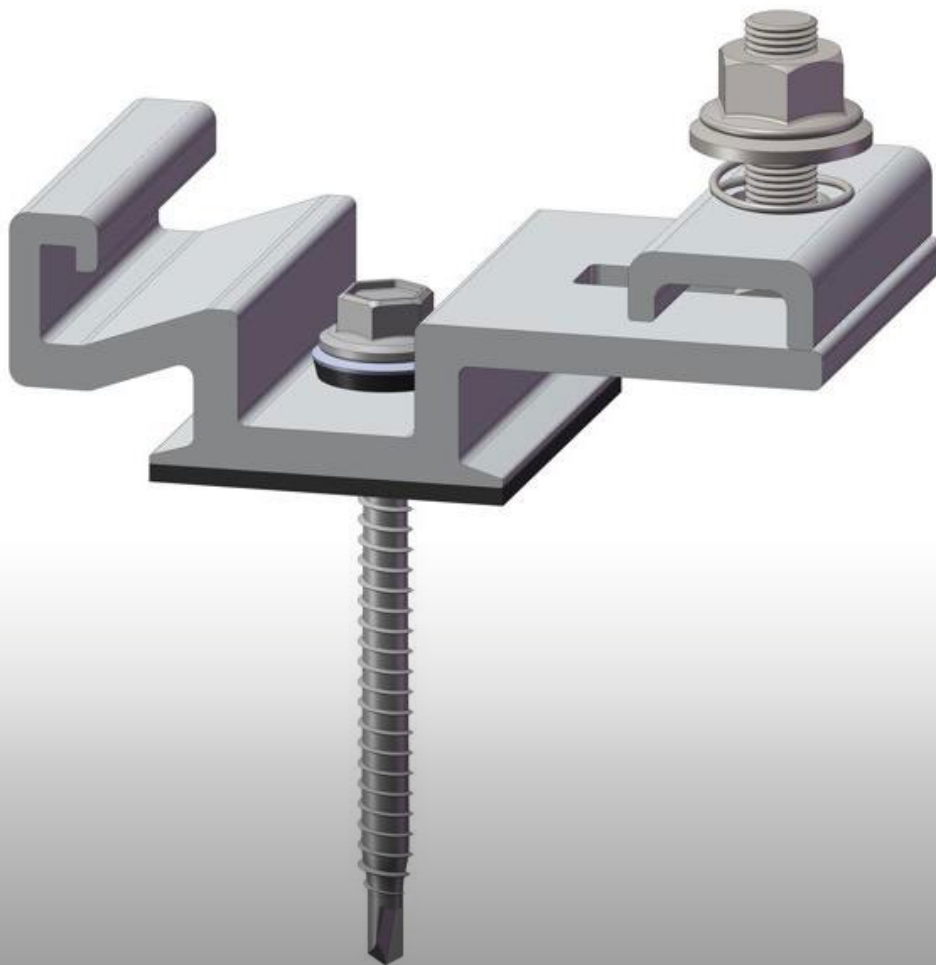


SolarRoof, EzClick Connection for T-Rail

Code-Compliant Planning and Installation Guide V 1.0
Complying with AS/NZS1170.2-2021



Introduction

The Clenergy PV-ezRack SolarRoof has been developed as a universal PV-mounting system for roof mounting on pitched and flat roofs. The ezClick connection for T-Rail is another innovative interface that supports portrait mounting of PV modules in flush (0°) configuration on both tin and concrete roofs. For large purlin spans on tin roofs, it offers the most convenient way to fix to T-Rail; for concrete roofs, it minimizes penetration points and thereby minimizes roof leaking risk.

Please review this manual thoroughly before installing PV-ezRack SolarRoof. This manual provides:

1) Supporting documentation for building permit applications relating to PV-ezRack SolarRoof Universal PV Module Mounting System.

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The PV-ezRack SolarRoof parts, when installed in accordance with this guide, will be structurally sound and will meet the AS/NZS1170.2:2021 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 Australia via email at tech@clenergy.com.au or contacting your local distributor in Australia.

Product Warranty:

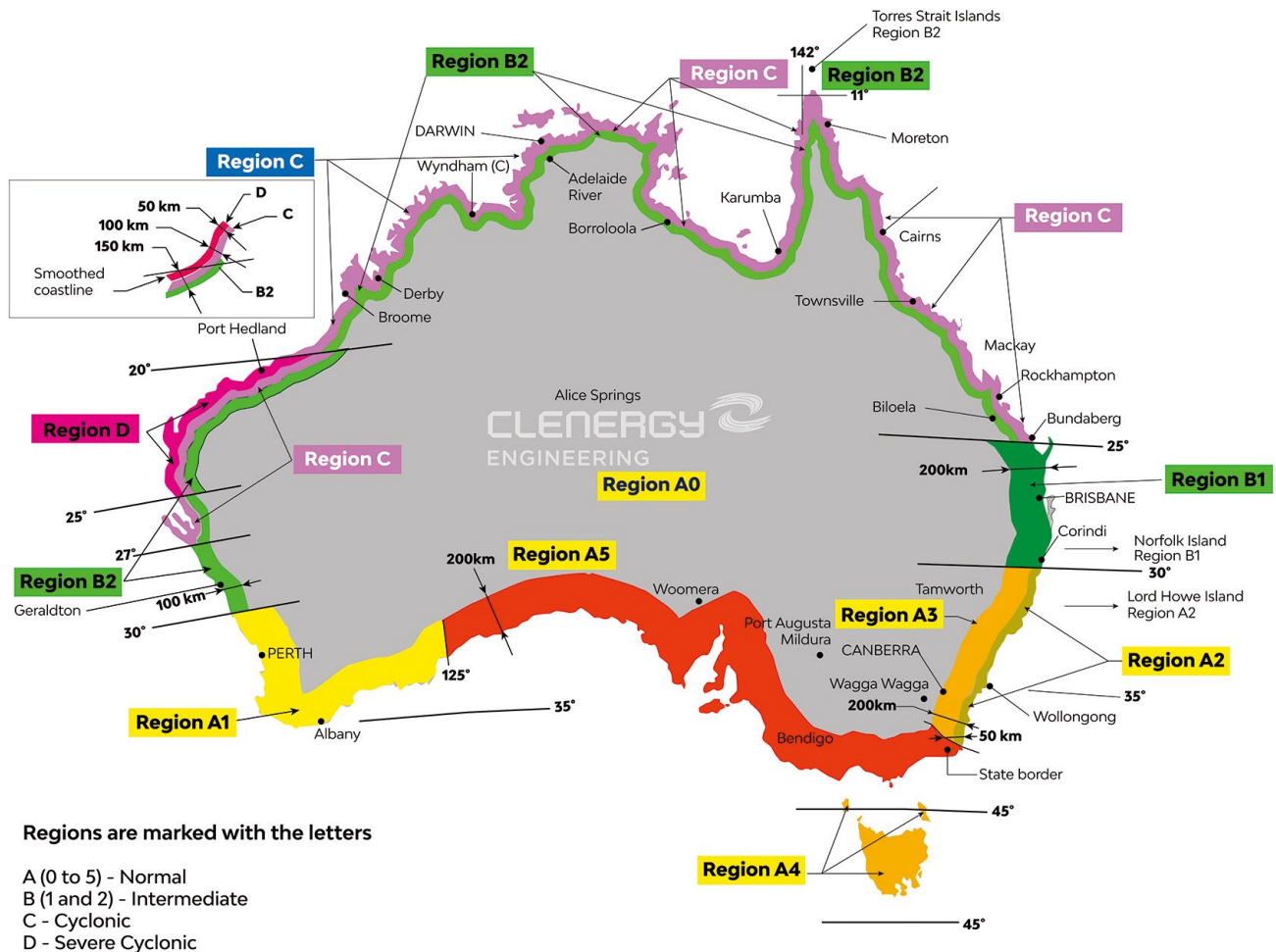
Please refer www.clenergy.com.au on our website.

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 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 licensed electricians.
- Ensuring safe installation of all electrical aspects of the PV array. This includes adequate earth bonding of the PV array and PV-ezRack SolarRoof components as required in AS/NZS 5033-2021.
- 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 the selection of appropriate flashing. Verifying the compatibility of the installation considering preventing electrochemical corrosion between dissimilar metals. This may occur between structures and the building and between structures, fasteners and PV modules, as detailed in AS/NZS 5033: 2021.
- Verifying atmospheric corrosivity zone of installation site by referring to AS 4312: 2019 or consulting local construction business to determine appropriate products and installations.

Planning

Determine the wind region of the installation site (Australia)



Wind Regions – Australia

Wind regions across Australia are defined by the Australian Standard AS 1170.2:2021. Compared to the 2011 version, the 2021 update includes significant changes to the wind region classifications.

- Central Australia is now classified as Wind Region A0 and Terrain Classification 2 instead of Wind Region A4
- Region A1, which previously covered most of Australia's South Coast, is now divided into Regions A1 and A5.
- Region B has been divided into regions B1 and B2. This will affect installations in Northern NSW, Gold Coast, Brisbane, Sunshine Coast, and Gladstone.
- Region B1 now includes more inland cities around Brisbane. This may require additional structural considerations, such as installing extra rails.

Determine the Terrain Category

You will need to determine the terrain category to ensure the installation meets the required standard. Terrain Category 1 (TC1) refers to highly exposed open terrain with very few or no obstructions, as well as all water surfaces. Examples include flat, treeless, sparsely - grassed plains; open oceans, rivers, canals, bays, and lakes.

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 2.5 (TC2.5) – Terrain with some trees or isolated obstructions, terrains in developing outer urban areas with scattered houses, or larger acreage developments with more than two and less than 10 buildings per hectare.

Terrain Category 3 (TC3) – Terrain with numerous closely spaced obstructions having heights generally from 3m to 10m. The minimum density of obstructions shall be at least the equivalent of 10 house-size obstructions per hectare, e.g. suburban housing, light industrial estates or dense forests.

Terrain Category 4 (TC4) – Terrain with numerous larger, high (10m to 30m tall) and closely-spaced constructions buildings, such as large city centers and well-developed industrial complexes.

If the installation site does not fall within Terrain Category 2, 2.5, or 3, it is necessary to contact Clenergy to obtain a project - specific engineering certificate to support the installation.

Verify Atmospheric Corrosivity Zone of Installation Site

Please refer to "AS 4312: 2019 Atmospheric Corrosivity Zones in Australia" or consult local construction business to verify corrosivity category of installation site.

Note: Clenergy provided screws for Tin interfaces are suitable for up to C5 corrosive environments only.

Determine the Height of the Installation Site

This document provides sufficient information for the PV-ezRack® SolarRoof™ system installation up to heights of 30 meters. If the installation site is more than 30 meters high, please contact Clenergy to obtain a project-specific engineering certificate to support the installation.

Determine the Installation Area of Roof

Please refer to the generic notes of the Certification Letter to determine the installation area based on building height, length, and width. Please be aware that under certain building conditions there is an Exclusion Zone for flush installation, which is the minimum distance between PV solar panel and roof edge of "2 x s", where "s" is the gap between the underside of the panel and the roof surface.

Determine the Maximum Rail Support Spacing

Please refer to the Certification Letter and Interface Spacing Table. If a project-specific Certification Letter has been provided, please refer to the support spacing in this letter.

