

# PV-ezRack®

By Clenergy 

## PostMount 4-A for XL Panels Installation Guide

Code-Compliant Planning and Installation Guide V1.1

Complying with AS/NZS1170.2: 2011 ADMT 4-2016



## 1. Introduction

Clenergy PV-ezRack® PostMount 4-A for XL Panels (up to 2100 x 1100 mm) is a ground mounting system suitable for large scale commercial and utility scale installations. PV-ezRack® PostMount 4-A for XL Panels has been developed to fit any PV module in the outdoors and uneven ground areas. PV-ezRack® PostMount 4-A for XL Panels have good compatibility for the different region via the angle adjustment (10°~60°). Using high quality engineered components PostMount 4-A for XL Panels saves developers and installers, time and money when delivering large scale projects.

Please review this manual thoroughly before installing PostMount 4-A for XL Panels. This manual provides the following contents:

- (1) Installation planning;
- (2) Installation instructions.

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The PV-ezRack® PostMount 4-A for XL Panels parts, when installed in accordance with this guide, will be structurally adequate and meet the AS/NZS1170.2:2011 Admt 4-2016 standard. During installation, and especially when working on the ground, please comply with the appropriate occupational health and safety regulations. Please also pay attention to other relevant regulations in your local region. Please check that you are using the latest version of the installation manual by contacting Clenergy via email on [www.clenergy.com.cn](mailto:www.clenergy.com.cn) or contacting your local distributor.

### 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;
- 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, including providing adequate earth bonding of the PV array and PV-ezRack® PostMount components as required in AS/NZS 5033-2014 ADMT 2 2-2018.

