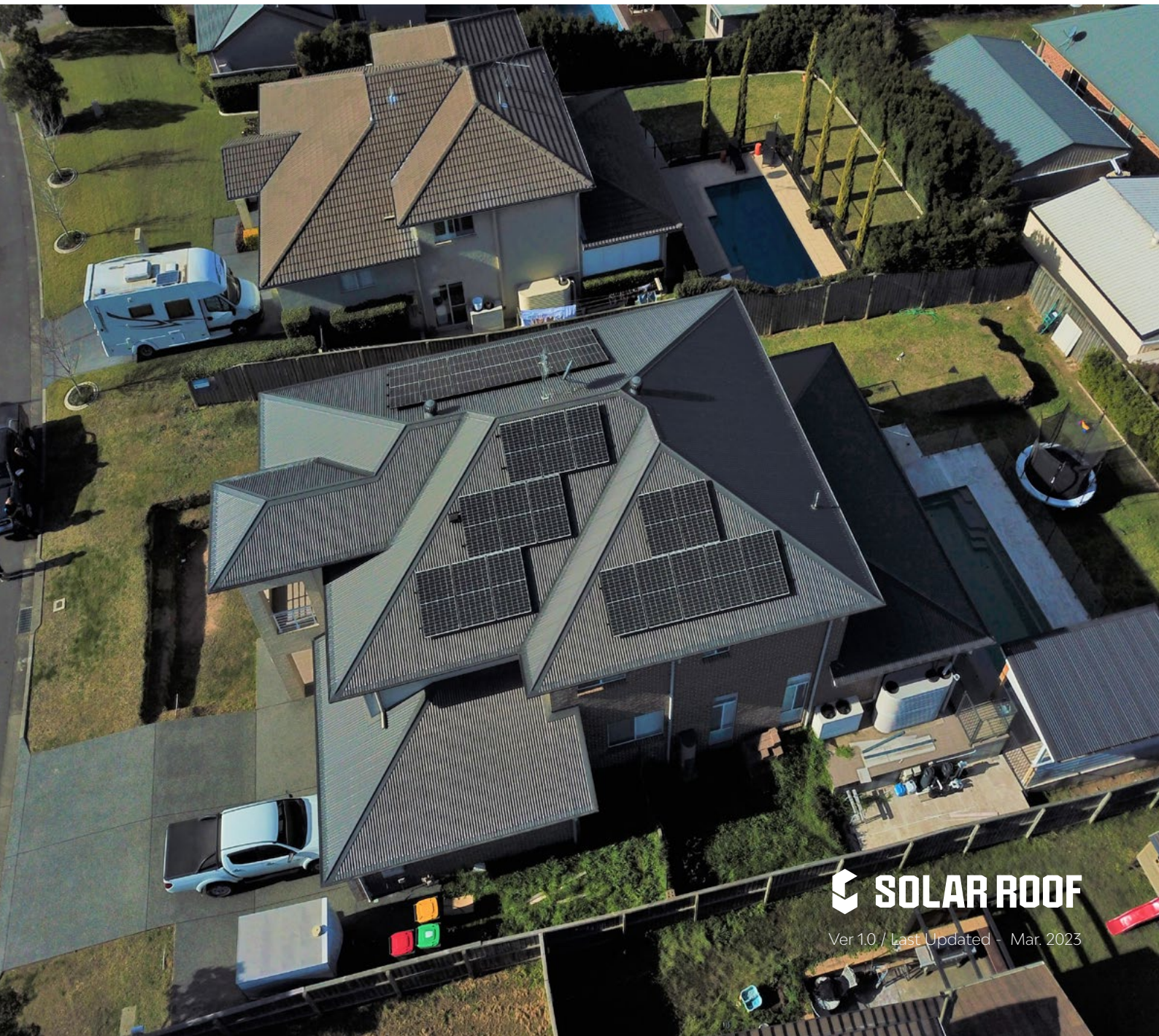


# SolarRoof Pro 2.0

Code-Compliant Planning and Installation Guide V1.0  
Complying with Eurocodes 0-9 and VDI 6012



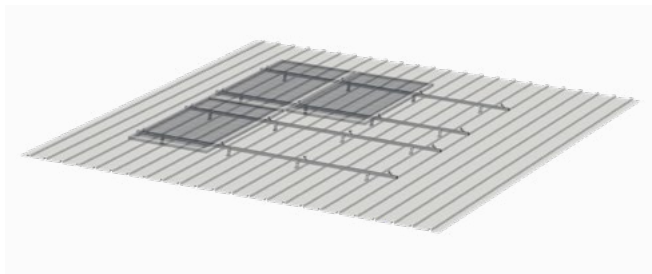


# Introduction

The Clenergy PVezRack® SolarRoof Pro 2.0 is a roof-mounting solution suitable for most residential pitched roofs. Using our innovative rail, M module, and interface family, the SRP2.0 delivers a quick, safe, and cost effective solution for installers.

Please review this manual thoroughly before installing PVezRack® SolarRoof Pro 2.0. This manual provides:

- 1) Supporting documentation for building permit applications relating to PVezRack® SolarRoof Pro 2.0 PV Module Mounting System,
- 2) Planning and installation instructions.



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The PVezRack® SolarRoof Pro 2.0 parts, when installed in accordance with this guide, will be structurally sound and will meet the Eurocodes and VDI 6012 standard. During installation, and especially when working on the roof, please comply with the appropriate Occupational Health and Safety regulations. Please also pay attention to any other relevant State or Federal regulations. Please check that you are using the latest version of the Installation Manual, which you can do by contacting Clenergy via email on sales@clenergy.com.

