Solar Mounts, LLC. Solar Carport Installation Manual

The Galactic Series



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Introduction

- The **Solar Mounts, LLC Solar Carport** is engineered for simplicity, durability, and performance. With the fewest components and hardware connections in its class, this solution streamlines installation while maintaining structural integrity. No drilling, cutting or welding is required. Bolt-to-design simplifies Post mounts to foundation cage and PV modules to purlins. All steel is pre-drilled, hot-dipped, G235 galvanized and 100% U.S.-sourced, meeting both AISC and BABAA certification standards.
- The system is highly configurable and adaptable to uneven terrain—ideal for sites where other structures can't be installed. PV modules deliver both shade and power, attaching easily with UL 467 & 2703 grounding washers and (proprietary) adaptable bracket for secure, grounded installations.
- Solar Mounts, LLC carport structures are engineered to withstand very high wind and snow loads. Waterproofing options include attractive under-decking or top-side water management components, with no impact on solar output.

Features and Benefits

- Four (4) main components and minimal hardware
- Pre-welded tilt angle (7° standard)
- Multiple clearance heights available (14’ recommended height clearance)
- Many Frame variations to match your goals and site (Y-, T-, L-, A-Frame, Long Spans)
- Universal brackets fit any PV module (‘panel”), industry-wide
- Solar Mounts LLC stocks components to maintain industry-leading lead times
- Solar Mounts provides stamped drawings in all 50 States and beyond

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 hats, safety glasses, gloves, steel-toed boots, and harnesses where applicable



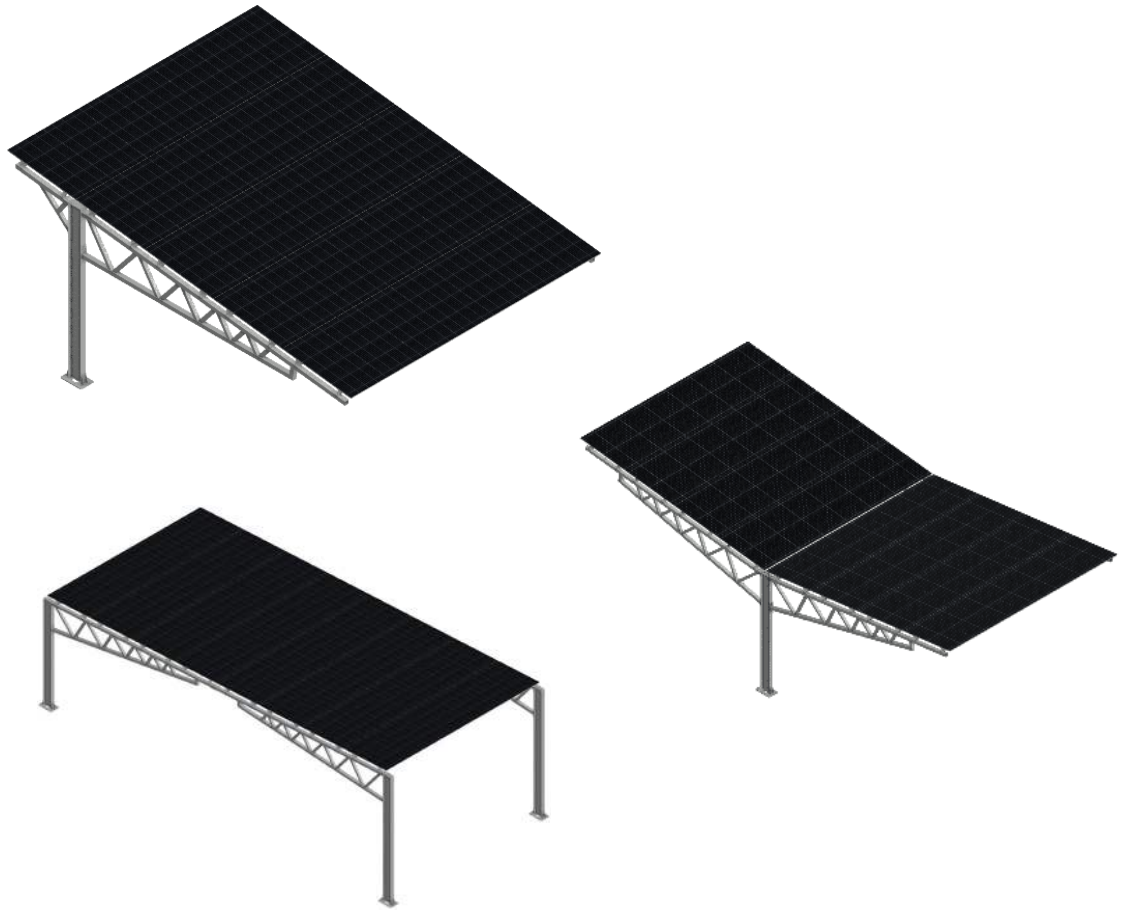
- Equipment Safety
  - Inspect tools and equipment before use.
  - Use caution when operating heavy machinery like skid steers and post drivers.
  - Use licensed operators to ensure skilled operation of equipment



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, or Needle Nose 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



- Equipment
  - Excavator
    - with 36” Auger bit if the site has pier footings
    - Bucket for spread footings
  - Scissor lift
  - Telehandler
  - Boom Lift
- Solar Carport System Ratings
  - PV Module Orientation : South
  - Grounding/Bonding Rating: UL 2703, UL 467
  - Mechanical Rating: UL 2703

Required Pre-Installation Guidance

- Working with Miss Dig (Public Locate)
  - 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 GPR devices.

811

Know what's **below.**
Call before you dig.

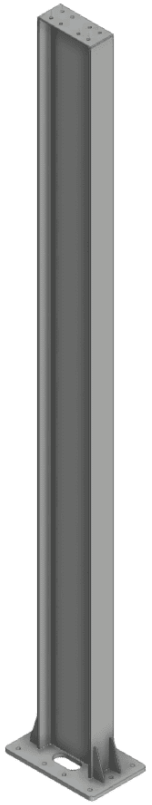
- GPR and LiDAR Data (Private Locate)
  - Underground detail can be gained by deploying ground penetrating radar (GPR) devices. GPR devices (e.g., US Radar, GSSI) can provide detailed information about shallow and deep obstructions, as well as accurate tracing of utility lines, water lines, fiber optics, 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, and give you detailed locating capabilities that can be transferred to construction drawings for the site.

