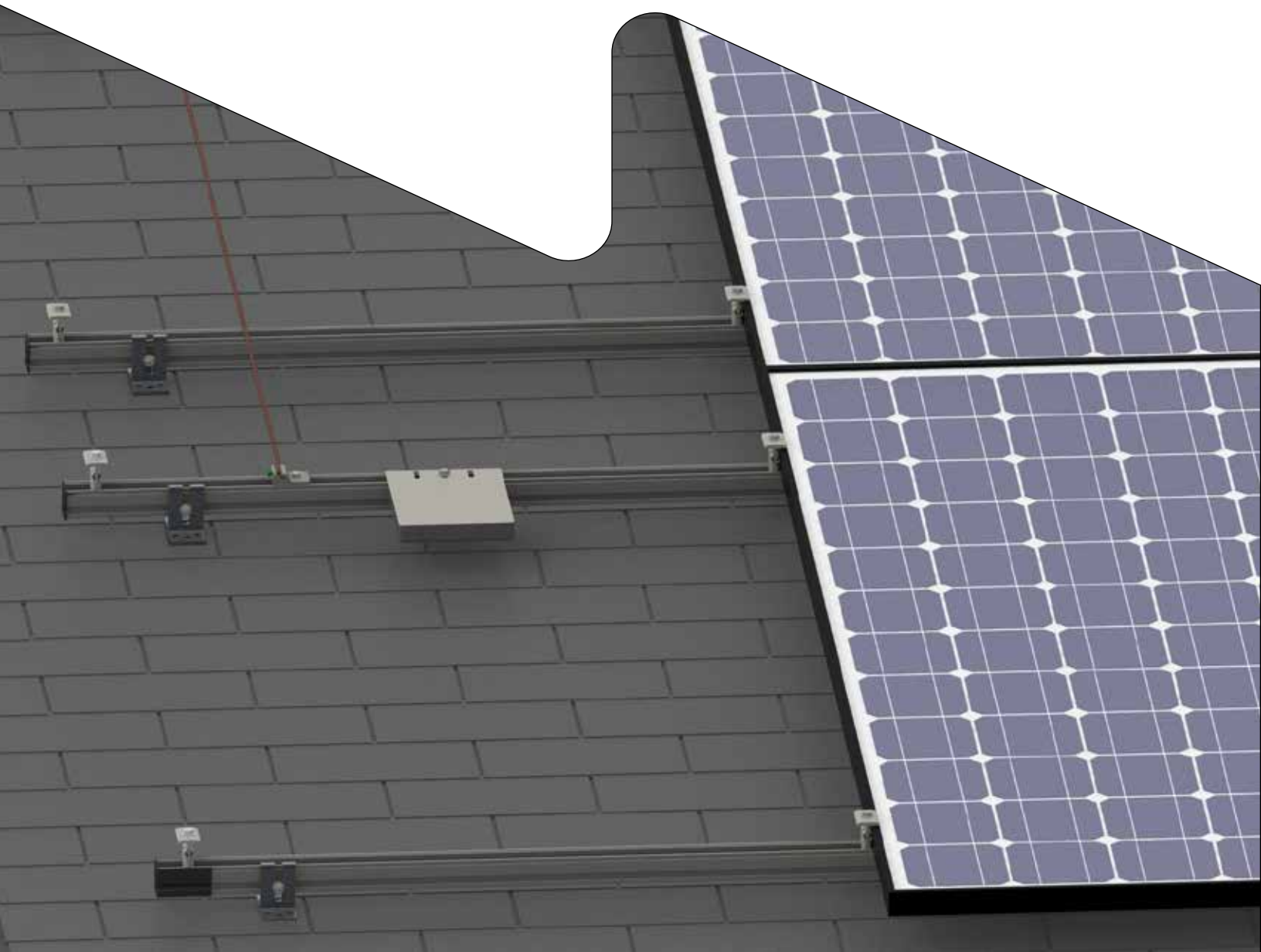
Connecting Strength

CrossRail

ASSEMBLY INSTRUCTIONS



Engineering, Quality & Table of Contents

Engineering Strength is at Our Core

With sophisticated product innovations and a deep customer focus, K2 Systems is the engineering leader for all your mounting system needs. We are a market leader with more than 32 GW installed worldwide.

We offer proven product solutions and innovative designs. Wind tunnel testing along with advanced structural and electrical validation to facilitate permitting, design and installation. Our designs result in cost competitive racking systems with dedicated support, positioning you to win more projects.

We partner with our customers and suppliers for the long-term. High quality materials and cutting edge designs provide a durable, yet functional system. Our product line is comprised of a few, coordinated components that lower the cost of materials, and simplify installation, saving you time and money. All backed by German engineering, a long track record of quality and a company that is here to stay.

Table of Contents

Design, Engineering & Code Compliance 3

Installation Guidelines & Required Tools 4

System Overview, Components 5

Additional Components 6

Part Number References 9

Product Installation 10
- Array Layout
- MultiMount & Rail Connector
- Cable Tray Installatiion
- MultiMount & Rail Connector
- MLPE Mount & Ground Lug
- Conduit Mount & Module Clamps
- Place & Secure Modules
- Finishing Touches
- Bonding & Grounding

Quality Tested - Several Certifications

K2 Systems stands for secure connections, highest quality and precision. Our customers and business partners have known that for a long time. Independent institutes have tested, confirmed and certified our capabilities and components.

Please find our quality and product certificates under: https://k2-systems.com/en-us/resource-center/download-library/

Design, Engineering & Code Compliance

Structural Requirements

K2 systems mounting components' structural performance can be evaluated and automatically calculated using the K2 Quote or K2 Base planning software to verify conformance to site specific conditions and design criteria. The design and engineering perimeters provided in a project specific report must be followed.

Roof pitch: 0° - 45°
Roof mean height: 0 - 60 ft
Wind Speed: 95-200 mph
Ground Snow Load: 0-100 psf

Typically, rail overhangs shall not exceed 1/3 of the maximum allowable span. Refer to engineering letters on K2 Systems website for more details on maximum spans and overhangs.

To allow for system movement due to thermal expansion and contraction, a movement joint, or break should be utilized. Systems with connected rail lengths exceeding 65 feet (20 meters); shall have a maximum allowable space between thermal expansion joints of 80 feet, with a minimum gap of 1.25" between rails at such points.

This system has been successfully evaluated for Mechanical Loading according to the requirements of UL 2703, Section 21. System tested to a maximum module size of 33.47 ft2 with minimum design load of 10 PSF down, 5 PSF up, and 5 PSF lateral.

To view a list of compatible modules, please click the link https://k2-systems.com/wp-content/uploads/2025/05/ApproveModuleList05-1025.pdf NOTE: This system is only approved for use with Type 1 & Type 2 fire rated modules for compliance toUL 3741 PV Hazard Control Systems.

Roof Requirements

Prior to installation, an evaluation of the roof structure must be conducted to ensure the substructure can withstand the imposed loads added by the K2 systems mounting components and all the other associated systems. Failure to obtain verification from a license professional as required by the governing building codes may forfeit any available warranty offered by K2 Systems.

Fire Rating

This system has undergone fire performance testing in accordance with UL 2703, Fire Performance. A System Class A fire rating is achieved when using CrossRail 44-X Max/44-X/48-X/48-XL under the following conditions:

- Installed over a Class A, or better fire rated roof covering
- Roof slope of 2/12 rise per L.F. or greater
- Conection to roof substrate with any height stand-off
- System uses only UL 61730 Listed modules with a fire performance rating of Type 1, Type 2.
- Consult the module manufacturer's installation instructions to ensure your installation is in compliance with their UL 61730 Listing.

