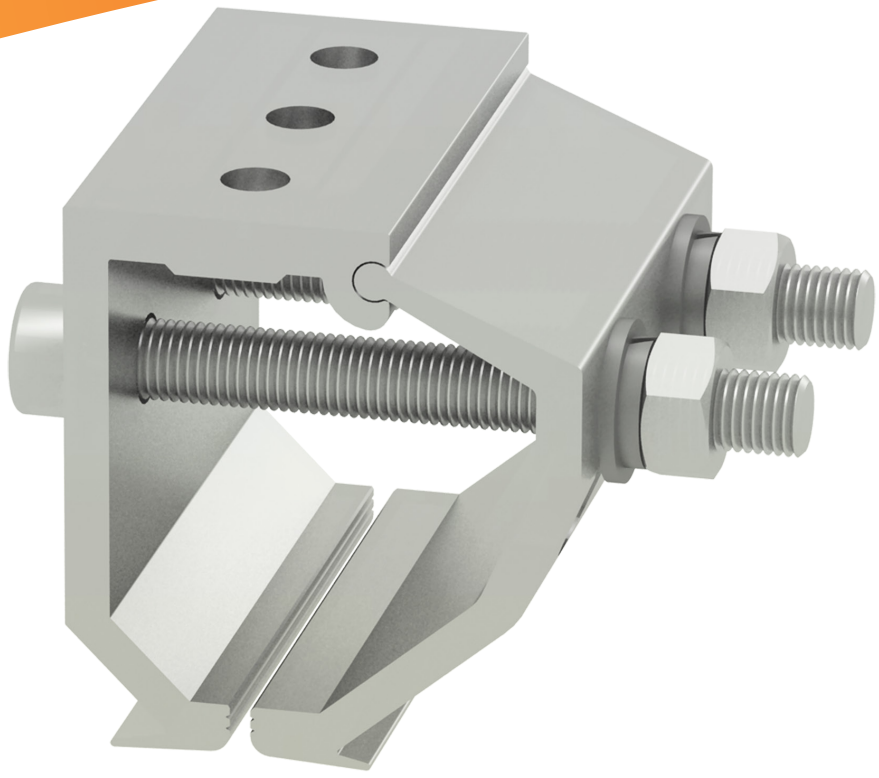
Clenergy
Innovating renewable energy

PV-ezRack®SolarRoof™ Klip-Lok Interface

Code-Compliant Planning and Installation Guide V3.0
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 and Z-Module technology enables fast and easy 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.

List of Contents

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 tech@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.

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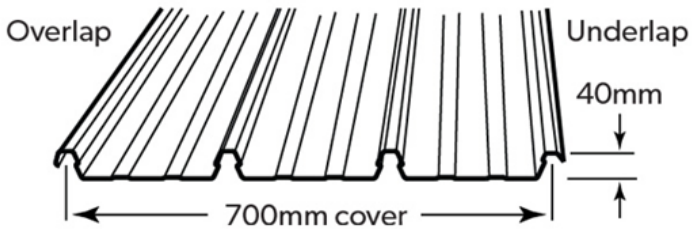
2. Planning

2.1 Determine the type of concealed roof

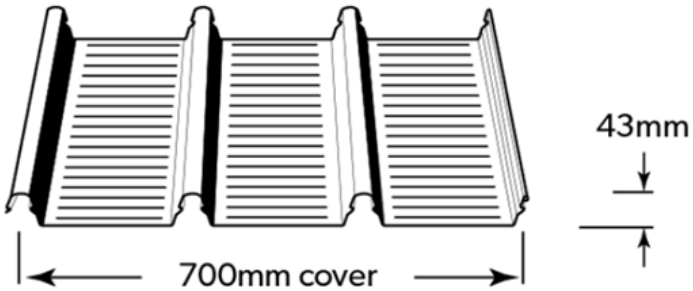
The best way to identify the type of concealed roof installed is to check the label normally located underneath the roofing sheet. Otherwise, you can contact the builder or check the building plan to find out the exact type of the roofing sheet.

NOTES:
1. Use of the Clenergy Klip-lok brackets is accredited only on the roof sheet types listed below;
2. If the roof sheet type (brand and model) cannot be identified, it is recommended to undertake on-site pull-out capacity test;
3. Klip-lok bracket can be direct contact with the majority of roof sheet without use of stand-off material between bracket and roof sheet. Please verify the roof sheet material and its compatibility with bracket (material: anodized aluminium) from the roof sheet manufacturer or refer the Clenergy Technical Bulletin of Dissimilar Metals (available on request) for the details.

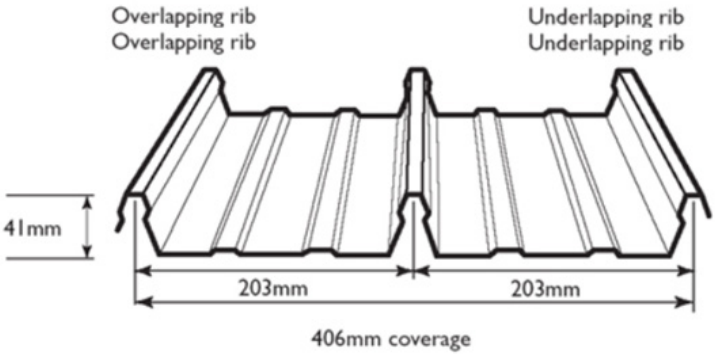
① Lysaught Klip Lok 700 Classic (Interface: ER-I-34, ER-I-09)



② Lysaught Klip-Lok 700 High Strength (Interface: ER-I-34, ER-I-09)



③ Lysaught Klip-Lok 406 (Interface: ER-I-34, ER-I-32/AU)



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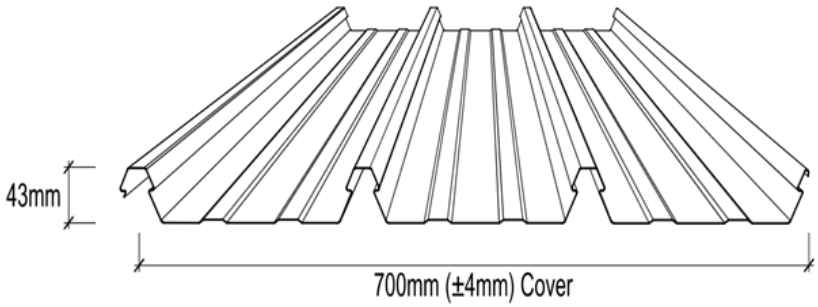
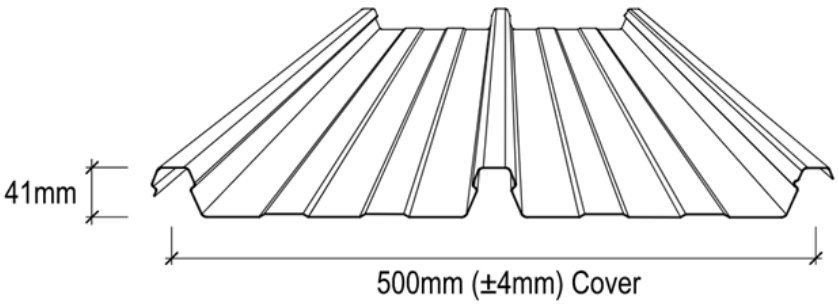
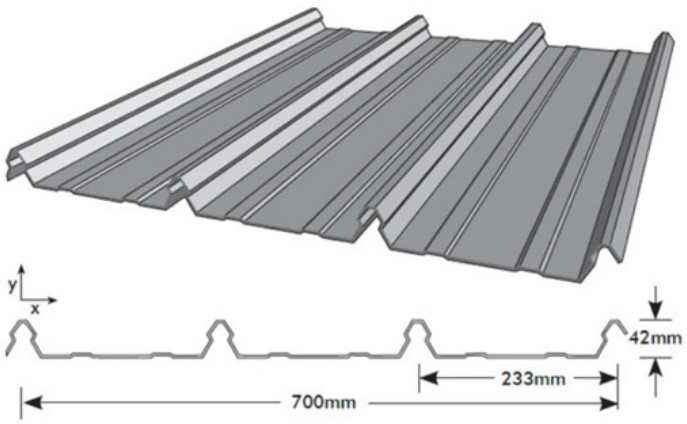
④ Stramit Speed Deck Ultra (Interface: ER-I-34, ER-I-09)



⑤ Stramit Speed Deck 500 (Interface: ER-I-34, ER-I-09)



⑥ Fielders Kingklip 700 (Interface: ER-I-34, ER-I-09)



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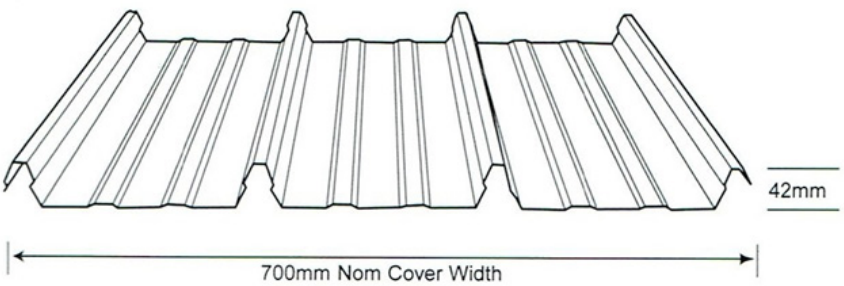
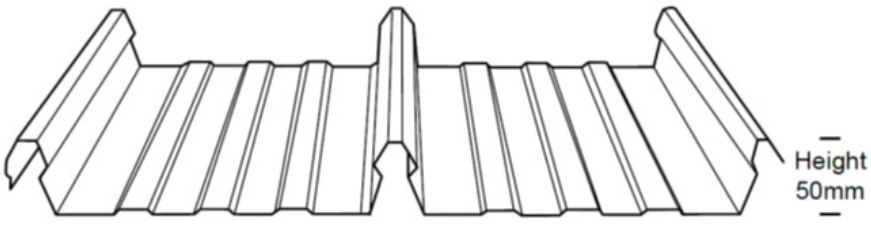
⑦ Stratco Topdeck 700 (Interface: ER-I-34, ER-I-09)

⑧ Metroll Metlok 700 (Interface: ER-I-34, ER-I-09)



⑨ Metroll Metlok 500 (Interface: ER-I-34)



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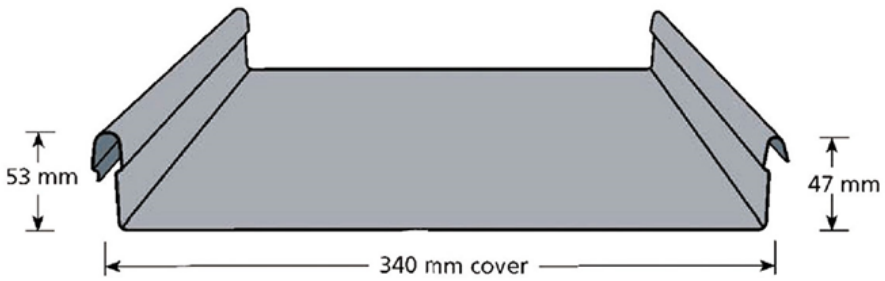
⑩ Revolution Maxline 340 (Interface: ER-I-34)



⑪ Steeline Lokdek 680 (Interface: ER-I-34)

