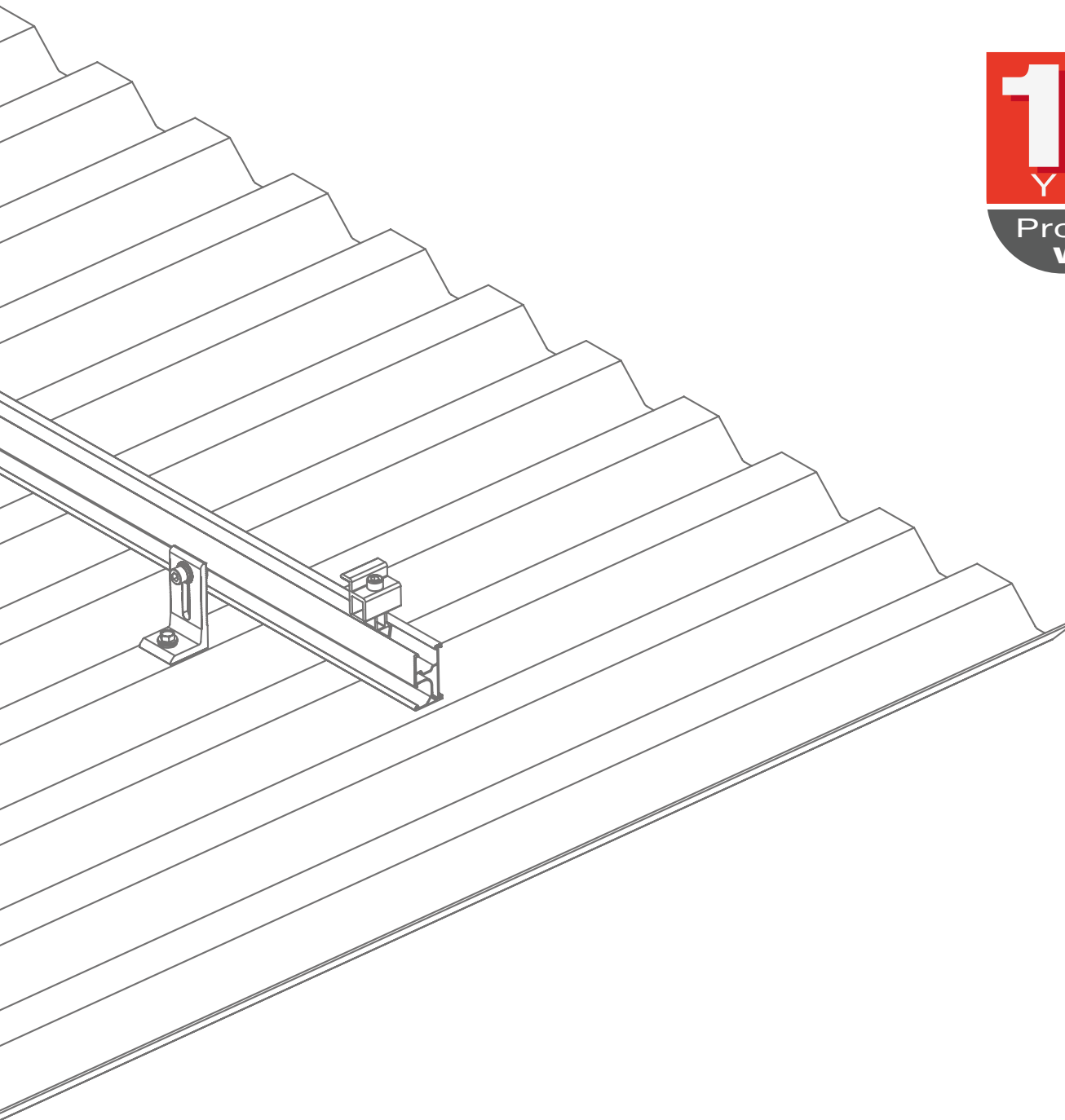


Trapezoidal metal sheet roof mounting system

installation manual

For flush mount with rail
Planning and Installation Complying with
AS/NZS1170.2:2011 AMDT 2-2012



| | |
|---|------|
| > Disclaimer | 1 |
| > Rail Mount Components List | 2 |
| > Assembly & Sectional Drawing | 3 |
| > Preparing | 4-5 |
| > L Foot Spacing Chart | 6 |
| > Pv Array Layout & Location | 7 |
| > Installation | 8-12 |
| > Grounding Components & Electrical Diagram | 13 |
| > Warranty | 14 |

Disclaimer

This manual describes the proper installation procedures and provides minimum standard required for product reliability and warranty. Thoroughly understanding this manual is imperative to proper installation.

Please review the following before installation

- Make sure the roof is in proper condition prior to installation.
Do not install on damage roofs.
- Comply with roofing manufacturer’s warranty terms.
- Ensure your work comply with local building codes and requirements, include any that may supersede this manual
- Ensure all products are appropriate for the installation, environments, and array under the site’s loading conditions.
- Ensure the installation is performed by licensed contractors, ` electrical installation must be conducted by licensed electrician. Ensure all work comply with local requirements.
- Use system components supplied by Enerack or parts recommended by Enerack.



This manual does not list all precautions needed for safe work. The installation must comply with health and safety requirements and other relevant standards and codes of practice. The manual provides guidelines for installation, but it does not guarantee the quality of installation work. Please complete the installation in a responsible and professional manner.

TOOLS AND TORQUE VALUE

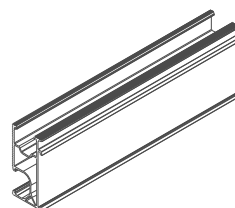
Installation tools

- > 6 mm Allen key
- > Cordless-drill (non-impact)
- > 13mm socket

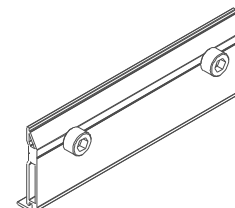


torque value

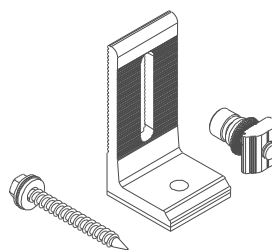
- > Rail splice: 8 N·m
- > L foot screw: fully seat
- > L foot to rail: 16 N·m
- > Mid clamp: 10 N·m
- > End clamp: 10 N·m
- > Grounding lug to rail: 8 N·m
- > Grounding lug for copper: 3 N·m



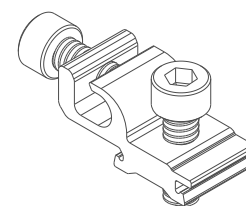
Rail
Material: Aluminum extrusion, AL 6005 T5
Finish: Clear or black anodized



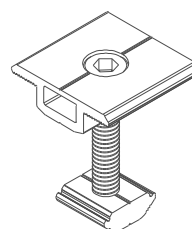
Rail splice
Material: Aluminum extrusion, 6005 T5
Finish: Clear or black anodized



