SOLAR MOUNTS, LLC.
BALLASTED GROUND MOUNT INSTALLATION MANUAL

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SAFETY INFORMATION

General Safety Guidelines

- Only trained personnel should perform installations.
- Always follow OSHA guidelines for fall protection and workplace safety.
- Wear appropriate PPE, including Hard hat, safety glasses, gloves, steel-toed boots, and harnesses where applicable.

Equipment Safety

- Inspect tools and equipment before use.
- Use caution when operating heavy machinery like skid steers and post drivers.

Hazard Warnings

- Be mindful of overhead power lines when lifting materials.
- Secure all materials properly to prevent tipping or falling.

TOOLS & EQUIPMENT REQUIRED

Hand Tools

- Impact Driver
- Torque Wrench
- Solar Mounts V-Clamp Pliers
- 15/16” Socket for 5/8” Bolt
- 1/2” Socket for 5/16” Bolt
- 3/4" Socket for 1/2" Bolt
- 15/16” Combination Wrench
- 3/4" Combination Wrench
- 1/2" Combination Wrench
- Come-along winch racket tool
- Concrete Finishing Tools

Equipment

- Skid Steer
- Vibro
- Post Jig
- Commercial Concrete Forms

PRE-INSTALLATION GUIDANCE

Working with Miss Dig

Contractors must call (811, Miss Dig) before they dig . This is typically a free service provided by the local utility company. More detailed surveys of underground utility lines, phone lines, fiber optics, water lines, etc. can be conducted using ground penetrating radar (GPR) devices.

GPR and LiDAR Data

Miss Dig is recommended for identifying and tracing utility power lines. However, even greater detail can be gained by deploying your own ground penetrating radar (GPR) devices. GPR devices (e.g., US Radar, GSSI) can provide detailed information about shallow and deep obstructions, as well as accurate tracing of utility lines, water lines, fiber optics, telephone lines and more. GPR can provide up to 1 cm of accuracy although 5 cm is common with the addition of GPS (GNSS).

LiDAR devices are getting smaller and more accurate. These devices can be carried by drones and provide contractors with very accurate elevations and identification of above-ground contours.

