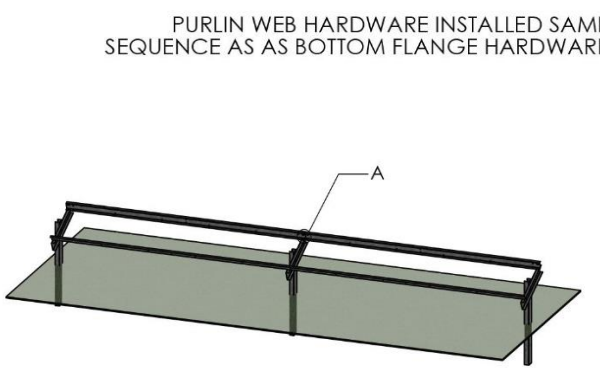


DETAIL B
SCALE 1 : 2

Extension Sections:

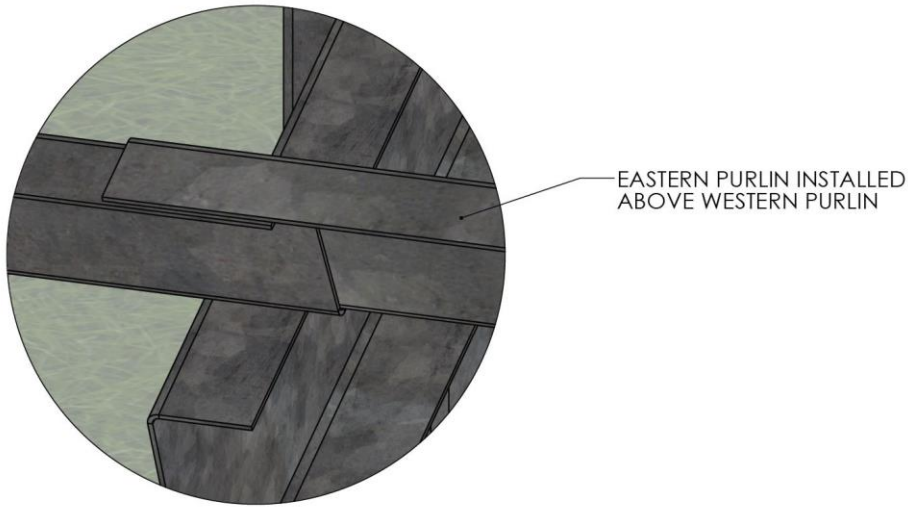
- If adding Extension Sections, ensure E-W Purlins are installed in the following sequence:
- Install hardware at end of Extension Section securing Purlin to Girder to terminate row.
- Install (1x) ½" bolt and required hardware in the slot on bottom flange and (1x) ½" bolt and required hardware in purlin web to create Extension Section connection.

High Side E-W Purlin Details:



DETAIL A
SCALE 1 : 3

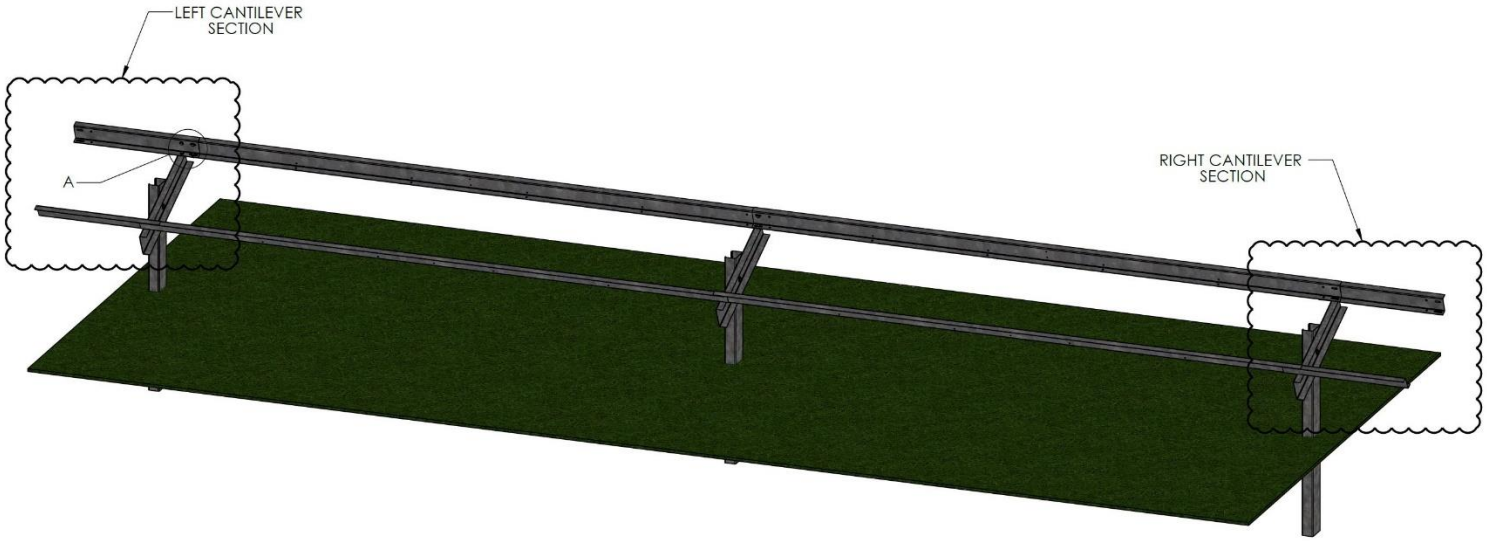
Low Side E-W Purlin Details:

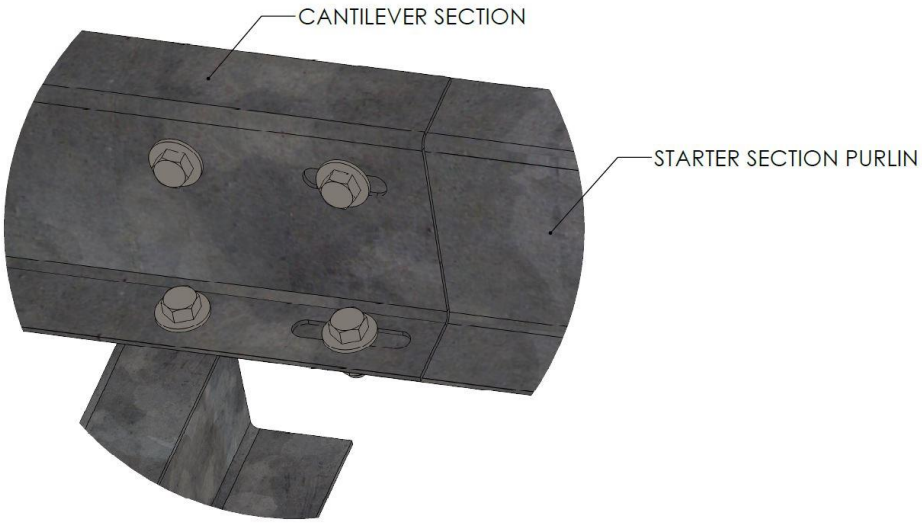


DETAIL B
SCALE 1 : 3

Cantilever Section Installation:

- If Cantilever Sections are required install as per below:
- Cantilever installation orientation follows same sequence as noted in **Extension Sections**.



