Sollega™

The Simple Solar Racking Solution™

FastRack 510™ Installation Manual

5º Version

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Introduction

Our mission is to provide the easiest to install and most cost effective solar mounting solution available. Our goal is to enable the installation of solar PV on every suitable roof in the world.

Sollega Simplifies and accelerates the adoption of solar energy technologies by reducing the mounting and installation costs associated with solar arrays. We provide the simplest solar mounting systems on the market, reducing labor, time, and project costs.

As the solar industry has grown, we have seen the cost of solar panels come down. We see installation and labor as the logical next steps to reducing the cost of PV. Our mounting systems minimize on-roof assembly and utilize industry standard, readily available attachment hardware.
Our systems are quick to install and maximize available roof space.

Product Profile

Sollega designs, tests and manufactures solar mounting solutions serving the US market. The FastRack is a patented, one-piece, injection molded solar racking system designed for both commercial low-pitch roofs and ground mount installations. It is made from BASF Ultramid® Glass-filled Nylon, for strength and durability (25 year warranty) in a lightweight part. It is also designed for simple assembly and disassembly and is 100% recyclable.

Sollega racking systems are compatible with all common solar panels currently on the market. Our universal design enables the installation of 60, 72, 96, and 128 cell modules in landscape or portrait orientation. All attachments are top mount, enabling easy access.

Headquartered in beautiful San Francisco, we welcome you to let us know how we can best serve your needs and look forward to providing you the highest quality, lowest cost solar racking solutions available.

Sincerely,

Elie Rothschild, CEO

Important Installation Details

Hardware:

Sollega uses durable Teflon coated hardware for bolts, washers, and nuts. Hardware is also available in 304 and 316 Stainless Steel upon request.

Ballast Requirements:

- Please follow all current and applicable codes, such as ASCE 7-05.
- For assistance with ballast requirements for a specific project, contact engineering@sollega.com.
- The roof pavers (a.k.a. ballast blocks or CMUs) should have dimensions of 16" x 8" x 4" with a weight of 27 to 33 lbs. (Fig 1), unless otherwise noted.
- Pavers should have a minimum net area compressive strength of 3000 psi or must comply with ASTM Designation C1491.
- Please visit www.sollega.com/ballast for details on where to source roof pavers near your particular location.
- Maximum Number of Pavers per Interior FastRack is 3
- Maximum Number of Pavers per North row is 4

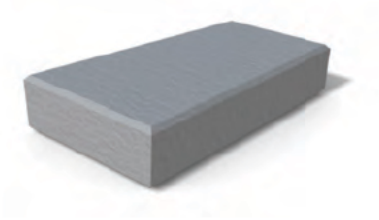


Fig 1: Standard Roof Paver

Tools Required:

- 1/2" socket torque wrench and 1/2" box wrench

The Installer is Solely Responsible For:

- Utilizing all necessary safety equipment, as required by applicable rules and regulations, or as required by common sense .
- Complying with all applicable local or national building codes, including any that may supersede this manual.
- Ensuring that the Sollega FastRack and other products are appropriate for the particular installations and are designed for the installation environment.
- Ensuring that the roof, its rafters, connections, and other structural support members can support the array under live load conditions.
- Ensuring that lag screws used for roof anchoring have adequate pullout strength and shear capacities.
- Maintaining the waterproof integrity of the roof including selection of appropriate flashing.
- Ensuring safe installation of all electrical aspects of the entire system.
- Following the roofing manufacturer's installation procedure and guidelines before beginning the installation.

Disclaimer of Liability:

- SOLLEGA does not assume responsibility and expressly disclaims liability for loss, damage, or expense arising out of, or in any way connected with installation, operation, use, or maintenance by using this manual.
- SOLLEGA assumes no responsibility for any infringement of patents or other rights of third parties, which may result from use of modules. No license is granted by implication or under any patent or patent rights. The information in this manual is believed to be reliable, but does not constitute an expressed and/or implied warranty.
- SOLLEGA reserves the right to make changes to the product, specifications, data sheets and this manual without prior notice.
- This document is not prescriptive regarding safety and does not purport to address all the safety concerns that may arise with its use. Contractors should become familiar with all applicable safety, health, and regulatory requirements before beginning work.

Important Installation Details (continued)

Electrical Safety

Any work done with PV and electrical equipment presents a shock hazard. Sollega FastRack is a mechanical solar mounting system and contains no "live" parts. Mechanical installers and electricians should coordinate in order to ensure that all personnel are aware of electrical hazards.

Assembly Modifications

Unauthorized field modification of Sollega components or assemblies may affect Sollega warranty coverage. Provide written drawings for Sollega's review, comment and approval prior to attempting any field modifications. Also, follow the requirements listed in the System Layout Guidelines.

General Information

The installation of solar modules requires a great degree of skill and should only be performed by qualified licensed professionals, including, without limitation, licensed contractors and electricians.
The installer should be familiar with construction standards established by the Occupational Safety and Health Administration (OSHA). They should also plan for safe practice during any installation activity with respect to hazards from tripping, falling, lifting, repetitive stress, and any overhead or electrical hazards. When working close to building roof edges, consider protection options that reduce worker exposure to fall hazards. Refer to OSHA Sub Chapter 7, Group 1, Article 2.
Sollega FastRack is made from BASF Ultramid and has the UL material rating UL 94-HB. When used as described in this installation manual, these materials are considered to be nontoxic.

Project Specific Design Modifications

On-site workers assisting in the installation process may encounter undocumented or unexpected obstacles requiring a modification of the project system design supplied by Sollega. Since PV arrays are intended to be primarily regular and repeating structures, any modifications to the original design should be noted on working drawings. If the array is disconnected or if the number of rows or length of a row is changed, contact a Sollega engineer for a revised ballast layout.

Care for the Roof

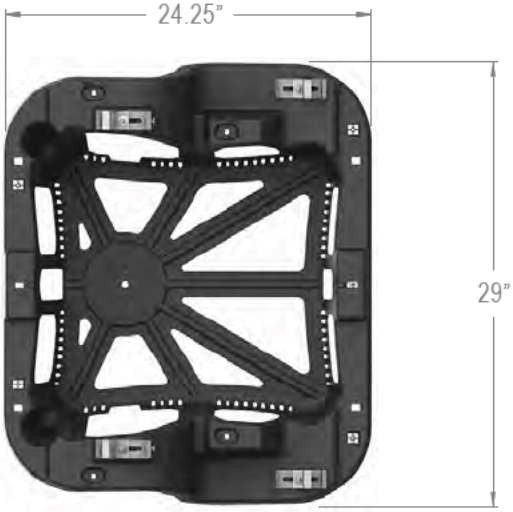
WARNING! Single-ply roofs are not damage tolerant. Avoid accumulation of metal fragments that result from drilling or sawing metal components. Metal fragments embedded in the soles of shoes can damage single-ply roofs. The service life of any roof is contingent upon care for the roof especially during equipment installation on a roof. Avoid concentrated loads on the roof. Never drag components into place. Instead, elevate the component, and then move it manually or with a cart. Locate it and then place it "on spot." To ensure roofing system warranty continuation, work with roofing contractors to ensure roofing system and array compatibility.

Final inspection

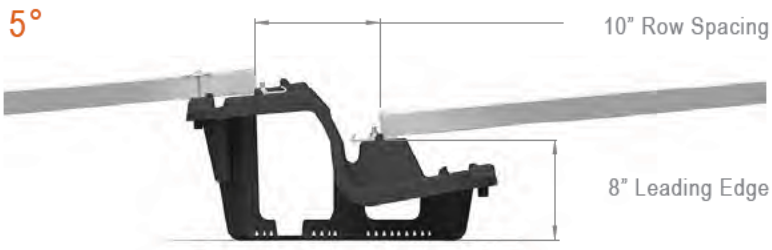
Visually inspect assembled arrays. The suggested process consists of a row-by-row walk-through and then a perimeter walk-around, after mechanical assembly, before electrical completion. Report any distortion in the assembly to Sollega. Array substrate supports should be in full contact with the roof or the ground. Any indication of uneven distribution of weight should be evaluated and corrected before continuing with electrical finishing.