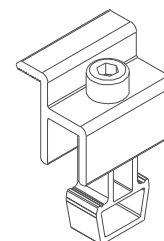
L foot
Material: Aluminum extrusion, AL 6005 T5
Finish: Clear anodized



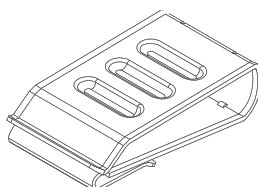
Grounding lug
Material: stainless steel 304



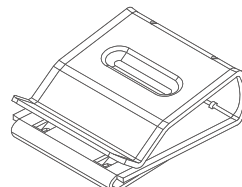
Universal mid clamp
Material: Aluminum extrusion, 6005 T5
Finish: Clear or black anodized
Frame size: 30/40mm



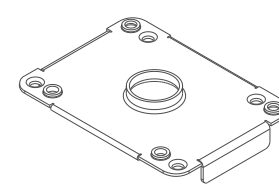
Universal end clamp
Material: Aluminum extrusion, 6005 T5
Finish: Clear or black anodized
Frame size: 30/40mm



Cable clip
Material: stainless steel 304
Item number: SR-WC4-4
 For 4 x PV cables 4mm2



Cable clip
Material: stainless steel 304
Item number: SR-WC4-2
 For 2 x PV cables 4mm2

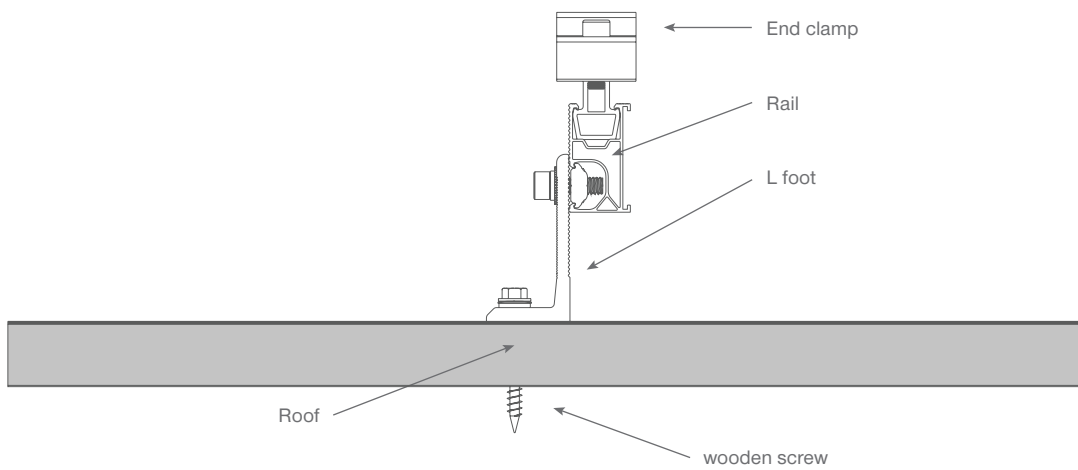
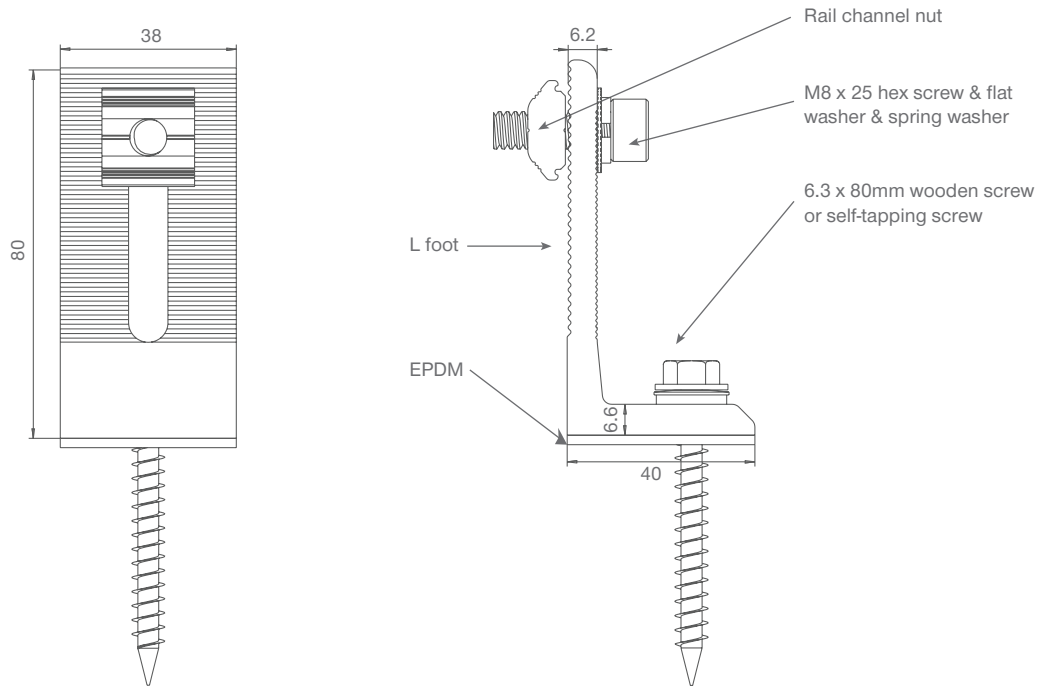


Grounding clip
Material: stainless steel 304

Material Types:

All extruded aluminum components: 6005 T5, clear anodized

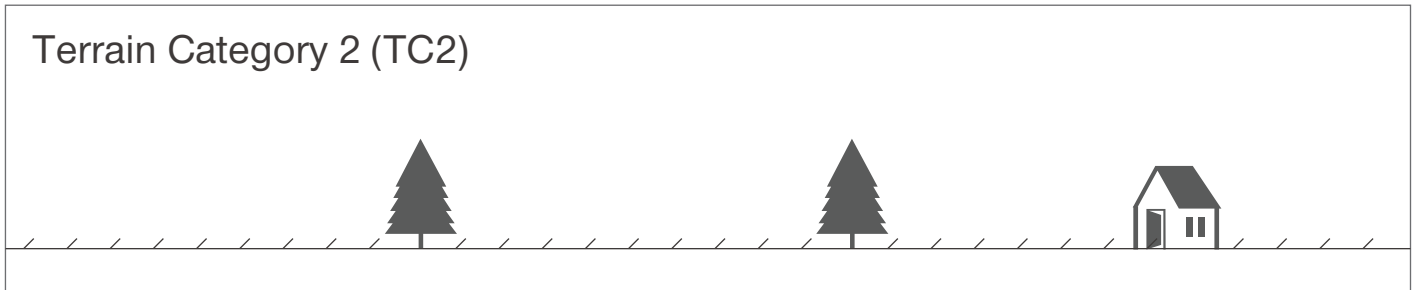
Hardware: Stainless steel 304



- Determine the max wind speed region of your installation site

| | | | | |
|-------------------|----|----|----|----|
| Wind zone | A | B | C | D |
| Max wind speedm/s | 43 | 56 | 66 | 88 |

- Determine the Terrain Category



Terrain Category 2 (TC2)

Open terrain, including grassland, with well scattered obstructions having heights generally from 1.5m to 5m, with no more than two obstructions per hectare, e.g. farmland and cleared subdivisions with isolated trees and uncut grass.