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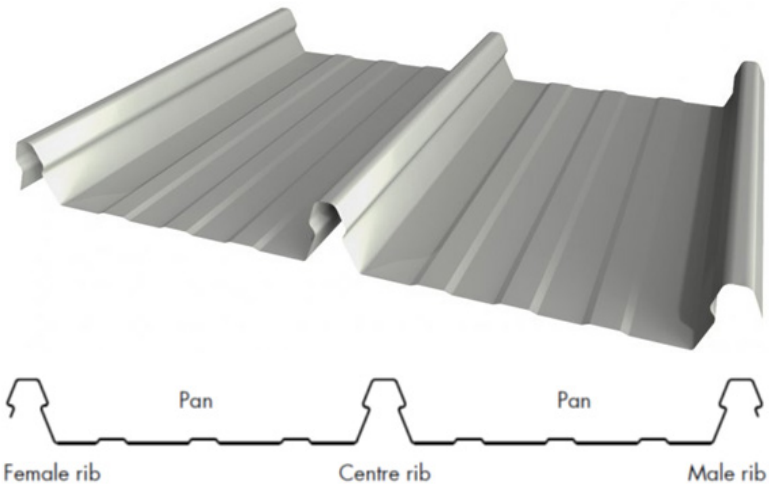
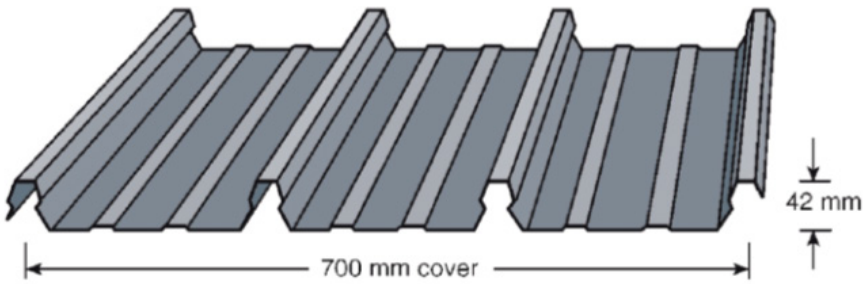
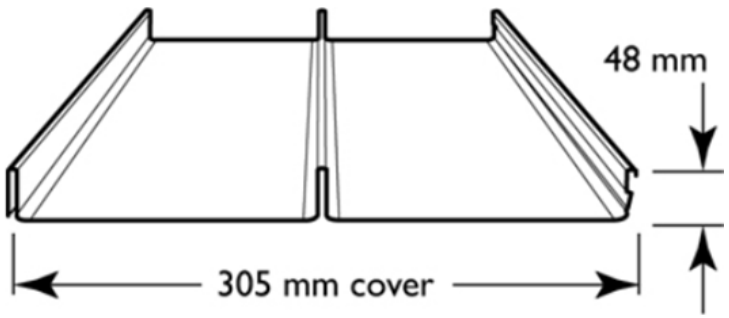
⑫ Steeline Steel-Rib 500 (ST28) (Interface: ER-I-34)



⑬ Rev-Klip 700 (Interface: ER-I-34, ER-I-09)



⑭ Lysaught LongLine 305 (Interface: ER-I-29/AU)



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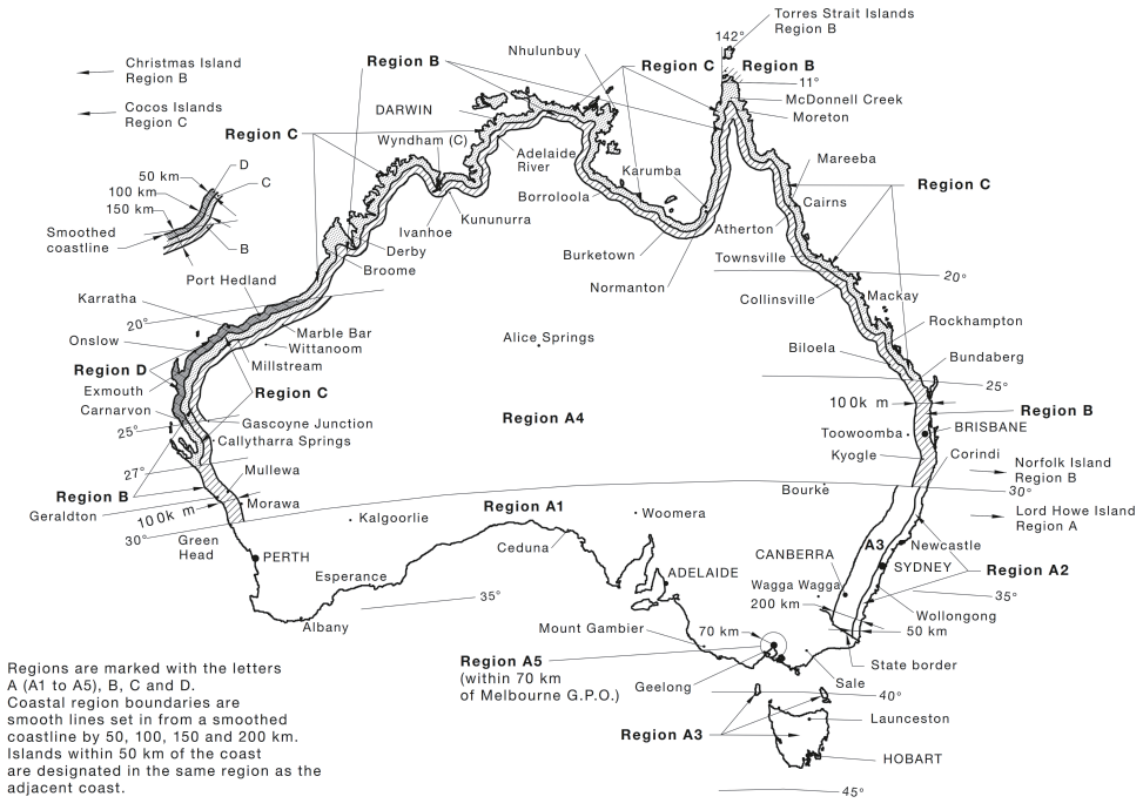
2. Planning

2.2 Determine the type of concealed roof



Regions are marked with the letters A (A1 to A5), B, C and D. Coastal region boundaries are smooth lines set in from a smoothed coastline by 50, 100, 150 and 200 km. Islands within 50 km of the coast are designated in the same region as the adjacent coast.

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.

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2.3 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.

2.4 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.

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2.5 Determine Roof slope

The PV-ezRack® SolarRoof™ system can be used for roof slopes up to 20°. Please verify that the Installation site roof slope is between 0° and 20°.

2.6 Determine the Installation Area of Roof

Please refer notes 19 and 20 in Certification Letter for roof zone definition to determine the installation zone of roof.

Please refer note 15 in Certification Letter for exclusion of installation of the Klip-lok interfaces. Different type of roof sheet has the different exclusion of installation area. Please contact the Clenergy for project-specific engineering letter if need to install on the excluded areas.

2.7 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.

2.8 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.

2.9 Determine the Clamping Zone of PV Modules

Please refer to the installation manual of the PV module manufacturer for the clamping zone info.

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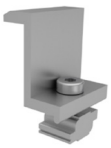
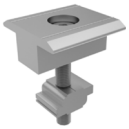
3. Tools & Components

3.1 Tools

Tools		
 Screw Driver (for M8 Hexagon Socket Screw)	 String	 Torque 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

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Component list

CRC-R/ECO
Cross Connector Clamp of ECO-Rail

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

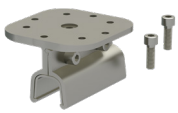
EZ-GC-ST
Grounding Clip

EZ-GL-ST
Grounding Lug

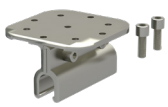
3.3 Applicable Klip-lok Interfaces

Component list

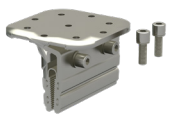
ER-I-34
Universal Klip-lok Interface



ER-I-09
Klip-lok Interface 700



ER-I-32/AU
Klip-lok Interface 406



ER-I-29/AU
SolarRoof, Klip-lok Interface for longline 305

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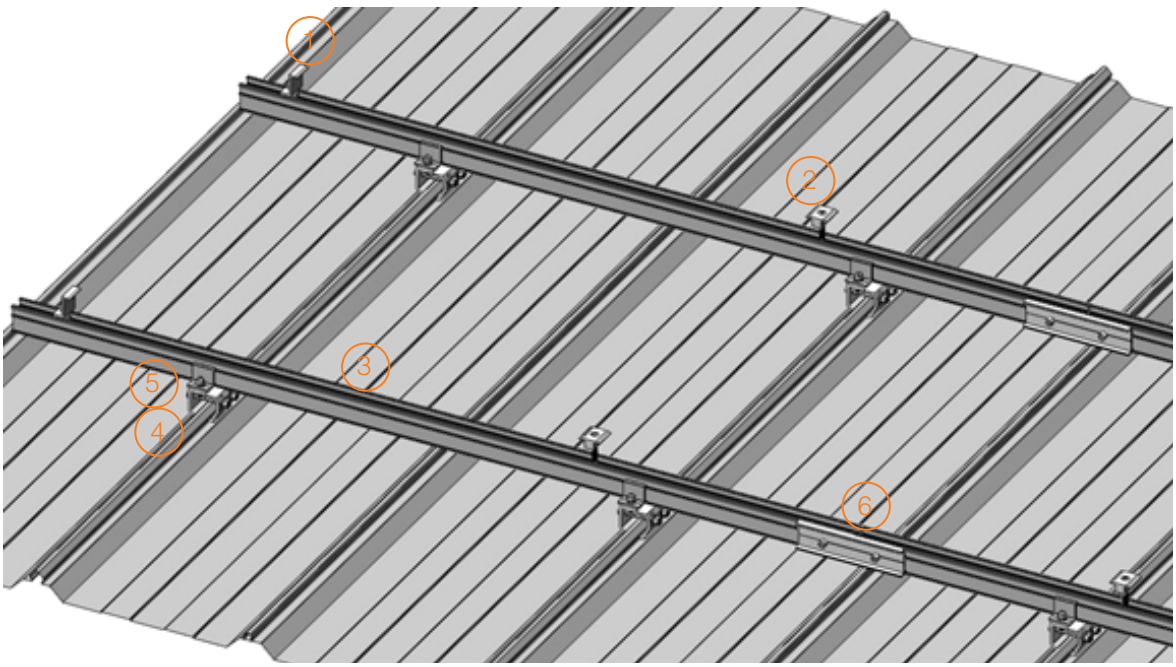
System Overview