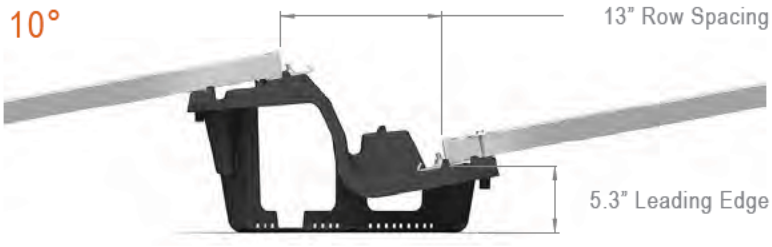
Image	Reference	Part Name	Description
	FR510	**FastRack**510™	**FastRack**510 - Injection Molded 5° Base
	PC	Pull Clamp	Extruded Aluminum Pull Clamp
	EC	End Clamp	Extruded Aluminum Top Clamp (Available in all module thicknesses)
	WS80	Windscreen	Anodized Aluminum Windscreen
	SMC	Grounding Mid Clamp	316 Stainless Steel UL Listed Grounding Mid-Clamp
	B	Windscreen Bolt	304 Stainless Steel 5/16” x 7/8” Hex Bolt *
	B5/B6	Mid Clamp Bolt	304 Stainless Steel 5/16” x 2-3/4” Hex Bolt *
	CN	Cage Nut	304 Stainless Steel 5/16” Threaded Cage Nut
	N	Serrated Flange Nut	304 Stainless Steel 5/16” Serrated Flange Nut *
	SW	Star Washer	304 Stainless Steel 5/16” External Tooth Star Washer *
	W2	Flat Washer	304 Stainless Steel 5/16” x 3/4” OD Flat Washer *
	SLW	Lock Washer	304 Stainless Steel 5/16” Split Lock Washer *
	GLK	Grounding Lug	Tin Plated Copper Grounding Lug Kit (Includes Stainless steel screw, external tooth lock washer, and nut)
	W-CLP	Wire Clip	Nylon - 8" Cable Tie with Edge Clip
	MA-2400 (2000 - 2600)	Roof Anchor	Optional Positive Mechanical Attachment for All Roof Types

*Available in 316 Stainless Steel

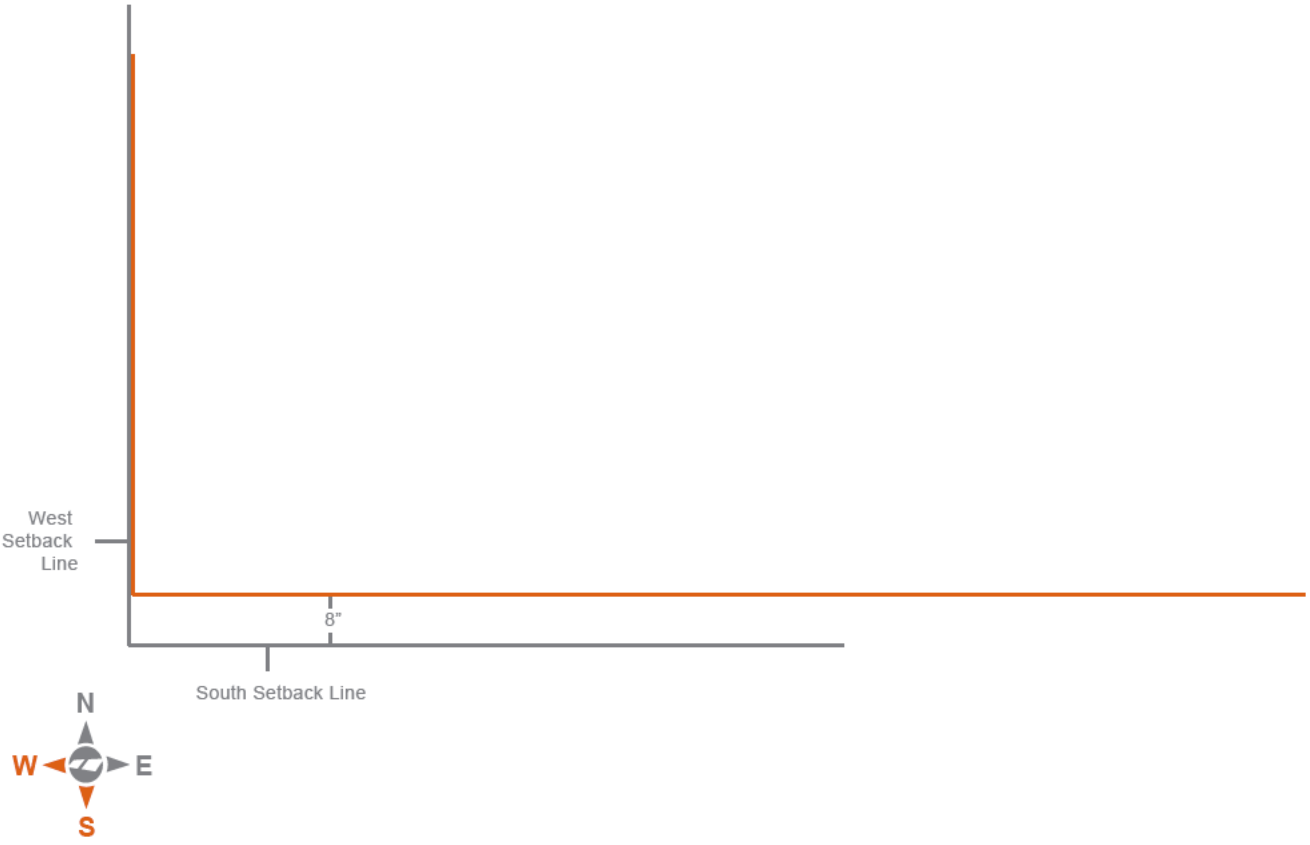


Tilt Angle	5°	10°
Row Spacing	10" (254 mm)	13" (330 mm)
Leading Edge	8" (203 mm)	5.3" (135 mm)
Compatible Modules	All framed modules 31" - 44" in width (787 mm and 1118 mm)	
Weight	4.5 lbs. (2.5 kg)	
Ballast Requirements	4" x 8" x 16" Roof Paver (31.5 lbs each) based on ASTM Designation C1491 – 01a.	
Material	BASF Ultramid® glass reinforced nylon	
Module Orientation	Landscape	
Wind Load Criteria	Meets ASCE 7-05 up to 145 mph	
UL Material Rating	UL 94-HB	
Warranty	25 years	
Dimensions	(LxWxH) 24.25 x 29 x 14" 616 x 737 x 356mm	
Disassembly	Simple disassembly and 100% recyclable content	
Patent	Patented design: USPatent No. D692,372	





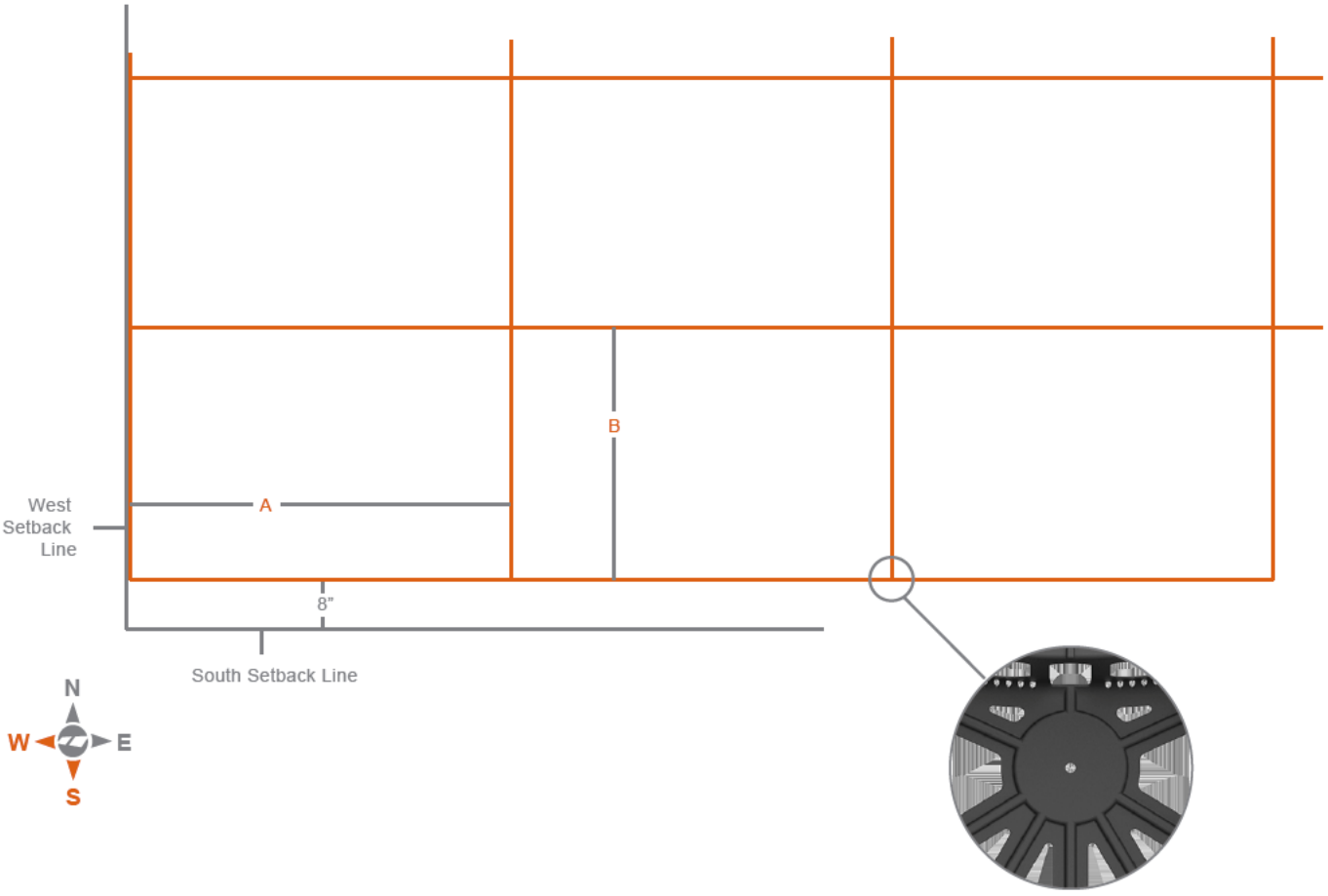
Measure Out the Southwest Corner



1. Begin by locating the South-West or South-East corner of the array, referencing the setback and layout schematic provided by Sollega. (South-West Corner Shown)

2. Snap chalk lines North-South and East-West to create a 90º reference point at the desired corner of the array. Note: On the South edge, the chalk line is 8” from required setback in Sollega’s provided schematic.

