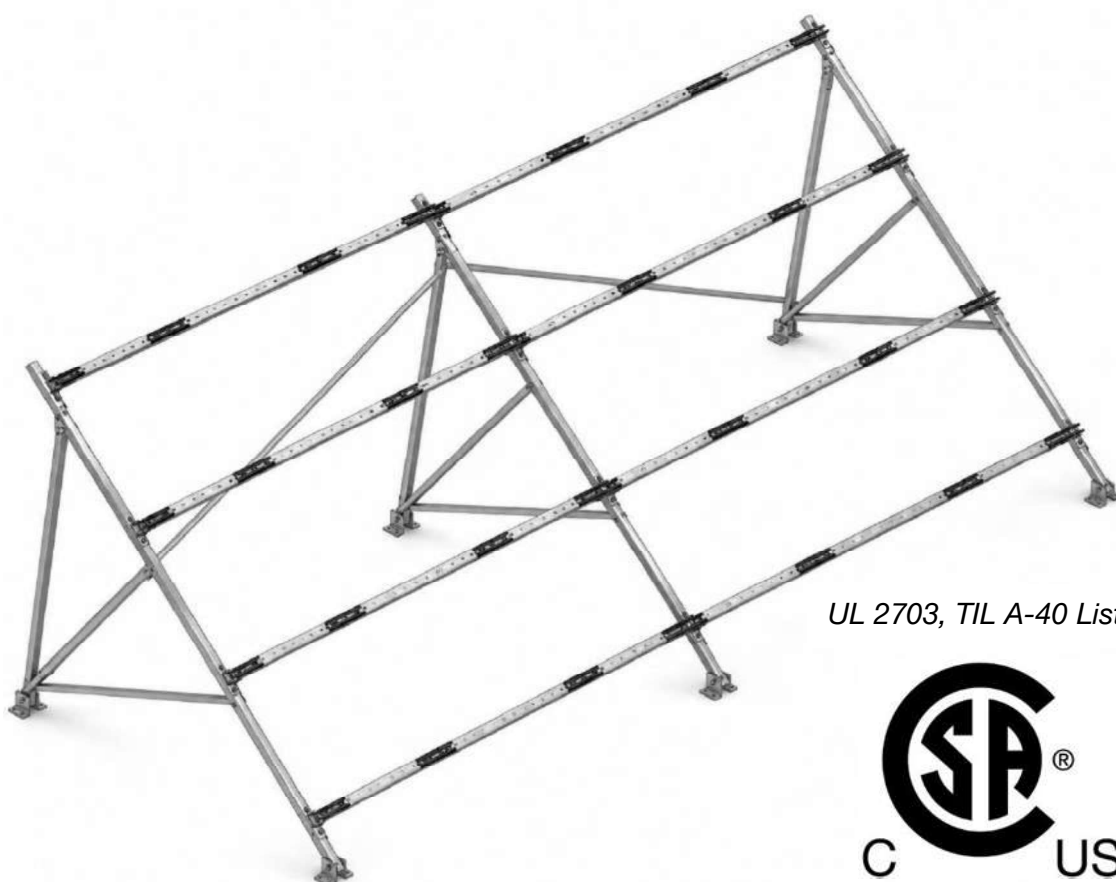




STATIC GROUND MOUNT INSTALLATION GUIDE

KS45SGM



UL 2703, TIL A-40 Listed





Kinetic Solar Racking and Mounting
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Commercial | Residential | Industrial | Institutional

DISCLAIMER

Before attempting to install, operate or service a Kinetic Solar Racking and Mounting Inc. Ground Mount all instructions should be read and understood. Failure to follow these instructions/guidelines may result in injury, property damage or death.

Kinetic Solar Racking and Mounting Inc. (Kinetic Solar) does not install any racking or mounting systems components. Kinetic Solar does not hold any duty or responsibility for the safe and proper installation and/or maintenance of its racking and mounting systems, including job site safety standards and procedures. Position fully assembled Steel Rails according to the solar module manufacturer's mounting specifications. A solar module's width and/or length will determine the exact rail spacing based on the clamping requirement.

As specified in UL 61730-1 5.2.3DV, PV modules are considered to be in compliance with the mechanical loading and bonding and grounding requirements of UL 61730-1 when mounted, bonded and grounded in the manner specified by either the PV module mounting instructions, or the mounting system manufacturer's instructions when the mounting, bonding, and grounding means have been evaluated with the PV module to UL 2703. Fasteners shall be clean and free of damage or signs of corrosion during installation. The system has not been evaluated for fire classification rating.

All installation work must comply with the applicable regional and local regulations or other national or international electrical standards and are the sole responsibility of the installer, contractor and/or developer.

Kinetic Solar Racking and Mounting shall not be held responsible for damages of any kind, including but not limited to injury, property damage or death. Kinetic Solar Racking and Mounting Inc. shall not be held responsible for misuse or non-compliance with the instructions detailed in this manual including handling solar modules, solar racking or system installation.

Packing materials, including plastic bags and foam, may pose suffocation, choking, or injury hazards. Keep away from children and animals. Dispose of packing materials responsibly per local and provincial regulations. Recycle through local programs where applicable.

Installation should not be performed during adverse weather conditions, which can compromise personal safety and the integrity of the installation. Exercise caution during installation.

Please retain this manual for future reference. Kinetic Solar reserves the right to make additions, deletions and modifications to the content of this document without prior notice. This manual is only valid for the following Kinetic Solar Racking Systems: Static Ground Mount Gen 3.0 Models.

The instructions contained in this manual are exclusive to the products referenced. Use of any other products in conjunction with the listed products is done at one's own risk.

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PRODUCT CERTIFICATIONS

KHBW – Bonding Washer

CL501TN – Terminal Lug

The above products are tested to **UL 467, CAN/CSA-C22.2 No.41** US/CANADA safety standards for safety grounding and bonding equipment. Deckel Rail, Mid Clamps, and Kinetic Ground Lugs have been certified to meet the bonding requirements of **UL 2703 and TIL A-40**.

GENERAL NOTES

- Before installation, verify that you possess all the required components and tools for installation.
- The orientation reference is based on the installer standing in front of the ground mount, facing the front (where solar panels will be installed).
- Before installation, confirm that the foundation spacing in both the East-West (138.5”) and North-South (120”) directions for compatibility with the K45SGM foot spacing.
- Verify that the chosen foundation is relatively level before beginning assembly. Identify the high-point across all foundations. The K45SGM system allows for a height adjustment of up to 2 inches on L-Base Plates to accommodate minor surface variations. The first installed L-Base becomes the datum foot and must be at the highest point of your foundation.
- It is normal that the hot dip galvanizing process may sometimes cause zinc accumulation inside holes or along edges; Bolts/hardware can be lightly tapped through the holes to clear the buildup. Alternatively, a drill one size smaller than the hole diameter may be used to clear the build-up while ensuring that zinc is **not** completely stripped.
- Do not fully tighten components until specified.
- Check to ensure that all bolts remain at the proper torque setting 6 months after installation and at least once yearly afterwards.
- All bolted connections shall include one flat washer under the bolt head before the bolt is inserted through the structural members. Install one flat washer and one lock washer on the threaded end of the bolt before installing the nut, unless directed otherwise.
- Refer to the drawing package for the rack configuration being assembled to ensure that the assembled Steel Tube Rails (with Deckel) are installed in the correct locations.

REQUIRED TOOLS LIST FOR INSTALLATION

✓ Measuring Tape.....



✓ Impact Driver.....



✓ 1/2" and 3/4" Wrench.....



✓ 1/2" and 3/4" Socket.....



✓ Torque Wrench.....



✓ Rubber Mallet.....

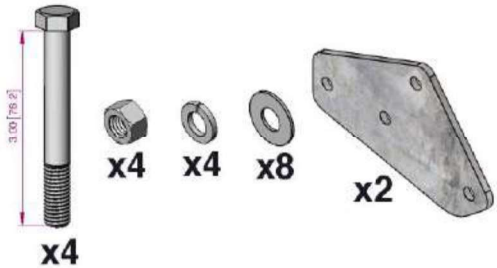


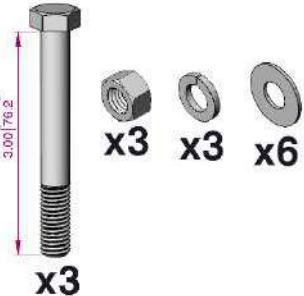
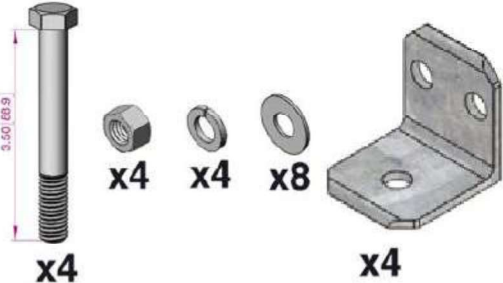
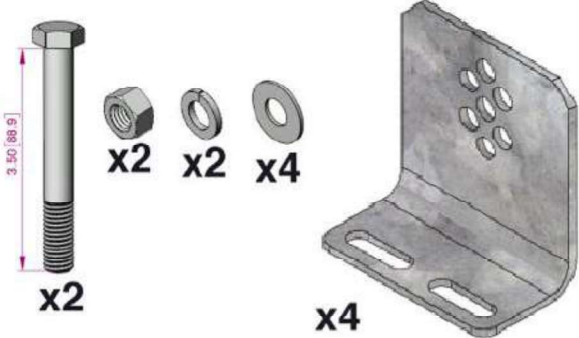
✓ Ladder 6 Foot minimum.....