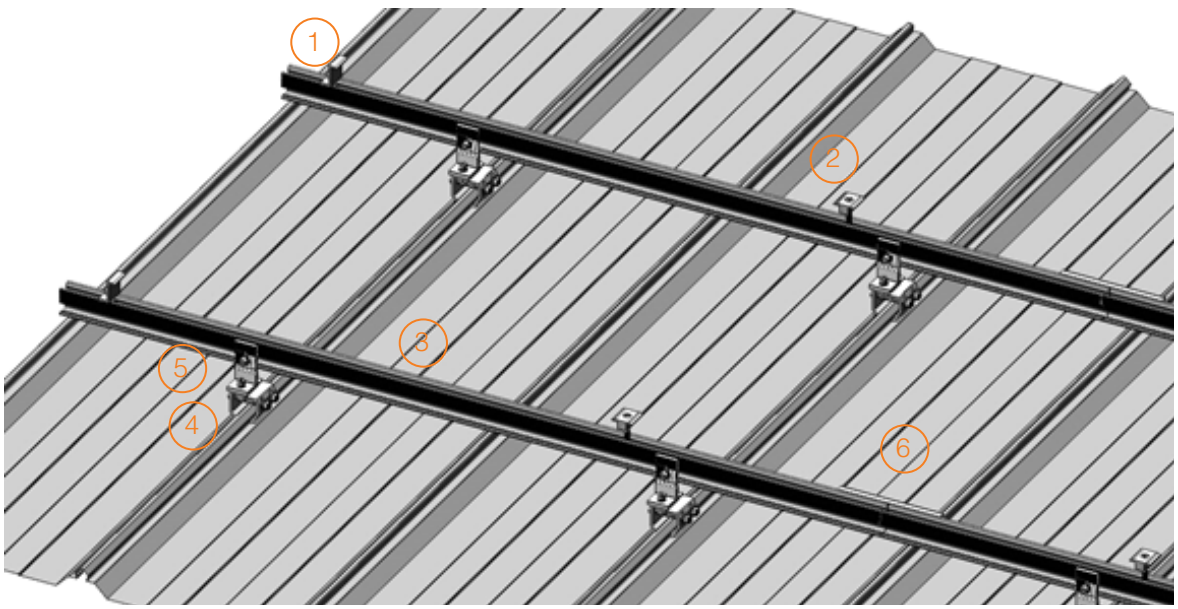
4. System Overview
4.1 Overview of Klip-lok Interface

- With Cross Connector Clamp (use Universal Klip-lok Interface as an exmaple)



① End Clamp ② Inter Clamp ③ ECO Rail ④ Universal Klip-lok Interface
⑤ Cross Connector Clamp ⑥ Splice for ECO Rail

- With Tin Interface (use Universal Klip-lok Interface as an exmaple)



① End Clamp ② Inter Clamp ③ ECO Rail ④ Universal Klip-lok Interface
⑤ Tin Interface ⑥ Splice for ECO Rail

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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

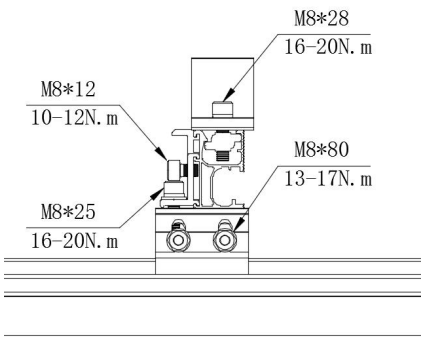
(2) Apply force uniformly, to maintain the required torque

(3) Professional tools and tool belts are recommended

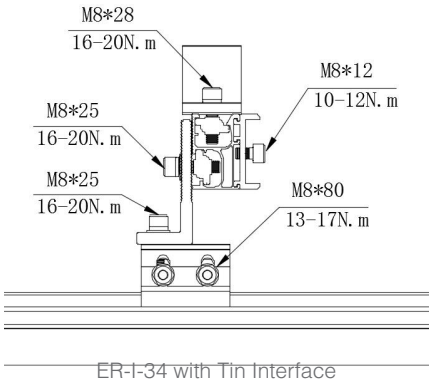
(4) In some cases, fasteners could be seized over time. As an option, if want to avoid galling or seizing of thread, apply lubricant (grease or 40# engine oil) to fasteners prior to tightening.

4.2.2 Safe Torques

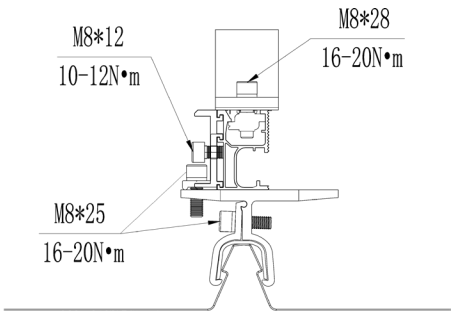
Please refer to safe torques defined in this guide as shown in the figures below. When fixing mid and end clamps, if the torques range specified by the panel manfuacturer is different, it should be used instead. In case power tools are required, Clenergy recommends the use of low speed only. High speed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



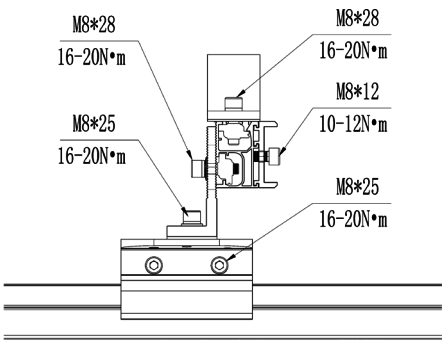
ER-I-34 with Cross Connector Clamp



ER-I-34 with Tin Interface



ER-I-09, ER-I-29/AU or ER-I-32/AU with Tin Interface



ER-I-09, ER-I-29/AU or ER-I-32/AU with Cross Connector Clamp

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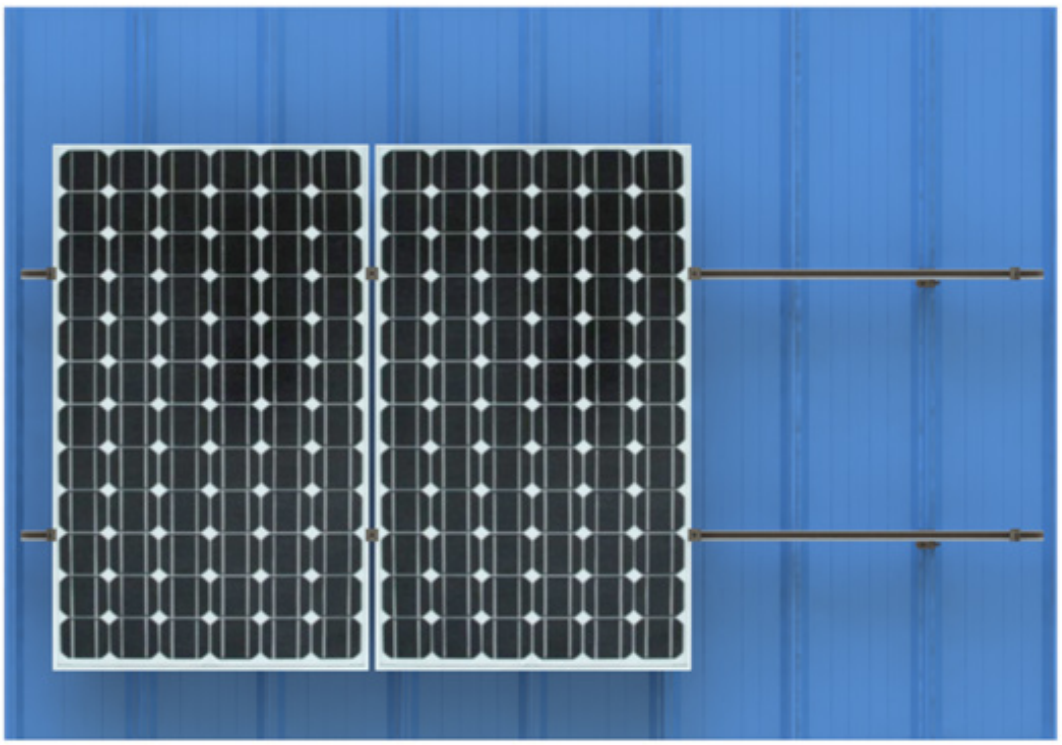
4.3 Installation Dimensions

All drawings and dimensions in this Installation Guide are a generic reference only. The 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 the 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.

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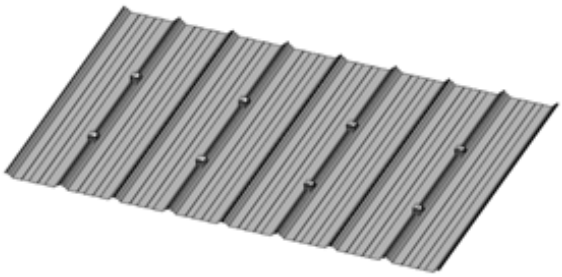
5.1 Universal Klip-lok Interface Installation

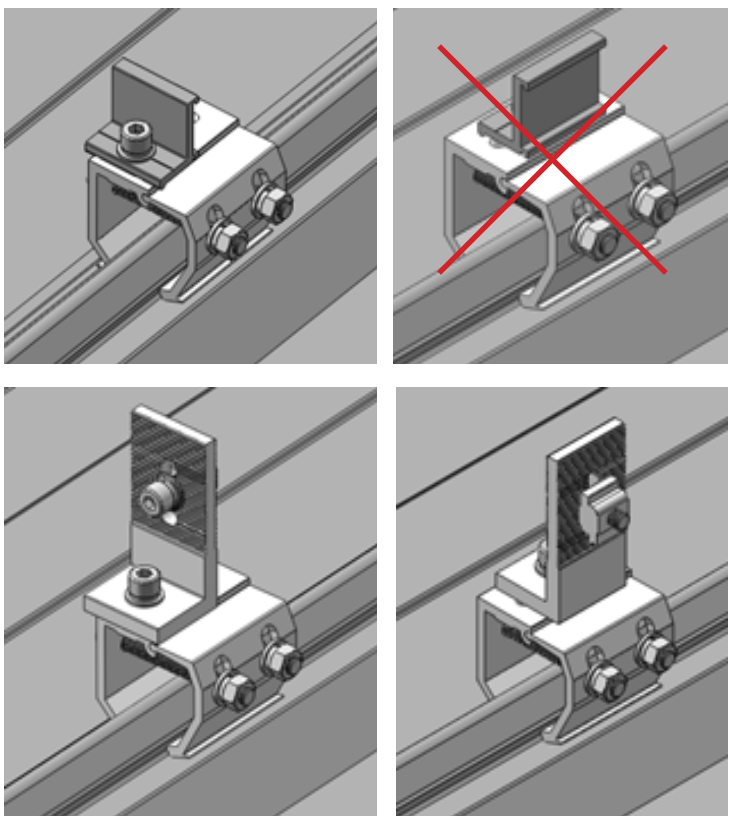
5.1.1 According to your plan, fix the Universal Klip-lok Interface on the ribs of metal sheet. Fasten the bolts of the Universal Klip-lok Interface within 16-20N.m after adjusted properly.



5.1.2 Cross Connector Clamp of ECO-Rail &Tin Interface Installation

When using Cross Connector Clamp of ECO-Rail, fix the Cross Connector Clamp of ECO-Rail on the top face of the Universal Klip-lok Interface. Fasten the bolt of the Cross Connector Clamp slightly before installing the ECO-Rail.
In this case, the PV Modules can be installed in portrait only.

When using Tin Interface, fix the Tin Interface on the top face of the Universal Klip-lok Interface, fasten the Tin Interface and the Universal Klip-lok Interface using M8 bolt within 16-20N.m after adjusted properly.



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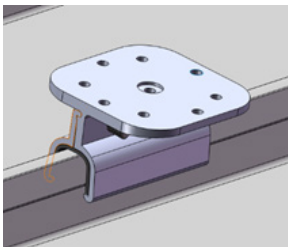
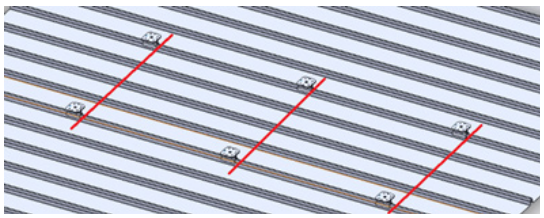
5.2 Other Klip-lok Interface Installation

5.2.1 According to the installation plan, after determining the position of the first Klip-lok Interface, fix it on the rib of tin roof and fasten lightly.



Recommended torque for M8 bolts is 16-20N·m.