Measure Out the South-West Corner



Intersections will be a Center Reference

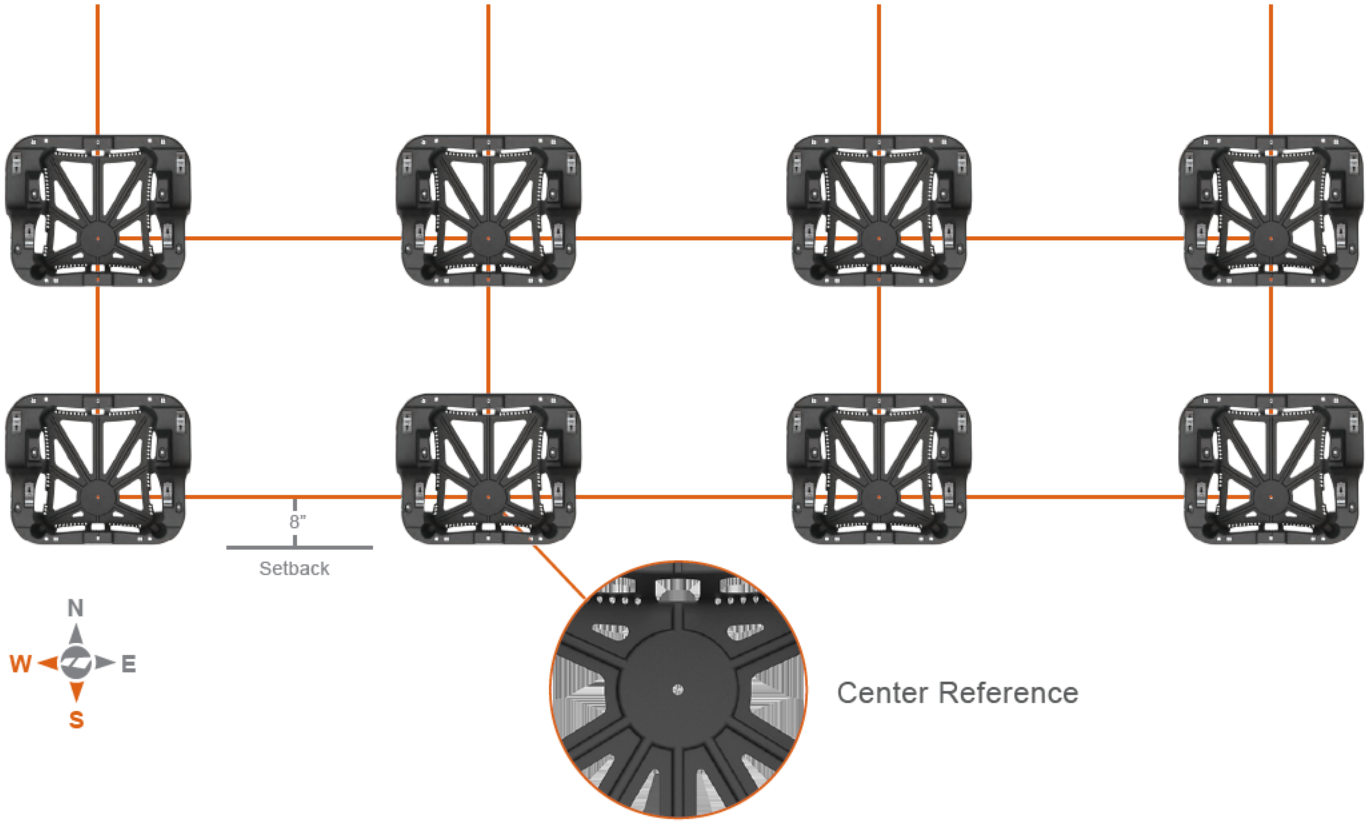
3. Snap N-S chalk lines. The distance apart (**A**) should = (The Module Length + 3/8")

Panel Length	61.0	64.5	65.0	65.55	66.0
Dimension A	61.375	64.875	65.375	65.925	66.375

4. Snap E-W chalk lines. The distance apart (**B**) should = (The Horizontal Run of your Angled Module + 10")

Panel Width	37.44	38.7	39.02	39.05	39.2
Dimension B	49.780	51.062	51.468	51.418	51.570

Position FastRack using the lines and center reference*



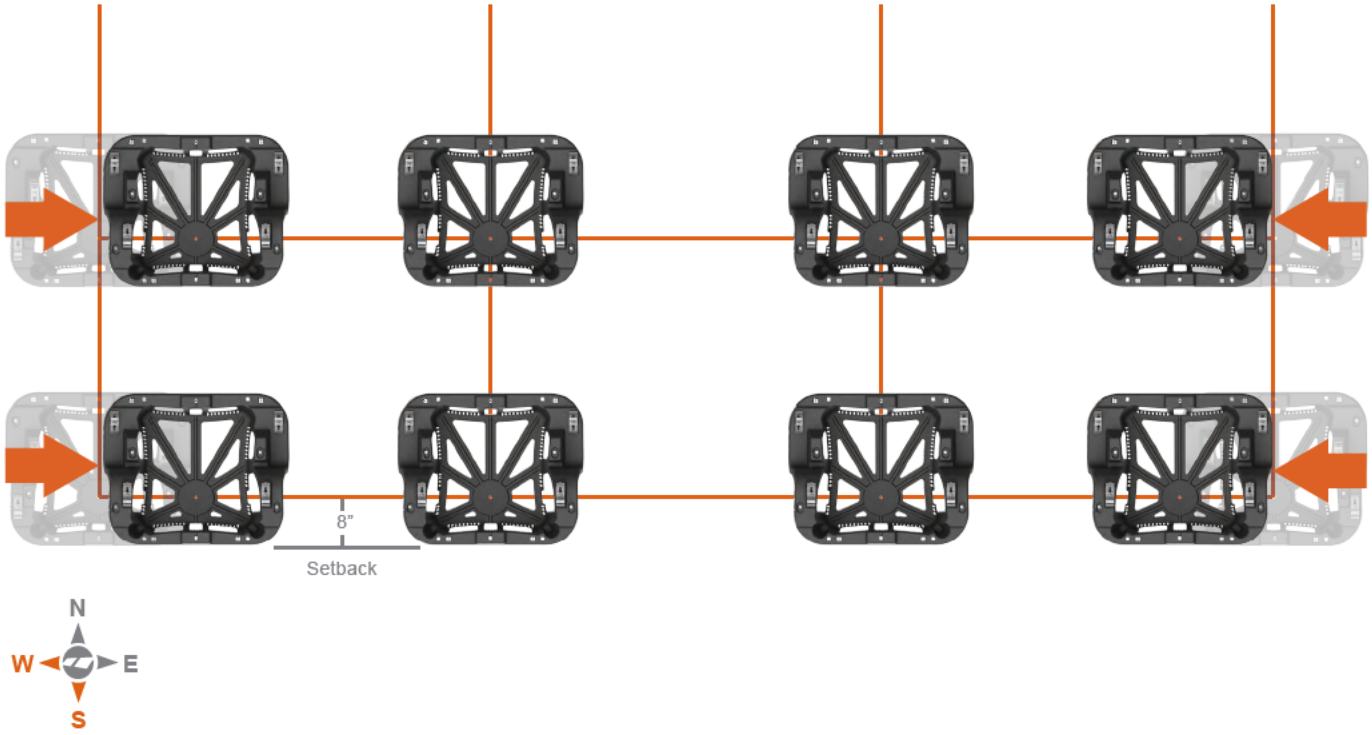
1. Place the first FastRack (FR510) at the corner of the array, in line with the reference indicator hole in the center of the FR510. Repeat at each center reference intersection.

2. Repeat at each center reference intersection.

*Please Note:

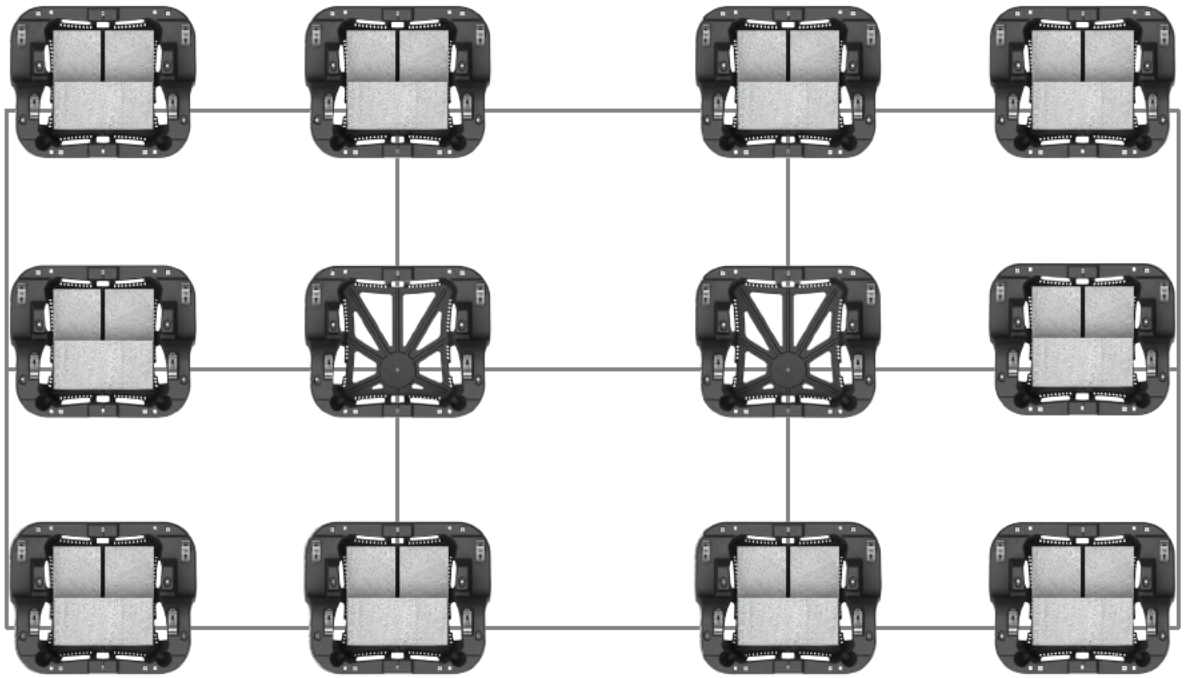
The following instruction are a snap-shot of typical module installation. For large arrays Sollega recomends installing the system outward from the corner of the array–building as you go. Complete this and the follwing steps as needed to install the array module by module as best suited to your layout. For questions or recomendations for a specifc layout please contact your Sollega sales representative.