Solar Carports Footings

- Solar Mounts,LLC and Solar-Construction offer three different types of foundations
  - Pier Footings
  - Spread Footings – standard
  - Hybird, e.g., spread footings with Helical posts (per Geotechnical reportand structural engineering. Additional Costs do apply)

- Why Solar Mounts prefers Spread Footings
  - **Cost-Effective** –Savings are realized as there's less exposure to change-orders due to cave-ins, water, obstructions, etc..
  - **Faster Installation** – Easier to form & pour, reducing labor costs & project timelines.
  - **Better Load Distribution** – Spreads the weight over a larger surface area, minimizing settlement and improving stability.
  - **Ideal for Solar Carports** – Since solar carports distribute loads over a wide area, spread footings provide the necessary support without requiring deep drilling.
  - **Works Well in Most Soils** – As long as the soil is compacted and stable, spread footings provide excellent support with minimal ground disturbance.

Solar Carport: Main Components



Post



Purlin
Stiffener

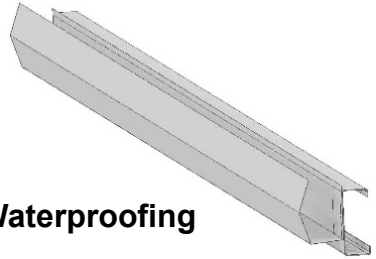


27’/36’ C-Purlin



Truss

Optional Mods



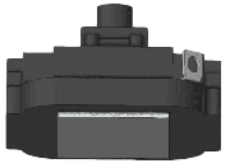
Waterproofing

Gutters and Downspouts



Snow Guards

LED Lighting



Pier Foundation Installation

- Saw Cutting and Excavating
  - Mark out pier foundation size and location according to SMLLC drawings and specs, along with the customer-provided licensed survey to confirm specific locations on the site plan
  - Cut out existing asphalt or concrete
  - Using a 36” auger, drill to a depth called out in Solar Mounts LLC stamped drawings and calculations (see SMLLC images below)
  - Fill bottom 3” with stone and compact
- Rebar and Concrete
  - Place Sonotube commercial concrete form and rebar cage into hole
  - Set bolt frame over concrete forming tube
  - Use Solar Mounts Anchor bolt template to hang anchor bolts down pier upright
  - Fill forming tube with concrete

- Pier Footing Images

Augured Hole





Placing Rebar Cages

Bolt Template Form





Complete

Spread Footings Installation

- Saw Cuttings and Excavating
  - Mark out foundation size and location according to SMLLC drawings and specs, along with the customer-provided licensed survey to confirm specific locations on the site plan
  - Cut out existing asphalt or concrete
  - Excavate to depth called out in SMLLC drawings (see images below)
  - Fill the bottom 3” (confirm on SMLLC drawings) with crushed stone and compact
- Rebar and Concrete
  - Tie rebar matts together with pier uprights in the center. See SMLLC drawings for appropriate rebar sizing and quantity
  - Drop rebar cage with uprights into hole
  - Use Solar Mounts Anchor bolt template to hang anchor bolts down pier upright
  - Fill forming tube with concrete

- Spread Footing Images



Tied Matts with Uprights



Set Cage



Forms

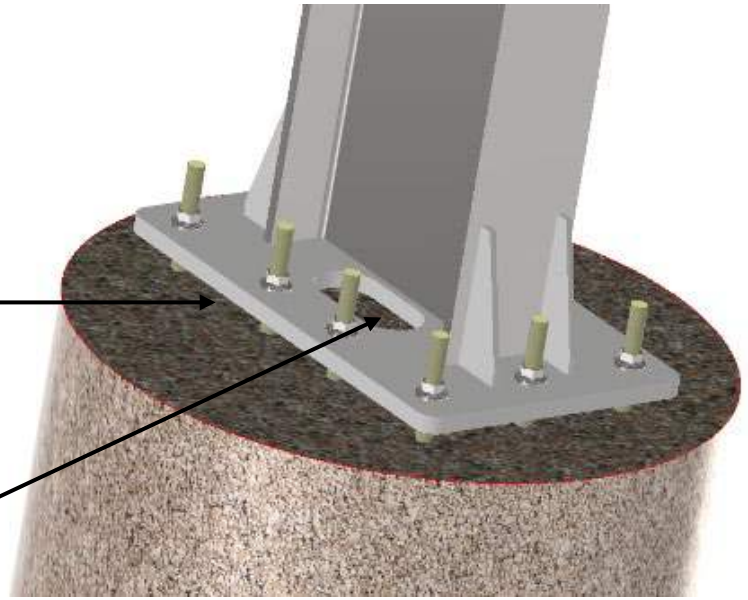


Pier Collar – Adjusting for Grade

- All standard SMLLC drawings include a 25” above grade pier
  - This may vary per customer requests, ensure to reference stamped SMLLC Drawings
- All projects include a 27” variance to account for grade change on same array
    - This can be found to reference on all SMLLC drawings
- **NOTE: going lower than pier height specified on SMLLC drawings will reduce the clearance height of the structure. (14’ standard height)**

