

PV-ezRack® SolarRoof™

Code-Compliant Planning and Installation Guide V3.1
Complying with AS/NZS1170.2-2011 AMDT 2-2016



Introduction

1. Introduction

The Clenergy PV-ezRack® SolarRoof™ has been developed as a universal PV-mounting system for roof-mounting on pitched and flat roofs. The use of patented aluminium base rails, Z-Module technology and telescopic mounting technology eliminates custom cutting and enables fast installation.

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,
- 2) Planning and installation instructions.

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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/NZS1170.2:2011 Amdt 2- 2016 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 on sales@clenergy.com.au, or contacting your local distributor in Australia.

The installer is solely responsible for:

- Complying with all applicable local or national building codes, including any updates 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 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;
- Ensuring that there are no less than two professionals working on panel installation;
- Ensuring the installation of related electrical equipment is performed by licenced 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 5033-2014 AMDT 2 2-2018;
- 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 pullout strength and shear capacities as installed;
- Maintaining the waterproof integrity of the roof, including 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 also between structures, fasteners and PV modules, as detailed in AS/NZS 5033: 2014.

2. Planning

2.1 Determine the wind region of your installation site



Region Definition:

Wind regions are pre-defined for the whole of Australia by the Australian Standard 1170.2. The Wind Region is an independent factor of surrounding topography or buildings.

- Most of Australia is designated Region A which indicates a Regional Wind Velocity of 43 m/s with wind average recurrence of 200 years.
- Some areas are designated Region B (52 m/s). Local authorities will advise if this applies in your area.

- Region C areas (64 m/s) are generally referred to as Cyclonic and are generally limited to northern coastal areas. Most Region C zones end 100km inland.
- Region D (79 m/s) is Australia's most extreme Cyclonic Region, located between the town of Carnarvon and Pardoo Station in Western Australia.

2.2 Determine the Terrain Category

You will need to determine the terrain category to ensure the installation meets the required standard.

Terrain Category 1 (TC1) – Very exposed open terrain with few or no obstructions and enclosed, limited-sized water surfaces at serviceability and ultimate wind speeds in all wind regions, e.g. flat, treeless, poorly grassed plains; rivers, canals and lakes; and enclosed bays extending less than 10km in the wind direction.

Terrain Category 1.5 (TC1.5) – Open water surfaces subjected to shoaling waves at serviceability and ultimate wind speeds in all wind regions, e.g. near-shore ocean water; larger unenclosed bays on seas and oceans; lakes; and enclosed bays extending greater than 10km in the wind direction. The terrain height multipliers for this terrain category shall be obtained by the linear interpolation between the values for the TC1 and TC2.

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 a few trees or isolated obstructions. This category is intermediate between TC2 and TC3 and represents the terrain in developing outer urban areas with scattered houses, or larger acreage developments with fewer than ten buildings per hectare. The terrain-height multipliers for this terrain category shall be obtained by linear interpolation between the values for the TC2 and TC3.

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 sized obstructions per hectare, e.g. suburban housing or light industrial estates.

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

If your installation site is not at TC 2, 2.5 or 3, please contact Clenergy to obtain a project specific engineering certificate to support your installation.

2.3 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 your installation site is more than 30 meters high please contact Clenergy to obtain project specific engineering certificate to support your installation.

2.4 Determine Roof slope

The PV-ezRack® SolarRoof™ system can be used for roof slopes up to 60°. Please verify that the Installation site roof slope is between 0° and 60°.

2.5 Determine the Installation Area of Roof

Please refer to PV-ezRack® SolarRoof Interface Spacing Table in Certification Letter.

2.6 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.

2.7 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.

Tools and Components

3. Tools and Components

3.1 Tools

Tools



Angle Grinder with Stone Disk



Screw Driver
(for M8 Hexagon Socket Screw)



Torque Spanner



Spanner



5m Tape



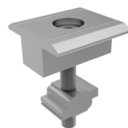
String & Marker Pen

3.2 Components

Component list



ER-EC-ST
End Clamp



ER-IC-ST
Inter Clamp



C-U/30/46-G
Universal Clamp



C-U/30/46
Universal Clamp



ER-EC-DU35/40
End Clamp, Dual 35 or
40mm



ER-EC-DU40/46
End Clamp, Dual 40 or
46mm



ER-R-ECO
ECO Rail



ER-SP-ECO
Splice for ECO Rail

Tools and Components

Component list



ER-I-01
Tile Interface



ER-I-01/CS
Tile Interface, Carbon
Steel



ER-I-01/EZC/ECO
Tile Interface with
ezClick connection for
ECO-Rail



ER-I-02
Flat Tile Interface



ER-I-04
Slate Interface



ER-I-23
Tile Interface-Landscape



ER-I-26
Tile Interface-Side mount



ER-I-51
Tile Interface, 118mm
horizontal arm



ER-I-05
Tin Interface



ER-I-05/CM
Tin Interface with Click
Module



ER-I-05A/EZC/ECO
Tin Interface A with
ezClick connection



ER-I-25
Tin Interface with Curved
Base for Corrugated
Roof



EZ-AD-C43
Adapter (Puck) for
Corrugated Iron Roof



EZ-GC-ST
Grounding clip



EZ-GL-ST
PV-ezRack Grounding Lug
with Copper Pipe



IS-SR265/111
Isolator Shade, non-
assembly (Mill Finish)



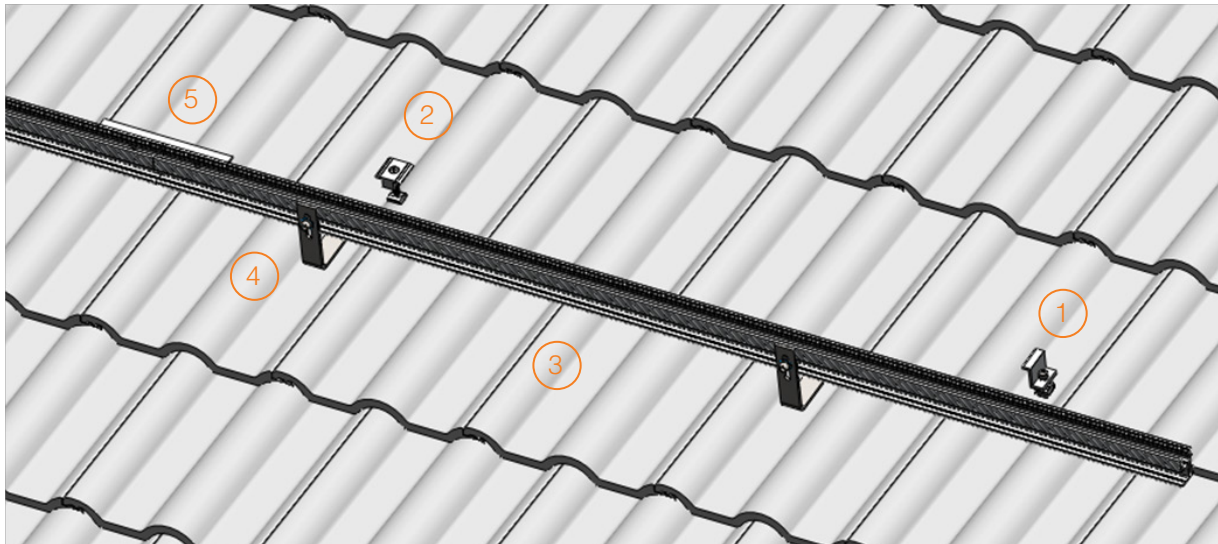
AB-SR/IS/260
Angle Bracket

System Overview

4. System Overview

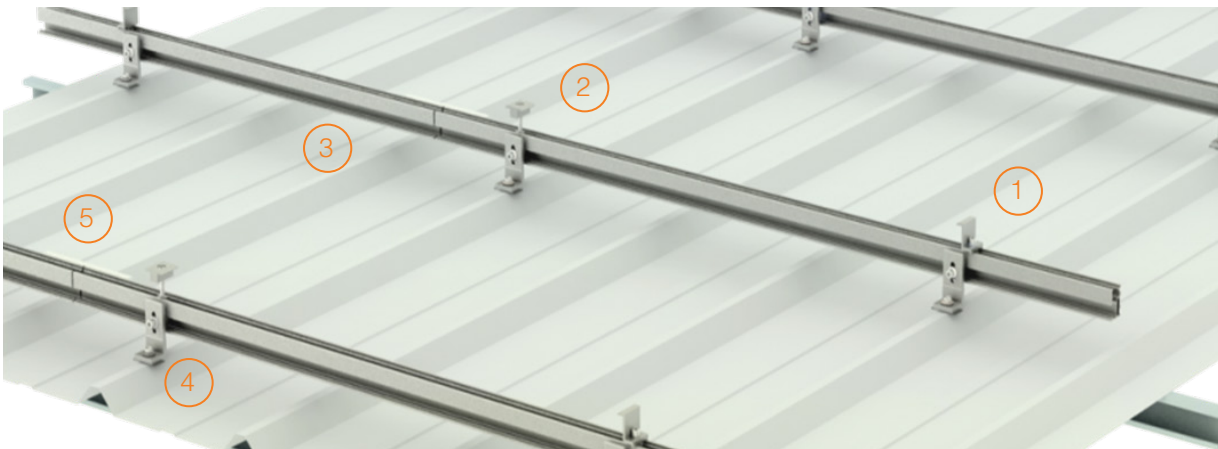
4.1 Overview of PV-ezRack SolarRoof

- Tile Roof



- ① End Clamp ② Inter Clamp ③ ECO Rail ④ Tile interface ⑤ Splice for ECO Rail

- Tin Roof



- ① End Clamp ② Inter Clamp ③ ECO Rail ④ Tin interface ⑤ Splice for ECO Rail

4.2 Precautions during Stainless Steel Fastener Installation

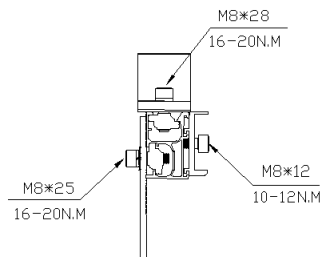
Improper operation may lead to deadlock of Nuts and Bolts. The steps below should be applied to stainless steel nut and bolt assembly to reduce this risk.

4.2.1 General installation instructions:

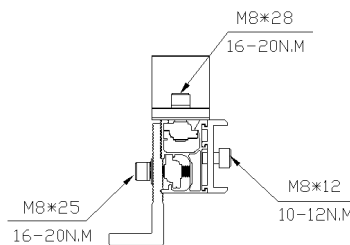
- (1) Apply force to fasteners in the direction of thread
- (2) Apply force uniformly, to maintain the required torque
- (3) Professional tools and tool belts are recommended
- (4) In some cases, fasteners could be seized over time. As an option, if want to avoid galling or seizing of thread, apply lubricant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

4.2.2 Safe Torques

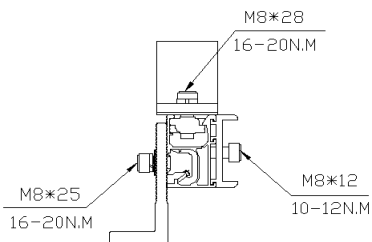
Please refer to safe torques defined in this guide as shown in the figures below. When fixing mid and end clamps, if the torques range specified by the panel manufacturer is different, it should be used instead. In case power tools are required, Clenergy recommends the use of low speed only. High speed 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.