Slide FR510s Inwards on the East and West row ends



Move The FR510s on the East and West Edges of each array in board of the reference line so that they will be under the modules.

Insert Ballast as indicated by the ballast schematic provided by Sollega

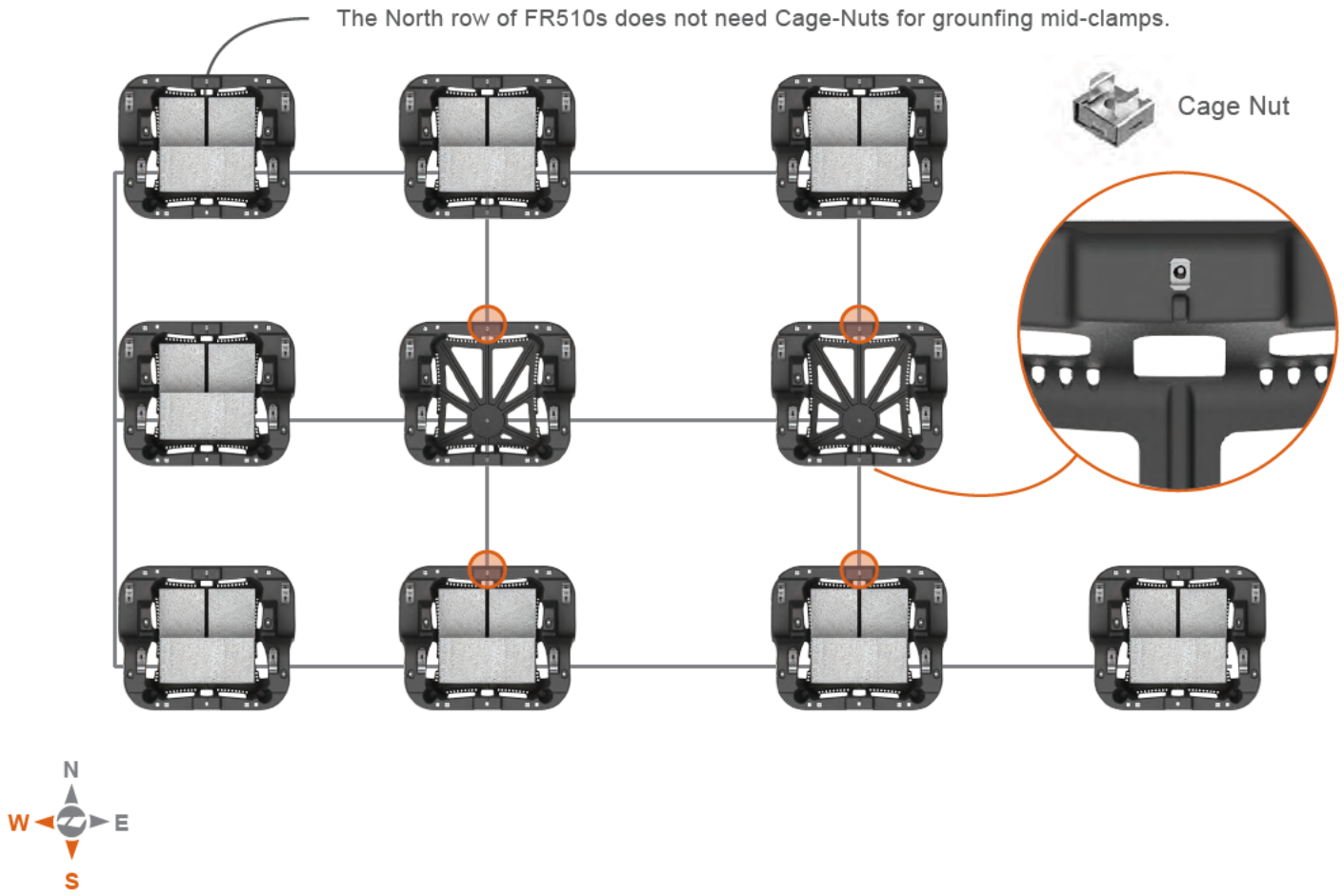


Place the required number of ballast blocks per FR510 as indicated by the ballast schematic provided by Sollega

Please Note:

- Most likely not all FR510s will have ballast, and some will have different numbers of blocks

Insert Cage Nuts for grounding mid-clamps in areas shown

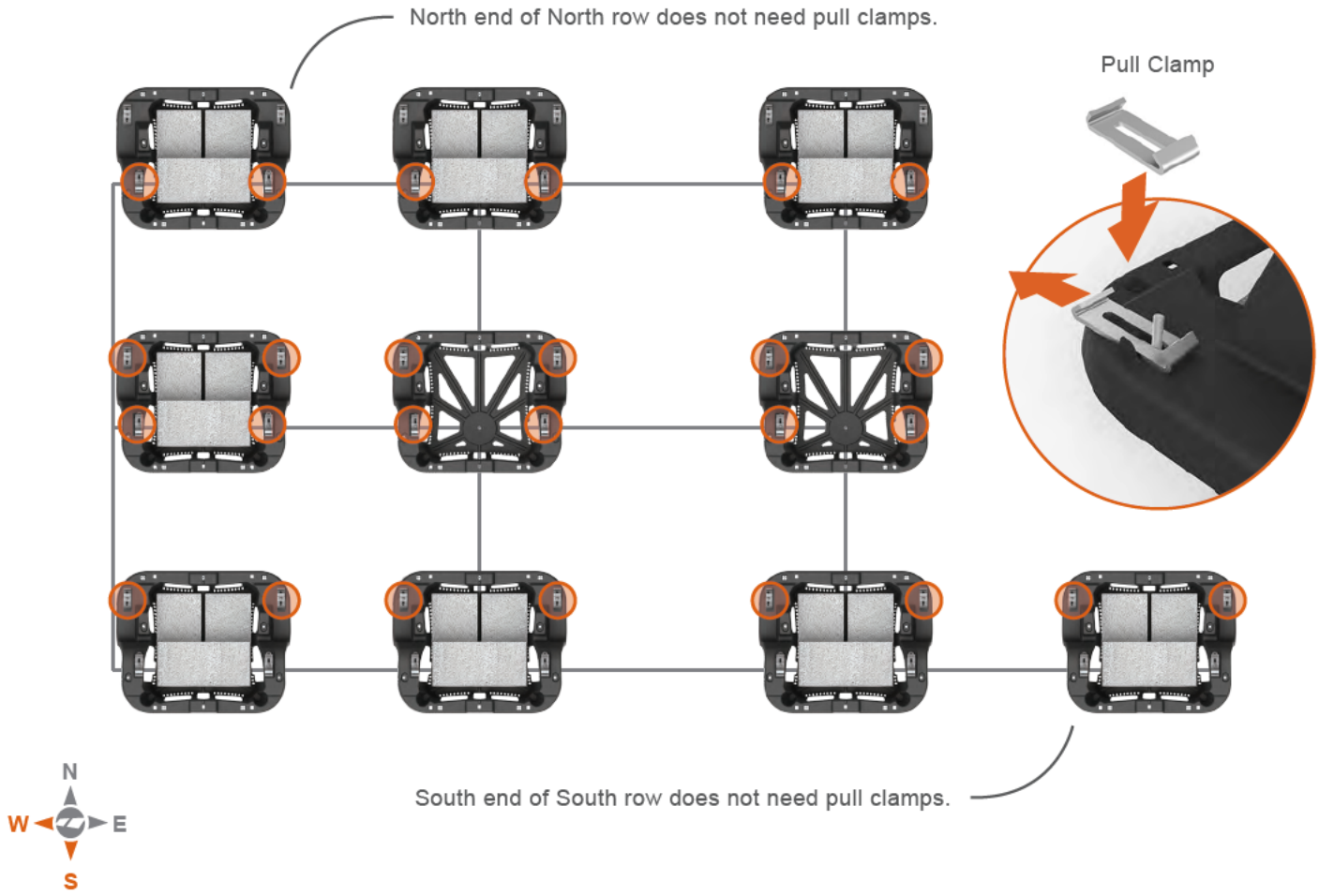


Install one Cage Nut (CN) per FR510 in the square cut-outs indicated above for the attachment of the grounding mid-clamp.

