

ETL CLASSIFIED



Intertek

UL2703 Classified for Bonding and Grounding

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1. Safety








a- Basic Safety Considerations

The following basic safety instructions and the warning notes are an essential part of this manual and are of fundamental importance for handling the product.

b- Warnings and Symbols

Throughout this manual you will notice several warning notes which consist of:

- Warning Symbols
- Indicator Word to show the danger Level
- Information regarding the source and type of the danger
- Measures to avoid the hazard prevent injuries or property damages

	Denotes a potential hazard which may lead to physical injury and/or property damage
	Denotes cardinal orientation relative to north
	Denotes connection type
	Denotes hand tighten fasteners
	Denotes that fasteners torque per specifications is required
	Denotes that adjustment or positioning can be performed
	Denotes that leveling and/or alignment is required

c- Responsibilities of the Installer

Every person installing this system must read and fully understand every section of this manual prior to working on the system. This installation manual should be read in conjunction with the provided Issued for Construction (IFC) drawings for your specific project. Proper Personal Protective Equipment (PPE) must be worn at all times, while performing installation or maintenance.

It is the responsibility of the installer to ensure all applicable safety measures are adhered to while installing this PV Racking system. Any modifications to the system or parts are to be performed only by authorized personnel and must be approved by Polar Racking Inc. (Polar Racking) prior to implementation. The installer must have adequate experience with all materials and tools used to install this system. Furthermore, the installer must be able to recognize any possible danger, whether it is stated in this manual or not. It is recommended that a site-specific hazard assessment is completed in advance of any construction work. Installer must inform Polar Racking with any installation issues immediately. Any consequences due to incorrect installation is the responsibility of the installer.

Due to the inherent properties of mating steel components, please ensure the limiting speed of cordless drivers (RPM) is set to the lowest torque setting (vs. drill setting), for all 5/16" fasteners to prevent over torqueing. All fasteners provided by Polar Racking have been pre-treated to prevent material Galling (or cold welding), however, this is highly dependent upon the speed at which they are fastened.

d- Responsibilities of the Operator

It is the responsibility of the operator to ensure all scheduled maintenance is performed on time. The operator must ensure that the installation of the system is performed only by qualified personnel with adequate skill and knowledge. The operator must ensure a copy of this manual is available to any installer and/or maintenance person. A replacement manual may be obtained by contacting Polar Racking using the contact information provided at the back of this manual.

2. Tools and Hardware

a- Tools









 <p>Sockets: 3/4" (for 1/2" Hex Bolt / Nut) 9/16" (for 3/8" Hex Bolt / Nut) 1/2" (for 5/16" Hex Bolt / Nut)</p>	 <p>Power Drill</p>	 <p>OR</p> <p>Laser Level or String line</p>
 <p>Torque Wrench</p>	 <p>Tape Measure</p>	 <p>Compass</p>
 <p>Level</p>		 <p>Square</p>

Figure 1: Tools required for installation

b- Hardware

Connection A

- 1/2"-13 Serrated Flange Bolt, 1" Length, Grade 5, Magni 565 Coated or HDG
- 1/2"-13 Serrated Flange Nut, Grade 5, Magni 565 Coated or HDG

Connection B

- 3/8"-16 Carriage Bolt, 1" Length, Grade 5, Magni 565 Coated or HDG
- 3/8"-16 Serrated Flange Nut, Grade 5, Magni 565 Coated or HDG

Connection C

- 5/16"-18 Carriage Bolt, 2.5" Length, Grade 5, Magni 565 Coated or HDG (PV Height: 26-40mm)
- 5/16"-18 Carriage Bolt, 3" Length, Grade 5, Magni 565 Coated or HDG (PV Height: 41-50mm)
- 5/16-18 Serrated Flange Nut (or Hex Nut), Grade 5, Magni 565 Coated or HDG
- 5/16" Washer, Flat, 1"OD, Magni 565 or HDG
- 5/16"-18 Serrated Flange Nut (or Hex Nut), Grade 5, Magni 565 or HDG

OR:

- 3/8" Washer, Flat, 1"OD, HDG Coated or Magni 565
- 3/8" Washer, Lock, 0.680" OD, HDG Coated or Magni 565

Connection D

- 5/16"-18 Serrated Flange Bolt (or Hex Head Bolt), 1.0" Length, Grade 5, Magni 565 Coated or HDG
- 5/16-18 Serrated Flange Nut (or Hex Nut), Grade 5, Magni 565 Coated or HDG
- 5/16" Washer, Flat, 1"OD, Magni 565 or HDG
- 5/16"-18 Serrated Flange Nut (or Hex Nut), Grade 5, Magni 565 or HDG

OR:

- 3/8" Washer, Flat, 1"OD, HDG Coated or Magni 565
- 3/8" Washer, Lock, 0.680" OD, HDG Coated or Magni 565

Connection E

- M16x100 Hex Bolt, Grade 5, Magni 565 Coated or HDG
- M16 Nut, Magni 565 Coated or HDG
- M16 Split Lock Washer Nut, Magni 565 Coated or HDG

Connection F

- 1/2" -13 Cap Screw Hex Head Bolt, 1.5" Length, Grade 8, Magni 565 Coated or HDG
- 1/2" -13 Hex Head Nut, A194 Grade – 2H, Magni 565 Coated or HDG
- 1/2" Washer, Flat, 1.375" OD, HDG Coated or Magni 565
- 1/2" Washer, Lock, HDG Coated or Magni 565

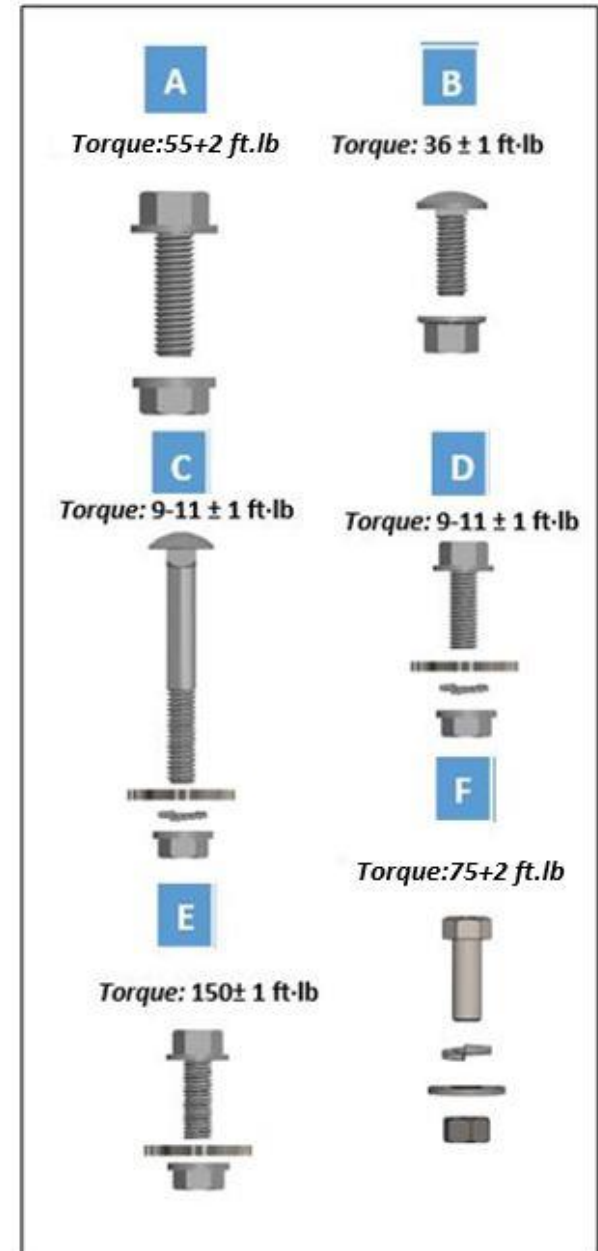


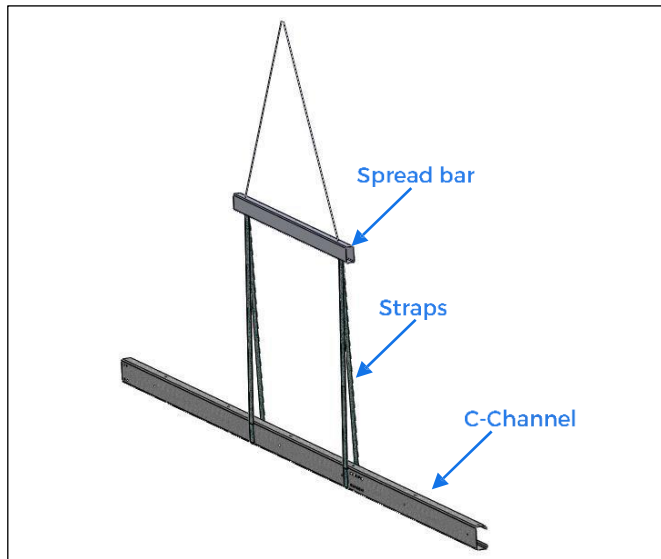
Figure 2: Hardware required for installation

3. Storage, Handling and Maintenance

The following conditions must be met for proper onsite handling and storing of the product to ensure no damage to product or property before product is installed:

- All boxes and components delivered to site should be kept dry and under cover
- Do not stack anything on racks or pallets of components
- Stage delivered racks on level ground
- Lift shipped bundles from the center of mass (i.e. Channels to be stored, lifted and handled on the flange not the web, see figure 3).
- Contractors are responsible to make sure all OSHA guidelines and/or local guidelines are followed including the state regulations.
- Any and all parts removed from packaging must be visually inspected for any damage or before its use in installation
- Installer is not to use any damaged parts on the installation site. Any and all damage must be reported immediately to project owner. The maintenance work described below must be performed once every year from the date of installation and after storms with severe winds.
- Inspect all fasteners and component connections. Observe for any deformation, cracks or other visible defects on the PRU components and replace.
- Check bolts and all hardware for specified torque and retighten if required (ensuring solar modules are seated correctly).
- Annual inspections must be done for mechanical movement due to any reason including torque values, thermal expansion or contraction and rectified.

Figure 3: Proper way for lifting beams



4. Racking Overview

- 1 – Post
- 2 - North-South Beam
- 3 - Brace
- 4 - East-West Bracket
- 5 - East-West Beam
- 6 - End-Clamps
- 7 - Mid-Clamps
- 8 - Solar Modules