The results of the racking system do not improve a roof covering class rating. All documentation can be found on UL's Online Database as well as K2 Systems' website.

General Information & Required Tools

General Information

General mounting instructions shall be followed at all times. K2 Systems mounting solutions are continuously under development thus the installation process may thereby change at any time. Prior to installation consult https://k2-systems.com/en-us/resource-center/download-library/. You may request an email copy of the latest installation procedures from info-us@k2-systems.com. It is best practices to have access to a digital copy or printed set of these instructions while on site during the installation process.

For dismantling of the system for service or decommissioning follow the installation procedures in reverse order from assembly.

Any components showing signs of damage that compromise safety shall be replaced immediately. In addition, any loose components or fasteners shall be re-tightened in accordance with these instructions.

The design, engineering and installation of K2 systems mounting solutions and associated products shall adhere to all governing building codes and environmental regulations including requirements set forth by the local Authority Having Jurisdiction (AHJ).

All project specific conditions shall be reviewed and/or certified by a professional engineer. Equipment shall be installed and operated by qualified and adequately trained installers.

K2 Systems is not liable for any resulting defects or damages for failing to adhere to K2 Systems installation instructions, site specific engineering requirements and all governing building codes; K2 Systems is also not liable for any resulting defects or damages as result of using competitor's or 3rd party mounting components not specifically approved for use by K2 Systems prior to installation. Any available warranty is forfeited in such cases.

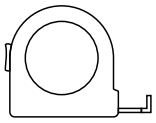
A 25 Year Limited Product Warranty is available for K2 Systems mounting solutions. The Terms and Conditions of the Warranty are available online, https://k2-systems.com/en-us/resource-center/download-library/. You may request an email copy from info-us@k2-systems.com.

K2 Systems stainless steel components are available in different corrosion resistance classes. Each structure or component must be carefully checked for possible corrosion exposure.

Tools for Installation

The following are the basic tools required for installation of the K2 Systems Mounting Solutions outlined within this document

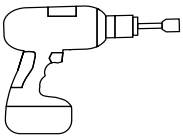
Tape Measure



Chaulk Line



Drill / Impact Drill



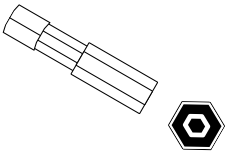
Torque Wrench



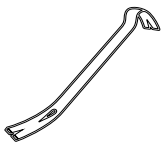
13mm Socket



3/16 Hex Bit



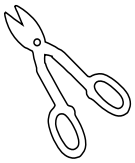
Roofing Bar



Caulk Gun



Tin Snips



Stringline

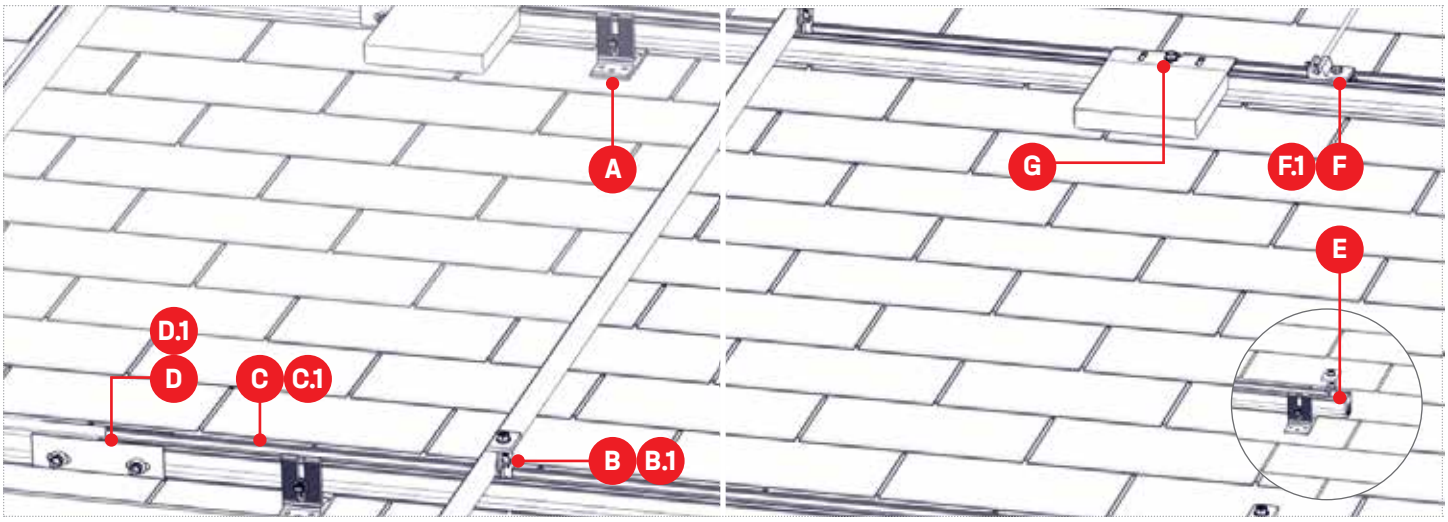


CrossRail • Information Subject to Change Without Notice

Images Illustrative in Nature & May Differ From The Physical Product

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System Overview | Components



A K2 Multi Mount



B K2 Cross Clamp Set

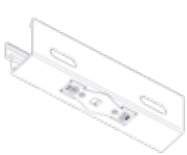


B.1 Yeti Clamp 2.0, Set

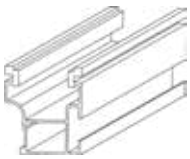
D Rail Connector



D.1 Tool-less Rail Connector

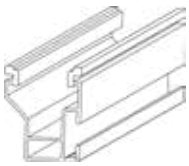


C CrossRail 44-X

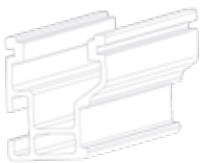


C.1 CrossRail 44 Max

C.2 CrossRail 48-X



C.3 CrossRail 48-XL



C.4 CrossRail 80



C.5 SolidRail 85

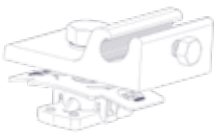
C.6 SolidRail 140



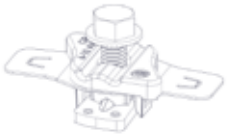
E K2 Rail EndCap



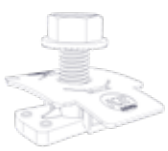
F K2 Ground Lug



F.1 Lighting Ground Lug



G CR Micro-inverter & Optimizer Kit



CrossRail • Information Subject to Change Without Notice

Images Illustrative in Nature & May Differ From The Physical Product

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System Overview | Additional Components

K2 MiniRail

Datasheets

H K2 MiniRail Comp Kit



Comp. Roof Attachments

Datasheets

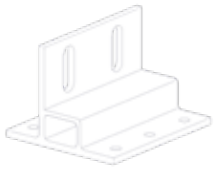
I T-Foot



J Big Foot

K SpliceFoot X

K.1 SpliceFoot XL



Tile Roof Attachments

Datasheets

L Universal Standard Hook, 9" Base Kit



M Flat Tile Hook X, Kit



N Universal Standard Hook +2, 5.5" Base



O Tile Hook 3S Wide Base w/Hardware



L.1 USH, 9", Base Kit, w/Butyl



M.1 Flat Tile Hook X Kit, w/Butyl



N.1 USH +2, 5.5" Base Kit, w/Butyl



P Drop N Lock RT, Kit



Metal Roof Attachments

Datasheets

Q Power-Clamp Mini, Kit Standing Seam



Q.1 Power-Clamp, Kit Standing Seam



R PowerClamp, Kit Trapezoidal



S PowerClamp, Kit Corrugated



T Rail-Less, Kit Standing Seam



CrossRail • Information Subject to Change Without Notice

Images Illustrative in Nature & May Differ From The Physical Product

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System Overview | Additional Components