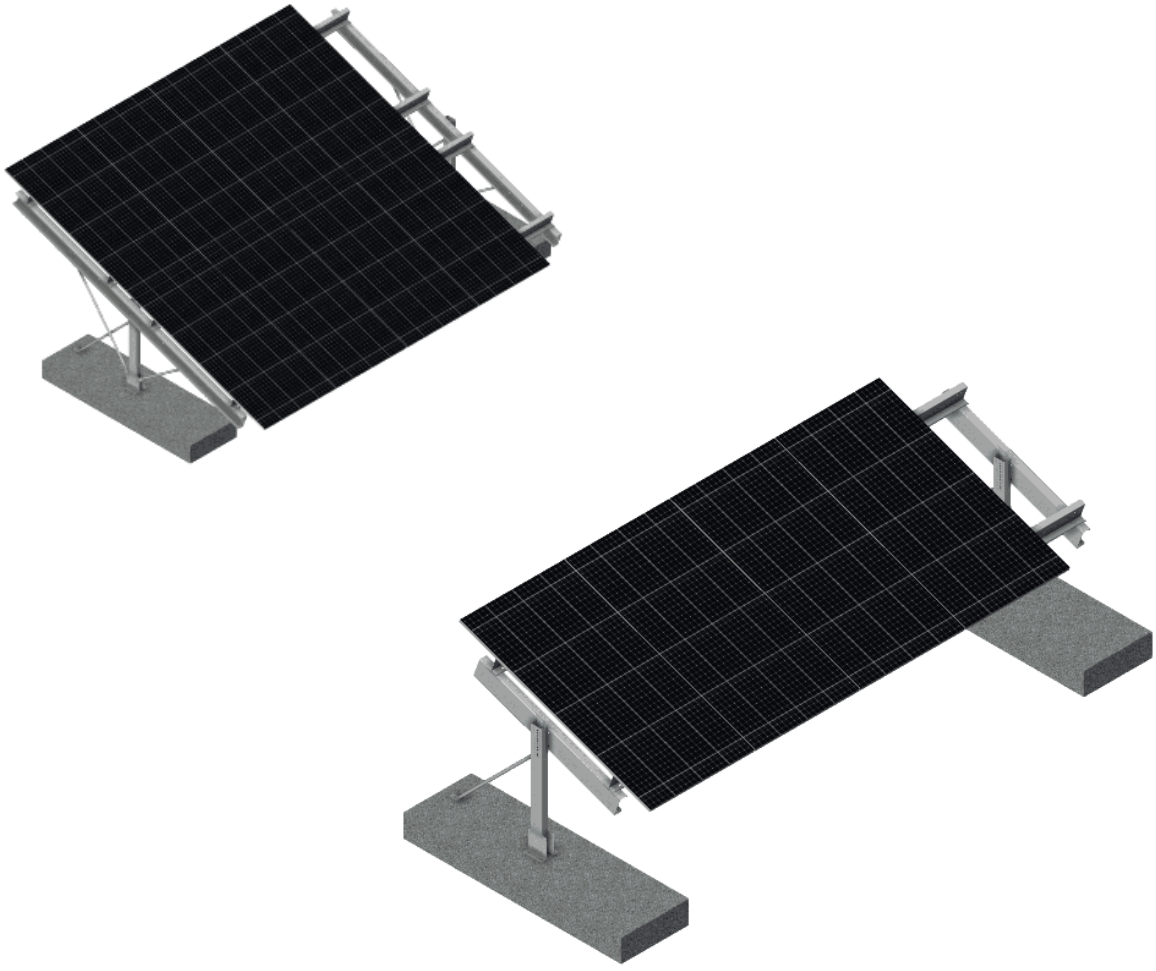
Ballasted Ground Mount System Ratings

Wind Load	180 mph
Snow Load	60 lbs.
Fire Rating	Class C (tilt 10-30°)
Maximum Size	2-High + 2 Cantilever, 4’ height from ground
PV Module Orientation	South (in the northern Hemisphere)
Grounding/Bonding Rating	UL 2703, UL 467
Mechanical Rating	UL 2703
# of PV Modules per section (Solar Mounts sections called “Starts” and “Adds”)	Six PV modules for 1-High, Twelve PV Modules for 2-High, 18 PV modules for 3-High

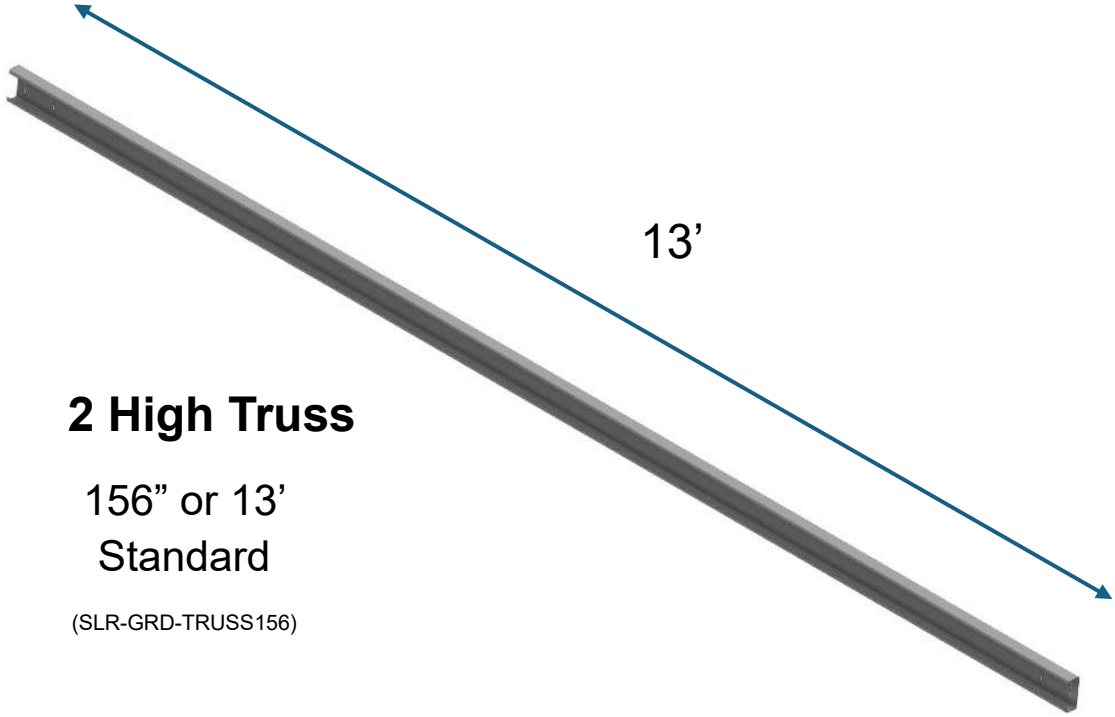
UL 2703 Ed.1 and TIL No. A-40 Mechanical Load ratings:

PV module constructions same as Type 1 or 2 –Module Area up to 33.4 sq ft	
Downward Design Load (lb/ft^2)	16.8
Upward Design Load (lb/ft^2)	16.8
Down-Slope Load (lb/ft^2)	5.0

PV module constructions same as Type 29 – Module Area up to 27.8 sq ft	
Downward Design Load (lb/ft^2)	16.8
Upward Design Load (lb/ft^2)	16.8
Down-Slope Load (lb/ft^2)	5.0



BALLASTED GROUND MOUNT: MAIN COMPONENTS



2 High Truss

156” or 13’
Standard

(SLR-GRD-TRUSS156)

1 High Truss

66 inches

(SLR-GRD-TRUSS66)