Terrain Category 3 (TC3)

Terrain with numerous closely spaced obstruction having heights generally from 3m to 10m. The minimum density of obstructions shall be at least the equivalent of 10 house sizes obstructions per hectare, e.g. suburban housing or light industrial estates.

- **Determine the height of building**

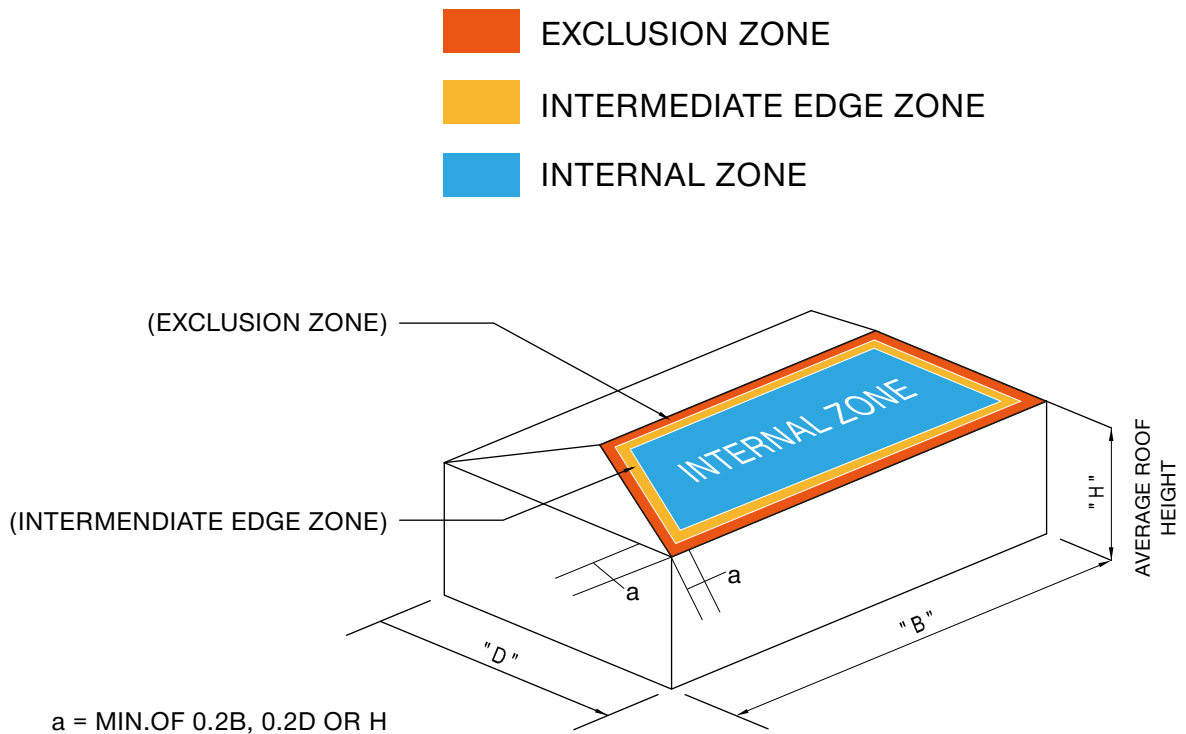
Note: This manual is for installation in building height ≤ 20 meters

- **Determine Roof slope**

Note: The installation manual is for roof slope up to 30 degrees.

- **Determine Roof zone.**

The roof zone describes the amount of the wind load that is subjected to the roof. Internal zone has the lowest load, the mounting system are designed to be installed to the internal zone. The installation is recommended to be over the internal zone as much as possible.



ROOF REGIONS

Please use the following table to determine the L foot spacing for installation.

• Design code reference

The following engineering references were considered in determining the values of the wind load conditions and material properties of the aluminum rail.

- > AS/NZS 1170.2:2011 Admt 3-2012
- > AS 1664.1.1:1997 on aluminum structures

• Design criteria

The following parameters were considered in determining the values of the allowable span charts of the railing.

- > Wind region A,B, C, D
- > WIND TERRAIN Category 3
- > PV modules to be flush installed on the roof
- > Max building height 20m
- > Max roof slope: 30 degree
- > Max PV module: 2000 x 1000mm

Roof Angle(ϕ) – $\phi < 15^\circ$

| | Building height H (m) | | |
|-----------|-----------------------|---------------|---------------|
| | H≤10m | 10<H≤15 | 15<H≤20 |
| Wind zone | Internal zone | Internal zone | Internal zone |
| A | 1570 | 1460 | 1370 |
| B | 1080 | 980 | 920 |
| C | 590 | 540 | 510 |
| D | 430 | N/A | N/A |

- > IBC 2015 / CALIFORNIA BUILDING CODE 2016
- > ASCE 7-10(wind loading)
- > Aluminum Design: Aluminum Design Manual 2010

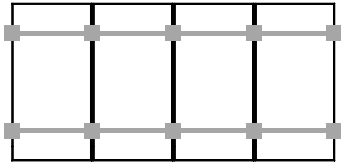
Roof Angle(ϕ) – $15^\circ \leq \phi \leq 30^\circ$

| | Building height H (m) | | |
|-----------|-----------------------|---------------|---------------|
| | H≤10m | 10<H≤15 | 15<H≤20 |
| Wind zone | Internal zone | Internal zone | Internal zone |
| A | 1730 | 1640 | 1570 |
| B | 1270 | 1150 | 1080 |
| C | 820 | 590 | 560 |
| D | 530 | 500 | 440 |

- > Maximum Building Height Considered = 30ft
- > Exposure Categories Considered: B & C
- > Wind Pressure Based on Section 30.4 (C&C Method 1)
- > Gust Factor, G = 0.85
- > Topography Factor, Kzt = 1.0
- > Directionality Factor, Kd = 0.85
- > Importance Factor, I = 1.0
- > Maximum Cantilever of Railing from Anchor 12 Inches
- > Tilt Angles Considered: 0 to 30 degrees

| Ground Snow Load (PSF) | Racking Max. Rail Span (Ft) For Zone 2* | | | | | |
|------------------------------|---|-----|-----|-----------------------------|-----|-----|
| | Exposure B Wind Speed (Mph) | | | Exposure C Wind Speed (Mph) | | |
| | 110 | 130 | 150 | 110 | 130 | 150 |
| 0 | 6 | 6 | 4 | 6 | 4 | 2 |
| 10 | 6 | 6 | 4 | 6 | 4 | 2 |
| 20 | 6 | 6 | 4 | 6 | 4 | 2 |
| 30 | 6 | 6 | 4 | 6 | 4 | 2 |
| 40 | 6 | 6 | 4 | 6 | 4 | 2 |
| 50 | 6 | 6 | 4 | 6 | 4 | 2 |
| 60 | 6 | 6 | 4 | 6 | 4 | 2 |
| 70 | 4 | 6 | 4 | 4 | 4 | 2 |
| 80 | 4 | 6 | 4 | 4 | 4 | 2 |
| 90 | 2 | 6 | 4 | 2 | 2 | 2 |