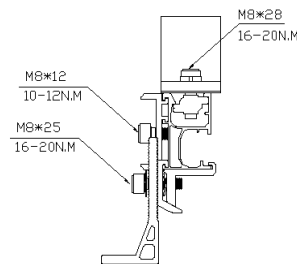
ER-I-01 and other tile interfaces



ER-I-05 and ER-I-25



ER-I-05/CM



ER-I-05A/EZC/ECO

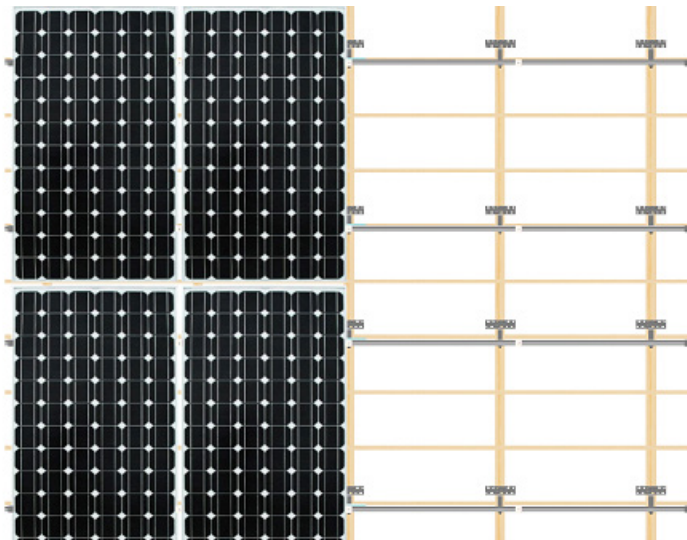
4.3 Installation Dimensions

All drawings and dimensions in this Installation Guide are a generic reference only. PV-ezRack® SolarRoof™ is to be optimized to suit specific conditions for each project and should be documented in a construction drawing.

Major components of PV-ezRack® SolarRoof™ may be provided in section sizes and lengths varying from those shown in this guide. The installation process detailed in this instruction guide remains the same regardless of changes in component size.

If you need to do any on-site modifications or alteration of the system please provide marked up drawings/sketches for Clenergy's review, prior to modification, for comment and approval.

5. Installation Instruction



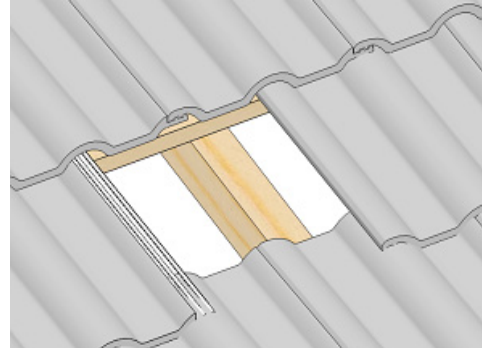
- Assess the number of modules in the vertical direction using the module height plus at least 18mm between modules (please check the installation manual of the solar module manufacturer);
- Assess the Number of modules in the horizontal direction using the module width plus 18 mm (20 mm if using Universal Clamps) between the modules.

Note: The standard end clamp will also add 20 mm (except for dual end clamps) on each side to the space required;

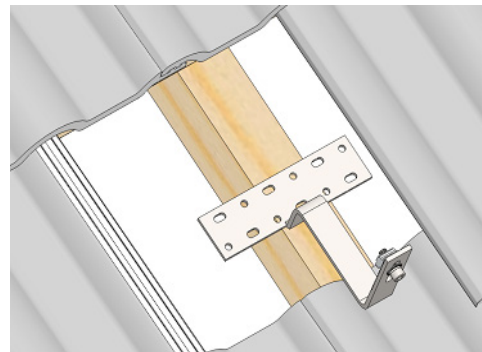
- Assess the horizontal spacing of the Roof Hooks;
- Assess the vertical spacing of the Roof Hooks = approx. 1/2 to 3/4 of module height;
- Always check the installation manual of the PV-Module you use in order to determine the allowed fixing points on the module frame.

5.1 Tile Interface Installation

5.1.1 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.

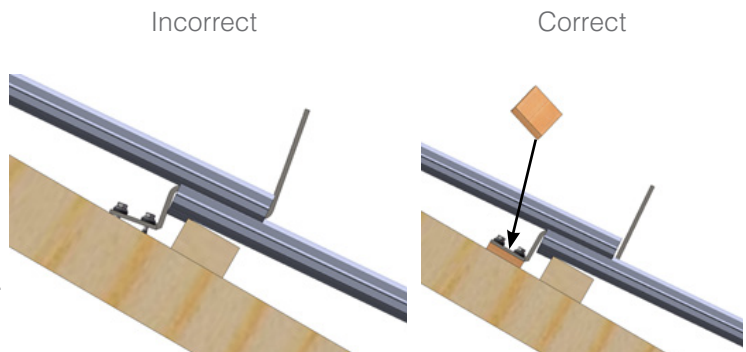


5.1.2 Fix the Roof Hooks to the rafter using Buildex 14-10 x 50 (14 gauge, 6.3 mm, 10 TPI, 50 mm long) Hex Head Zips screw with at least 35 mm embedment as shown in the figure on the right following the Buildex screws installation guide below:

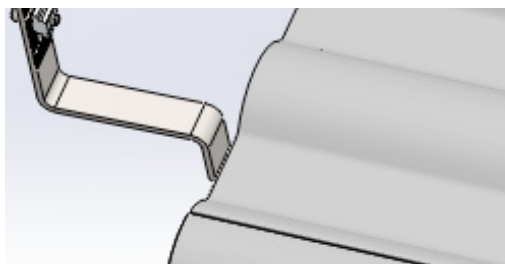
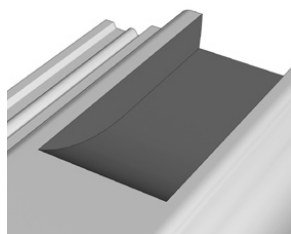
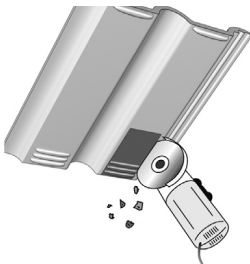


- Use a 3/8" Hex Socket.
- Use a mains powered or cordless screw driver with a drive speed of 3,000 RPM maximum.
- Fit the driver bit into the screw and place at the fastening position.
- Apply consistently firm pressure (end load) to the screw driver until the screw is fastened.

5.1.3 The roof hook must not press against the roof tile. If necessary, pack the roof hook. Buildex 14-10 x 50 screw allows max pack height of 17 mm to have a minimum 25 mm embedment depth into rafter. If it needs to pack over 17 mm, please use longer screws.

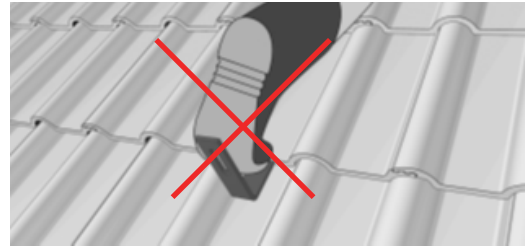


5.1.4 If necessary, use an angle grinder to cut a recess in the tile covering the Roof Hook at the point where the Roof Hook extends so that the tile lies flat on the surface. If grooved tiles are used, it will also be necessary to cut a recess in the lower tile.

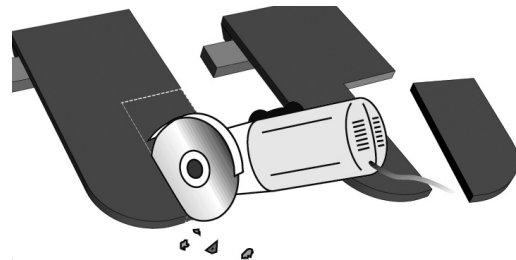


Installation Instruction

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

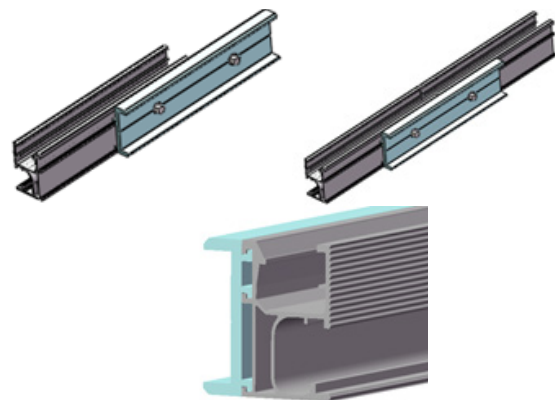


5.1.6 Variation for installation on plain tile roofs with plain tile roof cladding: A recess must be cut into the tiles around the position of the roof hook. The tile flashing should be used if necessary to prevent ingress of water.

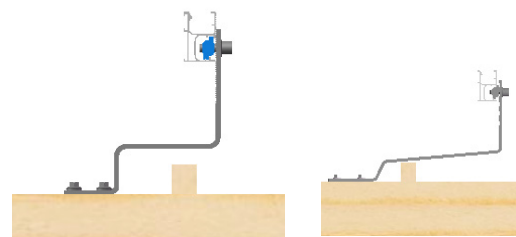


5.2 Rail Installation

5.2.1 To connect several rails together, slide half of the splice into the rear side of the rail. Fasten the first M8 Bolt using an Allen key, and slide the next rail into the splice. Tighten the second M8 Bolt using an Allen key. The total rail length is recommended not to be over 30 meters considering rails thermal expansion problem. Splice provides the electrical connection between the 2 rails through the pressure bolts. This eliminates the need of using 2 earthing lugs. Recommended torque is 10 ~12 Nm.

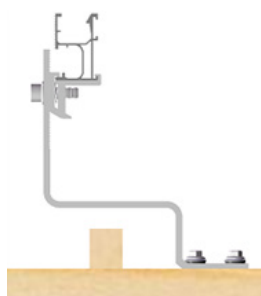


5.2.2 If the rails consist of different lengths, always begin with the shortest piece. Install the PV modules on the Roof Hooks and fasten loosely with M8 x 25 bolt and washers as shown in the figure on the right. Two to three screw turns are adequate for loose installation.



ER-I-01

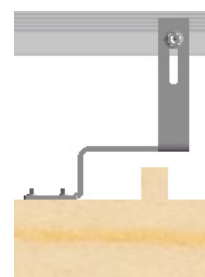
ER-I-02



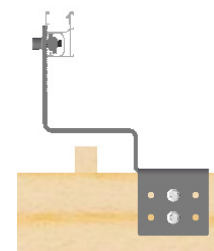
ER-I-01/EZC/ECO



ER-I-51



ER-I-23

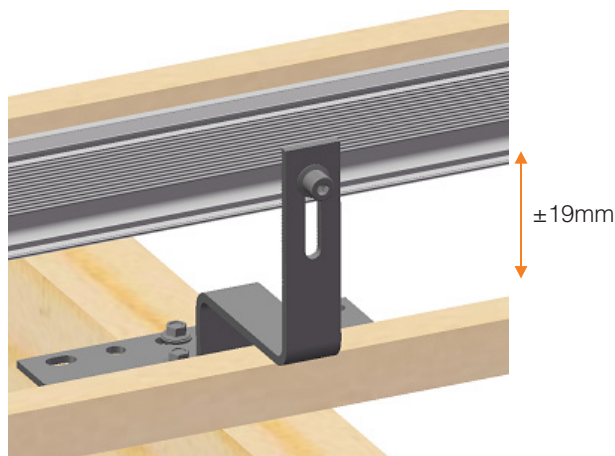


ER-I-26

Installation Instruction

5.2.3 Adjust the vertical and horizontal positioning using the long hole in the Roof Hook and the loosely connected Z Module in the rail, as shown in the figure on the right. The roof hook should not protrude over the rail after the adjustment.