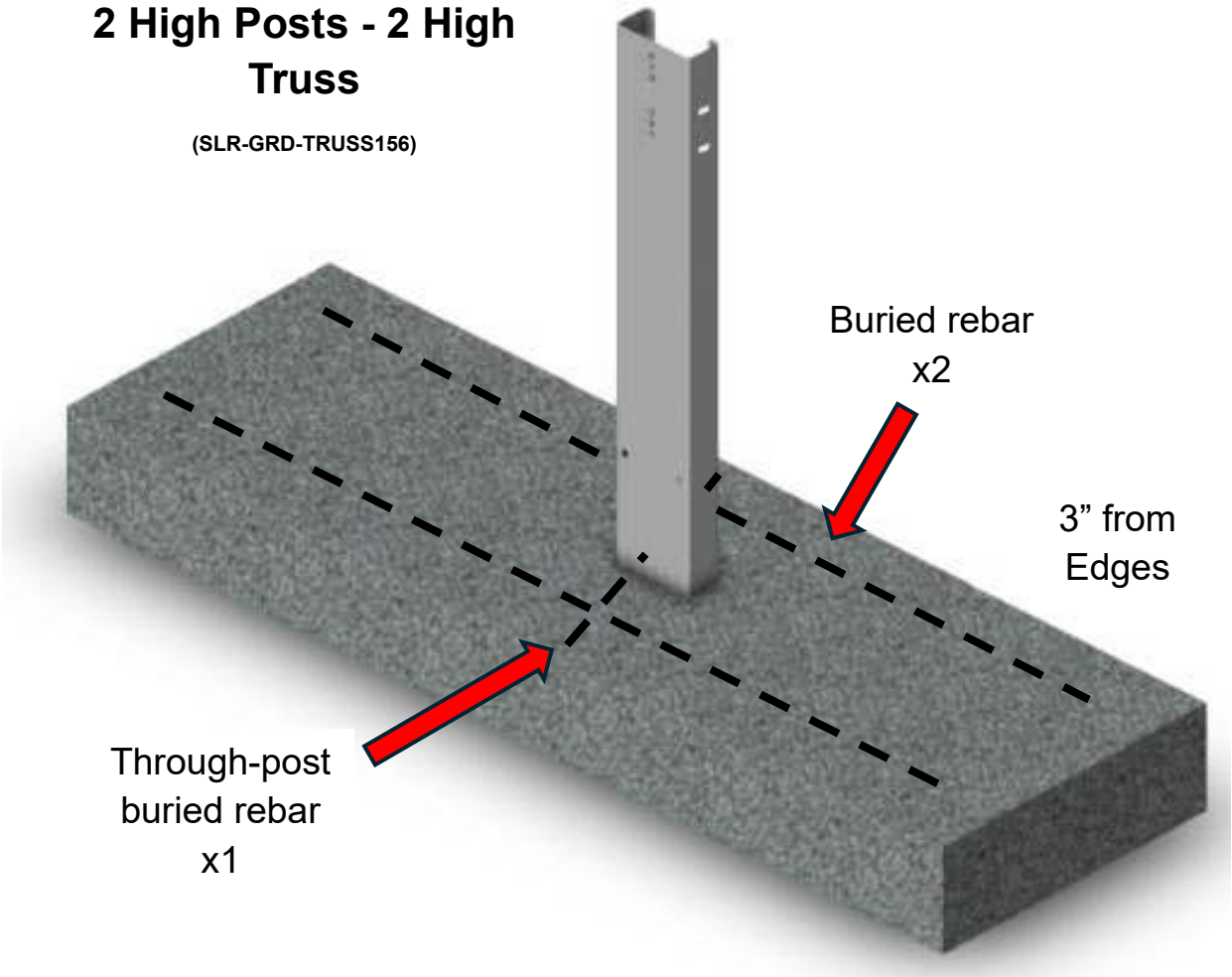
BALLASTED GROUND MOUNT: MAIN COMPONENTS

Purlin Stiffener

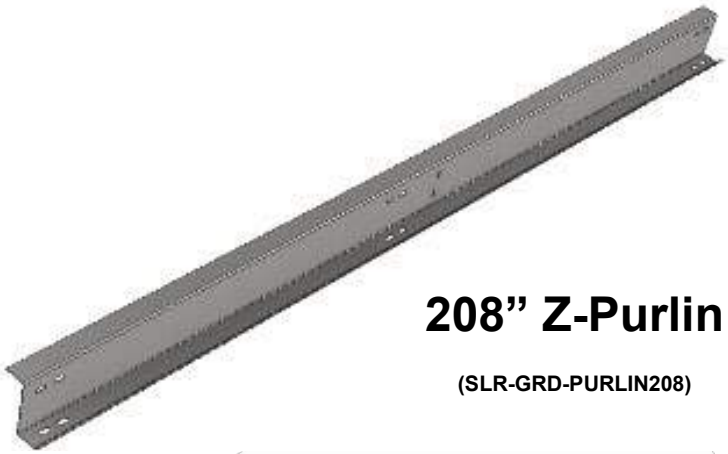
(SLR-CPT-PURLIN-STIFF)

Embedded C-Channel 1 & 2 High Posts - 2 High Truss

(SLR-GRD-TRUSS156)



BALLASTED GROUND MOUNT: MAIN COMPONENTS

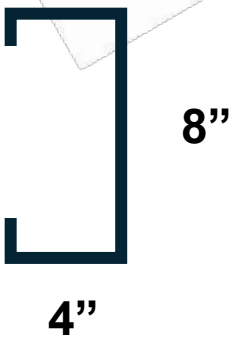


208” Z-Purlin

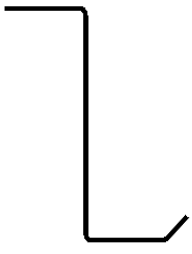
(SLR-GRD-PURLIN208)

208” C-Channel Purlin

C-Channel Purlin profile



Z-Purlin profile



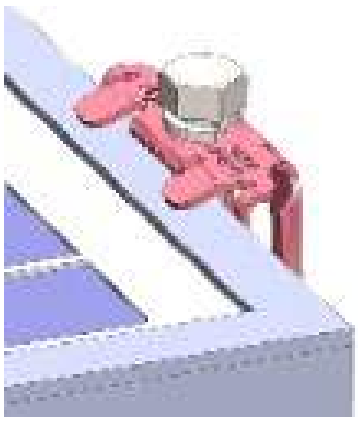
BALLASTED GROUND MOUNT: MAIN COMPONENTS

Mid-Clamp

(SLR-CLMP-HW-MID)