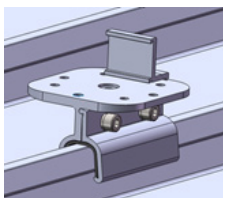
Fix the other Klip-lok Interfaces on the tin roof with the string as shown in the figure on the right.

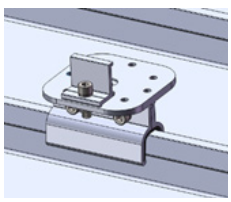


5.2.2 Cross Connector Clamp of ECO-Rail &Tin Interface Installation

5.2.2.1 When using the Klip-lok Interface and Cross Connector Clamp with ECO Rail, please install according to the steps below:

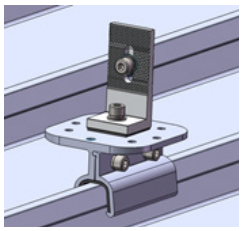
Fix all Cross Connector Clamp of ECO-Rail in the middle hole or side hole of the Klip-lok Interface, do not fasten tightly as shown in the figure on the right.

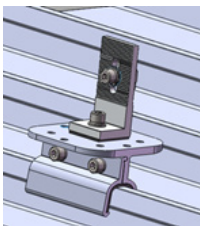




5.2.2.2 When using the Klip-lok Interface and Tin Interface with ECO Rail, please install according to the steps below:

Install all the Tin Interfaces on the middle hole of Klip-lok Interface, do not fasten tightly as shown in the figure on the right.





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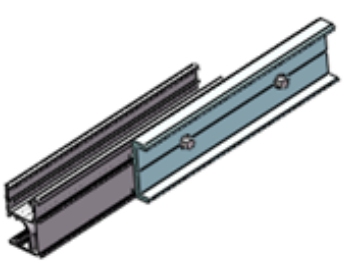
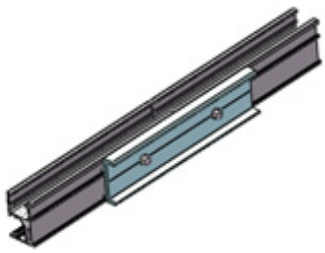
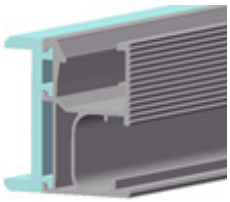
5.3 Rail Installation

5.3.1 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.





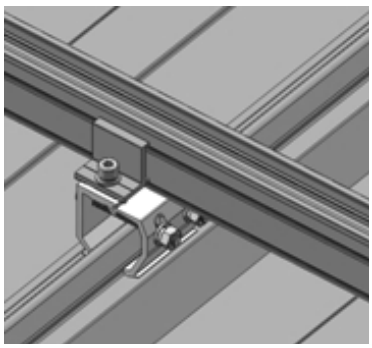
Splice provides the electrical connection between the 2 rails through the pressure bolts. This eliminates the need of using 2 earthing lugs.



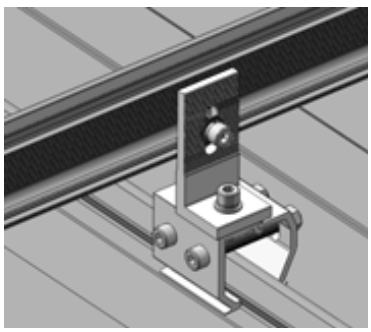
Recommended torque is 10 ~12 Nm.

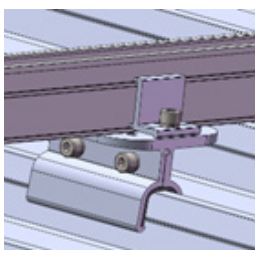
5.3.2 If the rails consist of different lengths, always begin with the shortest piece.

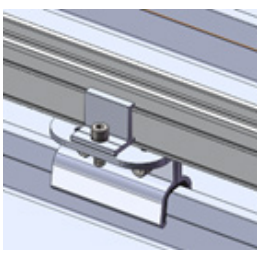
When using Rail Clamp, place the ECO-Rail on the Klip-lok Interface, uplift the Rail Clamp and click it into the side channels of the ECO-Rail as shown in the right figure. Fasten the Rail Clamp within 16-20 N.m after the Rail is positioned properly.

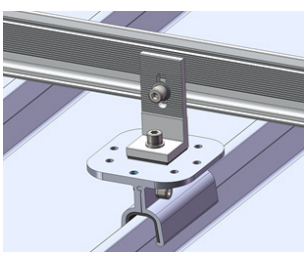


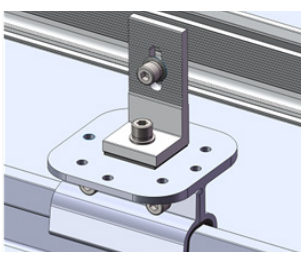
When using Tin Interface, fix the ECO-Rail and Tin Interface as shown in the right figure and then fasten within 16-20 N.m. after Rail is positioned properly.











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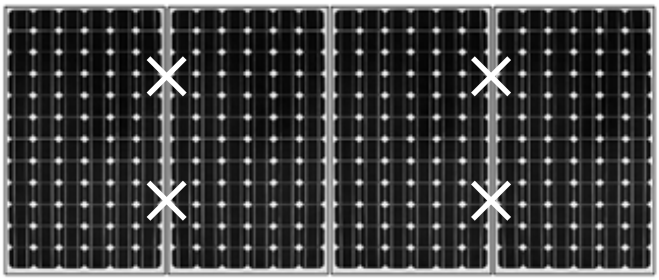
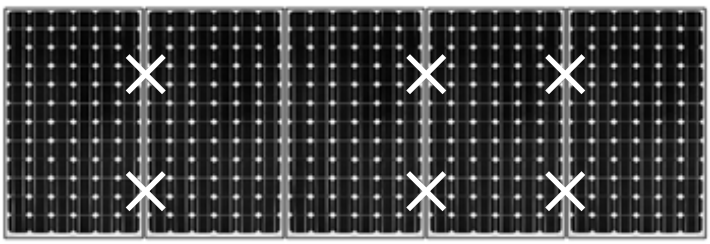
5.4 PV Module Installation

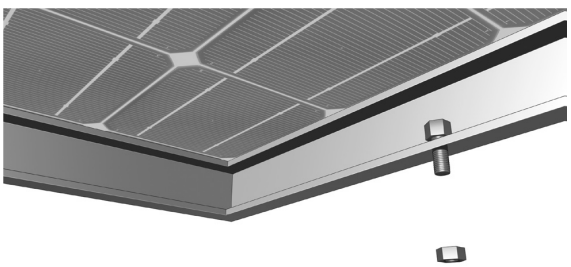
5.4.1 Deployment of Grounding Clips
1) When there is an even number of PV Module in each row:Install the grounding clips at the positions marked X in the figure shown. Then the number of Grounding Clips = number of PV Module. Eg; 4 grounding clips in the figure shown.



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



5.4.2 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.



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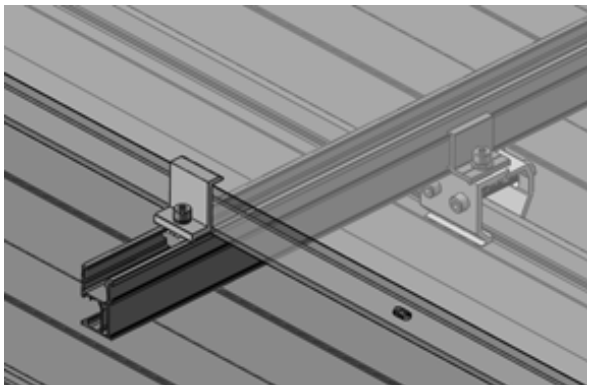
Installation Instruction

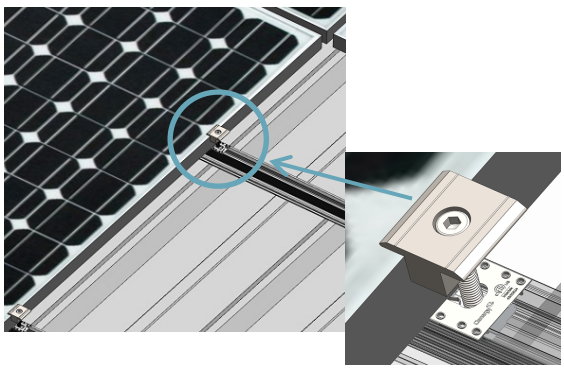
5.4.3 Place the PV Modules on to the rails and fix with End Clamps, Inter Clamps or Universal Clamps. Fasten with the Allen key. Please use Solution 1 or 2 below according to your project.



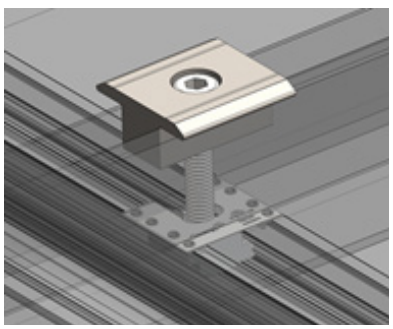
-Solution 1 (Apply Standard Clamps)

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.



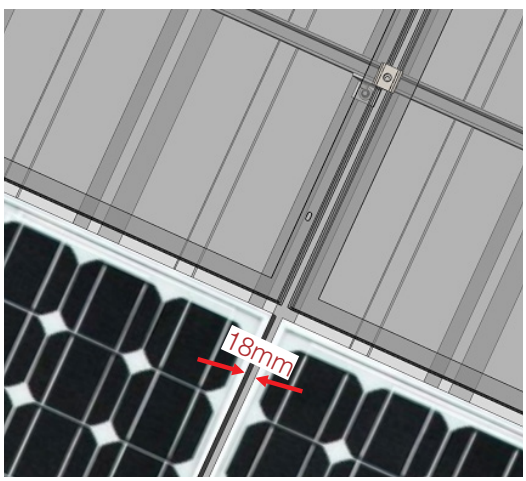
Step 3 loosely place the next framed PV Module into the other side of the Inter Clamp and Grounding Clip as shown in the figure on the right.



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.

- 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).



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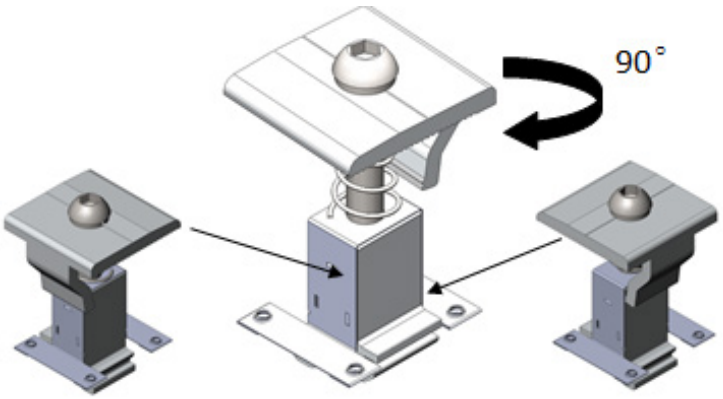
Installation Instruction

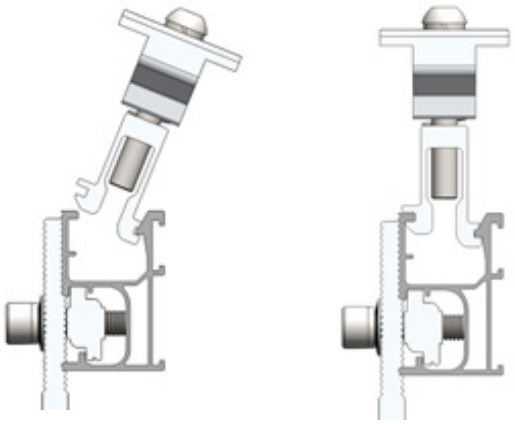
-Solution 2 (Apply Universal Clamps)

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.