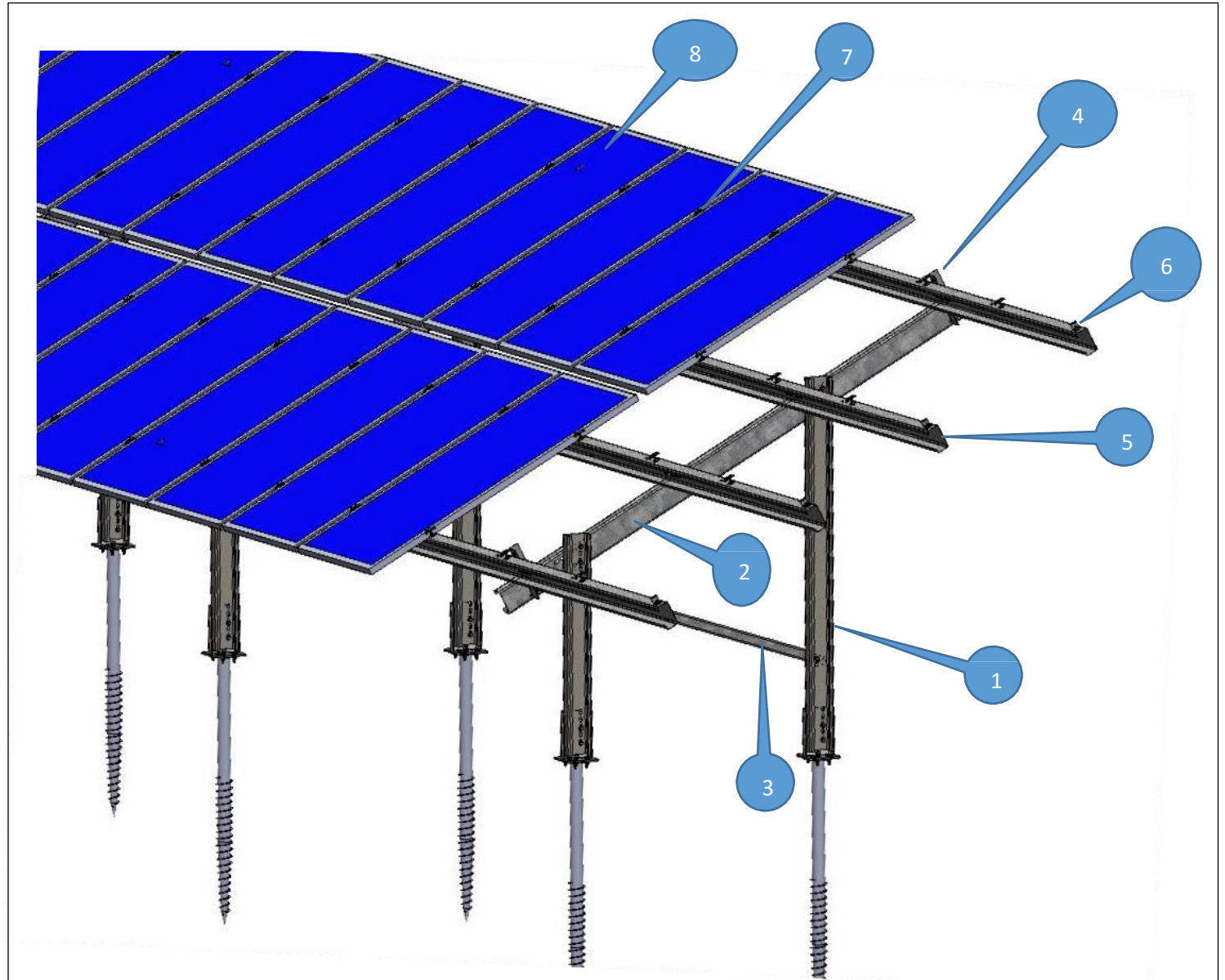


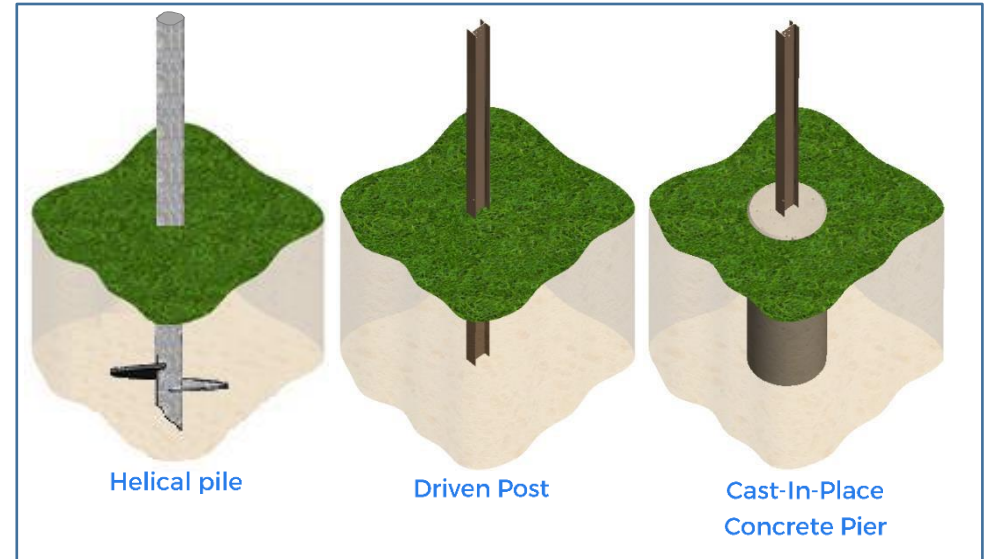
Figure 4: Racking Overview

a- Foundation Options

Foundation options

- Driven Post
 - o C-Channel
 - o I-Beam
 - o Round Post
- Cast-In-Place concrete pier
- Helical pile
- Ground Screw

If any other foundation type is required, please contact Polar Racking for more information.



b- Post Installation Tolerances

Note: Make sure all posts are installed at the specified tolerances. Contact Polar Racking if a deviation is required. Polar Racking can provide longer posts to handle ground variations and facilitate an expanded adjustment range of 6" to 10".

- North – South Alignment: ± 1 inch (25 mm)
- East – West Spacing: ± 2 inches (51 mm)
- Height: ± 2 inches (51 mm)
- Plumbness: $\pm 1^\circ$
- Rotation: $\pm 2^\circ$

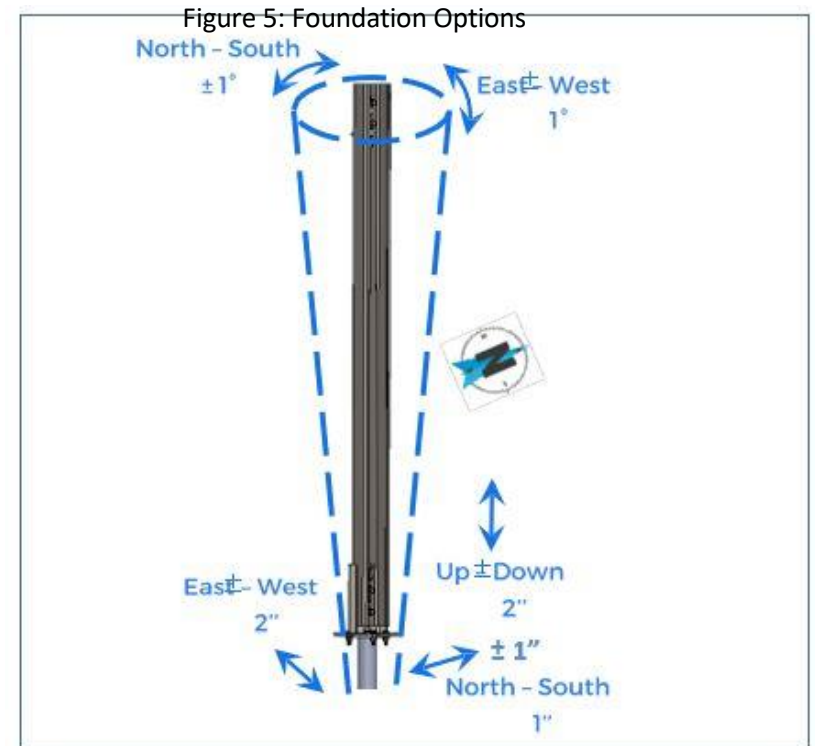


Figure 6: Post installation Tolerances

c- Racking Tolerances and Adjustability

- Foot Bracket Up – Down: ± 2 inches (51 mm) (Fig.7-1)
- North – South Beam: ± 3.5 inches (89 mm) (Fig. 7-2)
- East – West Beam: ± 2 inches (50 mm) (Fig. 7-3)
- East – West Bracket: ± 0.75 inches (19 mm) (Fig. 7-4)

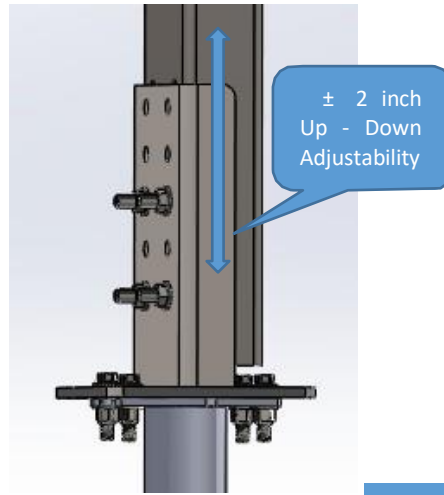


Fig. 7-1

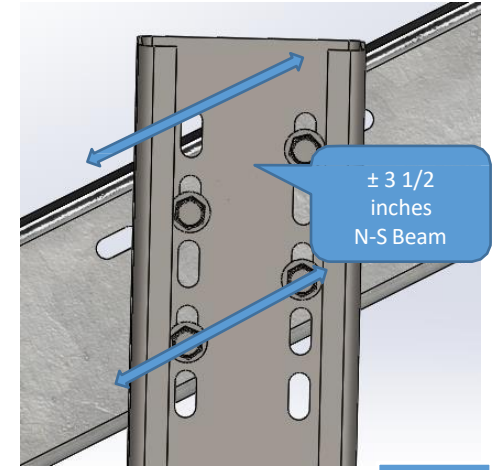


Fig. 7-2

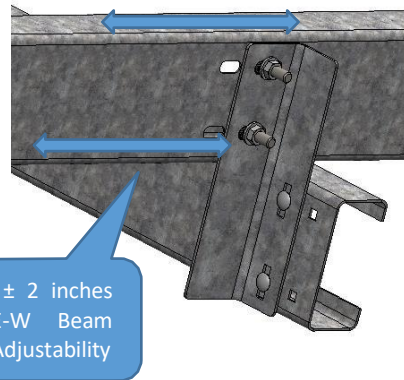


Fig. 7-3

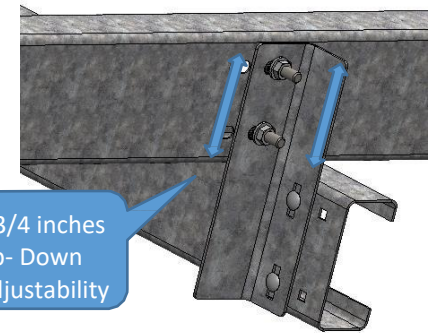


Fig. 7-4

Figure 7: Rack Tolerances and Adjustability

5. Installation Instructions

Note: See appendix 1-Rack Component page 28-33

a. A-Frame Construction

Note: Refer to Polar Racking drawings for Post size, optimal height, minimum embedment and spacing. Make sure Post Spacing is measured from center of post to center of next post measured at the top of the posts. Install first Post to the optimal height. Make sure next Posts are installed to specified tolerances.

Step One Install Foot Brackets on ground screws or helical piles. Make sure they are all level within a table. Align all due south. Fasten to specified torque level. At the middle slot of the foot bracket use M16x100 Hex Bolt, Grade 5, Magni 565 Coated or HDG, M16 Nut, Magni 565 Coated or HDG and M16 Split Lock Washer Nut, Magni 565 Coated or HDG. Also, at the two opposite corner slots use (2) - 1/2" -13 Cap Screw Hex Head Bolt, 1.5" Length, Grade 8, Magni 565 Coated or HDG, 1/2" x 1.375" O.D Flat Washer, Magni 565 Coated (or HDG), and one (1) 1/2" -13 Hex Head Nut, A194 Grade – 2H, Magni 565 Coated or HDG and (1) 1/2" Washer, Lock, HDG Coated or Magni 565. Torque fasteners as per specification shown in "section 2-b" of this document.

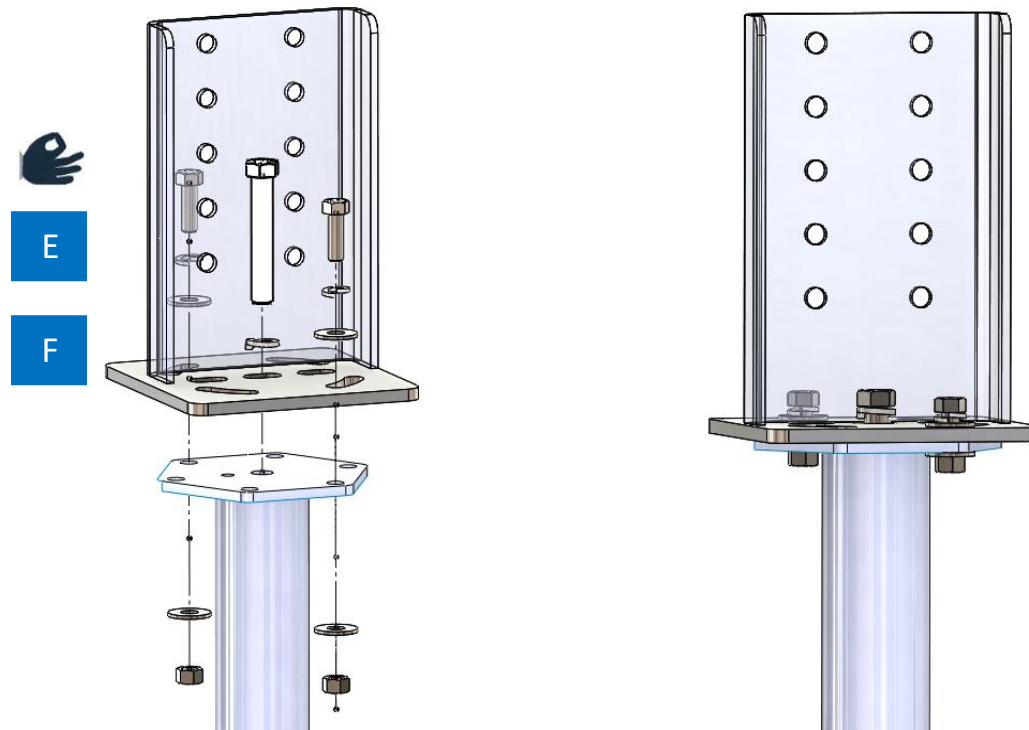


Figure 8: Foot Bracket Installation

Step Two Install First Post to the optimal height with mounting hole for Bottom Bracket facing south. Make sure next Posts are installed to specified tolerances.

