



SUNTILT™

PITCHED ROOF RACKING SYSTEM

Installation Manual

REVISION 26.8.1

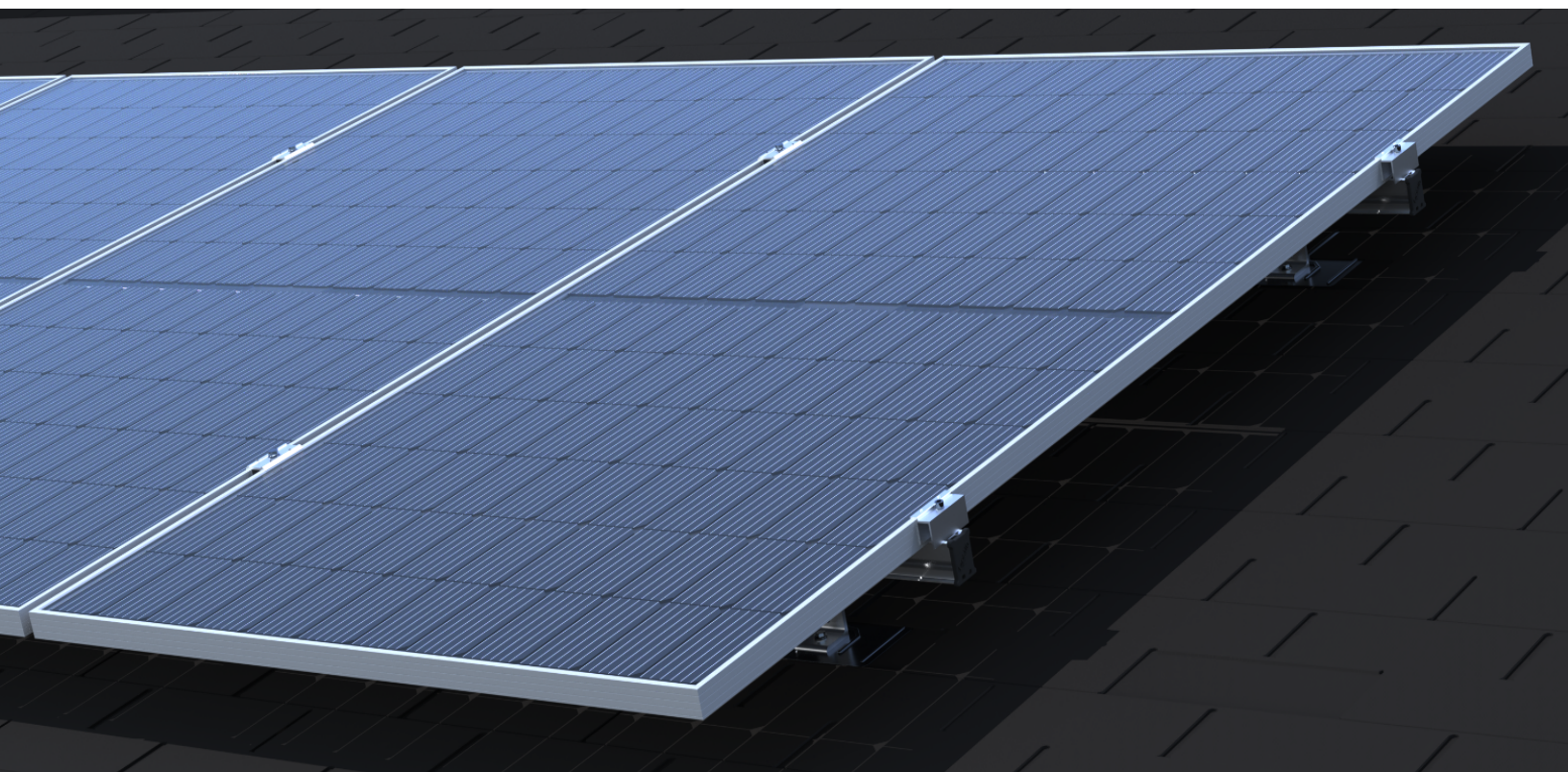


TABLE OF CONTENTS

INTRODUCTION.....	3	ANCHOR INSTALLATION.....	14
SAFETY MEASURES.....	4	Asphalt – L bracket with flashing.....	15
PREPARATION.....	6	Asphalt – T bracket.....	17
MATERIALS.....	8	Metal roofing – Exposed fastener.....	20
Standard components.....	8	Metal roofing – Corrugated sheet.....	22
Variable components.....	9	SYSTEM INSTALLATION.....	24
Asphalt shingles (T-anchor).....	9	Installing the rail adapter.....	24
Asphalt shingles (L-foot with flashing).....	9	Joining the rails.....	24
Exposed-fastener metal.....	10	Installing the rails.....	25
Standing-seam and corrugated-sheet metal.....	11	Securing the rail.....	25
SYSTEM DETAILS.....	12	Installing the module clamps.....	25
ATTACHMENT OPTIONS.....	13	Installing the modules.....	26
Asphalt shingles.....	13	Adding mid clamps.....	27
Anchor with flashing.....	13	Positioning the module.....	27
T-anchor.....	13	Adding additional modules.....	28
Metal roofing.....	14	Adding end clamps.....	28
Exposed fasteners.....	14	Securing the module row.....	29
Standing seam.....	14	Installing the end caps.....	30
Corrugated sheet.....	14	APPENDIX 1.....	31
		Opsun SMC adapters.....	31
		Electrical recommendations.....	33

INTRODUCTION

About this manual

This manual describes the installation procedure for Opsun's SunTilt flush-mount racking system. It covers every step of the assembly — from anchor preparation to module installation — including the required tightening torques. Read this manual in full before beginning.

General notes

Connect the copper grounding conductor in accordance with CEC Section 64 and the project electrical drawings. The IIsco GBL-4SS and Burndy BGBL4SS lugs are compatible with SunTilt rails and can accommodate conductors from #4 to 14 AWG. For larger conductors, the BTCGC1/0 lugs are also compatible with SunTilt rails and can accommodate conductors from #12 to 1/0 AWG.

Opsun expects installers to comply fully with local safety agencies such as CCOHS, CNESST, WorkSafeBC, etc. or any other applicable local safety standard. Installers must employ fully qualified workers equipped with the appropriate personal protective equipment and tools.

Maintenance

Maintenance must be performed annually to ensure the safety of the system (see the O&M documentation).

Product overview

Opsun's SunTilt racking system has been designed for installation on a wide range of roof types:

- Asphalt shingles
- Exposed-fastener metal roofing
- Standing-seam metal roofing
- Corrugated-sheet metal roofing

The ST1 / ST2 cross rails are fastened to the structure by means of the ST-RA1 adapter and anchors suited to the roof type. The ST-RL1 rail connector makes it possible to reach the required row length.

Faster installation

The overall system design was developed to deliver a fast installation time. With a combination of pre-assembled parts and standardized bolts and nuts, the system is 25% faster to install than standard mounting systems.

Durability

With all-aluminum extrusions and stainless steel fasteners, the SunTilt system offers a lightweight and robust design.

Warranty

Visit opsun.com for details of the limited materials and workmanship warranty.

SAFETY MEASURES

Warnings

This manual describes the installation procedures and the standards required for the reliability of the SunTilt product. Warranty details are available on Opsun's website. All installers must read this manual in full before starting work. Failure to follow these guidelines may result in property damage, personal injury or even death.

Installer Responsibilities:

Before work begins

- Verify that the roof is in good condition before installing any SunTilt component.
- Consult the stamped engineering drawing for the project, if available, to confirm the design specifications and the site loads.
- Consult the documentation of the module manufacturer and of any third-party equipment to confirm compatibility.

Regulatory compliance

- Comply with the National Building Code of Canada (NBC) and with any provincial or municipal code applicable in the province or territory where the work is carried out.
- Entrust all electrical work to a qualified contractor holding the licences required by the authorities having jurisdiction in the province or territory concerned.
- Ensure grounding in accordance with the Canadian Electrical Code (CEC), Section 10 and Section 64, as well as any applicable provincial provision.

During installation

- Use only Opsun parts or parts expressly recommended by Opsun. Substitution with unapproved parts may void the warranty.
- Avoid any contact between bare copper and aluminum or galvanized steel components (galvanic corrosion).
- Never use the ST1 / ST2 rails as scaffolding, a step or an anchor point for personnel.

Maintenance and operational safety

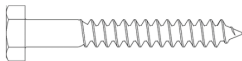
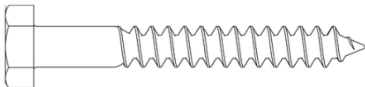
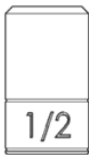
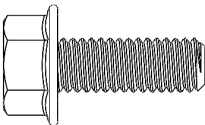
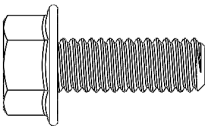
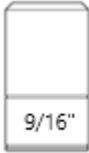
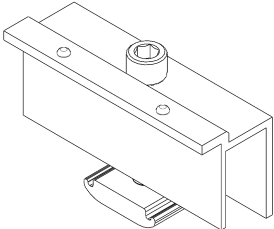
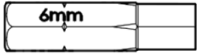
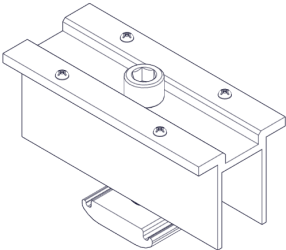
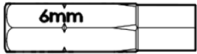
- Shut off the AC power before any maintenance or removal of modules, microinverters or optimizers.
- Immediately retighten any loose hardware found during periodic inspections.
- Replace any corroded or damaged component without delay.

Hazards specific to photovoltaic systems

The installer is responsible for prevention measures in accordance with the occupational health and safety requirements of its province or territory.

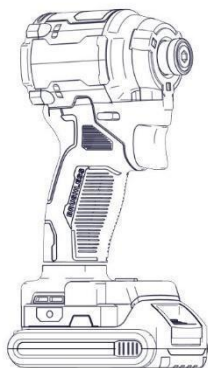
Modules are energized as soon as they are exposed to light and cannot be de-energized mechanically. When several modules are connected in series, disconnecting under load can generate an electric arc intense enough to cause severe burns, blindness or the ignition of clothing. Never disconnect a circuit under load.