Micro/Mini Rail

Datasheets

U MicroRail, TR



U.1 MicroRail, TR 2.0

V MiniRail Express

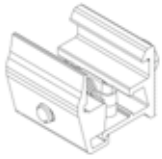
Accessories

Datasheets

W L-foot, Slotted Set



X K2 Rail Runner Kit



Y Wire Mgt. Clip, TC

Z K2 4 Wire Dragon Clip

AA HEYClip SunRunner Cable Clip, SS

AB CrossRail Sleeve

Part Numbers

System Components - Part Number References

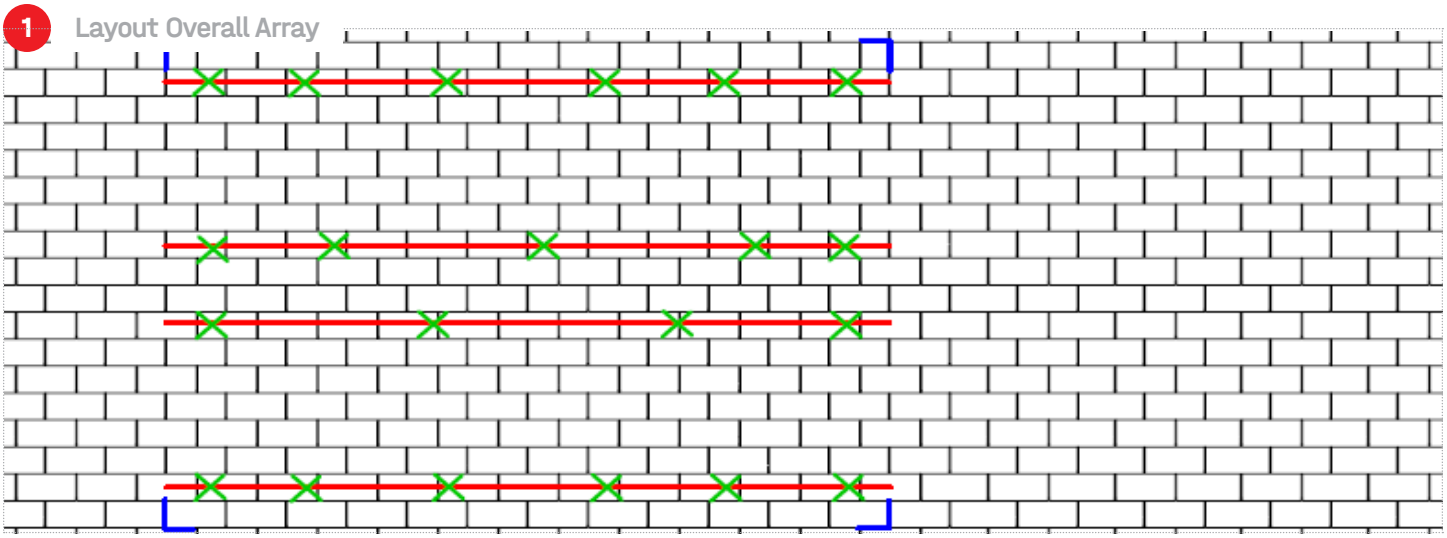
The following are the reference part numbers for the components outlined within this document

Ref.	Component	Part Numbers (P/N)
A	K2 Multi Mount	4000282, 4000284
B	K2 Cross Clamp Set	4000135, 4000145, 4000050-B, 4000050-B-US
B.1	Yeti Clamp 2.0, Set	Multiple P/Ns
C	CrossRail 44-X, 44 MAX, 48-X, 48-XL & 80	Multiple P/Ns
C	SolidRail 80 & 140	4000782, w/connector 4000792 4000782, w/connector 4000792
D	Rail Connector	4000385, 4000386, 4001196, 4000329
D.1	Tool-less Rail Connector	4000051-T, 4000052-T
E	K2 Rail EndCap	Multiple P/Ns
F	K2 Ground Lug	4000006-H
F.1	Lighting Ground Lug	4000396
G	CR Micro-inverter & Optimizer Kit	4000629-H, 4000629-H-US
H	K2 MiniRail Comp Kit	4000245, 4000246
I	T-Foot	400080
J	Big Foot	4000217
K	SpliceFoot X	4000160
K.1	SpliceFoot XL	4000299
L	Universal Standard Hook, 9" Base Kit	4000140
L.1	USH, 9", Base Kit, w/Butyl	4000140-B
M	Flat Tile Hook X, Kit	4000141
M.1	Flat Tile Hook X Kit, w/Butyl	4000141-B

Ref.	Component	Part Numbers (P/N)
N	Universal Standard Hook +2, 5.5" Base	4000142
N.1	USH +2, 5.5" Base Kit, w/Butyl	4000142-B
O	Tile Hook 3S Wide Base w/Hardware	4001294
P	Drop N Lock RT, Kit	4000234 (Flat), 4000235 (S) 4000236 (W)
Q	Power-Clamp Mini, Kit Standing Seam	4000016
Q.1	Power-Clamp, Kit Standing Seam	4000017
R	PowerClamp, Kit Trapezoidal	4000308
S	PowerClamp, Kit Corrugated	4000307
T	Rail-Less, Kit Standing Seam	4000532
U	MicroRail, TR	4000185, 4000184
U.1	MicroRail, TR 2.0	4000882
V	MiniRail Express	4000073
W	L-Foot, Slotted Set	4000630/4000631
X	K2 Rail Runner Kit	4000769/4000770
Y	Wire Mgt. Clip, TC	4000069
Z	K2 4 Wire Dragon Clip	4000400
AA	HEYClip SunRunner Cable Clip, SS	4000382
AA	CrossRail Sleeve	4000583

Product Installation | Array Layout

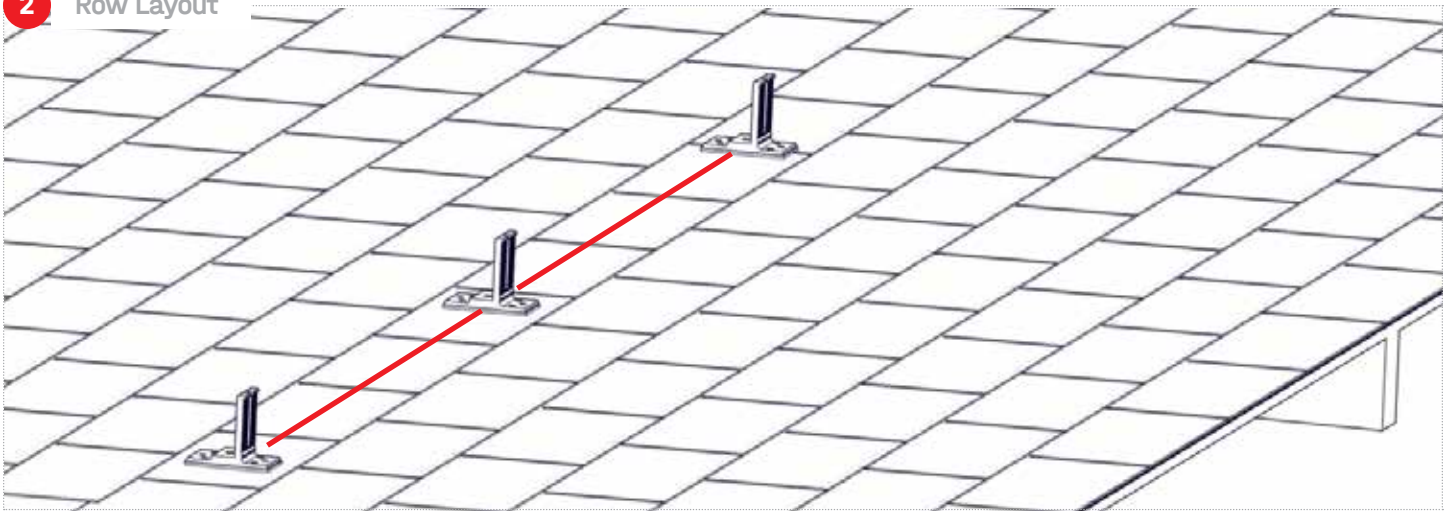
1 Layout Overall Array



Choose the appropriate roof attachment from the options above, and follow roof attachment quick guide for detailed layout and installation instructions. You can also find installation videos for all roof attachments on our website.