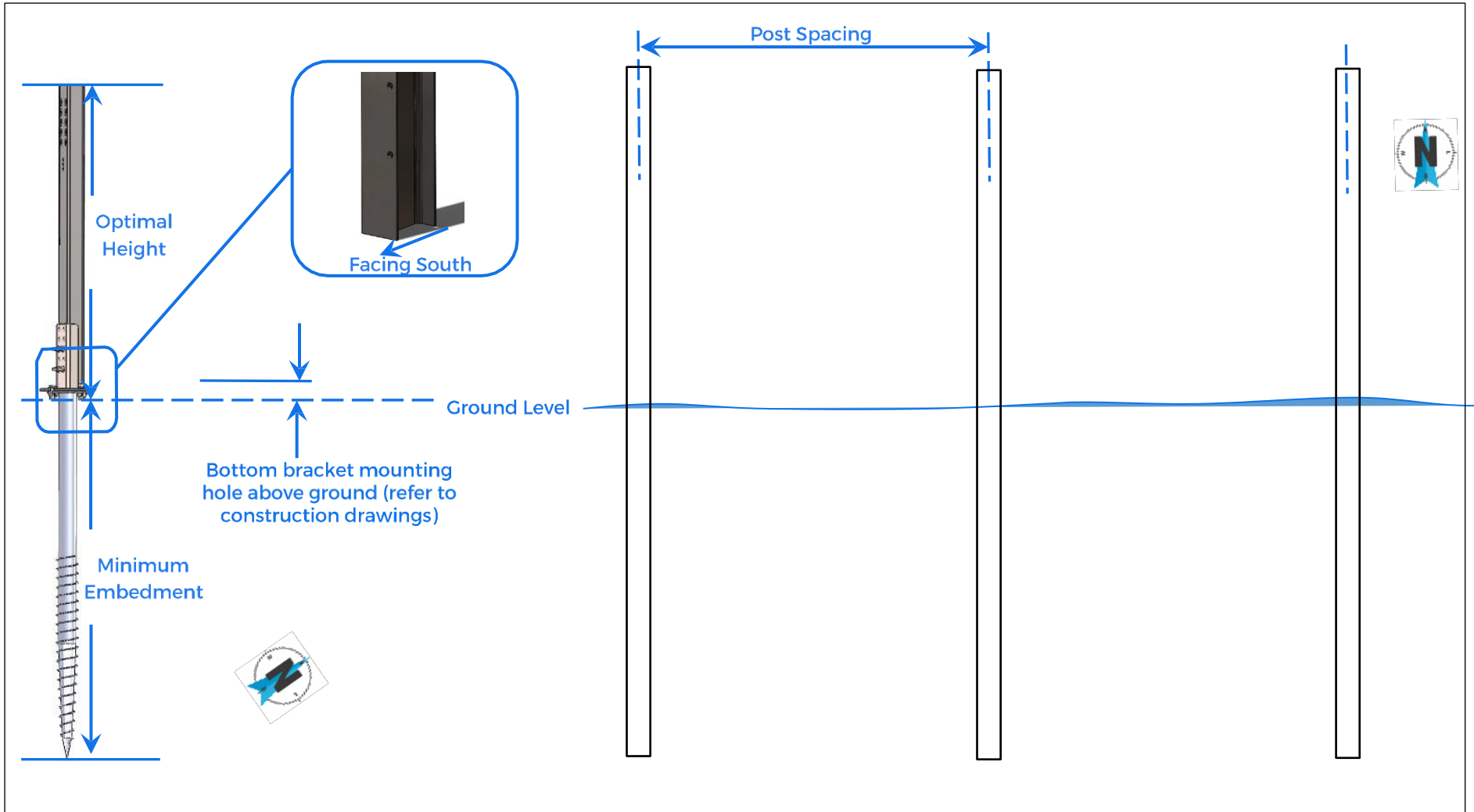


Figure 9: Post installation

Step Three Install North-South Beam on C-channel posts at desired tilt angle. Use two (2) 1/2"-13 Serrated Flange Bolt, 1" Length, Grade 5, Magni 565 Coated (or HDG) and two (2) 1/2"-13 Serrated Flange Nut, Grade 5, Magni 565 Coated (or HDG). Hand tighten the bolts at this stage.

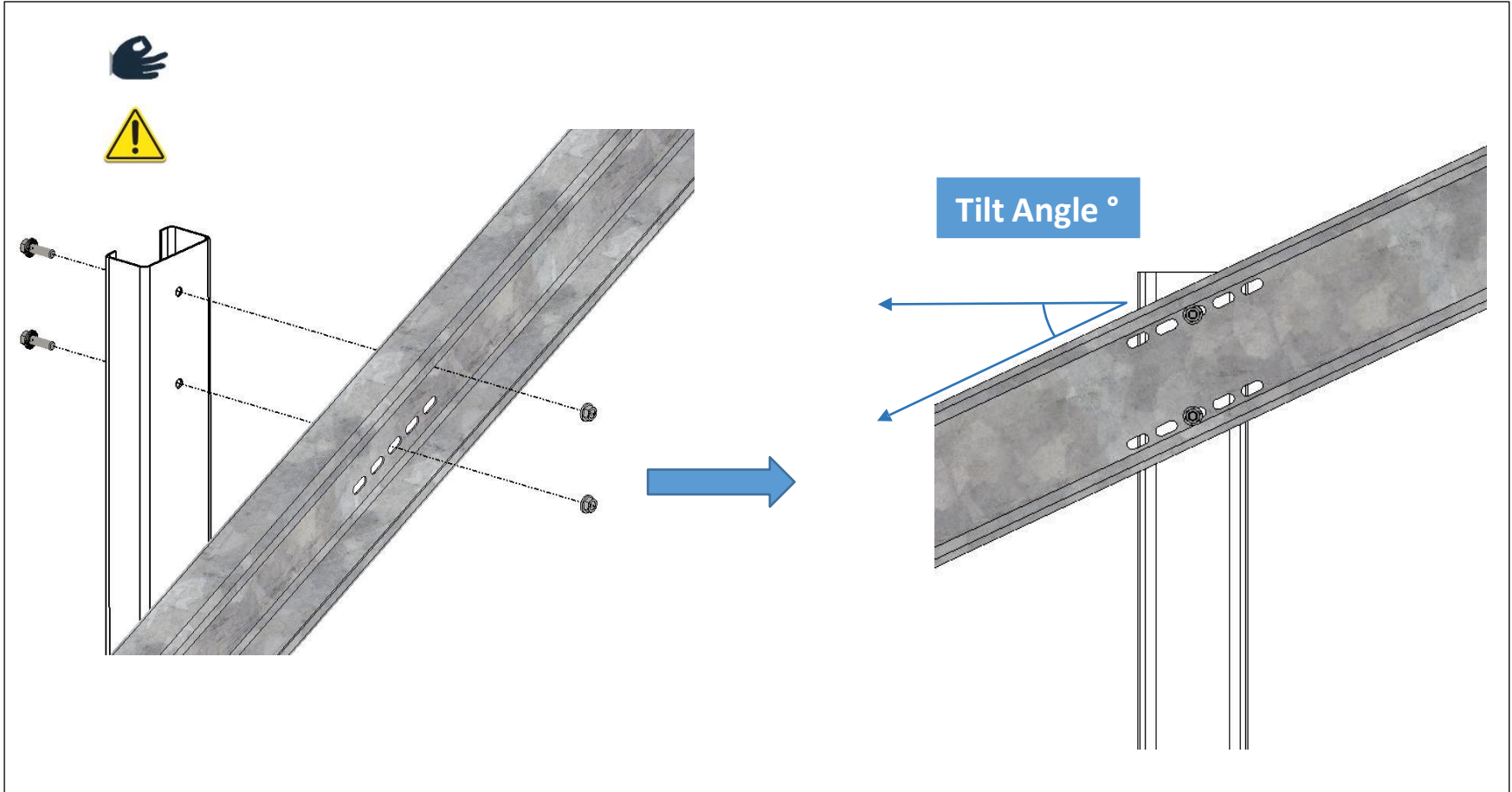


Figure 10: North South beam Installation

Step Four Install Brace between the two legs (C-channel beams) using 1/2"-13 Serrated Flange Bolt, 1" Length, Grade 5, Magni 565 Coated (or HDG) and 1/2"-13 Serrated Flange Nut, Grade 5, Magni 565 Coated (or HDG) as shown in figure 11. Adjust the position of the brace using the slots. **(Number of braces depends on the design loads, Check the engineering drawings provided).**

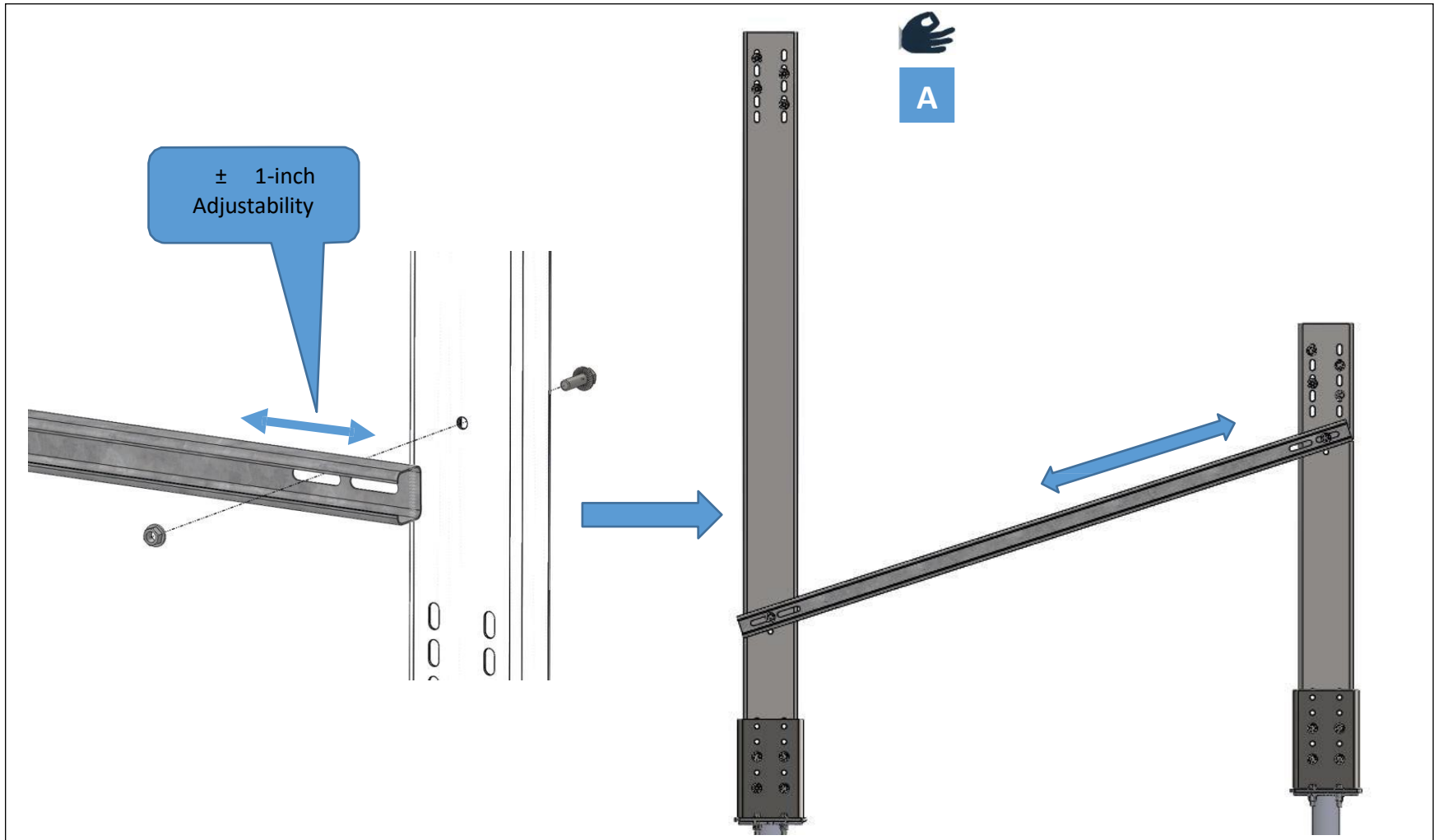


Figure 11: Post installation

Step Five Align the leading edge of the North-South Beams at the required tilt angle and torque all fasteners (in step 1, 2, 3 and 4) as per specifications shown in section 2-b of this document.

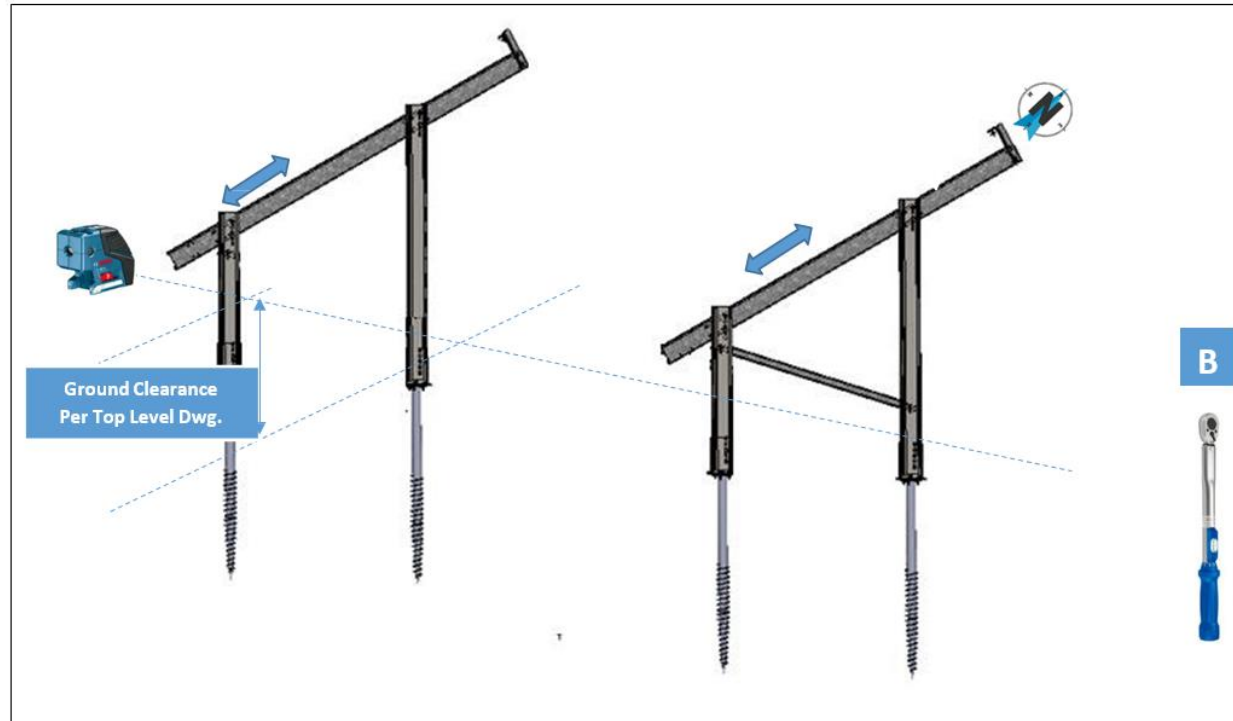


Figure 12: A-Frame Alignment

b. Typical Table Construction

Step One Install 4 (four) East-West Brackets to North-South Beam by hand tightening fasteners using two (2) 3/8"–16 Carriage Bolt, 1" Length, Grade 5, Magni 565 Coated or HDG and two (2) 3/8"–16 Serrated Flange Nut, Grade 5, Magni 565 Coated or HDG per bracket as shown in figure 13 (a). Using a square, ensure the perpendicularity of the East-West bracket with the North-South beam as shown in figure 13 (b).