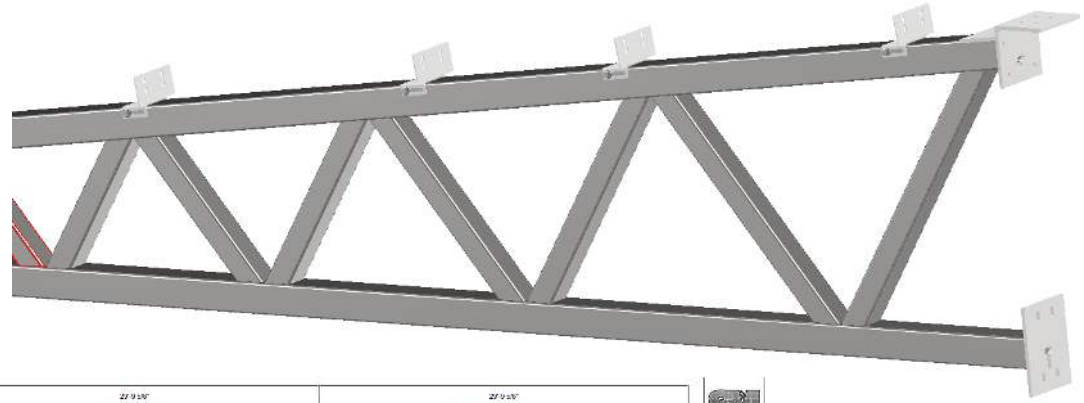
Placing Post on Foundation

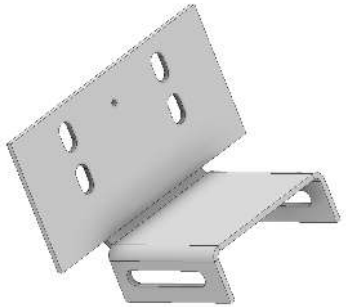
1. Sling and grab post from top using I-Beam clamps
2. Make sure placement is level on anchor bolts
3. Should be 1-1/2” Gap between top of cement foundation collar and post base plate
   a) To be grouted at completion of job
   b) Referenced on SMLCC drawings
4. Conduit holes are located on both sides of base plate (3-1/2”x7.5” Slots)
5. Torque nuts to AISC snug tight + ¼ turn
   a) Mentioned on SMLCC drawings

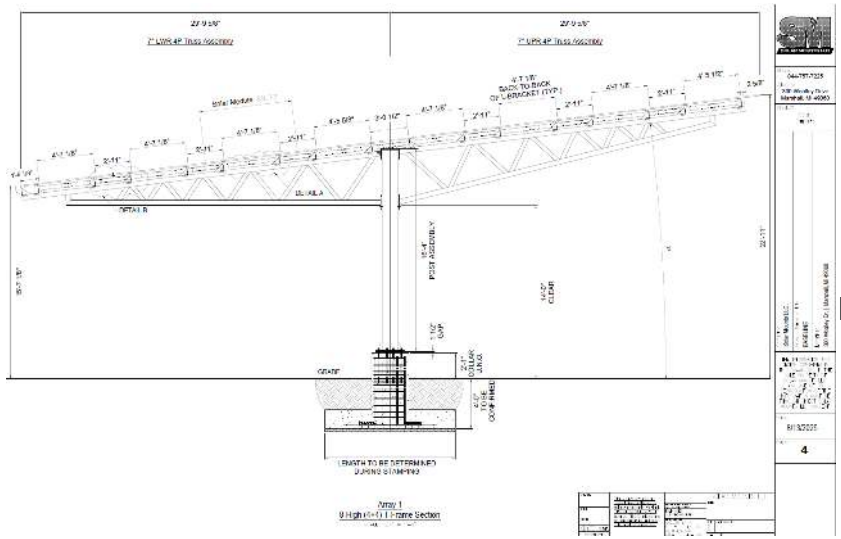


Bolting Adjustable L-Bracket to Truss

- On SMLLC drawing set, a side view is arranged showing the distances necessary to place all L-Brackets onto each truss
- On the ground, Bolt L-Brackets onto truss using 1/2” X 7” bolt
- Tightening to 70-80 ft-lbs
- Also included:
  - ½” Flat Washer
  - ½” Lock Washer
  - ½” Nut