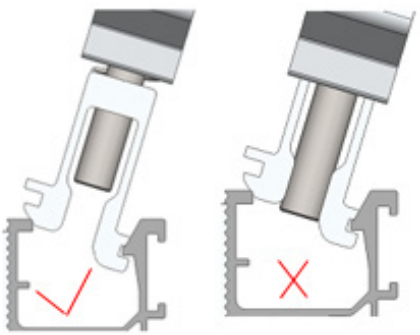
NOTE: Please ensure the Universal Clamp C-U/30/46 or Universal Clamp with Grounding Clip C-U/30/46-G is positioned correctly according to 5.4.1 Deployment of Grounding Clip.



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.



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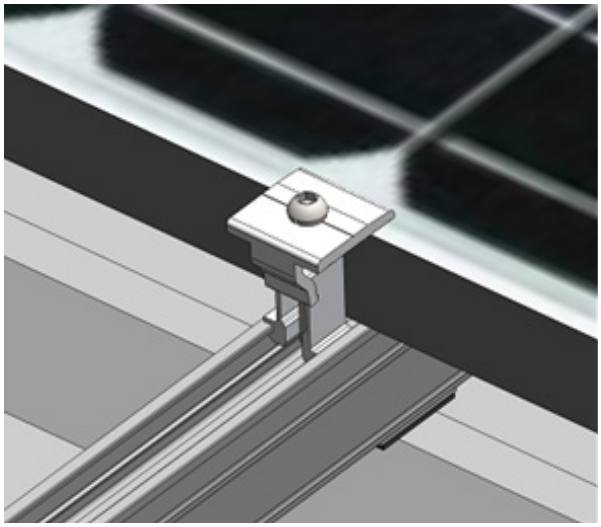
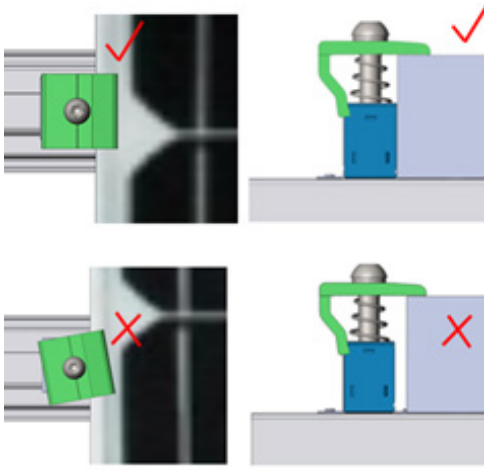
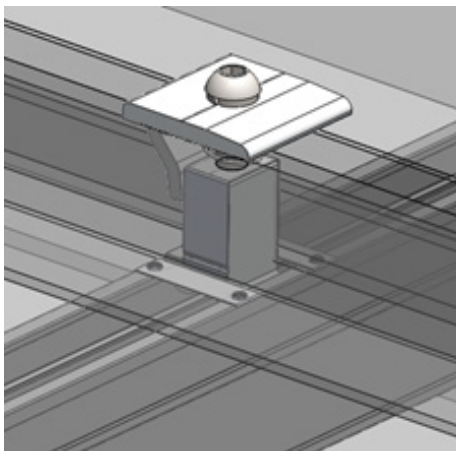
Installation Instruction

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.





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.



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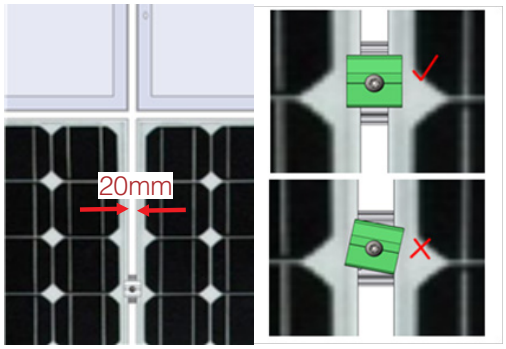
Step 5 Loosely place the next framed PV Module into the other side of the Universal Clamp. Ensure the Grounding Clip is fully covered and ensure the frame of the PV Module is in close contact with Universal Clamp as shown in the figure on the right.



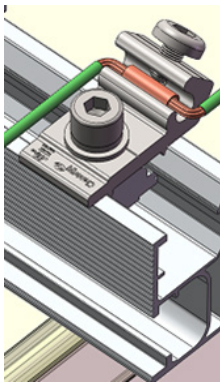
Step 6 Repeat steps above to install all PV Modules. Visually check the Universal Clamps and PV modules are properly positioned and then fasten all Clamps.
When you using Universal Clamps, the gap between two adjacent PV Modules is 20mm.
The recommend torque for Universal Clamps in the End Clamp position is 13~14N.m.
The recommend torque for Universal Clamps in the Inter Clamp position is 16~20N.m.

5.4.4 Apply one pre-assembled Grounding Lug per Rail. Slide the Grounding Lug into to the rail channel and fasten the bolt M8*25 with 16~20 N·m. Strip earthing cable (the maximum size is 10 mm2) and insert the conductor into the provided copper tube. Place the copper tube into the channel of Grounding Lug and tighten M6*10 with 5~6 N·m to ensure the earthing cable is tight.

Note: Check the electrical resistance between rail and earthing cable conductor to ensure the bonding is made.

There are three solutions for Grounding Lug installation:

-Solution 1
Fix the Grounding Lug into the top channel of Rail as shown in the figure on the right.



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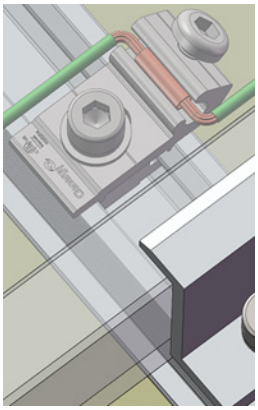
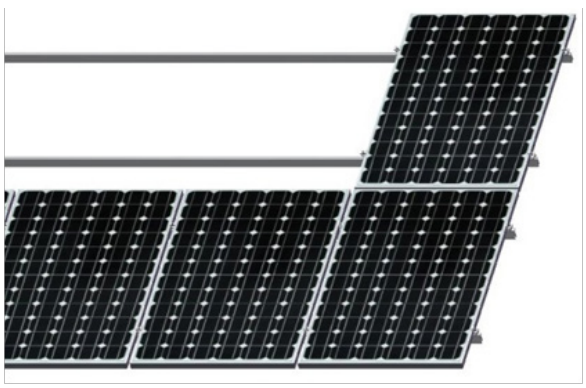
-Solution 2
Fix the Grounding Lug into the top channel of Rail where just under the PV Module as shown in the figure on the right.



-Solution 3
Fix the Grounding Lug at the side channel of Rail as shown in the figure on the right.

5.4.5 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 5.4.1 to 5.4.6 until all PV modules are installed.



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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.

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Certification Letter and Interface Spacing Table

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www.mwengineering.melbourne
ABN 37 605 815 585

18th March 2020

Clenergy Australia
1/10 Duerdin Street
Clayton, VIC 3168

CERTIFICATION LETTER

Clenergy PV ez-Rack SolarRoof Klip-lok flush interface certification – TC2, 2.5, 3 – Wind Region A, B, C. Internal REF: **00249-REV1.**

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**
  - **Wind Terrain Category 2, 2.5 and 3**
  - **Wind average recurrence of 200 years**
  - **Wind Region A, B, and C**
- **Solar panel length up to 2.2 m**
- **Solar panel width up to 1.1 m**

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/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

STRUCTURAL DESIGN CERTIFICATION

PV-ezRack® SolarRoof Klip-lok flush interface spacing tables according to AS/NZS 1170.2:2011 Amdt 4-2016

Within Australia

Terrain Category 2, 2.5 & 3

Client: Clenergy Australia

REF: 00249 – REV 1

Date: MAR 2020

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REF: 00249 – REV 1

Client: Clenergy Australia

Internal reference: CL- 343-S- REV 1

Project: PV ez-Rack SolarRoof Klip-lok flush interface spacing tables

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**

Wind Terrain Category: 2, 2.5 & 3

Wind average recurrence: 200 years

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.

Contents

PV ez-Rack SolarRoof Interface spacing table for

LYSAGHT KLIP-LOK 700 CLASSIC

Type of Rail ER-R-ECO and all other ECO-Rails

Type of Interface ER-I-34, ER-I-09 and ER-I-09/100/45

Solar Panel Dimension 2 m x 1 m

Roof Angle - $0° < \alpha \leq 20°$

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1134	1400	884	1078	804	980	746	910	620	756
B	809	1050	695	903	655	809	517	630	390	476
C	459	560	251	306	230	280	161	196	149	182

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1251	1508	1064	1282	964	1161	901	1086	676	814
B	894	1161	760	987	724	894	571	697	437	526
C	501	603	284	342	250	302	175	211	163	196

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1348	1624	1323	1594	1146	1380	1038	1250	728	877
B	1092	1315	990	1285	820	1013	701	844	488	588
C	553	666	352	424	313	377	213	256	182	220

Note: Refer to *Note 15* to find out installation exclusion zones.

PV ez-Rack SolarRoof Interface spacing table for

LYSAGHT KLIP-LOK 700 HI-STRENGTH

Type of Rail	ER-R-ECO and all other ECO-Rails
Type of Interface	ER-I-34, ER-I-09 and ER-I-09/100/45
Solar Panel Dimension	2 m x 1 m

Roof Angle - $0° < \alpha \leq 20°$

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1264	1560	985	1201	895	1092	831	1014	691	842
B	934	1139	794	968	719	877	517	631	411	501
C	576	702	315	384	288	351	201	246	187	228

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1411	1700	1200	1445	1087	1309	1016	1224	762	918
B	1008	1326	936	1127	848	1021	610	735	567	684
C	706	850	400	482	353	425	247	298	229	276

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1600	1928	1575	1898	1401	1639	1232	1485	864	1041
B	1248	1504	1223	1474	1036	1248	722	891	549	662
C	800	964	517	623	453	546	308	371	264	318

Note: Refer to *Note 15* to find out installation exclusion zones.

PV ez-Rack SolarRoof Interface spacing table for

LYSAGHT KLIP-LOK 406

Type of Rail	ER-R-ECO and all other ECO-Rails
Type of Interface	ER-I-34 and ER-I-32/AU
Solar Panel Dimension	2 m x 1 m

Roof Angle - $0° < \alpha \leq 20°$

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1014	1300	938	1144	853	1040	800	975	576	702
B	710	910	588	774	533	701	505	655	328	400
C	448	546	245	298	224	273	157	191	146	177

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1248	1560	1139	1373	1036	1248	971	1170	699	842
B	852	1092	705	928	639	841	605	786	405	488
C	544	655	308	371	272	328	190	229	177	213

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1352	1690	1378	1660	1234	1487	1080	1301	757	913
B	923	1183	865	1153	764	1006	729	911	432	521
C	603	727	386	464	342	412	232	280	199	240

Note: Refer to *Note 15* to find out installation exclusion zones.