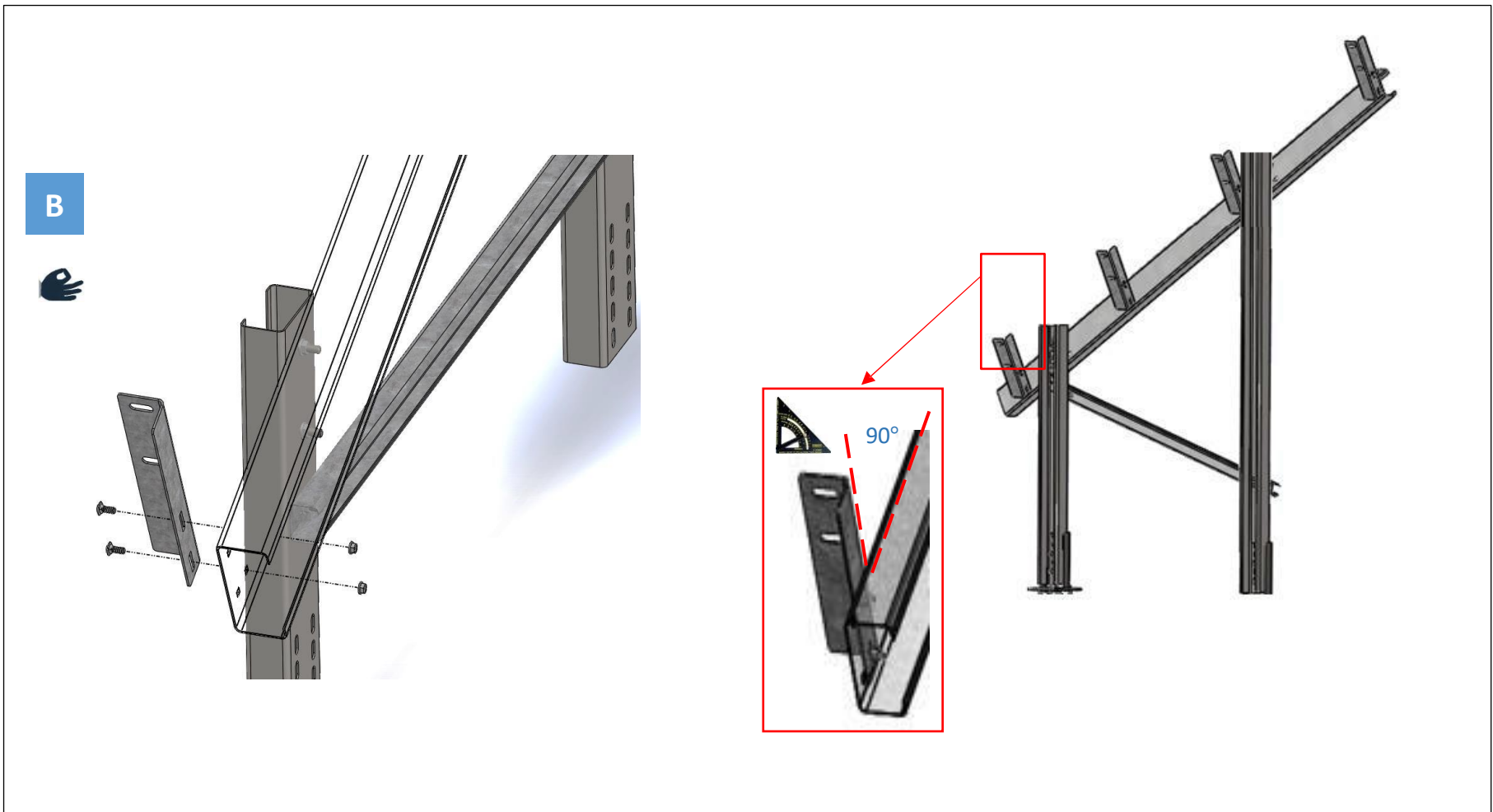


Figure 13: East-West Bracket Installation (Completing A frame)

Step Two Mate east-west beams with splice beam as shown in figure 14 below, leaving minimum 10 mm gaps. After all beams and splices are populated and adjusted. Use 3/8"–16 Carriage Bolt, 1" Length and torque fasteners to torque levels as per IFC drawings.

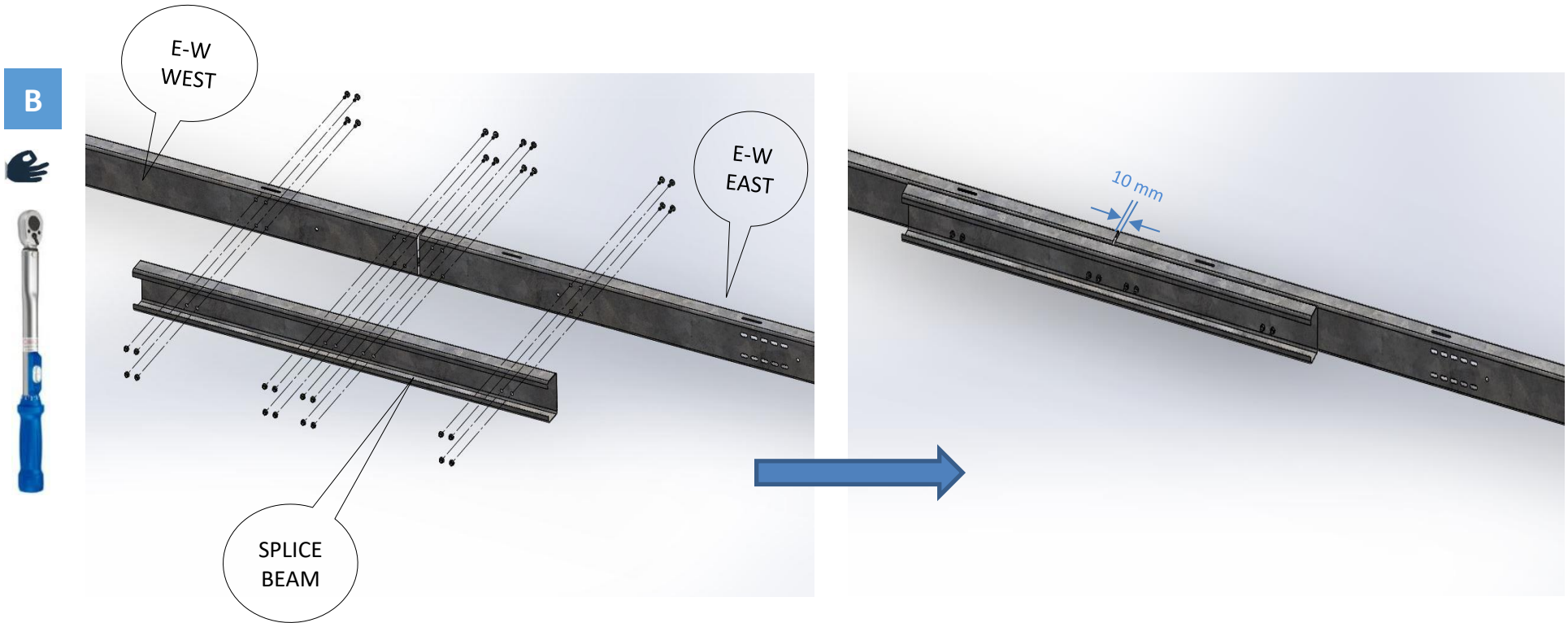


Figure 14: Splice beam installation

Step Two

Install East-West Beam to East-West Bracket by using (hand tightened) two (2) 1/2"-13 Serrated Flange Bolt, 1" Length, Grade 5, Magni 565 Coated (or HDG) and two (2) 1/2"-13 Serrated Flange Nut, Grade 5, Magni 565 Coated (or HDG) on each side as shown in figure 15 and as per engineering drawings provided. Match one of the slots on the East-West beam and avoid forcing/stressing beam/bracket into a slot. Ensure East-West Beam is seating on North-South Beam (drain holes down), adjust East-West Bracket height as necessary. See section 4-c of this document for tolerances and Adjustability).

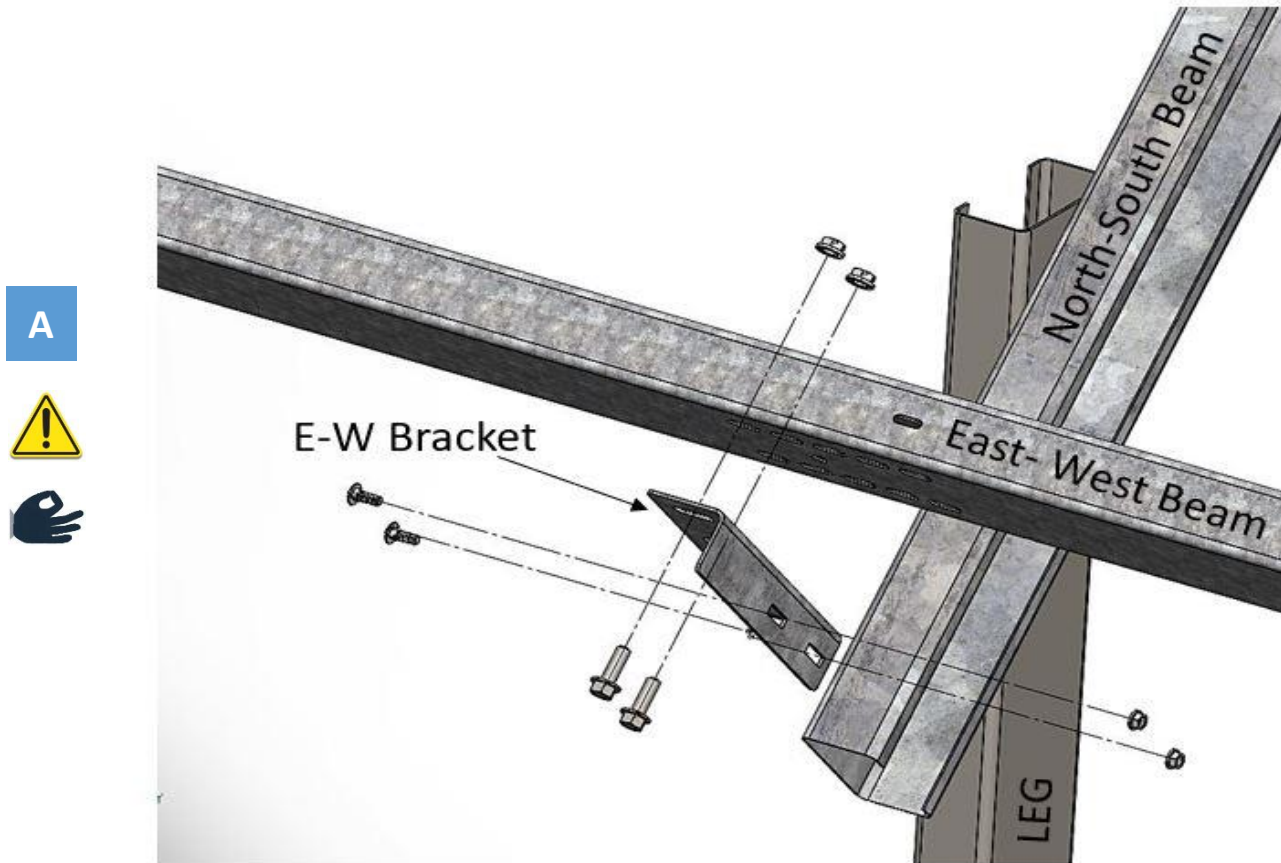


Figure 15: East-West Beam installation

2x8 is a standalone table but it can be connected to create combined tables after some analysis and engineering. **Please consult POLAR RACKING INC for the proper engineering and analysis.**

Step Three Procedure to connect 2x8 table to adjacent tables:

Install all E-W beams and align cantilever ends in north-south direction through rack adjustment. Torque fasteners as per specification shown in section 2-b of this document. Mate multiple east-west beams with splice plates eight (8) 3/8"–16 Carriage Bolt, 1" Length, Grade 5, Magni 565 Coated or HDG and eight (8) 3/8"–16 Serrated Flange Nut, Grade 5, Magni 565 Coated or HDG per splice, leaving minimum 10 mm gaps. After all beams and splices are in place and adjusted, torque fasteners as per specification shown in Section 2-b of this document.