End Clamp

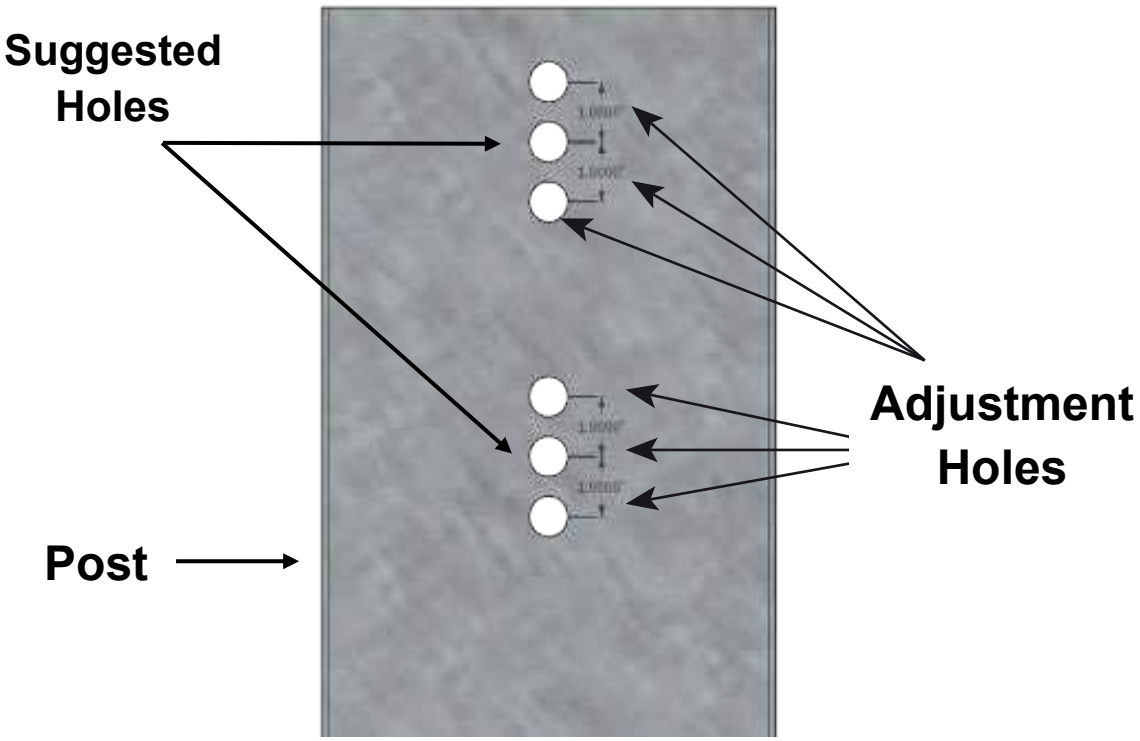
(SLR-CLMP-HW-AKS-END)



POST ORIENTATION AND ANGLES

The elevation of the truss can be adjusted using corresponding holes for correcting elevation and depth issues in ballasted post

Adjustments are made in 1” increments

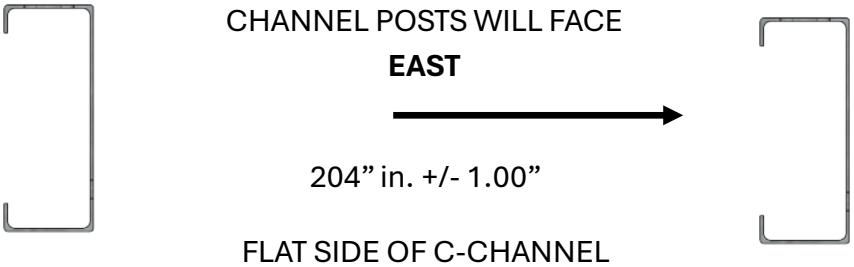


POST ORIENTATION AND ANGLES

IF DESIRED ANGLE IS

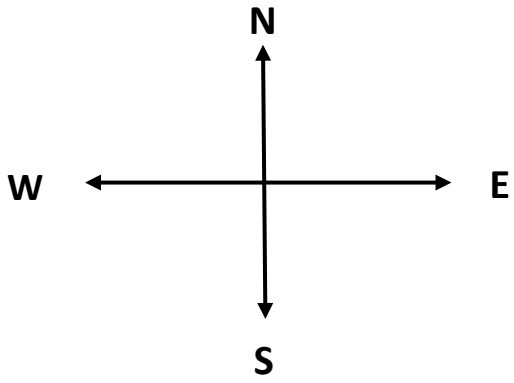
5°, 15°, 25°, OR 35°, FLAT SIDE OF C-CHANNEL POSTS WILL FACE

EAST



204” in. +/- 1.00”

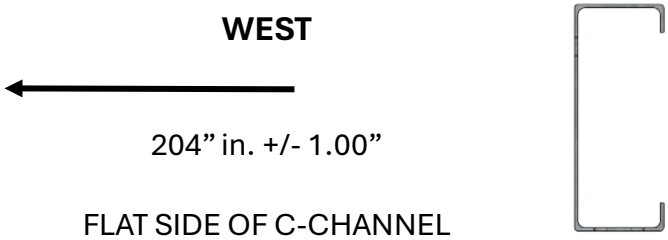
FLAT SIDE OF C-CHANNEL POSTS FACING EAST