STEP 1: A-FRAME ASSEMBLY

Table 1: A-Frame Components Table

ITEM	COMPONENT / DESCRIPTION		QTY
1	 A-FRAME MAIN DIAGONAL (SQ. TUBE 2" X 167.1")		1
2	 A-FRAME LEG (SQ. TUBE 2" X 107.8")		1
3	 A-FRAME REINFORCEMENT 1 (R1) (SQ. TUBE 1.5" X 85.8")		1
4	 A-FRAME REINFORCEMENT 2 (R2) (SQ. TUBE 1.5" X 82.1")		1
BAG S-A		GALVANIZED HEX HEAD BOLT 5/16"-18 X 3.0" GALVANIZED HEX NUT GALVANIZED LOCK WASHER GALVANIZED FLAT WASHER CONNECTION PLATE	1

BAG S-B		GALVANIZED HEX HEAD BOLT 5/16"-18 X 3.0" GALVANIZED HEX NUT GALVANIZED LOCK WASHER GALVANIZED FLAT WASHER	1
BAG S-C		GALVANIZED HEX HEAD BOLT 1/2"-13 X 3.5" GALVANIZED HEX NUT GALVANIZED LOCK WASHER GALVANIZED FLAT WASHER RAIL CONNECTOR BRACKET	1
BAG S-D		GALVANIZED HEX HEAD BOLT 1/2"-13 X 3.5" GALVANIZED HEX NUT GALVANIZED LOCK WASHER GALVANIZED FLAT WASHER L-BASE PLATE	1

For detailed specifications and measurements, please refer to the **A-Frame** engineering drawing provided in **Appendix 1**.

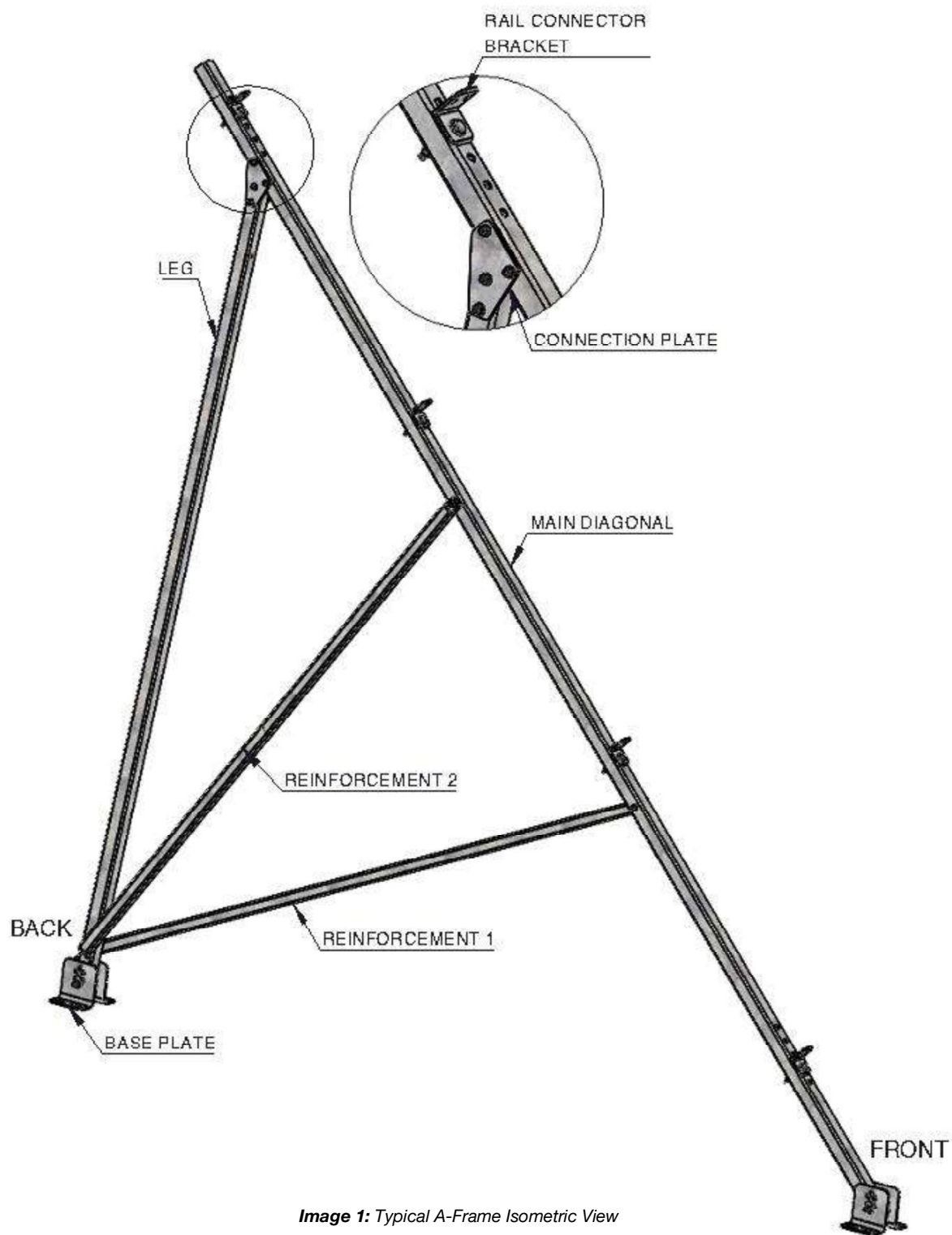


Image 1: Typical A-Frame Isometric View

STEP 1.1: A-FRAME MAIN DIAGONAL AND LEG ASSEMBLY

Join the A-Frame Main Diagonal and Leg using the Connection Plates and Hardware Bag S-A.

- I. Identify the **A-Frame Main Diagonal** and **Leg**, and hardware **Bag S-A**, and lay them on a flat surface.
- II. Inspect the components for zinc accumulation. If present, carefully clean to ensure proper fit.
 - *Note: Only remove excess zinc; maintaining the coating is essential for corrosion resistance.*
- III. Align both components using the holes on the **Connection Plate**. (Refer to **Image 2**).
- IV. Secure the components using the hardware in the **Bag S-A** (5/16" x 3.0" Bolts + Flat Washers + Lock Washers + Hex Nuts).
- V. Do not fully tighten the bolts to allow for alignment adjustments.