Note: In order to maintain the specified gaps between tables and avoid any stack up errors further down the row: ensure that the cantilever length at the end of the first table (at the end of the next table) is measured from the nominal location of the A-Frame (or the nominal location of the post) and checked with the dimensions provided on the engineering drawings

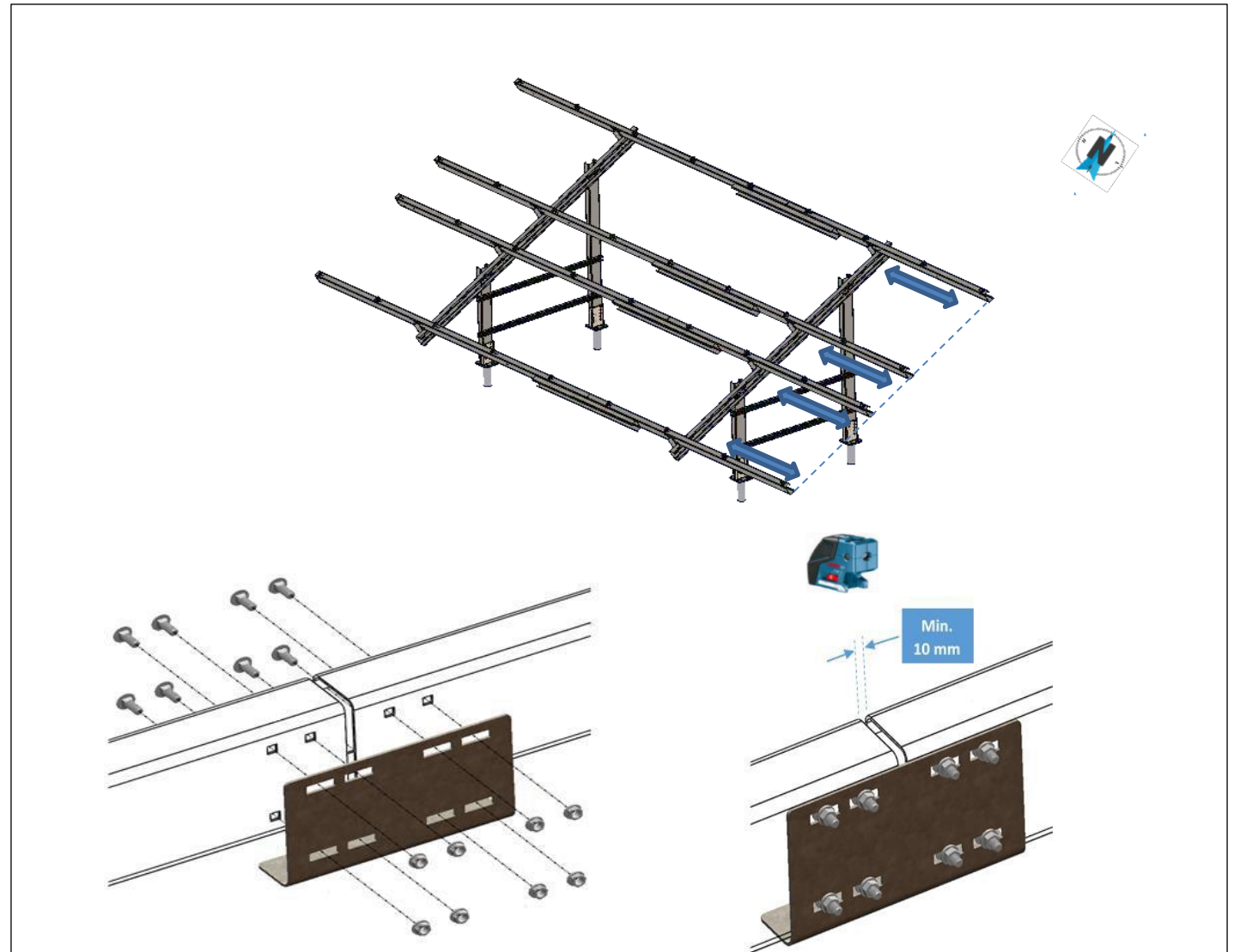


Figure 16: Install complete rack (table)

Step Four Mate kit's east-west beams with splice plates, using eight (8) 3/8"–16 Carriage Bolt, 1" Length, Grade 5, Magni 565 Coated or HDG and eight (8) 3/8"–16 Serrated Flange Nut, Grade 5, Magni 565 Coated or HDG per splice as shown in figure 17, Leaving minimum 10 mm gaps between East-West beams. After all beams and splices are in place and adjusted, torque fasteners as per specification shown in Section 2-b of this document. Some tables do not require splice plate connections (Refer to construction drawings).

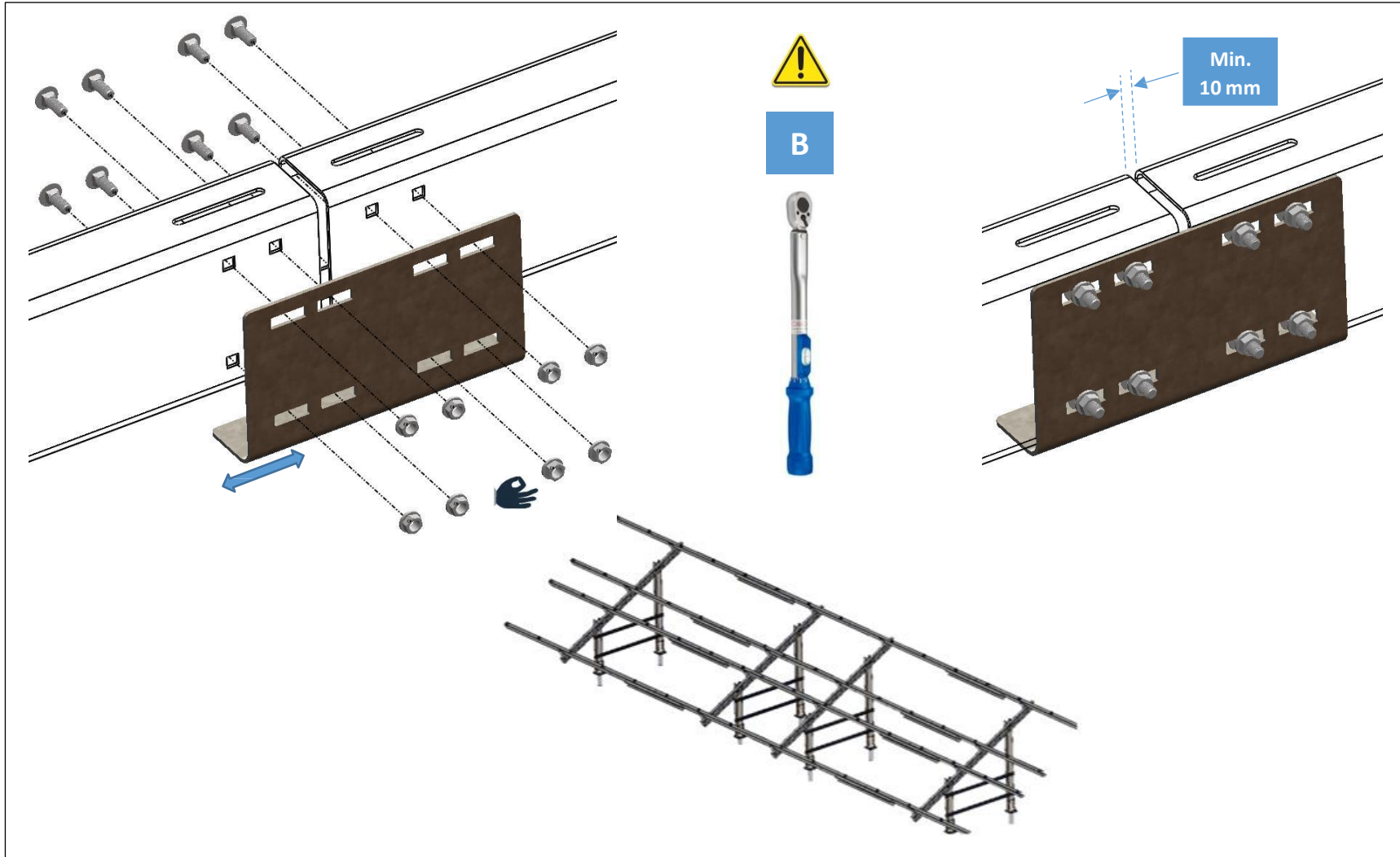


Figure 17: Complete rack (table)

c. PV Installation

Step One Start with the South row and the most easterly module. Position the module on purlins as per construction drawing (verify the clamping zone distance “B” shown in figure 18 (b) and as per the IFC drawings and distance A as per the installation manual of the selected PV module). Fix the first end module with two end-clamps as shown in figure 18 (b) using one (1) 5/16”-18 Serrated flanged Bolt (or Hex Head Bolt), 1.0”Length, Grade 5, Magni 565 Coated or HDG, one (1) flat washer, one (1) lock washer and one (1) 5/16”-18 Serrated flanged nut (or Hex Head), Grade 5, Magni 565 Coated or HDG per clamp. Make sure the vertical wall of the end-clamp and the solar module frame are flush and no gap is present. Do not over-torque the 5/16” bolts, hand tight the bolts first and then torque to specified rate, (See section 2-b of this document for hardware and torque rates). **DO NOT USE IMPACT GUN WITH ANY 5/16” BOLT.**

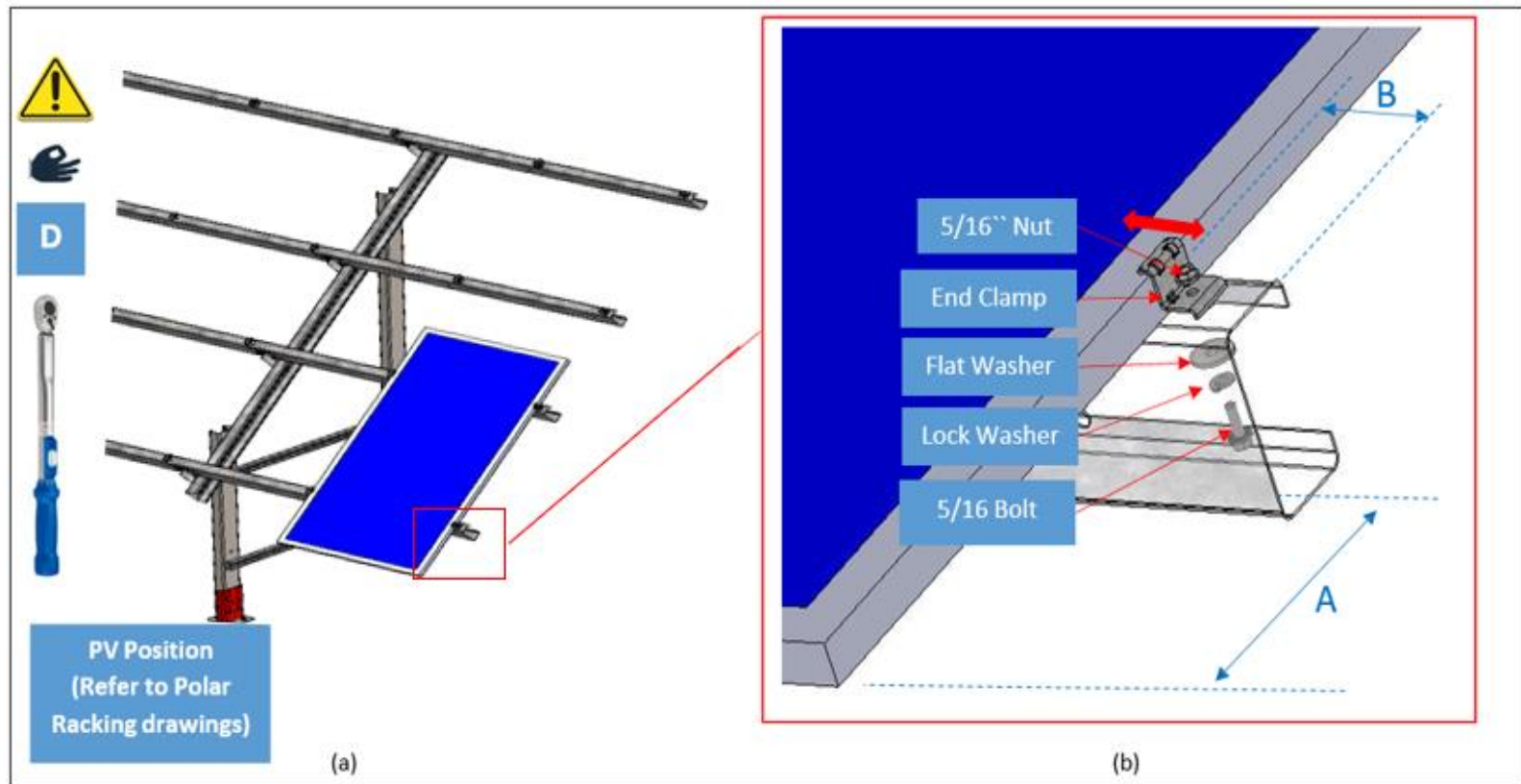


Figure 18: Install the first module and end clamp

Step Two

Hand tighten the two Intermodule-clamps as shown in figure 19 and IFC drawings provided. Use one (1) 5/16"-18 Serrated flanged Bolt (or Hex Head Bolt), 2.5" or 3" **(based on the module thickness)** Length, Grade 5, Magni 565 Coated or HDG, one (1) flat washer, one (1) lock washer and one (1) 5/16"-18 Serrated flanged nut (or Hex Head), Grade 5, Magni 565 Coated or HDG per clamp. Place one bonding washer (WEEB) between the PV module and the east-west beam, see Bonding Washers Configuration instruction on page 24 of this document. Ensure minimum three dimples of the bonding washers are in contact with the PV module frame. Do not over-torque the 5/16" bolts, hand tight the bolts first and then torque to specified rate, (See section 2-b of this document for hardware and torque rates).