## The installer is solely responsible for:

- Complying with all applicable local or national building codes, including any that may supersede this manual;
- Ensuring that PV-ezRack and other products are appropriate for the particular installation and the installation environment;
- Using only PV-ezRack parts and installer-supplied parts as specified by the PV-ezRack project plan. (substitution of parts may void the warranty and invalidate the letter of certification);
- Recycling: Recycle: according to the local relative statute.
- Removal: Reverse installation process.
- Ensure that there are no less than two professionals working on panel installation.
- Ensure the installation of related electrical equipment is performed by licenced electricians.
- Ensuring safe installation of all electrical aspects of the PV array.
- Ensuring that the roof, its rafters/purlins, connections, and other structural support members can support the array under building live load conditions;
- Ensuring that screws to fix interfaces have adequate pull-out strength and shear capacities as installed;
- Maintaining the waterproof integrity of the roof, including selection of appropriate flashing;
- The installation need to comply with the regulations of the German Central Association of Roofers (ZVDH) for work on roofs.
- During the installation of supporting system, module installation shall take full consideration of fire risks. Please read and understand the solar module installation manual before system installation.
- For more regulations of the German Professional Association, see:  
 BGV A1-General rules  
 BGV A2-Power Systems and Equipment  
 BGV C22-Construction work

# System Specifications

Roof Angle	15-60 degrees
Building Height	<=12m
Wind Zone	Wind zone 1 to wind zone 4
Snow Zone	Snow zone 1 to snow zone 3
Max Altitude	According to the calculation report
Max Span Width	According to the calculation report
Min distance for wood screws from wood edges	According to EN 1995-1-1
Manufacture	Clenergy Technology Co., Ltd.
Design Standards	BS EN 1990:2002 Basis of Structural Design; DIN EN 1991-1-4. Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions; DIN EN 1991-1-3 : 2004 EUROCODE 1: ACTIONS ON STRUCTURES - PART 1-3: GENERAL ACTIONS - SNOW LOADS; VDI 6012 Blatt 1.4 Integration of decentralised and regenerative energy systems in buildings; EN 1995-1-1: Eurocode 5: Design of timber structures; DIN 1055-4:2006:Eurocode3 Design of Steel structures -Part 1- 8: Design of joints; DIN 1055-5:2006: Actions on structures-Part5: Snow loads and ice loads.
All wood fasteners need to follow the local building regulations, e.g. DIN 1052	
Only approved and certified wood screws are to be used for roof hook installations	
The hooks can only be mounted on the roof rafters but not on the roof lath (the horizontal wood beams that hold the tiles)	

## Note:

Snow zone 1, altitude above the sea level up to 500m;

Snow zone 2, altitude above the sea level up to 285m;

Snow zone 3, altitude above the sea level up to 255m;

Wind zone 1, Inland, the height of building less than 12m;







Wind zone 2, Inland, coastal and island of the Baltic Sea; the height of building less than 12m;

Wind zone 3, Inland, coast and islands of the Baltic Sea; the height of building less than 12m;

Wind zone 4, Inland, coast of the North and Baltic Seas and islands of the Baltic Sea; the height of building less than 12m.

# Tools and Components

## Tools

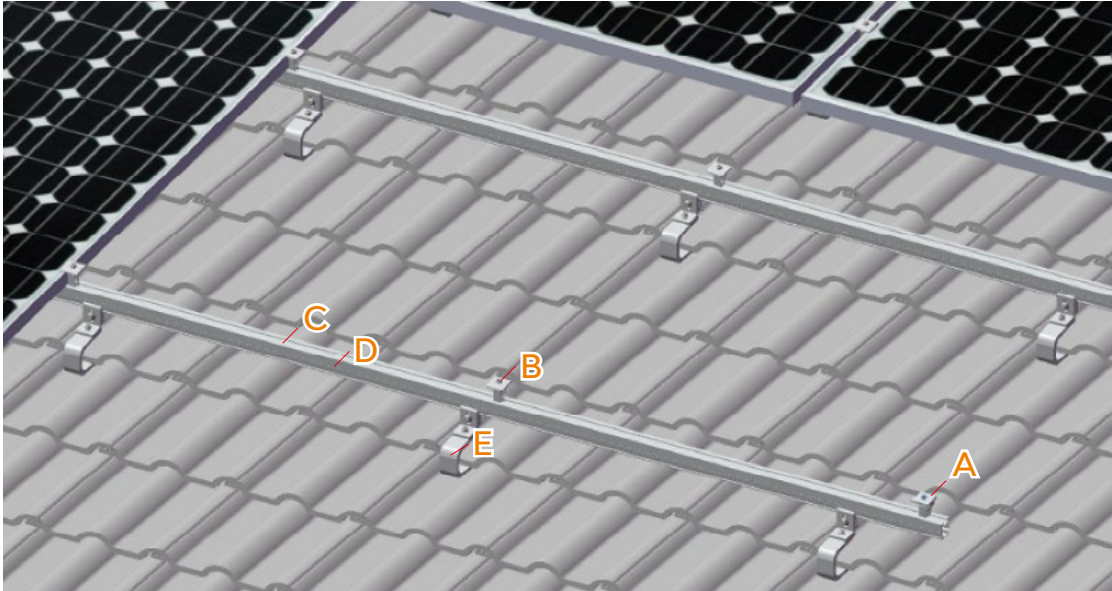
				
<p><b>Angle Grinder with Stone Disk</b></p>	<p><b>Screw Driver</b> (for M8 Torx Screw and bolt)</p>	<p><b>Torque Spanner</b></p>	<p><b>Tape</b></p>	<p><b>String &amp; Marker Pen</b></p>
				