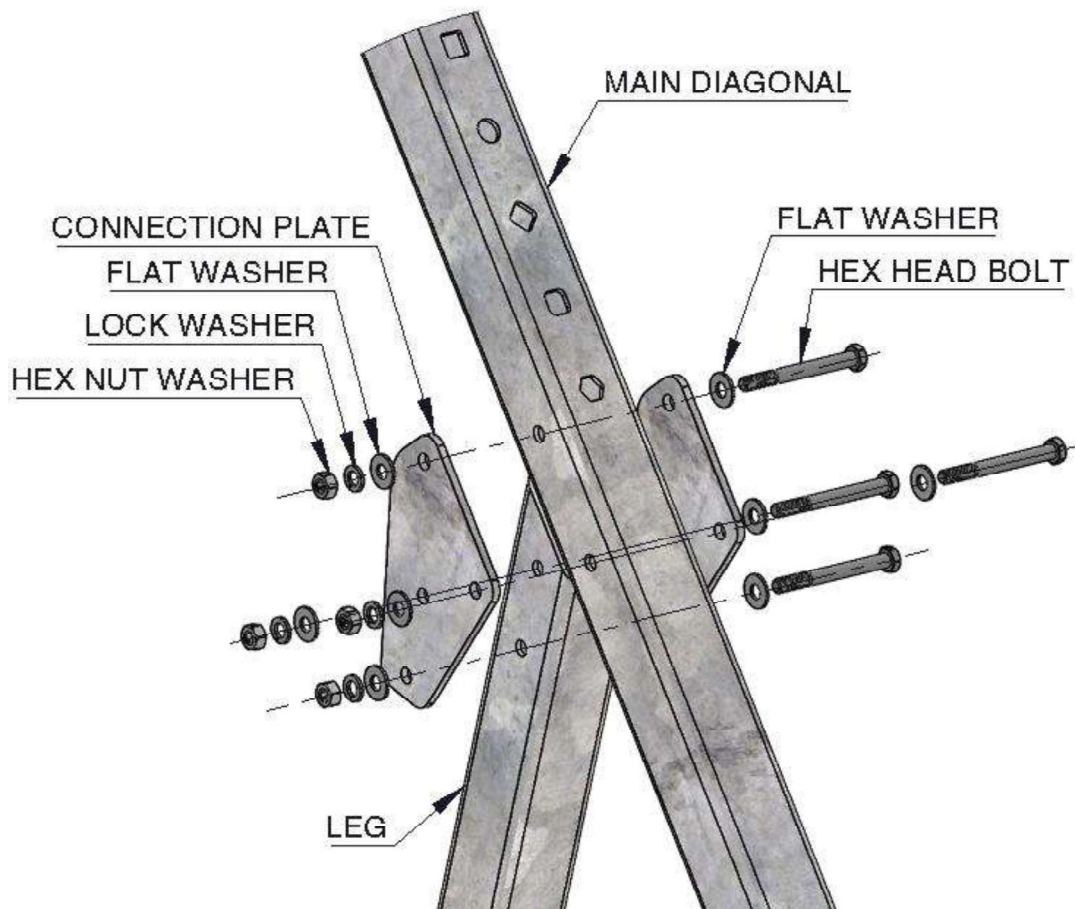


Image 2: Typical A-Frame connection

STEP 1.2: REINFORCEMENT SECTIONS ASSEMBLY

Identify Reinforcement Tube R1 and attach it to the A-Frame Main Diagonal hole marked "1" and Reinforcement Tube R2 to the hole marked "2".

- I. Identify both **Reinforcement Tubes** (1.5" sq. tubes) and hardware **Bag S-B**.
- II. Align the two **Reinforcement Tubes** with the hole located on the bottom of the **A-Frame Leg**.
- III. Install the hardware from **Bag S-B** (5/16"x 3" Bolts + Flat Washers + Lock Washers + Hex Nuts) through the aligned holes on both sides of the leg.
- IV. Hand-tighten the bolts to allow rotation.
- V. Match the "1" and "2" markings on the **Reinforcement Tubes** to the corresponding holes on the **Main Diagonal**.
- VI. Secure the components using the remaining hardware in **Bag S-B**.
- VII. Do not fully tighten the bolts to allow for alignment adjustments.

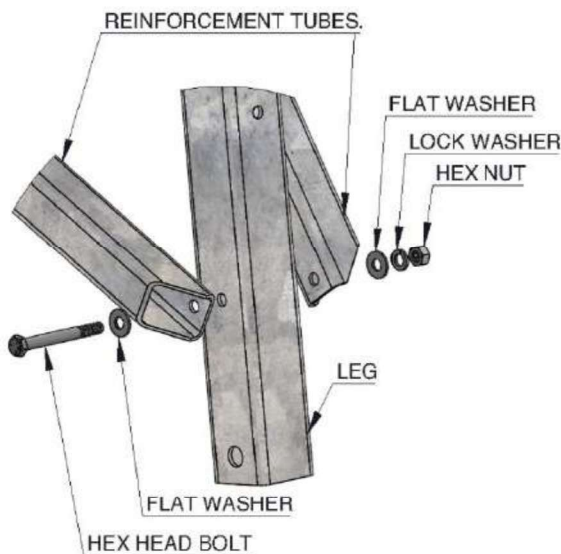


Image 3: Reinforcement Tubes onto A-Frame Leg

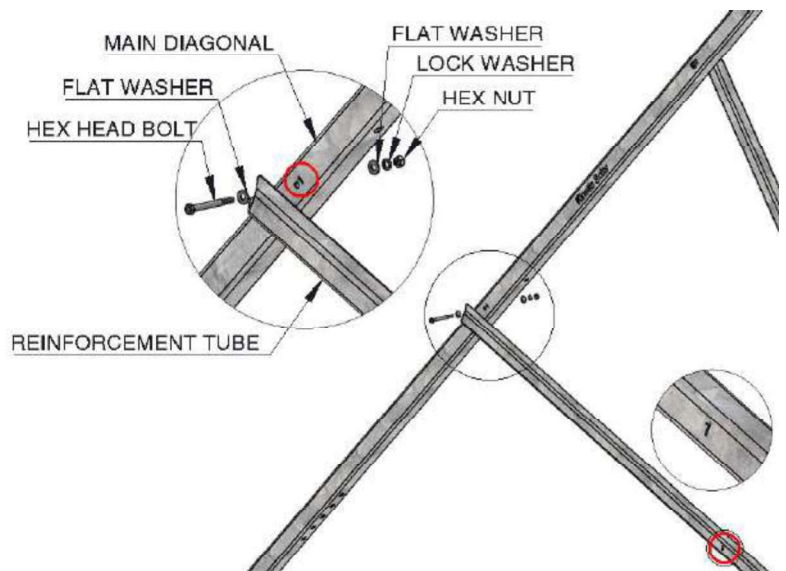


Image 4: Reinforcement Tubes onto A-Frame Main Diagonal

STEP 1.3: RAIL CONNECTION BRACKET ASSEMBLY

Before installing the **Rail Connection Brackets**, identify the correct module **clamping zone** (green-zone) according to the module manufacturer installation manual. This will help you select the right hole for positioning the bracket. The two inner brackets remain fixed regardless of panel size while the outermost brackets adjust vertically to accommodate the green-zone. Use the dimensions shown in **Image 5** to select the desired spacing for the rails.