Please Note:

- The metal tabs of cage nuts are oriented North and South.
- The Northern-most row of FR510s do not need Cage Nuts.
- The ends of rows of FR510s do not need Cage Nuts.

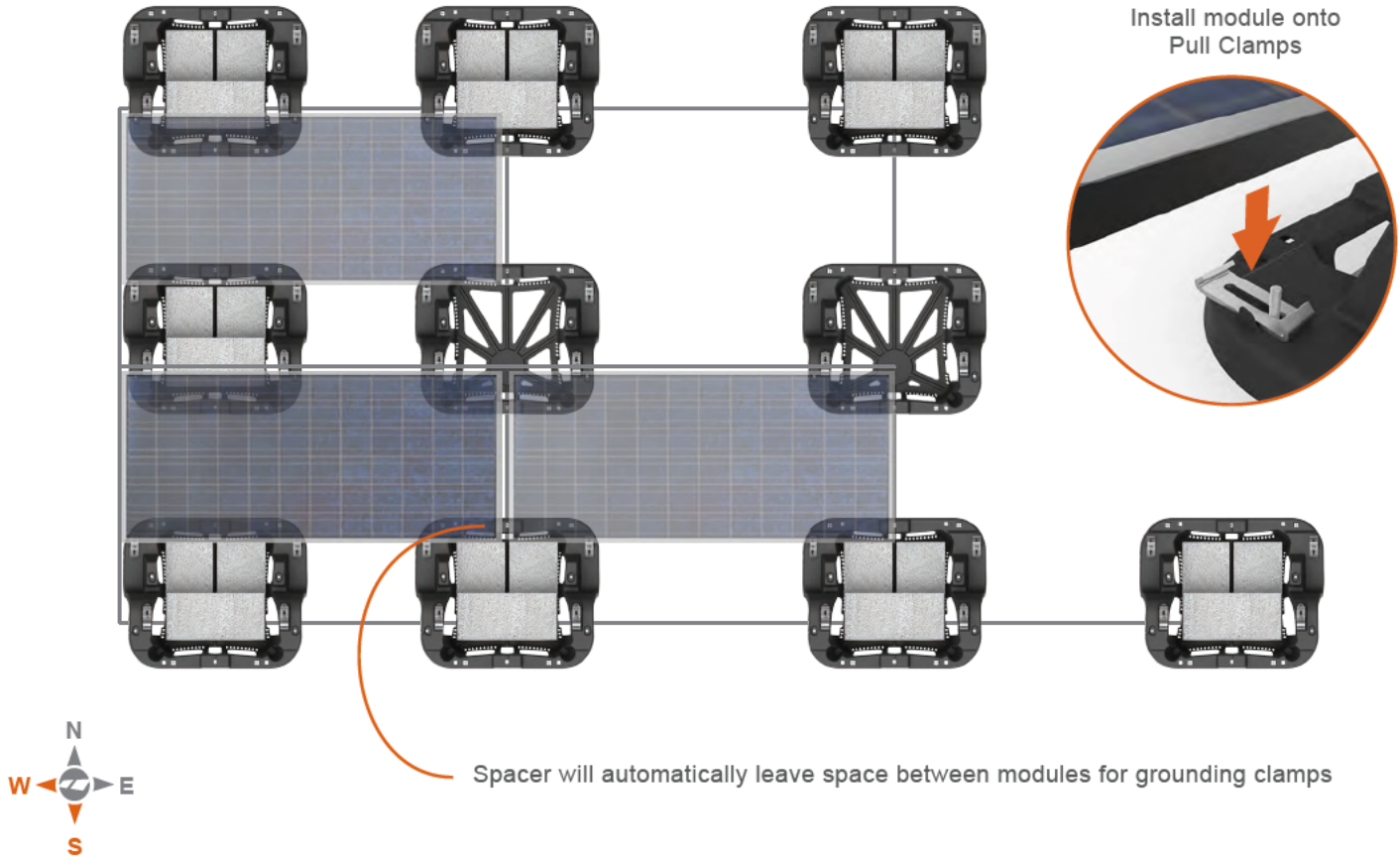
Place Pull Clamps in areas shown



Install Pull Clamps (PC) in the locations shown above and slide towards the closest edge.

Please Note:
- The South end of the South row does not need Pull Clamps.
- The North end of the North row does not need Pull Clamps.

Install Modules working from the south-west corner

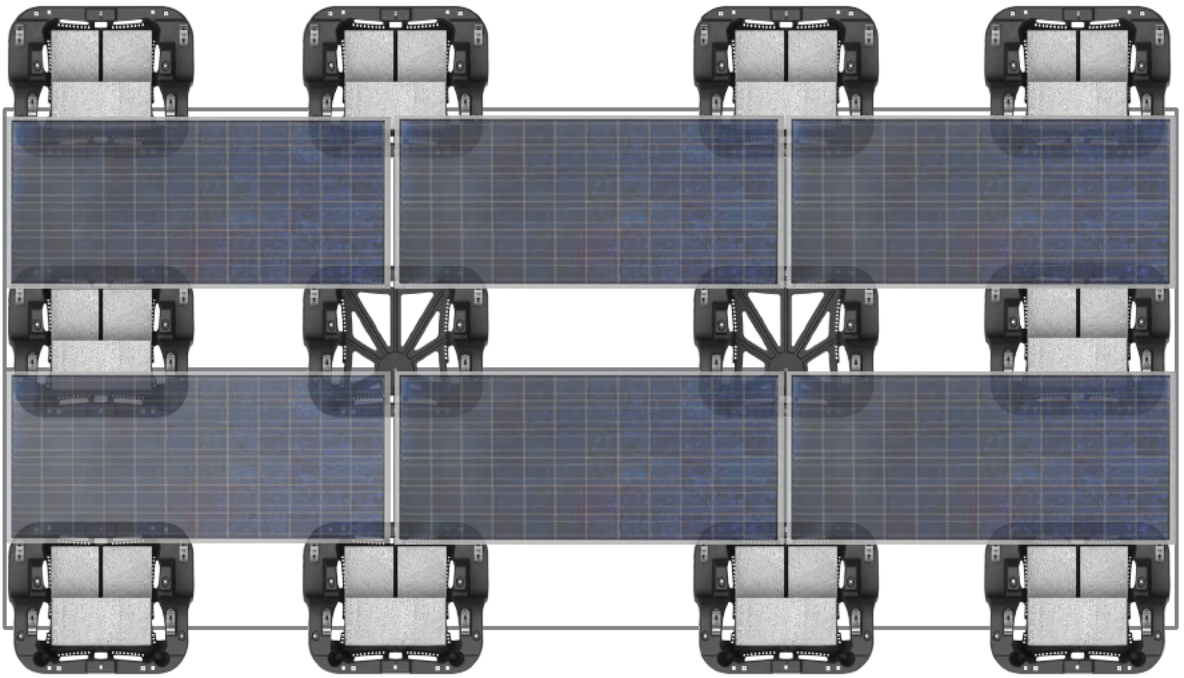


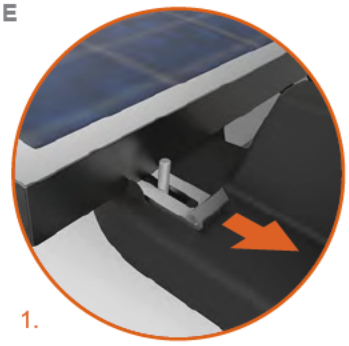
Install Modules Starting in the south-west corner and working your way East and North.

Please Note:

- The South end of the South row does not need Pull Clamps.
- The North end of the North row does not need Pull Clamps.

Install End Clamps working from the south-west corner

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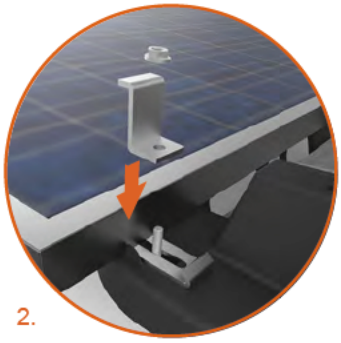
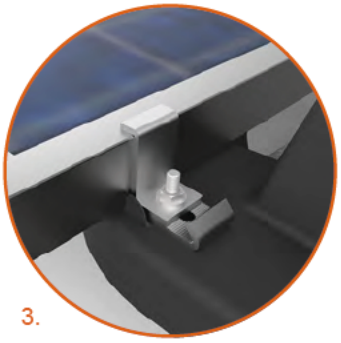

2.


3.