Verify Maximum Rail End Overhang

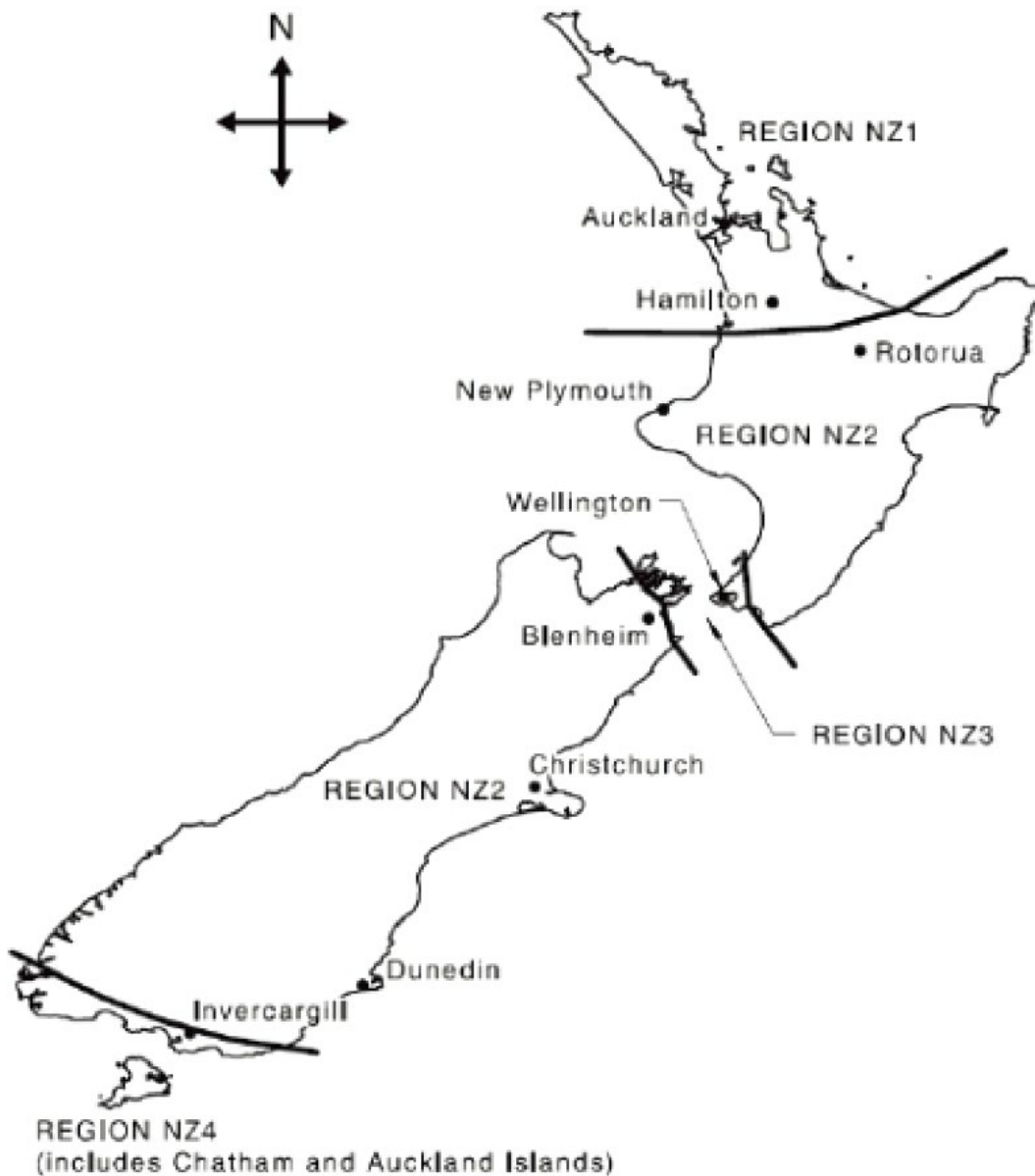
Rail end overhang is defined as the distance from the last interface to the end of the panel. The maximum rail end overhang is 40% of the last interface installed spacing. For example, if the max interface spacing in the generic engineering certificate is 1200 mm and installed spacing is 1000 mm, the maximum rail end overhang is 400 mm.

Acquire PV Modules Clamping Zone Information

It is important to check PV modules clamping requirements (e.g., clamp dimensions and clamping distance from the end of the panel) with the manufacturer before installations. This ensures the correct clamp size is used and aids in planning the interface positions on the roof, as well as the orientation and placement of the rails.

Determine the wind region of the installation site (New Zealand)

Wind regions map below shows 4 different wind regions in New Zealand: NZ1, NZ2, NZ3 and NZ4.



Determine the Terrain Category

It requires determining the right terrain category to ensure the installation meets the maximum interface spacing specified in the engineering certificate.

Note: Clenergy provided screws for Tin interfaces are suitable for up to C5 corrosive environments only.

Terrain Category 1 (TC1) – Very exposed open terrain with very few or no obstructions, and all water surfaces (e.g. flat, treeless, poorly grassed plains; open ocean, rivers, canals, bays and lakes).

Terrain Category 2 (TC2) – Open terrain, including grassland, with well-scattered obstructions having heights generally from 1.5 m to 5 m, 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 obstructions having heights generally from 3 m to 10 m. The minimum density of obstructions shall be at least the equivalent of 10 house-size obstructions per hectare (e.g. suburban housing, light industrial estates or dense forests).

Terrain Category 4 (TC4) – Terrain with numerous large, high (10 m to 30 m tall) and closely spaced constructions, such as large city centres and well-developed industrial complexes.

If your installation site is not at TC 2 or 3, please contact Clenergy to obtain a project specific engineering certificate to support your installation.