DO NOT USE IMPACT GUN WITH ANY 5/16" BOLT.

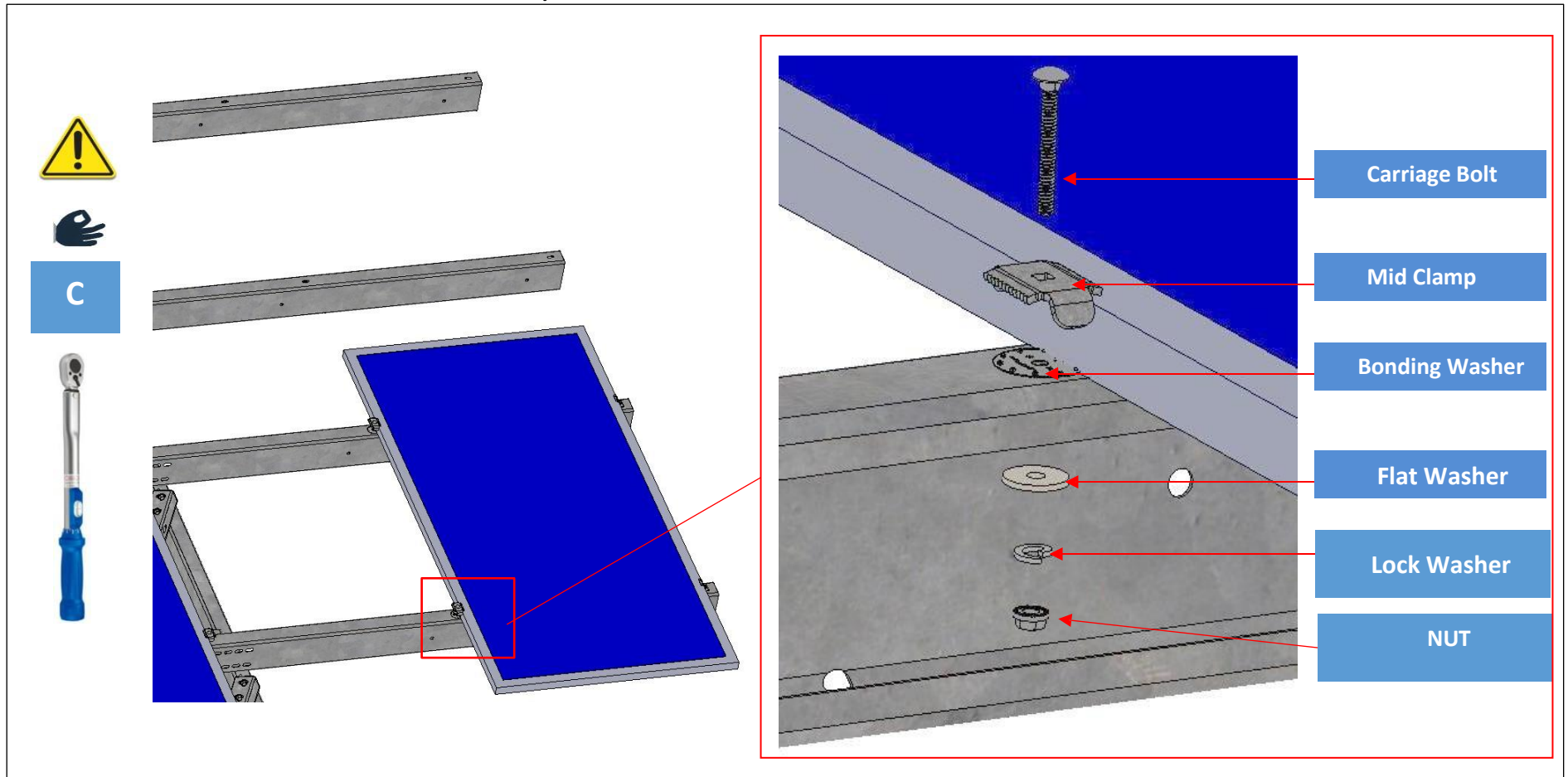


Figure 19: Mid clamp Installation

Step Three

Continue with installing the adjacent module, clamp as per direction specified in step one and two above and as shown in figure 20. Ensure minimum three dimples of the bonding washers are in contact with the PV module frame.

*** Check the IFC drawings for the module spacing based on the PV module width. If the PV module range is between 990 mm to 1030 mm, then after the fourth module in the row installed end clamps should be used. If the PV module range is between 1031 mm to 1112 mm, then inter module clamps are to be used between modules. See figure 20 below.**

Do not over-torque the 5/16" bolts, hand tight the bolts first and then torque to specified rate, (See section 2-b of this document for hardware and torque rates). **DO NOT USE IMPACT GUN WITH ANY 5/16" BOLT.**

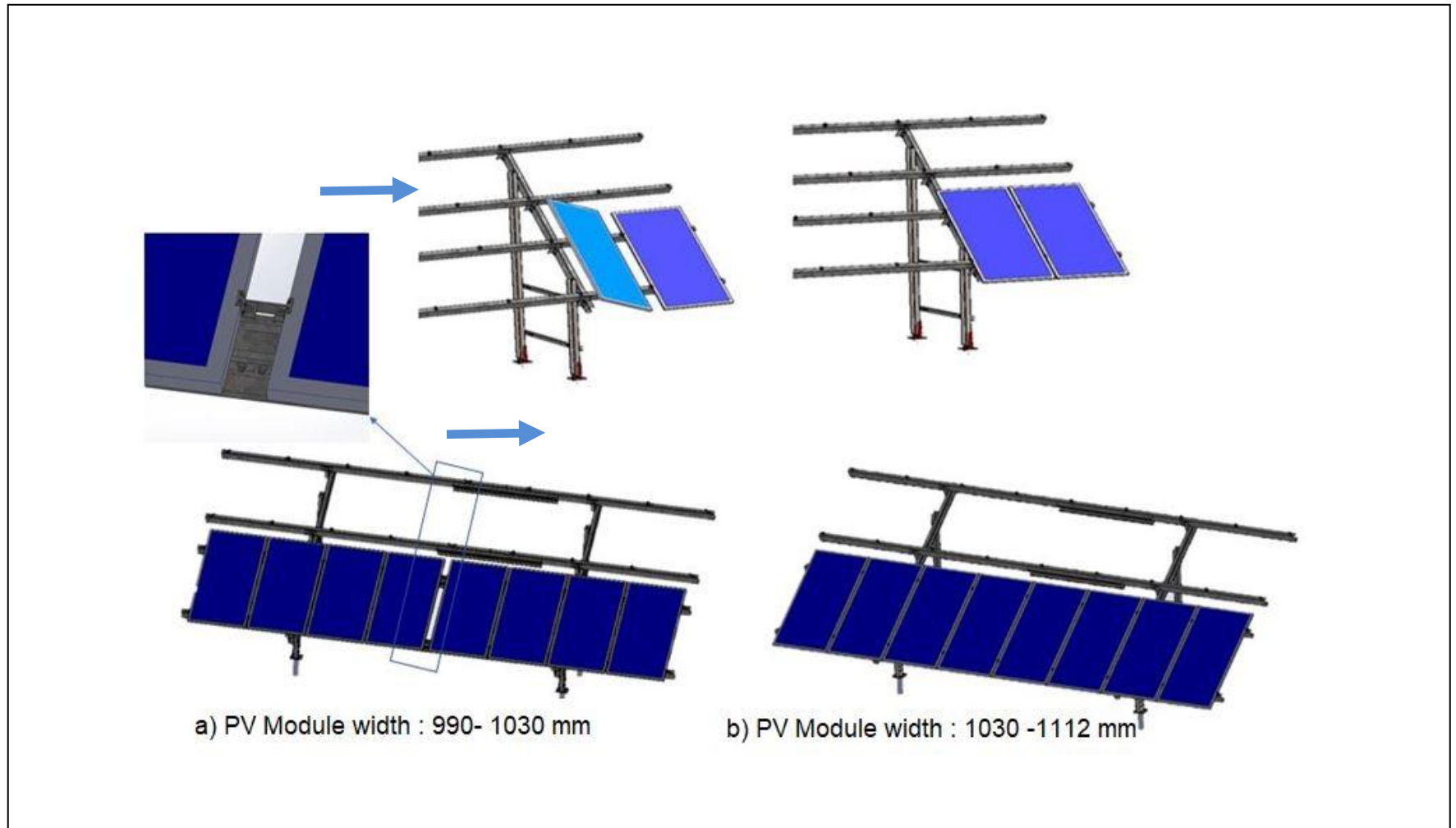


Figure 20: Modules Installation (first row)

Step Four

Install the next row as shown in figure 21 (refer to IFC drawings for the appropriate size of gap to be left between modules and the two rows). Ensure minimum three dimples of the bonding washers are in contact with the PV module frame. After a full table of modules have been fastened into place and the table is square, torque all fasteners as per specifications shown in section 2-b of this document. Do not over-torque the 5/16" bolts. **DO NOT USE IMPACT GUN WITH ANY 5/16" BOLT.** Note: All tables table configurations installed with the same manner as 2x8 table. (refer to engineering drawings for more details)

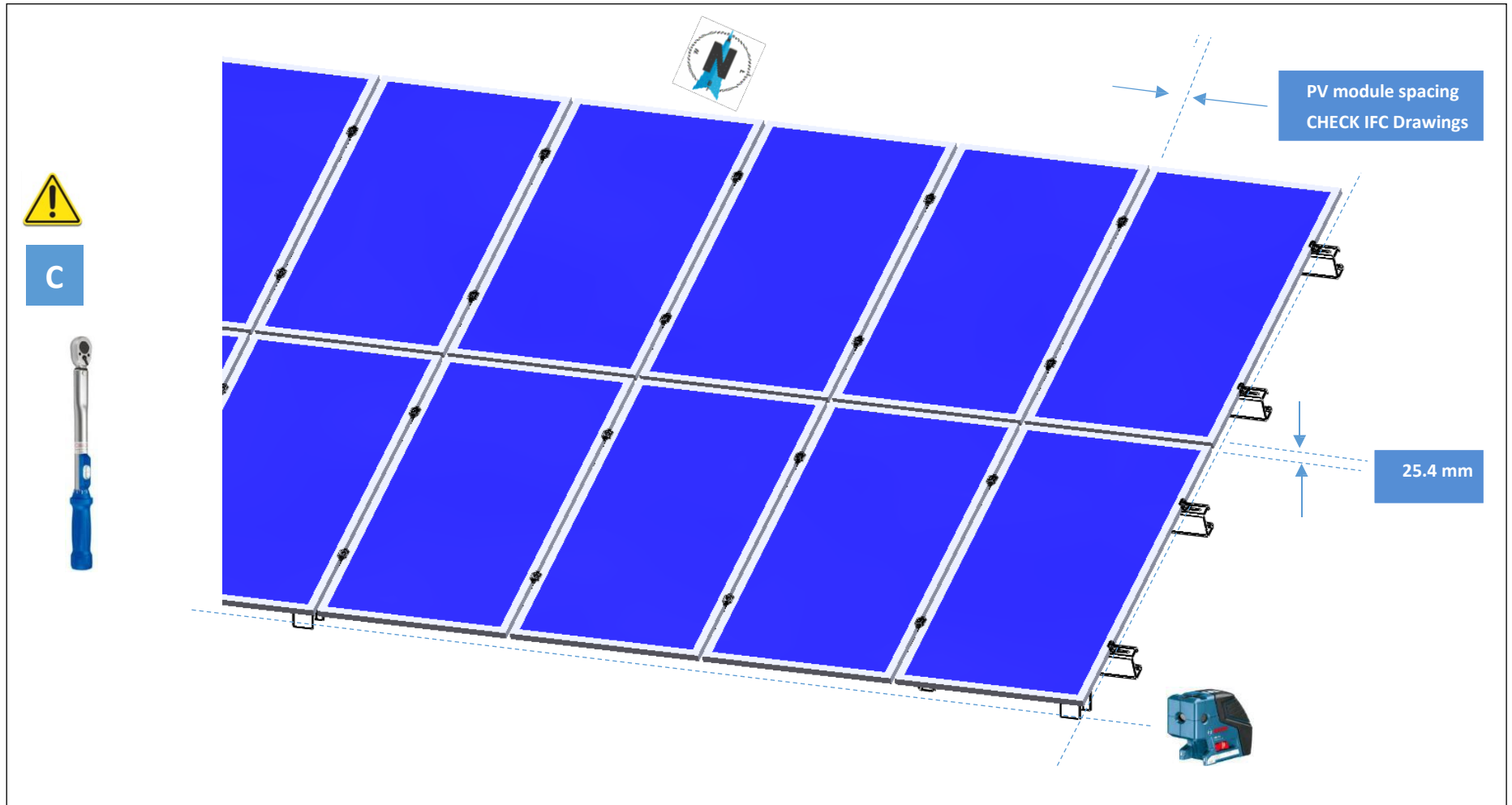


Figure 21: Full Table Installation

d. Bonding and Grounding

1. WEEB bonding washer with part number WEEB-DSK516-45 to be used
2. Minimum 3 dimples must be in contact with the aluminum module frame.
3. Gap between modules to be no greater than 27 mm.
4. Do not fasten with impact tool, to avoid over torquing and deformation of clamp and member.
5. WEEB bonding washers noted, are considered the minimum requirement. Installing more bonding washers than required, will not negatively impact the electrical bond between the module frame and the E/W Beam.