IF DESIRED ANGLE IS

0°, 10°, 20°, OR 30°, FLAT SIDE OF C-CHANNEL POSTS WILL FACE

WEST

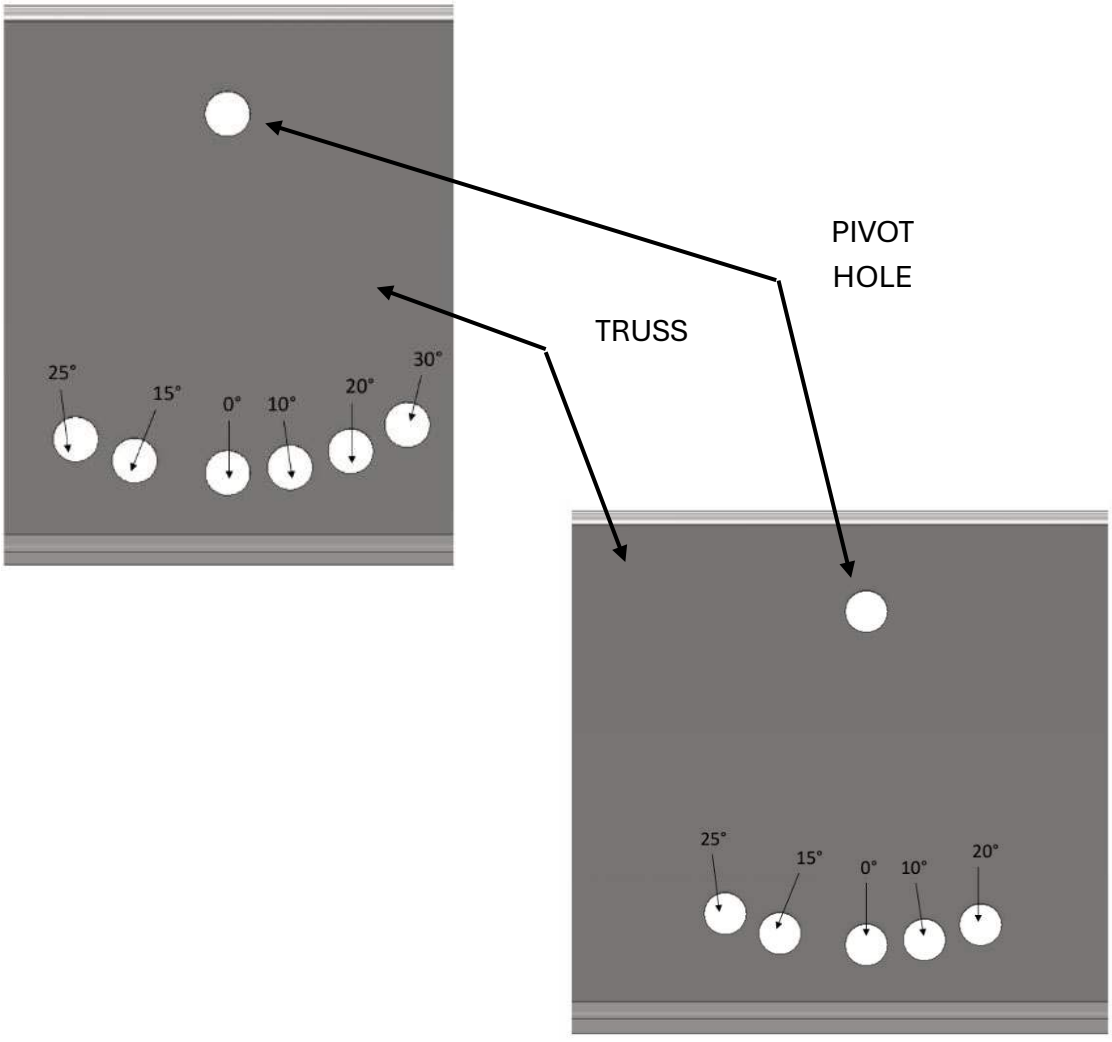


204” in. +/- 1.00”