PREPARATION

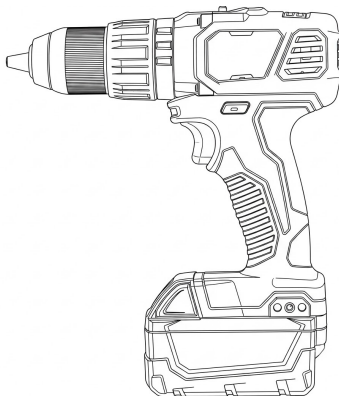
Fasteners	Tools	Torque
Lag bolt 1/4 " 	  	8.0 N·m (6 lbf·ft)
Lag bolt 5/16 " 	  	16.0 N·m (12 lbf·ft)
5/16"-18 bolts 	  	14.0 N·m (10 lbf·ft)
3/8"-16 bolts 	  	27.1 N·m (20 lbf·ft)
ZBC clamp - End 	 	19.0 N·m (14 lbf·ft)
UBC clamp - Mid 	 	19.0 N·m (14 lbf·ft)

Other tools to simplify installation:

Impact driver



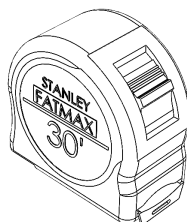
Drill



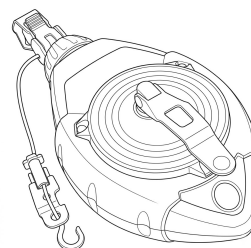
Rafter scanner



Tape measure



Chalk line

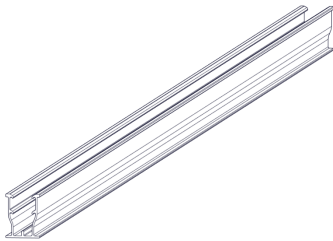


MATERIALS

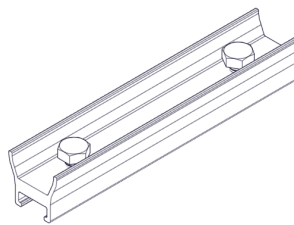
Standard components

The following components are required for all pitched-roof installation types.

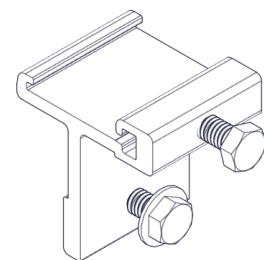
Cross rail
ST1 & ST2



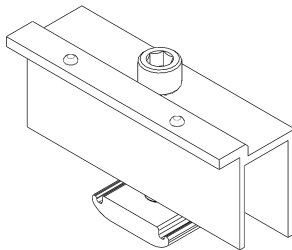
Rail connector
A-ST-RL1



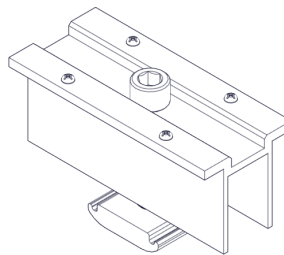
Rail adapter
A-ST-RA1



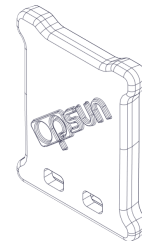
ZBC clamp - End
A5-ZBC-xx



UBC clamp - Mid
A5-UBC-xx



End cap (optional)

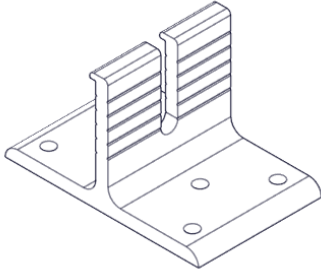


Variable components

The following components are required depending on the type of roof covering.

Asphalt shingles (T-anchor)

T-base



Lag bolt 1/4"

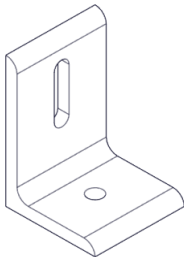


EPDM washer 1/4"



Asphalt shingles (L-foot with flashing)

"L" foot



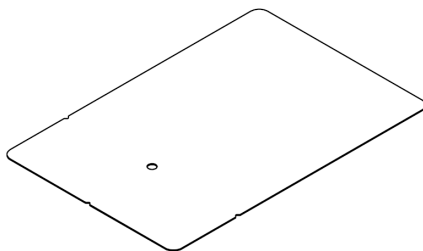
Lag bolt 5/16"



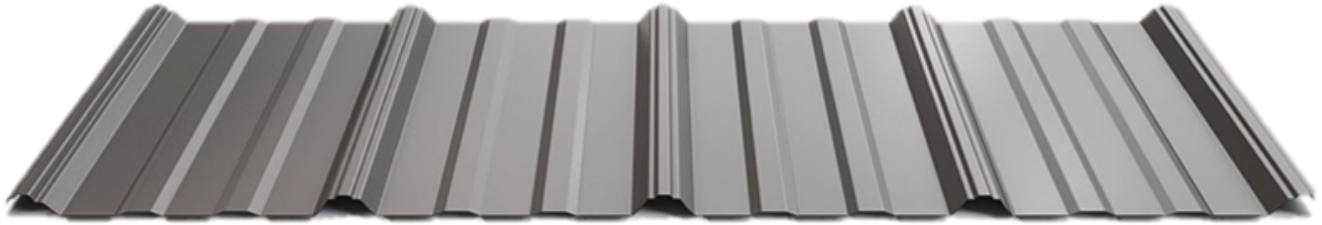
EPDM washer 5/16"



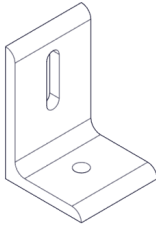
Flashing



Exposed-fastener metal



"L" foot



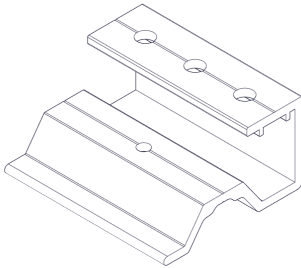
Lag bolt 1/4" x 2.5 in.



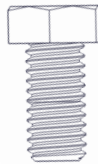
EPDM washer 1/4"



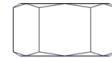
SMC-type adapter



3/8"-16 bolt



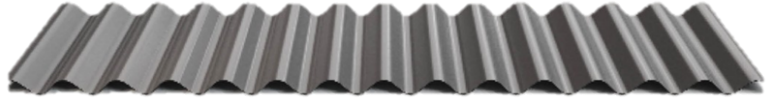
3/8"-16 nut



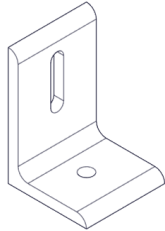
Standing-seam and corrugated-sheet metal



"L" foot

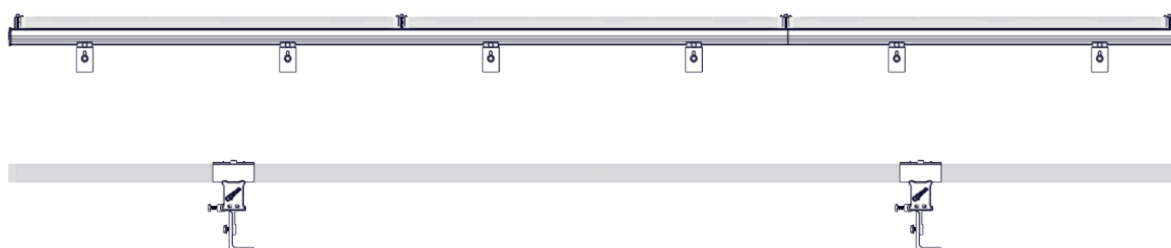
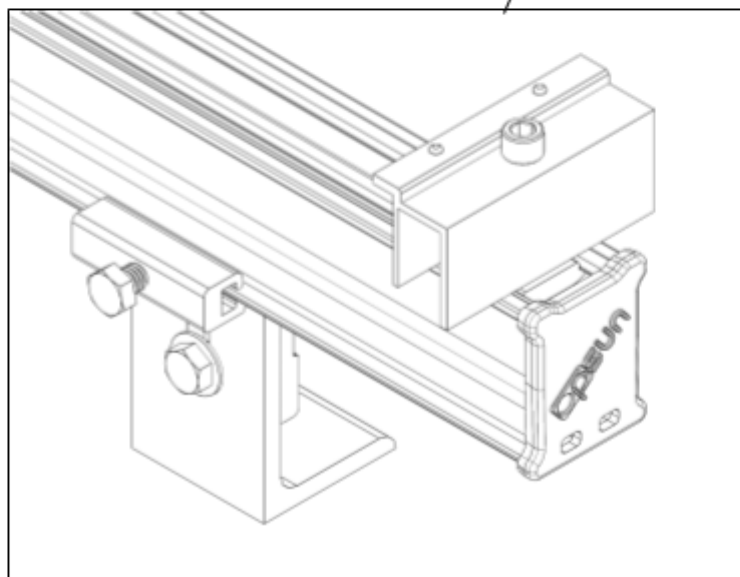
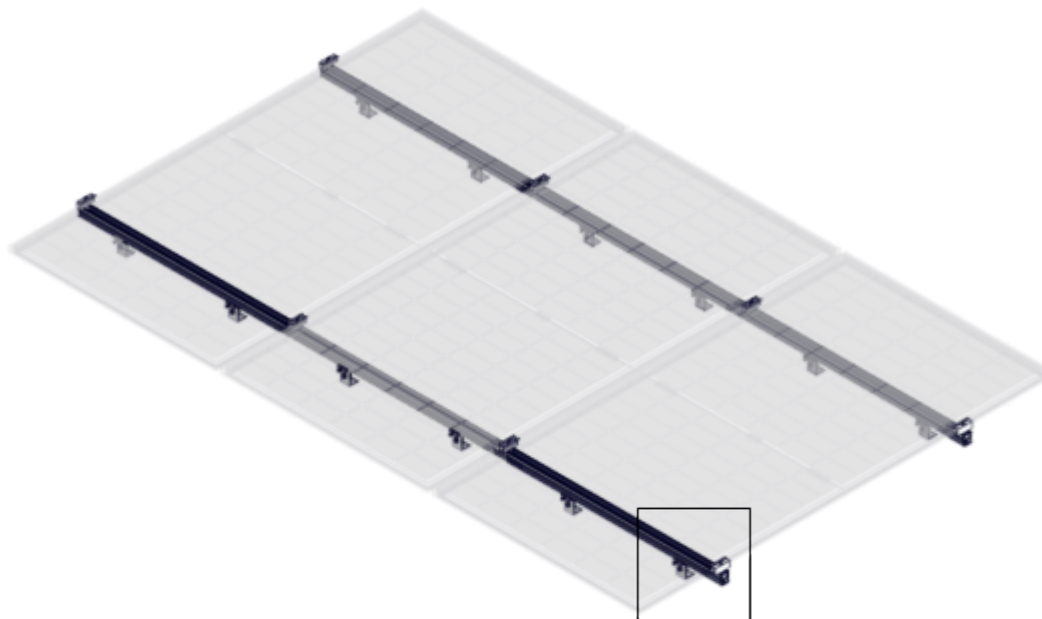


Anchor



Supplied by a third party

SYSTEM DETAILS



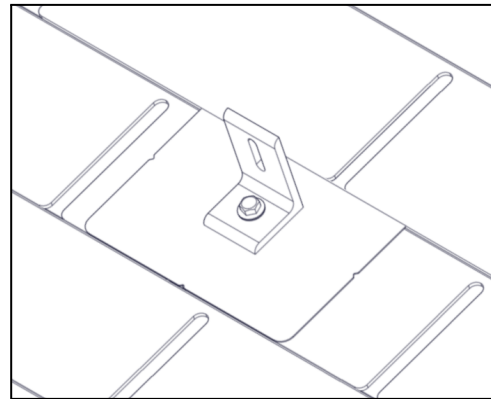
ATTACHMENT OPTIONS

Opsun's SunTilt system is designed to be compatible with a wide range of roof adapters. Select the appropriate mounting option according to your roof type

Asphalt shingles

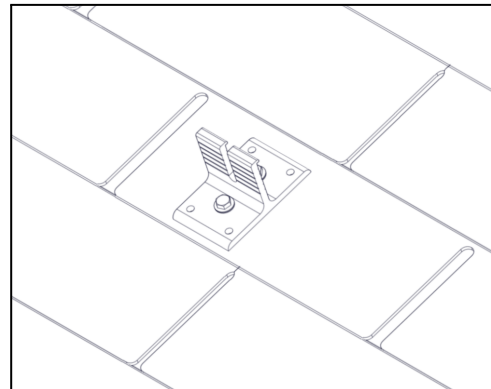
Anchor with flashing

Opsun's SRL-FL1-1H mounting option for asphalt shingle roofs anchors directly into the roof trusses and integrates a waterproofing system that slides under the shingle, providing a leak-resistant solution with minimal sealant application.