The recommended torque is 16 ~20Nm.

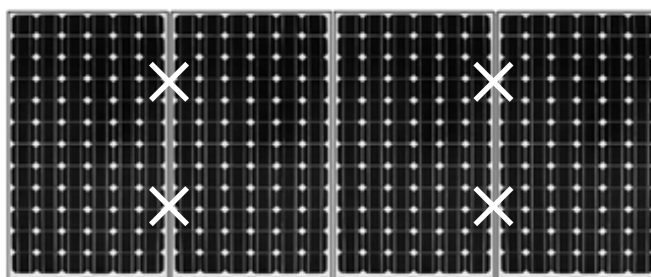


5.3 PV Module Installation

5.3.1 Deployment of Grounding Clips

1) When there is an even number of PV Module in each row:

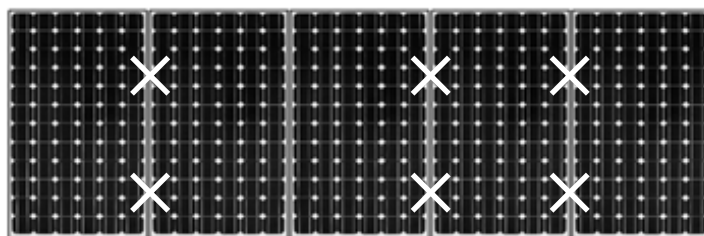
Install the grounding clips at the positions marked X in the figure shown. Then the number of Grounding Clips = number of PV Module.
Eg; 4 grounding clips in the figure shown.



2) When there is an odd number of PV Module in each row:

Install grounding clips at positions marked X in figure shown.

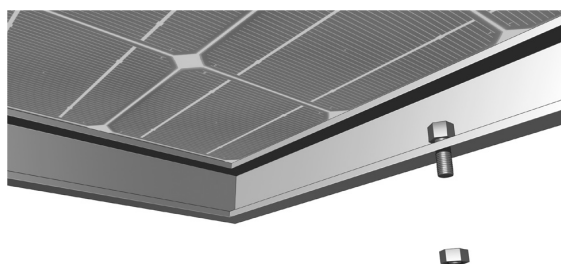
Then the number of Grounding Clips = number of PV Module + 1. Eg; 6 grounding clips in figure shown.



Please note:

When replacing a defective PV Module, it is required to replace the grounding clip under the defective PV Module.

5.3.2 Before installing the PV modules on horizontal rail installations, add anti-slip protection to the lowest row of PV modules. To do this, fasten M6 x 20 mm bolts (with the shank downwards) to the lower mounting holes of the PV module frame. When installing large modules (e.g. ASE250) M8 x 20 mm bolts must be used.

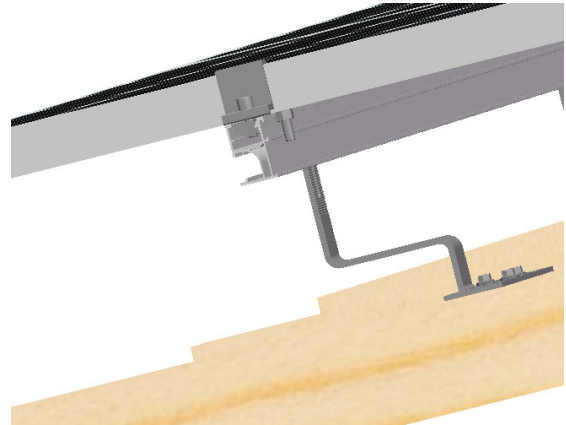


Installation Instruction

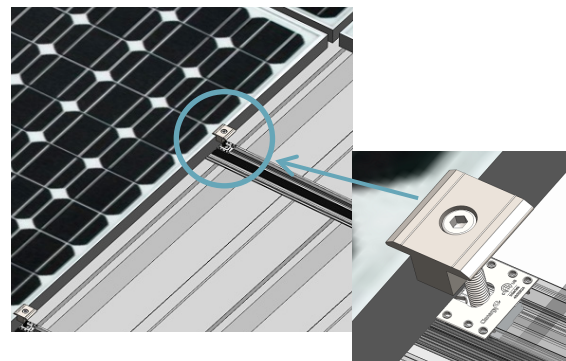
5.3.3 Place the PV Modules on to the rails and fix with End Clamps, Inter Clamps or Universal Clamps. Fasten with the Allen key. Please use Solution 1 or 2 below according to your project.

-Solution 1 (Apply Standard Clamps)

-Step 1 Place the first PV Module on the Rail according to your plan, and fix it in place using the End Clamps. Then fasten lightly with the Allen Key as shown in the figure on the right.



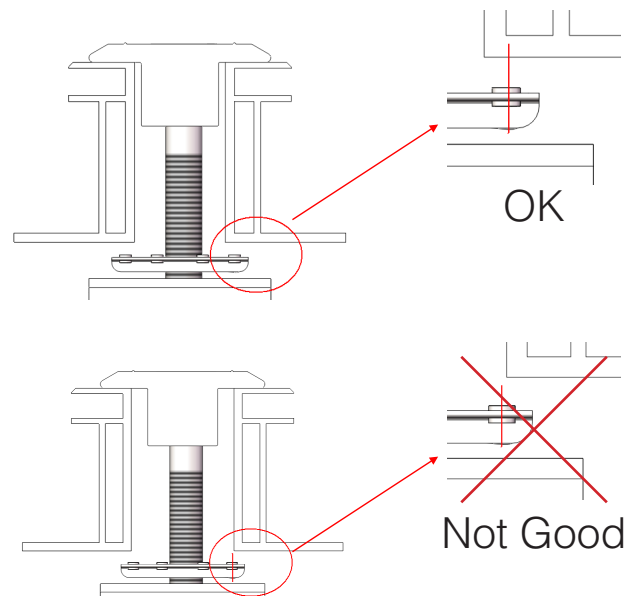
-Step 2 Slightly lift the PV Module and slide Inter Clamps and Grounding Clips into position. The teeth on Grounding Clip will automatically align when the Inter Clamp is properly installed as shown in the figure on the right.



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

Important Notes:

-To fix the Grounding Clip properly, ensure the frames of PV Modules are completely pressed against the Inter Clamps and Grounding Clips. Visually check that Grounding Clips are positioned properly.



Installation Instruction

-Grounding Clips are intended for SINGLE USE ONLY! Only fasten the bolts down when the position of the PV Module is finalized. (Only slightly tighten bolts to keep PV Modules in place prior to the final check)

-Solution 2 (Apply Universal Clamps)

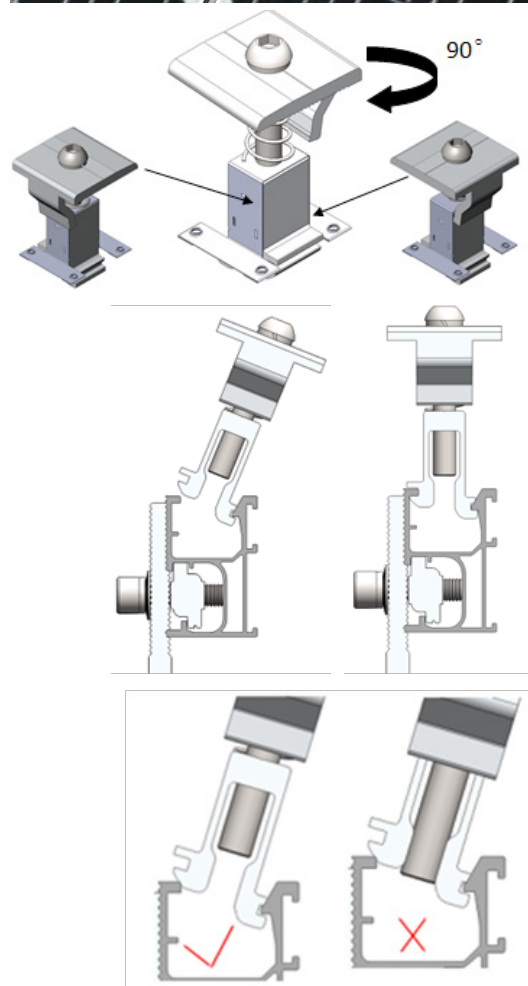
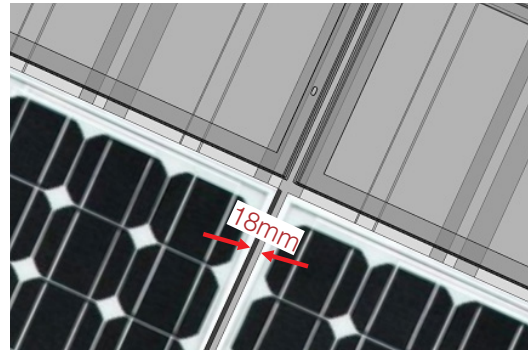
Step 1 Twisting the head of the Universal Clamp changes the functionality from End to Inter Clamp as shown in the figure on the right.

NOTE: Please ensure the Universal Clamp C-U/30/46 or Universal Clamp with Grounding Clip C-U/30/46-G is positioned correctly according to 5.3.1: Deployment of Grounding Clip.

Step 2 Incline the Universal Clamp to fit the lower channel against the lower channel of the Rail, and press the Universal Clamp down towards the other side to securely fit the upper channel against the upper rail channel, as shown in the figure on the right

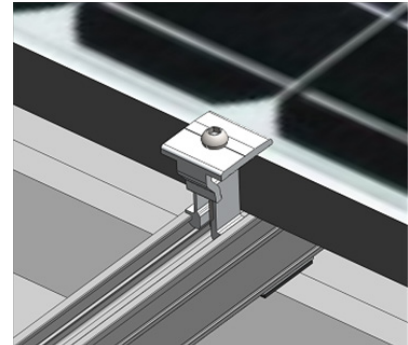
Note: Before installation, make sure there is enough clearance between the screw and lower module of Universal Clamp as shown in the figure on the right.

Step 3 Place the first PV Module on the Rails and apply the Universal Clamp in the End Clamp position and fasten slightly with the Allen Key. Make sure the frame of the PV Module is fully in contact with the Universal Clamp as shown in the figure on the right. Visually check the Universal Clamp and PV module are properly installed.