# Tools & Components

## 2. Tools & Components

### 2.1 Tools

#### Tools



Allen Key 6 mm



Spanner



Torque Wrench



5m Tape

### 2.2 Components

#### Components



**C-U/30/46-G**  
Universal Clampx18



**ER-R-ECO/2100**  
ECO Rail, length  
2100mmx6



**ER-P-152/3000**  
Pipex1



**SC-PM2/3/4/A**  
Steel Capx1



**ER-RT-100**  
Adjustable Tubex1



**ER-RT-100**  
Rectangular Tube-  
Masterx1



**AB-75/45/550-LP**  
Angle Bracketx6

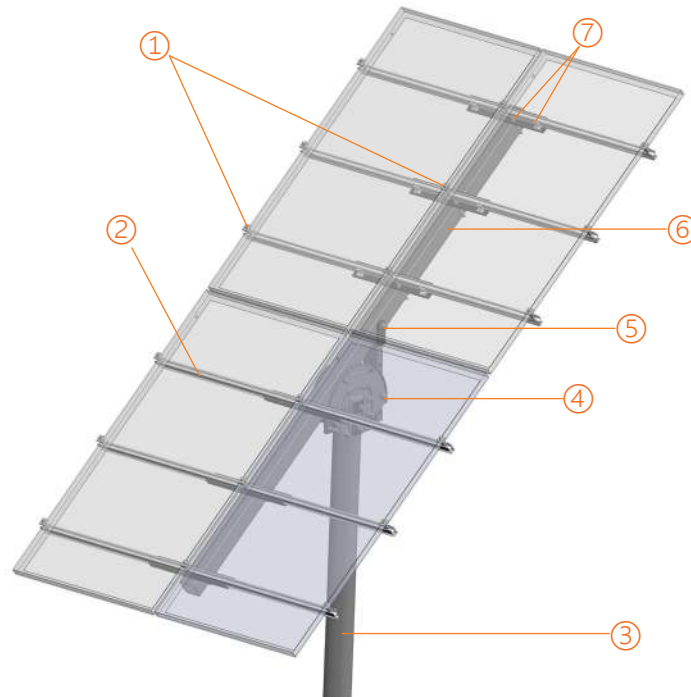


**EZ-GL-ST**  
Grounding Lugx4

# System Overview

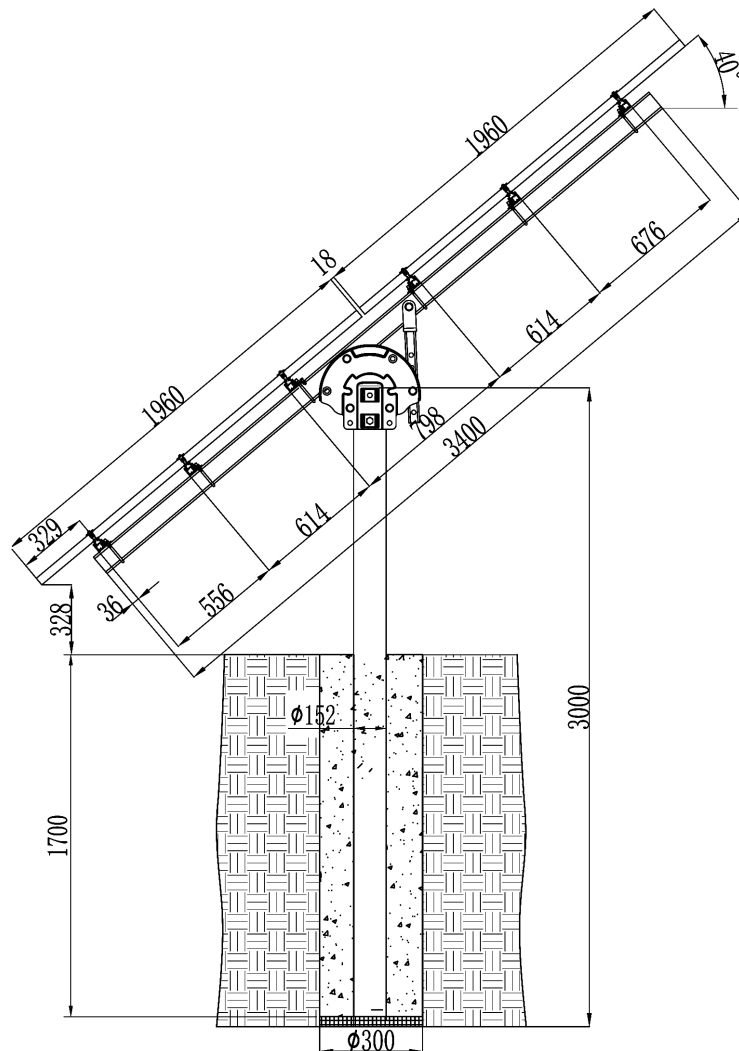
## 3. System Overview

### 3.1 Overview of PV-ezRack®



- ① Universal Clamp
- ② ECO Rail
- ③ Pipe
- ④ Steel Cap Assembly
- ⑤ Adjustable Tube
- ⑥ Rectangular Tube-Master
- ⑦ Angle Bracket

**Side view drawing of PV-ezRack® PostMount 4-A for XL Panels is shown below. The panels tilt angle and embedment depth below are for reference only. Please refer to Certificate Letter to obtain the certified max panels tilt angle and min embedment depth for different wind regions and different soil types.**



### 3.2 Precautionary Measures for Stainless-Steel Fastener Installation

Improper operation may lead to the deadlock of bolts and nuts. Follow the steps below to reduce this risk.

#### 3.2.1 Reduce the friction coefficient

- (1) Ensure that the thread surface is clean (no dirt or contaminant).
- (2) Apply lubricant (grease or 40# engine oil) to fasteners prior to tightening to avoid galling or seizing in the threads.