T-anchor

Opsun's TM1 mounting option for asphalt shingle roofs anchors directly into the roof trusses and integrates a waterproofing system with a butyl membrane, providing a leak-resistant solution with minimal sealant application.

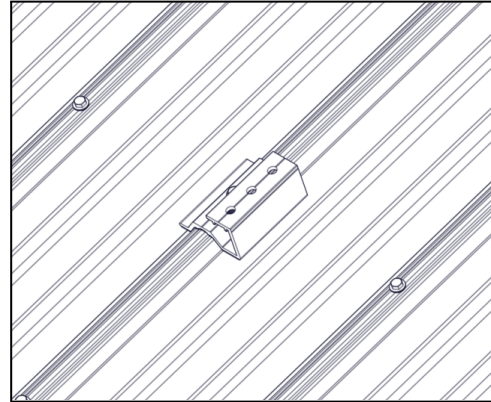


Metal roofing

Exposed fasteners

Opsun offers a selection of adapters specifically designed for exposed-fastener metal roofs. This patented design takes advantage of the existing fastener holes on your roof, simplifying installation and saving time. They also fasten securely into the roof purlins, ensuring a robust and durable attachment. This adapter integrates a waterproofing system with an SBS membrane, providing a leak-resistant solution.

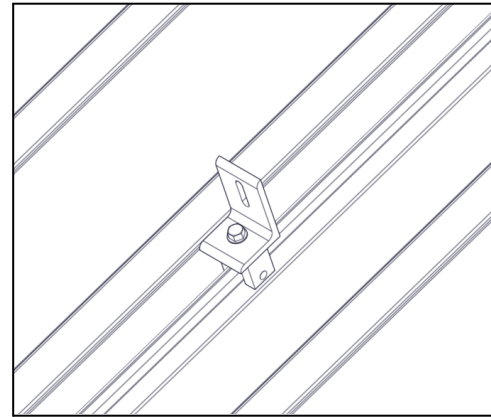
See the Opsun selection in appendix, page 30.



Standing seam

A wide range of standing-seam clamps is available on the market, each designed to fit a specific roof profile. These clamps fasten securely to the roof seams without perforation, preserving the integrity of the roof. It is recommended to choose the model compatible with the exact profile of your roof.

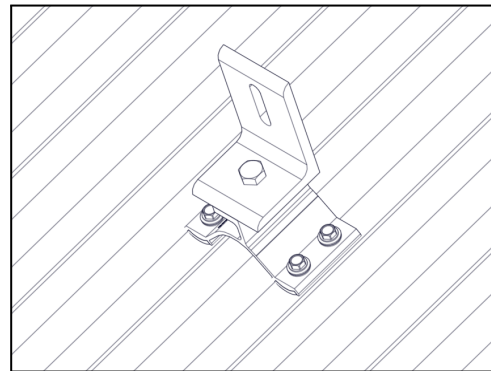
Opsun offers a bracket that fits this clamp, ensuring simple and reliable integration with your mounting system.



Corrugated sheet

A wide range of brackets is available on the market for corrugated-sheet roofing, each designed to fit the specific profile of the corrugations. These brackets install directly on the crests of the corrugations using screws, taking care to ensure adequate sealing at the penetration point. It is recommended to choose the model compatible with the exact profile of your roof.

Opsun offers a bracket that fits this type of profile, ensuring simple and reliable integration with your mounting system.

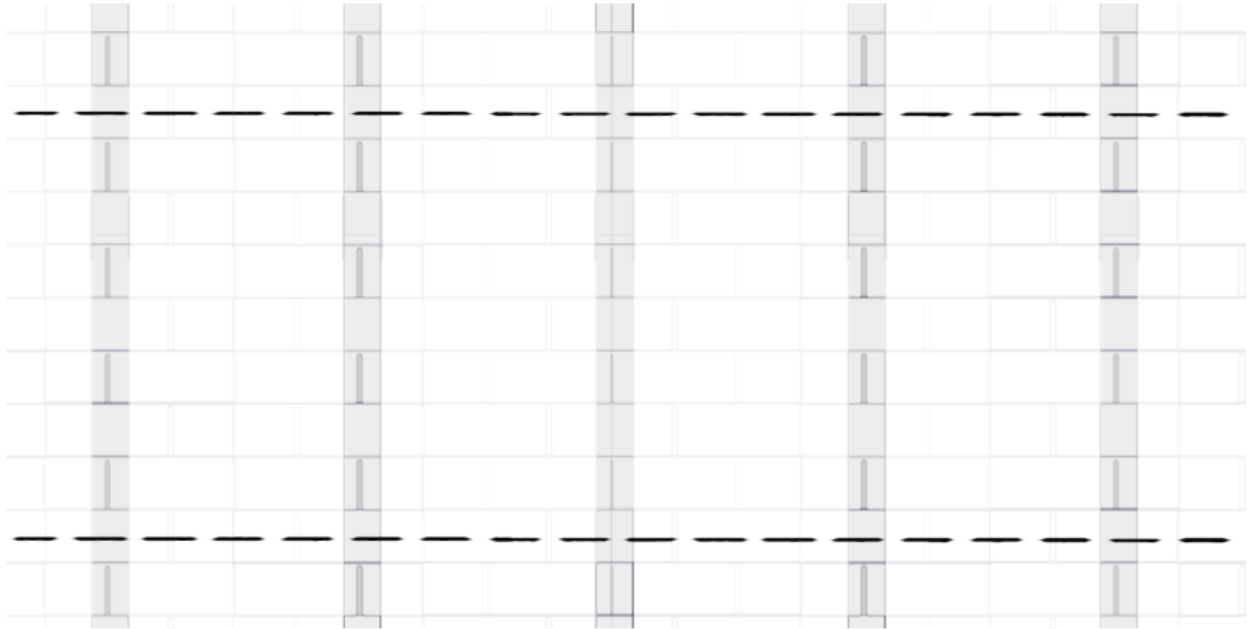


ANCHOR INSTALLATION

Asphalt – L bracket with flashing

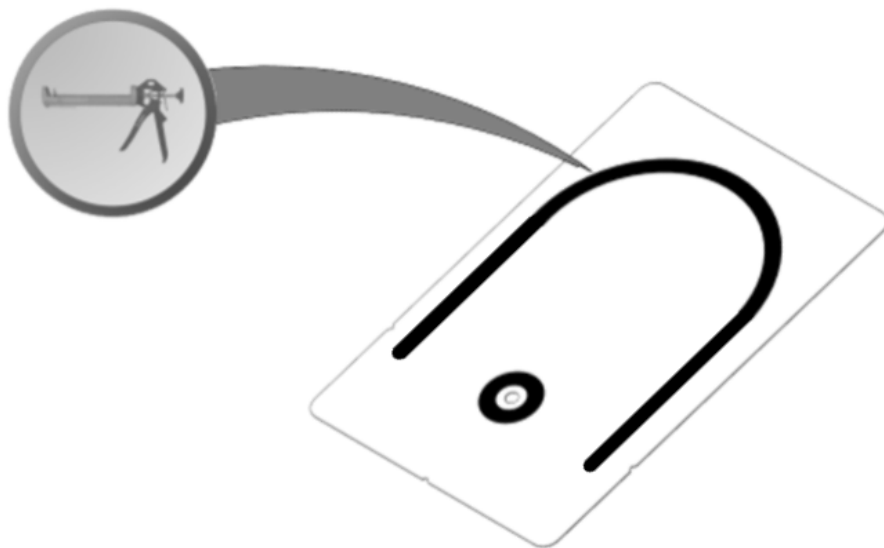
Marking the trusses

Snap a chalk line to position the system, then locate and mark the position of each truss.



Preparing the anchor

On the underside surface of the flashing, apply sealant in a U shape at the top and around the hole.



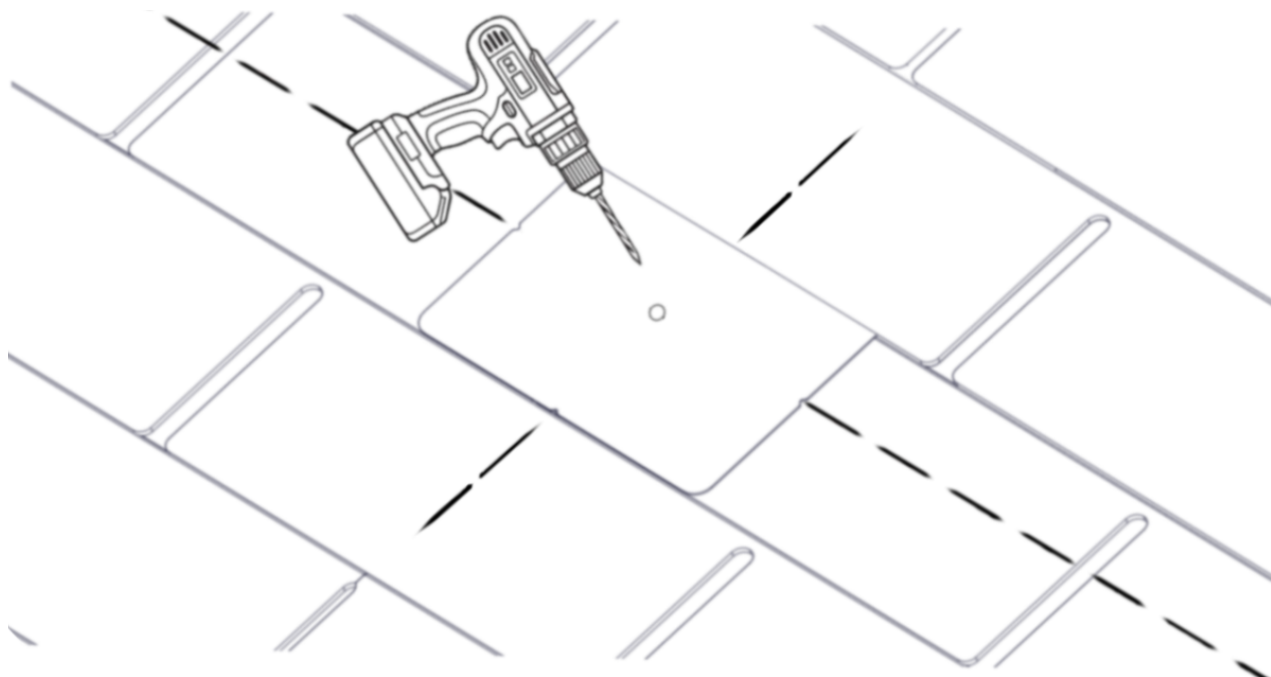
Applying the flashing

Align the bottom of the flashing with the bottom of the shingle sheet. Make sure the flashing meets the underside of the shingle sheet above.