PV ez-Rack SolarRoof Interface spacing table for

STRAMIT SPEED DECK ULTRA

Type of Rail	ER-R-ECO and all other ECO-Rails
Type of Interface	ER-I-34, ER-I-09 and ER-I-09/100/45
Solar Panel Dimension	2 m x 1 m

Roof Angle - $0° < \alpha \leq 20°$

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1296	1600	1010	1232	918	1120	853	1040	708	864
B	958	1168	814	993	737	899	530	647	421	514
C	590	720	323	394	295	360	207	252	192	234

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1448	1744	1230	1482	1115	1343	1042	1256	782	942
B	1034	1360	960	1156	869	1047	625	753	582	701
C	724	872	410	494	362	436	253	305	235	283

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1641	1978	1617	1948	1437	1681	1264	1523	886	1068
B	1280	1543	1255	1513	1063	1280	740	914	563	679
C	821	989	531	639	465	560	316	381	271	326

Note: Refer to *Note 15* to find out installation exclusion zones.

PV ez-Rack SolarRoof Interface spacing table for

FIELDERS KINGKLIP 700

Type of Rail	ER-R-ECO and all other ECO-Rails
Type of Interface	ER-I-34, ER-I-09 and ER-I-09/100/45
Solar Panel Dimension	2 m x 1 m

Roof Angle - $0° < \alpha \leq 20°$

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1175	1450	916	1117	832	1015	773	943	642	783
B	868	1059	738	900	668	815	481	586	382	466
C	535	653	292	357	268	326	187	228	174	212

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1312	1581	1115	1343	1010	1217	945	1138	708	853
B	937	1233	870	1048	788	949	567	683	527	635
C	656	790	372	448	328	395	230	277	213	257

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1488	1792	1463	1762	1302	1523	1145	1380	803	968
B	1160	1398	1135	1368	963	1160	671	828	511	615
C	744	896	479	577	421	508	286	345	245	296

Note: Refer to *Note 15* to find out installation exclusion zones.

PV ez-Rack SolarRoof Interface spacing table for

STRATCO TOPDECK 700

Type of Rail	ER-R-ECO and all other ECO-Rails
Type of Interface	ER-I-34, ER-I-09 and ER-I-09/100/45
Solar Panel Dimension	2 m x 1 m

Roof Angle - $0° < \alpha \leq 20°$

TC	2									
Wind Region	Building Height (m)									
	H < 5		5 ≤ H < 10		10 ≤ H < 15		15 ≤ H < 20		20 ≤ H < 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1053	1300	821	1001	746	910	693	845	576	702
B	608	741	516	630	468	571	337	410	267	326
C	426	520	233	284	213	260	149	182	139	169

TC	2.5									
Wind Region	Building Height (m)									
	H < 5		5 ≤ H < 10		10 ≤ H < 15		15 ≤ H < 20		20 ≤ H < 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1162	1400	988	1190	895	1078	837	1008	628	756
B	732	882	622	750	564	679	405	489	327	394
C	465	560	263	317	232	280	163	196	151	182

TC	3									
Wind Region	Building Height (m)									
	H < 5		5 ≤ H < 10		10 ≤ H < 15		15 ≤ H < 20		20 ≤ H < 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1252	1508	1227	1478	1064	1282	964	1161	676	814
B	776	935	751	905	660	795	460	554	341	411
C	513	618	376	453	291	350	198	238	169	204

Note: Refer to *Note 15* to find out installation exclusion zones.

PV ez-Rack SolarRoof Interface spacing table for

LYSAGHT LONGLINE 305

Type of Rail	ER-R-ECO and all other ECO-Rails
Type of Interface	ER-I-29
Solar Panel Dimension	2 m x 1 m

Roof Angle - $0° < \alpha \leq 20°$

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1264	1560	985	1201	895	1092	831	1014	691	842
B	934	1139	794	968	719	877	517	631	411	501
C	576	702	315	384	288	351	201	246	187	228

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1411	1700	1200	1445	1087	1309	1016	1224	762	918
B	1008	1326	936	1127	848	1021	610	735	567	684
C	706	850	400	482	353	425	247	298	229	276

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1600	1928	1575	1898	1401	1639	1232	1485	864	1041
B	1248	1504	1223	1474	1036	1248	722	891	549	662
C	800	964	517	623	453	546	308	371	264	318

Note: Refer to *Note 15* to find out installation exclusion zones.

PV ez-Rack SolarRoof Interface spacing table for

METROLL METLOK 700

Type of Rail	ER-R-ECO and all other ECO-Rails
Type of Interface	ER-I-34, ER-I-09 and ER-I-09/100/45
Solar Panel Dimension	2 m x 1 m

Roof Angle - $0° < \alpha \leq 20°$

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1013	1250	789	963	718	875	666	813	554	675
B	639	913	543	776	492	703	354	505	281	402
C	461	563	252	308	231	281	161	197	150	183

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1131	1363	961	1158	871	1049	814	981	611	736
B	744	1063	632	903	573	818	412	589	332	475
C	565	681	320	386	283	341	198	238	184	221

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1282	1545	1257	1515	1123	1313	987	1190	692	834
B	844	1205	823	1175	700	1000	500	714	440	530
C	641	773	411	495	363	438	247	297	212	255

Note: Refer to *Note 15* to find out installation exclusion zones.

PV ez-Rack SolarRoof Interface spacing table for

STRAMIT SPEED DECK 500

Type of Rail	ER-R-ECO and all other ECO-Rails
Type of Interface	ER-I-34, ER-I-09 and ER-I-09/100/45
Solar Panel Dimension	2 m x 1 m

Roof Angle - $0° < \alpha \leq 20°$

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1094	1350	852	1040	775	945	720	878	598	729
B	690	986	586	838	531	759	382	546	304	434
C	498	608	272	332	249	304	174	213	162	197

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1221	1472	1038	1251	940	1133	879	1059	660	795
B	803	1148	683	976	619	884	445	636	359	513
C	611	736	346	417	305	368	214	258	198	239

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1385	1669	1311	1639	1135	1418	1028	1285	721	901
B	911	1302	890	1272	756	1080	540	771	475	573
C	692	834	445	536	392	473	267	321	229	275

Note: Refer to *Note 15* to find out installation exclusion zones.

PV ez-Rack SolarRoof Interface spacing table for

REV-KLIP 700

Type of Rail	ER-R-ECO and all other ECO-Rails
Type of Interface	ER-I-34, ER-I-09 and ER-I-09/100/45
Solar Panel Dimension	2 m x 1 m

Roof Angle - $0° < \alpha \leq 20°$

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1013	1250	789	963	718	875	666	813	554	675
B	748	913	636	776	576	703	414	505	329	402
C	461	563	252	308	231	281	161	197	150	183

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1131	1363	961	1158	871	1049	814	981	611	736
B	808	1063	750	903	679	818	489	589	455	548
C	565	681	320	386	283	341	198	238	184	221

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1282	1545	1257	1515	1123	1313	987	1190	692	834
B	1000	1205	975	1175	830	1000	578	714	440	530
C	641	773	411	495	363	438	247	297	212	255

Note: Refer to *Note 15* to find out installation exclusion zones.

PV ez-Rack SolarRoof Interface spacing table for

METROLL METLOK 500

Type of Rail	ER-R-ECO and all other ECO-Rails
Type of Interface	ER-I-34
Solar Panel Dimension	2 m x 1 m

Roof Angle - $0° < \alpha \leq 20°$

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	729	900	568	693	517	630	480	585	399	486
B	460	657	391	558	354	506	255	364	202	289
C	332	405	182	221	166	203	116	142	108	132

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	814	981	692	834	627	755	586	706	440	530
B	536	765	455	650	412	589	297	424	239	342
C	407	491	231	278	204	245	142	172	132	159

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	923	1112	866	1082	756	946	685	857	481	601
B	607	868	586	838	504	720	360	514	317	382
C	462	556	291	351	262	315	178	214	152	184

Note: Refer to *Note 15* to find out installation exclusion zones.

PV ez-Rack SolarRoof Interface spacing table for

STEELINE STELL-RIB 500 (ST28)

Type of Rail	ER-R-ECO and all other ECO-Rails
Type of Interface	ER-I-34
Solar Panel Dimension	2 m x 1 m

Roof Angle - $0° < \alpha \leq 20°$

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1134	1400	884	1078	804	980	746	910	620	756
B	838	1022	712	869	645	787	464	566	369	450
C	517	630	282	344	258	315	181	221	168	205

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1267	1526	1077	1297	975	1175	912	1099	684	824
B	905	1190	840	1012	761	917	547	659	509	613
C	633	763	359	432	317	382	222	267	206	248

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1436	1730	1411	1700	1258	1471	1106	1332	776	934
B	1120	1350	1095	1320	930	1120	648	799	493	594
C	718	865	462	557	407	490	276	333	237	286

Note: Refer to *Note 15* to find out installation exclusion zones.

PV ez-Rack SolarRoof Interface spacing table for

REVOLUTION MAXLINE 340

Type of Rail	ER-R-ECO and all other ECO-Rails
Type of Interface	ER-I-34
Solar Panel Dimension	2 m x 1 m

Roof Angle - $0° < \alpha \leq 20°$

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1215	1500	947	1155	861	1050	800	975	664	810
B	898	1095	763	931	691	843	497	606	395	482
C	554	675	303	369	277	338	194	236	180	219

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1357	1635	1153	1390	1045	1259	977	1177	733	883
B	969	1275	900	1084	815	982	586	706	546	657
C	679	818	384	463	339	409	237	286	221	266

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	1539	1854	1514	1824	1347	1576	1185	1428	831	1001
B	1200	1446	1175	1416	996	1200	694	857	528	636
C	769	927	496	598	436	525	296	357	254	306

Note: Refer to *Note 15* to find out installation exclusion zones.

PV ez-Rack SolarRoof Interface spacing table for

STEELINE LOKDECK 680

Type of Rail	ER-R-ECO and all other ECO-Rails
Type of Interface	ER-I-34
Solar Panel Dimension	2 m x 1 m

Roof Angle - $0° < \alpha \leq 20°$

TC	2									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	810	1000	631	770	574	700	533	650	443	540
B	578	750	497	645	468	578	369	450	279	340
C	328	400	179	219	164	200	115	140	107	130

TC	2.5									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	894	1077	760	915	688	829	644	775	483	582
B	639	829	543	705	517	639	408	498	312	376
C	358	431	203	244	179	215	125	151	116	140

TC	3									
Wind Region	Building Height (m)									
	H ≤ 5		5 < H ≤ 10		10 < H ≤ 15		15 < H ≤ 20		20 < H ≤ 30	
	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central	U.W & D.W	Central
A	963	1160	938	1130	818	986	741	893	520	626
B	780	940	700	910	586	723	500	603	348	420
C	395	476	247	297	224	270	152	183	130	157

Note: Refer to *Note 15* to find out installation exclusion zones.

General Notes

Note 1. 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 2. The spacing information in this document has been designed to be compliant with the capacity of the below items:

- Klip-lok clamp
- Roofing sheet
- Fixing clip between roofing sheet to purlin

Note 3. This document does not cover the following:

- Building frame capacity

It has been assumed that the building frame will be able to resist the additional loadings imposed by the installation of the solar panels in conjunction with the Clenergy Mounting System.