Corner out and mark array on roof. Snap chalk lines for rail location within shingle course. (Refer to module manufacturer frame clamping zones). Mark mounting locations over rafters and chalk lines within shingle course. Refer to engineering letters for allowable mount spacing. It is best practice to stagger mounts.

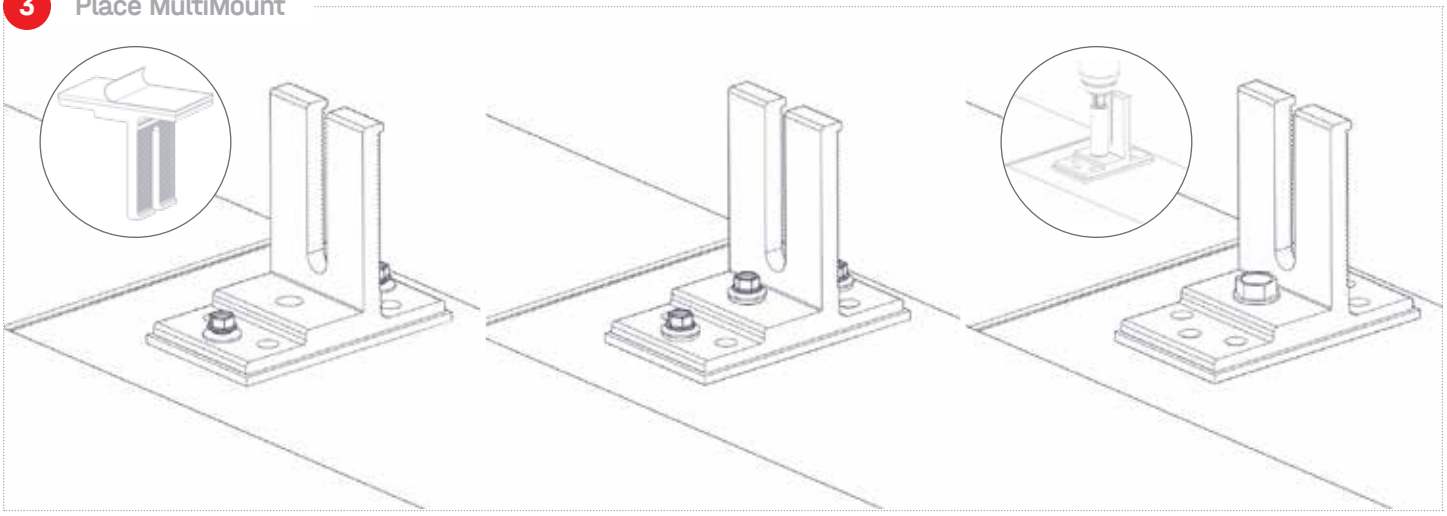
2 Row Layout



Line up mount on chalk line facing the MultiMount serrations according to the roof

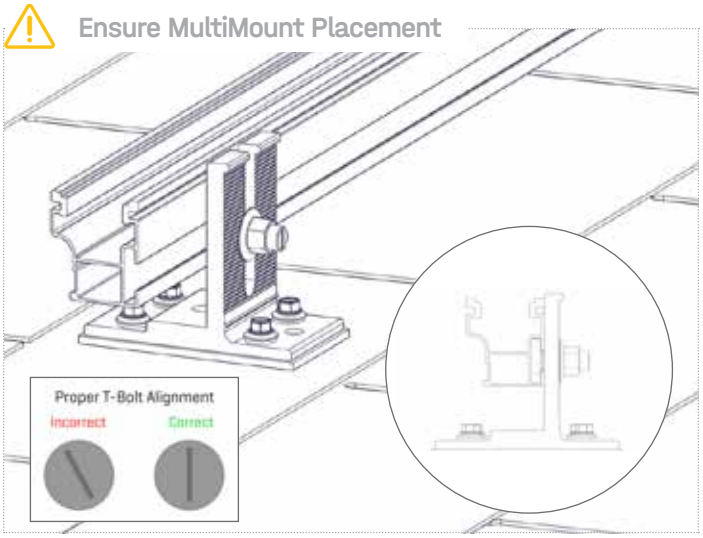
Product Installation | MultiMount & Rail Connector

3 Place MultiMount



Locate the rafter and clean roofing surface for mount placement. Peel back protective paper from butyl and stick down mount on a single shingle course with the center hole lining up over the rafter. Position all mounts in the same direction with the long side towards the ridge. Drive chosen lag screws into the rafter until the conical washer stops rotating, providing a positive seal. Do not over-torque. It should be tightened until the conical washer stops rotating. For rafter attach there are three different configurations to ensure a proper installation of the mount. Refer to Multi Mount Quick Guide for more detailed installation steps.

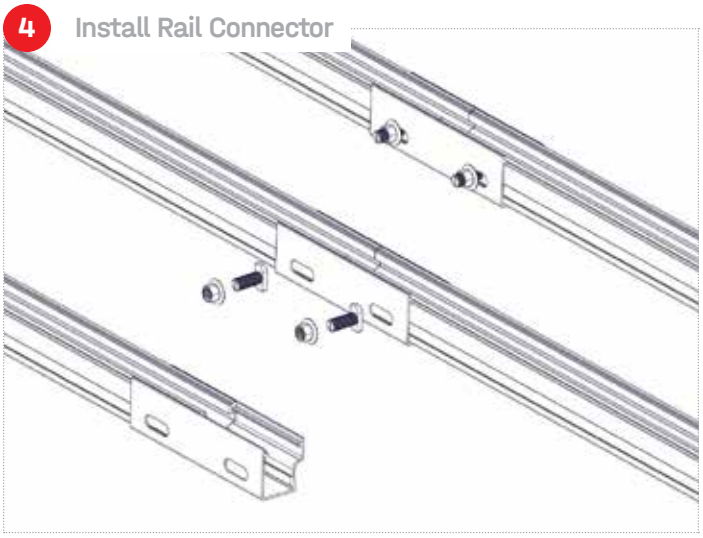
⚠ Ensure MultiMount Placement



Position and install rail on back side of K2 MultiMount towards the ridge, as shown in the image. Insert T-Bolt through slot and into side channel of CrossRail. Turn the T-Bolt clockwise ensuring that the mark at the end of the shaft is vertical, indicating proper alignment and tighten.