Pre-drilling

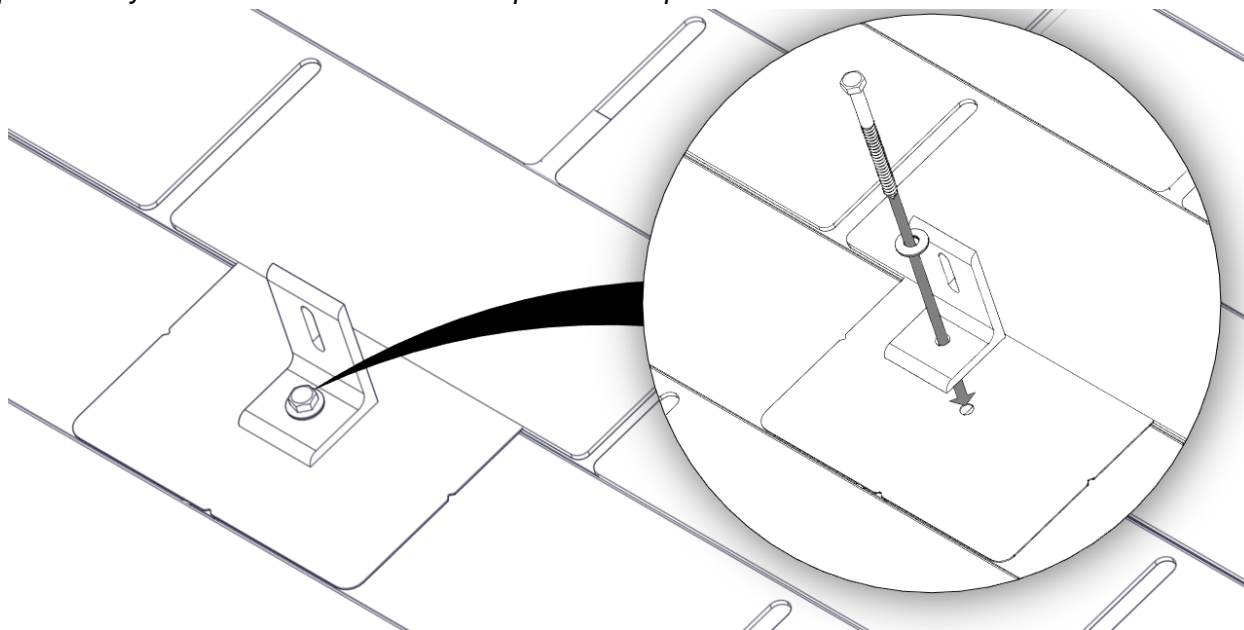
Once the flashing is inserted under the shingle and aligned with the chalk line and the chalk mark, drill a pilot hole for a 5/16" lag bolt. Use a 3/16 in. drill bit (or 7/32 in. if the wood is very hard or dry).



Installing the anchor

Fasten the “L” bracket to the rafter with a 5/16” lag bolt + EPDM washer.

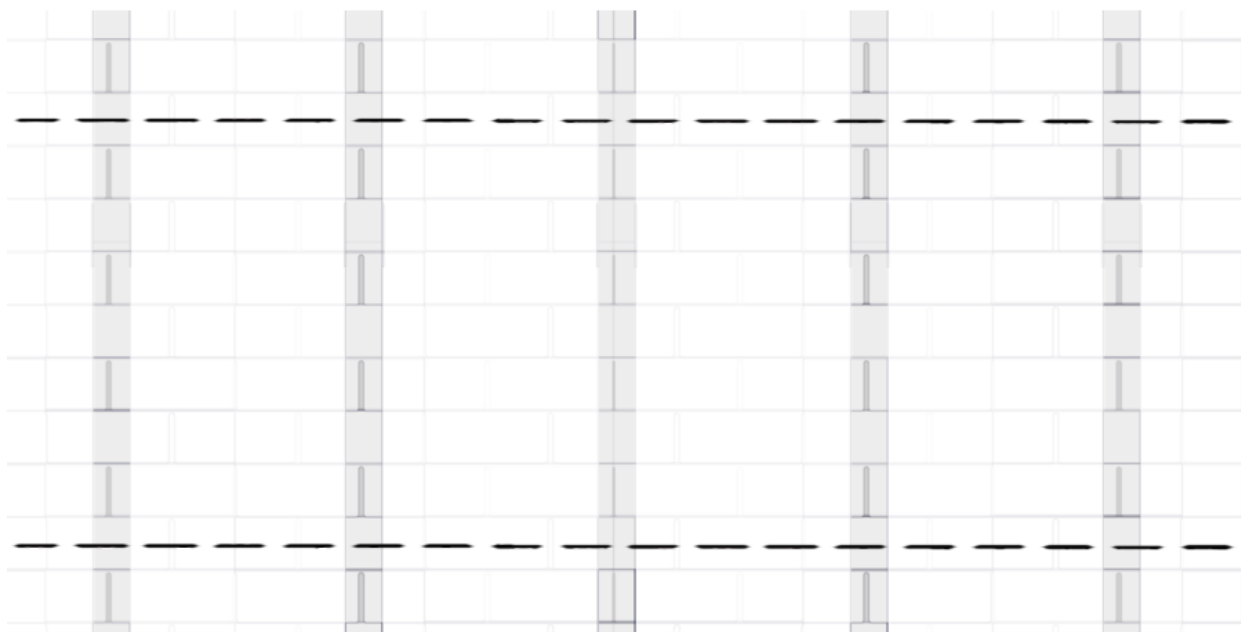
Recommendation: it is recommended to dip the threads of the lag bolt in sealant before driving it, in order to prevent any water infiltration at the truss penetration point.



Asphalt – T bracket

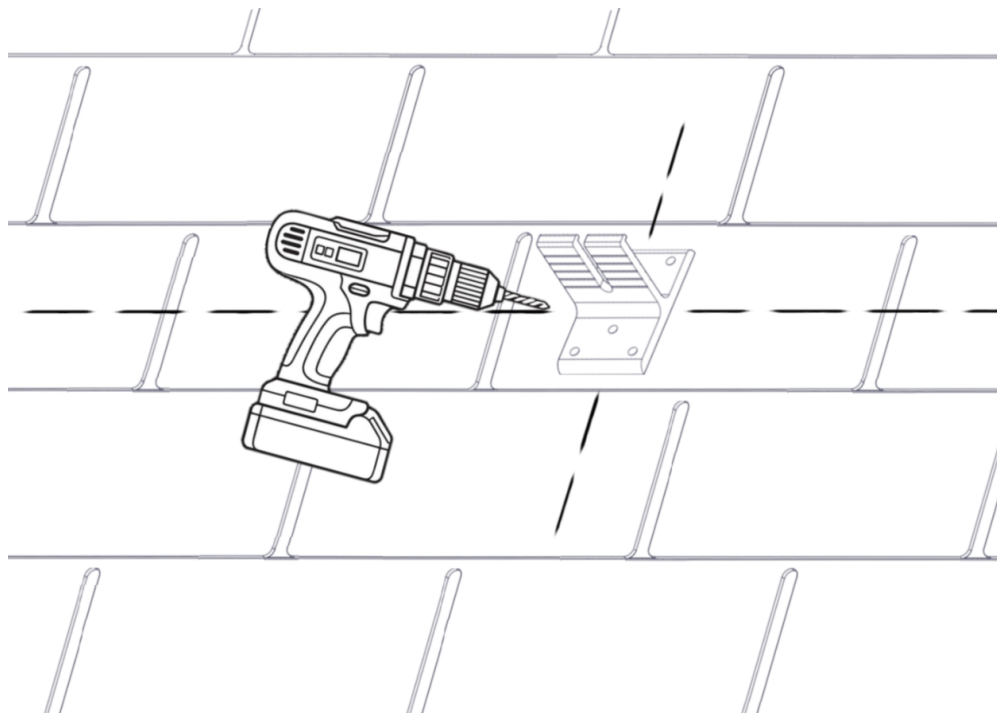
Marking the trusses

Locate and mark the position of each roof truss.



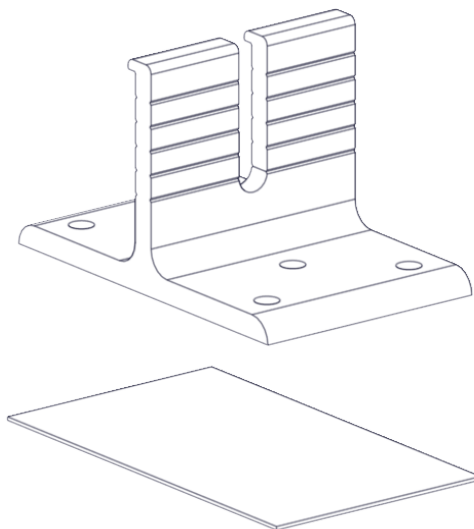
Pre-drilling

If lag screws are used, align the T-anchor with the chalk line and the rafter, then drill a pilot hole. Use a 5/32 in. drill bit (or 11/64 in. if the wood is very hard).



Preparing the anchor

Cut a 4-inch piece of waterproofing membrane and apply it under the base of the anchor.



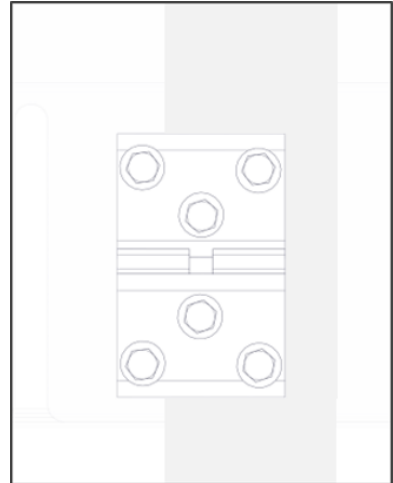
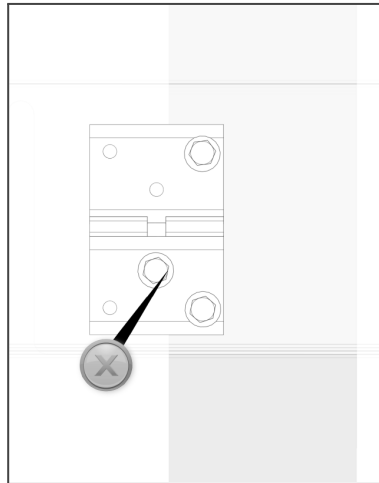
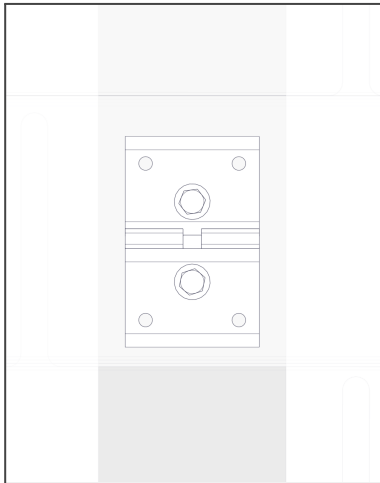
Installing the anchor

Fasten the T-anchor to the roof with a minimum of two 1/4" lag screws into the roof trusses.