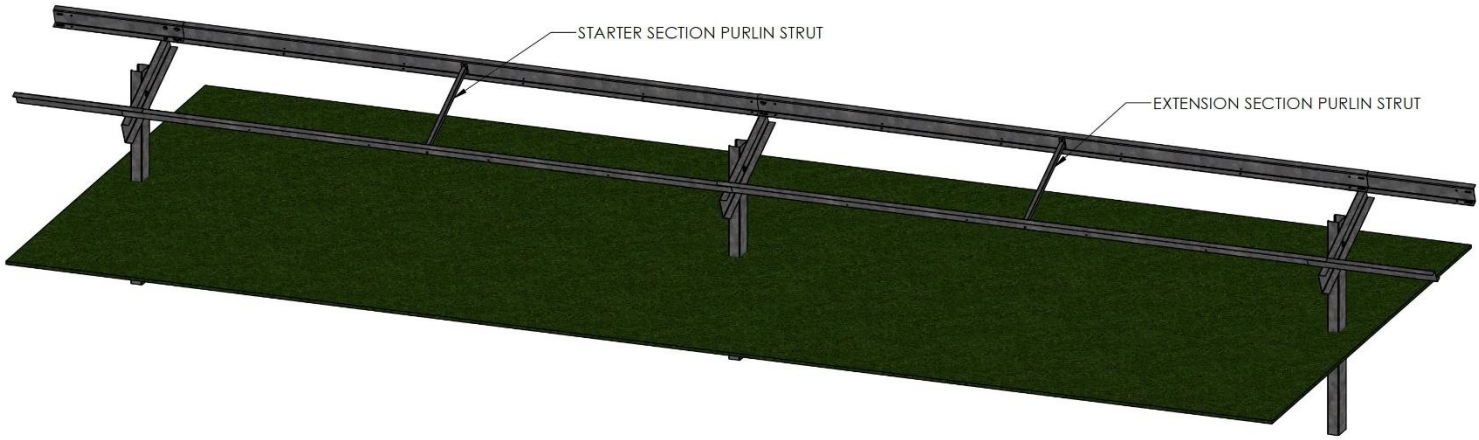


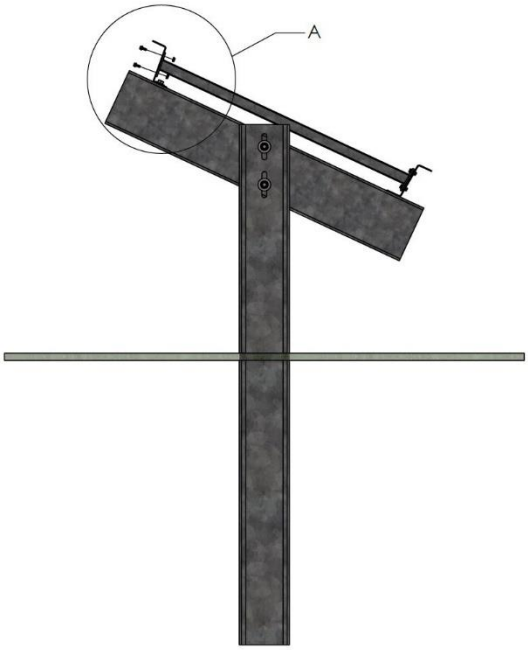
DETAIL A
SCALE 1 : 3

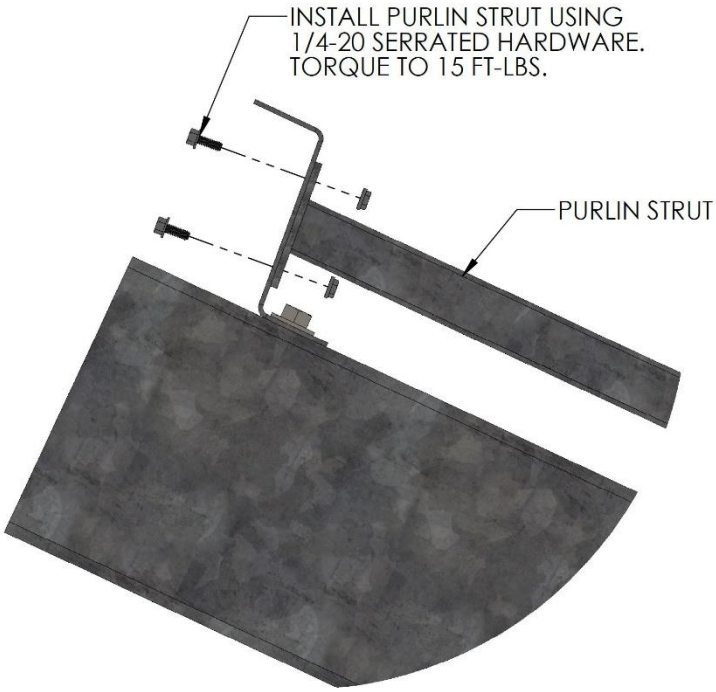
- UTILIZE (4X) 1/2" HARDWARE WHEN INSTALLING CANTILEVER SECTIONS.
- REFER TO STARTER SECTION PURLIN INSTALLATION FOR HARDWARE SEQUENCE AND TORQUE VALUE.