FLAT SIDE OF C-CHANNEL POSTS FACING WEST

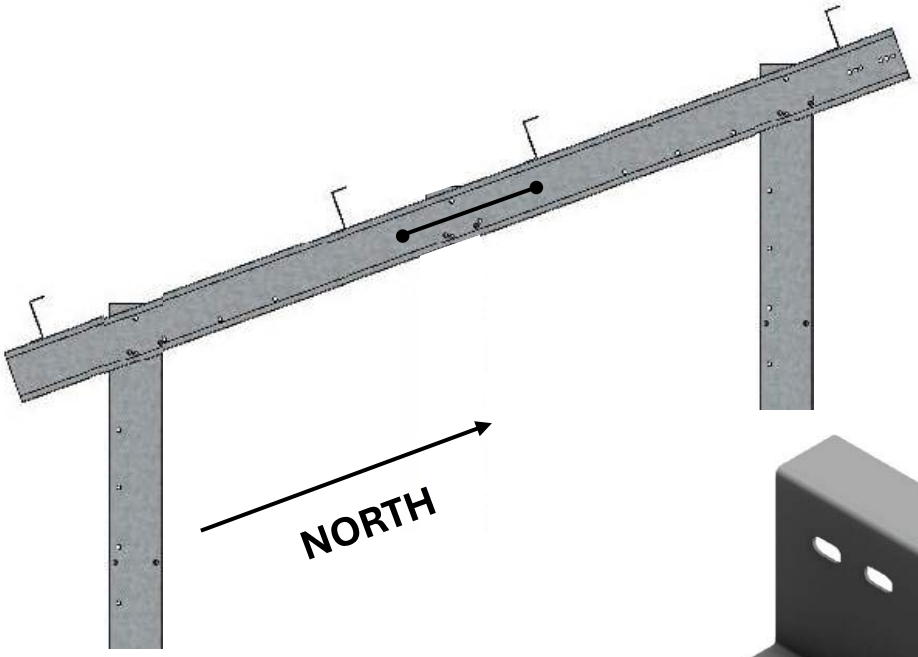
TRUSS INSTALLATION

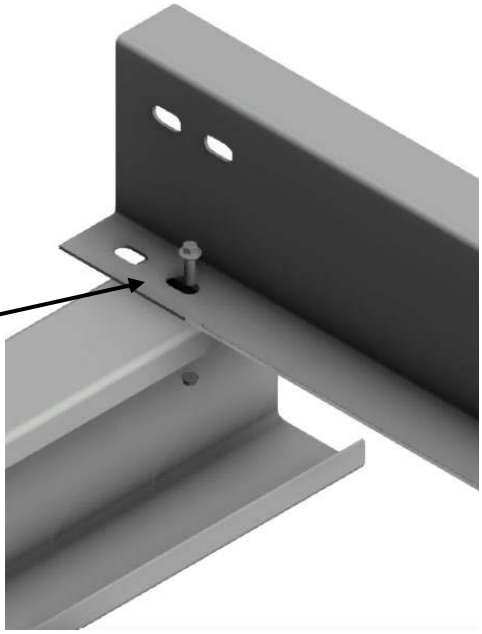
- Fasten 5/8” bolt through pivot hole in truss and into post driven or C-Post (hand tighten the nut)
- Select desired angle
- Fasten 5/8” bolt through truss at desired angle location
- Tighten to 60 ft. lbs.



PURLIN INSTALLATION

- Attach Z-Purlins to truss as pictured using 1/2” flanged bolt and flanged nut.
- Make sure all purlins are pointing North (Northern hemisphere installs)
- Before tightening, see next page for Add-On section install and Purlin overlap