* Maximum Building Height Considered = 30ft

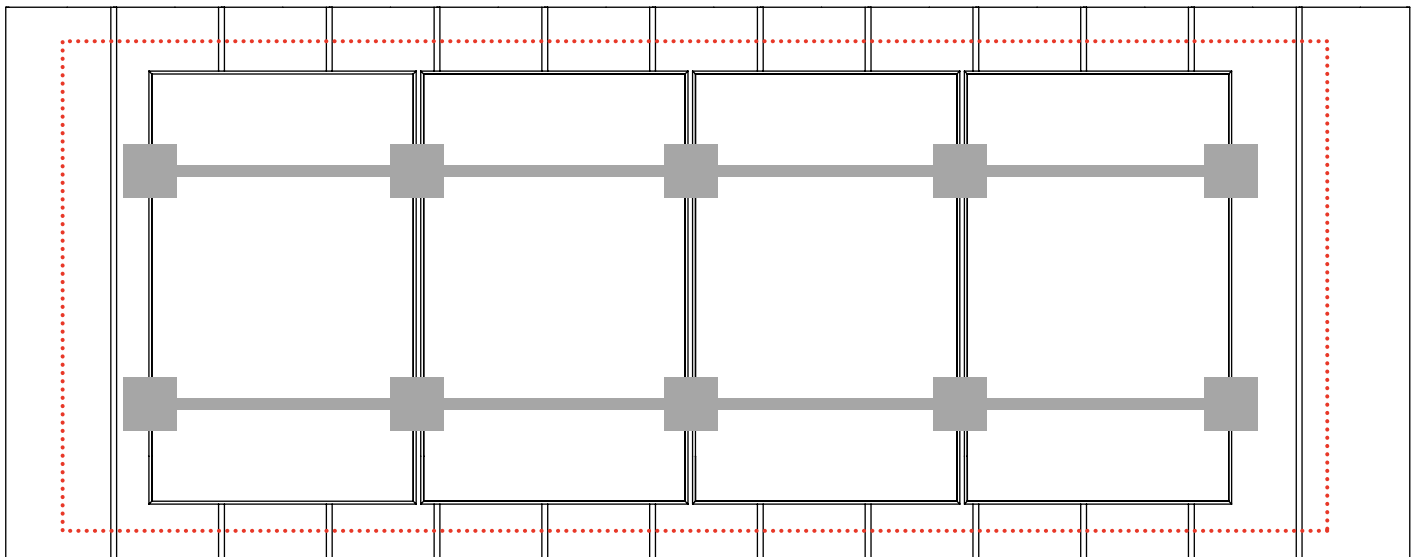
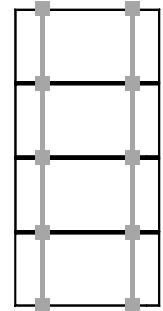


PV array Length required

1. Total width of the modules
2. 17mm for each mid clamp
3. 20.5mm for each end clamp
4. 20mm for 1 grounding lug per row of module
5. 50-100mm extra length for any adjustment or other application.

PV array orientation

Each row of modules is held to the roof using rails which are to be fastened by a number of L foot. The layout can be set with rails parallel to the seam or horizontal to the seam.



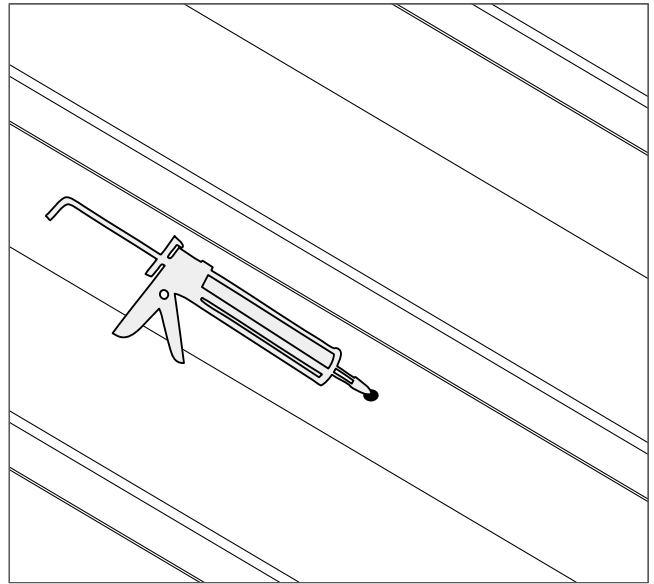
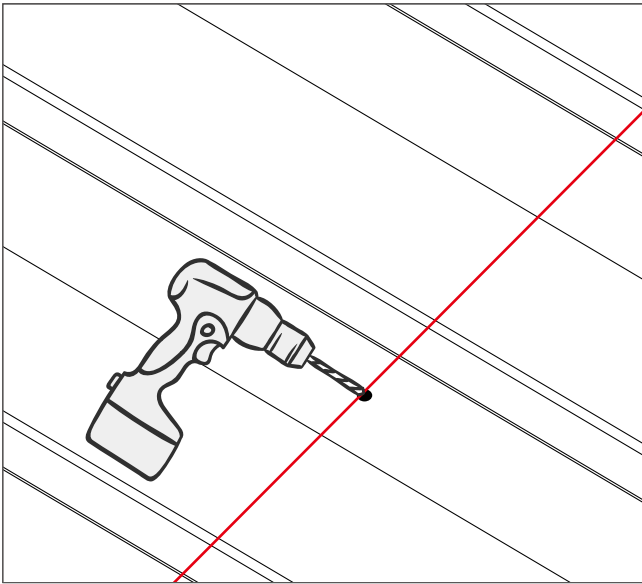
PV array location

- Determine the appropriate installation area on the roof.
- locate the substructures (timber batten or steel batten/purlins) and mark with chalk line on the crest.
- Locate the position for each L foot on appropriate span and mark the locations.