Step 3: Installing E-W Purlin Strut

- Each Starter Section and Extension Section are constructed with the installation of a single E-W Purlin Strut at the midpoint of the Z Purlin.
- Install E-W Purlin Strut utilizing ¼”-20 hardware as prescribed below. (applies to Northern and Southern E-W Z Purlin)



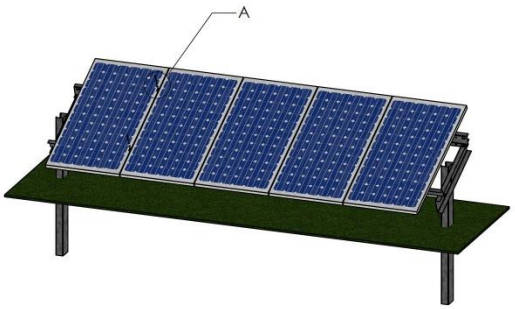


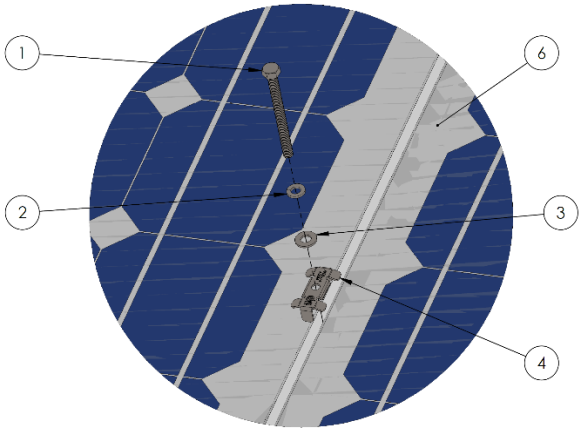


DETAIL A
SCALE 1 : 4

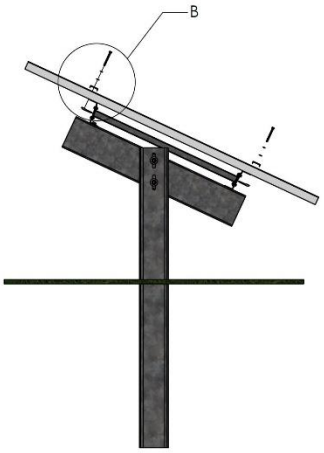
Step 4: Installing PV Modules & Top-Down Compression Bonding Clamps

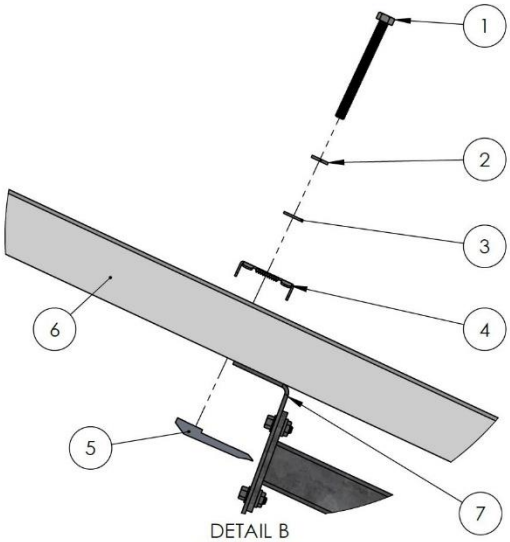
- Install PV Modules on top of East-West Z Purlin using provided bonding top down compression mid and end clamps. Torque clamp hardware to 12-15 ft. lbs.
- Start installation of modules 2" from end of purlins.
- Ensure distance between end of short edge of module and clamp bolt are even on both sides. This ensures proper placement of module on the East-West Z Purlins.