T-bolt to CrossRail Bolt Torque: 25.8 lb-ft

4 Install Rail Connector

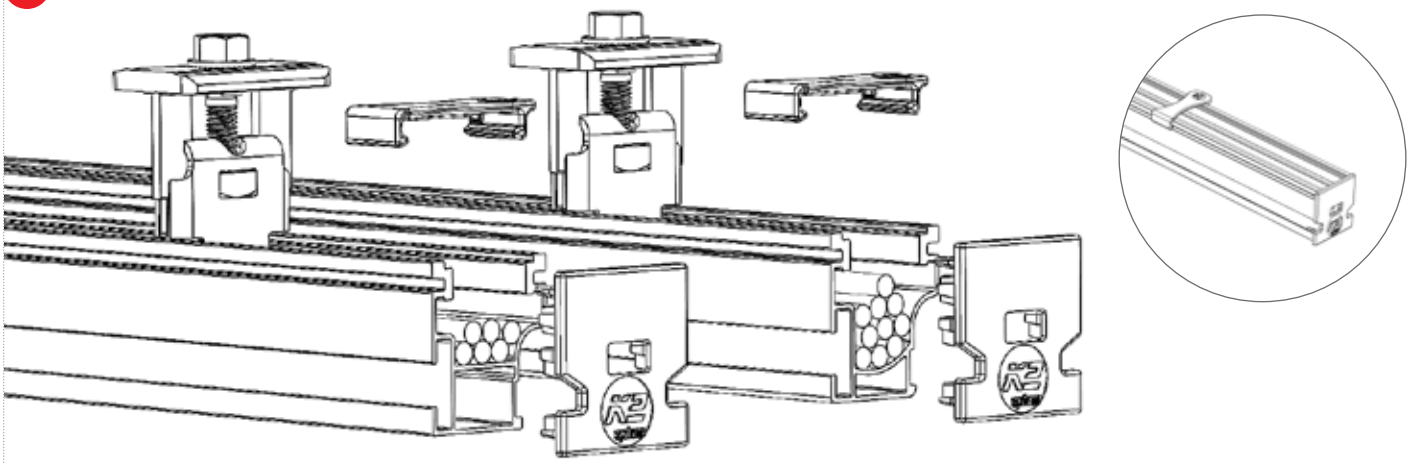


Slide Rail Connector onto first rail by matching up the mating features. Then, slide second rail into the connector and center the rail ends Attach rail connector using one T-Bolt and Serrated Hex nut per side (2 total). Using a 13mm socket to tighten. Leave 1/16"-3/16" gap between rail ends. Tool-less option does not require T-bolts.

Rail Connector to CrossRail Bolt Torque: 25.8 lb-ft

Product Installation | Cable Tray Installation

5 Cable Placement



Installation Steps for TC Wire Management Clip
- Snap into the CrossRail channel
- Make sure the TC Clip is perpendicular to the CrossRail
- TC Clips are to be installed no more then 55" apart and within 12" of entry into the rail, per NEC Section 334.30
- Optional End Caps provide closure of the Cable Tray System and also prevents debris and pest from collecting inside the rail. To install, firmly press the cap into the CrossRail

**Listed standard zip ties may be used in place of the TC Wire Management Clips

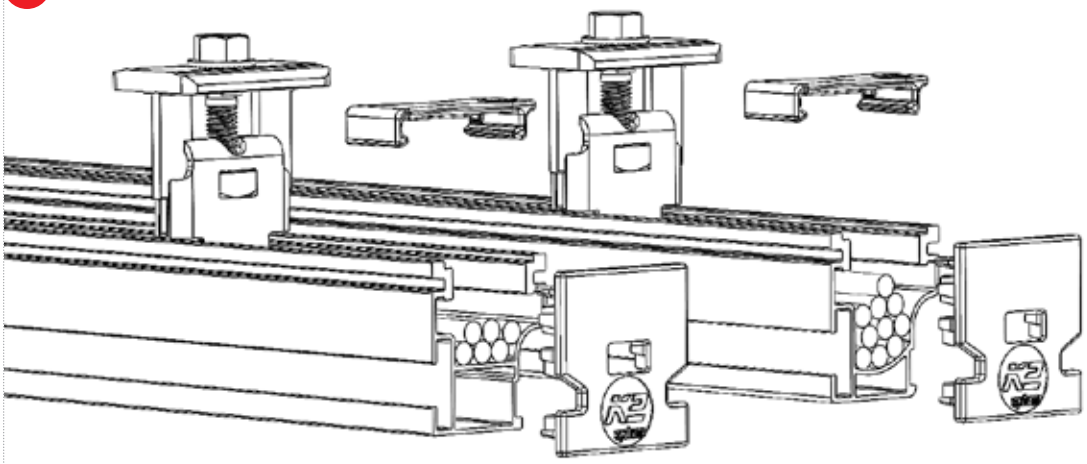
Removal of TC Wire Management Clips
- TC Wire Management Clips can be removed by pulling up on the rounded flange.

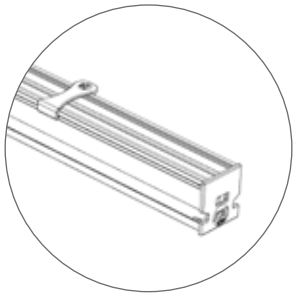
Cable Tray Fill
- Total sum of all cable cross sections installed in Cable Tray/CrossRail shall not exceed 40% of max cable fill. The CrossRail always maintains a gap greater the 7/8" above the roof surface and does not require additional temperature derating.
- Review and calculate conductor ampacity per NEC section 310.15 as required by local codes.

Warning! Do not use as a walkway, ladder, or support for personnel. Use only as a mechanical support for cables, tubing, and raceways. Non ventilated

Product Installation | Cable Tray Installation (Cont.)

5 Cable Placement





Rail Type	Max Cable Fill 40% [in²]	AWG 10	AWG 12	Enphase Q Cable
CrossRail 44-X	0.468	(Qty 8)	(Qty 10)	(Qty 5)
CrossRail 44-X Max	0.564	(Qty 9)	(Qty 12)	(Qty 6)
CrossRail 48-X	0.560	(Qty 9)	(Qty 12)	(Qty 6)
CrossRail 48-XL	0.556	(Qty 9)	(Qty 11)	(Qty 6)
CrossRail 80	0.648	(Qty 11)	(Qty 13)	(Qty 7)
Mini Rail Comp	0.648	(Qty 11)	(Qty 13)	(Qty 7)

CrossRail 44-X Datasheet

CrossRail 44-X Max Datasheet

CrossRail 48-X Datasheet

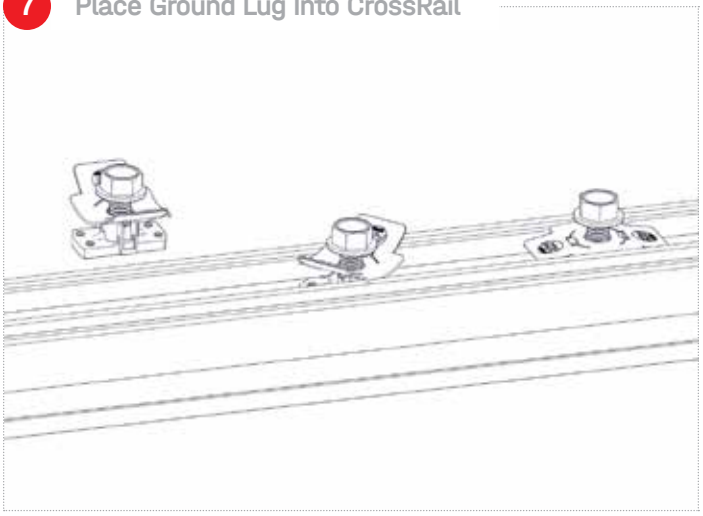
CrossRail 48-XL Datasheet

CrossRail 80 Datasheet

Mini Rail Comp Datasheet

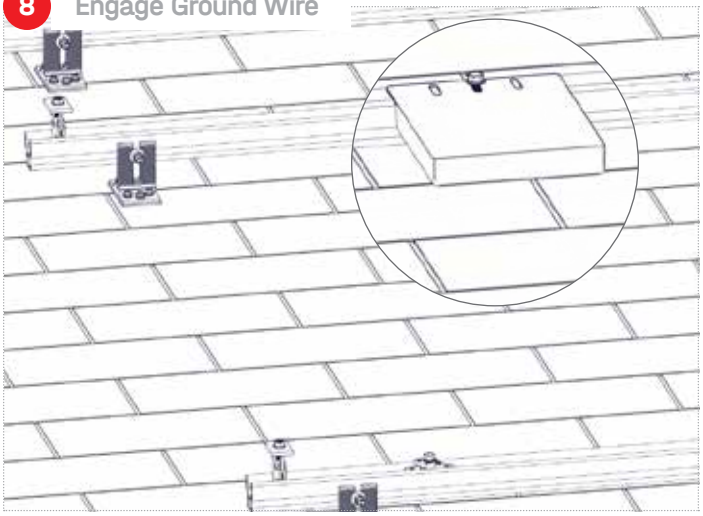
Product Installation | MLPE Mount & Ground Lug