When you hit the truss directly, install the screw on the opposite side only.

If you miss a truss, place another screw to the left or to the right. Once you have found it, install the opposite screw.

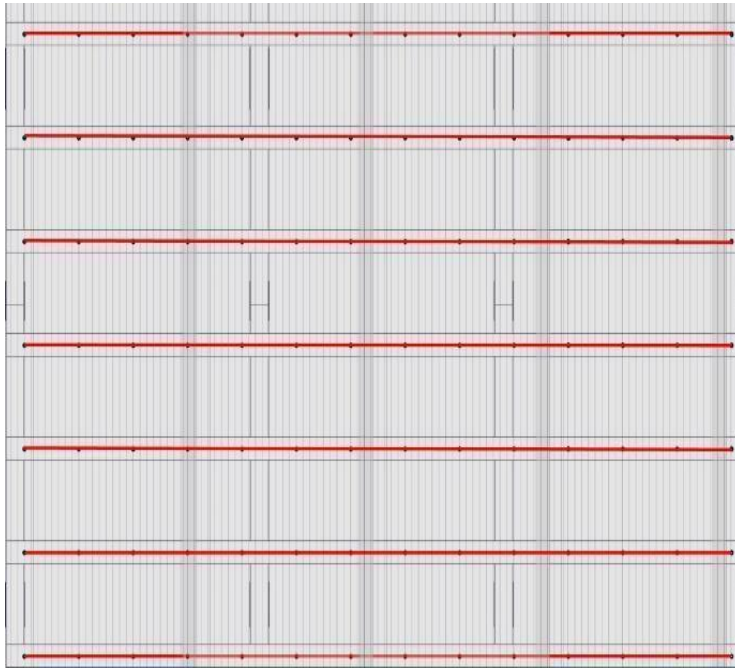
If 3 screws have missed the truss, place all 6 screws to secure it properly.
** Make sure at least 2 of the screws are engaged in the roof truss**



Metal roofing – Exposed fastener

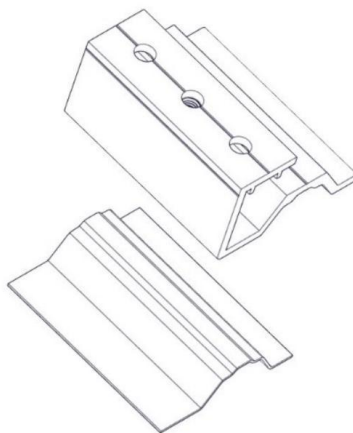
Marking the battens/purlins

Determine the location of each batten. Clean the location and remove the existing screw.



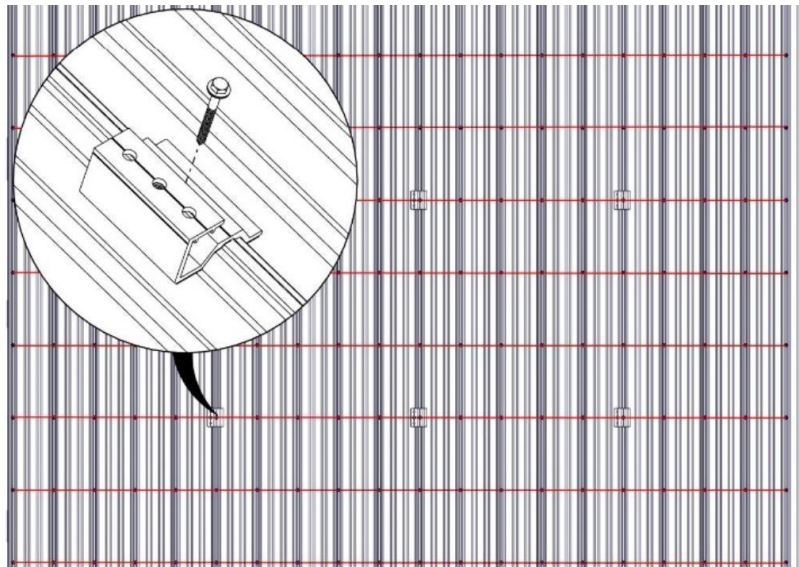
Preparing the anchor

Cut a 4-inch piece of waterproofing membrane and apply it under the base of the anchor.



Installing the anchor

Enlarge the hole with a $\varnothing 3/16"$ drill bit. Securely fasten the anchor in place using a lag bolt and an EPDM washer.



Metal roofing – Corrugated sheet

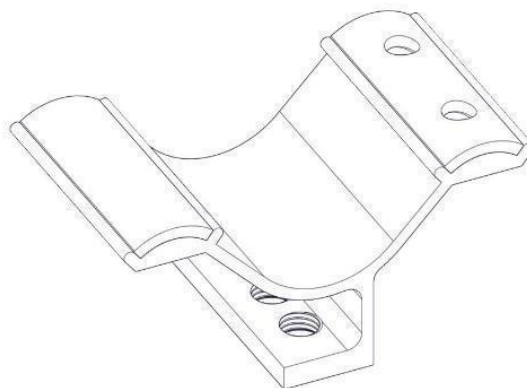
Marking the battens / purlins /

Locate and mark the location of the battens. Clean each marked location.



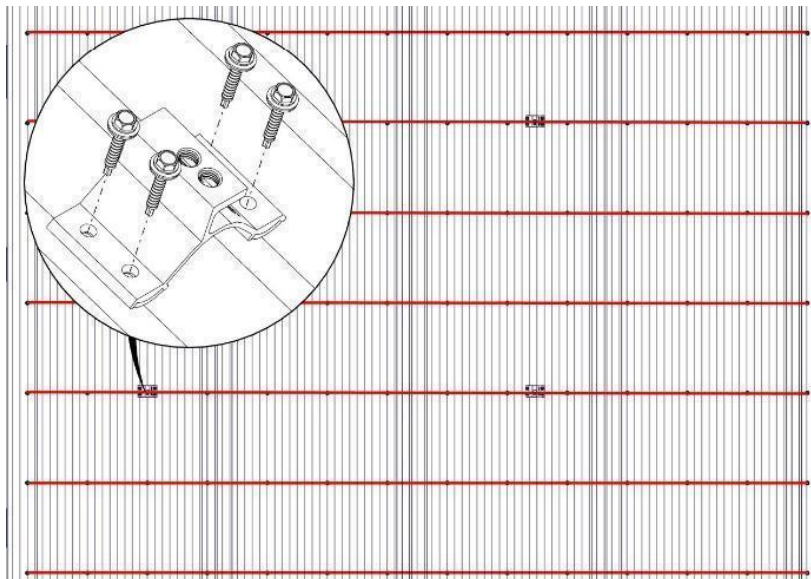
Preparing the anchor

Peel off and remove the paper from the base of the anchor. Then place it on top of the roof rib, aligned with the marked truss.



Installing the anchor

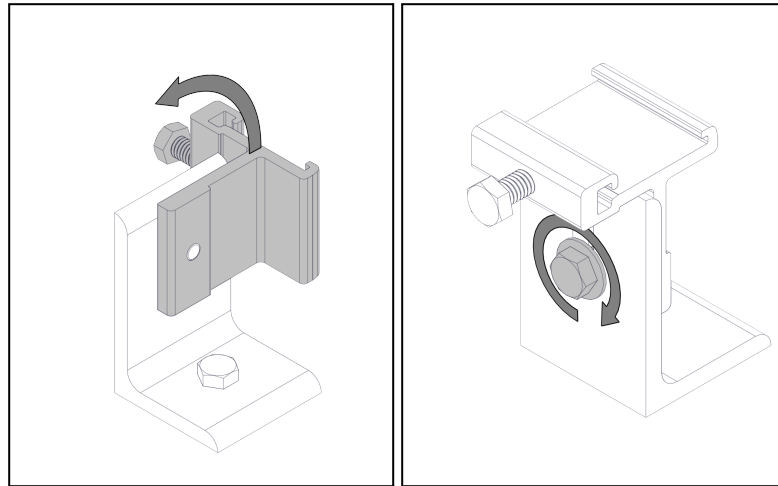
Securely fasten the anchor in place using as many holes as possible. If there are only two, use the upright location.



SYSTEM INSTALLATION

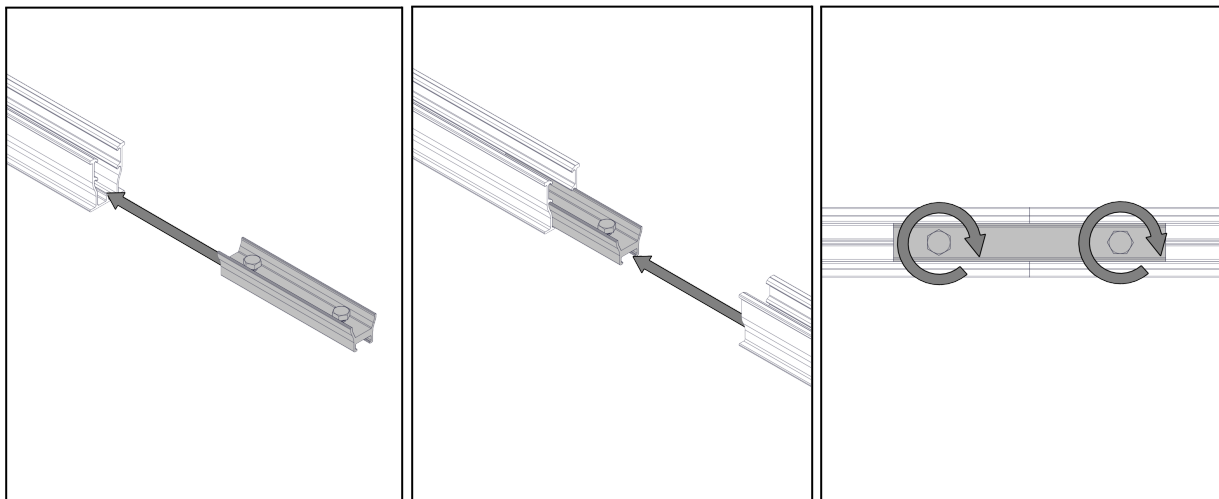
Installing the rail adapter

Install the rail adapter on the anchoring solution of your choice, adjust the height and secure it in place