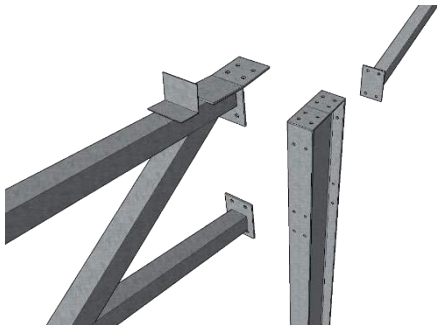


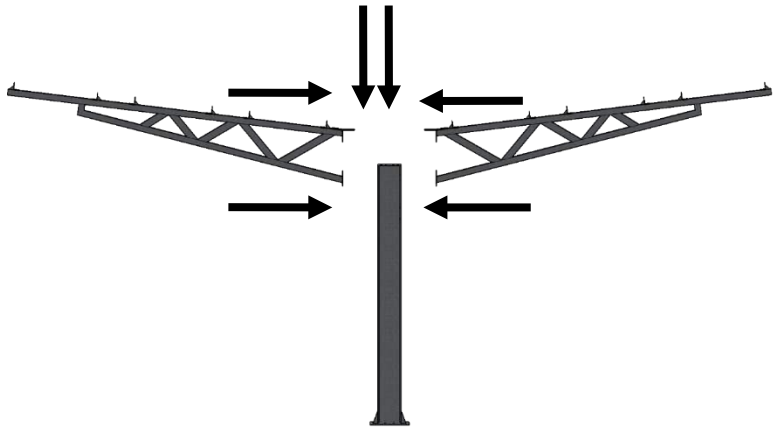


Reference these pages in your SMLCC Drawings

Attaching Truss to Post

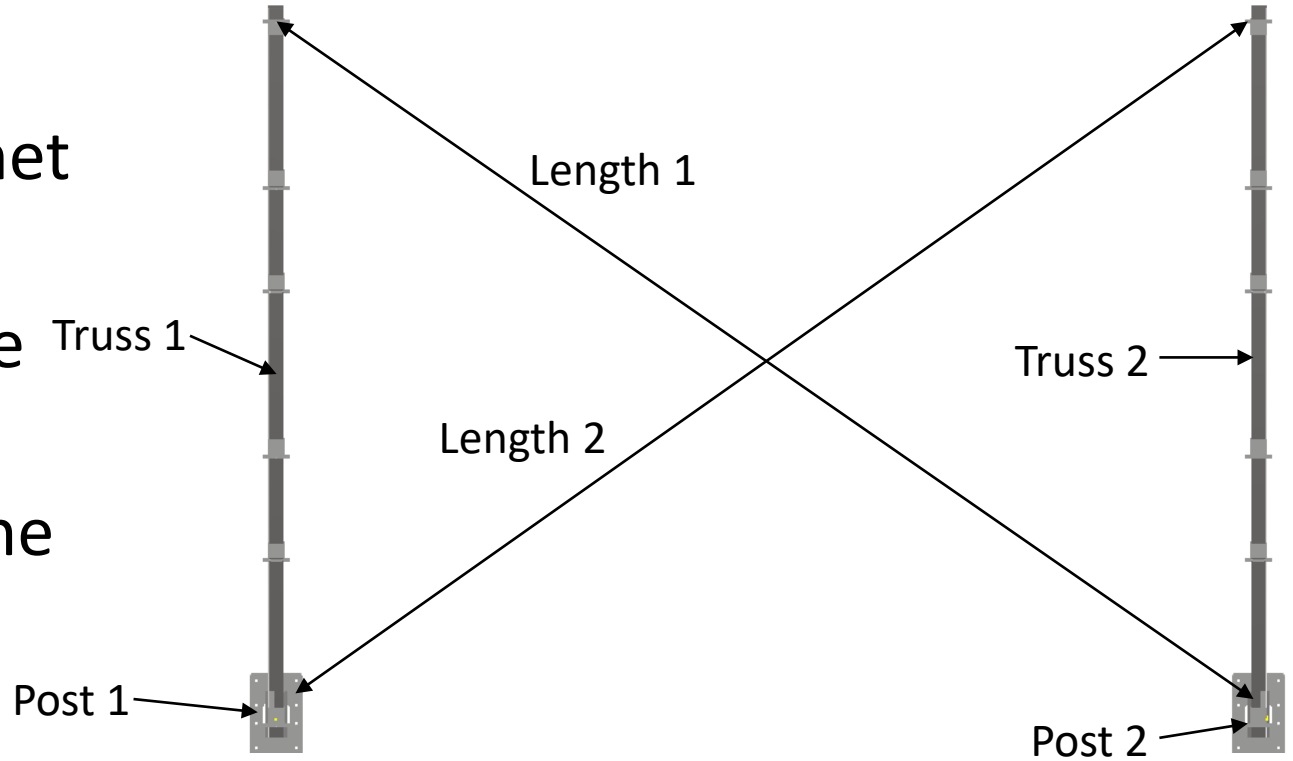
- Each truss will connect to the post using (12) ¾” x 3.25” Bolts
- Torque specs: AISC Snug Tight + ¼ Turn
- Also included:
  - ¾” Flat Washer
  - ¾” Lock Washer
  - ¾” Nut





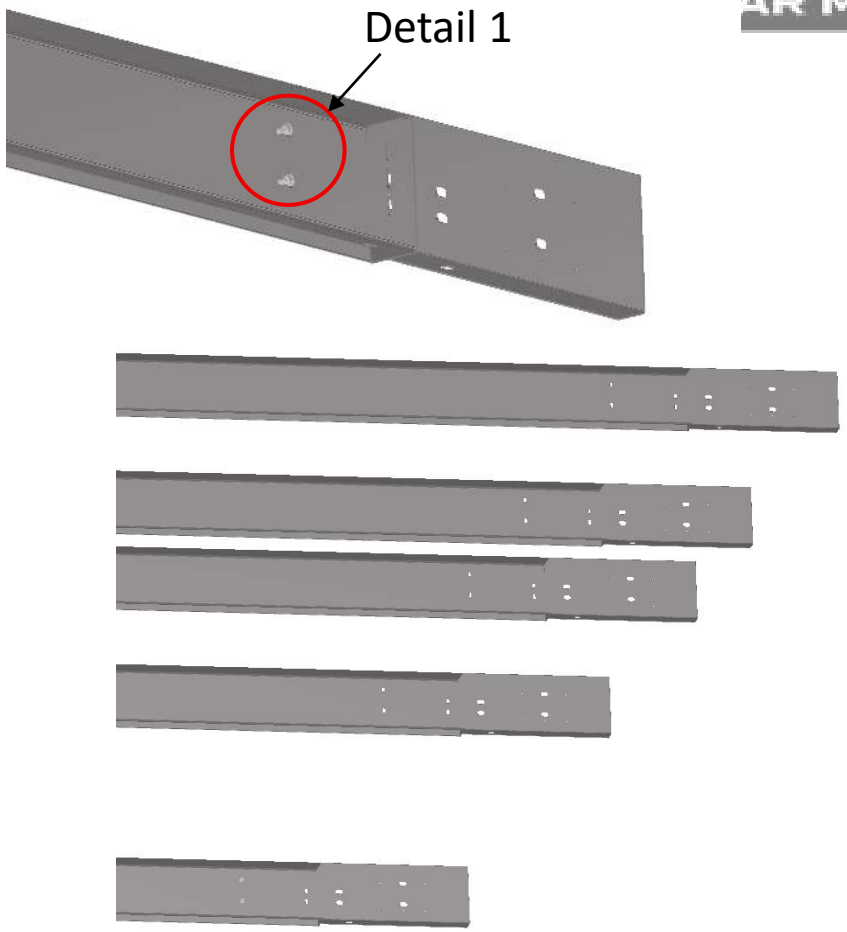
Squaring of Trusses

- Square the system before installing purlins, SMLLC recommends using two rachet strap to make an “X”.
- Length 1 should be the same measurement as Length 2
- Leave these installed until the installation of purlins is complete.