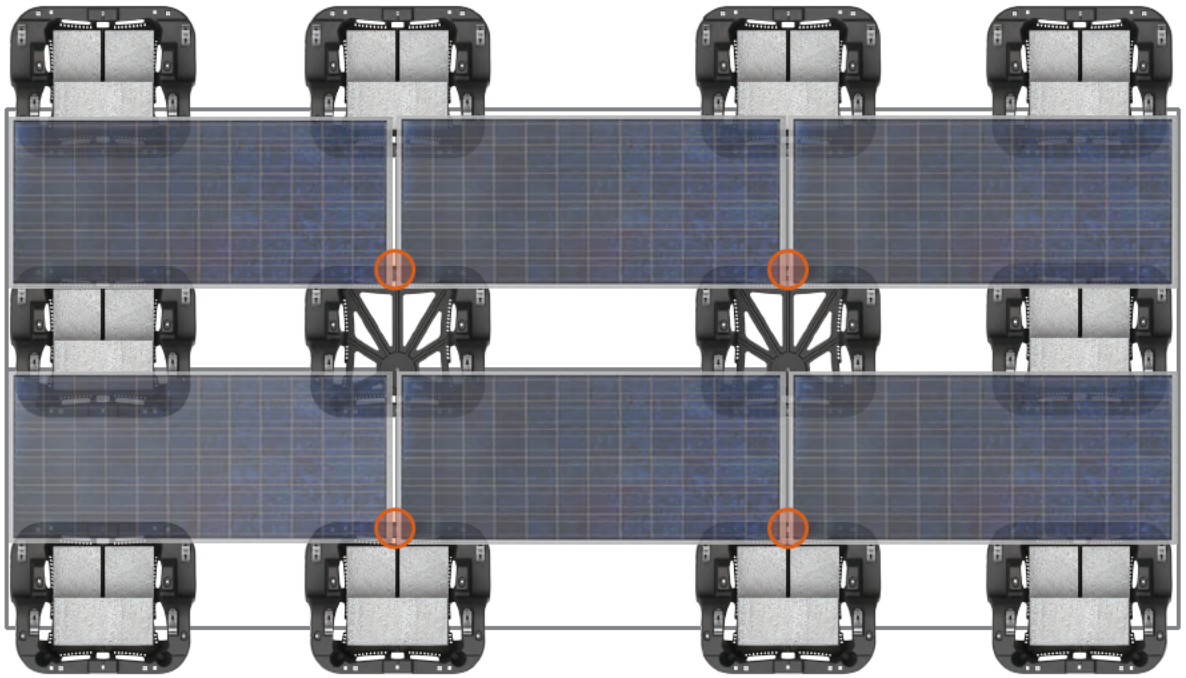
1. Slide back the Pull Clamp (PC) so that it is secure against the inner lip of the module

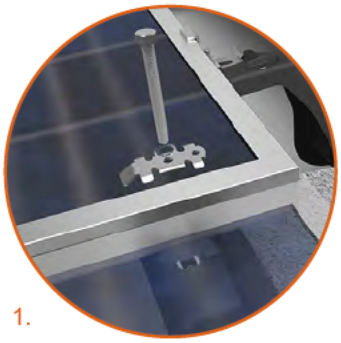
2. Install the End Clamp (EC) and Serrated Flange Nut (N) to the bolt on the FastRack.

3. Tighten the Serrated Flange Nut (N) to 10 lbs/ft of torque.

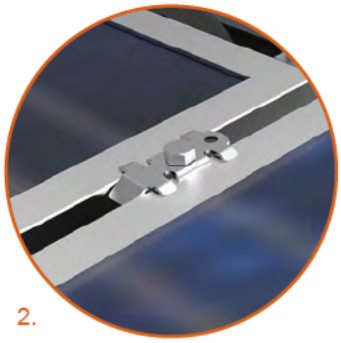
Please Note:
If there are mechanical attachments, you can leave the hardware loose in these areas, since you will be removing the module and affixing the mechanical roof anchor. See the Mechanical roof anchor instructions on page 17.

Install Grounding Mid-Clamp between modules





1.



2.

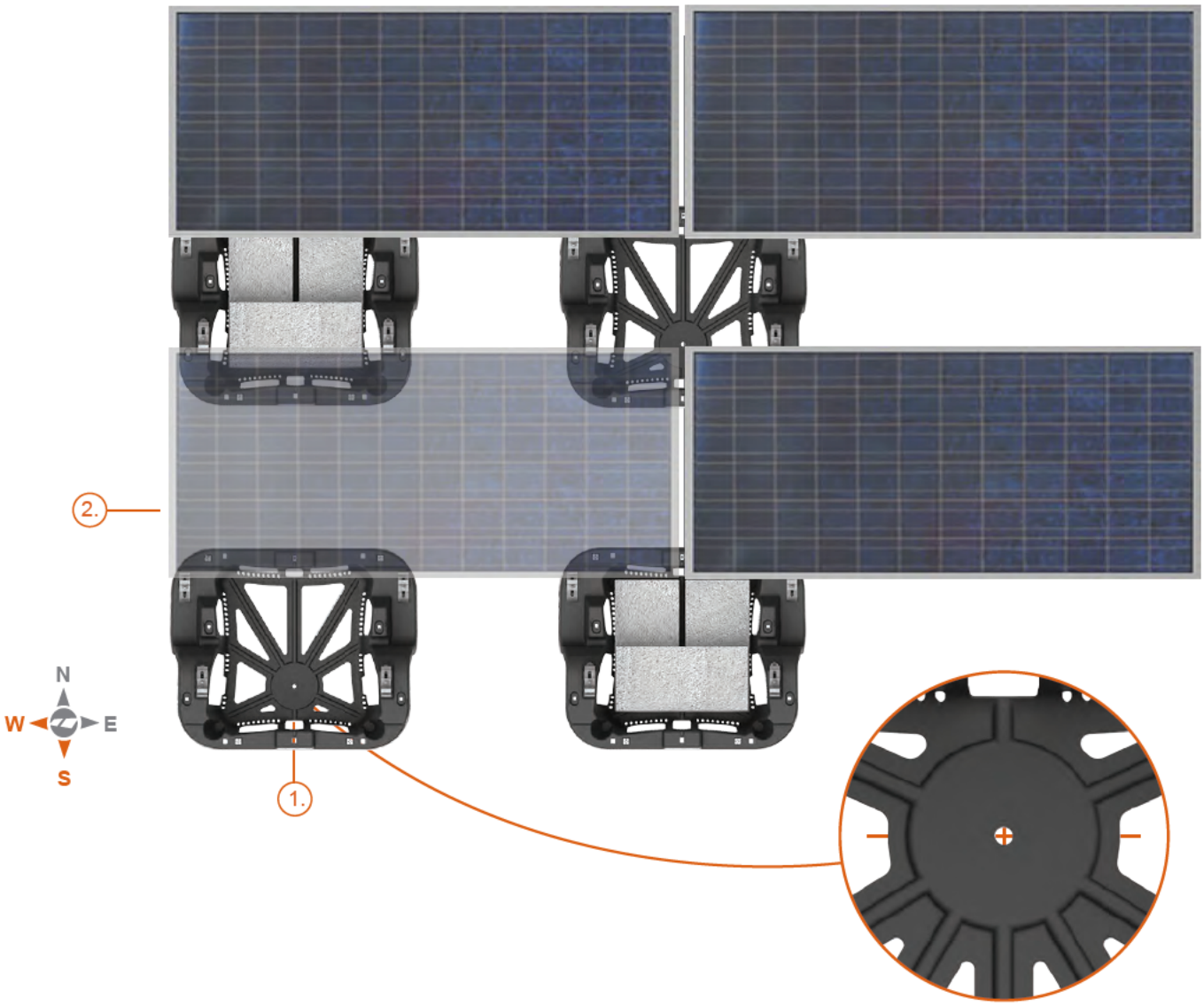
1. Attach Grounding Mid-Clamps (SMC) into the cage nuts where shown using the 3” bolt (B3) and lock washer (SLW).

2. Ensure that the teeth of the Grounding Mid-Clamp (SMC) are securely attached onto the top surface of the module frame and that the bolt is tightened to 12 lbs/ft of torque.

Please Note:

Only one Grounding Mid-Clamp needed between modules.