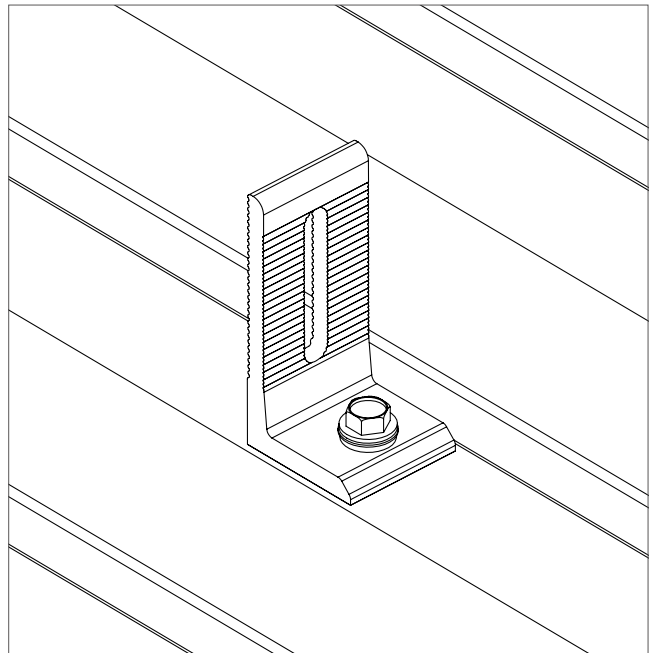
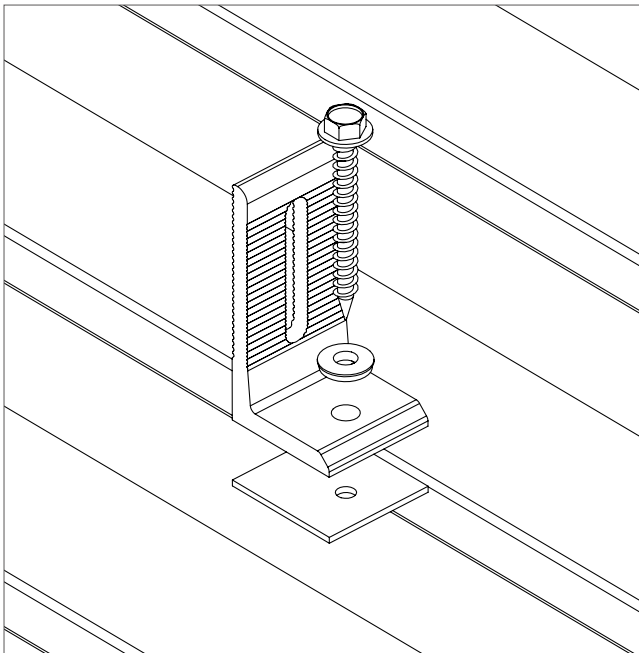
Note:

- For a steel roof with exposed fixings, it's easy to run the positioning line align with existing roof screws.
- the PV array should not be installed closer than 500mm to the perimeter of the roof including ridge line and eaves (unless verified by a professional engineer).
- Center the installation area over the roof as much as possible
- Leave enough room to safely move around the array during installation.

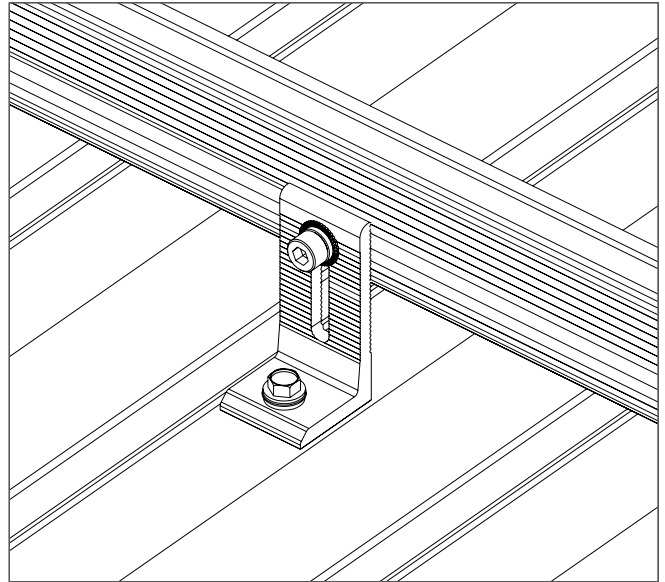
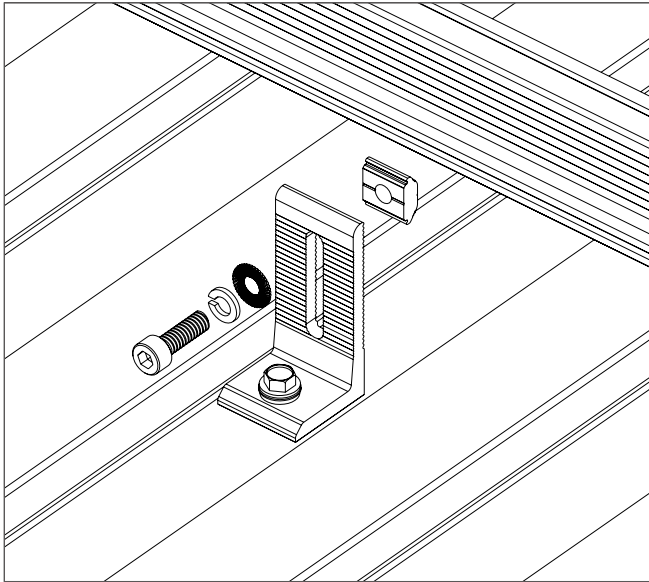


install L foot and rails

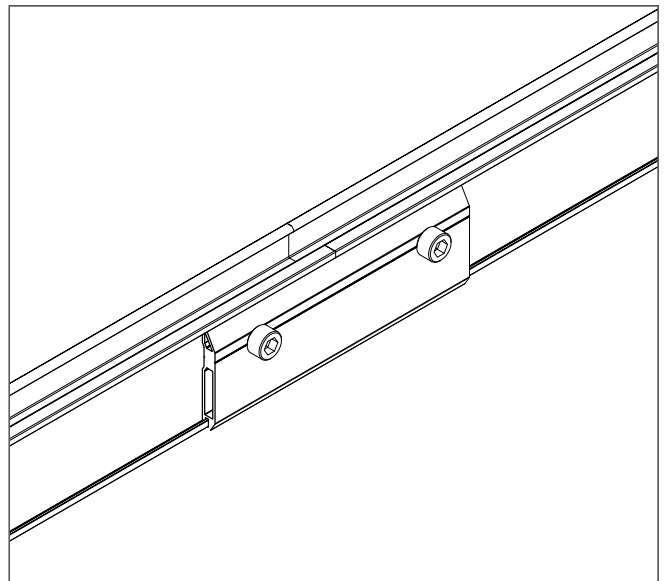
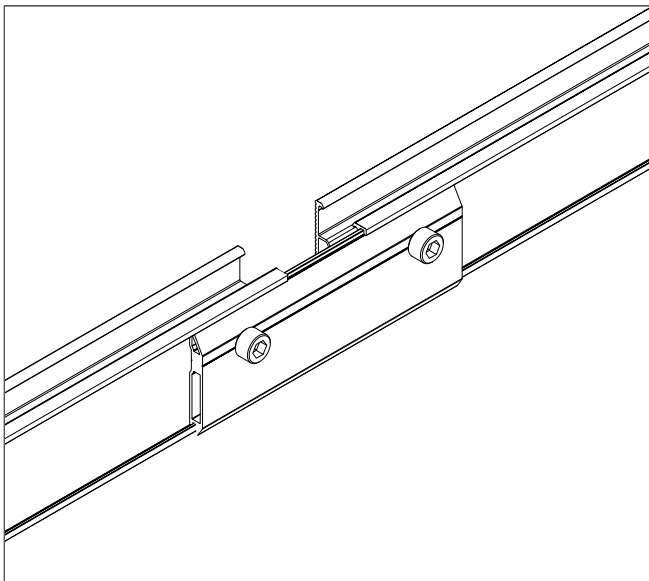
1. Drill pilot holes at planned locations and backfill with sealant.