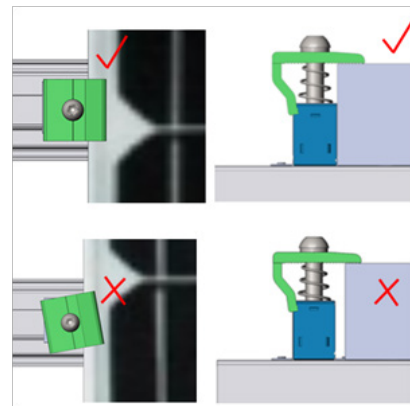


Installation Instruction

Step 4 When using as an Inter Clamp, click the Universal Clamp into the rail channel and slightly lift the framed PV Module to ensure the Grounding Clip is fully covered as shown in the figure on the right



Step 5 Loosely place the next framed PV Module into the other side of the Universal Clamp. Ensure the Grounding Clip is fully covered and ensure the frame of the PV Module is in close contact with Universal Clamp as shown in the figure on the right.

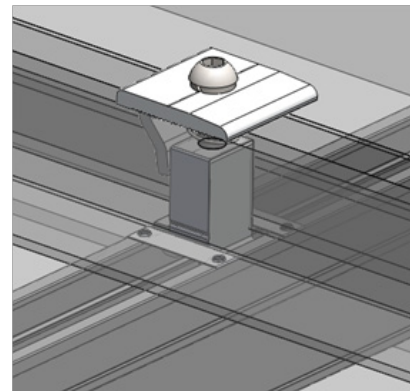


Step 6 Repeat steps above to install all PV Modules. Visually check the Universal Clamps and PV modules are properly positioned and then fasten all Clamps.

When you using Universal Clamps, the gap between two adjacent PV Modules is 20mm.

The recommend torque for Universal Clamps in the End Clamp position is 13~14N.m.

The recommend torque for Universal Clamps in the Inter Clamp position is 16~20N.m.



Installation Instruction

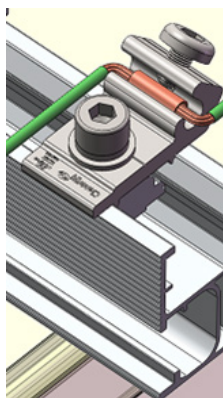
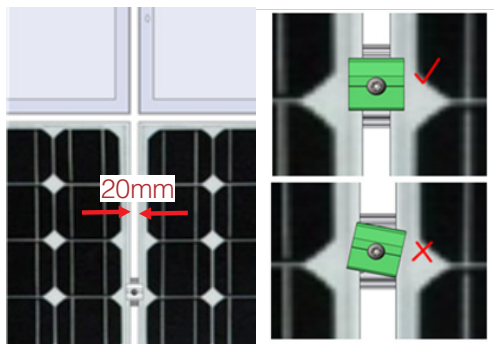
5.3.4 Apply one pre-assembled Grounding Lug per Rail. Click the Grounding Lug into to the rail channel and insert the Copper Wire (the maximum size is 4mm² or similar). Fasten the bolt M6*10 with 5~6 N·m and the bolt M8*25 with 16~20 N·m as shown in the figure on the right.

Copper Pipe will be supplied for the case that using small size Copper Wire.

There are three solutions for Grounding Lug installation

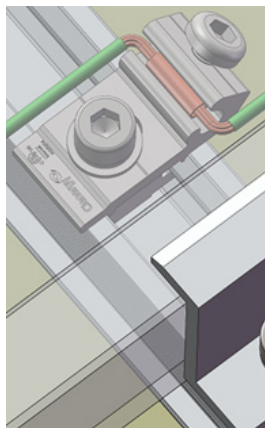
-Solution 1

Fix the Grounding Lug at the end of Rail as shown in the figure on the right.



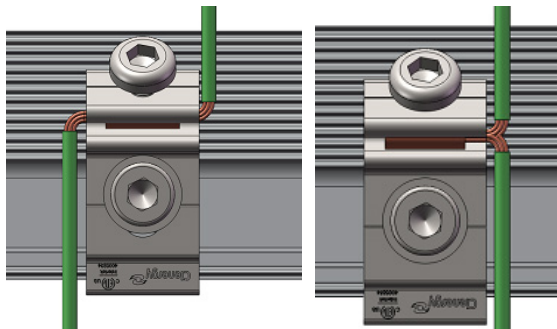
-Solution 2

Fix the Grounding Lug at the Rail where just under the PV Module as shown in the figure on the right.

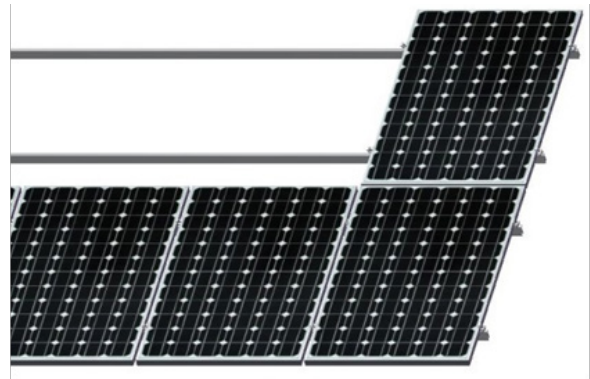


-Solution 3

Fix the Grounding Lug at the side channel of Rail as shown in the figure on the right.



5.3.5 Slide the first PV module of the second row onto the corresponding module of the first row. Separation from the lower PV module can be maintained for aesthetic reasons. An Inter Clamp can be used as a separator, so that the vertical and horizontal separation of the PV modules is identical. Continue mounting the modules as described in steps 5.3.1 to 5.3.6 until all PV modules are installed.



5.4 Tin Interface Installation

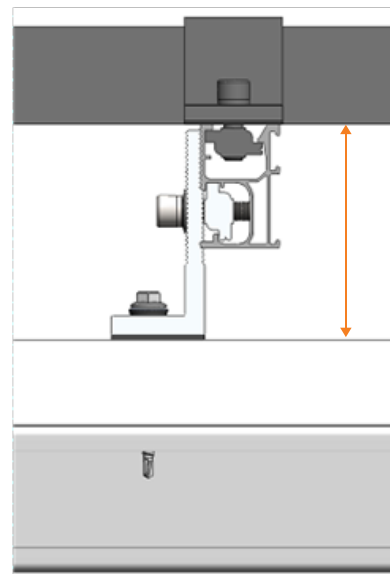
5.4.1 For installations using ER-I-05, Tin Interface equipped with Buildex 14-11 x 70 (14 gauge, 6.3 mm, 11 TPI, 70 mm long) Hex Head Zips screw. Fix the ER-I-05 at the planned locations on metal or wood purlins as shown in the figure on the right following the Buildex screws installation guide below:

- Use a 3/8" Hex Socket.
- Use a mains powered or cordless screw driver with a drive speed of 3,000 RPM maximum.
- 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.

Repeat 5.2 and 5.3 to install the Rails and PV Modules.

Note:

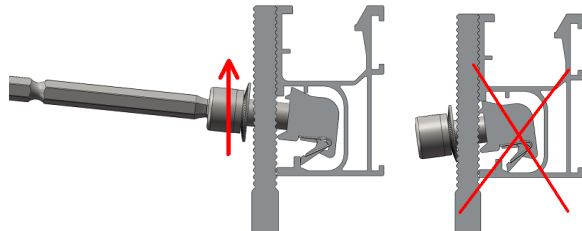
- The purlin thickness should be no less than 0.75mm and no more than 2.4mm;
- Please refer to the recommended torques in 4.2.3 Safe Torques;
- Screws not exposed to frequent rain should be washed down with fresh water at least every 6 months to meet the warranty conditions of Buildex screws.



Clearance
85~100mm

Installation Instruction

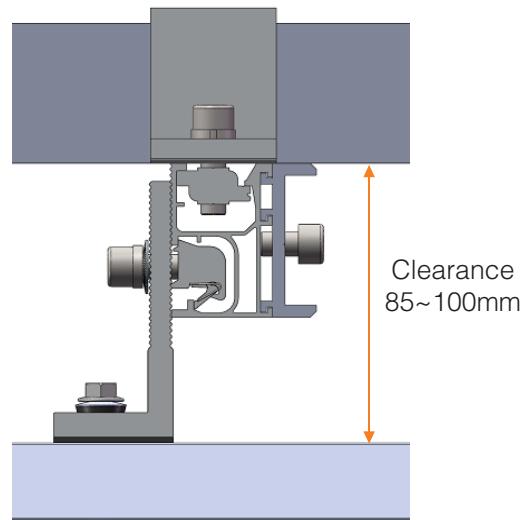
5.4.2 For installations using ER-I-05/CM, Tin Interface with Click Module, equipped with Buildex 14-11 x 70 (14 gauge, 6.3 mm, 11 TPI, 70 mm long) Hex Head Zips screw. . Fix the ER-I-05/CM at the planned locations on metal or wood purlins as shown in the figure on the right following the Buildex screws installation guide above. Repeat 5.2 and 5.3 to install the Rails and PV Modules.



When fastening ER-I-05/CM with rail, it needs to lift up the bolt of click module to make click module well touch with upper rib of side channel of rail. So, the click module can be fixed into the rail properly as shown in the figure on the right.

Note:

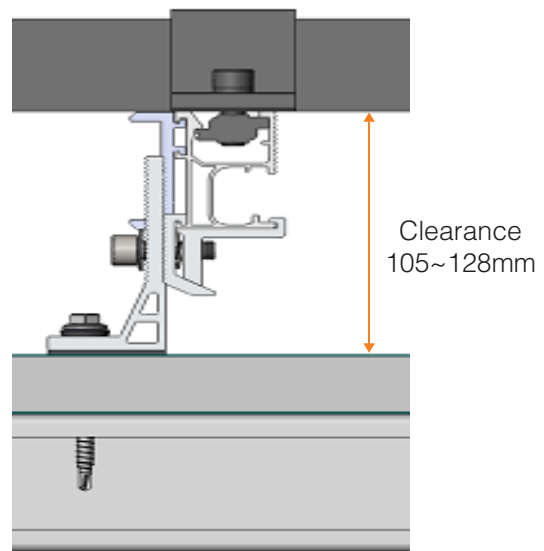
- The purlin thickness should be no less than 0.75mm and no more than 2.4mm;
- Please refer to the recommended torques in 4.2.3 Safe Torques;
- Screws not exposed to frequent rain should be washed down with fresh water at least every 6 months to meet the warranty conditions of Buildex screws.



5.4.3 For installations using ER-I-05A/EZC/ECO, Tin Interface with ezClick connection with Buildex 14-11 x 70 (14 gauge, 6.3 mm, 11 TPI, 70 mm long) Hex Head Zips screw. Fix the ER-I-05A/EZC/ECO at the planned locations on metal or wood purlins as shown in the figure on the right following the Buildex screws installation guide above. Repeat 5.2 and 5.3 to install Rails and PV Modules.

Note:

- The purlin thickness should be no less than 0.75mm and no more than 2.4mm;
- Please refer to the recommended torques in 4.2.3 Safe Torques;
- Screws 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.



Installation Instruction

5.4.4 For installations using ER-I-25, Tin Interface with Curved Base for Corrugated Roof with Buildex 14-11 x 70 (14 gauge, 6.3 mm, 11 TPI, 70 mm long) Hex Head Zips screw. Fix the ER-I-25 at the planned locations on metal or wood purlins as shown in the figure on the right following the Buildex screws installation guide above. Repeat 5.2 and 5.3 to install Rails and PV Modules.