i) WEEB CONFIGURATION FOR 2x8 TABLE

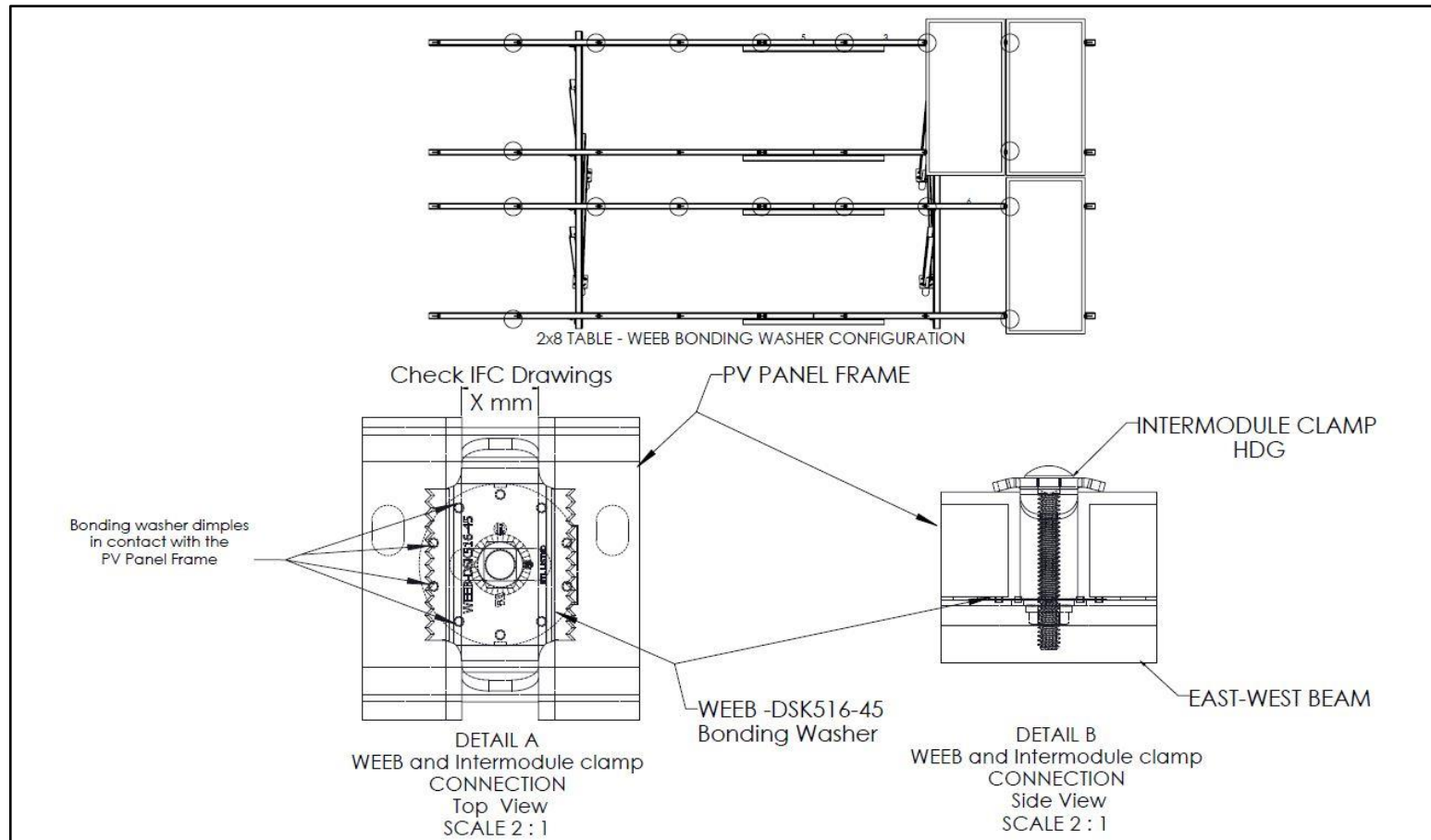


Figure 22: Bonding Washer Configuration 2X8

Full row of modules is bonded together via purlins and splice plates, see figure 23. If necessary, tables can be grounded together using typical grounding lugs and ground wire as specified by a local Authority having Jurisdiction. It's the installer responsibility to make sure the bonding washers are installed properly as per the IFC drawings and this installation manual. It is the installer responsibility to check local codes and with the Authority having Jurisdiction, and to verify electrical requirements.

Note: For effective electrical bonding, bonding washers SHOULD NOT be re-used in the event of module replacement or system rectifications (new bonding washers are required).

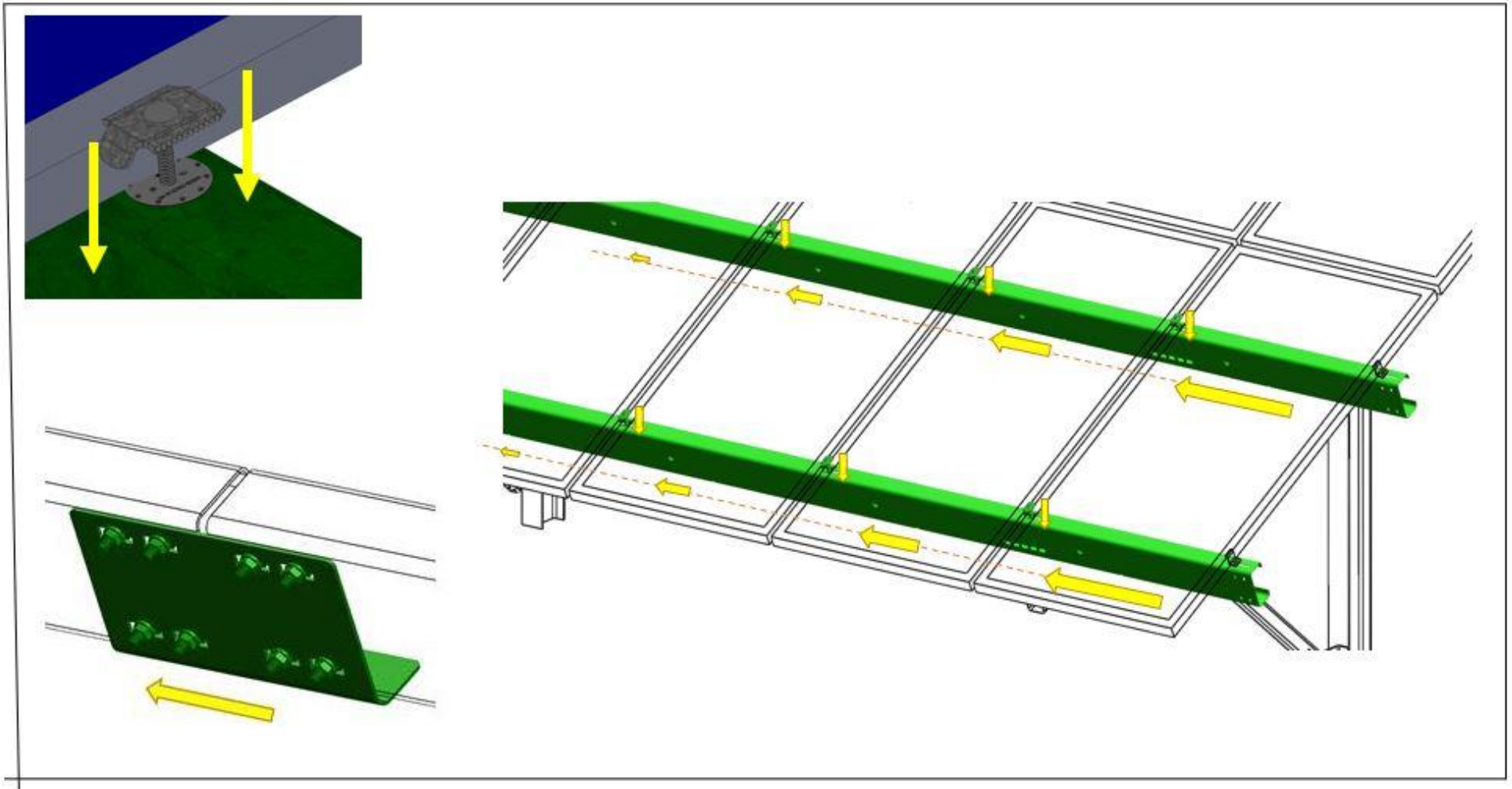


Figure 23: Bonding Path

e. Wire Management

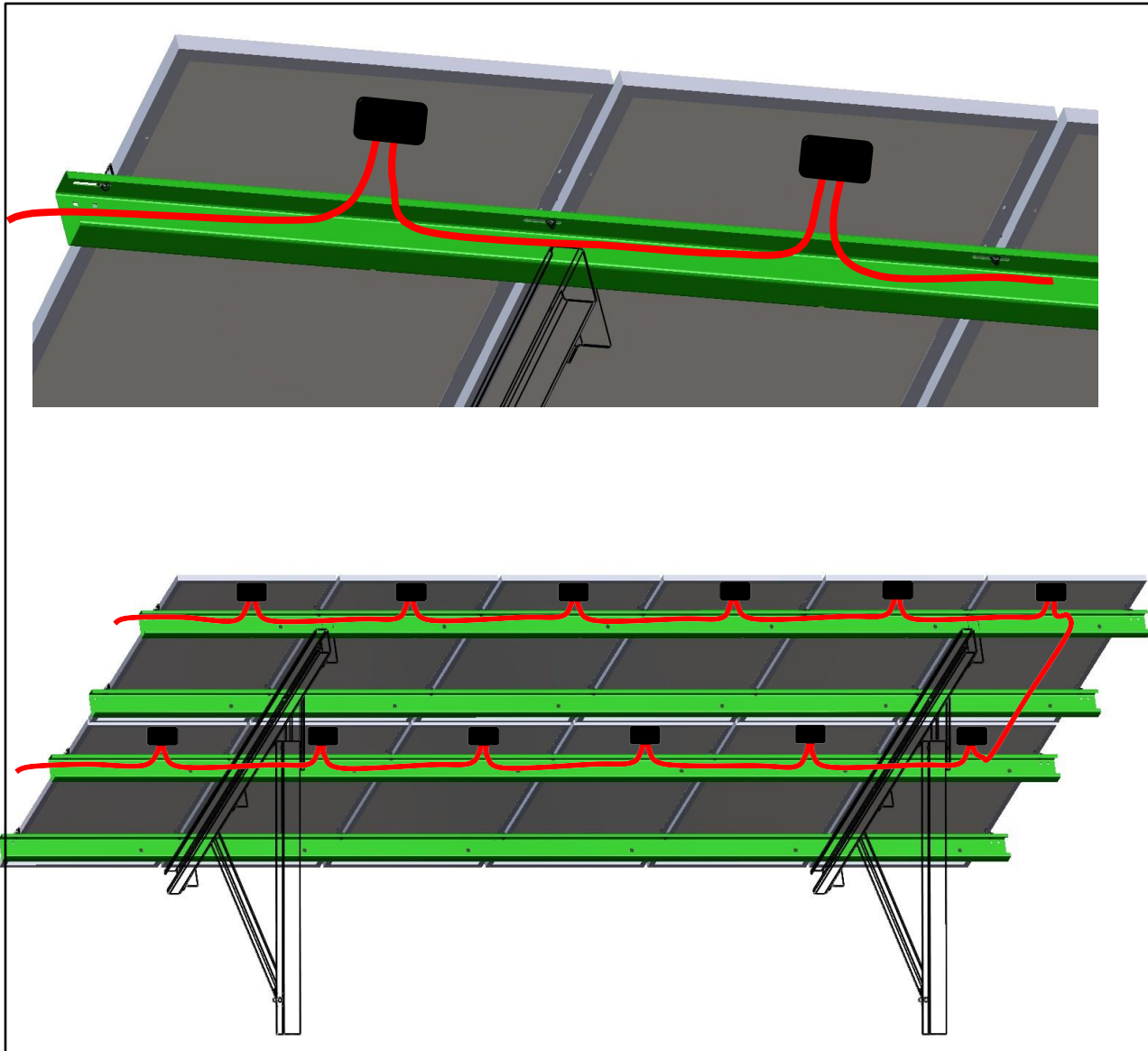


Figure 24: Wire Management

Route PV Module cables through the closest purlin to string with the next module box cable. Follow the stringing plan from the electrical engineering drawing. Wire management holes are spaced out equally on the E-W beam for connection of tie clips or cable routing (see figure 24)

Route all cables through the closest purlin for the full table of modules and follow the instruction from the owner's electrical engineering specifications to reach the combiner boxes. Make sure that the maximum series Fuse Rating is 30 Amps.