2. Fix the L foot to timber batten or steel batten/purlins with supplied screw. Fully seat.

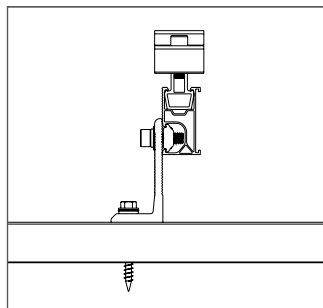
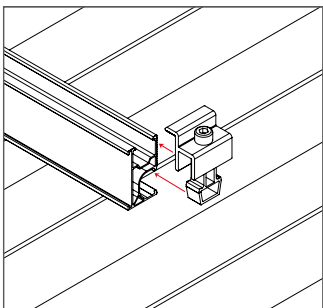
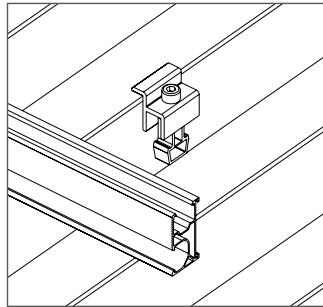
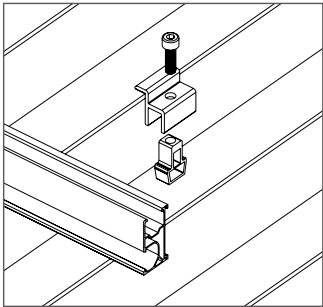
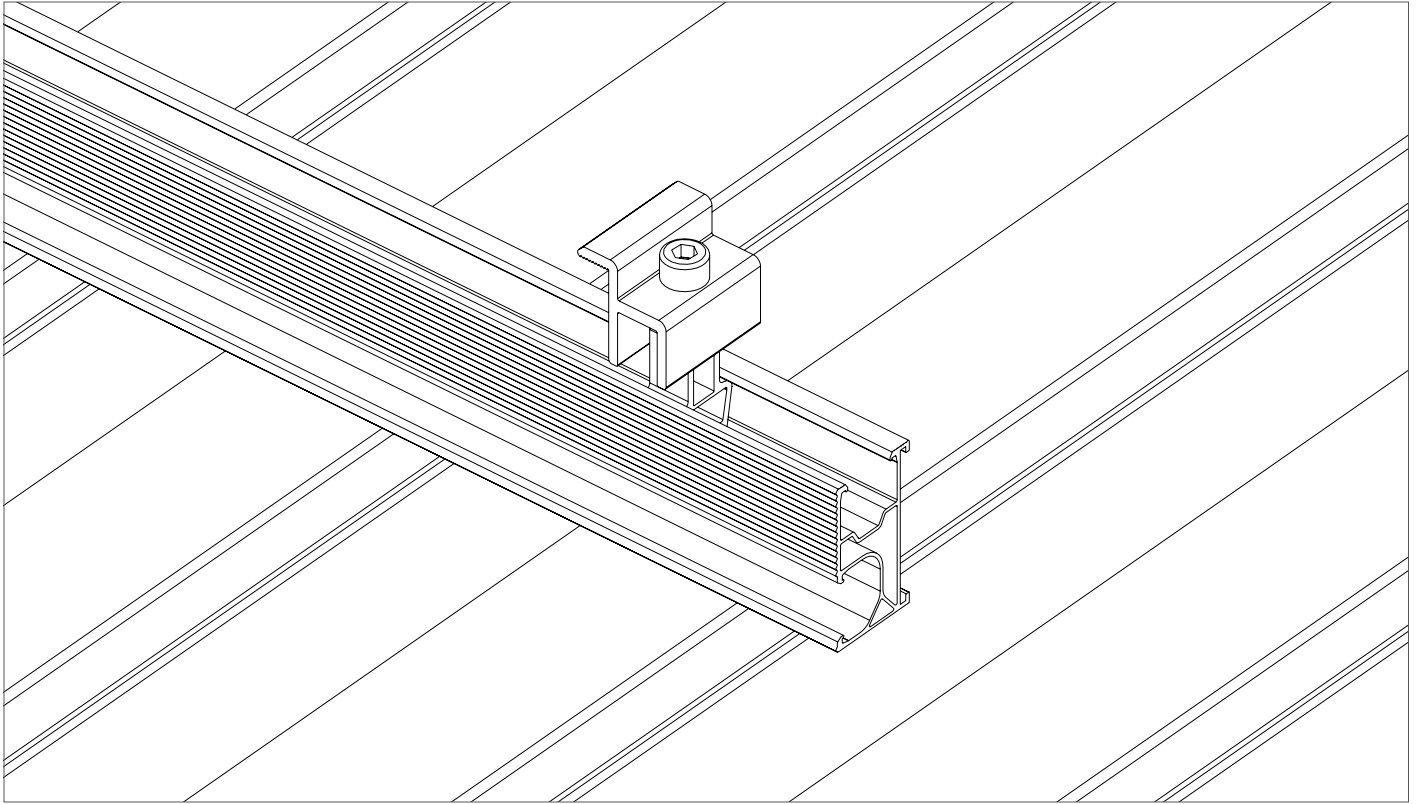