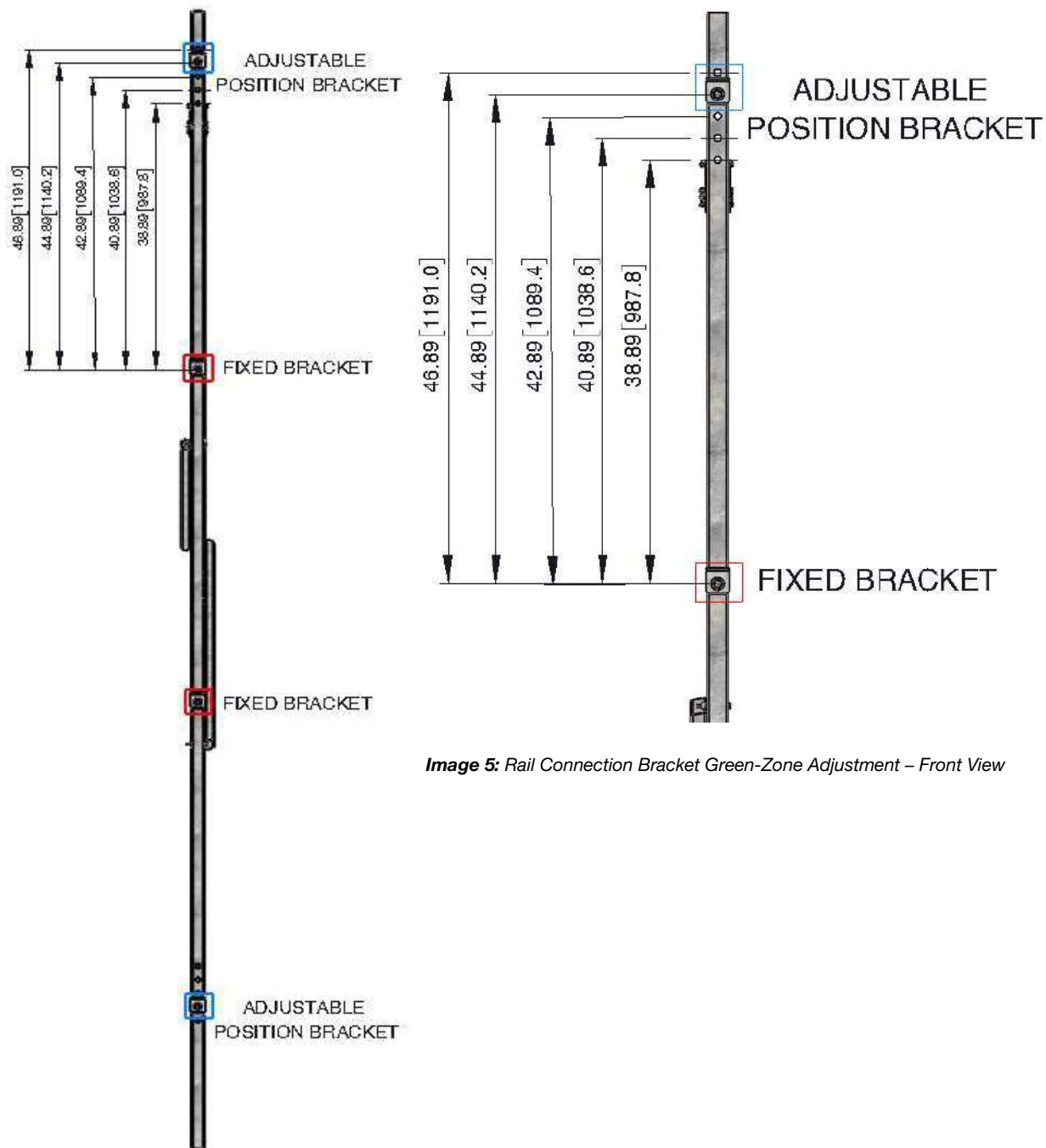


Image 5: Rail Connection Bracket Green-Zone Adjustment – Front View

- I. Identify the **Rail Connector Bracket** and hardware **Bag S-C**.
- II. Align the single hole of the **Rail Connector Bracket** with the corresponding hole on the **A-Frame Main Diagonal**. Select the appropriate hole based on the module's green-zone. (Refer to **Image 5**).
- III. Install the hardware from **Bag S-C** (1/2"x 3.5" Bolts + Flat Washers + Lock Washers + Hex Nuts) through the aligned holes of the **A-Frame Main Diagonal**.
- IV. Do not fully tighten the bolts to allow for alignment adjustments.
- V. Repeat step **1.3.II to 1.3.IV** for all **Rail Connector Brackets** (four per A-Frame).

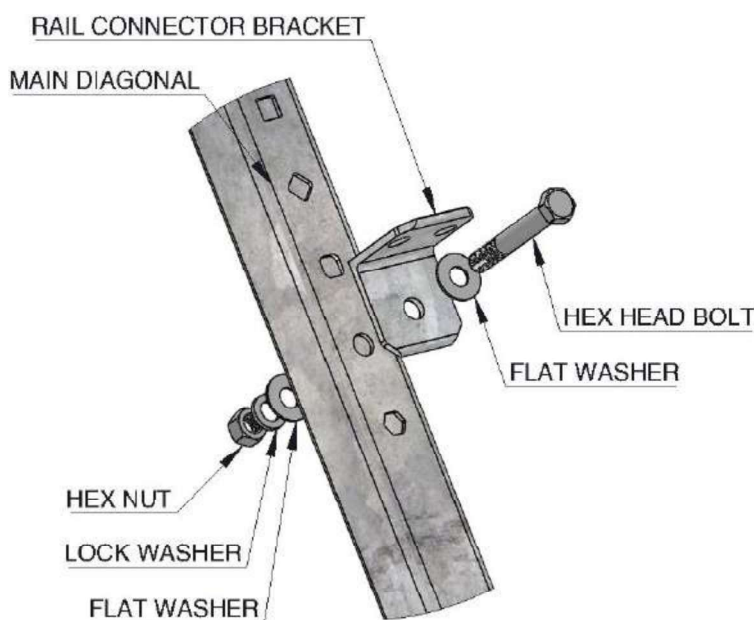


Image 6: Rail Connection Bracket installation

NOTE: DO NOT FULLY TIGHTEN THE RAIL CONNECTION BRACKET TO ALLOW FOR RAIL ALIGNMENT.

Table 2: Recommended Torque Values

Recommended Torque for Grade 5 UNC Bolts		
Bolt Specification	Torque (ft-lbs)	Torque (Nm)
1/2"-13	40-50	54-68
5/16"-18	10-13	14-18

STEP 1.4: L-BASE PLATE INSTALLATION

The **L-Base Plate** allows 0.5" vertical incremental adjustments (2.0" max). The lowest hole (**Datum Hole**) must be used for the first A-Frame that is on the datum foot, located at the highest-point across all foundations.

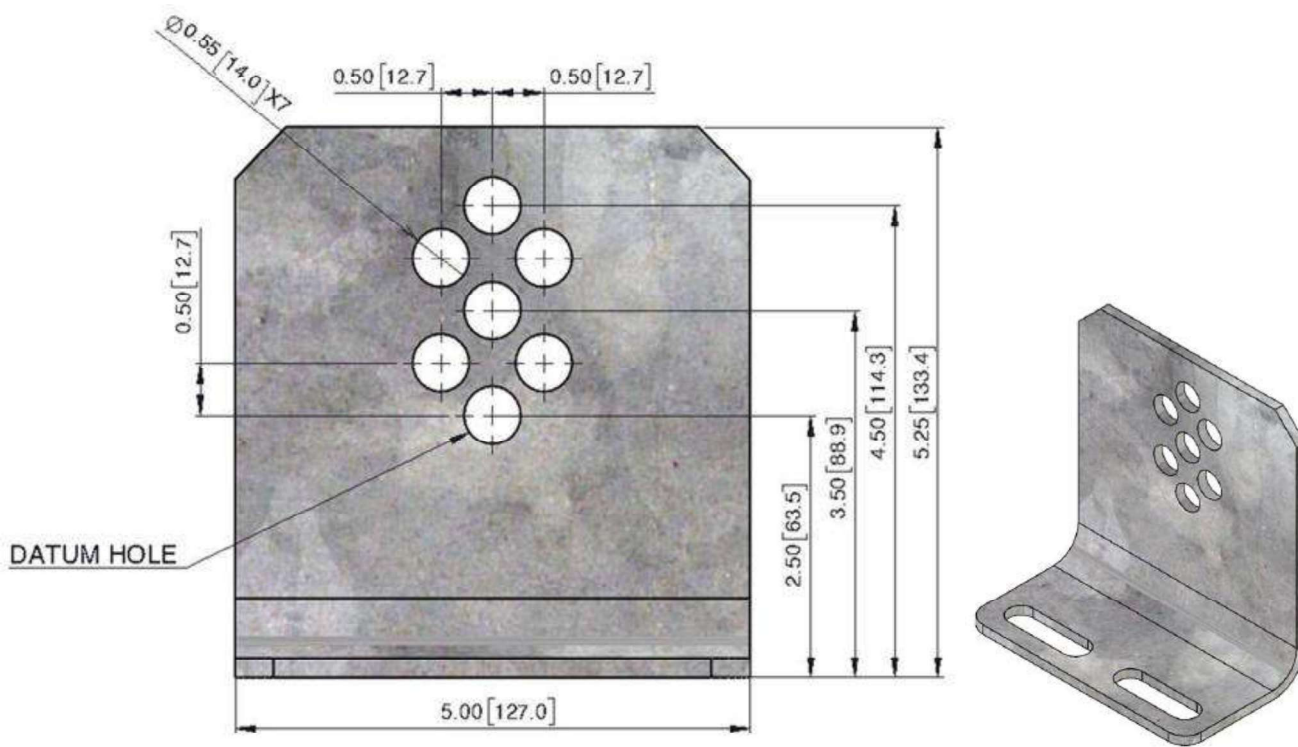


Image 7: Base Plate Adjustment

Measure the height differences between the foundations and choose the most appropriate holes in relation to the datum foot to secure the subsequent **A-Frames**. This is to maintain level across the length of the array.

STEP 1.4.1: FIRST L-BASE (DATUM FOOT) INSTALLATION

- I. Identify the **L-Base Plates** and hardware **Bag S-D** (1/2"x 3.5" Bolts + Flat Washers + Lock Washers + Hex Nuts).
- II. Align the **Datum Holes** on the L-Base Plates with the lowest set of holes on each side of the A-Frame.
- III. Install the hardware from **Bag S-D** through the aligned holes on both sides. (Refer to **Image 8**).
- IV. Do not fully tighten the bolts to allow for alignment adjustments.

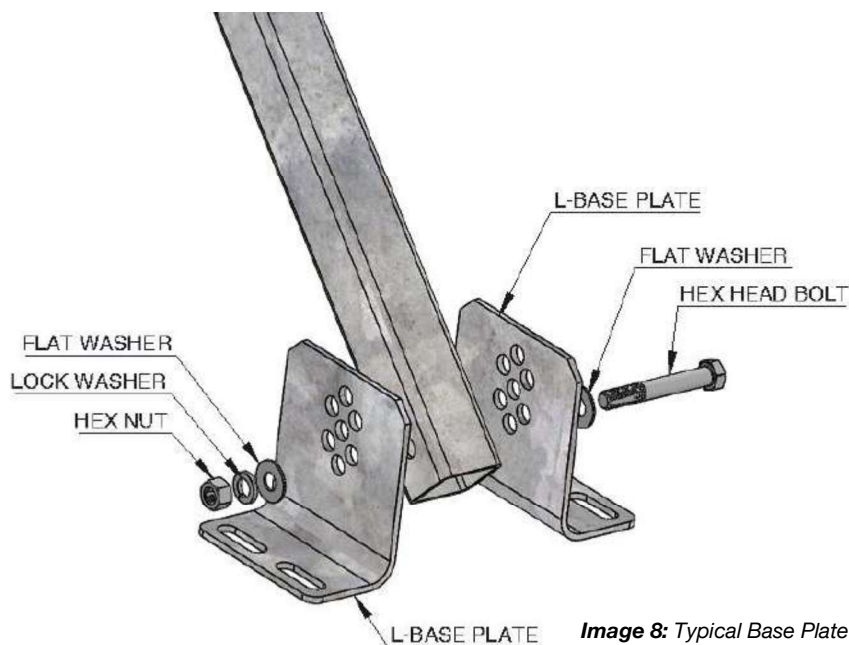


Image 8: Typical Base Plate Assembly Detail

STEP 1.4.2: SUBSEQUENT L-BASE INSTALLATION

- I. Using the remaining **L-Base Plates** and hardware in **Bag S-D**, align the **L-Base Plates** on each side of the A-Frame. Select the appropriate hole based on the required height relative to the **Datum Foot** to keep the structure level using 0.5" (12.7mm) increments as needed.
- II. Do not fully tighten the bolts to allow for alignment adjustments.
- III. **Repeat step 1.4.2 on all other A-Frames as needed.**