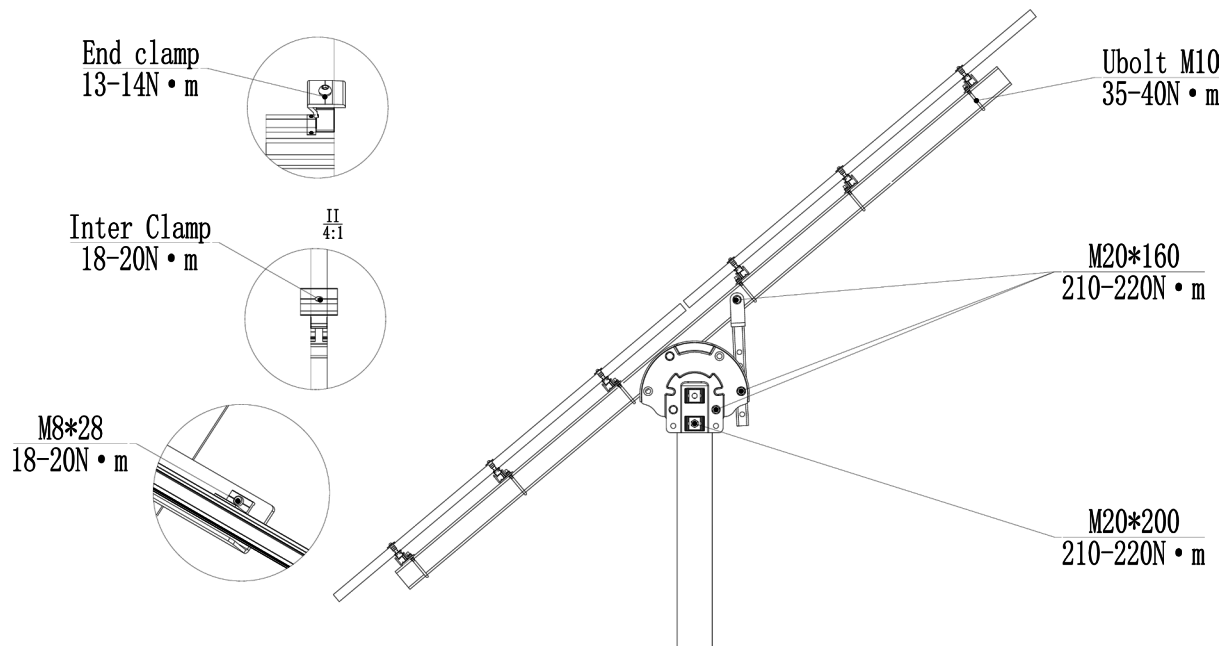
# System Overview

## 3.2.2 General installation instructions

- (1) Apply force to fasteners in the direction of thread.
- (2) Apply force uniformly to maintain required torque.
- (3) Professional tools and tool belts are recommended.
- (4) Avoid using electric tools for final tightening.
- (5) Avoid working at high temperatures.

## 3.2.3 Safe Torques

Please refer to safe torques defined in this guide as shown in the figure below. If 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, please make sure that there is no load on the fastener before you cut it. Avoid damaging the anodized or galvanized surfaces.



## 3.3 Installation Dimensions

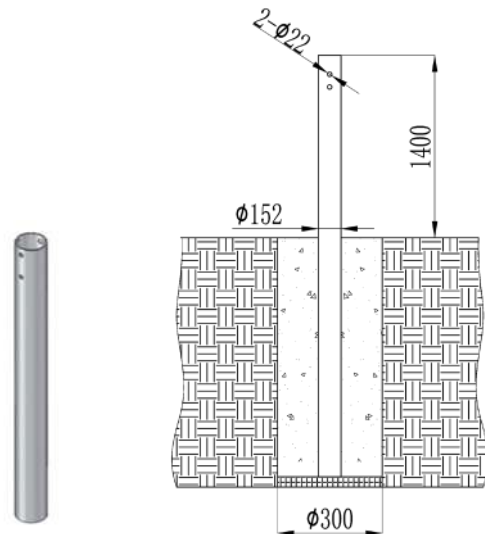
All drawings and dimensions in this installation guide are for generic reference. The PV-ezRack® PostMount 4-A for XL Panels is to be optimized to suit specific conditions for each project and documented in engineering drawings. As a result, major components of the PV-ezRack® PostMount 4-A for XL Panels may be provided in sectional sizes and lengths that vary from those shown in this guide. The installation operations detailed in this instruction guide remain the same regardless of the component size. In case you need to do any on-site modifications or alteration of the system in a way that would be different from engineering drawings, please provide marked up drawings/sketches for Clenergy's review prior to modification for comment and approval.