DETAIL A
SCALE 1 : 3



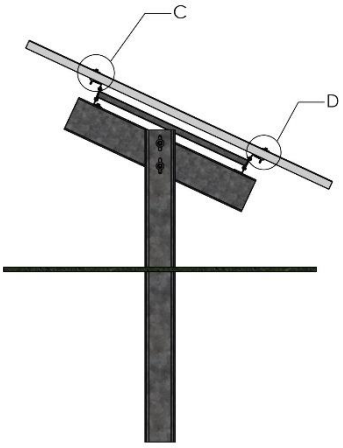


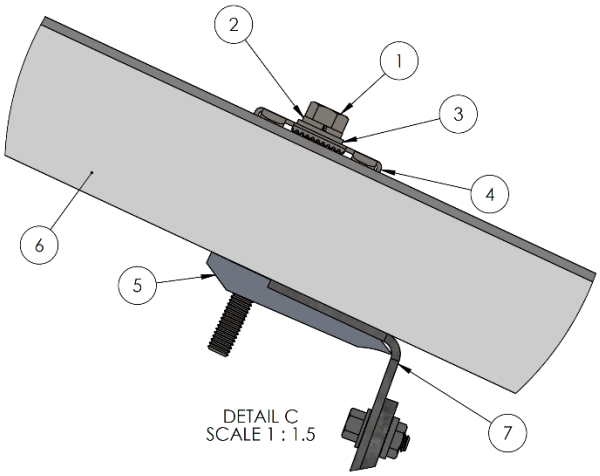
DETAIL B
SCALE 1 : 4

ITEM NO.	DESCRIPTION	QTY.
1	5/16" HEX BOLT	1
2	5/16" SPRING LOCK WASHER	1
3	5/16" FLAT WASHER	1
4	BONDING MID-CLAMP	1
5	CLAMP RETAINING CLIP	1
6	PV MODULE	1
7	Z PURLIN	1

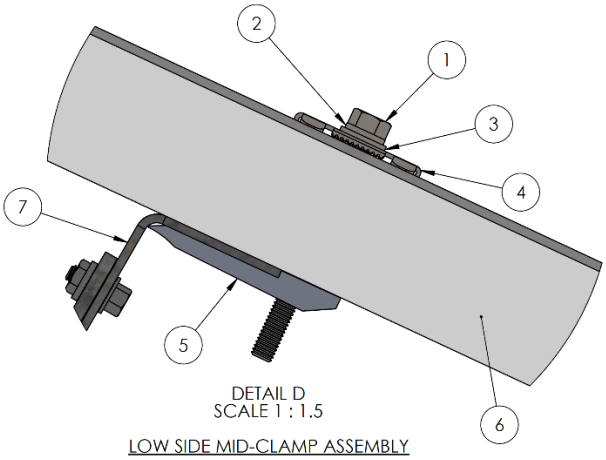
Top-Down Bonding Mid-Clamp Orientation

- Clamp orientation to be installed as depiction below:
    - Ensure clamp retaining clip is installed such that all faces sit squarely to purlin and is fully nested into purlin interface. Ensure retaining clip remains square during torque sequence.

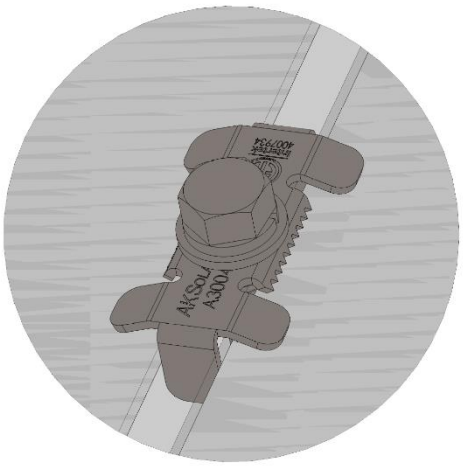




HIGH SIDE MID-CLAMP ASSEMBLY



LOW SIDE MID-CLAMP ASSEMBLY

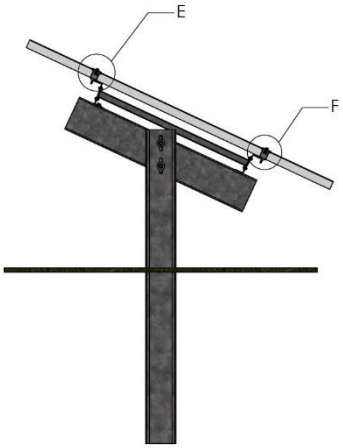


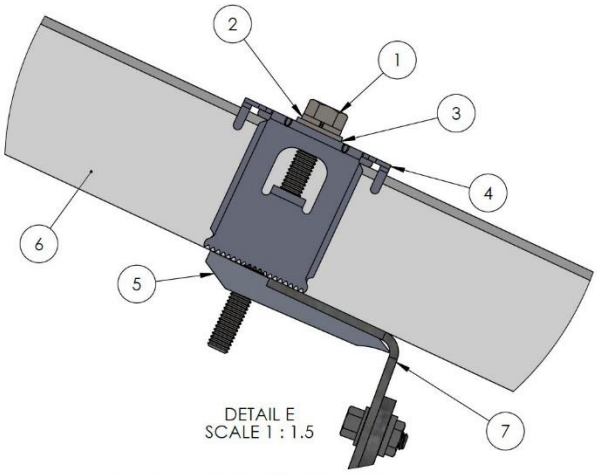
INSTALLED MID-CLAMP ASSEMBLY

ITEM NO.	DESCRIPTION	QTY.
1	5/16" HEX BOLT	1
2	5/16" SPRING LOCK WASHER	1
3	5/16" FLAT WASHER	1
4	BONDING MID-CLAMP	1
5	CLAMP RETAINING CLIP	1
6	PV MODULE	1
7	Z PURLIN	1