Installer is responsible for and shall provide an appropriate method of direct-to-earth grounding according to the latest edition of the National Electrical Code, including NEC 250: Grounding and Bonding, NEC 690: Solar Photovoltaic Systems, and CSA C22.1, Safety Standard for Electrical Installations, Canadian Electrical Code, Part 1.

Note:

Drainage holes at the bottom of the east-west beam to ensure no water build-up in the beam.

6- List of Approved PV Modules for Bonding and Grounding

Table 1: Approved PV modules

No.	Module Manufacturer	Module Number
1	Canadian Solar	CS6P-xxxP, CS6K-xxxM, CS6K-xxxMS, CS6X-P, CS3U
2	Hanwha Q-Cells	HSL60 and HSL72, Q PLUS L-G4.1, Q PLUS L-G4.2, Q PLUS L-G4.3, Q. PEAK DUO L-G7
3	LG	LG xxxN1C-G4, LG xxxN1C-G3, LG xxxN2W-B3, LG xxxN2W-G4, LGxxxN2W-A5, LG Mono X Plus- LGXXXS2W- A5, LGNeON2-LGXXXN2W-A5
4	Risen Energy	High Performance Mono Module 60X6 and High-Performance Mono Module 72X6, RSM60-6
5	Heliene	60M, 72M, 72P
6	Hyundai Solar	TI Series
7	Jinko	JKM270
8	Rec Solar	RECxxxPE Peak Energy Series (Multi)
9	Trina Solar	TSM-xxxPD05.10, TSM-xxxPD14, TSM-DEG15MC.20
10	Winaico	WSP-M6 PERC series and WST-P6 PERC series
11	Longi Solar	LR4-72HBD

7-Warranty and Product Maintenance

IMPORTANT WARNING	
It is critical that the Polar Racking is properly and securely attached together and installed on the piles. Improper installation could result in injury or damage to people and property including, but not limited to, the installer(s), building, solar modules and other people and equipment. You are responsible for installing and securing the Polar Racking system properly and checking the attachments prior to module installation.	Read and understand the installation manual that is supplied with your Polar Racking Product prior to installation or use. If you do not understand all of the instructions and cautions, or if you do not have sufficient mechanical and electrical experience and are not thoroughly familiar with the installation procedures, you should seek professional help from a competent installer to install the Product.

Polar Racking Inc. (“Polar”) , warrants to the original purchaser (“Purchaser”) of its racking Product(s) (“Product”) that the Product shall be free from defects in material and/or defects due to poor workmanship for a period of ten (10) years from the date of original purchase (“Racking Warranty”), save and except for the finish of said Product.

• What Does The Warranty Cover?

The Racking Warranty covers any defects in material and/or defects due to poor workmanship, but does not include on-site labour.

• How Long Does The Coverage Last?

The Racking Warranty lasts for a period of ten (10) years from the date of original purchase. The warranty, during its term, is transferable from the Purchaser to a new owner of the Product upon written notice of said change of ownership being given from original purchase to Polar within 60 days of said change of ownership.

• What Will Polar Do?

If within the specified Warranty periods the Product shall be reasonably proven to be defective, then Polar

shall at its option, and subject to the limitations described herein, will: (i) repair or replace any defective Product at no charge; (ii) refund the full purchase price of the Product; or (iii) issue credit in the amount of the purchase price to be used toward the purchase of new Product or accessories from Polar. Such repair or replacement shall completely satisfy and discharge all of Polar’s liability with respect to this limited Warranty.

• What Does This Warranty Not Cover?

The following are not covered by these warranties: on-site labour in any form and any problem or damage that is caused by abuse; negligence; failure to follow professional engineer stamped drawings for the specific installation; normal wear and tear; modifications or repairs not performed or authorized by Polar; overloading; miss-use, including but not limited to failure to assemble, mount, or use the Product in accordance with its written instructions or guidelines included with the Product or made available to the Purchaser; or an act of God (such as wind storms or similar events). Polar is not liable for or warranty material used on or fixed to the bottom of Product, which in all installations are chosen by the original purchaser/ installer/ user of the Product. All installations in corrosive atmospheric conditions are excluded and void said Racking Warranty. This Racking Warranty shall be Void if installation of the Product is not performed in accordance with any Professional Engineer stamped drawings created for the specific installation, or Polar’s written installation instructions, or if the Product has been modified, repaired, or reworked in a manner not previously authorized in writing by Polar, or if the Product is installed in an environment of fashion for which it was not designed.

The Racking Warranty does not cover damage to the Product that occurs during its shipment, storage, or installation.

No warranty is given for Products purchased or used outside the United States, Canada, or Mexico. To the furthest extent permitted by law, (i) this warranty does not cover damage to property other than the Product itself; and (ii) the remedies provided for herein shall be exclusive.

POLAR LIMITS THE DURATION OF ALL IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE TO THE SHORTEST PERIOD PERMITTED BY LAW, WHICH IN ANY EVENT SHALL NOT EXCEED THE DURATION OF THIS WARRANTY. Some provinces/states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. ALSO, CONSEQUENTIAL AND INCIDENTAL DAMAGES ARE NOT RECOVERABLE UNDER THIS WARRANTY. Under no circumstances shall Polar be liable for special, indirect or consequential damages arising out of or related to use by Purchaser of the Product. Manufacturers of related items. Some provinces/ states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

Polar will not be held responsible for any modification or alterations made to any approved design layout and/ or specification provided by Polar. Any and all proposed changes must first be reviewed, and approved in writing by Polar’s Engineering team.. By acceptance of this document, the Purchaser acknowledges that they understand and agree to/with the above statement and any and all limitations detailed in this warranty.

• How Do You Get Service?

In order to be eligible for service under this warranty you must immediately notify Polar, in writing, upon learning of any defect of its Products by either calling the phone number listed above or writing to the address listed above and explaining the nature of defect. If appropriate, arrangement for service under this warranty will be made. You may be required to provide proof of purchase prior to obtaining service under this warranty. In addition, Polar may require you to return the Product to Polar, in its sole discretion, as to whether the Product is defective.

Table 2: PRU Portrait Rack Components (CONTINUED)

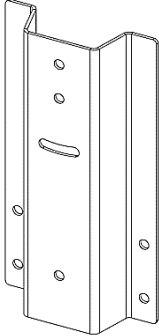
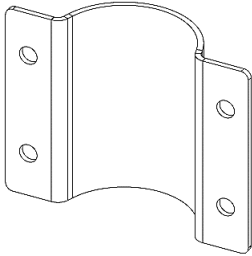
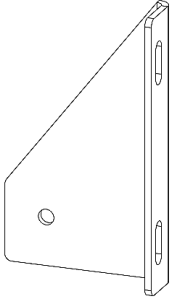
Item no.	Name	Manufacturer/ trademark ²	Type / model	Technical data	Photo
2	Top Bracket, Front	Polar Racking, Inc.	Various	<p>Material: 50 ksi min.- prime steel, Finish: G90 Hot dipped galvanized as per ASTM 653, Details: Length: 508mm for I- beam & 114.3mm post; and 469.9mm for 141.3mm diameter post. Thickness: 4.76mm.</p>	
3	Top Bracket, Back	Polar Racking, Inc.	Various	<p>Material: 50 ksi min.- prime steel; Finish: Hot dipped galvanized as per ASTM A123, Grade 75 Details: For 114.3mm diameter or 141.3mm diameter post, Thickness: 4.76mm</p>	
4	Bottom Bracket- I-beam	Polar Racking, Inc.	Various	<p>Material: 50 ksi min.- prime steel, Finish: Hot dipped galvanized as per ASTM A123, Grade 75, Details: Thickness: 6mm.</p>	

Table 2: PRU Portrait Rack Components (CONTINUED)

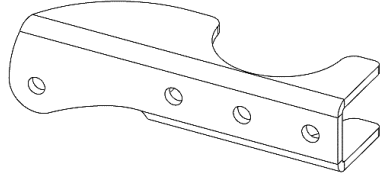

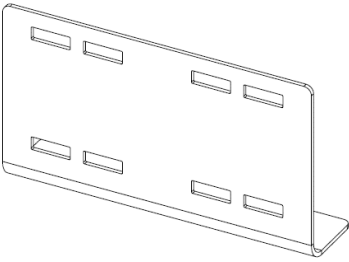
Item no.	Name	Manufacturer/ trademark ²	Type / model	Technical data	Photo
5	Bottom Bracket - Round	Polar Racking, Inc.	Various	<p>Material: 50 ksi min.- prime steel, Finish: Hot dipped galvanized as per ASTM A123, Grade 75, Details: Length: 304.8mm and 333.4mm for 114.3mm and 141.3mm diameter post respectively. Thickness: 4.76mm and 6mm.</p>	
6	6" and 8" East- West Bracket	Polar Racking, Inc.	Various	<p>Material: 50 ksi min.- prime steel; Finish: Hot dipped galvanized as per ASTM A123, Grade 75, Details: Length: 297.9mm and 370mm for 6" and 8" beam respectively. Thickness: Ga10.</p>	
7	6" and 8" Splice	Polar Racking, Inc.	Various	<p>Material: 50 ksi min.- prime steel; Finish: Hot dipped galvanized as per ASTM A123, Grade 75, Details: Length: 152.4mm and 203.2mm for 6" and 8" beam respectively. Thickness: Ga10.</p>	

Table 2: PRU Portrait Rack Components (CONTINUED)

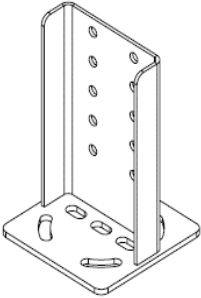


Item no.	Name	Manufacturer/ trademark ²	Type / model	Technical data	Photo
8	Foot Bracket	Polar Racking, Inc.	Various	<p>Material: 50 ksi min.-prime steel; Finish: Hot dipped galvanized as per ASTM A123, Grade 75, Details: Length x Width x Height: 190mmx190mmx288mm. Thickness: Plate: 8mm; Leg: 5mm.</p>	
9	North-South Beam	Polar Racking, Inc.	Various	<p>Material: 50 ksi min.-prime steel; Finish: G90 Pre-galvanized as per ASTM 653, Details: 3"x6" or 3.5"x8" Standard C shape, Length: Varies, Thickness: Ga16-Ga12.</p>	
10	Brace	Polar Racking, Inc.	Various	<p>Material: 50 ksi min.-prime steel; Finish: G90 Pre-galvanized as per ASTM 653, Details: 2"x2.5" Standard C shape, Length: Varies Thickness: Ga16-Ga12.</p>	

Table 2: PRU Portrait Rack Components (CONTINUED)





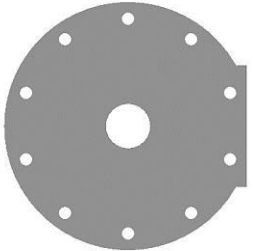
Item no.	Name	Manufacturer/ trademark ²	Type/ model	Technical data	Photo
11	East-West Beam	Polar Racking, Inc.	Various	<p>Material: 50 ksi min.- prime steel; Finish: G90 Pre-galvanized as per ASTM 653, Details: 3"x6" or 3.5"x8" Standard C shape, Length: Varies Thickness: Ga16-Ga12.</p>	
12	Leg	Polar Racking, Inc.	Various	<p>Material: 50 ksi min.- prime steel; Finish: G90 Pre-galvanized as per ASTM 653, Details: 3"x6" short and long legs, Standard C shape, Length: Varies Thickness: Ga16-Ga12.</p>	
13	End-Clamps	Polar Racking, Inc.	Various	<p>Material: 50 ksi min.- prime steel; Finish: G90 Pre-galvanized as per ASTM 653, Height: 30-50mm Thickness: Ga10.</p>	
14	Intermodule -Clamps	Polar Racking, Inc.	Various	<p>Material: 50 ksi min.- prime steel; Finish: G90 Hot dipped galvanized per ASTM 653, Details: Length: 70.2mm. Thickness: Ga10.</p>	

Table 2: PRU Portrait Rack Components (CONTINUED)

Item no.	Name	Manufacturer / trademark ²	Type / model	Technical data	Photo
15	Bonding Washer	Polar Racking, Inc.	WEEB-DSK516-45	<p>Material: S304 Stainless steel</p> <p>Details: M8 or 5/16" hardware.</p>	
16	Grounding Lug	ILSCO-SGB-4	Various	<p>UL 467 compliant with use of 4-14AWG solid copper conductors, assembly consist of: tin-plated, solid copper lay-in lug with SS set screw, torqued at 35 in-lbs.</p>	