Mechanical Anchor installation

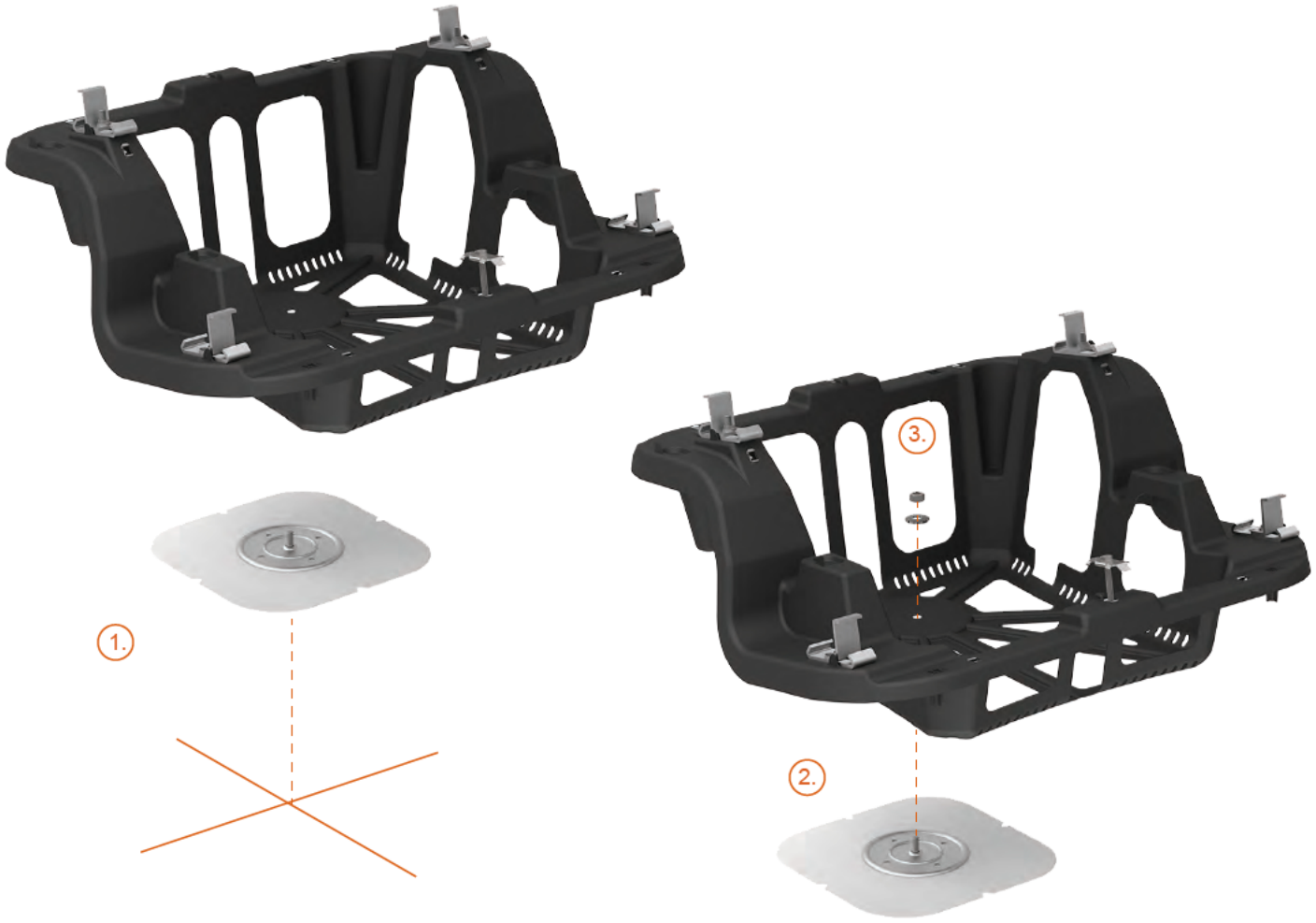


1. Mark a center point on the roof exactly where the mechanical anchor hole is on the FR510.

2. Remove the module or modules that interact with the FR510 to be mechanically anchored.

Please Note:
The cross hair you are marking for the mechanical anchor might be slightly different than the marks on the roof from the beginning of assembly, due to some minor shifting during module attachment.

Install Mechanical Anchor on marked center point



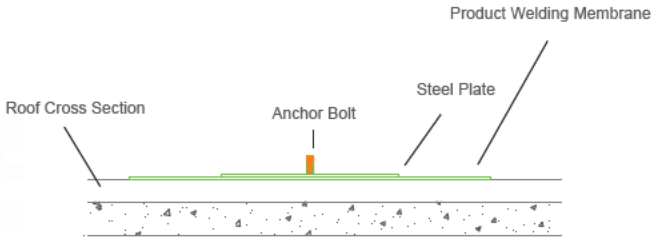
1. Once the module(s) have been removed, lift up the FR510 and put it to the side.

2. Attach mechanical anchors at the marked spot, using the manufacturers guidelines for each type of anchor and roof type. See the next page for our anchor details and cross sections.

3. Once the mechanical anchor is in place, attach the FR510 through the center anchor hole with a wide 3/8 washer (W3) and 3/8 nylon-insert lock nut (NLN).

Mechanical Anchor styles and cross section details

2000



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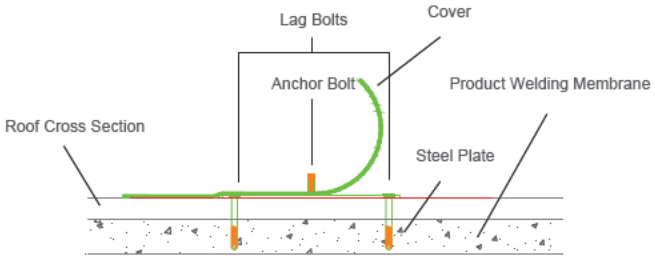

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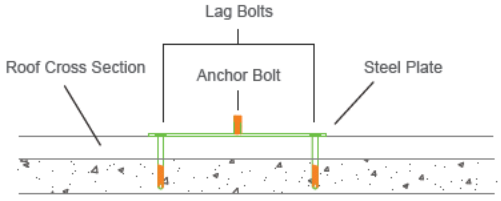
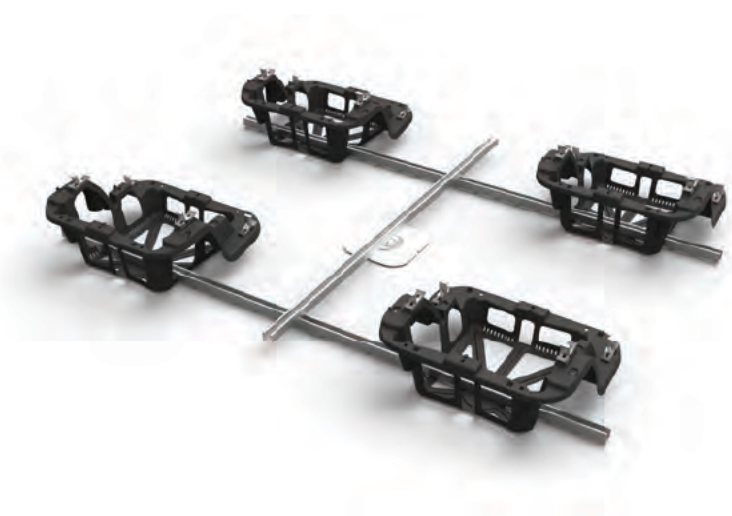


Alternate Mechanical Anchor variations with strut

The FastRack 510 includes strut channels that run NS and EW, so that the mechanical roof anchor can be secured in places external to the FastRack 510 footprint.
Below are a few examples of configurations:

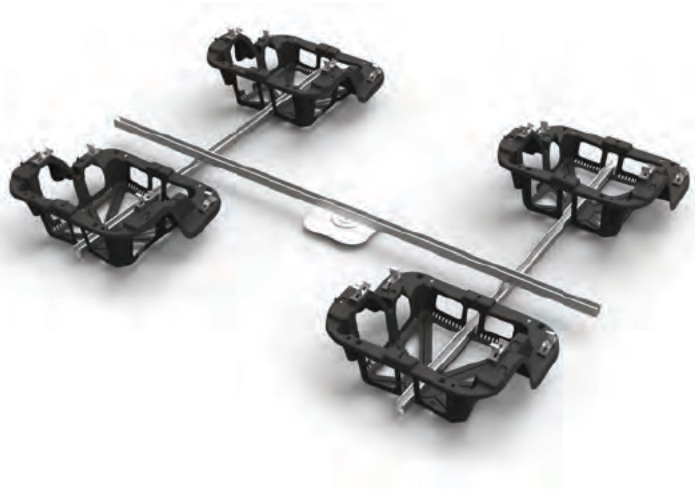
1. North-South Strut

2. North-South Center Strut

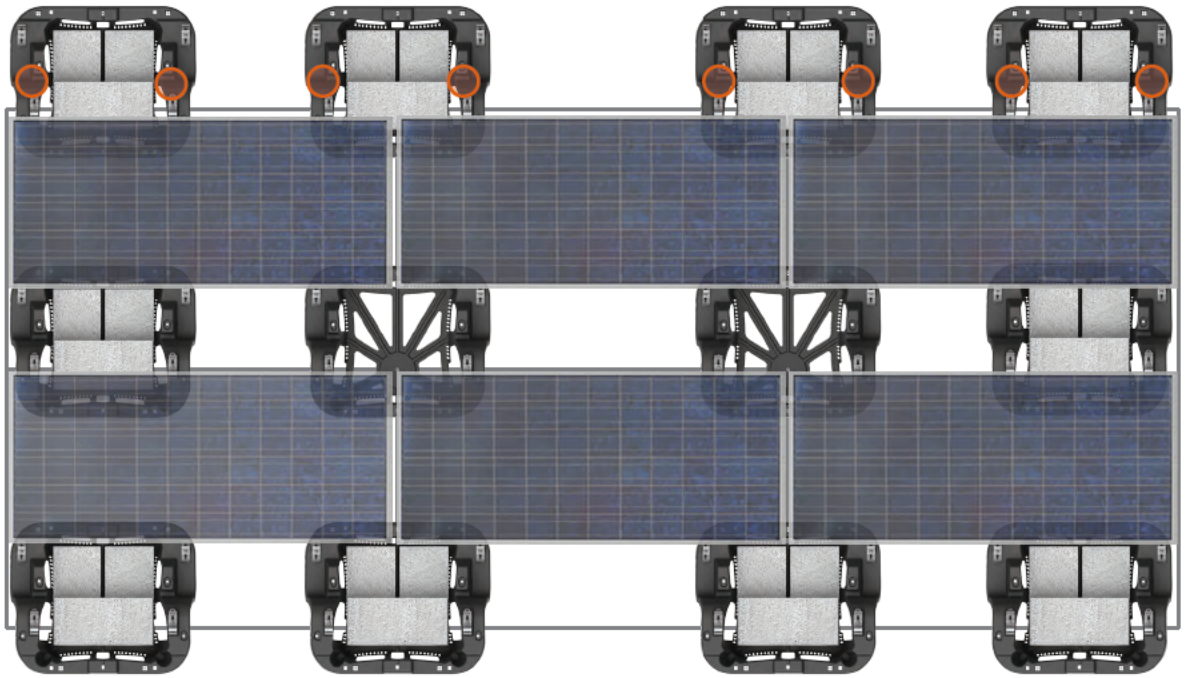


3. East-West Strut

4. East-West Center Strut



Install Cage Nuts for Windscreens



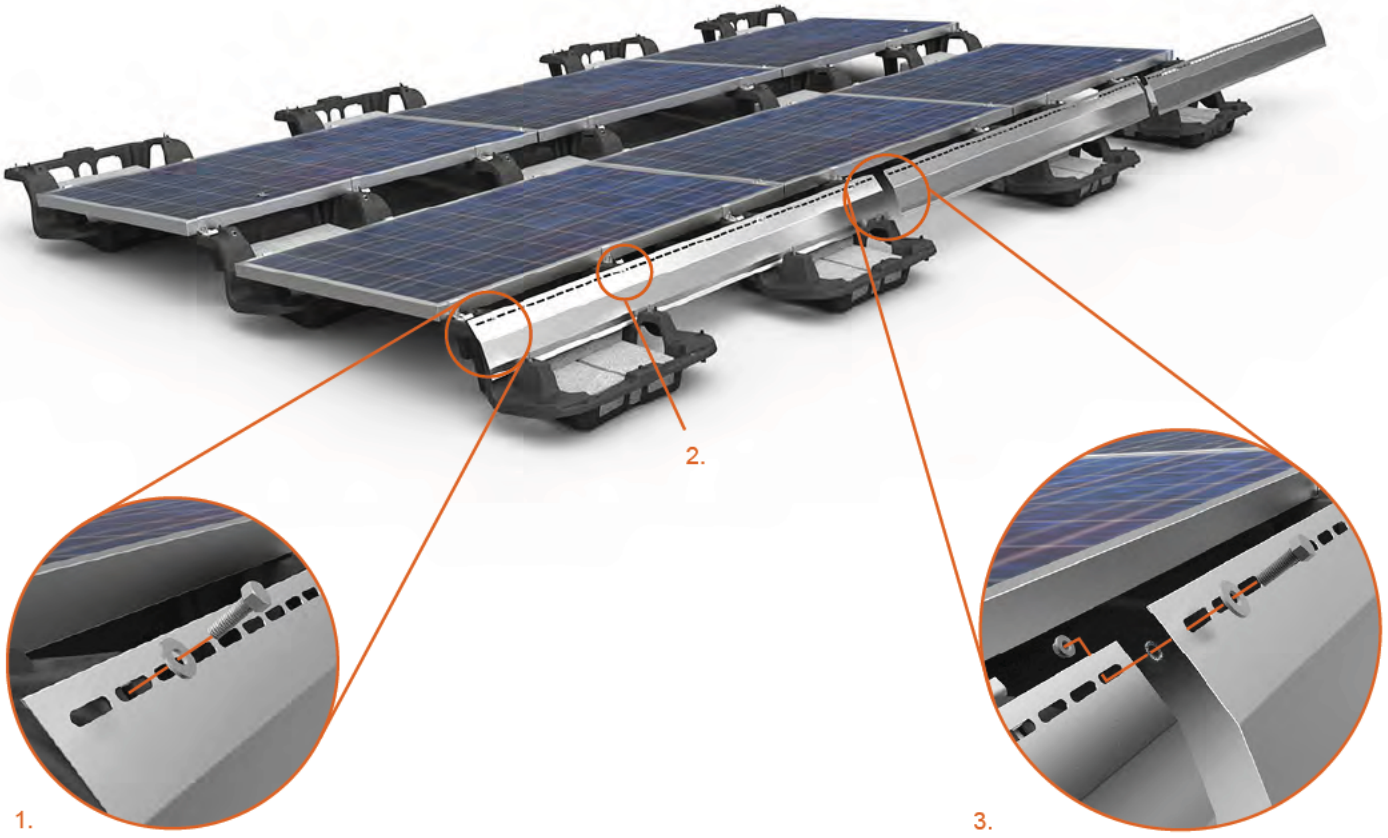
1.

1. Insert Cage nuts (CN) from the back into the square holes in the North row where indicated above.

Please Note:

If project plan calls for Windscreens on the South row, then install cage nuts in the same manner on the South row.

Install Windscreens



1. Position the Windscreen (WS) at the beginning of the North Row and attach the second slot to the cage nut with a bolt (B) a split lock-washer (SLW) and Washer (W2) and tighten to 5 lbs/ft. torque

2. Continue to attach the Windscreen to the FR510 along the length in this method.

3. Where windscreens overlap, attach the two Windscreens together with a Bolt (B), Washer (W2), Star Washer (SW) between the windscreens, and a flange nut (N) and tighten to 5 lbs/ft. torque.

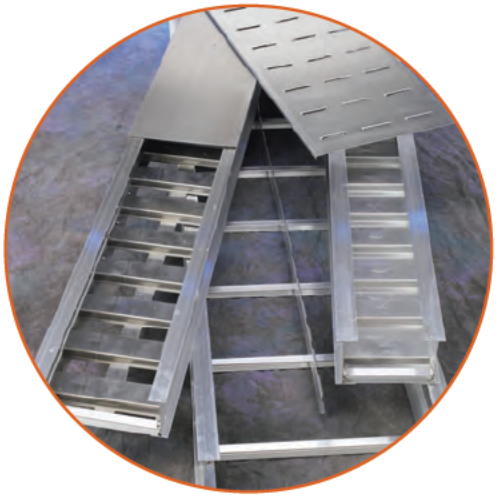
Please Note:
If the Windscreen overlaps where there is a fastrack cage nut available, you can do step 3 at this location and save a flange nut.

Wire Management Options

Below are a couple of Sollega approved wire management solutions. Please visit the manufacturers web pages, or contact your Sollega sales representative to learn more about approved wire managment solutions and techniques.

1. Hellerman Tyton Solar E-Clips attached to the lip of the FastRack 510.
   Please visit www.hellerman.tyton.com for more information.

2. Cooper Industries B-Line Aluminum wire trays, including Cooper B-line Series 24 Aluminum cable wire tray 36” wide. Please visit www.cooperindustries.com for more information.



Sollega FastRack 510 25-Year Warranty

SOLLEGA Inc.™ is dedicated to providing excellent customer support and service and will continually evolve our warranty to enhance our dealers' and customers' experiences with SOLLEGA. The following policies and procedures are subject to change as our process evolves.

SOLLEGA Inc. warrants that its FastRack™ Photo-voltaic (PV) Module Mounting System, when sold and delivered pursuant to a SOLLEGA Sales Order, will be new, will conform to the specifications in the applicable SOLLEGA Sales Order, and will be free from defects in material and/or workmanship for a period of Twenty Five (25) years from the date of shipment. Except for the foregoing limited warranties, SOLLEGA makes no other warranties express or implied for its SOLLEGA FastRack.

This Warranty does not apply to damage incurred during shipment and does not apply to damage that is the result of improper handling. This Warranty will be void if during the warranty period, the SOLLEGA FastRack has been improperly or incorrectly installed, used, or maintained, or has been operated under abnormal conditions or contrary to applicable specifications.

This Warranty is granted to the original SOLLEGA FastRack owner only and is only applicable to the original installation of the SOLLEGA FastRack. This Warranty does not apply to damage to the SOLLEGA FastRack that is the result of weather conditions that exceed local building code limits that were applicable at the time that the SOLLEGA FastRack was originally installed.

It is recognized and agreed that the foregoing limited warranties are in lieu of all other warranties, whether express or implied, and that SOLLEGA Inc. does not make any warranty of merchantability or any warranty of fitness for a particular purpose.

In the event the SOLLEGA Inc. FastRack fails to satisfy the foregoing limited warranties, then SOLLEGA will repair or replace, at its option and cost, the defective product. The foregoing remedy shall be in lieu of all others that the SOLLEGA Purchaser may have, and the Purchaser waives all other remedies.

To obtain warranty service, the Purchaser should contact SOLLEGA Inc. by telephone or email, and SOLLEGA will establish a claim file and initiate action to repair or replace the defective product. SOLLEGA will work with the Purchaser to determine the extent of the problem and may elect to perform a site inspection.

SOLLEGA Inc. will not assume expense or liability for correction of a defective SOLLEGA. FastRack by the Purchaser or by third parties without SOLLEGA's prior written authorization. In the event of the authorized correction of a defective SOLLEGA FastRack, the warranty period will be extended by the length of time during which the defective equipment was in the process of being repaired or replaced.

Unauthorized field modification to SOLLEGA's final layout will affect warranty coverage. If any changes are made that significantly affect the structural integrity of the system, customer must provide written drawings for SOLLEGA's review, comment and approval prior to attempting any field modifications. Modifications may include but are not limited to changes in location of FastRacks, modules, windscreens, roof anchors, roof pavers or any other racking system components. SOLLEGA Inc.'s total liability hereunder for the repair or replacement of a SOLLEGA FastRack, or any defective components thereof, shall not exceed the original purchase price of the system. In no event will SOLLEGA Inc. be liable for or responsible to the Purchaser, or to any other party, for any consequential, incidental, or special, loss, cost, damage, or expense arising from the curtailment or interruption of photo-voltaic (PV) system operation or from the curtailment or interruption of any operations, processes, or equipment connected to the PV system.

This warranty grants the purchaser specific legal rights that may vary according to the state in which the Sollega FastRack is installed. In some states, sellers cannot limit the rights of the purchaser, so you may have access to legal remedies in addition to or greater than those specified here.

This warranty does not cover failures resulting from freeze damage, fire, flood, lightning, hurricane, tornado, hailstorm, windstorm, earthquake, or other acts of god, vandalism, explosions, exposure to harmful materials or fluids, or unauthorized alterations or repairs or any other cause beyond the control of SOLLEGA Inc.

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