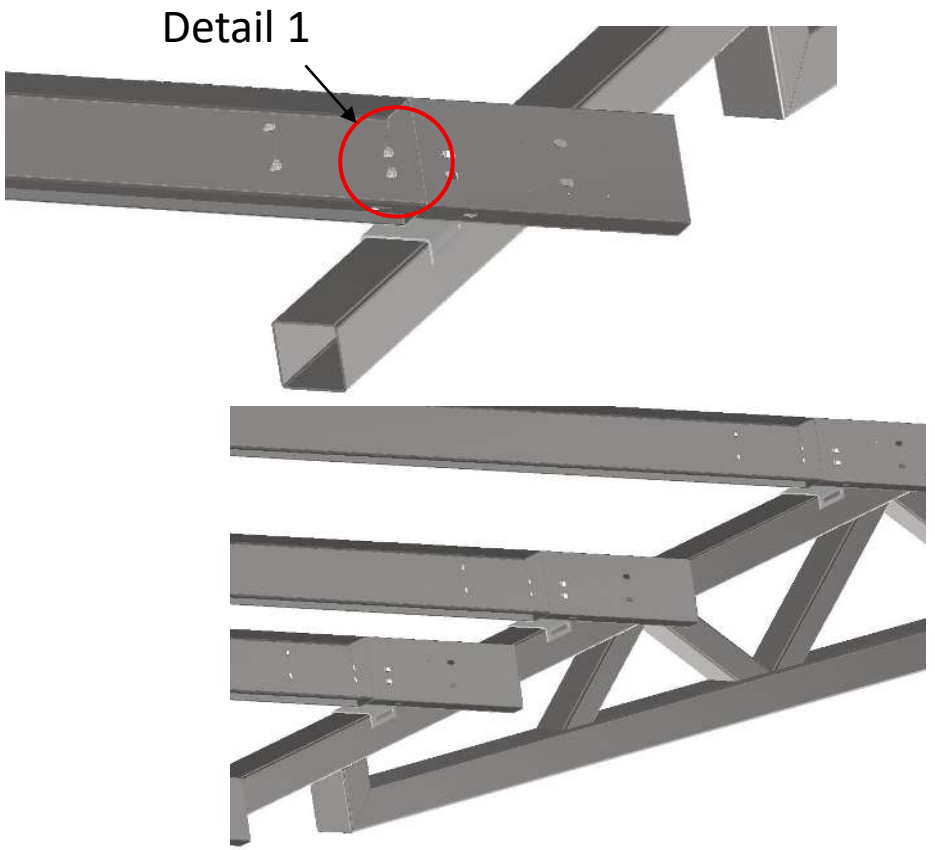
Attaching Overlap Plates and Purlins

- On the ground, Assemble 40” Overlaps to <u>one</u> end of the C-Purlins with (2) ½” x 1.25” Bolts (1/2” nut). Use the slots called out on Detail 1
- For <u>ONLY the first section</u> in each Array, put the overlaps on both sides of the purlins. Still only putting bolts shown on detail 1



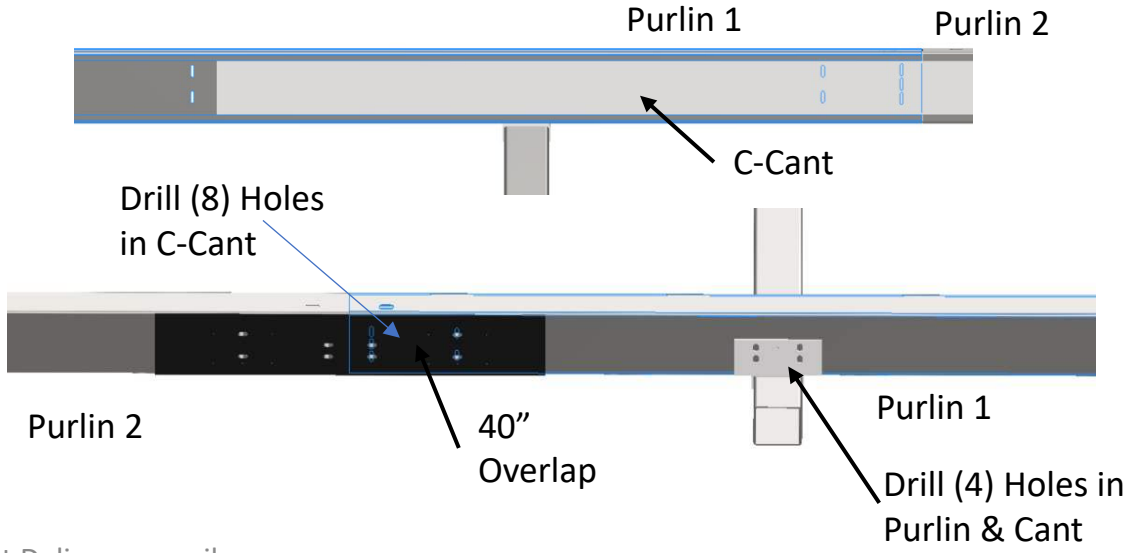
Attaching Overlap Plates and Purlins

- Lift purlin onto each L-Plate (which should already be fastened and measured in accordance with page 14), Overlap and Purlin together using (2) ½” x 1.25” Bolts (1/2” Nut) See Detail 1
- Upon completion, every purlin should have (4) ½“ fasteners on each end torqued to 70-80 ft-lbs



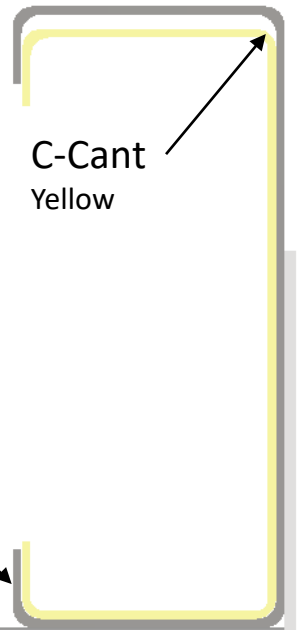
Non-Standard Post to Post Spans

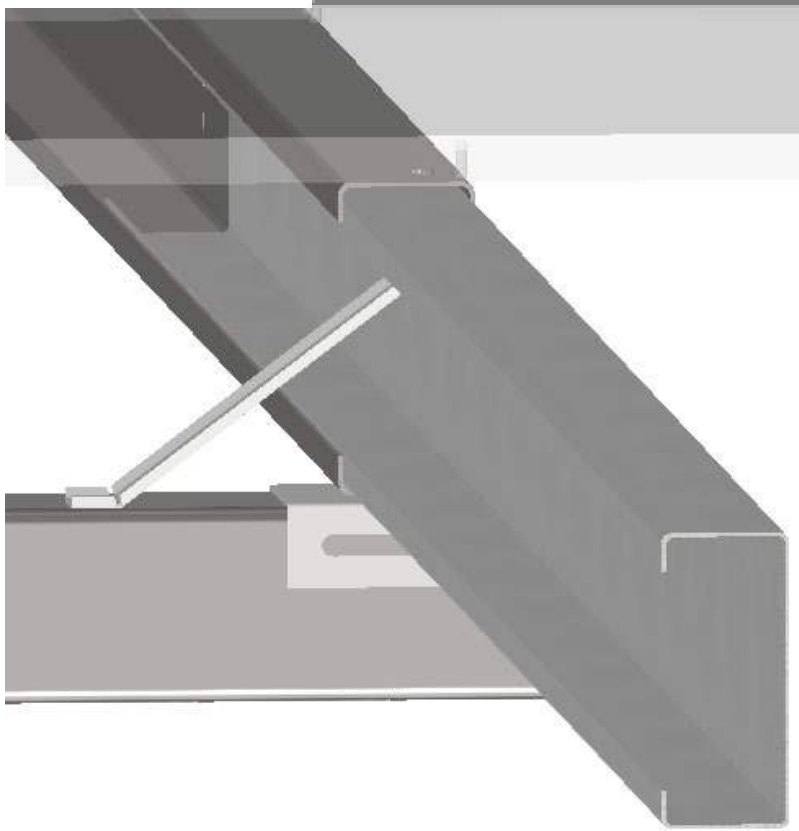
- Solar Mounts 8” C-Purlin standard length is 27’
- Solar Mounts 12” C-Purlin Standard length is 36’
- One of two options is available:
- 1. A shorter section with 27’ on both sides
  - Cut the 27’ purlin to the specified length on the plans
  - Drill (4) 9/16” Holes where the Purlin bolts to the overlap and Adjustable L-Bracket
- 2. A shorter section with a section larger than 27’ next it.
  Ex: a 24’ section next to a 30’
  - See the attached The 27’ Purlin will overhang the truss into space.
  - A C-Cantilever will be inserted to splice the two purlins together. This C-Cantilever should reach back past the tube truss
  - (4) 9/16” Holes will need to be drilled in the C-Purlin & C-Cantilever to connect to the L-Bracket.
  - The 40” Overlap should slide out to strengthen up the purlin splice as well.
  - (8) 9/16” Holes will need to be drilled into the C-Cant