<p><b>Spanner</b></p>				

## Components

				
<p><b>EC-M28-46/L50</b> <b>EC-M28-46/L50/BA</b> End Clamp 28-46mm with M module, Length 50mm</p>	<p><b>IC-M28-46/L50</b> <b>IC-M28-46/L50/BA</b> Inter Clamp 28-46mm, with M module, Length 50mm</p>	<p><b>ER-R-SRP11/TO/40</b> Toroda Rail 40</p>	<p><b>ER-SP-SRP11/TO/40</b> Splice for Toroda Rail 40, L200mm</p>	<p><b>ER-I-SRP11/TO/02A</b> Alu Adjustable Roof Hook 40-56 with Toroda rail connection, wood screw 8*100</p>
				
<p><b>EZ-CAP-TO/40/G</b> Cap for Toroda Rail 40</p>	<p><b>EZ-GL-TO</b> Grounding Lug for Toroda Rail</p>	<p><b>GC-DT</b> Grounding Clip</p>	<p><b>EZ-CC-PV/4</b> Capilano Cable Clip for PV Panels for holding 4 cables</p>	

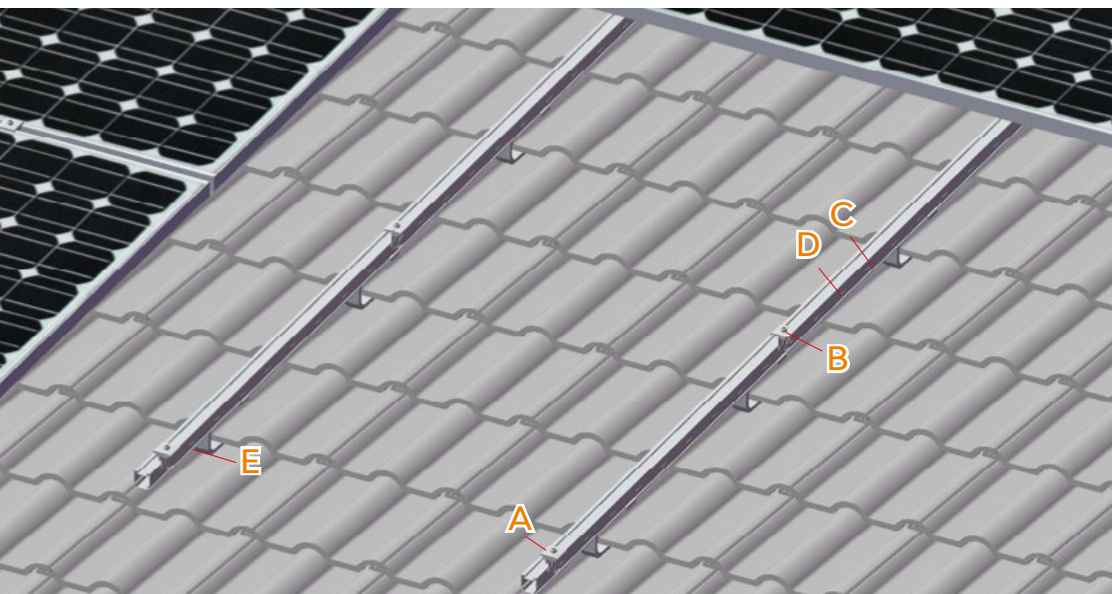
# System Overview

## Overview of PV-ezRack SolarRoof Pro 2.0 (Portrait)



A. End Clamp    B. Inter Clamp    C. Toroda Rail 40    D. Splice for Toroda Rail 40  
E. Tile interface

## Overview of PV-ezRack SolarRoof Pro 2.0 (Landscape)



A. End Clamp    B. Inter Clamp    C. Toroda Rail 40    D. Splice for Toroda Rail 40  
E. Tile interface (90° rotated)

## Precautions during Stainless Steel Fastener Installation

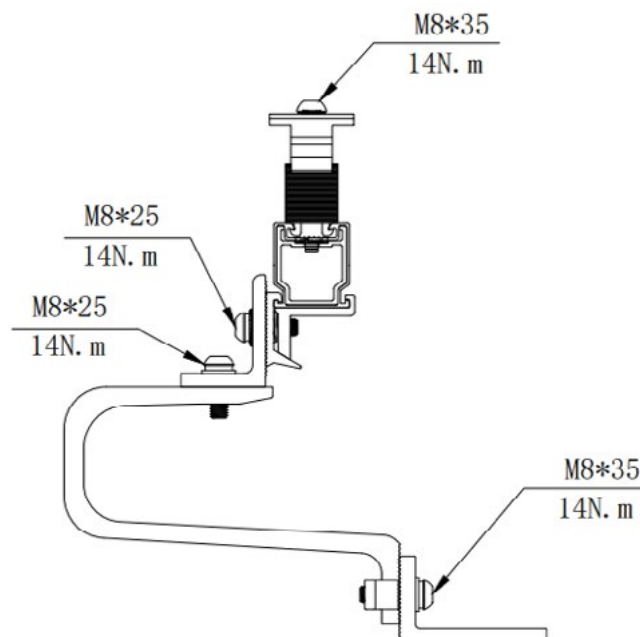
Improper operation may lead to deadlock of Nuts and Bolts. The steps below should be applied to stainless steel nut and bolt assembly to reduce this risk.

### General installation instructions:

- (1) Apply force to fasteners in the direction of thread
- (2) Apply force uniformly, to maintain the required torque
- (3) Professional tools and tool belts are recommended
- (4) In some cases, fasteners could be seized over time. As an option, if want to avoid galling or seizing of thread, apply lubricant (grease or 40# engine oil) to fasteners prior to tightening.