Note:

- The purlin thickness should be no less than 0.75mm and no more than 2.4mm;
- Please refer to the recommended torques in 4.2.3 Safe Torques;
- Screws 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.

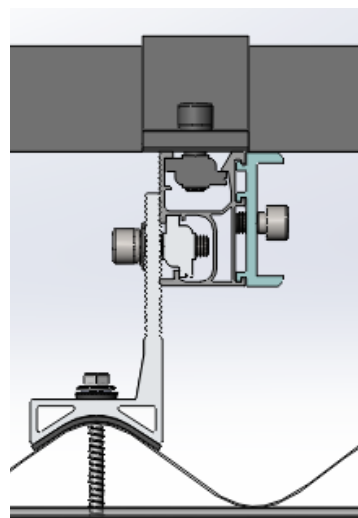
5.4.5 For installations using EZ-AD-C43 and ER-I-05, Adapter (Puck) for Corrugated Iron Roof and Tin Interface. Attach the EZ-AD-C43 on the planned position and then fix the ER-I-05 on metal or wood purlins as shown in the figure on the right following the Buildex screws installation guide above.

Repeat 5.2 and 5.3 to install Rails and PV Modules.
Note: The purlin thickness should be no less than 0.75mm and no more than 2.4mm.

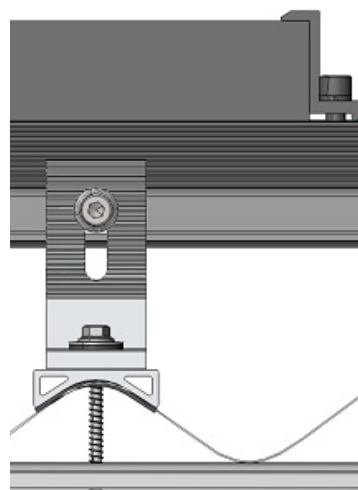
Note:

- The purlin thickness should be no less than 0.75mm and no more than 2.4mm;
- Please refer to the recommended torques in 4.2.3 Safe Torques;
- Screws 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.

NOTE:
WHEN USING TIN INTERFACES FOR INSTALLATION WORKS, SCREWS NOT EXPOSED TO FREQUENT RAIN SHOULD BE WASHED DOWN WITH FRESH WATER AT LEAST EVERY 6 MONTHS TO MEET THE WARRANTY CONDITIONS OF BUILDDEX SCREWS.

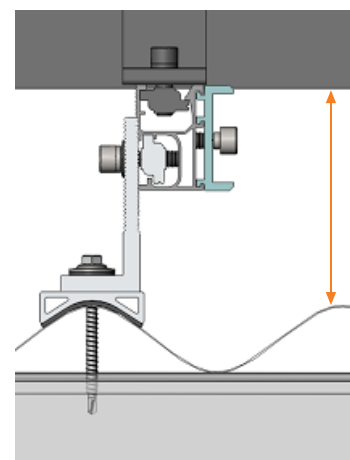


Clearance
89~104mm



Clearance
89~104mm

The rail is perpendicular to the Rib of metal sheet roof



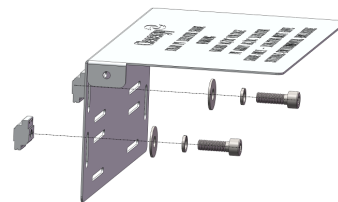
Clearance
89~104mm

The rail is parallel to the Rib of metal sheet roof

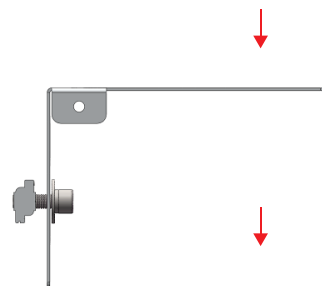
5.5 Accessory Installation

5.5.1 Isolator Shade Installation - To be Fixed along the Rail

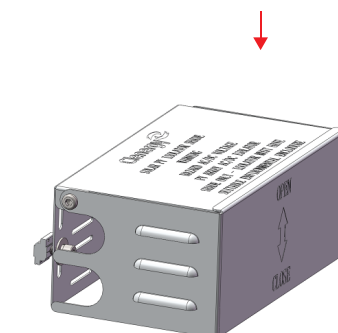
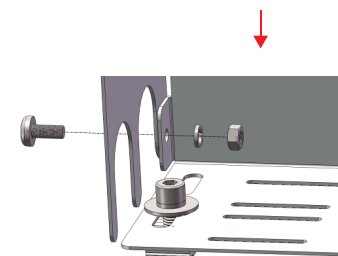
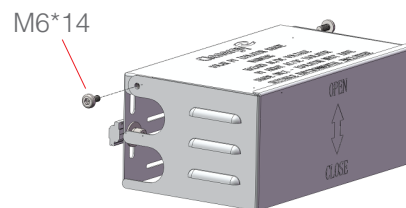
Assemble the Isolator Shade step by step as shown in the figure on the right.



Recommended torque for M6 bolts is 4-5N·m, which allows for optimal opening and closing of the isolator cover.



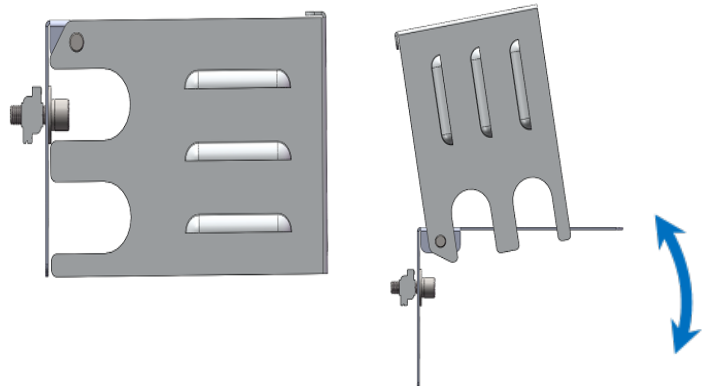
Note: When using Isolator Shade (black anodized), please apply External Teeth Lock Washers between Plain washer for earthing continuity.



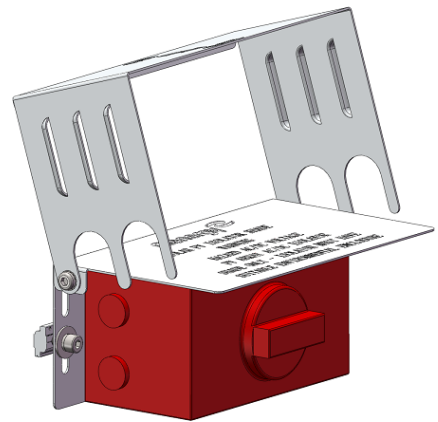
Installation Instruction

According to your plan, mark out the position for Isolator Shade installation on the Rail.

Note: Allow space above the Rail for the Isolator Shade Cover to open fully

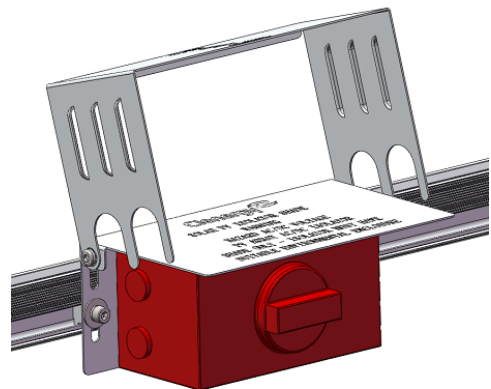


Rotate up the Cover and fix the Isolator to the Isolator Shade according to the Isolator Installation Guide



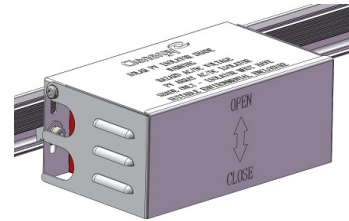
Once the Isolator is fixed properly, position the Z Module in the Rail channel and fix the Isolator Shade with the bolts supplied.

Recommended torque for M8 bolts is 4-5 Nm.



Installation Instruction

After cable installation, close the Isolator Cover as shown in the figure on the right.



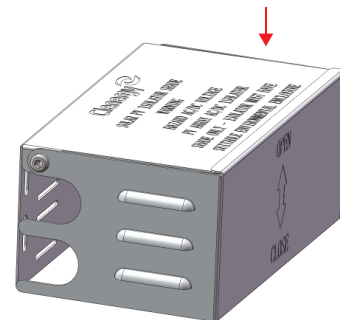
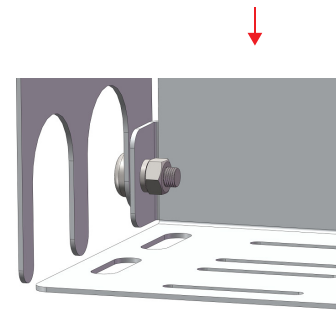
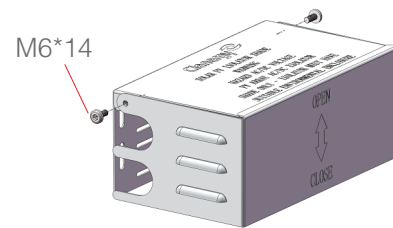
- To be Fixed Rail End (Optional)

An alternative option for fixing the Isolator Shade is at the end of the rail using the Angle Bracket as below,

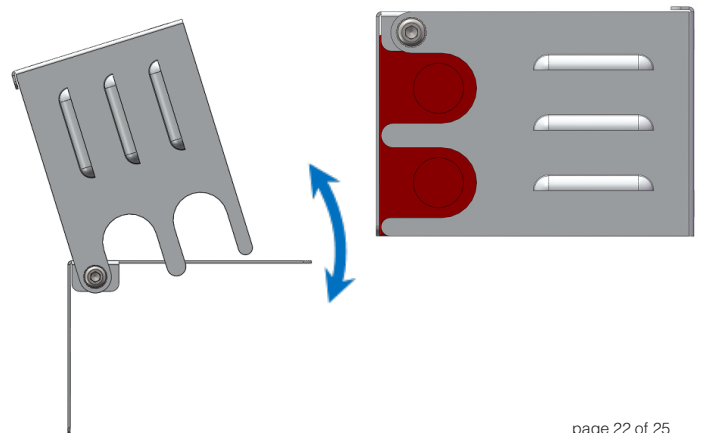
Assemble the Isolator Shade step by step as shown in the Figure on the right.

Recommended torque for M6 bolts is 4-5N·m, which allows for optimal opening and closing of the isolator cover.

Note: When using Isolator Shade (black anodized), please apply External Teeth Lock Washers between Plain washer for earthing continuity.



Rotate up the Cover and fix the Isolator to the Isolator Shade according to the Isolator Installation Guide in the Figure on the right.



Installation Instruction

Fix the Angle Bracket to the Isolator Shade and then fix the assembled Isolator Shade on the Rail as shown in the Figure on the right.

Note: Allow space above the Rail for the Isolator Shade Cover to open fully.