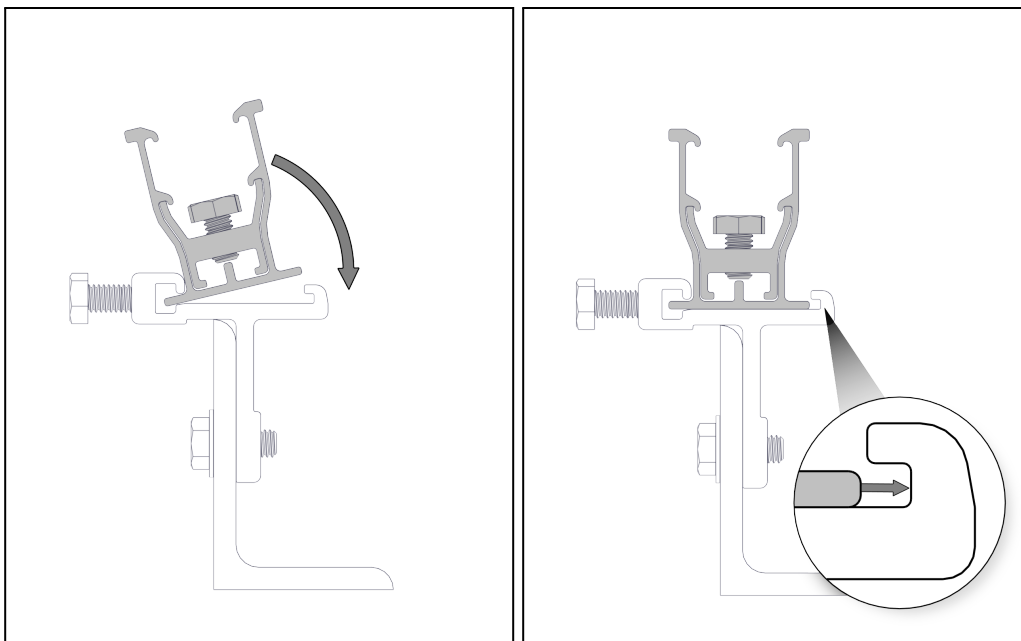
Joining the rails

Insert the rail connector inside the end of the cross rail. Slide the second cross rail over the rail connector. Tighten the rail connector in place.



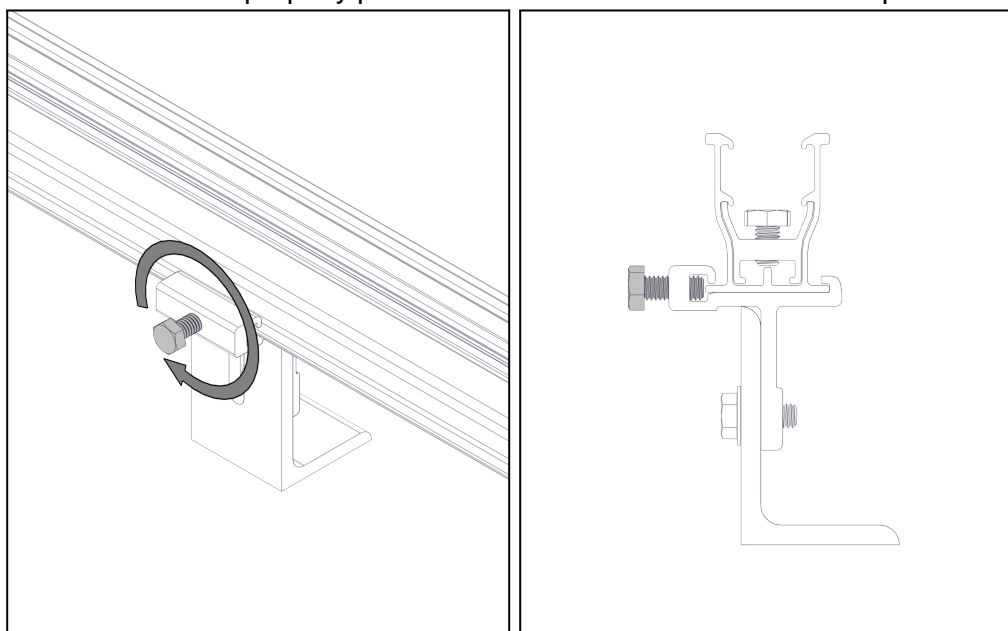
Installing the rails

Insert the rail into the opening of the adapter and rotate it forward, sliding it into the lip to stabilize it.



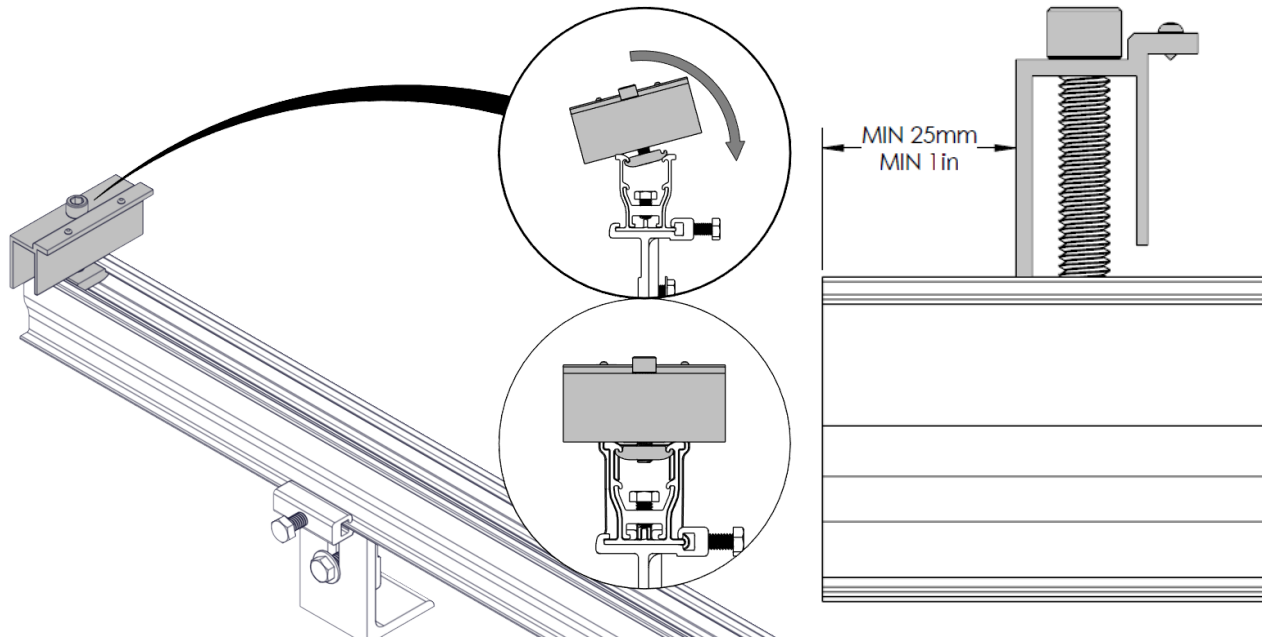
Securing the rail

Make sure the cross rail is properly positioned and secure it with the rail adapter bolt.



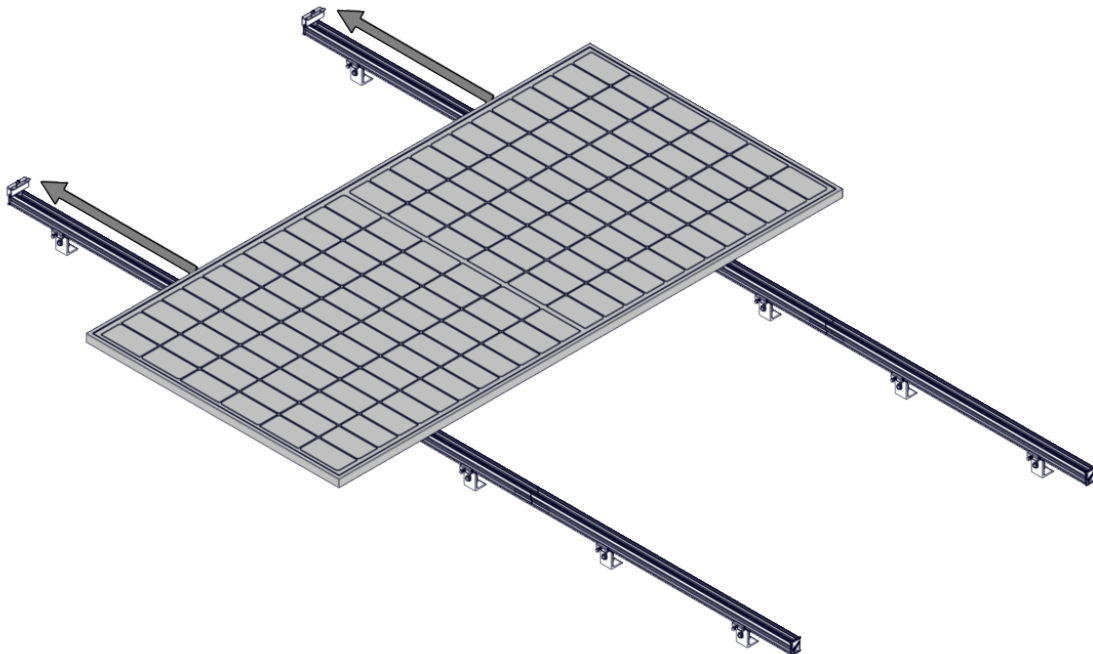
Installing the module clamps

Insert a ZBC clamp at each end of the rails. Maintain a distance of 25 mm from the rail edge



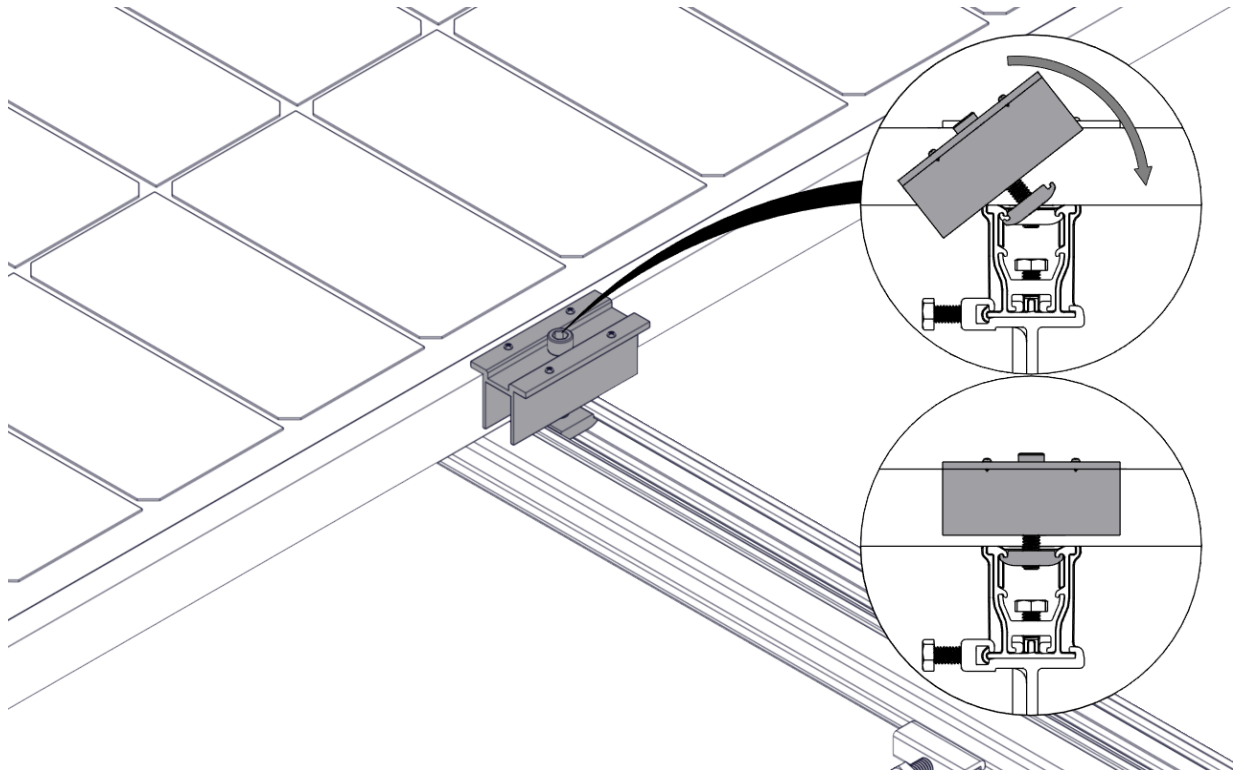
Installing the modules

Slide the first module under the ZBC clamp.