3. Connect rails to L foot to 16 N-m using a M6 Allen key or hex driver bit



4. Connect multiple rails by using rail splice (if required per system design)

Note: Ensure the rails are square before placing modules

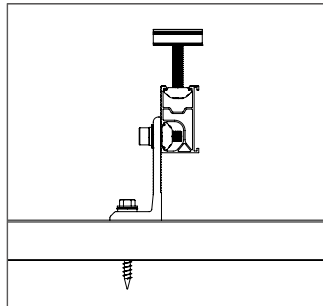
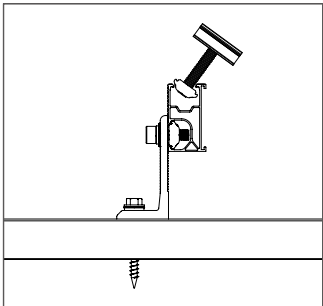
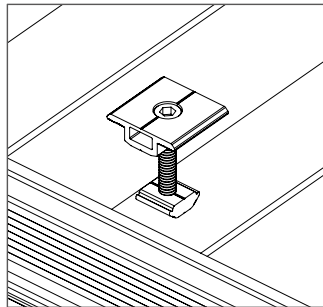
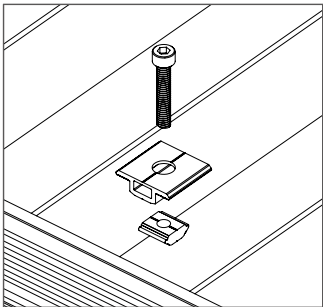
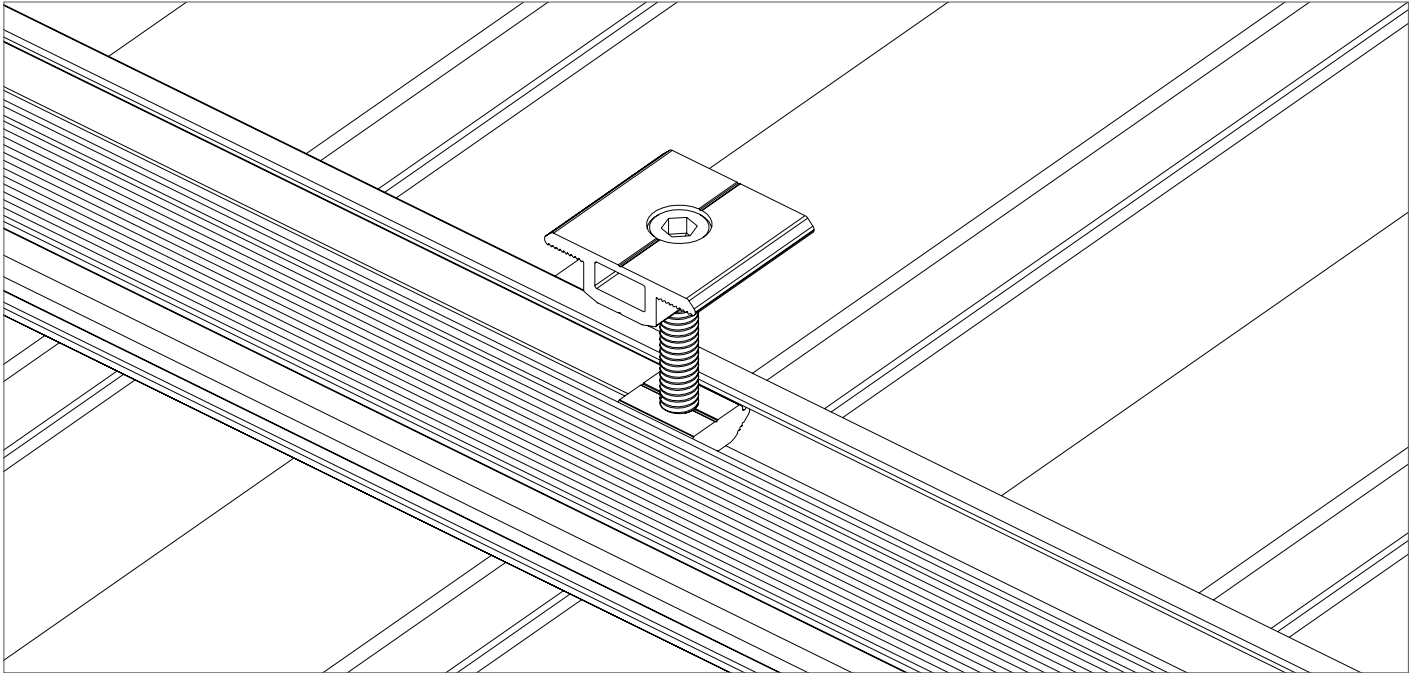


install the mid clamp and end clamp

1. Place the first PV module with a minimum 25mm from rail ends, slide end clamp into both rails and tighten the end clamp to 10 N·m using 6 mm Allen key or hex driver bit

Note:

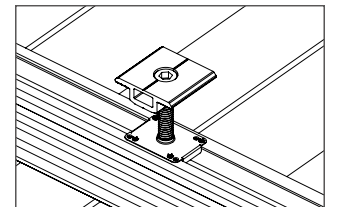
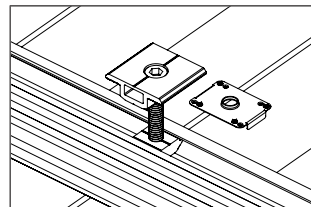
- Leave extra 25mm If grounding lug is to be installed at this end of rail
- Ensure the module length is align with the rails ends.

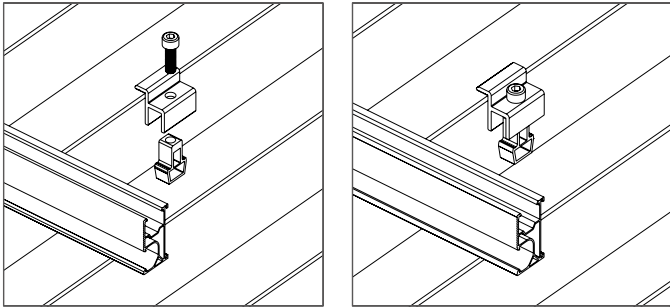


2. Place second PV module into rail, leaving a 20mm gap between modules and insert the mid clamps, slide the PV module flush against mid clamp closely, then tighten the mid clamp screw to 10 N-m using 6 mm Allen key or hex driver bit. Repeat procedure for follow mid clamps.