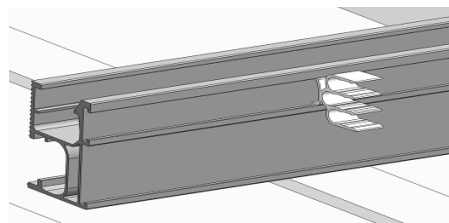
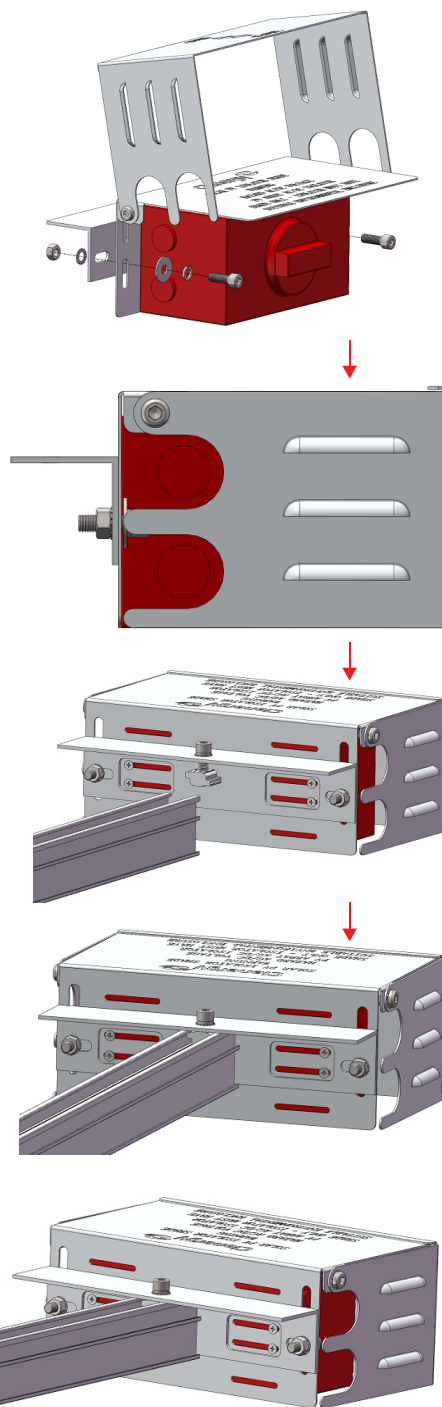
Recommended torque for M8 Bolts for fixing Angle Bracket on Isolator Shade is 8-10N·m.

Recommended torque for M8 Bolt for fixing Isolator Shade on the Rail is 16-20N·m.

After cable installation, close the Isolator Cover as shown in the Figure on the right.

5.5.2 Cable Clip Installation

- Click the top end of the Cable Clip into the channel on the back of the rail.
- Push the other end of the clip in to the rail channel, using a rubber mallet if required.



6. Warranty

10 year limited Product Warranty, 5 year limited Finish Warranty

Clenergy (Xiamen) Technology co. Ltd warrants to the original purchaser ("Purchaser") of product(s) that it manufactures ("Product") at the original installation site that the Product shall be free from defects in material and workmanship for a period of ten (10) years, except for the anodised finish, which finish shall be free from visible peeling, or cracking or chalking under normal atmospheric conditions for a period of five (5) years, from the earlier of 1) the date the installation of the Product is completed, or 2) 30 days after the purchase of the Product by the original Purchaser ("Finish Warranty").

The Finish Warranty does not apply to any foreign residue deposited on the finish. All installations in corrosive atmospheric conditions are excluded. The Finish Warranty is VOID if the practices specified by AAMA 609 & 610-02 – "Cleaning and Maintenance for Architecturally Finished Aluminum" (www.aamanet.org) are not followed by Purchaser. This Warranty does not cover damage to the Product that occurs during its shipment, storage, or installation.

This Warranty shall be VOID if installation of the Product is not performed in accordance with Clenergy's written installation instructions, or if the Product has been modified, repaired, or reworked in a manner not previously authorized by Clenergy IN WRITING, or if the Product is installed in an environment for which it was not designed. Clenergy shall not be liable for consequential, contingent or incidental damages arising out of the use of the Product by Purchaser under any circumstances.

If within the specified Warranty periods the Product shall be reasonably proven to be defective, then Clenergy shall repair or replace the defective Product, or any part thereof, at Clenergy's sole discretion. Such repair or replacement shall completely satisfy and discharge all of Clenergy's liability with respect to this limited Warranty. Under no circumstances shall Clenergy be liable for special, indirect or consequential damages arising out of or related to use by Purchaser of the Product.

Manufacturers of related items, such as PV modules and flashings, may provide written warranties of their own. Clenergy's limited Warranty covers only its Product, and not any related items.

Certification Letter and Interface Spacing Table



03 March 2020

Clenergy Australia
1/10 Duerdin Street
Clayton, VIC 3168

CERTIFICATION LETTER

Clenergy PV ez-Rack Solar Roof Certification – TC2, 2.5, 3 – Wind Region A, B, C, D. Internal REF:
00115. Project REF: CL-10088-SM-REV-D.

MW Engineering Melbourne, being Structural Engineers within the meaning of Australian regulations, have calculated the maximum spacings for the PV ez-Rack rail system for the following conditions:

- **Wind Loads to AS 1170.2-2011 AMDT 4-2016**
 - o **Wind Terrain Category 2, 2.5 and 3**
 - o **Wind average recurrence of 200 years**
 - o **Wind Region A, B, C, D**
- **Solar panel length up to 2.1m**
- **Solar panel width up to 1.1m**

Attached are the tables showing the spacings according to Wind Region, roof pitch, and building height.

The values shown on these tables will be valid unless an amendment is issued on any of the following codes:

- | | |
|-----------------------------------|-------------------------|
| - AS/NZS 1170.0- 2002 AMDT 4-2016 | General Principles |
| - AS/NZS 1170.1- 2002 AMDT 4-2016 | Imposed Loadings |
| - AS/NZS 1170.2- 2011 AMDT 4-2016 | Wind Loadings |
| - AS/NZS 1664.1- 1997 AMDT 1:1999 | Aluminium Code |
| - AS 1684.2- 2010 AMDT 2-2013 | Residential Timber Code |
| - AS 1720.1- 2010 AMDT 3-2015 | Timber Code |
| - AS/NZS 4600: 2005 | Cold Formed Steel Code |
| - AS 4100- 1998 | Steel Structures |
| - AS/NZS 1252.2-2016 | Bolting |

Should you have any queries, do not hesitate to contact us.

Best Regards,

Alberto Escobar
Civil/Structural Engineer

BEng MIEAust NER

BRP EC 46542

RPEQ 18759

info@mwengineering.melbourne

March 2020

STRUCTURAL DESIGN DOCUMENTATION

PV-ezRack® SolarRoof Interface Spacing Table According to AS/NZS 1170.2:2011 Amdt 4-2016 Within Australia Terrain Category 2, 2.5 & 3

Client : Clenergy Australia

REF: CL-I0088-SM-REV-D

Date: 3/03/2020

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Internal REF: 00115

Client: Clenergy Australia

Project: PV ez-Rack SolarRoof Interface Spacing table

Australian Standards

AS/NZS 1170.0:2002 (R2016)	General Principles
AS/NZS 1170.1:2002 (R2016)	Imposed loadings
AS/NZS 1170.2:2011 (R2016)	Wind Loadings
AS/NZS 1252.2:2016	Bolting
AS/NZS 4600: 2005	Cold-Formed Steel Structures
AS 4100-1998	Steel Structures
AS/NZS 1664.1:1997-Amdt 1:1999	Aluminium
AS 1684.2-2010/Amdt 2-2013	Residential Timber framing
AS 1720.1-2010/Amdt 3-2015	Timber design

Wind Terrain Category 2, 2.5 and 3

Designed: SM

Date: Mar-20

Disclaimer: From the date of publication onwards, any amendment made to any of the above mentioned Standards will make this report outdated and a new one will have to be released, unless the amendment has no implications on this certificate.

PV ez-Rack SolarRoof Interface spacing Table for Tile Roof

Type of Rail	ER-R-ECO (ECO Rail)
Type of Interface	ER-I-01 (Tile Interface)
Solar Panel Dimension	2 m x 1 m
Terrain Category	2

Roof Angle - $0^\circ < \alpha \leq 10^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1488	1444	1369	1354	1310
B	1086	997	893	819	700
C	692	647	566	513	454
D	417	402	365	327	290

Roof Angle - $10^\circ < \alpha \leq 20^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1459	1415	1342	1327	1284
B	1065	977	875	802	686
C	678	634	554	503	445
D	408	394	357	321	284

Roof Angle - $20^\circ < \alpha \leq 30^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1444	1400	1328	1314	1270
B	1054	967	866	794	679
C	671	628	549	498	440
D	404	390	354	318	282

Note: The above spacings are for Up Wind End and Down Wind End Zone. Refer to Note 20 for Central Zone spacings (10% increase).

Note: This Engineering report is based on 2 m x 1 m panels and two rails per panel. Refer to Note 12 for further details.

PV ez-Rack SolarRoof Interface spacing Table for Tile Roof (Cont.)

Type of Rail	ER-R-ECO (ECO Rail)
Type of Interface	ER-I-01 (Tile Interface)
Solar Panel Dimension	2 m x 1 m
Terrain Category	2

Roof Angle - $30^\circ < \alpha \leq 60^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1414	1371	1301	1287	1244
B	1032	947	848	778	665
C	657	615	537	488	431
D	396	382	346	311	276

Note: The above spacings are for Up Wind End and Down Wind End Zone. Refer to Note 20 for Central Zone spacings (10% increase).

Note: This Engineering report is based on 2 m x 1 m panels and two rails per panel. Refer to Note 12 for further details.

PV ez-Rack SolarRoof Interface spacing Table for Tile Roof

Type of Rail	ER-R-ECO (ECO Rail)
Type of Interface	ER-I-01 (Tile Interface)
Solar Panel Dimension	2 m x 1 m
Terrain Category	2.5

Roof Angle - $0^\circ < \alpha \leq 10^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1560	1514	1436	1420	1373
B	1139	1046	936	858	733
C	726	679	593	538	476
D	437	421	382	343	304

Roof Angle - $10^\circ < \alpha \leq 20^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1529	1483	1407	1392	1346
B	1116	1025	918	841	719
C	711	665	581	528	466
D	428	413	375	336	298

Roof Angle - $20^\circ < \alpha \leq 30^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1514	1468	1393	1377	1332
B	1105	1014	908	833	711
C	704	658	575	522	462
D	424	409	371	333	295

Note: The above spacings are for Up Wind End and Down Wind End Zone. Refer to Note 20 for Central Zone spacings (10% increase).

Note: This Engineering report is based on 2 m x 1 m panels and two rails per panel. Refer to Note 12 for further details.

PV ez-Rack SolarRoof Interface spacing Table for Tile Roof (Cont.)

Type of Rail	ER-R-ECO (ECO Rail)
Type of Interface	ER-I-01 (Tile Interface)
Solar Panel Dimension	2 m x 1 m
Terrain Category	2.5

Roof Angle - $30^\circ < \alpha \leq 60^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1482	1438	1364	1349	1305
B	1082	993	889	815	697
C	689	645	563	511	452
D	415	400	363	326	289

Note: The above spacings are for Up Wind End and Down Wind End Zone. Refer to Note 20 for Central Zone spacings (10% increase).