Adding mid clamps

Insert a UBC clamp on each rail and press each clamp against the module frame.



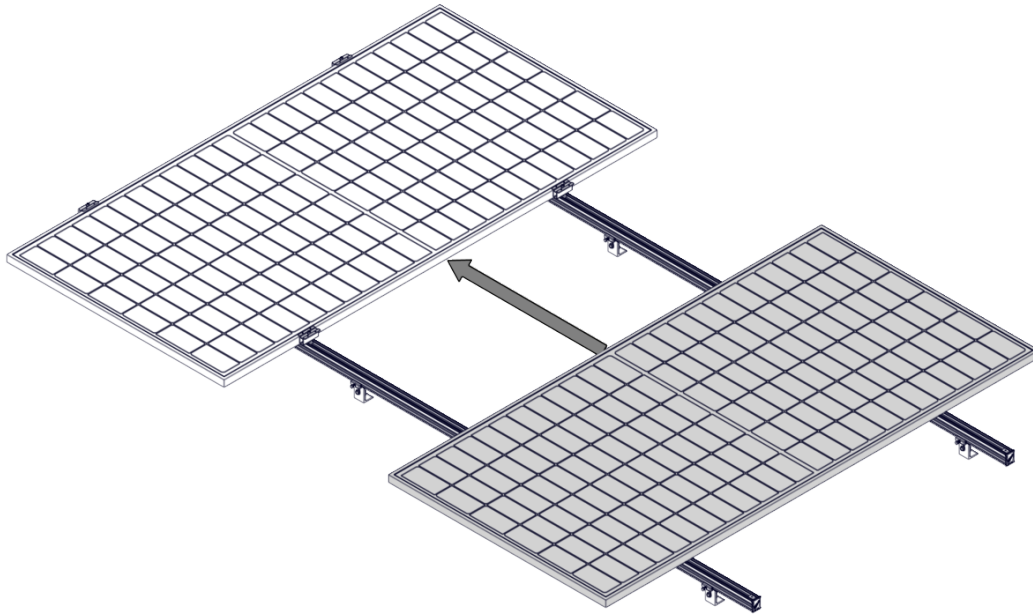
Positioning the module

Move the module along the rails to comply with the clamping zones prescribed by the module manufacturer.



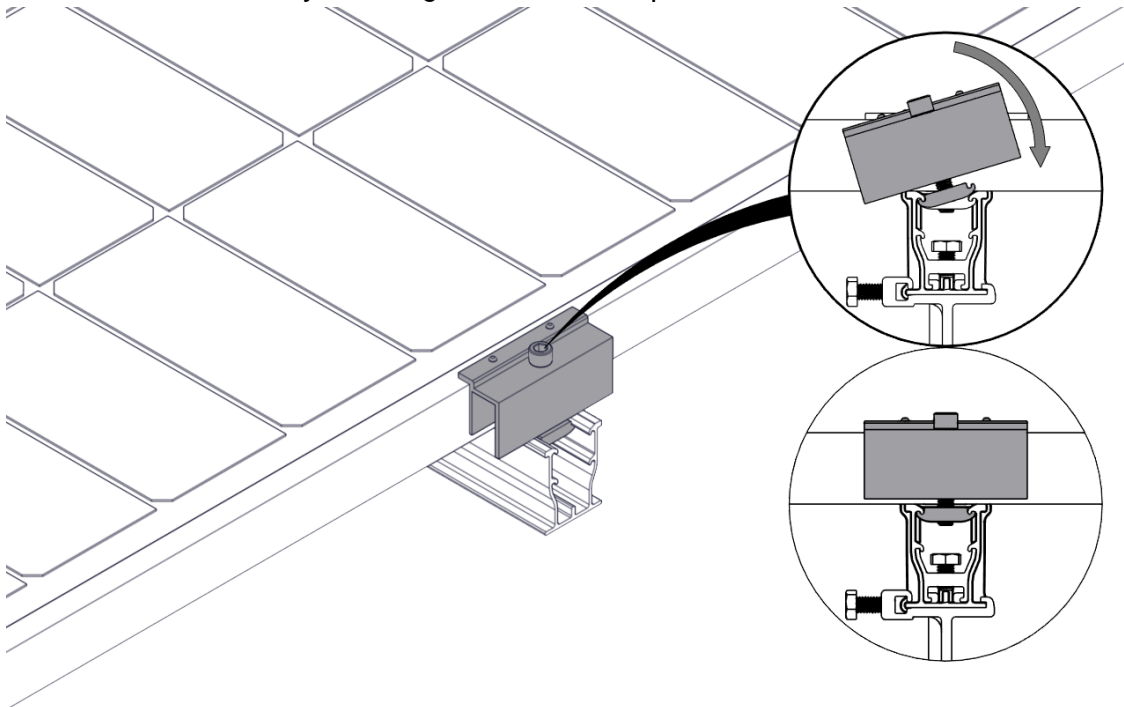
Adding additional modules

Add a module against the UBC clamp and repeat the two previous steps until the row is complete.



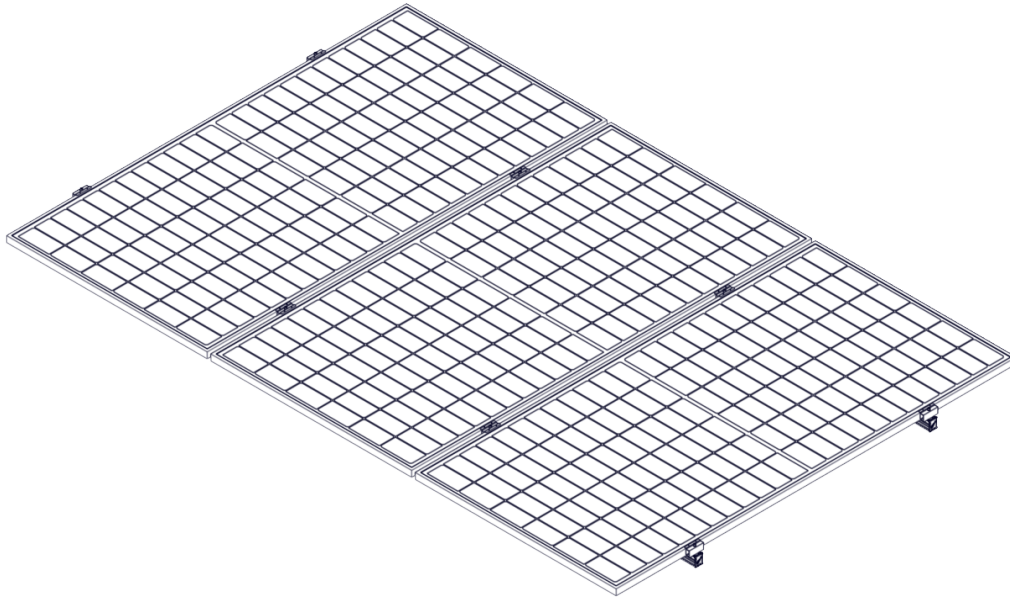
Adding end clamps

Close off the module row by inserting a ZBC end clamp at the end of each rail.



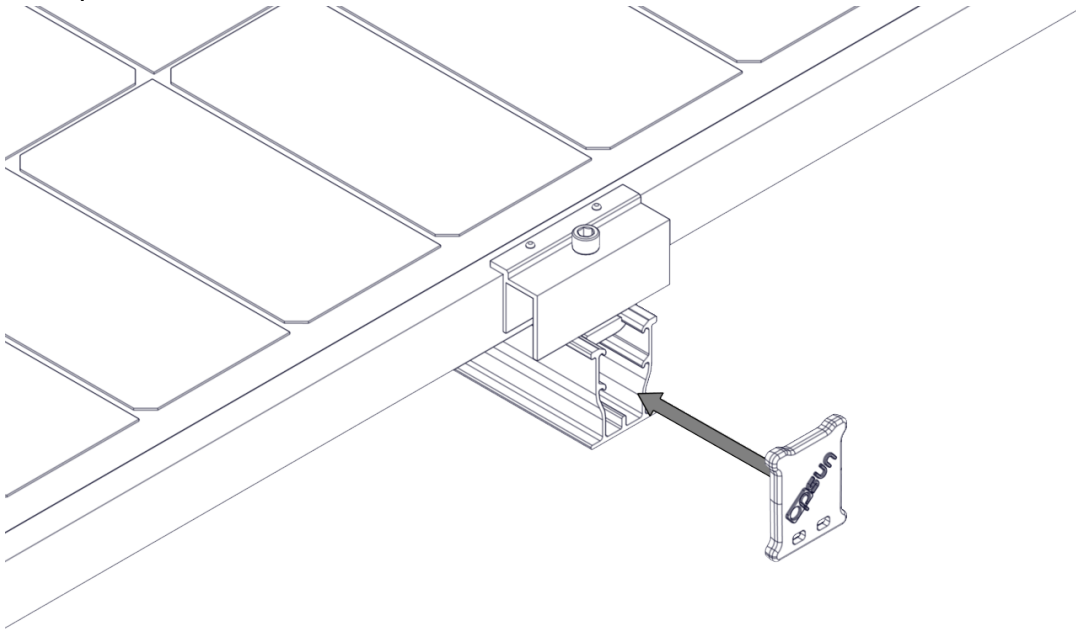
Securing the module row

Make sure each module is properly secured by applying the specified torque to each clamp.



Installing the end caps

Once everything is in place, install the end caps at the ends of each rail, simply by inserting the rail into the part.