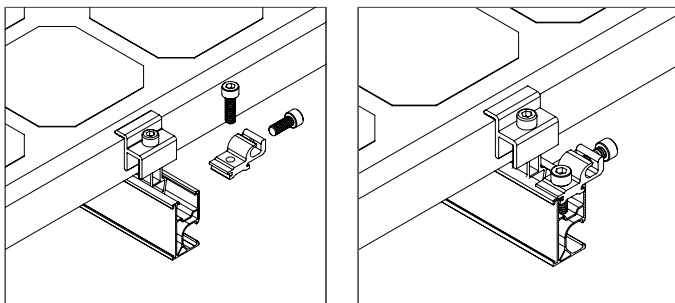
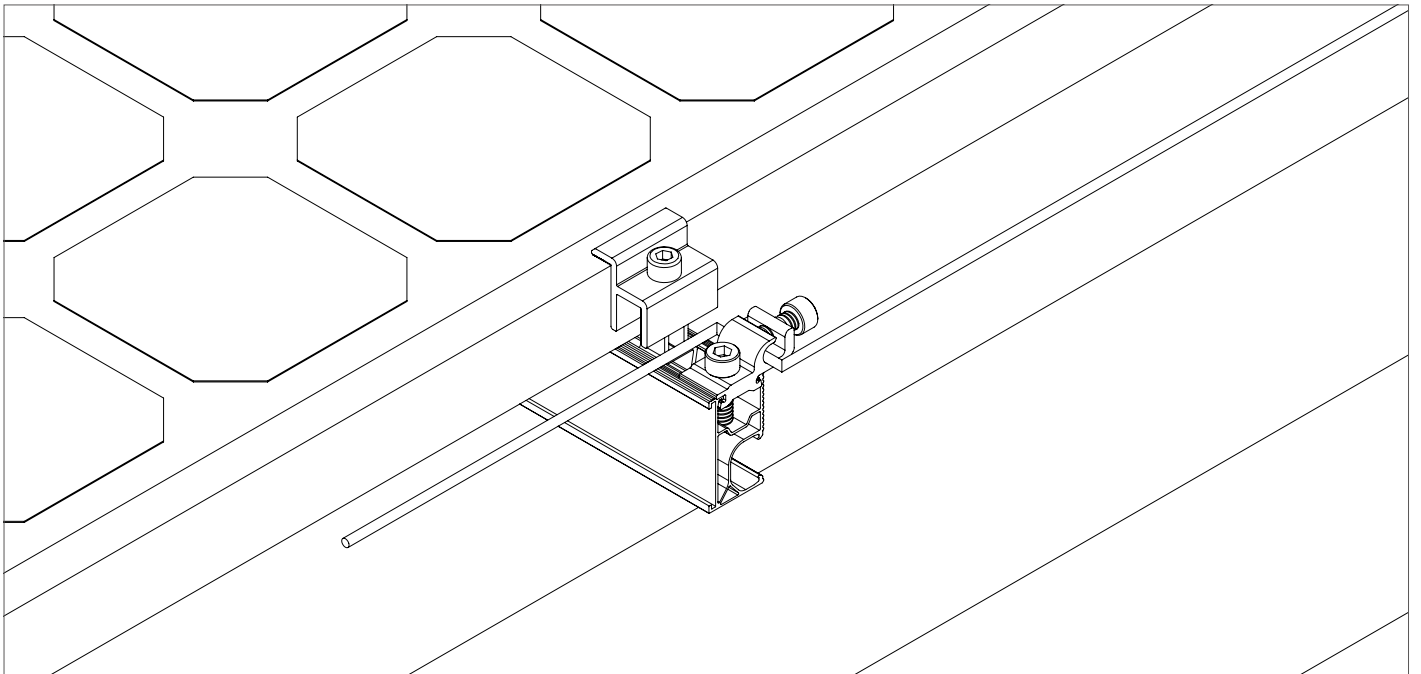
Note:

- Ensure the PV modules are neatly square to one another
- Ensure the array is straight,
- Ensure the mid clamp is secured tighten
- If a grounding clip is used, please insert the grounding clip properly to mid clamp and place the modules. Make sure PV modules are well contacted to the grounding clips before the mid clamps are tighten



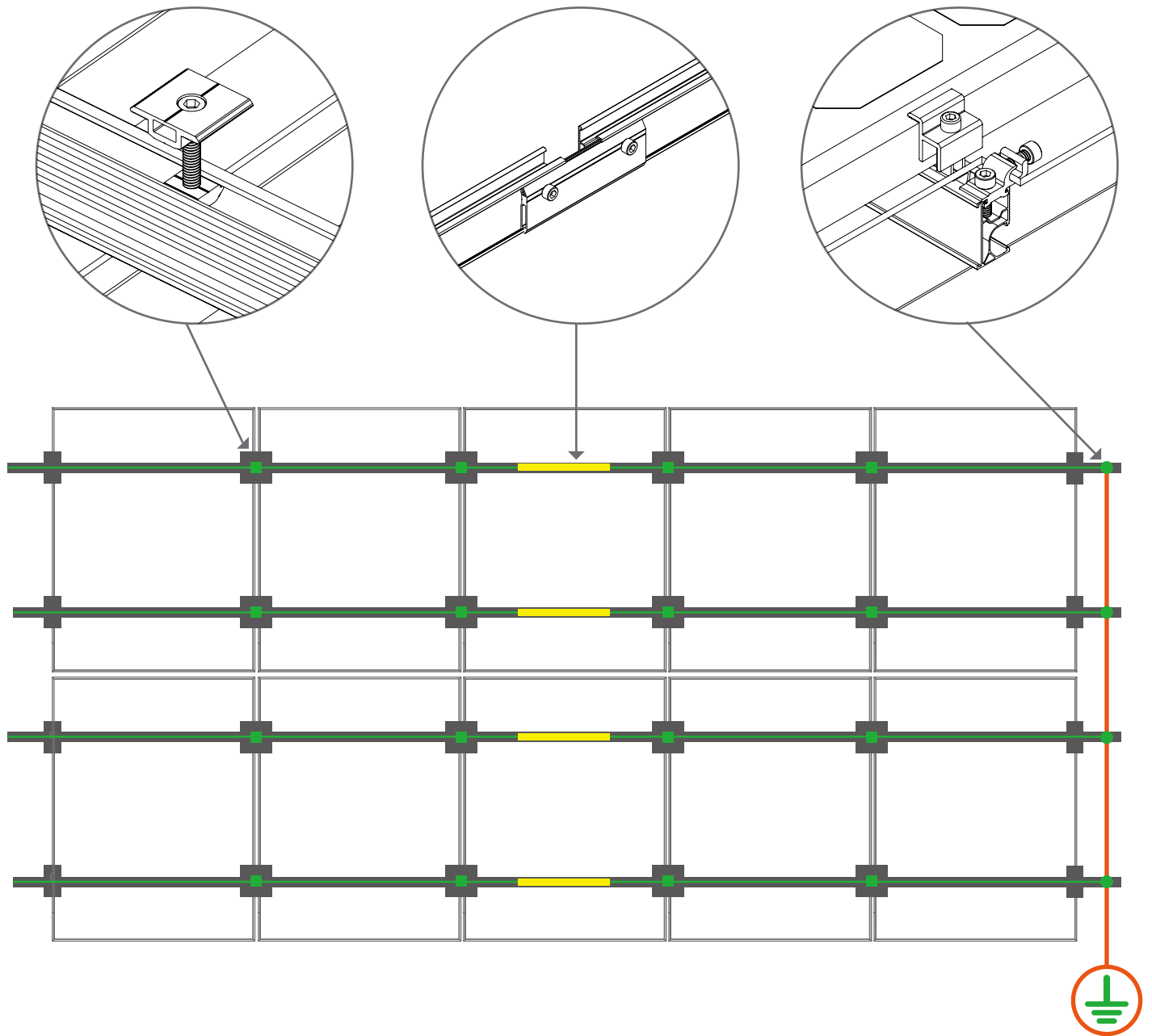


3. Place last module in position on rail with a minimal 50mm from rail end, slide end clamps onto both rails and tighten the screws to secure the PV module.



install the grounding lug.

Install the grounding lug to 8 N·m using 6 mm Allen key or hex driver bit at the end of a rail. Run grounding wire to connect all grounding lugs.



- Solar Module
- Mid Clamp
- End Clamp
- Ground Path
- Copper Wire
- Rail splice Kit
- Ground Lug
- Ground Clip