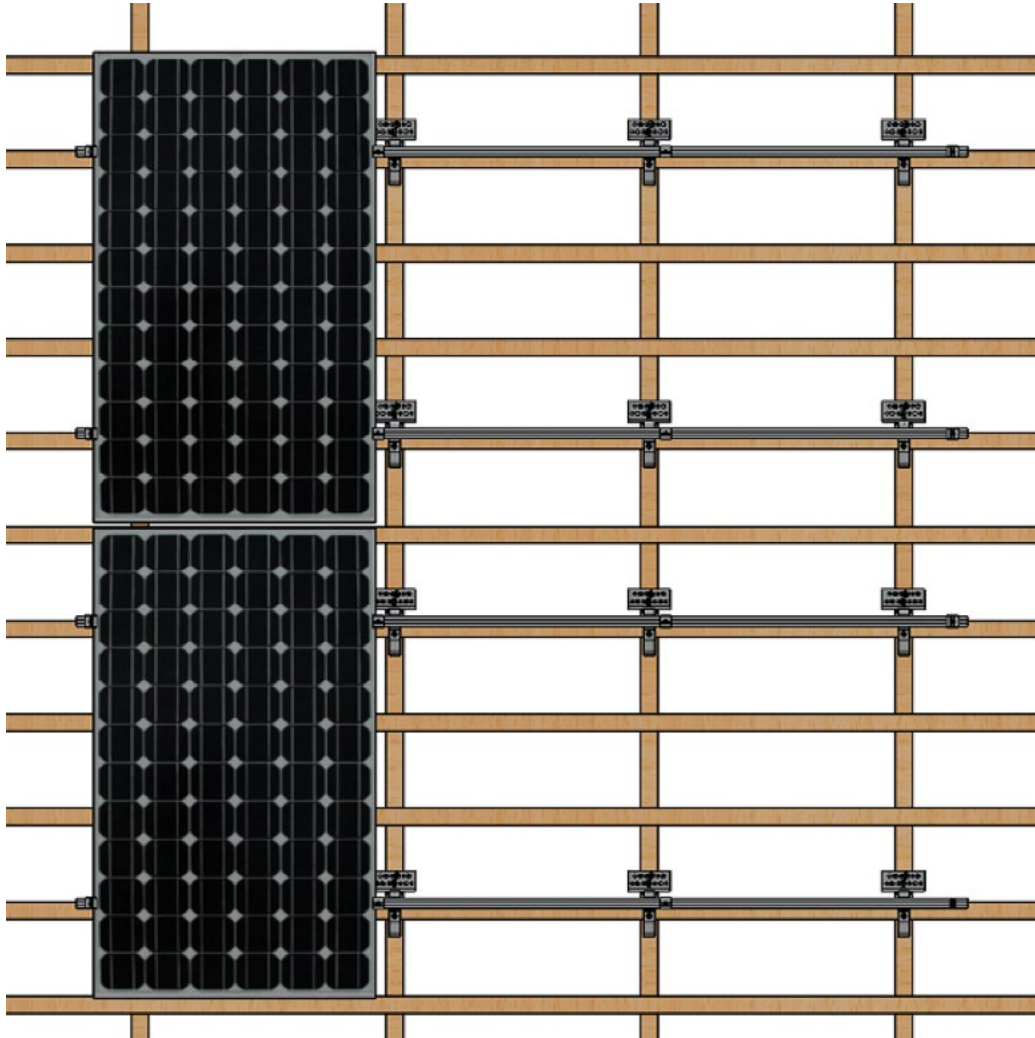
### Safe Torques

Please refer to safe torques defined in this guide as shown in the figures below. In case power tools are required, Clenergy recommends the use of low speed only. High speed and impact drivers increase the risk of bolt galling (deadlock). If deadlock occurs and you need to cut fasteners, ensure that there is no load on the fastener before you cut it. Avoid damaging the anodized or galvanized surfaces.