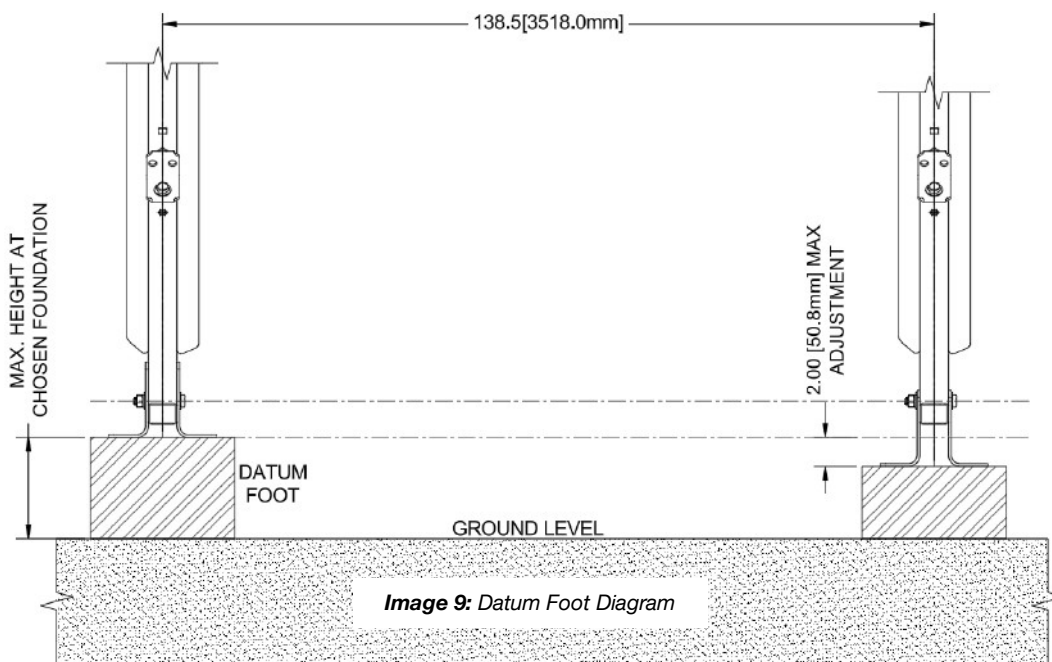
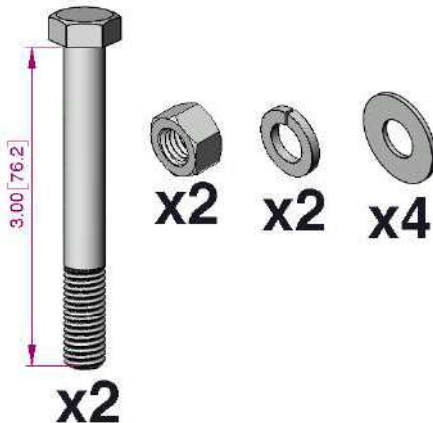


Image 9: Datum Foot Diagram

STEP 2: A-FRAME & CROSS BRACE INSTALLATION

Table 3: Cross Brace Components

ITEM	COMPONENT / DESCRIPTION	
1	 CROSS BRACE (ANGLE IRON 1" X 1" X 164.5" LONG)	
BAG S-E		GALVANIZED HEX HEAD BOLT 5/16"-18 X 3.0" GALVANIZED HEX NUT GALVANIZED LOCK WASHER GALVANIZED FLAT WASHER

- I. Identify the **Cross Brace** and hardware **Bag S-E**.
- II. Starting with the datum foot, place the **A-Frames** onto the chosen foundations, spaced East-West 138.5" (3518 mm) apart.
- III. Identify hardware from **Bag S-E** (5/16"x 3.0" Bolts + Flat Washers + Lock Washers + Hex Nuts). Align the **Cross Brace** with the holes at the top and bottom of each **A-Frame**. Insert the bolts and hand-tighten.
- IV. Ensure proper placement of the Cross Braces:
 - Install one Cross Brace on the outside of the A-Frames, and the other on the inside.
 - When an array has only two A-Frames, it requires two Cross Braces between A-Frames. (**Image 10**)
 - When using more than two A-Frames, only one Cross Brace is required between A-Frames, and the Cross Braces share attachment points. Refer to drawing package. (**Image 11**)
- V. Confirm alignment and squareness by verifying the dimensions (refer to **Image 10**), then fully tighten and torque the **Cross Braces** to the **A-Frames** (5/16"-18 bolts, 10-13 ft-lbs / 14-18 Nm).

- VI. Fully tighten and torque the **L-Bases** to the **A-Frames** (**1/2"-13 bolts, 40-50 ft-lbs / 54-68 Nm**) and check that they are correctly positioned onto the foundations. Verify that the vertical, horizontal, and diagonal squareness is maintained across all **A-Frames**.
- VII. Attach the **A-Frame** assemblies to the foundations through the L-Base Plates.