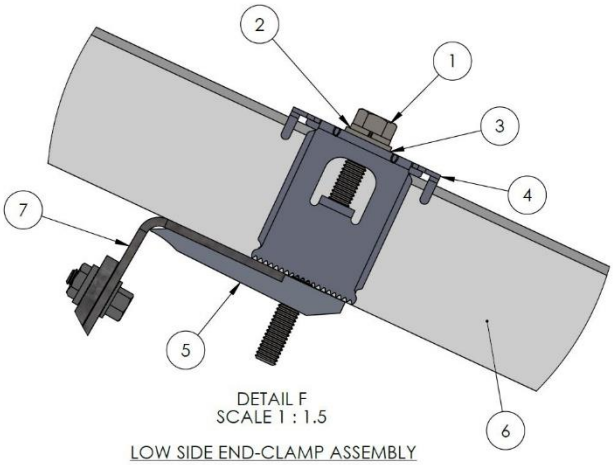
END CLAMP HARDWARE ASSEMBLY DETAIL

End clamp hardware and clamp retaining clip installed same sequence as mid clamps. Ensure proper clamp retaining clip orientation as described in mid clamp installation section.

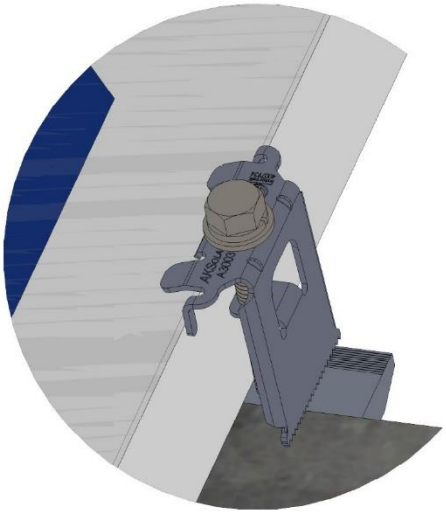




HIGH SIDE END-CLAMP ASSEMBLY



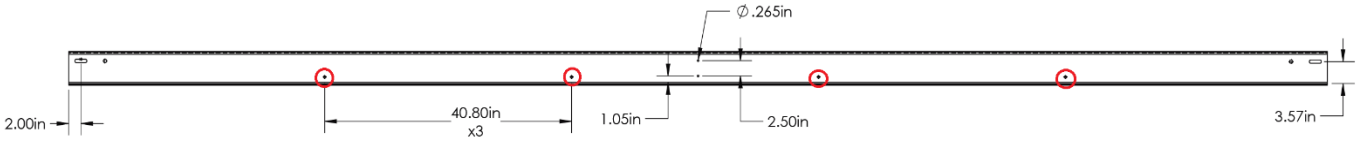
LOW SIDE END-CLAMP ASSEMBLY



INSTALLED END-CLAMP ASSEMBLY

ITEM NO.	DESCRIPTION	QTY.
1	5/16" HEX BOLT	1
2	5/16" SPRING LOCK WASHER	1
3	5/16" FLAT WASHER	1
4	BONDING END-CLAMP	1
5	CLAMP RETAINING CLIP	1
6	PV MODULE	1
7	Z PURLIN	1

Wire Management:



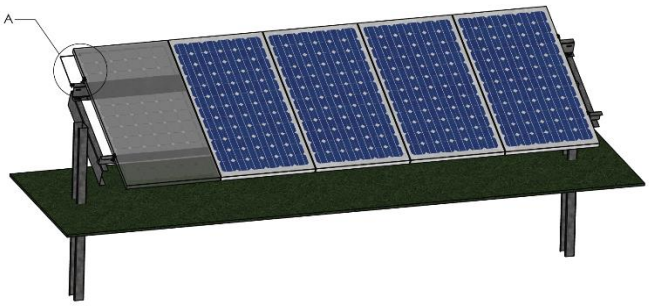
The East-West Z Purlins have pre-punched holes as indicated below to install zip ties and create a channel for wire management in the East-West direction.