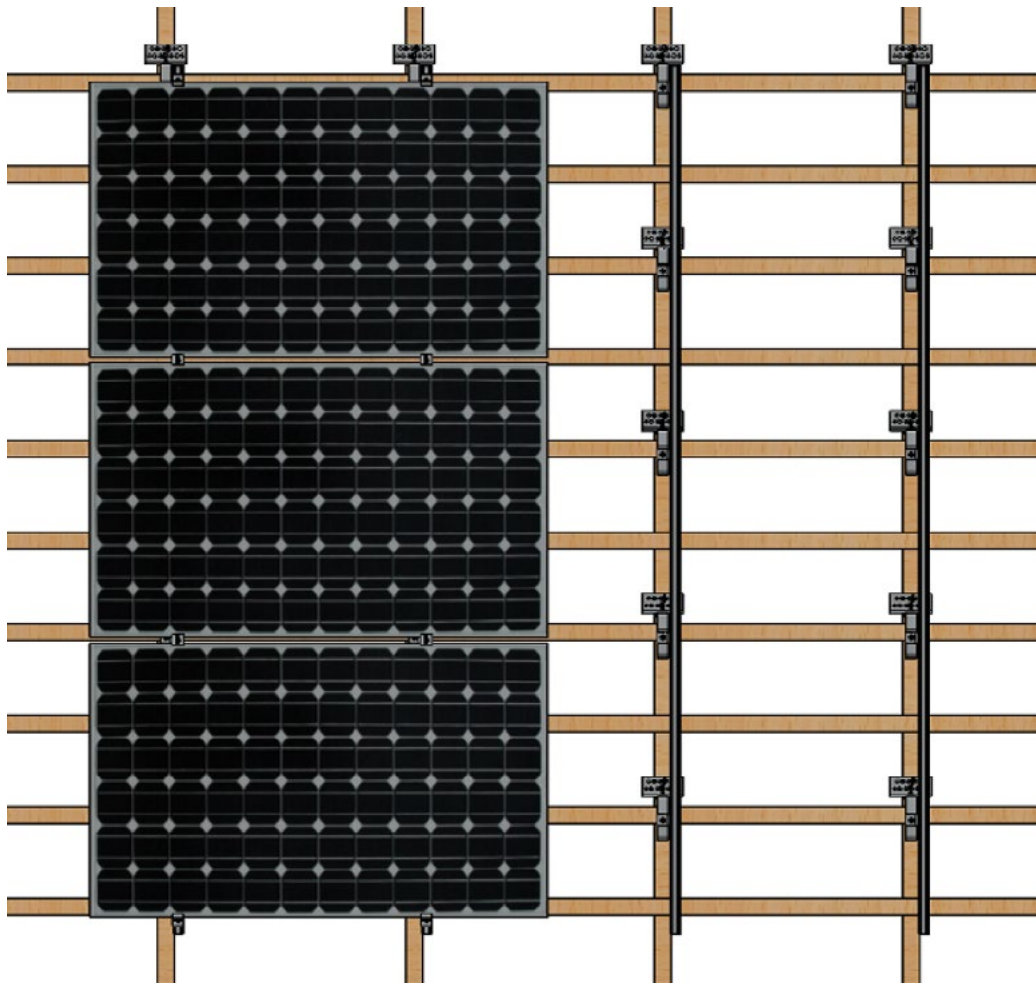


# Installation Instructions



## Modules in Portrait

- The min. distance from the mounting rack to the roof edges is 20cm.
- Assess the horizontal spacing of the Roof Hooks;
- Assess the vertical spacing of the Roof Hooks = approx.  $\frac{1}{2}$  to  $\frac{3}{4}$  of module height;
- Check the allowed max. spacing listed in this installation guide.



### Modules in Portrait

- The min. distance from the mounting rack to the roof edges is 20cm.
- Assess the horizontal spacing of the Roof Hooks;
- Assess the vertical spacing of the Roof Hooks = approx. 1/2 to 3/4 of module height;
- Check the allowed max. spacing listed in this installation guide.
- Always check the installation manual of the PV-Module you use in order to determine the allowed fixing points on the module frame.



# Alu Hook Installation

Determine the positions of the roof hooks according to your plans. Remove the roof tiles at the marked positions or, if possible, simply push them up slightly.



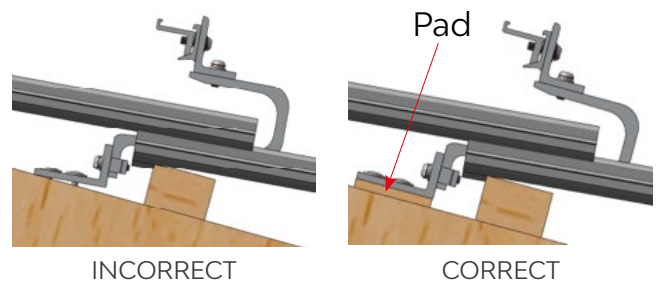
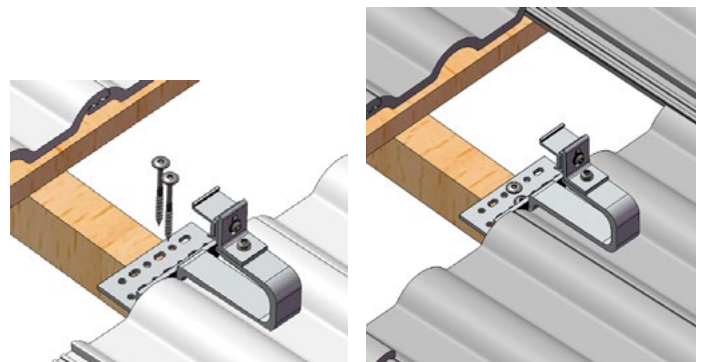
Fix the roof hooks to the rafter using M8\*100 Torx screw as shown in the figure on the right following screws installation guide below:

- Use a 3/8" Torx Socket.
- Use a powered or cordless screw driver.
- Fit the driver bit into the screw and place at the fastening position.
- Apply consistently firm pressure (end load) to the screw driver until the screw is fastened.

Note: Only approved and certified wood screws are to be used for roof hook installations. A predrill 5mm dia. hole is needed and the distance between the screw to rafter edge is 3\*d (screw dia.)

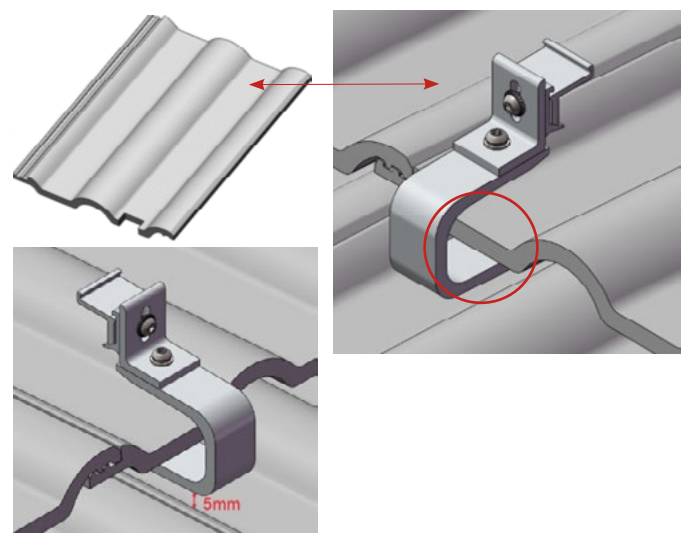
The hook can be installed only on the roof rafter but not on the tile lath.

The roof hook must not press against the roof tile. If necessary, pack the roof hook.



If necessary, use an angle grinder to cut a recess in the tile covering the Roof Hook at the point where the Roof Hook extends so that the tile lies flat on the surface. If grooved tiles are used, it will also be necessary to cut a recess in the lower tile.

5mm spacing between the lower side of arm and tile is recommended as shown in the figure on the right.