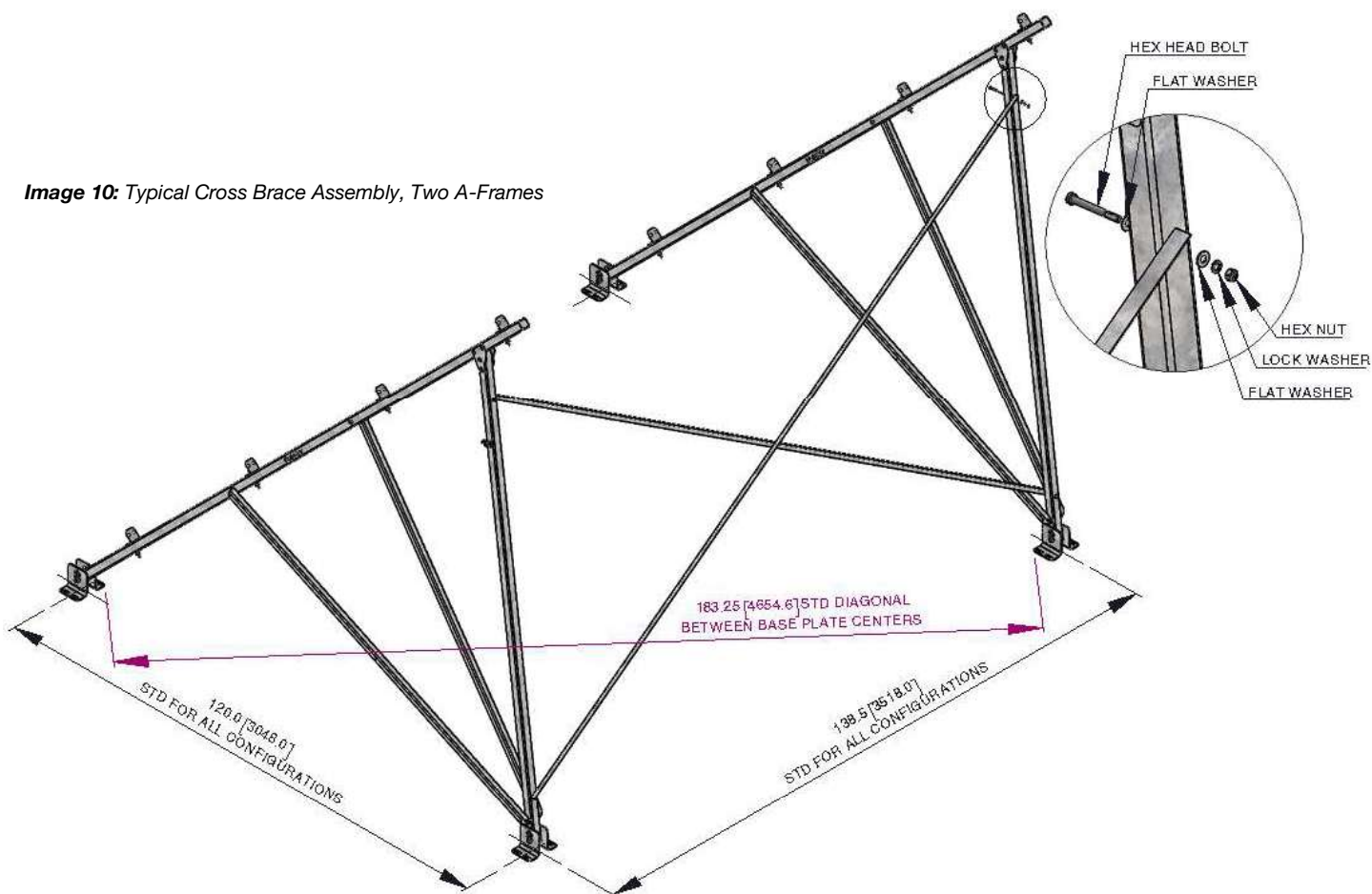


Image 10: Typical Cross Brace Assembly, Two A-Frames

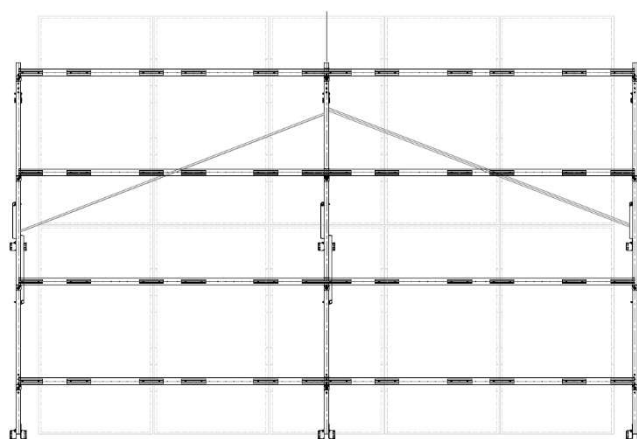


Image 11: Typical Cross Brace Assembly, Three A-Frames

STEP 3: STEEL TUBE RAIL ASSEMBLY

Table 4: Steel Tube Rail Components

ITEM	COMPONENT / DESCRIPTION	
1	 6 MODULE STEEL TUBE RAIL - SQ TUBE 3" X 138.4" LONG	
2	 8 MODULE STEEL TUBE RAIL - SQ TUBE 3" X 177.20" LONG	
3	 10 MODULE STEEL TUBE RAIL - SQ TUBE 3" X 228" LONG	
4		10.85" DECKEL RAIL
5		25.3" DECKEL RAIL
BAG S-F	 x48	GALVANIZED SELF TAPPING SCREW 5/16" X 3/4"

STEP 3.1: DECKEL RAIL INSTALLATION

Note: Depending on the **K45SGM** configuration being installed, up to two different **Steel Tube Rail** lengths may be required: a **6-module rail** or an **8-module rail**. The quantity and location of the **Deckel Rails** will vary based on the selected configuration and the width of the solar modules being used.

For proper module installation, refer to the configuration drawing corresponding to the rack size being assembled. The applicable configuration drawings are included with this installation manual.

Note:

Deckel Rail locations and the "6-Module Rail" and "8-Module Rail" designations are based on 44.65 in. (1134 mm) modules. Refer to the drawing packages to accommodate 1303 mm

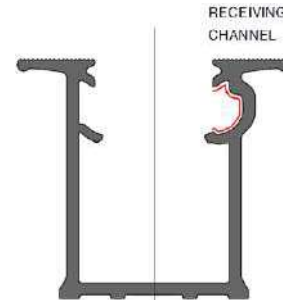


Image 12: Deckel Rail – Side View

- I. Identify the **Deckel Rails** (Item 4 & 5) and the hardware included in **Bag S-F**.
- II. Position the **Steel Tube Rails** leaving the "TOP" marking facing upward.
- III. Using the dimensions from the drawing package, measure and space the **Deckel Rails** to match the width of the modules. Position each **Deckel Rail** on the top of the **Steel Tube Rail** according to the required module layout and align it using the pilot holes. Ensure all Deckel Rails are positioned in the same orientation so that the receiving channels will be mounted on the upper side of the A-Frame.
(Refer to **Image 12, 13, 14, 15**).
- IV. Install the **Deckel Rail** using the **5/16" x 3/4" Self-tapping Screws** into the **Steel Tube Rail**.
- V. Repeat for all other **Deckel Rails** as needed.

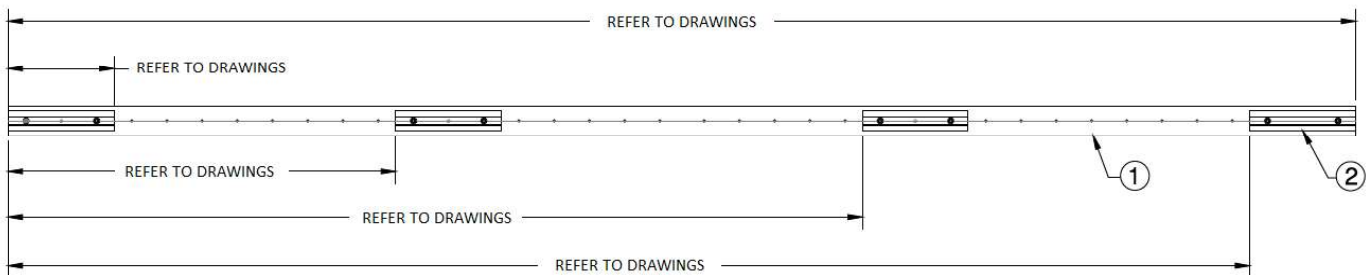


Image 13: Deckel Rail placement onto Steel Tube Rail

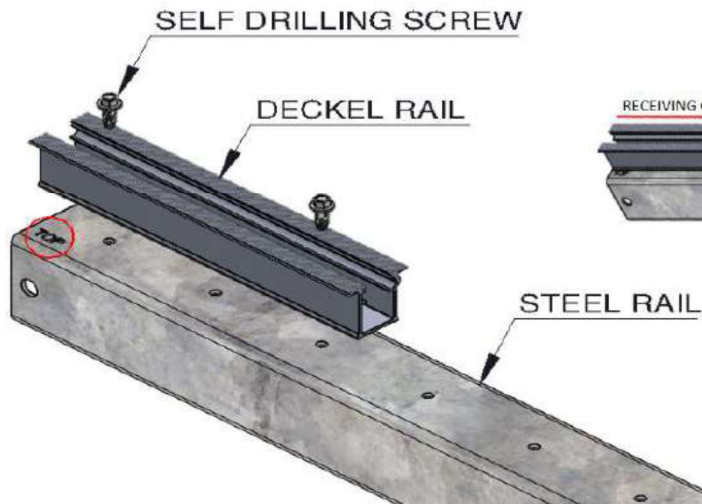


Image 14: Deckel Rail Assembly



Image 15: Deckel Rail Orientation Detail

STEP 4: STEEL TUBE RAIL INSTALLATION

To install a **6 Module Steel Tube Rail** onto the **A-Frame** using the **Rail Connector Bracket**, insert the bolts through the holes located on the side of the rail closest to the ends. (Image 16).

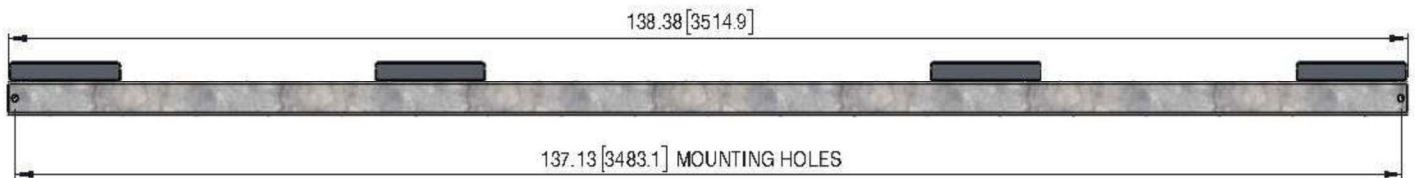


Image 16: 6 Module Steel Tube Rail Mounting Holes – Front

To install an **8 Module Steel Tube Rail** (Cantilevered) use the holes referred to as **POSITION A**.

To install an **8 Module Steel Tube Rail** (Centered) use the holes referred to as **POSITION B**. (Image 17).

Note: "Position B" is only used for the K45SGM8-G & K45SGM6-LG Ground Mounts.