Attaching C-Cantilevers –
Less Than 10’ length

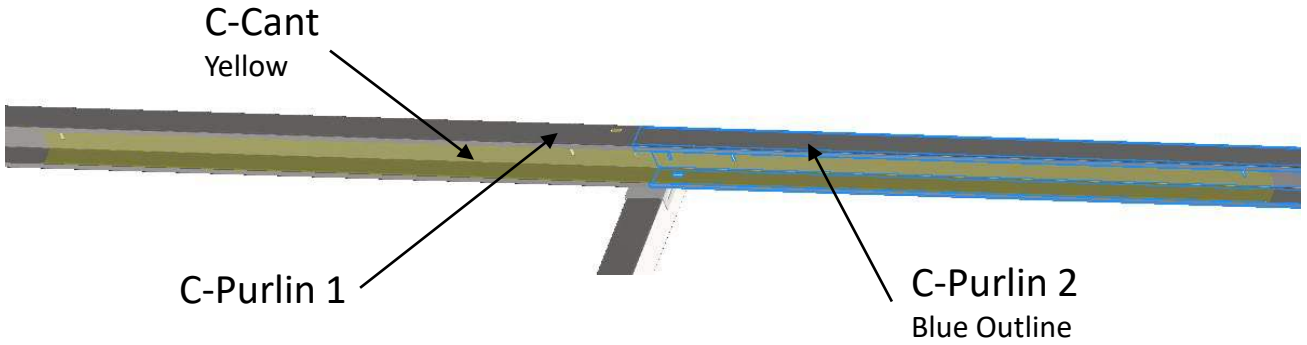
- The cantilevers are designed to slide inside of the C-purlins
  - C-Cantilevers are 14’ in length
- Reference SMLLC Drawings for each length of cantilever
  - NOTE: Lengths will vary per array
- Slide C-Cantilever into the C-purlins to necessary length
- Drill holes in C-cantilever in needed areas to bolt in same locations as purlins (See previous page for those locations)

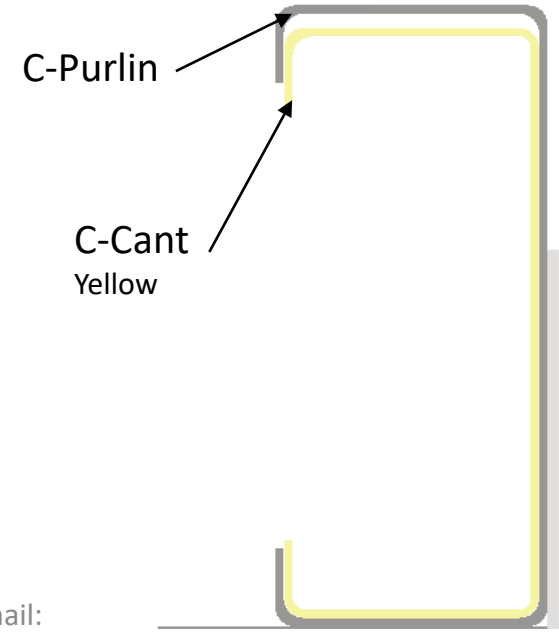




Attaching C-Cantilevers – 10’ or longer

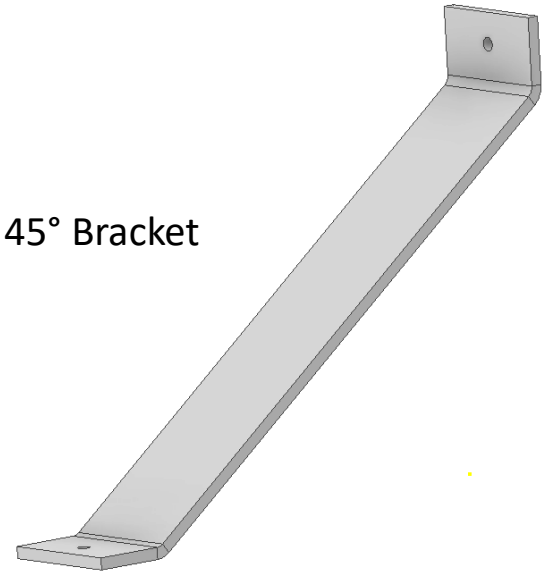
- Reference SMLLC Drawings for each length of cantilever
  - NOTE: Lengths will vary per array
- If needed cantilever length is longer than 10’ an extra C-purlin will be supplied
- Cut the C-purlin to the stated dimension in SMLLC drawing
- Slide C-Cantilever 4’ into previous purlin, with 6’ sticking out
- Slide C-Purlin over the extruding C-Cantilever
  - Fasten components same as previously mentioned
  - Holes in C-Cantilever will need to be drilled