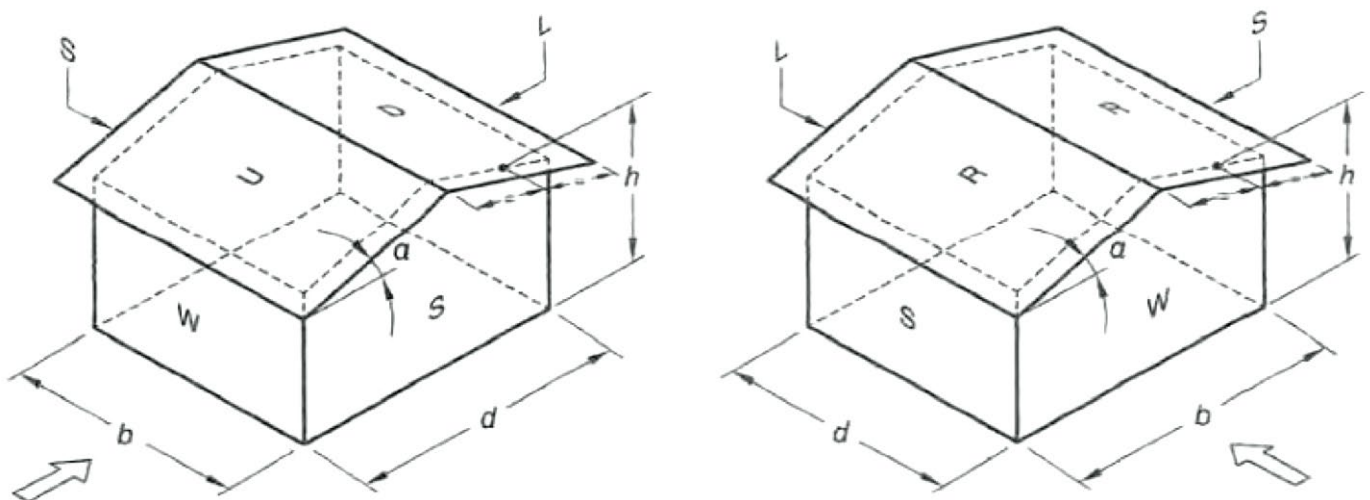
Verify Atmospheric Corrosivity Zone of Installation Site

Please refer “SNZ TS 3404:2018 Durability Requirements for Steel Structures and Components” or consult local Construction business to verify corrosivity category of installation site to determine appropriate corrosivity class roof interface screw.

Determine Building Dimension

This document provides sufficient information for the PV-ezRack SolarRoof system installation up to 20 meters building height (average roof height of structure above the ground, see the diagram below). If your building is more than 20 meters high, please contact Clenergy to obtain project specific engineering certificate to support your installation.

Building horizontal dimensions (b and d) are required to calculate the ratio of h/d to determine maximum interface spacing.



Parameters for Rectangular Enclosed Buildings

Determine the Installation Area of Roof

There are 4 different roof zones for tilt leg installation: Internal Zone, Intermediate Zone, Edge Zone and Corner Zone. Please see diagrams and steps below to define area of each zone.

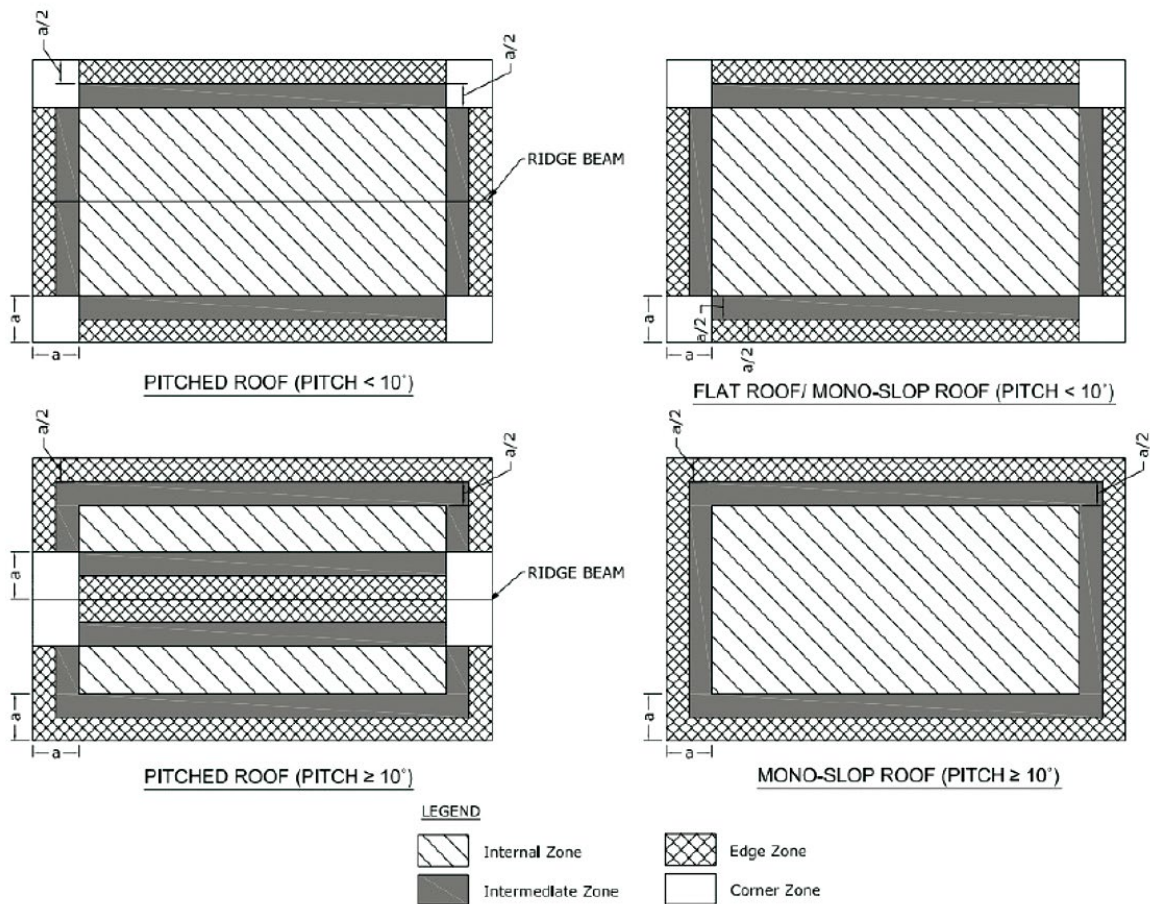
Determine the Maximum Rail Support Spacing

Please refer to the Certification Letter and Interface Spacing Table. If a project-specific Certification Letter has been provided, please refer to the support spacing in this letter.