Note 4. 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
ST-Rail	ER-R-STXXXX	Standard Rail
Splice	ER-SP-ST	PV-ezRack Splice for Standard Rail 200mm
Roof bracket	ER-I-09	Klip-lok bracket
Roof bracket	ER-I-09/100/45	Klip-lok bracket

Components	Part No.	Description
Roof bracket	ER-I-29/AU	Klip-lok bracket
Roof bracket	ER-I-32/AU	Klip-lok bracket
Roof bracket	ER-I-34	Universal Klip-lok clamp
Inter Clamp	ER-IC-STXX	Inter Clamp = clamp + Z-Module + bolt
End Clamp	ER-EC-STXX	End Clamp = clamp + Z-Module + bolt
Security Inter Clamp	ER-IC-STXX/S	Security Inter Clamp
Security End Clamp	ER-EC-STXX/S	Security End Clamp
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
Cross Connection Clamp	CRC-R/ECO CRC-R/ECO-ZBW	Cross Connection Clamp
Interface	ER-I-05	Tin Interface

Components	Part No.	Description
Interface	ER-I-05/BA	Tin Interface Black
Interface	ER-I-05A/EZC/ECO	ezClick connection for ECO-Rail
Interface	ER-I-05A/EZC/ECO	ezClick connection for ECO-Rail
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
Inter Clamp (*)	ER-IC-FL/XX/XX	Inter Clamp for Frameless Module
ECO-Rail Black	ER-R-ECO/4200/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
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 5. For Terrain Category (TC) definition, please refer to clause 4.2.1 of AS/NZS 1170.2:2011 (R2016).

Note 6. Topographic Multiplier (Mt) taken as 1.0.

Note 7. Shielding Multiplier (Ms) taken as 1.0.

Note 8. Wind Direction Multiplier (Md) taken as 1.0.

Note 9. The installed frame must comply with the clamping zone of the PV Panel.

Note 10. Capacities checked and compared against testing data from Clenergy Australia and NATA certified testing.

Note 11. Maximum permitted rail overhang of 40% of the installation spacing.

Note 12. 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 13. 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 14. No consideration has been taken on the effect of snow loads. In case the roof is located in a snow prone area, a project specific design must be completed.

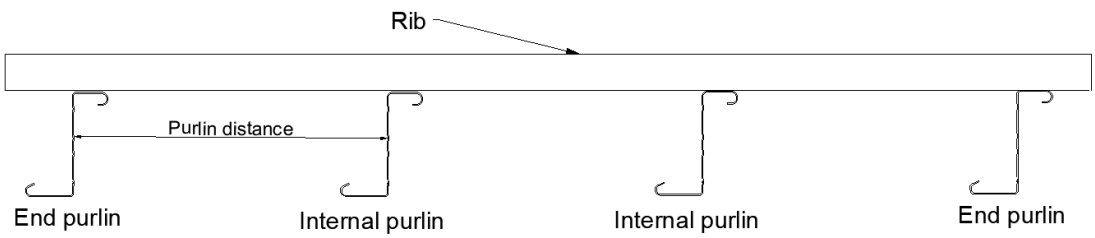
Note 15. Exclusion for installation of the klip-lok clamps on the roof depending on the type of roof sheet to be as per the following table

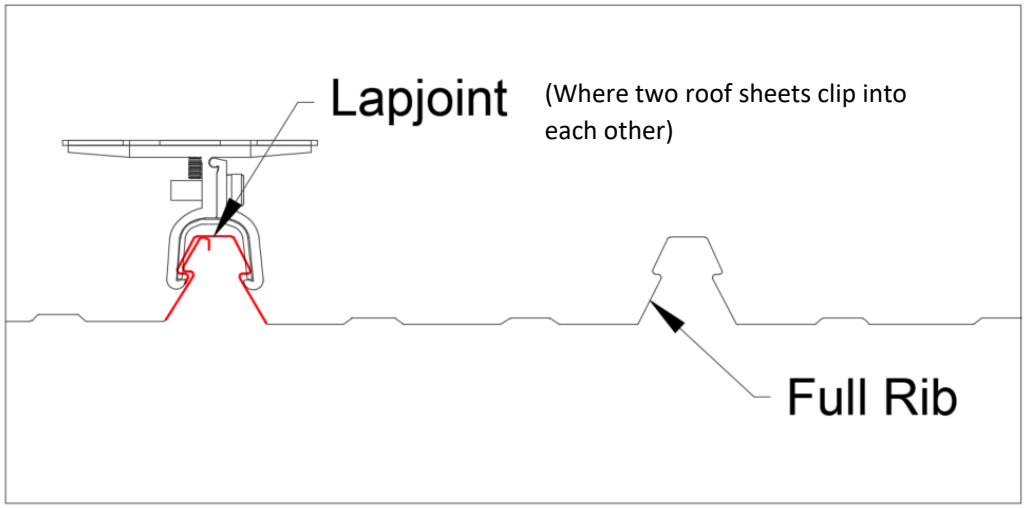
Roof Sheet type	Exclusions	Test Repot No.
Lysaght KLIP-LOK 700 Classic	• Lapjoints and full ribs when purlin spacing $\geq$ 2000 mm	MT-19/0633-A and 20-0028
Lysaght KLIP-LOK 700 Hi-Strength	• Lapjoints between purlins on internal purlins	MT-11/023 and 20-0028
Lysaght KLIP-LOK 406	• Full ribs and lapjoints when purlin spacing $\geq$ 1600 mm; • Lapjoints when purlin spacing $\geq$ 1200mm	MT-17/001-A
Stramit Speed Deck Ultra	• Lapjoints between purlins on internal purlins	MT-11/023
Fielders Kingklip 700	• In-line with Clip on full rib and internal purlin; • In-line with clip on full rib and end purlin; • Mid- span, between clips on lapjoints and internal span	MT-11/280

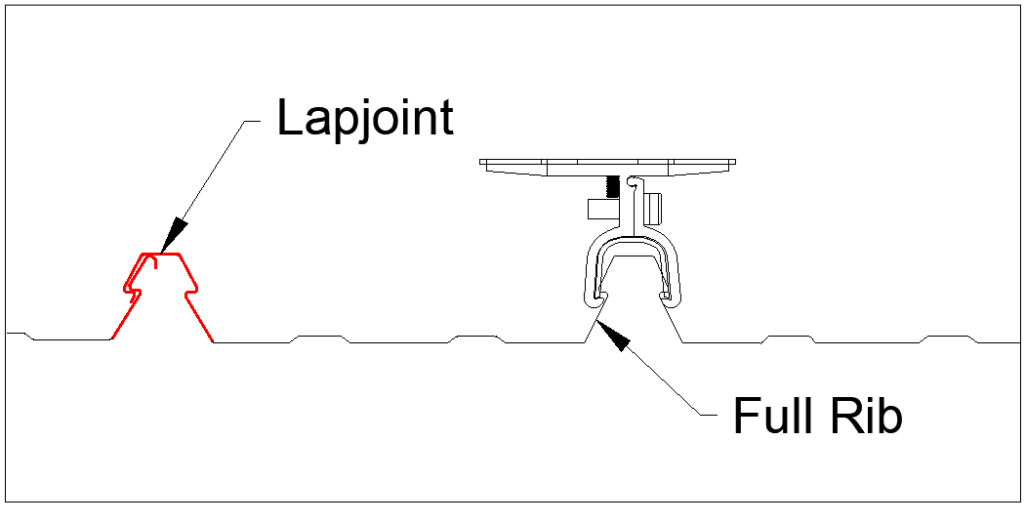
Roof Sheet type	Exclusions	Test Repot No.
Stratco Topdeck 700	• Full ribs and lapjoints when purlin spacing ≥ 2000 mm; • Lapjoints when purlins spacing ≥ 1200 mm	MT-17/001-B and MT-19/1007
Lysaght Longline 305	• Full ribs between purlins on internal purlins	MT-13/133
Metroll Metlok 700	• Full ribs and lapjoints when purlin spacing ≥ 2000mm; • On top of purlin on lapjoint; • Lapjoints when purlin spacing ≥ 1200mm	MT-19/0633-B
Stramit Speed Deck 500	• Full ribs and lapjoints when purlin spacing ≥ 2000mm; • Full ribs when purlin spacing ≥ 1200mm.	MT-19/0762
Rev-klip 700	• Full ribs and lapjoints when purlin spacing ≥ 2000mm; • Full ribs when purlin spacing ≥ 1200mm	MT-19/1018-A
Metroll Metlok 500	• Full ribs when purlins spacing ≥ 1200mm	7530/MJ
Steeline Steel-Rib 500	• Full ribs and lapjoints when purlin spacing ≥ 2000m; • Full ribs when purlin spacing ≥ 1200mm; • Full ribs on top of the purlin	MT-19/1090-B
Revolution Maxline 340	• Lapjoints when purlin spacing ≥ 1200mm	MT-19/1018-B
Steeline Lokdeck 680	• Lapjoints when purlin spacing ≥ 1200mm	20-0028

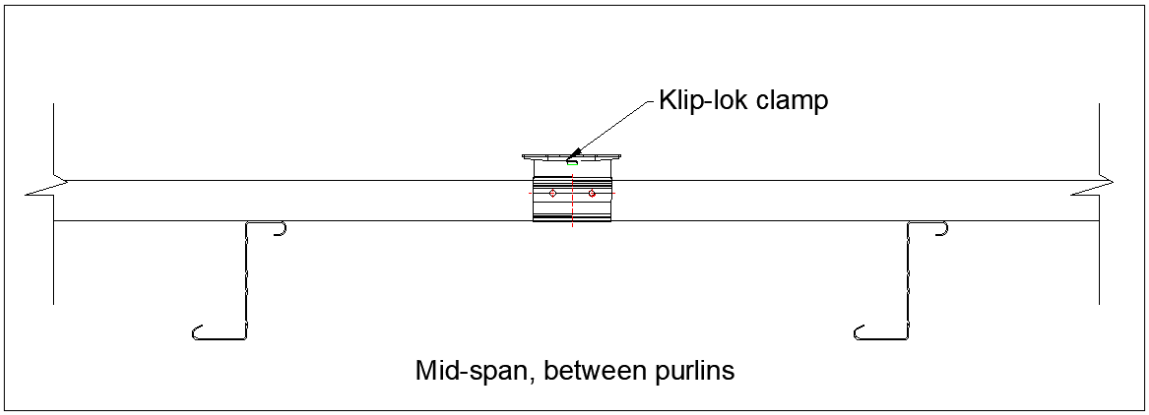
Contact Clenergy for a project specific assessment if you cannot comply the above exclusion.

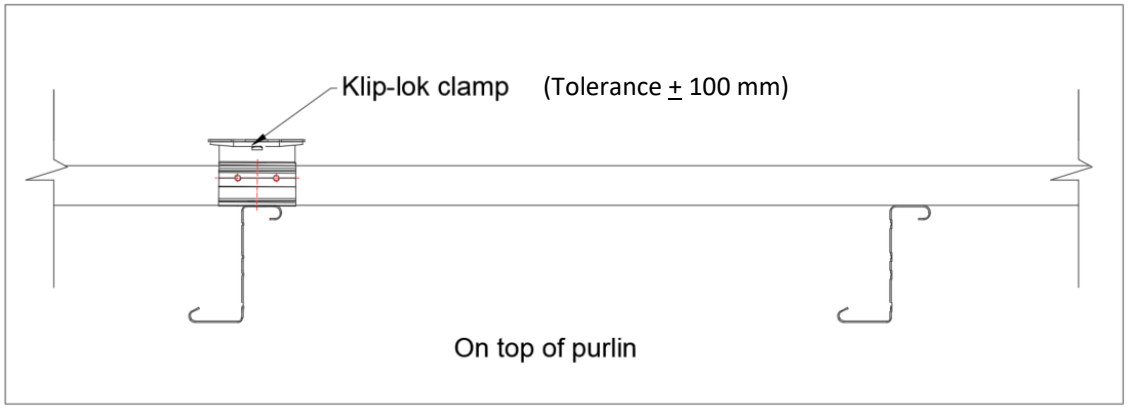
Refer to the below pictures to find clamp position, rib type and location on respective roof sheet.