## 4. Installation Instruction

### 4.1 Pipe Installation

Dig a hole with the diameter of 300mm.

Place the pipe into the middle of the hole and fill it with concrete. Maintain the position of the pipe. The allowed vertical tolerance is  $\pm 2^\circ$ . Keep the axle of the 2-  $\varnothing 22$  holes parallel to East-West; keep the vertical angle deviation within  $\pm 5^\circ$ . For more than one system on one site maintain all the axles of 2-  $\varnothing 22$  holes aligned.



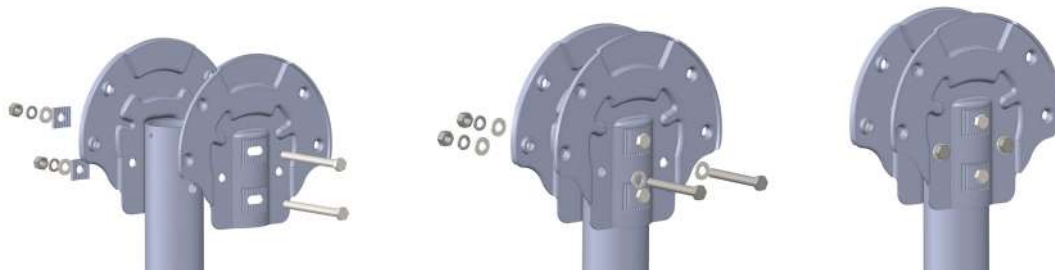
### 4.2 Steel Cap Installation

Connect the Pipe to the corrugated washer and Steel Cap Assembly with M20\*210 hexagonal bolt, washer 20, Hexagon nut M20 .

Combine two Steel Caps with M20\*210 hexagonal bolt, washer 20, Hexagon nut M20.

#### Note:

1. Do not fasten the M20 Bolt prior to complete the assembly of PM-A Rectangular Tube-Master.
2. Keep all the Bolt head aligned.



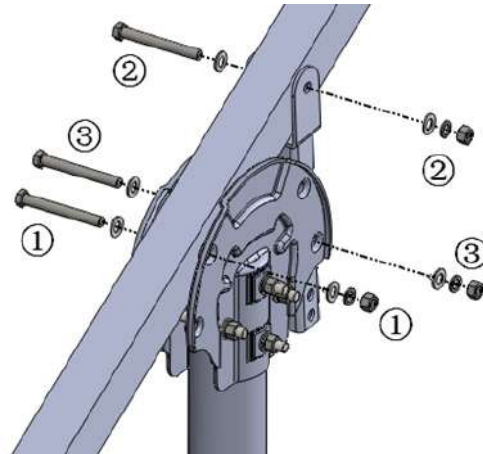
## 4.3 Rectangular Tube-Master and Adjustable Tube Installation

4.3.1 Fix the Rectangular Tube-Master at Steel Cap Assembly with M20\*160 hex bolt, M20 nut, plain washer 20, and spring washer 20. See the mark ① .

4.3.2 Fix the Adjustable Tube at Rectangular Tube-Master with M20\*160 hex bolt , plain washer 20, and spring washer 20 M20 nut. See the mark ② .

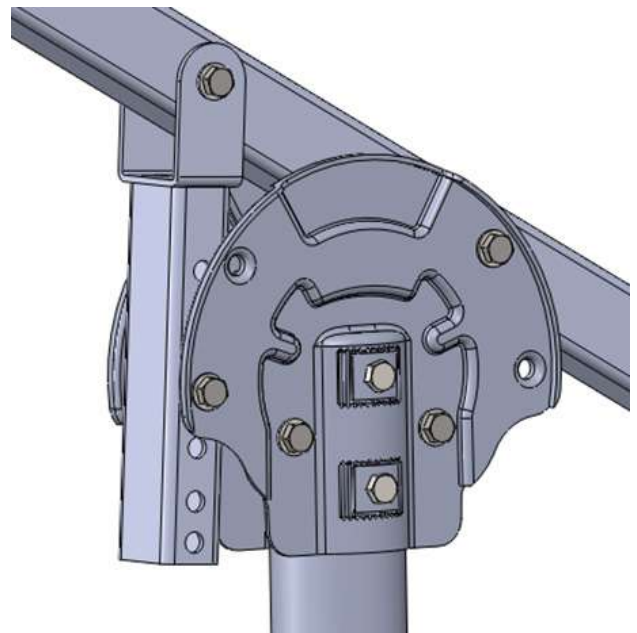
4.3.3 Fix the Adjustable Tube at Steel Cap Assembly with M20\*160 hex bolt, M20 nut, plain washer 20, and spring washer 20. See the mark ③ .