7 Place Ground Lug Into CrossRail



For MLPE mounting, use the CR Microinverter & Optimizer Mounting Kit. Mark installation locations of MLPEs on the rail. By slightly pinching the plastic installation tabs on the MK3 insert the CR Microinverter & Optimizer Mounting Kit into the rail channel and turn clockwise 90 degrees until plastic tab seats into notch on the top channel, and MK3 nut is perpendicular with channel. **NOTE: MK3 Single Use Only**

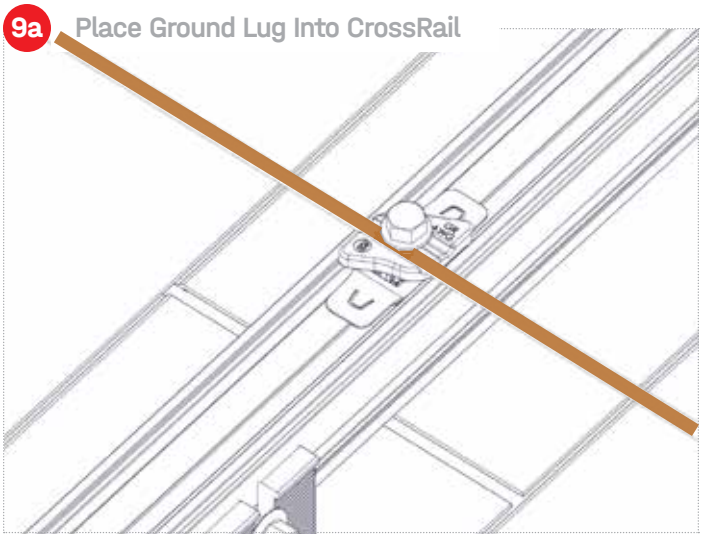
8 Engage Ground Wire



Slide the open slot of the MLPE mounting plate on to the flange bolt of the CR Microinverter & Optimizer Mounting Kit. Using a 13mm socket tighten to 10.3 ft-lbs.

MLPE Mount to CrossRail Bolt Torque: 10.3 ft-lbs

9a Place Ground Lug Into CrossRail

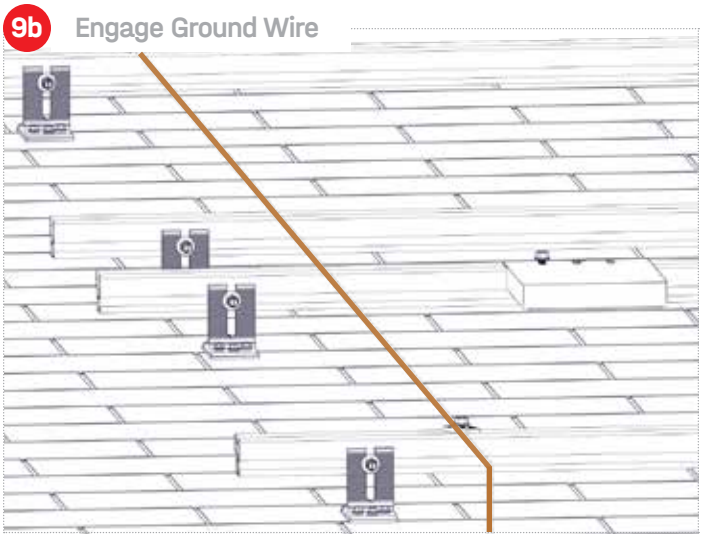


Insert MK3 Slot Nut of preassembled K2 Ground Lug into top channel of CrossRail. While slightly pinching plastic tabs, rotate 90º clockwise to engage into rail channel. Ensure bonding teeth are perpendicular torail channel.

Ground Lug to CrossRail Torque: 12.0 ft-lbs (16.3 Nm)

Lightning Lug to CrossRail Torque: 8-10 ft-lbs (10.8-13.6 Nm)

9b Engage Ground Wire



Continue installing one ground lug per row of modules. Install equipment grounding conductor wire of bare copper or stripped section of insulated copper into the terminal screw channel of the lug. Use #6, #8 or #10 AWG solid or stranded copper wire. Using a 7/16" socket tighten terminal screw required specifications.

Grounding Lug Conductor Torque: 3-5 lb-ft (4-6.8 Nm)

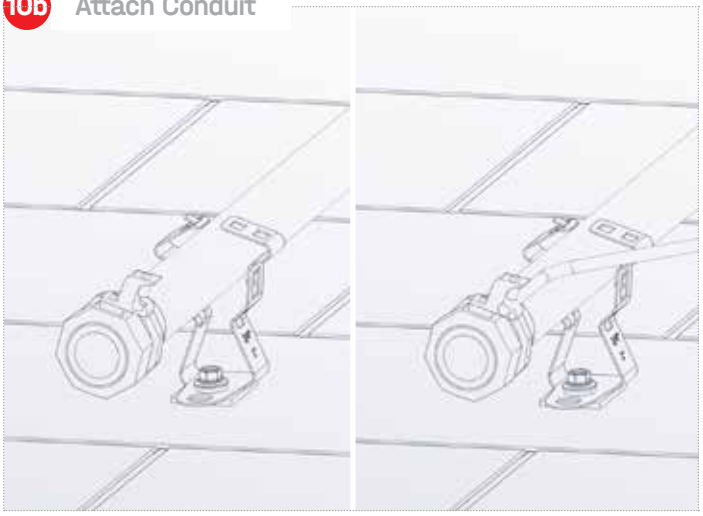
Product Installation | Conduit Mount & Module Clamps

10a Install Conduit Clamp



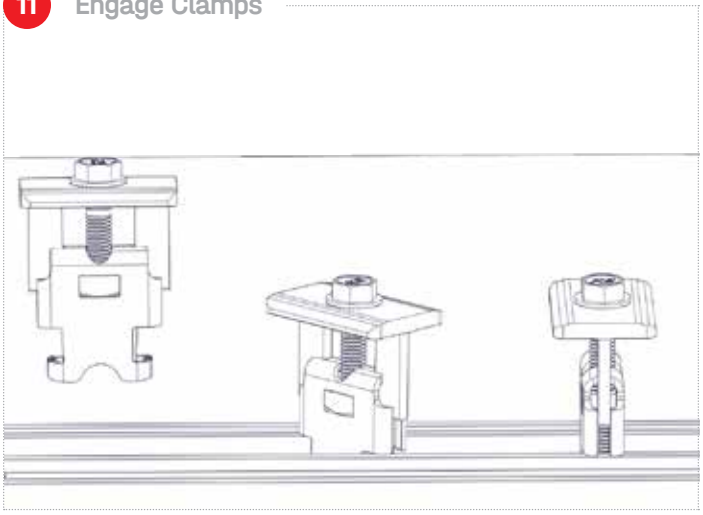
Position conduit clamp into place and tightnen screw.