Step 1. Determine building height (h), width (b) and length (d) – see diagram above;

Step 2. The lowest value between " $b \times 0.2$ " and " $d \times 0.2$ " is "a" if h/b or $h/d \geq 0.2$;

Step 3. "a" equates to $2h$, if both h/b and $h/d < 0.2$,



Roof Zones Definition

Verify Maximum Rail End Overhang

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

Acquire PV Modules Clamping Zone Information

It is recommended to acquire PV modules clamping zone info. from PV modules manufacturer, which can help to plan interfaces positions on the roof and rails orientation and positions.

Tools and Components

Tools

				
Screwdriver	Marker Pen	Torque Spanner	Tape	String
				
3/8" Hex Socket	Anchoring Kit	Mixing Nozzles		

Components (Manufacturer: Clenergy)

			
ER-EZC/T/V1R1 EzClick Connection for T-Rail	ER-R-T110/XXXX T-Rail 110	ER-SP-T110 Splice for T-110 Rail	ER-CAP-T110 Cap for T-110 Rail

Components (Manufacturer: Non-Clenergy*)

	
Chemical Anchor Stud [M8]* x L* mm	Anchoring Adhesive*

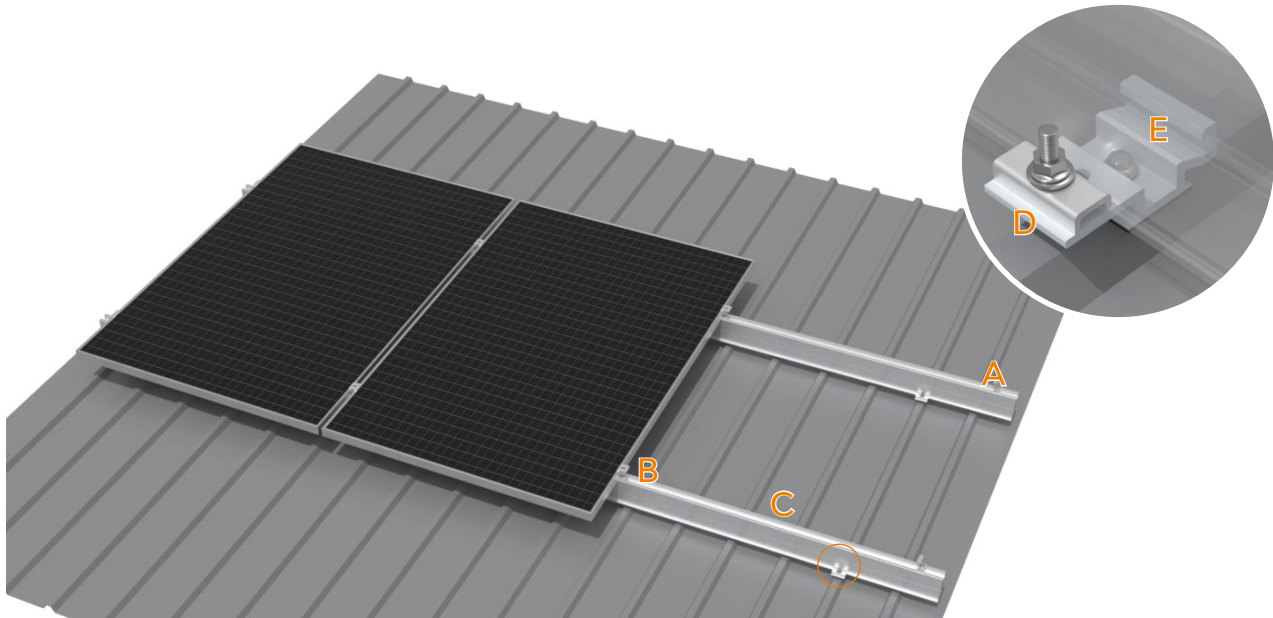
*Non-Clenergy components are to be sourced externally.

*Anchor Stud gauge [M8] and length, L, depends on the following parameters to meet the Clenergy accredited minimum pull out capacity of 6.1kN:

- I. Required height of interface over concrete roof surface, as per installer’s requirements at site.
- II.Required manufacturer embedment into concrete membrane, for the above-mentioned rod capacity.