Realized the angle adjustment by position the bolt in the different holes.



4.3.4 Fasten the Steel Cap Assembly to Pipe with M20\*210, M20\*160 Hex Bolt, keep the Rectangular Tube-Master parallel to the south-north by adjust the Steel Cap Assembly.

Recommended torque for M20 bolts is 210~220 N·m.



### Note:

1. Adjust the angle of the allation, the angle of the Rectangular Tube-Master with 10° (6 holes from up to bottom corresponds to 10° to 60° tilt angle) in order to make the assembly process run smooth.
2. Using the adjustable washer to avoid the gap between the Rectangular Tube-Master and the Adjustable Tube.

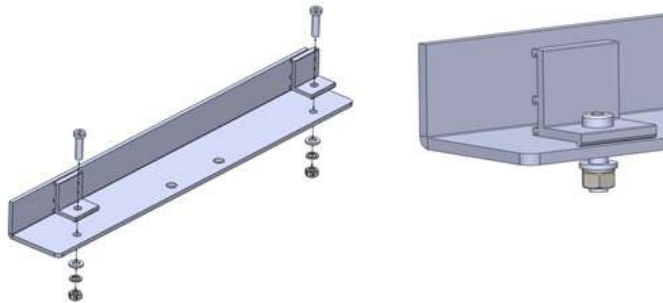
**Unreliable connection is forbidden.**



## 4.4 Angle Bracket Installation

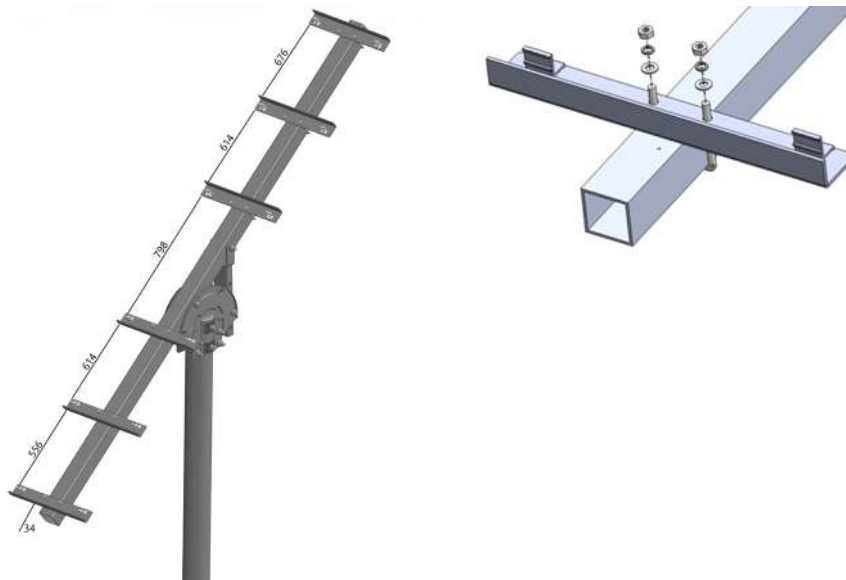
4.4.1 Preassemble the Cross Connection Clamp at the Angle Bracket with 2 pcs M8\*28 Hex Bolt, 2 pcs plain washer, 2 pcs Washer 8, 2 pcs Hexagon nut M8 as shown in the figure below.

**Note: Do not tighten the nut in order to make ECO Rail well.**



4.4.2 Connect the Angle Bracket to Rectangular Tube-Master with 6 pcs U bolts, 12 pcs M10 nuts, 12 pcs spring washer 10, 12 pcs plain washer 10 as shown in the figure below.