10b Attach Conduit



Attached the conduit and place the bonding bushing on the end. Bond the metal raceways with a listed bushing, making sure to run the bonding path into the ground lug.

11 Engage Clamps



Install Cross Clamp, simply place into the rail and turn clockwise.

NOTE: K2 Cross Clamps are intended for single use.

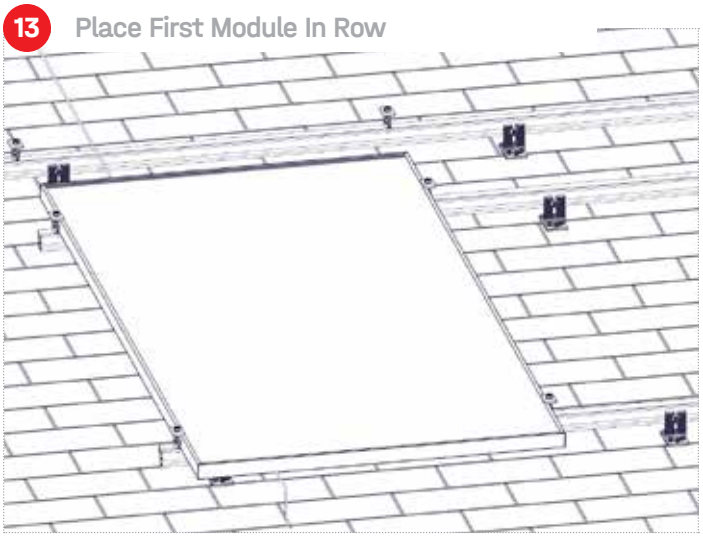
12 Position Clamps



Position Cross Clamps into their approximate installation locations. The base of the clamps allow them to stand in place once installed into the rail.

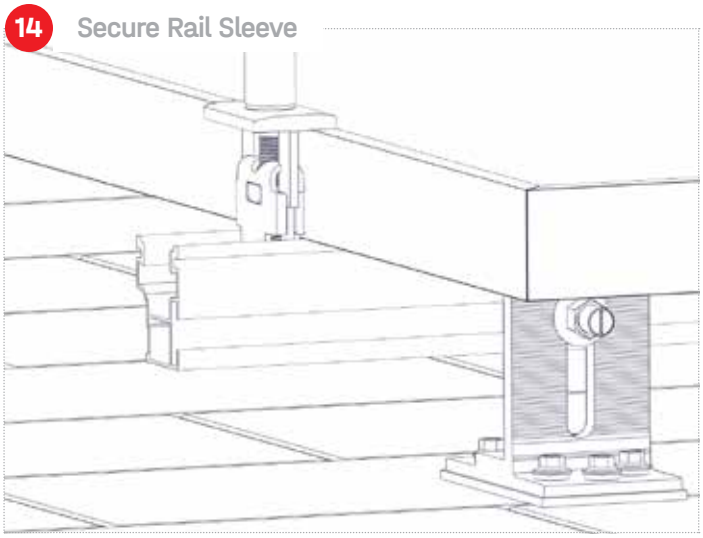
Product Installation | Place & Secure Modules

13 Place First Module In Row



Set the first module at the end of your rail, adjust module position to set the array square to the roof and set clamps at desired mounting locations. Leave a minimum of 1.5" of rail space past the edge of the module frame to account for the Cross Clamp.

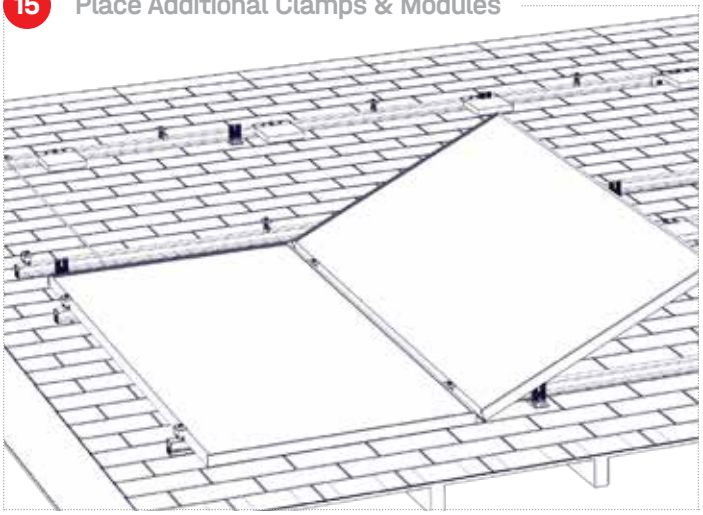
14 Secure Rail Sleeve



Using a 13mm socket to tIghten CrossClamps to required torque.

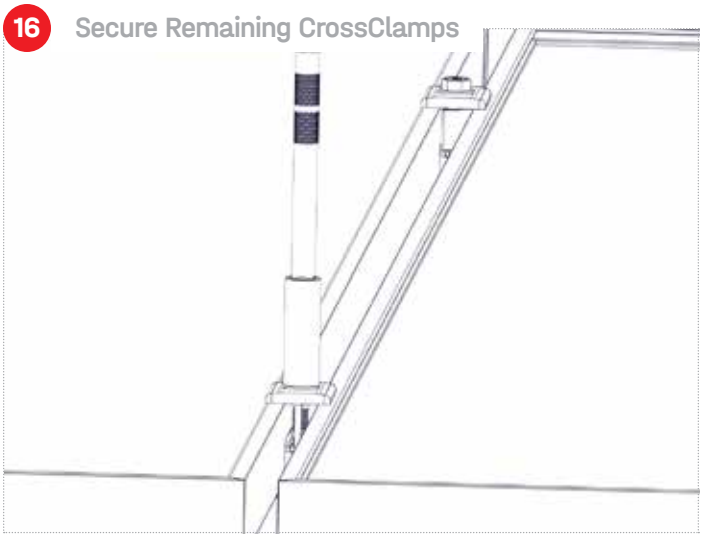
CrossClamp Bolt Torque: 12 ft-lbs

15 Place Additional Clamps & Modules



Set up your Cross Clamps by pushing them flush against the first module, adjust the height of spacer tab on clamp to sit flush against module frame. Set your next module down on the rail.

16 Secure Remaining CrossClamps

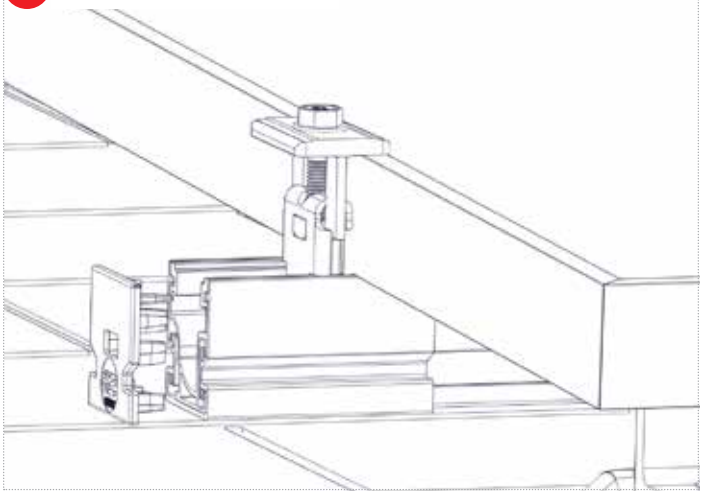


Using a 13mm socket to tIghten CrossClamps to required torque.