Note: This Engineering report is based on 2 m x 1 m panels and two rails per panel. Refer to Note 12 for further details.

PV ez-Rack SolarRoof Interface spacing Table for Tile Roof

Type of Rail	ER-R-ECO (ECO Rail)
Type of Interface	ER-I-01 (Tile Interface)
Solar Panel Dimension	2 m x 1 m
Terrain Category	3

Roof Angle - $0^\circ < \alpha \leq 10^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1665	1615	1532	1515	1465
B	1216	1116	999	916	783
C	774	724	633	575	508
D	466	450	408	366	325

Roof Angle - $10^\circ < \alpha \leq 20^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1632	1583	1501	1485	1436
B	1191	1093	979	898	767
C	759	710	620	563	498
D	457	441	400	359	318

Roof Angle - $20^\circ < \alpha \leq 30^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1615	1567	1486	1470	1422
B	1179	1082	969	888	759
C	751	703	614	557	493
D	452	436	396	355	315

Note: The above spacings are for Up Wind End and Down Wind End Zone. Refer to Note 20 for Central Zone spacings (10% increase).

Note: This Engineering report is based on 2 m x 1 m panels and two rails per panel. Refer to Note 12 for further details.

PV ez-Rack SolarRoof Interface spacing Table for Tile Roof (Cont.)

Type of Rail	ER-R-ECO (ECO Rail)
Type of Interface	ER-I-01 (Tile Interface)
Solar Panel Dimension	2 m x 1 m
Terrain Category	3

Roof Angle - $30^\circ < \alpha \leq 60^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1582	1535	1455	1440	1392
B	1155	1060	949	870	744
C	736	688	601	546	483
D	443	427	388	348	308

Note: The above spacings are for Up Wind End and Down Wind End Zone. Refer to Note 20 for Central Zone spacings (10% increase).

Note: This Engineering report is based on 2 m x 1 m panels and two rails per panel. Refer to Note 12 for further details.

PV ez-Rack SolarRoof Interface spacing Table for Tin Roof

Type of Rail	ER-R-ECO (ECO Rail)
Type of Interface	ER-I-05 (Tin Interface)
Solar Panel Dimension	2 m x 1 m
Terrain Category	2
Purlin Thickness	1.5 mm

Roof Angle - $0^\circ < \alpha \leq 10^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1579	1496	1469	1432	1377
B	1368	1157	1047	964	900
C	890	734	670	624	588
D	542	506	431	395	367

Roof Angle - $10^\circ < \alpha \leq 20^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1574	1492	1460	1423	1372
B	1359	1157	1042	955	895
C	881	730	661	620	583
D	532	464	422	386	358

Roof Angle - $20^\circ < \alpha < 30^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1570	1487	1460	1418	1368
B	1359	1148	1037	950	890
C	877	725	661	620	583
D	532	464	422	386	353

Note: The above spacings are for Up Wind End and Down Wind End Zone. Refer to Note 20 for Central Zone spacings (10% increase).

Note: This Engineering report is based on 2 m x 1 m panels and two rails per panel. Refer to Note 12 for further details.

PV ez-Rack SolarRoof Interface spacing Table for Tin Roof

Type of Rail	ER-R-ECO (ECO Rail)
Type of Interface	ER-I-05 (Tin Interface)
Solar Panel Dimension	2 m x 1 m
Terrain Category	2
Purlin Thickness	1.5 mm

Roof Angle - $30^\circ < \alpha < 60^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1561	1469	1423	1386	1359
B	1331	1102	1010	936	872
C	863	707	597	615	578
D	532	459	413	376	349

Note: The above spacings are for Up Wind End and Down Wind End Zone. Refer to Note 20 for Central Zone spacings (10% increase).

Note: This Engineering report is based on 2 m x 1 m panels and two rails per panel. Refer to Note 12 for further details.

PV ez-Rack SolarRoof Interface spacing Table for Tin Roof

Type of Rail	ER-R-ECO (ECO Rail)
Type of Interface	ER-I-05 (Tin Interface)
Solar Panel Dimension	2 m x 1 m
Terrain Category	2.5
Purlin Thickness	1.5 mm

Roof Angle - $0^\circ < \alpha \leq 10^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1671	1616	1561	1487	1469
B	1460	1359	1221	1111	1010
C	1001	890	789	725	652
D	624	569	505	459	422

Roof Angle - $10^\circ < \alpha \leq 20^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1666	1611	1551	1478	1460
B	1450	1359	1216	1106	1005
C	996	881	780	725	643
D	620	565	500	450	418

Roof Angle - $20^\circ < \alpha < 30^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1662	1607	1551	1473	1455
B	1450	1354	1212	1102	1001
C	987	877	776	721	643
D	620	565	496	454	413

Note: The above spacings are for Up Wind End and Down Wind End Zone. Refer to Note 20 for Central Zone spacings (10% increase).

Note: This Engineering report is based on 2 m x 1 m panels and two rails per panel. Refer to Note 12 for further details.

PV ez-Rack SolarRoof Interface spacing Table for Tin Roof

Type of Rail	ER-R-ECO (ECO Rail)
Type of Interface	ER-I-05 (Tin Interface)
Solar Panel Dimension	2 m x 1 m
Terrain Category	2.5
Purlin Thickness	1.5 mm

Roof Angle - $30^\circ < \alpha < 60^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1652	1561	1515	1469	1359
B	1395	1304	1193	1092	964
C	955	863	771	716	643
D	615	551	487	441	404

Note: The above spacings are for Up Wind End and Down Wind End Zone. Refer to Note 20 for Central Zone spacings (10% increase).

Note: This Engineering report is based on 2 m x 1 m panels and two rails per panel. Refer to Note 12 for further details.

PV ez-Rack SolarRoof Interface spacing Table for Tin Roof

Type of Rail	ER-R-ECO (ECO Rail)
Type of Interface	ER-I-05 (Tin Interface)
Solar Panel Dimension	2 m x 1 m
Terrain Category	3
Purlin Thickness	1.5 mm

Roof Angle - $0^\circ < \alpha \leq 10^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1744	1735	1671	1597	1450
B	1528	1524	1423	1285	1148
C	1102	1092	946	845	753
D	689	679	606	532	468

Roof Angle - $10^\circ < \alpha \leq 20^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1735	1726	1666	1588	1446
B	1524	1519	1418	1276	1138
C	1102	1088	936	840	748
D	684	670	601	523	464

Roof Angle - $20^\circ < \alpha < 30^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1680	1662	1597	1524	1377
B	1515	1423	1368	1248	1102
C	1203	1065	918	826	725
D	776	652	588	514	450

Note: The above spacings are for Up Wind End and Down Wind End Zone. Refer to Note 20 for Central Zone spacings (10% increase).

Note: This Engineering report is based on 2 m x 1 m panels and two rails per panel. Refer to Note 12 for further details.

PV ez-Rack SolarRoof Interface spacing Table for Tin Roof

Type of Rail	ER-R-ECO (ECO Rail)
Type of Interface	ER-I-05 (Tin Interface)
Solar Panel Dimension	2 m x 1 m
Terrain Category	3
Purlin Thickness	1.5 mm

Roof Angle - $30^\circ < \alpha < 60^\circ$

Wind Region	Building Height (m)				
	$H \leq 5$	$5 < H \leq 10$	$10 < H \leq 15$	$15 < H \leq 20$	$20 < H \leq 30$
A	1671	1662	1597	1524	1377
B	1441	1423	1368	1248	1102
C	1074	1065	918	826	725
D	661	652	588	514	450

10 TPI or 13g (6mm) - 10 TPI Roof Zip

Note: The above spacings are for Up Wind End and Down Wind End Zone. Refer to Note 20 for Central Zone spacings (10% increase).

Note: This Engineering report is based on 2 m x 1 m panels and two rails per panel. Refer to Note 12 for further details.

General Notes

Note 1 Tile Roof Interface Spacing tables based on a minimum depth into F7 (Pine) timber of 25mm and Tin Roof Interface Spacing tables based on a minimum depth into F7 (Pine) timber of 35mm.

Note 2 Standard screws shipped for Tin and Tile Roof Interfaces

Metal Purlins/Battens	Fasteners to use
0.75 mm	Buildex- 14 - 11 x 70 Hex Head Zips Climaseal 3 with 16 mm ABW on G550 Steel Battens
1.5 mm - 2.4 mm	Buildex- 14 - 11 x 70 Hex Head Zips Climaseal 3 with 16 mm ABW
Wood Purlins and Rafters	Fasteners to be used
Timber F7 (Pine) and Timber I7 (Hardwood).	<p>Tin Interface: Buildex- 14 - 11 x 70 Hex Head Zips Climaseal 3 with 16 mm ABW or 14g (6.3 mm)</p> <p>Tile Interface: Buildex- 14 - 11 x 70 Hex Head Zips Climaseal 3 with 16 mm ABW or 14-10 x 50 Hex Head T17 with 16mm ABW Climaseal 3 or other screw of pullout value not less than screws above</p>

Note 3 Tin and tile spacings were calculated based on Steel Purlins G450 1.5mm and Timber F7 (Pine). For 0.75 mm Steel Battens and 1.2mm purlins, all spacings shall be reduced as follows:

Wind Region A	Wind Region B	Wind Region C	Wind Region D
- 28 %	- 40 %	- 40 %	- 40 %

Note 4 Tin Spacings were calculated based on Steel Purlins G450 1.5 mm. Contact Clenergy to find the increase factor suitable for 1.9mm and 2.4mm purlin thickness.

Note 5 This Engineering Document was designed to cater for most common installation scenarios however, it does not cater for all of them. Contact Clenergy if you are unable to comply with any of the installation specifications listed on this document.