**Note: Do not tighten the nut until all the Angle Bracket aligned.**



## 4.5 ECO Rail Installation

Uplift the Cross Connection Clamp in the certain angle. Click the Clamp into the ECO Rail. Position the Rail in the middle of the Rectangular Tube-Master, and then fasten the M8\*28 bolt.

Recommended torque for M8 bolts is 18~20 N·m.

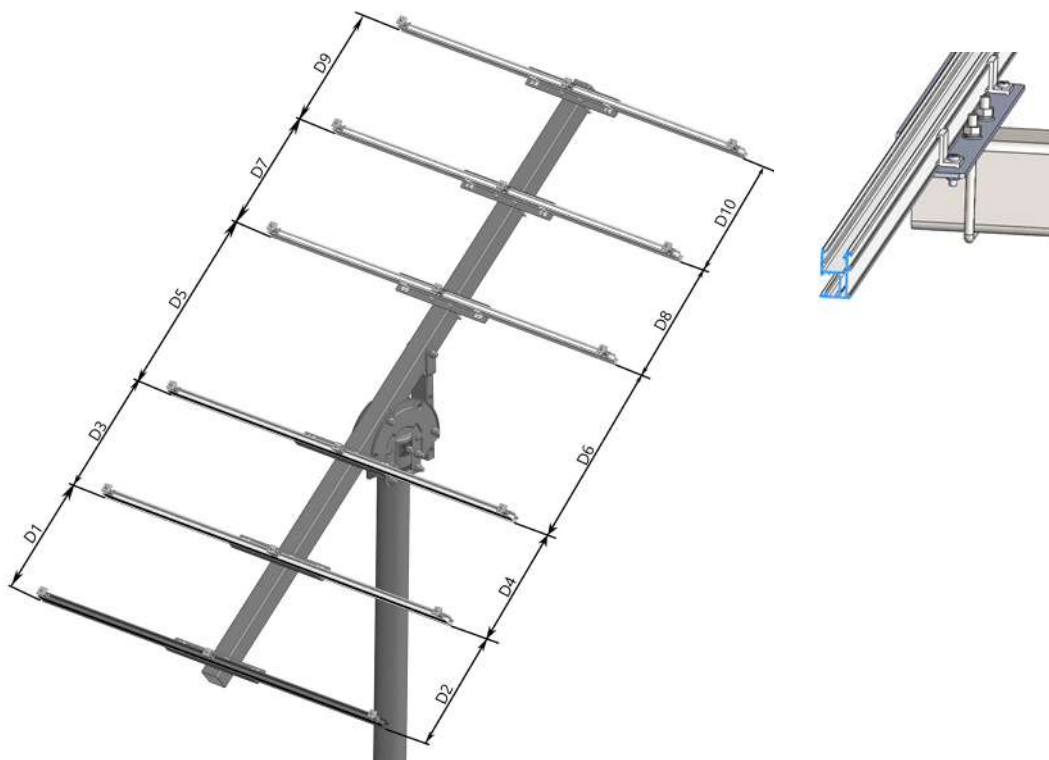
Adjust the Rectangular Tube- Landscapes until the dimension  $D1=D2; D3=D4; D5=D6; D7=D8; D9=D10$ . Fasten the U bolt.

Recommended torque for M10 bolts is 35~40 N·m

**Note:** ECO Rail of 2100mm is a standard length in this system, which can be suitable for up to 1002 mm wide panel. If the panels are over 1002 mm (less than 1100 mm) wide, the required minimum rail length is:

**(panel width-1002)\*2+2100 (mm).**

For example, panels are 1050 mm wide. The required minimum rail length is  $(1050-1002)*2+2100 = 2196$  mm. For convenience, the rail length is rounded up to 2200mm (multiple of 50 mm).