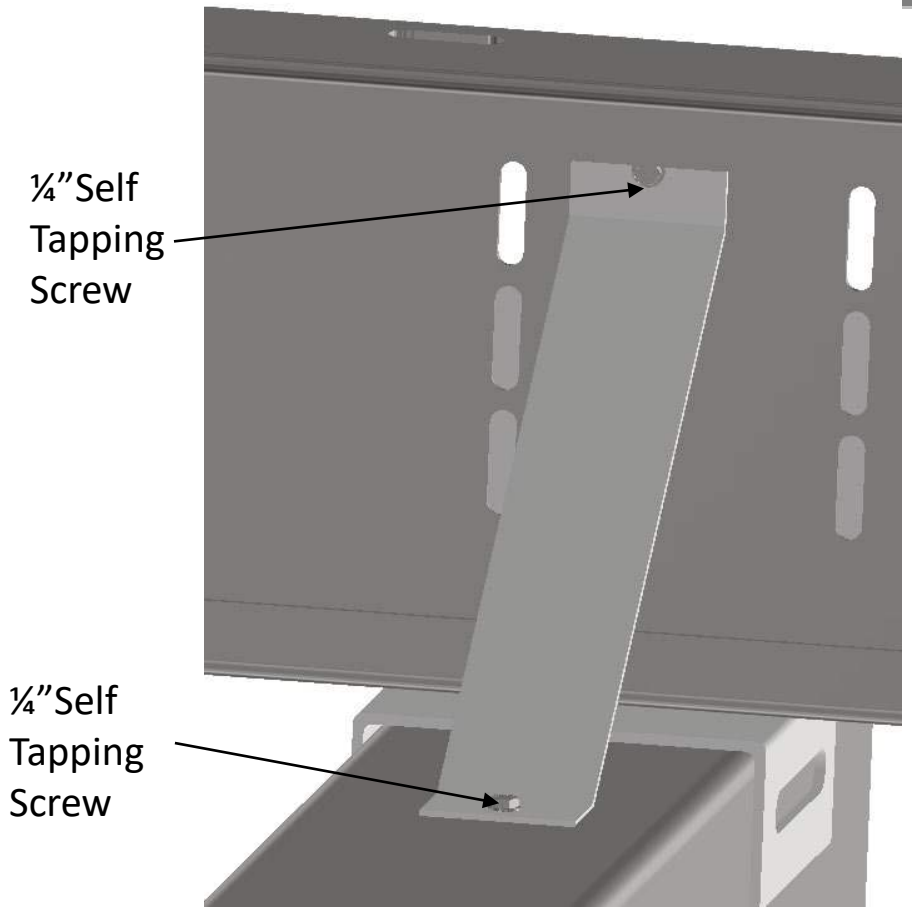




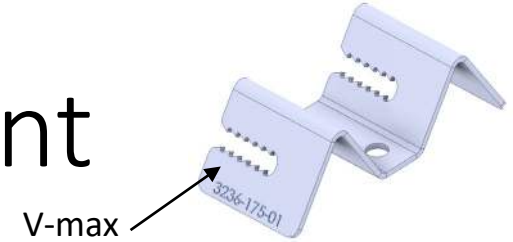
Installation of 45° Brackets

- 45° Designed to stiffen the C-Purlin
- Using ¼” Self Tapping Screw, fasten 45° Bracket to C-Purlin
- Using ¼” Self Tapping Screw, fasten 45° Bracket to Truss