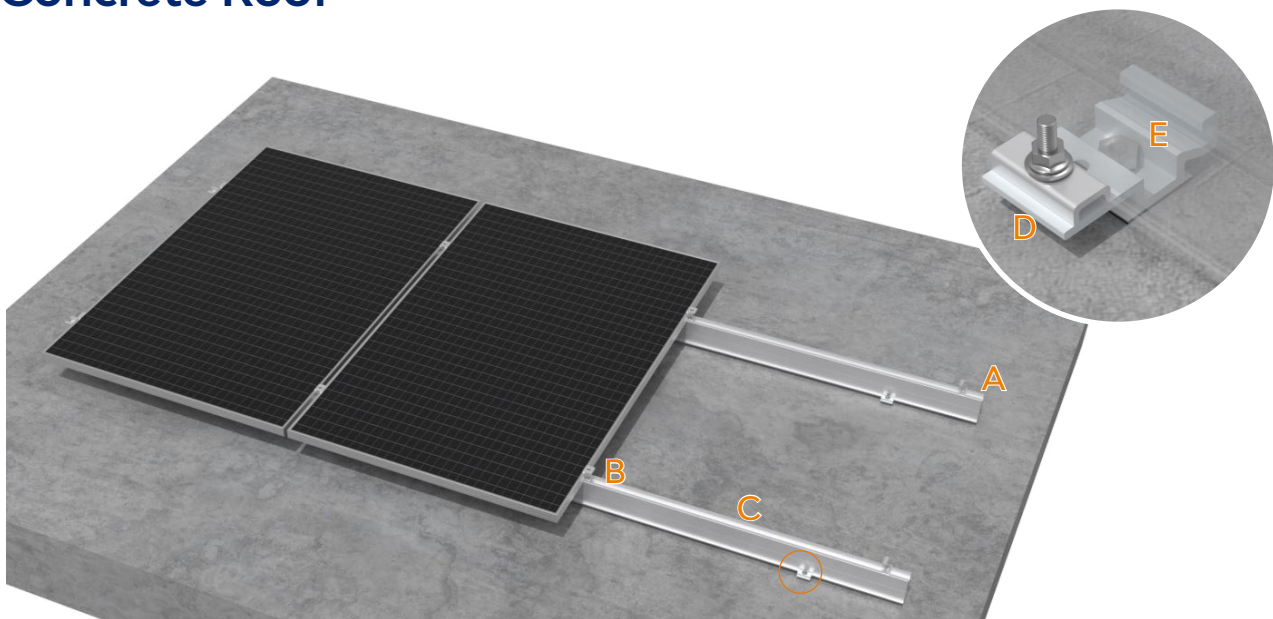
System Overview

Overview of PV-ezRack® SolarRoof T-Rail solution on Tin Roof



A. End Clamp B. Inter Clamp C. T110 Rail D. EzClick Connection for T-Rail E. Buildex Screw

Overview of PV-ezRack SolarRoof T-Rail solution on Concrete Roof



A. End Clamp B. Inter Clamp C. T110 Rail D. EzClick Connection for T-Rail E. Chemical Anchor Stud

Precautions during Stainless Steel Fastener Installation

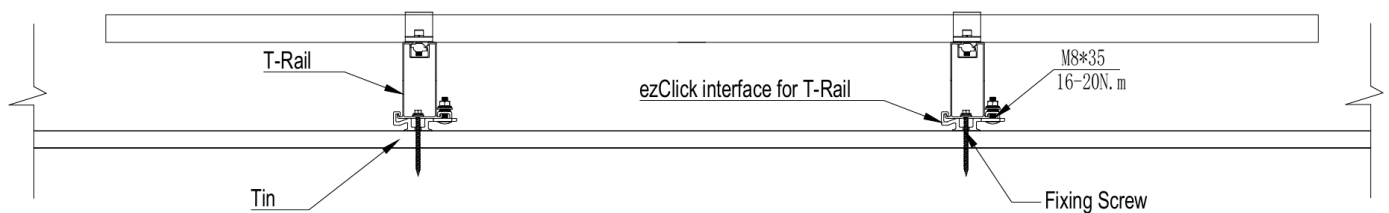
Improper operation may lead to the deadlock of Nuts and Bolts. The steps below should be applied to stainless steel nut and bolt assembly to reduce this risk.

General installation instructions:

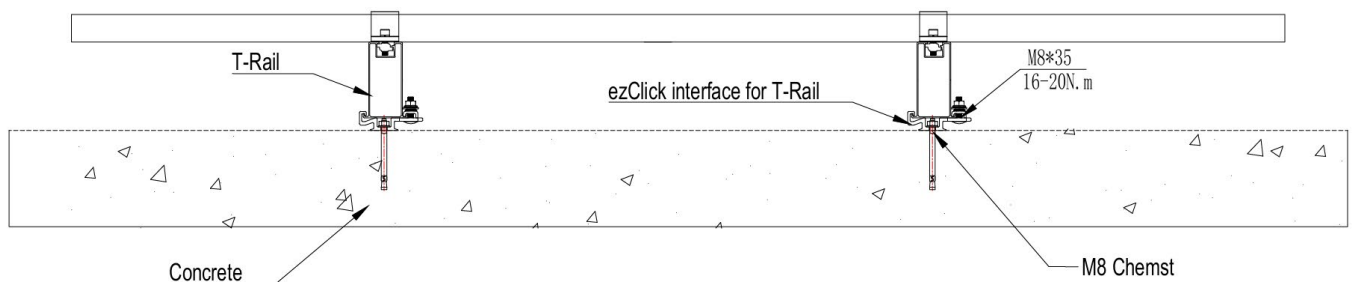
- (1) Apply force to fasteners in the direction of the thread.
- (2) Apply force uniformly, to maintain the required torque.
- (3) Professional tools and tool belts are recommended.
- (4) In some cases, fasteners could be seized over time. To prevent galling or thread seizing, apply lubricant (such as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

Safe Torques:

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



On Tin Roof

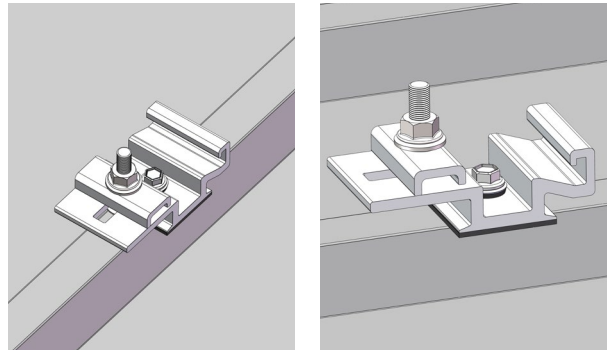


On Concrete Roof

Installation Instructions

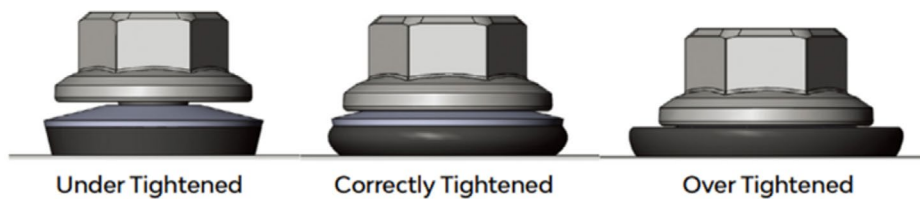
EzClick Interface Installation

Position the ezclick interface correctly on the rib of the roof according to the layout plan and press the interface down to ensure the EPDM pad on each side makes proper contact with the roof rib. Once positioned, fix the ezclick interface to the roof substructure using the provided Buildex 14 gauge Hex Head Zips screw.