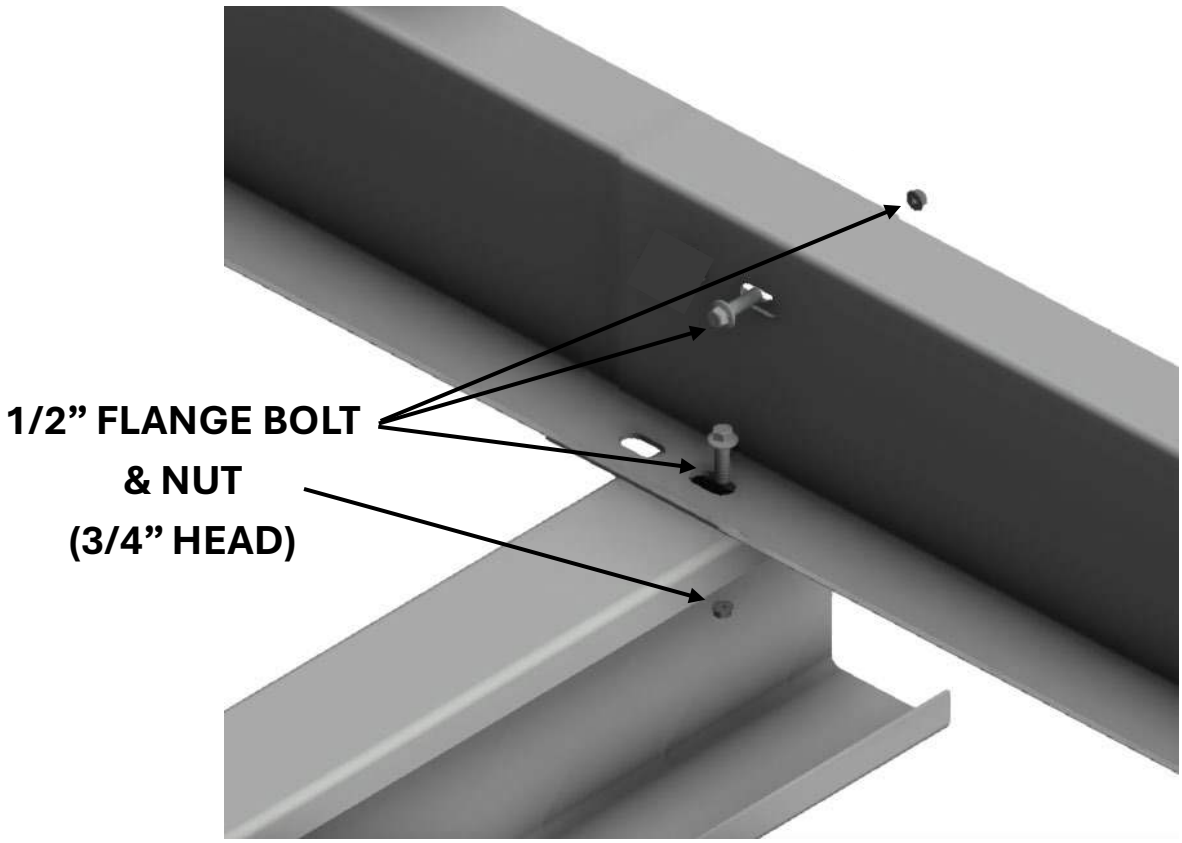




1/2” FLANGE BOLT & NUT

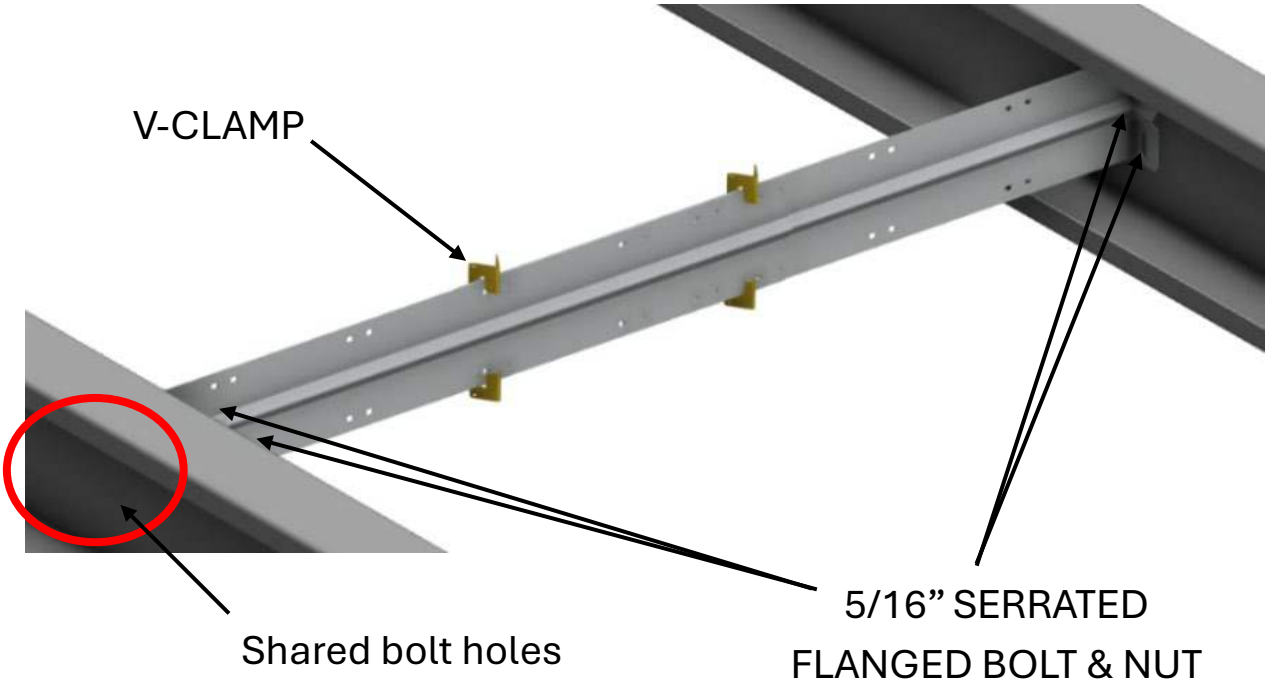
ADD-ON SECTION INSTALLATION

- Overlap Add-On section Z-Purlin, and use shared bolt hole locations
- Secure into place with ½” bolt and nut
- Tighten hardware to 50 ft. lbs.



PURLIN STIFFENER ATTACHMENT

- See SMLLC drawings for appropriate spacing
- Compress V-Clamp with SMLLC Double V-Clamp Pliers or needle nose pliers and release in position
- Attach stiffener to purlins with 5/16” serrated flanged bolt & nut. Tighten to 50 ft. lbs.
- NOTE: Technicians can install in the field or use a jig to pre-assemble purlin stiffeners



PV MODULE (PANEL) ATTACHMENT AND INSTALLATION

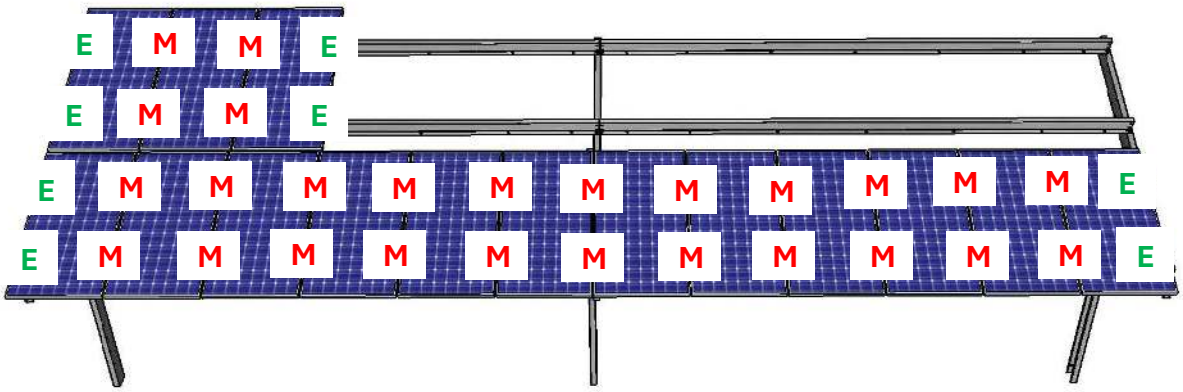
- Place PV module (“panel”) on Z-Purlins
- Secure PV module in place with end clamps.
    - Tighten PV Module End Clamp bolts to 8-10 ft. lbs.
    - **Use 2 clamps for each side of the PV module**
- Place second PV module on purlins in line with first panel.
- Secure the two PV modules together with the mid clamp as pictured.
    - Tighten to 8-10 ft. lbs.