Note 6 The following components are satisfied for use according to AS/NZS 1664.1:1997-Amdt 1:1999 and AS/NZS 1170.2:2011 Amdt 4-2016

Components	Part No.	Description
ECO-Rail	ER-R-ECO/XXXX	ECO Rail
Splice	ER-SP-ECO	PV-ezRack Splice for ECO rail
Australian Made Mill Finish ECO Rail	R-ECO/XXXX/AUMF	PV-ezRack Australian Made Mill Finish ECO Rail

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Components	Part No.	Description
ST-Rail	ER-R-STXXXX	Standard Rail
Splice	ER-SP-ST	PV-ezRack Splice for Standard Rail 200mm
Inter Clamp	ER-IC-STXX	Inter Clamp = clamp + Z-Module + Bolt.
End Clamp	ER-EC-STXX	End Clamp = clamp + Z-Module + bolt
Clamp	C-U/30/46-G	Universal Clamp for Frame Height 30-46mm with Grounding Clip
Clamp	C-U/30/46	Universal Clamp for Frame Height 30-46mm
End Clamp	ER-EC-DU35/40	End Clamp dual 35 or 40mm
End Clamp	ER-EC-DU40/46	End Clamp dual 40 or 46mm
Interface	ER-I-01, 02, 04, 23, 26 and 51	Tile Interface
Interface	ER-I-01/CS	Carbon Steel Tile Interface
Tile Interface with ezClick connection for ECO-Rail	ER-I-01/EZC/ECO	PV-ezRack SolarRoof, Tile Interface with ezClick connection for ECO-Rail
Interface	ER-I-05	Tin Interface
Interface	ER-I-05/BA	Tin Interface Black
Interface	ER-I-05/CM	Tin Interface with Click Module
Interface	ER-I-05A/EZC/ECO	ezClick connection for ECO-Rail
Interface	ER-I-25	Tin Interface with curved Base for corrugated Roof
End Clamp (*)	EC-FL/GE/XX/XX	End Clamp for Frameless Module (glued EPDM)
Inter Clamp (*)	IC-FL/GE/XX/XX	Inter Clamp for Frameless Module (glued EPDM)
End Clamp (*)	ER-EC-FL/XX/XX	End Clamp for Frameless Module

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Components	Part No.	Description
Inter Clamp (*)	ER-IC-FL/XX/XX	Inter Clamp for Frameless Module
Adapter for Corrugated Roof	EZ-AD-C43	Adapted for Corrugated Iron Roof for Tin interface ER-I-05
Corrugated Adapter	EZ-AD-C110	PV-ezRack Adapter for Corrugated Iron Roof.
Roof Extender (<i>Reduction Factor</i>)	ER-RE-200	Roof Hook Extender, Suitable for ER-I-01,02,04,05,23,26, 51 and 01/CS
Connector Clamp	CRC-R/ECO	Cross Connector Clamp for ECO-Rail
Hanger Bolt	ER-HB-10/200A	PV-ezRack, Hanger Bolt M10*200mm
Hanger Bolt	ER-HB-MP/8/150EP	PV-ezRack Hanger Bolt for metal purlin M8*150mm
Hanger Bolt	ER-HB-8/150	Hanger bolt without mounting plate M8x150. Fixed to timber purlin only
ECO Rail Black	ER-R-ECO/XXXX/BA	ECO Rail Black
Splice ECO Rail Black	ER-SP-ECO/BA	Splice ECO Rail Black
Mid Clamp XX Black	ER-IC-STXXB	Inter Clamp XX Black
End Clamp XX Black	ER-EC-STXXB	End Clamp XX Black
ECO Rail Cap Black	CAP-ECO/PA/B	ECO Rail Cap Black
Black Universal Clamp	C-U/30/46-BA	Black Universal Clamp
Black Universal Clamp	C-U/30/46-G-BA	Black Universal Clamp with grounding clip

(*) Subject to the panel manufacturer's installation guide.

Note 7 For Terrain Category (TC) definition, please refer to clause 4.2.1 of AS/NZS 1170.2:2011 (R2016).

Note 8 The installed frame must comply with the clamping zone of the PV Panel.

Note 9 Capacities checked and compared against testing data from Clenergy Australia and MTS (NATA certified).

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- Note 10** Maximum permitted rail overhang of 40%.
- Note 11** For the definition of roof zones, refer to **Appendix D6** of the **AS/NZS 1170.2:2011 (R2016)** standard.
- Note 12** This Engineering report is based on 2 m x 1 m panels and two rails per panel. However, a percentage increase could be applied on all interface spacings as shown on the following table.

Number of rails per panel	Panel length / width (mm)	Spacing +/-
2 rails	$\leq 1700 / \leq 1100$	+ 8 %
3 rails	$\leq 1700 / \leq 1100$	+ 12 %
4 rails	$\leq 1700 / \leq 1100$	+ 15 %
2 rails	$\leq 2000 / \leq 1100$	0 %
3 rails	$\leq 2000 / \leq 1100$	+ 10 %
4 rails	$\leq 2000 / \leq 1100$	+ 12 %
2 rails	$\leq 2100 / \leq 1100$	- 10 %
3 rails	$\leq 2100 / \leq 1100$	+ 6 %
4 rails	$\leq 2100 / \leq 1100$	+ 10 %

- Note 13** From the date of publication onwards, any amendment made to any of the above mentioned Standards will make this report outdated and a new one will have to be released, unless the amendment has no implications on this certificate.
- Note 14** No consideration has been taken on the effect that the solar panel will have over the roof structure. It has been assumed that the roof will be able to resist the additional loadings imposed by the installation of the solar panels in conjunction with the Clenergy Mounting System.
- Note 15** All components from Clenergy must be installed according to manufacturer's specification and the instructions shown in the relevant installation manual. Please check the Clenergy Australia website or contact them for access to the most recent installation manuals.
- Note 16** No consideration has been taken on the effect of snow loads. In case the roof is located in a snow prone area, a special design must be made.
- Note 17** Neither Clenergy nor MW Engineering Melbourne are not to be responsible for external factors leading to compression of the tile interfaces.

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Note 18 General conditions

Note 18.1 Minimum grade for steel purlins/battens of 450 Mpa.

Note 18.2 Timber Grade members: F7 (Pine) and F17 (Hardwood).

Note 18.3

If any of the screws of the interfaces go into pre-existing holes, they will have to be one size up compared to the screws that were previously installed. This is to ensure that the pullout capacity remains the same or higher.

Note 19 Spacings on Tile Interfaces will be reduced as follows:

Interface	% of Reduction
ER-I-01/CS, ER-I-51 & ER-I-01/EZC/ECO	-
ER-I-02	-50%
ER-I-04	-50%
ER-I-23	-28%
ER-I-26	-28%

Note 20 A minimum of two (2) screws per Tile Interface will be required for installation.

Note 21 For installations on the Central Zone increase ER-I-01 & ER-I-05 Interface Spacings by 10%.

Note 22 Use the same spacing listed on the tables of this certificate for panels installed in landscape.

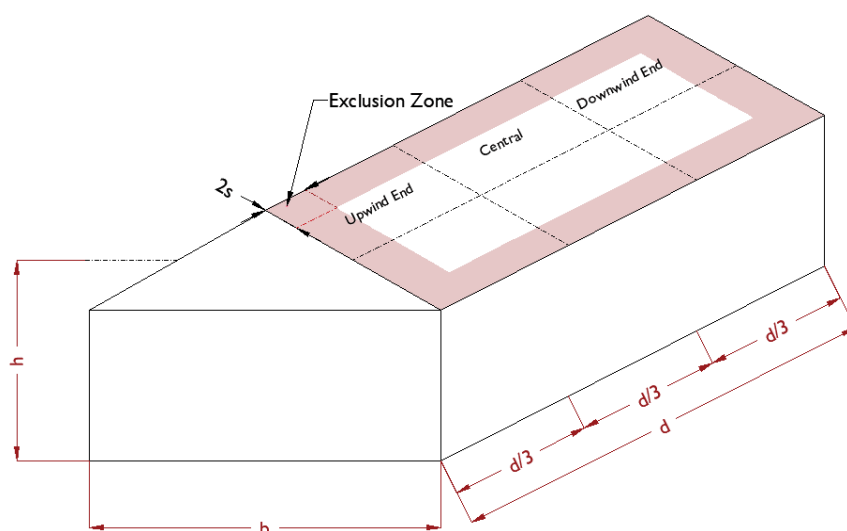
Note 23 When using Roof Extender (ER-RE-200), reduce interface spacings by 15% on Wind Region A and B and 30% on Wind Region C and D.

Note 24 If reducing screw embedment by using EZ-AD-C43 adaptor or if attaching to a smaller timber batten/purlin, fixing spacing to be reduced/increased to timber purlins as per below:

Batten type	Batten-Purlin Depth / Screw embedment	
	25 mm	30 mm
Timber F7	Reduction of 35%	Reduction of 25%
Timber F17	Spacings remain the same	Increase of 20%

Note 25 Conditions for flush mounted systems installed on flat and pitched roofs according to the D6 Appendix of the AS/NZS 1170.2:2011 (R2016).

- Roof pitch to be between 1° and 30°.
- $h/d \leq 0.5$ and $h/b \leq 0.5$. Being h = height, b = width and d = length of the building as per the below picture.
- Gap between the underside of the panel and the roof to be no less than 50mm and no more than 300mm.

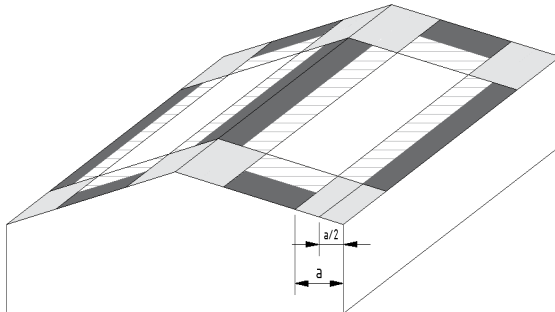


Note 26 Minimum distance from the edge of the roof to be "2s" where "s" is the gap between the underside of the panel and the roof.

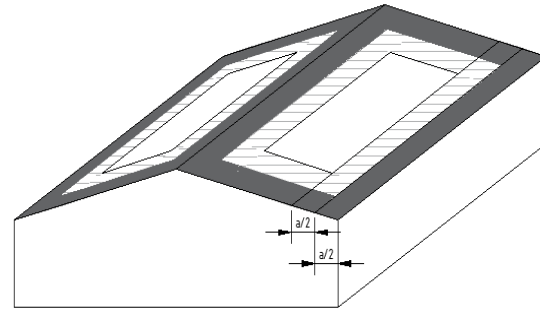
Note 27 If the installation is located in ISO corrosivity category C4 reduce the interface spacing by 5%. If the installation is located in ISO corrosivity category C5 reduce the interface spacing by 25%.

Note 28 Roof Zone definition for flush mounted systems installed on flat and pitched roofs when any of the conditions listed on Note 25 are not met.

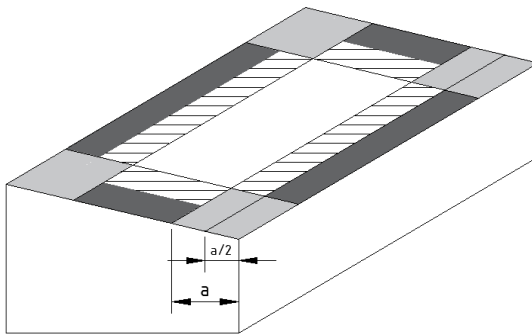
- Step 1** Determine building height (h), width (b) and length (d).
- Step 2** Choose the **lowest** value between " h ", " $b \times 0.2$ " and " $d \times 0.2$ ".
- Step 3** The **lowest** value on Step 2, equates to a .



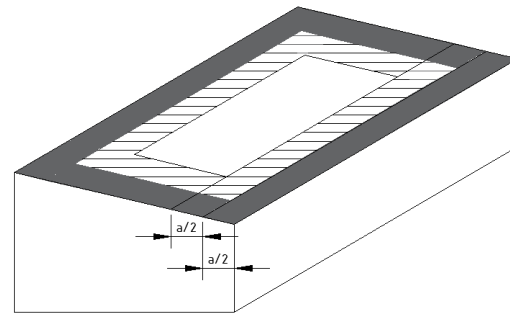
Roof Pitch $< 10^\circ$



Roof Pitch $\geq 10^\circ$



Flat/Mono – Slope Roof $< 10^\circ$



Flat/Mono – Slope Roof $\geq 10^\circ$

Legend:

- Internal Zone
- Intermediate Zone
- Edge Zone
- Corner Zone

Internal = Central

Intermediate = Up Wind End and Down Wind End



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