Lapjoint
(Where two roof sheets clip into each other)
Full Rib


Lapjoint
Full Rib


Klip-lok clamp
Mid-span, between purlins



Note 16. This Engineering report is based on 2 m x 1 m panels and two rails per panel. However, for different panel sizes a percentage increase or decrease can be applied on all interface spacings as shown on the following table.

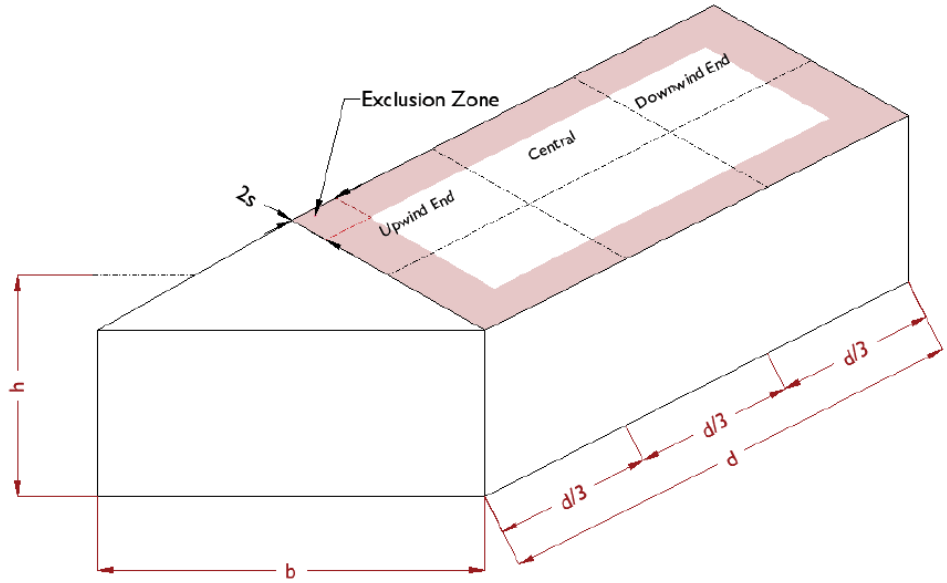
Number of rails per panel	Panel length / width (mm)	Spacing +/-
2 rails	≤ 1700/ ≤1100	+ 8 %
3 rails	≤ 1700/ ≤1100	+ 12 %
4 rails	≤ 1700 / ≤1100	+ 15 %
2 rails	≤ 2000/ ≤1100	0 %
3 rails	≤ 2000/ ≤1100	+ 10 %
4 rails	≤ 2000/ ≤1100	+ 12 %
2 rails	≤ 2100/ ≤1100	- 10 %
3 rails	≤ 2100/ ≤1100	+ 6 %
4 rails	≤ 2100/ ≤1100	+ 10 %
2 rails	≤ 2200/ ≤1100	- 13 %

Note 17. 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 18. 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 ≤ 0.5 and h/b ≤ 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 50 mm and no more than 300 mm.

- 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.

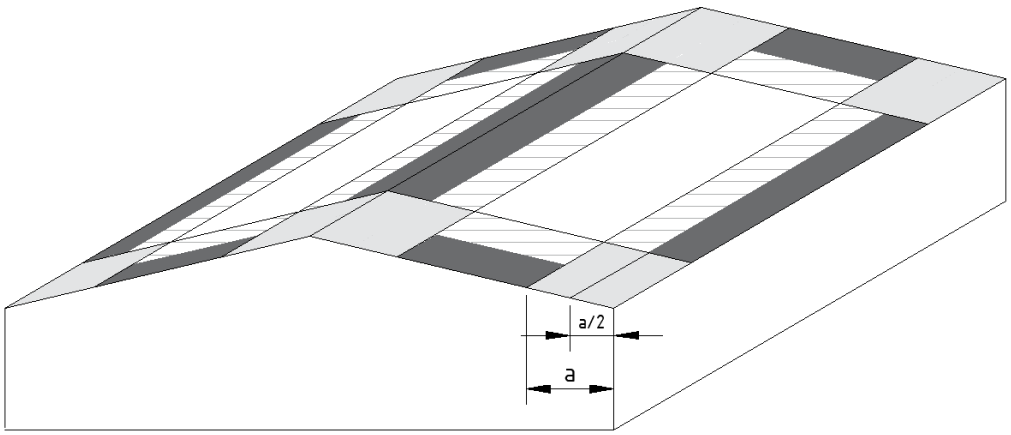


Note 19. Roof Zone definition when the installation doesn't meet the parameter on section D6 part (d) of the AS/NZS 1170.2:2011 (R2016) standard for roof angle is between 1° to 45°.

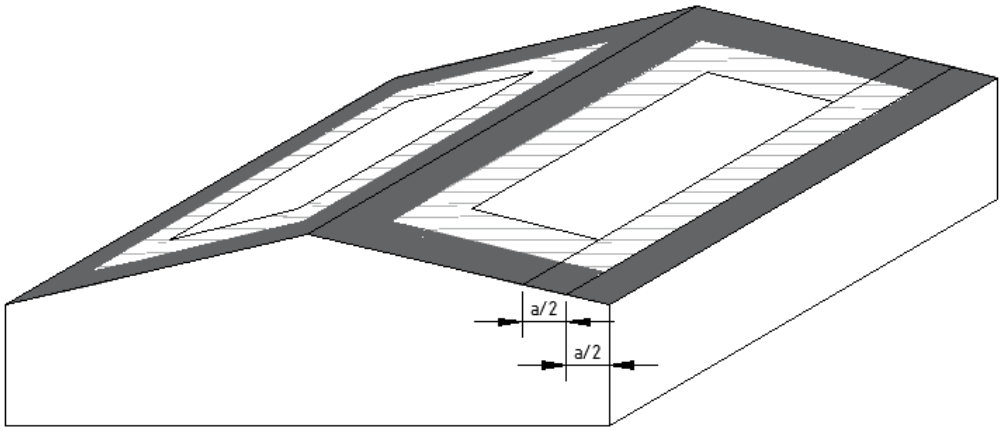
Step 1. Determine building height (h), width (b) and length (d).

Step 2. Choose the lowest value between "h", "b x 0.2" and "d x 0.2".

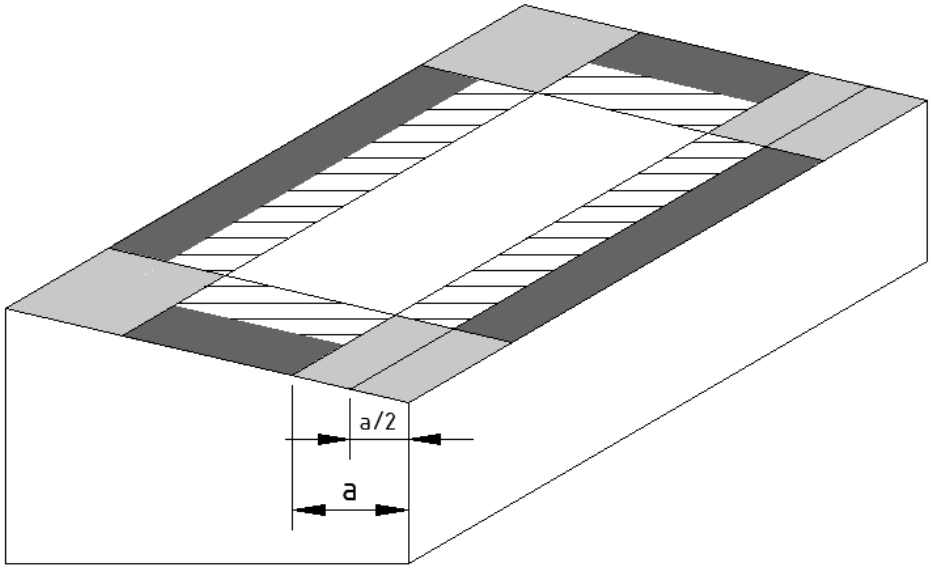
Step 3. The lowest value on Step 2, equates to a.



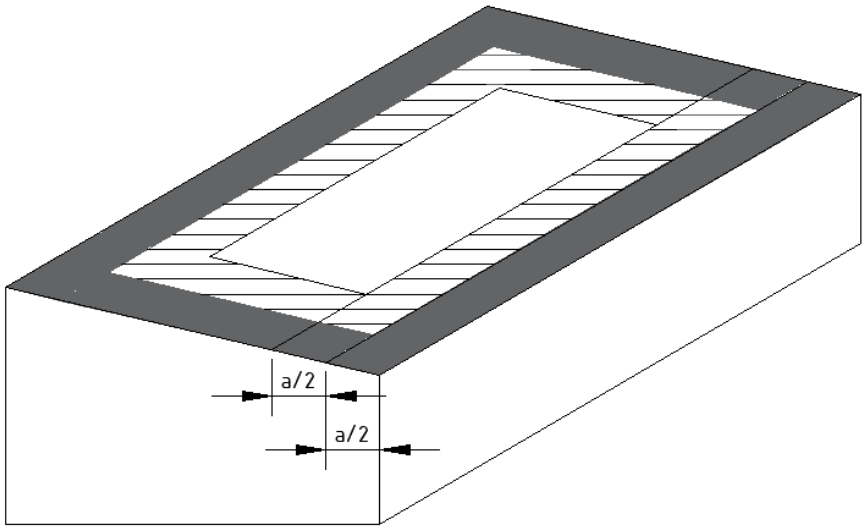
Roof Pitch < 10°



Roof Pitch ≥ 10°



Flat/Mono – Slope Roof < 10°



Legend:

Flat/Mono – Slope Roof ≥ 10°

Internal Zone

Intermediate Zone

Edge Zone

Corner Zone

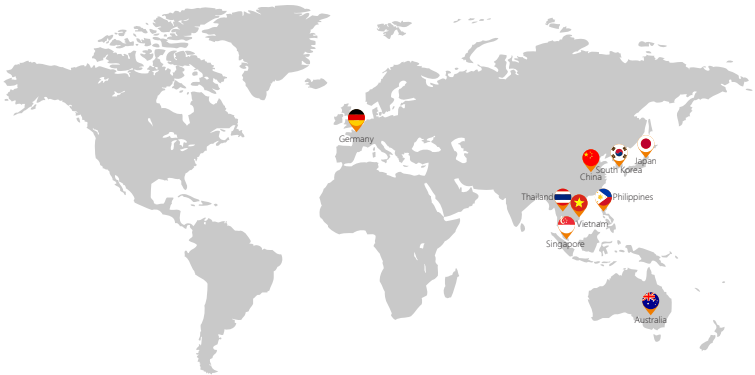
Note 20. Zone reduction factors to be the following:

- **Internal:** Use the same table spacings as central zone.
- **Intermediate:** Divide central zone spacings by 1.5.
- **Edge:** Divide central zone spacings by 2.
- **Corner:** Divide central zone spacings by 3.

Example when building parameters fall outside section D6 of the AS/NZS 1170.2:2011 (R2016) standard.

- Wind Region A
- Terrain Category: 3
- Building height: 5m
- Roof pitch: less than 10°
- Roof Sheet: Lysaght Klip-lok 700 Classic
- Panel dimension: 2 m x 1 m
- Installation on intermediate zone
- Central spacing from the table above: 1624 mm
- Spacing calculated for intermediate zone: 1083 mm

Worldwide Network



10 Year Warranty*

Clenergy PV-ezRack®SolarRoof™ Klip-Lok Interface V3.0 202004

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