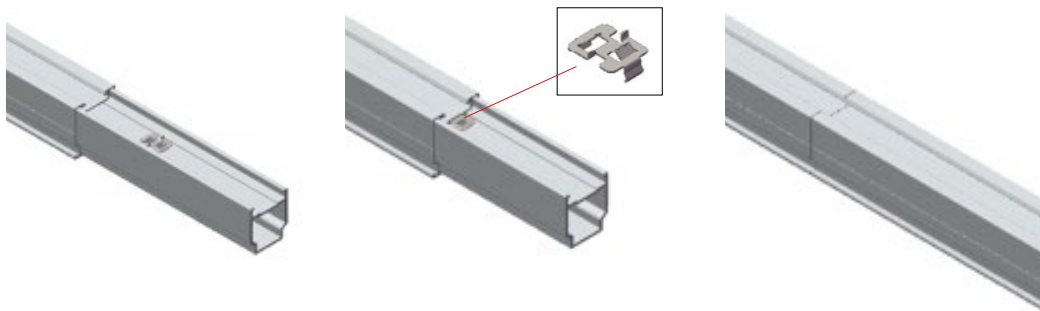


Caution! Do not use fitted roof hooks as a ladder, as this extreme point load could damage the tile below.

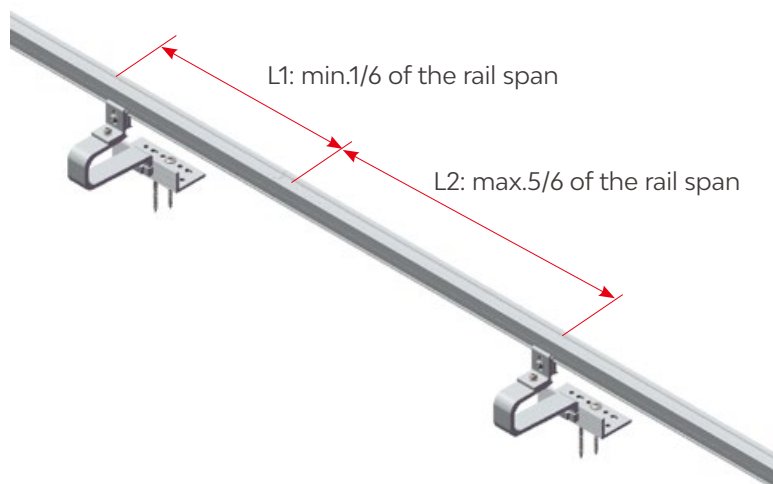


## Rail Installation

To connect several rails together, slide half of the splice into the rear side of the rail, until it's stuck and fixed by the Connection Clip. Then slide the next rail into the splice and get it fixed.



The installation location of the splice is as shown in the figure below.

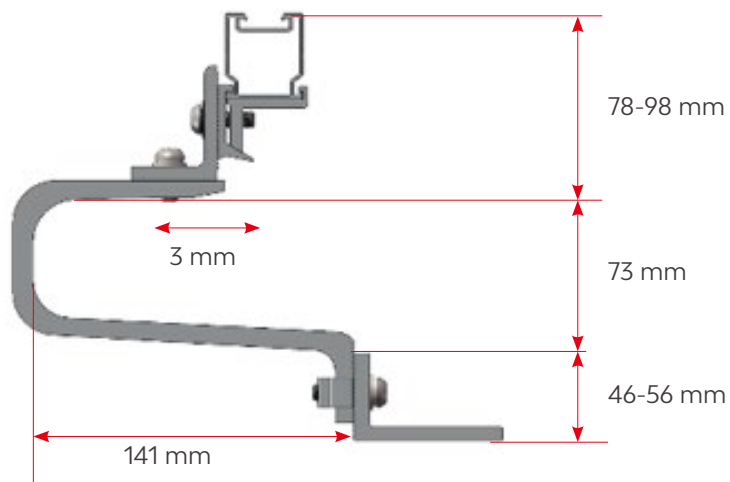


Place the rails on the Upper Clamp for L Bracket, and fasten the M8 Torx screw loosely with Torx L-key or the equivalent.



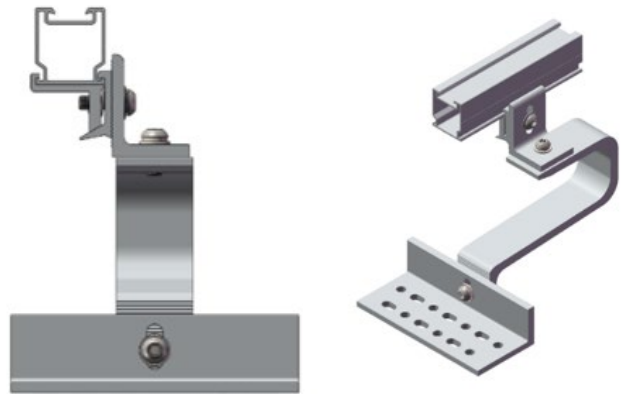
The recommended torque is 14N·m.

Please refer to the figures on the right for adjustments. The adjustable range are shown in the figure below.





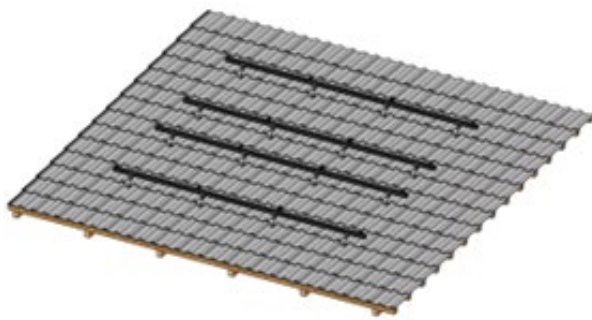
Note: If PV modules are installed in landscape, the rail need to running parallel to the rafter, as shown in the figure on the right.