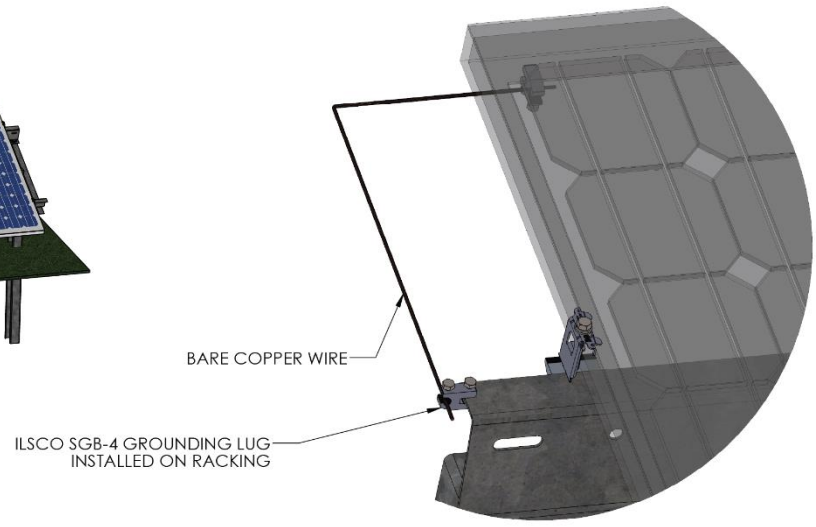
Step 5: Bonding and Grounding

The top-down compression mid and end clamps bond module to module and create multi-path bonding connections. In order to ensure adequate bonding from module to racking, a bonding path from module to rack must be created. See details below:

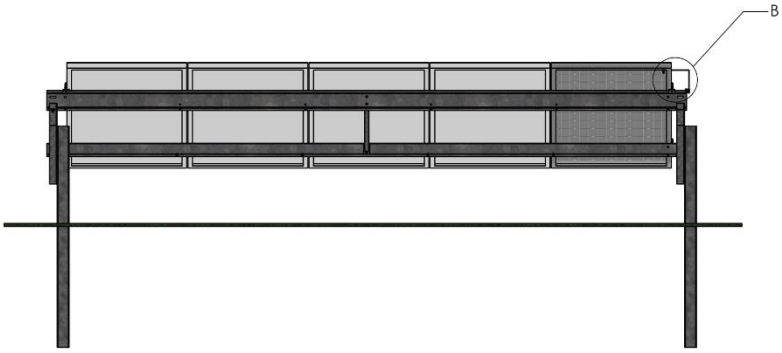
- The graphics below depict typical bonding details.

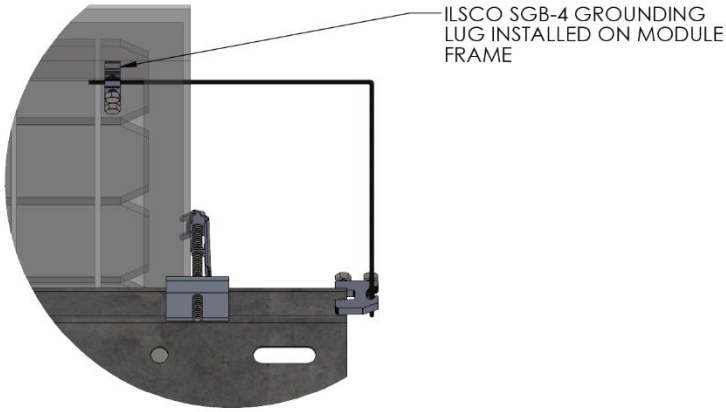
Option 1:





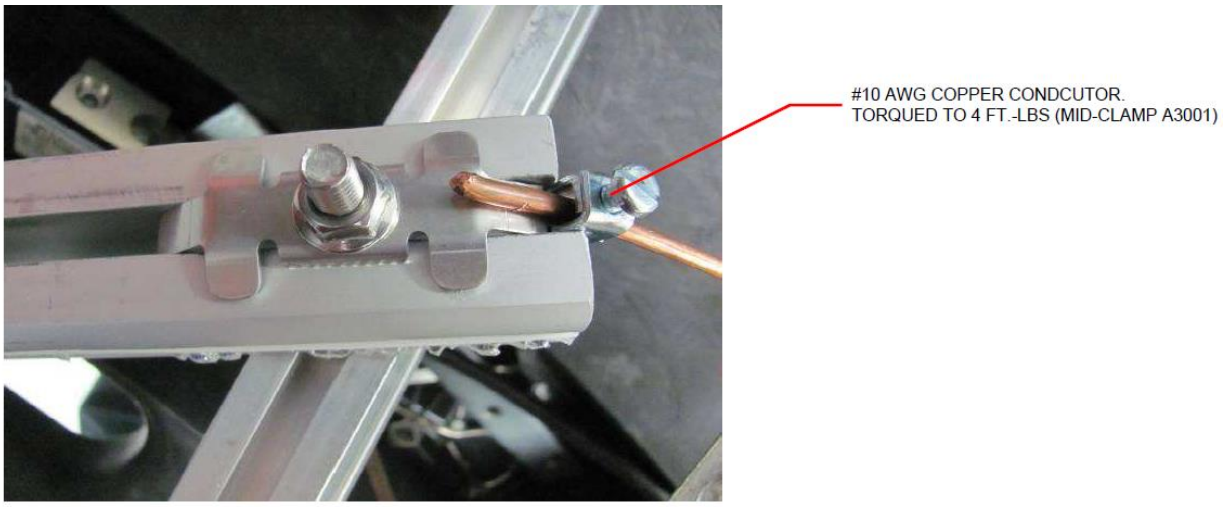
DETAIL A
SCALE 1 : 4





DETAIL B
SCALE 1 : 4

Option 2:



Please confirm/consult with an electrician, regarding the quantity of bonding jumpers required as this is contingent on the overall electrical design of the system

9.0 Maintenance

1. Genmounts recommends a yearly inspection of all PV systems performed by an installer. Special attention shall be paid to loose or corroded electrical or mechanical connections and verify proper grounding.

2. The installer shall adequately check the torque of all the fasteners.

3. In the unusual event that a PV module or racking component must be replaced or re-torqued, proceed with the same care as during the initial installation.

4. The installer shall also verify that all racking components are:
    a. free from damage or degradation
    b. properly positioned
    c. installed according to the plans and calculations of the project

10.0 Certification

CERTIFICATE OF COMPLIANCE

Certificate Number	20140805-E356152
Report Reference	E356152-20120907
Issue Date	2014-AUGUST-5
Issued to:	A K STAMPING CO INC 1159 U S RTE 22 MOUNTAINSIDE NJ 07092
This is to certify that representative samples of	COMPONENT - MOUNTING SYSTEMS, MOUNTING DEVICES, CLAMPING DEVICES AND GROUND LUGS FOR USE WITH PHOTOVOLTAIC MODULES AND PANELS See Addendum Page
	Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.
Standard(s) for Safety:	Mounting Systems, Mounting Devices, Clamping/Retention Devices And Ground Lugs, For Use With Flat-Plate Photovoltaic Modules And Panels, Subject 2703
Additional Information:	See the UL Online Certifications Directory at www.ul.com/database for additional information

Only those products bearing the UL Recognized Component Mark should be considered as being covered by UL's Recognition and Follow-Up Service.

The UL Recognized Component Mark generally consists of the manufacturer's identification and catalog number, model number or other product designation as specified under "Marking" for the particular Recognition as published in the appropriate UL Directory. As a supplementary means of identifying products that have been produced under UL's Component Recognition Program, UL's Recognized Component Mark: , may be used in conjunction with the required Recognized Marks. The Recognized Component Mark is required when specified in the UL Directory preceding the recognitions or under "Markings" for the individual recognitions.

The final acceptance of the component is dependent upon its installation and use in complete equipment submitted to UL LLC.

Look for the UL Recognized Component Mark on the product.

William R. Carney

William R. Carney, Director, North American Certification Programs

UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at www.ul.com/contactus

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CERTIFICATE OF COMPLIANCE

Certificate Number	20140805-E356152
Report Reference	E356152-20120907
Issue Date	2014-AUGUST-5

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Recognized Component for use with Mounting Systems and Clamping Devices for Flat-Plate Photovoltaic Modules and Panels:

Bonding Spacers:
-075 (Engineering No. A2210-1)
-100M (Engineering No. A2210-1M)
-100 (Engineering No. A2210-2)
-125 (Engineering No. A2210-3).

Mid-clamp and End-clamps:
Part number A3001 Bonding/Grounding Mid-clamp.
Part numbers A3000, A3002 and A3004 Bonding Mid-clamps.
Part number A3003-xx Bonding end-clamp

William R. Carney

William R. Carney, Director, North American Certification Programs

UL LLC

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