CrossClamp Bolt Torque: 12 ft-lbs

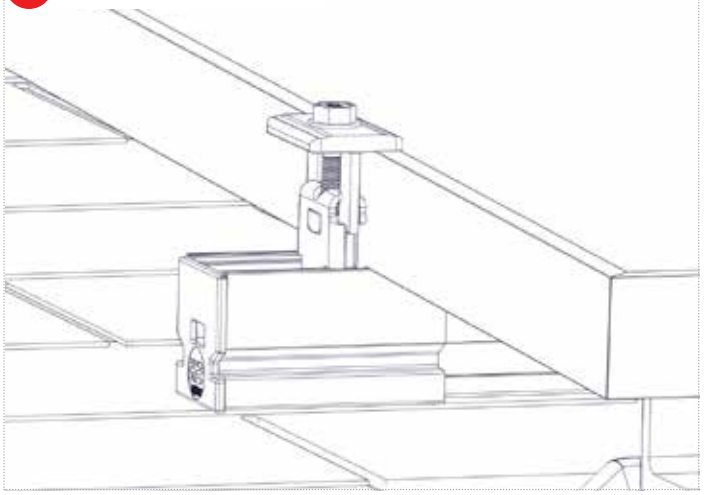
Product Installation | Finishing Touches

17 Secure Rail End Cap



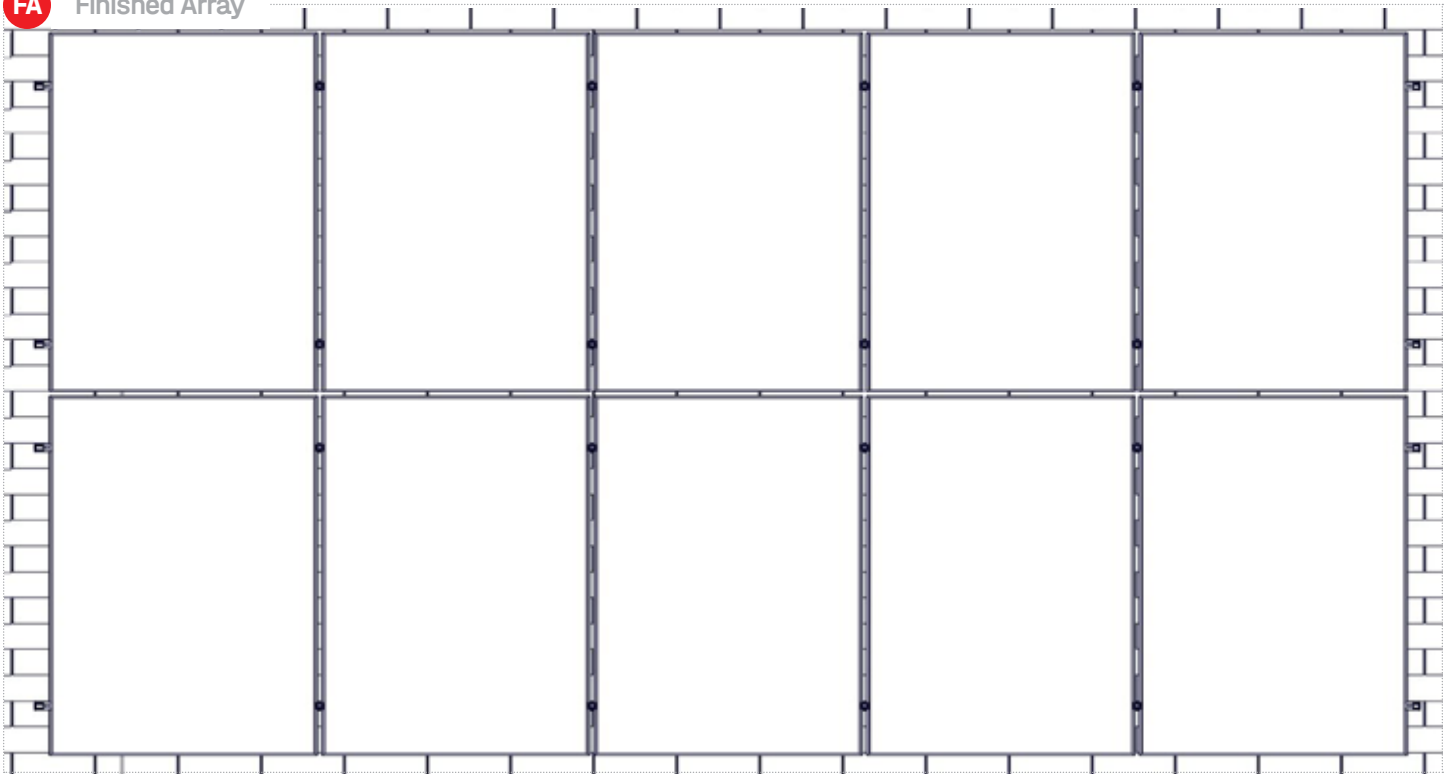
An optional End Cap can be attached at the end of your rails to create a clean aesthetic look.

18 Secure Rail Sleeve



An optional Black CrossRail Sleeve can be attached at the end of mill rails to match the rail ends to black module frames.

FA Finished Array



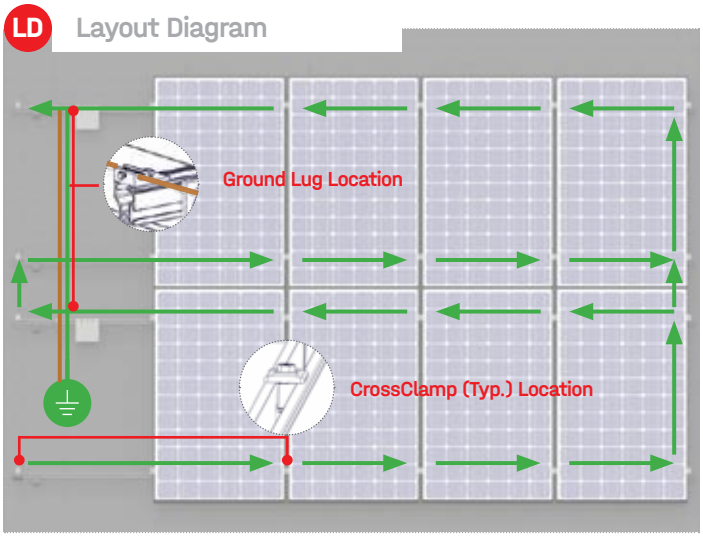
CrossRail • Information Subject to Change Without Notice

Images Illustrative in Nature & May Differ From The Physical Product

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Product Installation | Bonding & Grounding Paths

LD Layout Diagram



Bonding & Grounding

The bonding and grounding of K2 systems mounting solutions and associated products shall adhere to all governing building codes.

Appropriate means of bonding and grounding are required. A sample bonding path diagram is shown within this document. Your specific installation may vary, based upon site specific conditions and your AHJ's requirements.

K2 Systems has obtained a UL 2703 system listing in compliance with Underwriter's Laboratories (UL) requirements.

Each electrical connection has been evaluated to a maximum fuse rating of 30A. At least one ground lug per row of modules must be used to ground all equipment within each sub-array, although additional may be used for redundancy. When installed per these installation instructions, all connections meet the requirements of NEC 690.43.

This racking system may be used to ground and/or mount a PV module complying with UL 61730 only when the specific module has been evaluated for grounding and/or mounting in compliance with the included instructions.

Connecting Strength

CrossRail

Testing & Certification
UL 2703 Compliance
UL 467 Compliance
UL 3741 Compliance

Certified As "CrossRail System"

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