APPENDIX 1

Opsun SMC adapters

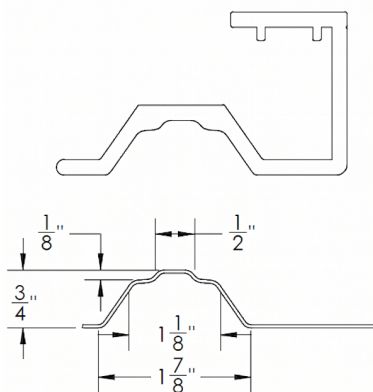
Warning

Please note that Opsun cannot be held responsible for any problem arising from an incorrect selection of adapters. To ensure compatibility and optimal system performance, we strongly recommend consulting a qualified installer to determine the appropriate adapter for your specific roof type and fastening system.

Refer to the Opsun SMC adapters below for your specific type of exposed-fastener metal roof:

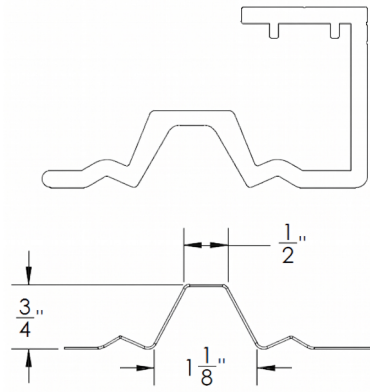
SMC1

Vicwest metal roofing, Ultra Vic model, or any profile with similar dimensions.



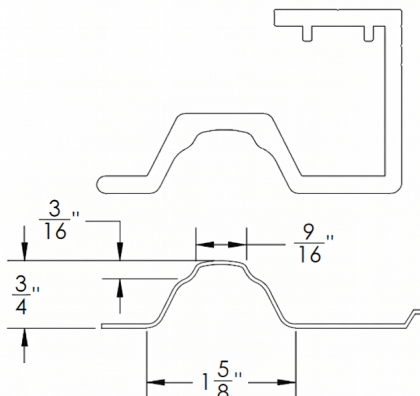
SMC2

Vicwest metal roofing, Super Vic model, or any profile with similar dimensions.



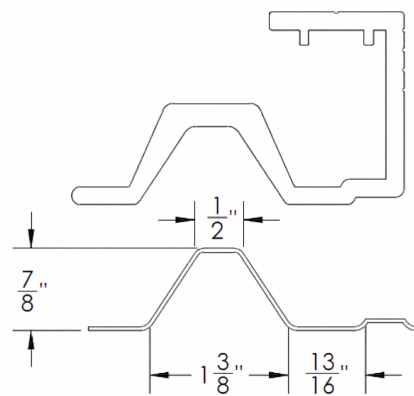
SMC3

Americana metal roofing, or any profile with similar dimensions.



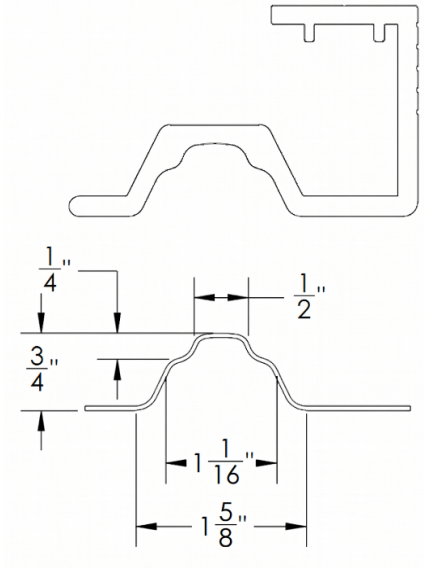
SMC4

Agway metal roofing, Century model, or any profile with similar dimensions.



SMC5

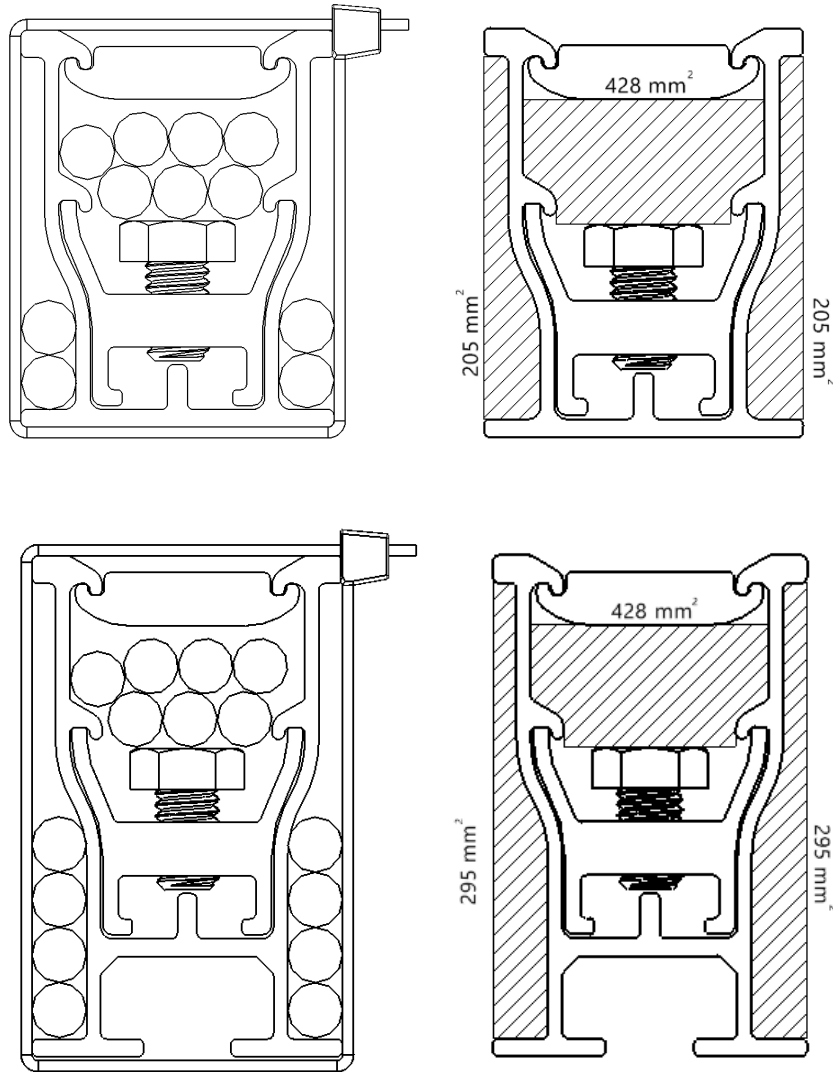
Agway metal roofing, Optimum model, or any profile with similar dimensions.



Electrical recommendations

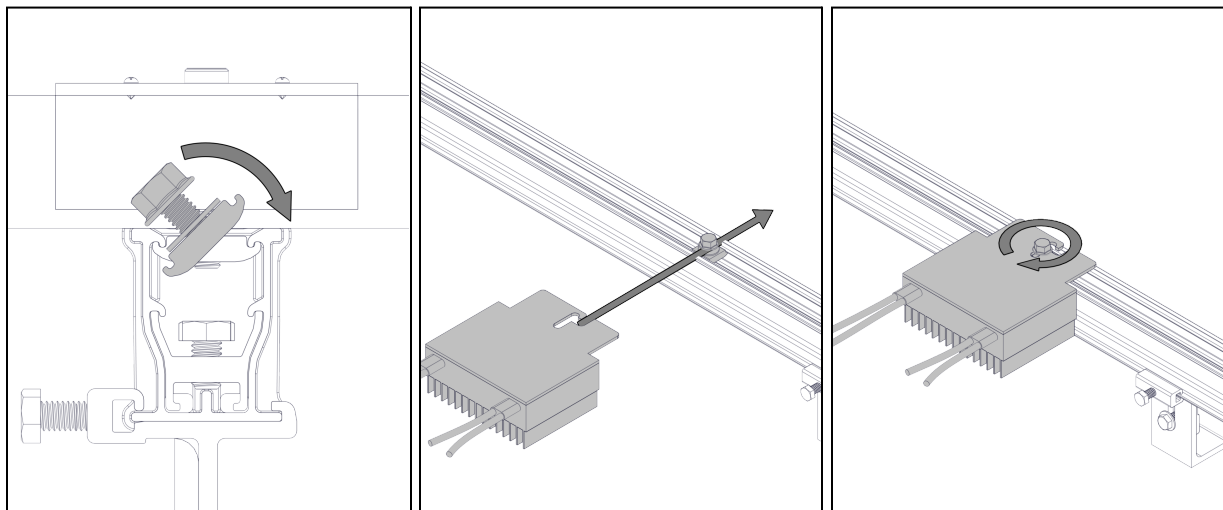
Cable management

Route and secure the wires with cable ties, in accordance with the local electrical requirements of the installation region.



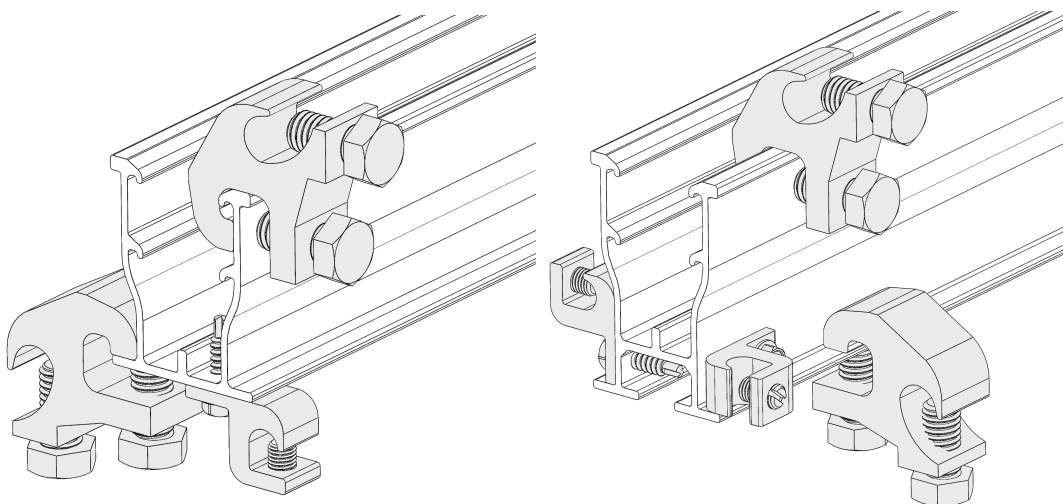
Installing optimizers and microinverters (MLPE)

Electrical equipment such as microinverters or power optimizers can be installed at the desired location anywhere along the rail. First insert the supplied hardware, place the device mounting plate under the bolt head and apply the prescribed torque.



Grounding

The Burndy BGBL4SS and Ilco GBL-4SS grounding lugs are installed using #10 diameter self-drilling screws with a maximum length of 0.75 in. They can be installed in the lower zone of the ST1 and ST2 rails. The Burndy BTCGC1/0SS grounding lugs can be installed by clamping onto the upper wall of the rail or onto a lower lip, anywhere along the rail.



For all aspects related to cable management and to the proper electrical grounding of your solar system, it is essential to consult a qualified electrician. Their expertise ensures that the installation meets safety standards, complies with local regulations and operates efficiently.