M

MID-CLAMP ON DIAGRAM

E

END CLAMP ON DIAGRAM



ELECTRICAL GROUNDING OF THE BALLASTED GROUND MOUNT PV SUPPORT STRUCTURE

- Solar electric contractors must electrically ground the structure to a single premises ground. If more than one Ground Lug is attached to the structure, all these ground points and EGC's must be properly bonded together.
- Please see NEC Article 690.41, 690.47(C)(3), 250.52 and 250.53(A) for guidance.
    - The recommended approach is to use a separate DC grounding electrode for the PV array and Solar Mounts Ballasted Ground Mount PV support structure, as this enhances protection against lightning and transient voltage. For lightning protection associated with grounding systems, refer to NEC 250.106.
- Attach the Ground Lug (e.g., Ilsco GBL Grounding Lugs, Part #18-GBL-4DBT or equivalent) to the C-channel post using a #10 self-drilling screw (zinc or stainless steel, e.g., 1 ¼") so that the lug is flush with the post.
- The Ground lug can be fastened to the C-channel post at any location along its length. Tighten to 5 ft. lbs.
- CAUTION: PV module removal may disrupt the bonding path and could introduce the risk of electric shock. Additional steps may be required to maintain the bonding path. A ground path can be extended 2 feet (between PV modules) within the PV array boundary using Solar Mounts wire ways. Modules should only be removed by qualified persons in compliance with the instructions in this manual

FINAL INSPECTION & MAINTENANCE

- Check all ballasted Ground Mount cement blocks for cracks, loose posts, soil displacement, etc. Ensure blocks are prepared for proper curing
- Any loose components or fasteners shall be re-tightened in accordance with these instructions
- Check all Post, Strut, Strut Plate and Purlin bolts and nuts for tightness.
- Check PV array to ensure all PV modules are clean and unbroken.
- Ensure all PV module mid-clamps and end clamps are tightened to specification.
- Periodically inspect the structure for signs of wear or loosening. If any components of the ballasted Ground Mount system show signs of damage that compromises safety, these components shall be replaced immediately.
- Check for animal or vegetative interaction or interference with the structure and/or PV modules.

CONTACT INFORMATION

For general questions or for SMLLC designated sales rep, please contact:
Solar Mounts LLC
Website: https://solarmounts.com
Phone: (844) 757-7225

Warranty

To obtain the Solar Mounts LLC warranty, please fill out the SMLLC Commissioning Form for each project site and return to Solar Mounts, LLC.

(NOTE: The SMLLC warranty starts at delivery of materials to customer site.)

List of Approved PV Modules ("Panels") for UL 2703 listed Solar Mounts, LLC Solar Support Structures*

Solar Mounts, LLC. support structures are certified to UL 2703 for electrical grounding/bonding and mechanical requirements. Solar Mounts, LLC. system owners retain this certification when support structures are used only in combination with PV modules listed in the chart below.

*Please contact Solar Mounts, LLC for the latest list of approved PV modules.

Module Manufacturer	PV Module Model Number
Aptos	DNA-120-BF10-xxxW
Boviet Solar	BVM6612M-XXXS-H-HC-BF-DG
Canadian Solar	CS6W-xxxMS
Canadian Solar	CS7N-XXXTB-AG
Canadian Solar	CS6W-xxxMB-AG
Canadian Solar	CS6.1-54TM-xxxH
HT Solar (HT-SAAE)	HT72-18X (ND)-F
Imperial Star	ISM7-SHSB156-xxxM
JA Solar	JAM72D40-xxx/LB
JA Solar	JAM72D42-xxx/LB
JA Solar	JAM72D30-xxx/MB
Jinko	JKMXXXM-72HL4-TV
Jinko	JKMXXXN-72HL4-BDX
Jinko	JKMXXXN-72HL4-BDV
Jinko	JKMXXXN-78HL4-BDV
Longi	LR7-72HGD-XXXM
Longi	LR8-66HYD-XXXM
Longi	LR7-72HYD-XXXM
Maxeon	SPR-P6-XXX-UPP
Mission Solar Energy	MSN10xxxHN4G
Mission Solar Energy	MSN10xxxHT4T
Panasonic	EVPVxxxHK2
Peimer USA	DR10HxxxMB
Peimer USA	SFxxxM
Philadelphia Solar	PS-MNB108(HCBF)-xxxW
Phono Solar	PSxxxM8GF-24/TNH
Phono Solar	PSxxxM8GFH-24/TNH
Q Cells	Q.PEAK DUO ML-G12S
Q Cells	Q.PEAK DUO XL-G11S
REC	RECXXXAA PRO M
REC	RECxxxAA Pure

REC	RECXXXAA PURE-RX
SEG	SEG-xxx-BTC-BG
SEG	SEG-xxx-BTC-BG
SEG	SEG-495-BTD-BG
Silfab	SIL-620/630/640 XL
Silfab	SIL-520 QM
Silfab	SIL-420/430 QD
Trina	TSM-DEG19RC.20
Trina	TSM-NEG21C.20
Trina	TSM-DEG21C.20
Trina	TSM-NE09RC.05
Trina	TSM-NEG19RC.2
Waree	BiN-08-xxx
Waree	Bi-62-xxx
Waree	Bi-55-xxx