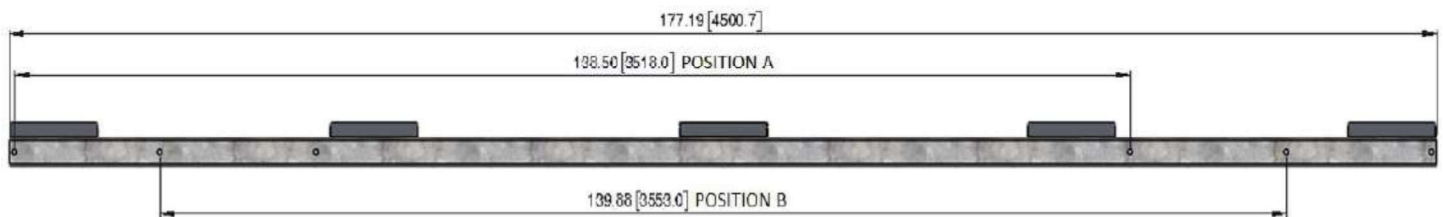


Image 17: 8 Module Steel Tube Rail Mounting Holes – Front

NOTE: Refer to the rack assembly drawing package to verify the required configuration. Ensure that each assembled Steel Tube Rail (with Deckel) is installed in its designated location on the rack, as indicated by the corresponding location marker: red triangle, blue circle, yellow diamond, or purple square.



To install a **10 Module Steel Tube Rail** (Centered) using the **Rail Connector Bracket**, insert the bolts through the holes located on the side of the rail closest to the ends. (Refer to **Image 18**).

Note: The **10-Module Steel Tube Rail** is only used for the K45SGM10-G & K45SGM8-LG Ground Mounts.

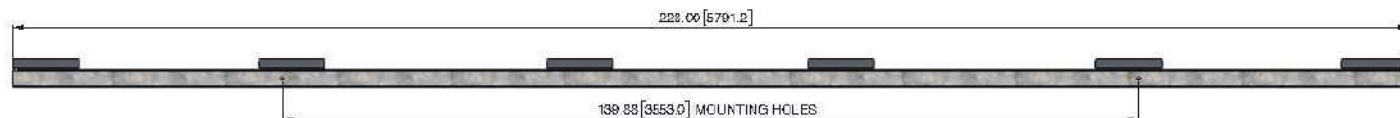
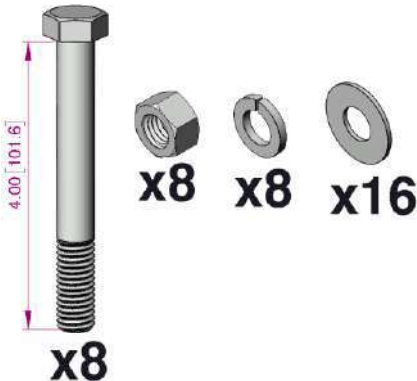


Image 18: 10 Module Steel Tube Rail Mounting Holes – Front View

Table 5: Steel Tube Rail Installation Hardware

ITEM	COMPONENT	DESCRIPTION
BAG S-G		GALVANIZED HEX HEAD BOLT ½”-13 X 4.0” GLAVANIZED HEX NUT GALVANIZED LOCK WASHER GALVANIZED FLAT WASHER

- I. Identify the hardware in **Bag S-G**.
- II. Lift the **Module Steel Tube Rail** and rest it on the mounted **Rail Connector Bracket**, ensuring the orientation of the receiving channels are mounted on the upper side of the A-Frame Main Diagonal. (Refer to **Image 20**).
- III. Insert and hand-tighten bolts (1/2”x 4.0” Bolts + Flat Washers + Lock Washers + Hex Nuts).
- IV. Repeat steps **4.1.II** to **4.1.III** for all remaining **Steel Tube Rail installations**. (Refer to **Image 19**).
- V. Once all rails are installed, verify the alignment and fully tighten bolts connecting the **Rail Connector Bracket** to the **Steel Tube Rails** using the recommended torque of 40–50 ft-lbs (54–68 Nm).
- VI. Torque the **Rail Connector Bracket** bolts to the **A-Frame Main Diagonal** (40-50 ft-lbs / 54-68 Nm).

NOTE: Before fully tightening the Steel Tube Rails to the Rail Connector Brackets, verify that the East-West span between the A-Frames measures 138.5 in. (3518 mm) at both the top and bottom. Equal measurements ensure the assembly is square, thereby aligning the holes.



Image 19: Typical 6 Module Steel Tube Rail Installation Shown

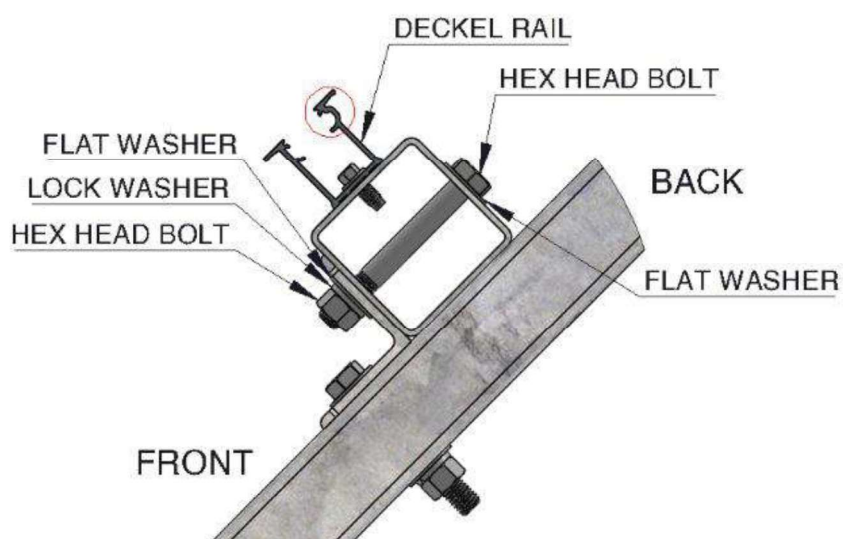


Image 20: Typical Steel Tube Rail Orientation

STEP 5: MODULE MID/END CLAMP INSTALLATION

NOTE: Ensure the first module is mounted square to the rack. This helps keep the remaining modules aligned and minimizes deviation across the length of the array.

- I. Retrieve the **Mid & End Clamps**. Position and hold the first module squarely onto the rails.
- II. Holding the top of the clamp, position the K-Nut at the lowest point on the bolt. At a 30° angle to the **Deckel Rail**, insert the K-Nut of the clamp assembly into the receiving channel. The inserted component sits in place and is free to move within the channel. Slide the clamp to the side of the module and repeat for all clamps as needed.
- III. Place the second module onto the rail and slide it toward the first, ensuring full contact with the **Mid Clamps**.
- IV. Ensure that the K-Nut is seated in the rail channel during tightening. Torque all **Mid-Clamps and End-Clamps to 12 ft-lbs (16.3 Nm)**.
- V. Repeat steps as required for the remaining modules.

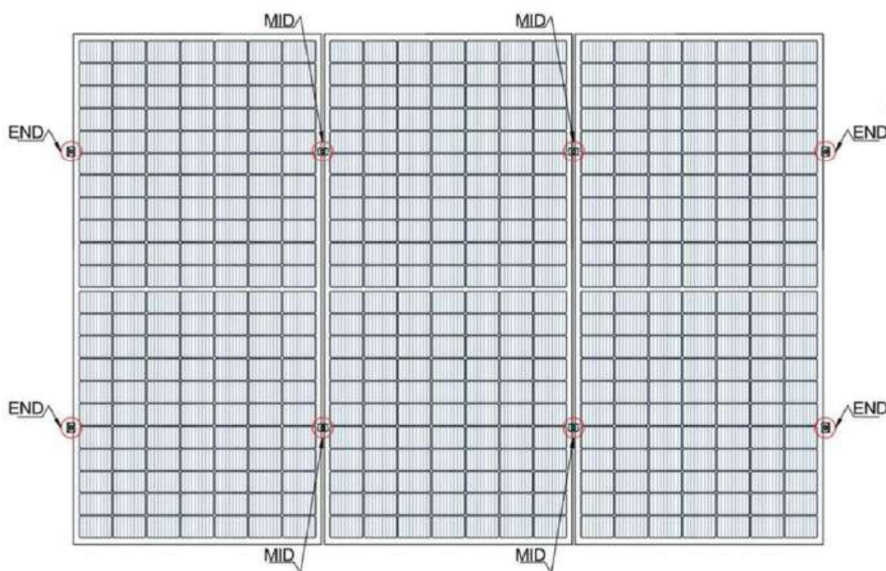


Image 21: Typical Mid & End Clamp Locations

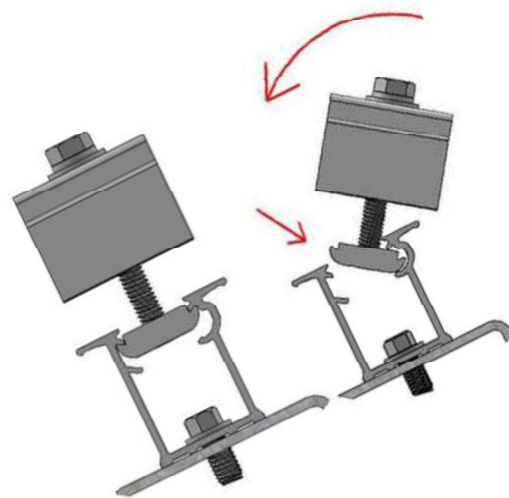


Image 22: Installation of a typical Mid or End Clamp

STEP 6: BONDING PATH & GROUND LUG INSTALLATION

Ground can be achieved using a **Kinetic Ground Lug** attached to an **A-Frame**.
One **Ground Lug** is required per array.