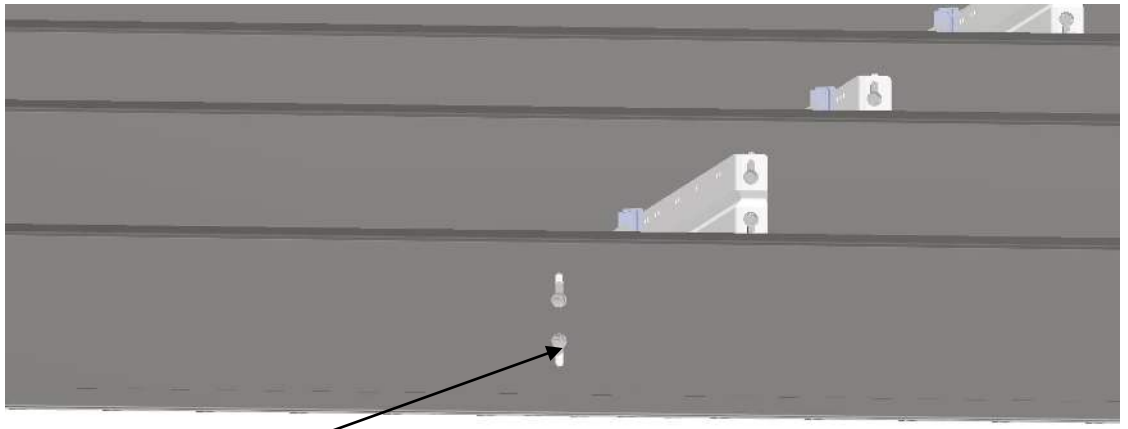


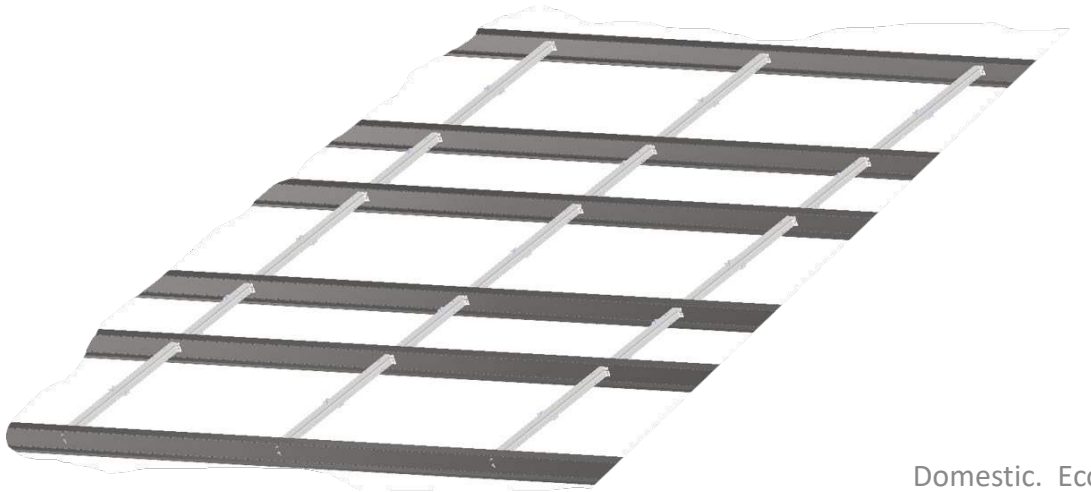


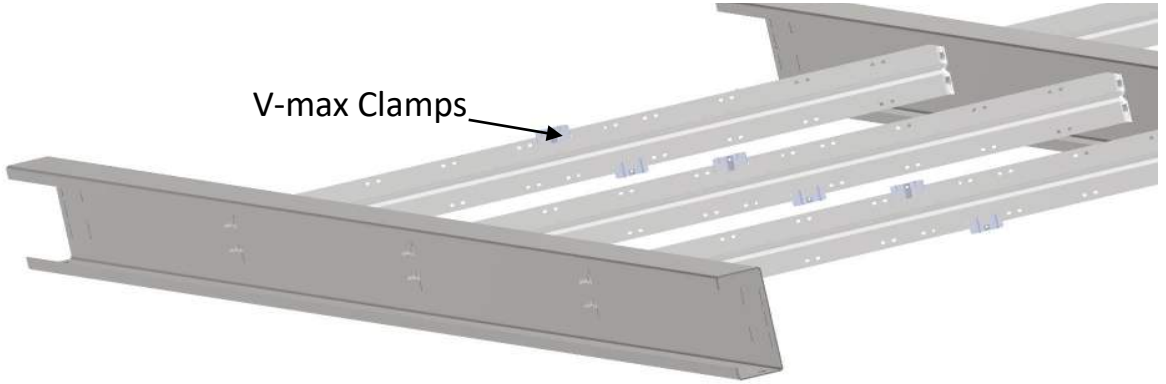
Purlin Stiffener Attachment



- See SMLLC drawings for appropriate spacing
- Compress the Vmax-Clamp with SMLLC V-Clamp pliers (or needle nose pliers) and release into position (Detail 1)
- **NOTE:** many contractors fabricate a jig and build the Purlin stiffeners on the ground
- Attach the stiffener to purlins with (2) 5/16” serrated flanged bolt and nut (Detail 2)
- Torque 5/16” to 17-20 ft-lbs

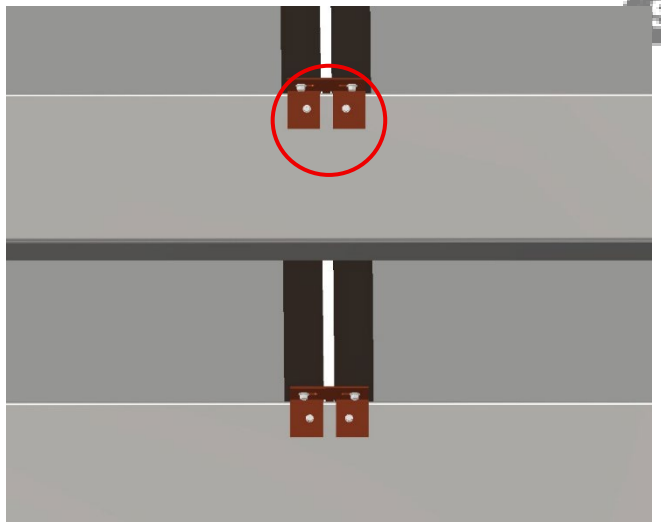






PV Module Attachment & Installation

- Attach bracket to one side of module using ¼”x 1” bolt and ¼” nut, lock/spring washers and bonding washer (i.e. “WEEB”).
- Secure the bracket to the purlin using two (2) ¼” self-drilling screws into (Detail 1)
- Secure the second PV module onto the bracket using ¼” x 1” bolt and ¼” nut, lock/spring washers and bonding washer (i.e. “WEEB”). The PV bracket will accommodate two PV module bolts/nuts/washer sets for the two adjacent PV modules. (Detail 2)
- Torque to 10-12 ft-lbs **NOTE:** Avoid over torquing!

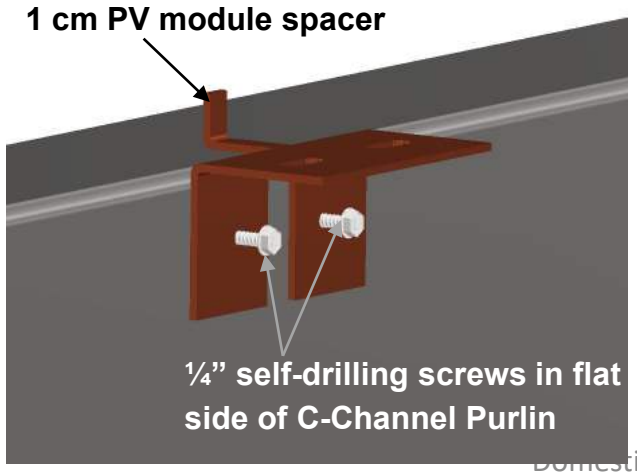


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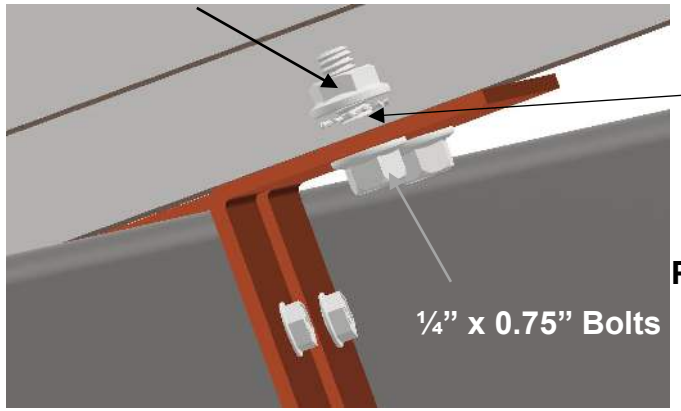
Two PV Brackets on two purlins. Each bracket supports two adjacent PV modules

1

PV Bracket in place on the C-Channel Purlin. Attached to the purlin with two (2) self-drilling screws. Note: 1 cm PV module spacer and two wide slots for the hardware for two adjacent PV modules



2



PV WEEBs (Washer, Electrical Equipment Bonding 2 per panel)

PV Bracket mechanically fastening and grounding/bonding two adjacent PV modules to the bracket and Purlins