Screw installation instruction:

1. Use a 3/8" Hex Socket.
2. Use a mains-powered or cordless screwdriver with a maximum drive speed of 3,000 RPM.
3. Fit the driver bit into the screw and place it at the fastening position.
4. Apply consistently firm pressure (end load) to the screwdriver until the screw has fastened.



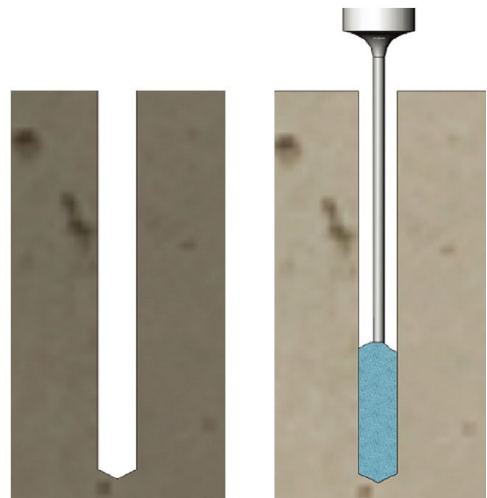
Note:

Screws that are not exposed to frequent rain should be washed down with fresh water at least every 6 months to meet the warranty conditions of Buildex Screws.

Concrete roofs:

A. Chemical Anchor installation instruction:

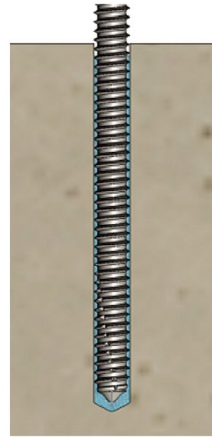
- (1) Source anchor stud based on installation plan and Clenergy accredited rod pull out capacity of 6.1kN. Drill a hole to manufacturer's requirements.
- (2) Remove dust and debris by brushing and blowing as necessary, shown in Figure on the right image, (If hole is wet or flooded, remove excess water with wet/dry vacuum).
- (3) Apply anchoring adhesive as per manufacturer's guidelines, ensuring no air pockets form as shown Figure on the right.



A. Chemical Anchor installation instruction:

(4) Insert chemical Anchor Stud/rebar to bottom of hole while turning as shown in Figure on the right.

(5) Wait until adhesive has fully cured before loading as shown in Figure on the right.



Note:

Please refer to manufacturer's manual for instructions on adhesive cooling temperatures and waiting times.

Load should not be applied to anchor until the adhesive has sufficiently cured as specified in manufacturer's manual. The max anchor length standing out from the concrete roof must not exceed 18mm; otherwise, the top of the anchor will interfere with rail.

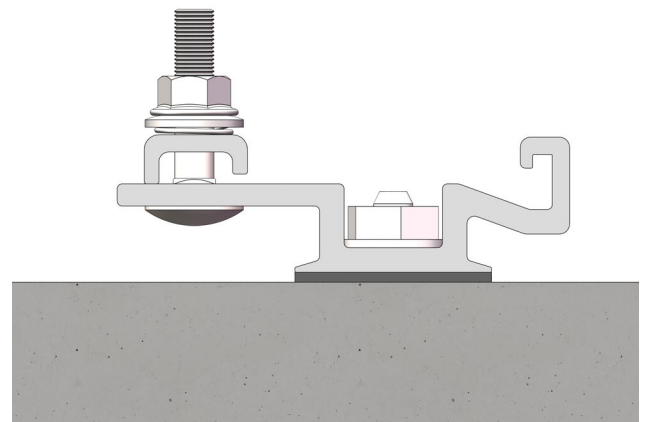
Waterproofing

The adhesives form waterproof fixing points once cured. For more information, please contact chemical anchor stud manufacturer.

B. ezClick Interface Installation

Connect and adjust ezClick interface position on the anchor stud. Tighten with washer and nut as per manufacturer's instruction.

Clenergy recommended torque for M8*12 bolt is 16~20 N·m.

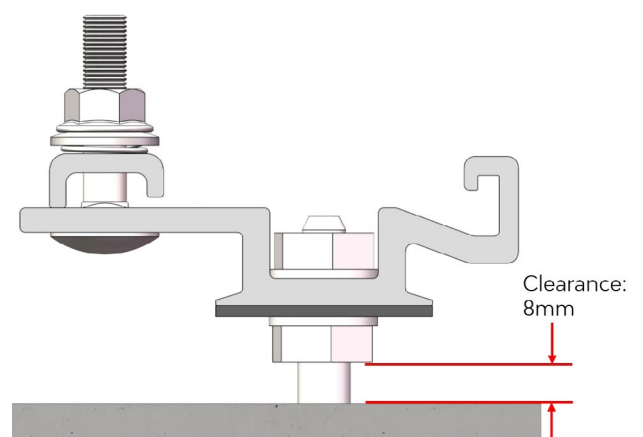


Uneven roof surfaces:

The base of the bottom nut can have a maximum clearance of 8mm using an M8 gauge anchor stud. In this case, interface base should be double fastened with bolts and washers, as shown in Figure on the right.

The clearance can be increased to 12mm by using an M10 gauge anchor stud.