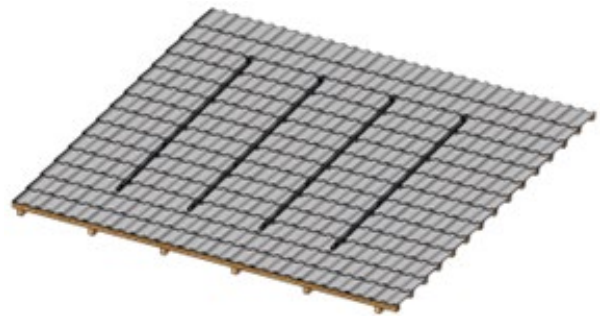
**Verify Maximum Rail End Overhang**

Rail end overhang should be not over 40% of the interface spacing. For example, if the interface spacing is 1500mm, the Rail end overhang can be up to 600mm only.

The rail installation are completed as shown in the figures below.



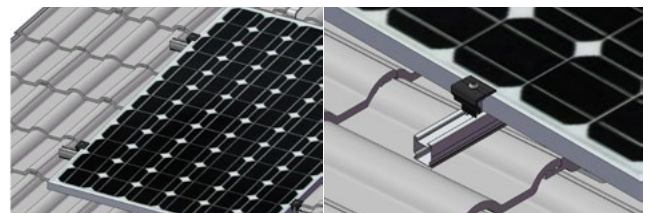
modules in portrait



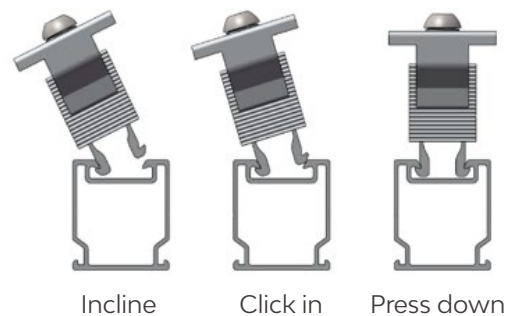
modules in landscape

**PV Module installation**

Place PV Modules on rails, fix with end clamps and inter clamps. Click the M-module of the clamps into the top channel of rail as shown in the figures on the right.



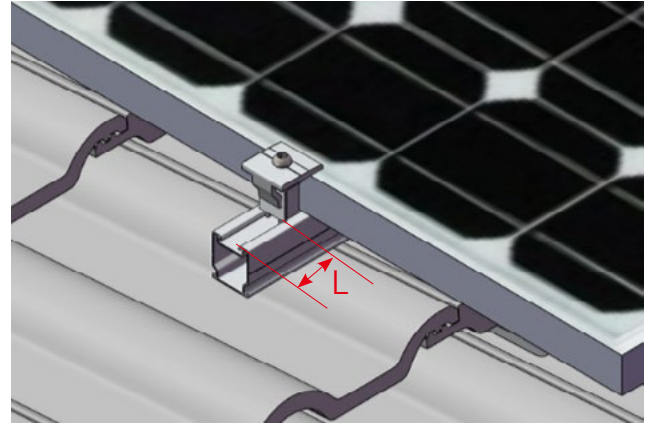
Step 1 Place the first PV Module on Rails according to your plan and apply the End Clamps to fix it and then fasten lightly using Torx L-key or the equivalent as shown on the right figure.



Notes:

The distance L from end clamp to the end of the rail shall be over 10mm.

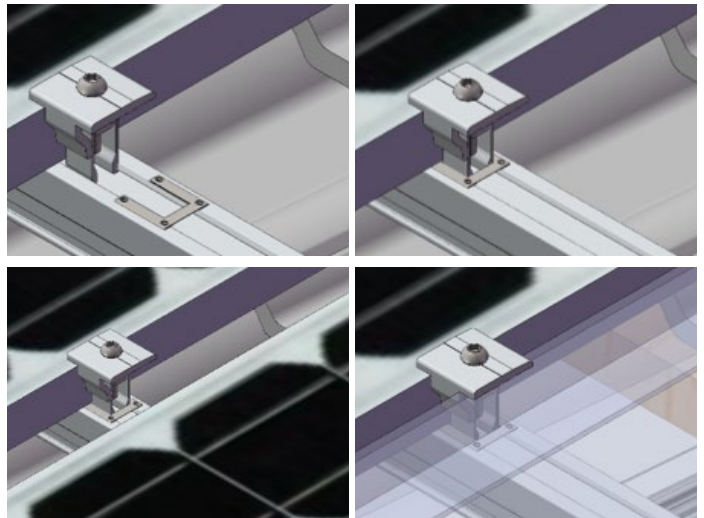
Step 2 Slightly lift the PV Module and slide Inter Clamps and Grounding Clips into position. The teeth on Grounding Clip will automatically align when the Inter Clamp is properly installed as shown on the right figures.



Step 3 loosely place the next framed PV Module into the other side of the Inter Clamp and Grounding Clip as shown on the right figure.

Important Notes:

- To fix the Grounding Clip properly, ensure the frames of PV Modules are completely pressed against the Inter Clamp and Grounding Clip. Visually check that Grounding Clips are positioned properly.
- Grounding Clips are intended for SINGLE USE ONLY!
- Only fasten the bolts down when the position of PV Module is finalized. (Only slightly tighten bolts to keep PV Modules in place prior to the final check)