Table 6: Ground Lug Components

ITEM	COMPONENT	DESCRIPTION
BAG	 X1	GROUND LUG
M	 X1	GALVANIZED 5/16" X 3/4" SELF DRILLING SCREW

- I. Identify **BAG M** (Ground Lug + Self-drilling Screw).
- II. Mount the **Ground Lug** onto the desired location on an A-Frame using the self-drilling screw.
- III. Run the ground-wire into the channel of the **Ground Lug** and torque to 3 ft-lbs (4.07 N-m).

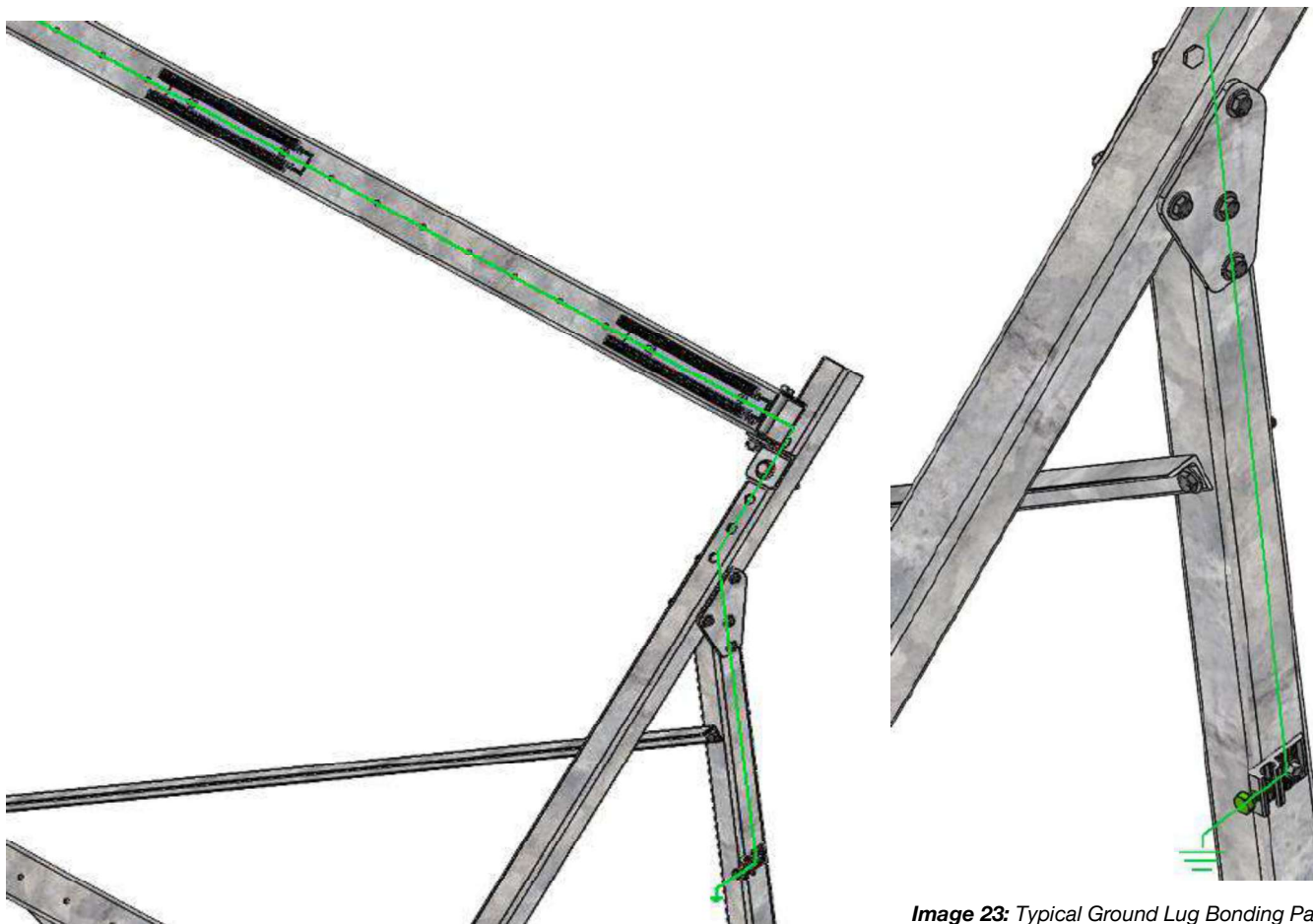


Image 23: Typical Ground Lug Bonding Path

STEP 7: MESH INSTALLATION (OPTIONAL / SOLD SEPARATELY)

Table 10: Mesh Components

ITEM	COMPONENT	DESCRIPTION	QTY
BOX N	 x150	GALVANIZED SELF TAPPING SCREW 5/16" X 3/4" (BOX FOR 100 FT LENGTH MESH)	1

The standard mesh size is 48 inches (1219.2 mm) in width and can be cut to the desired length.

- I. Identify the Hardware in **Box N** (sold separately).
- II. Measure the required length from the **bottom edge of the bottom rail** to the **top edge of the top rail**.
Cut **three strips** to cover the total width of the array.
- III. Install the mesh strips on the **underside of the rails** — the first strip in the center, followed by the second and third strips on either side, while maintaining a minimum **1.5" overlap** for proper coverage.
- IV. Using the pilot holes located on the underside of the **Steel Tube Rails**, securely fasten the mesh to the rail using the **5/16" x 3/4" self-tapping screws**.
- V. Repeat the process for all remaining sections of Mesh as required.

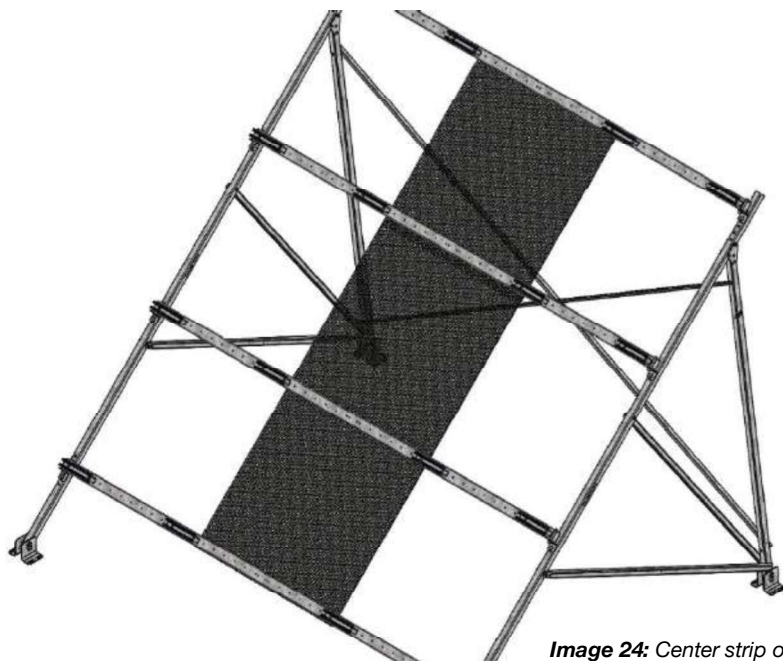


Image 24: Center strip of Mesh depicted

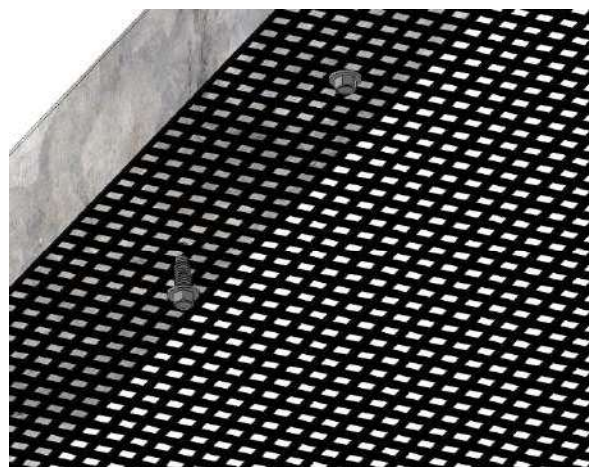


Image 25: Typical Mesh Installation