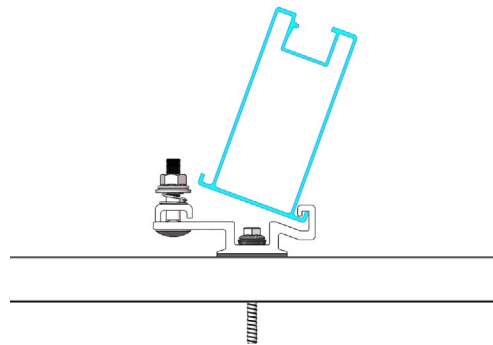
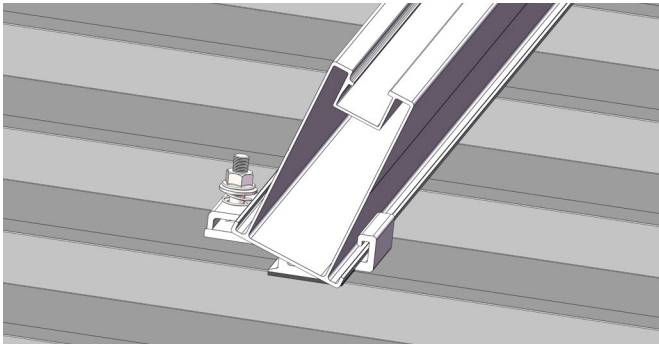
This would require predrilling the interface base to fit the rod.



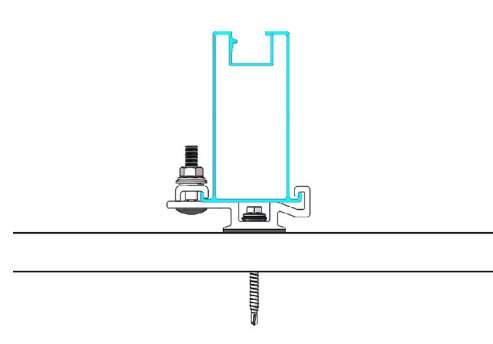
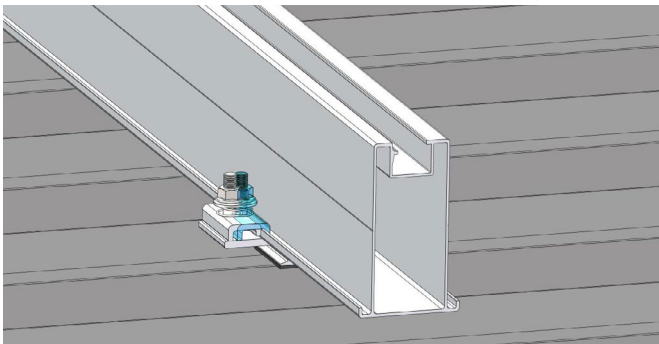
Rail Installation

When connecting T-rails and ezClick connection:

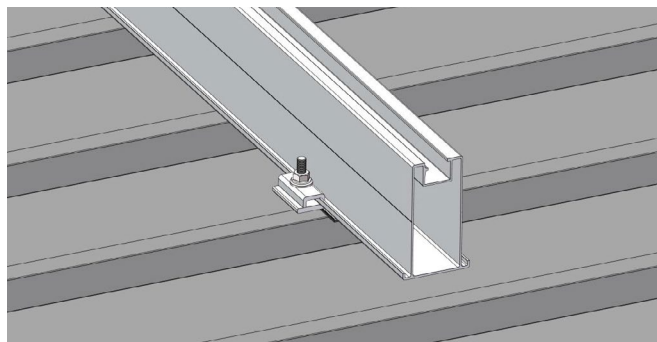
Tilt the T-Rail to a certain angle and place the T-Rail into the groove of the ezClick ensuring the rail is properly aligned.



Position the T-Rail horizontally, then slide the ezClick top over the groove of the rail as shown in the Figure below. Tighten the interface with the bolt until it fits into the groove on the other side of the T-Rail, locking it in place.



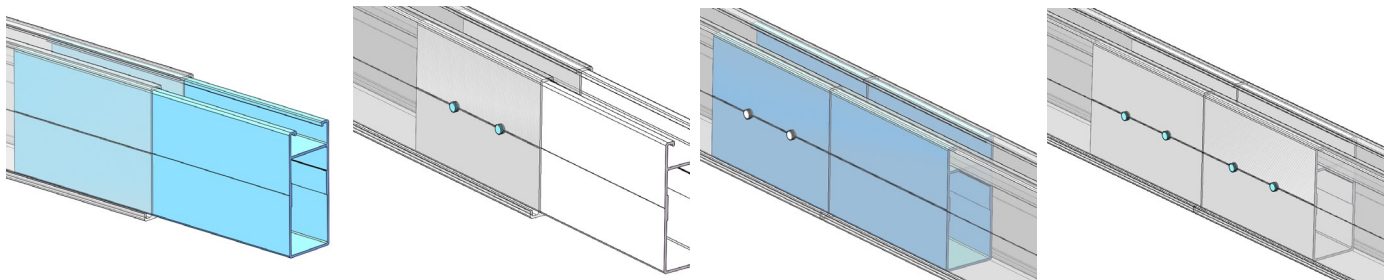
Once both sides are securely engaged, rotate the nut clockwise to complete the installation.



When connecting T110 rails:

Determine the necessary length of T110-Rail prior to installation. If, a single T110-Rail isn't long enough, join two rails together using a T-Rail splice as shown below then proceed with the installation as directed above.

The diagrams illustrate the splicing process:



Required torque is 10 ~12 N.m.

The Rail Splice (shown highlighted in blue) is inserted into the hollow open end of the first T110 rail, with roughly half the splice remaining exposed

The second T110 rail is then slid over the exposed half of the splice, putting both rail ends flush together

2 bolts are fastened through the pre-drilled holes on the rail surface to secure the splice internally and prevent any

PV Module Installation

Please refer to the [PV-ezRack Grounding System](#) Installation Guide for PV modules clamps and grounding lugs installations.

The installers must ensure panel clamps are installed flush mounted to the panel frame and apply the correct torque value of the clamp fastener as shown in this guide.



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Last Updated - Jun. 2026