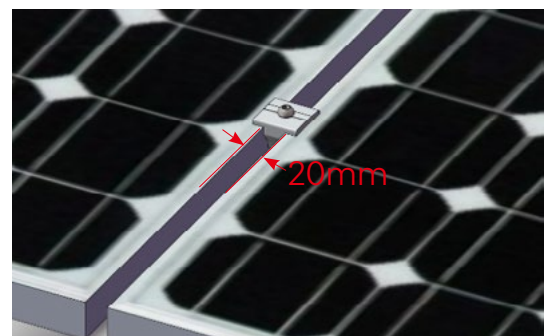


Step 4

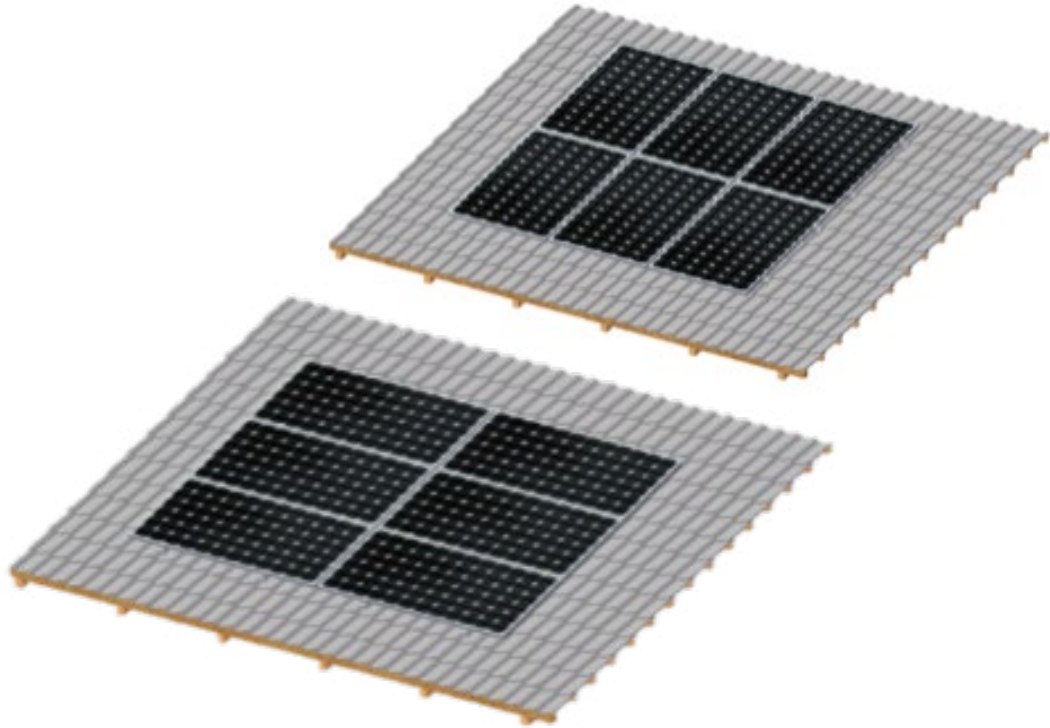
Maintain 20mm vertical gap and 20mm horizontal gap between the two adjacent rows of PV Modules. You can use two Inter Clamps to separate two PV Modules, and remove after installation as shown on the right figure.

Double check if all PV Modules are fixed properly.

Fasten all the screws tightly with the recommended torque 14N·m.



PV module installation is completed as shown on the right figures.

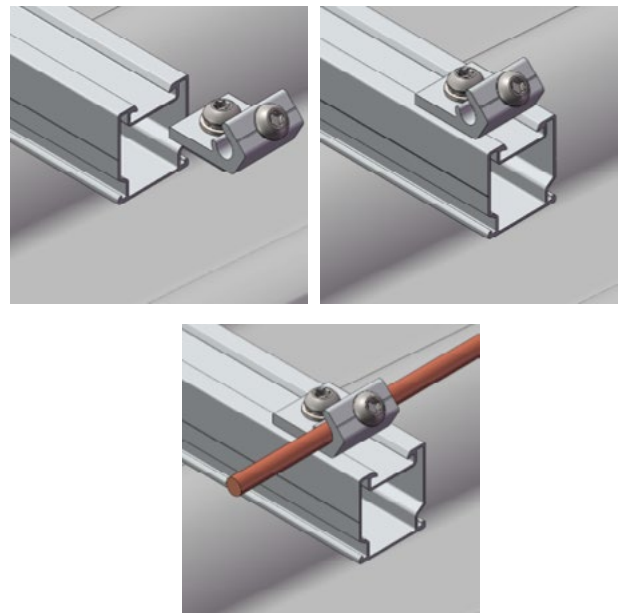


## Grounding System

### Grounding Lug installation

Slide the W module into the top channel of rail, and fasten the M8 Torx screw tightly with recommended torque of 14N·m.

Insert the copper wire into the grounding lug and fasten the M8 Torx screw tightly with recommended torque of 8N·m as shown on the right figures.

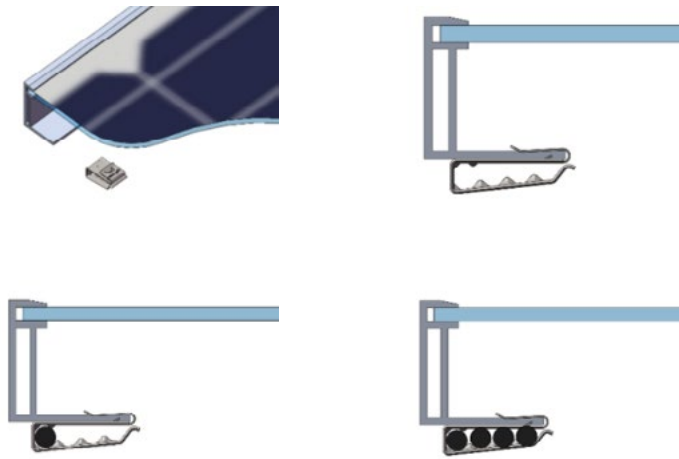




## Accessories Installation

### Cable clip installation

Clamp the cable clip on the edge of PV modules. Insert the cables into the holes of cable clips as shown on the right figures.










## PV-ezRACK®

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