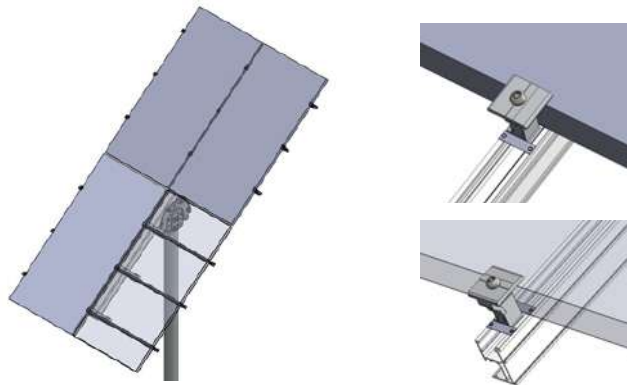


## 4.6 PV Module Installation

4.6.1 Fix the PV panel to ECO Rail, via Universal Inter Clamps and End Clamps step by step until all the panels complete.

Recommended torque for M8 bolts is 18~20 N·m

# Installation Instruction

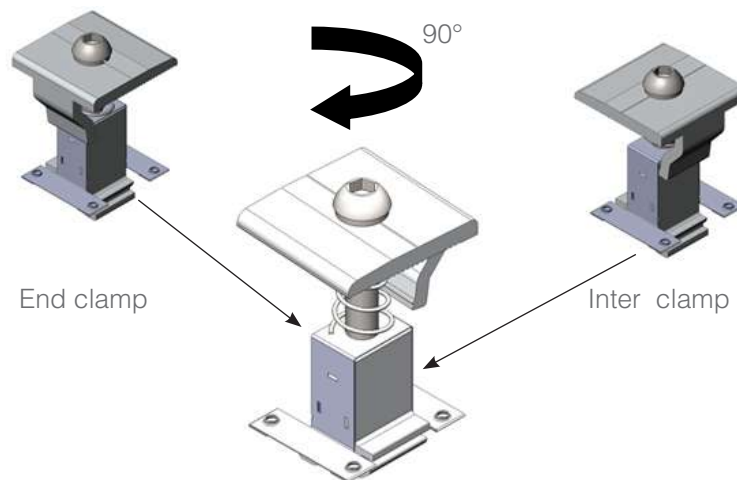


**Note: The Universal Clamp can be used both as a End Clamp and a Inter Clamp, and the height can be adjusted from 30 to 46 mm.**

When the side of the Universal Clamp close the narrow side of the Universal Clamp Buckle, it can be used as End Clamp, and when the side of the Universal Clamp close the wide side of the Universal Clamp Buckle, it can be used as Inter Clamp, as shown in the figure on the right. The Universal Clamp can be directly rotated to the position of required End or Inter Clamp.

Recommended torque for M8 bolts when it is Inter Clamp is 18~20 N·m

Recommended torque for M8 bolts when it is End Clamp is 13~14 N·m

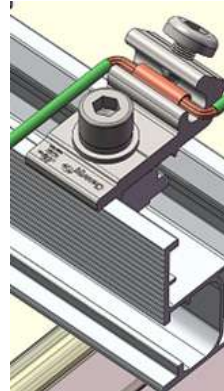


4.6.2 Apply one pre-assembled Grounding Lug per Rail. Click the Grounding Lug into to the rail channel and insert the Copper Wire. (the maximum size is 4 mm<sup>2</sup> or similar) Fasten the bolt M6\*14 with 5~6 N·m and the bolt M8\*25 with 16~20 N·m .Copper Pipe will be supplied for the case that using small size Copper Wire.

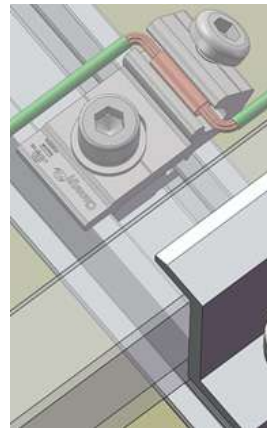
# Installation Instruction

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.



# Certification Letter



18<sup>th</sup> April 2019

Clenergy Australia  
1/10 Duerdin Street  
Clayton, VIC 3168

## Array Frame Engineering Certificate

### Postmount PM4-A/2100 Installation

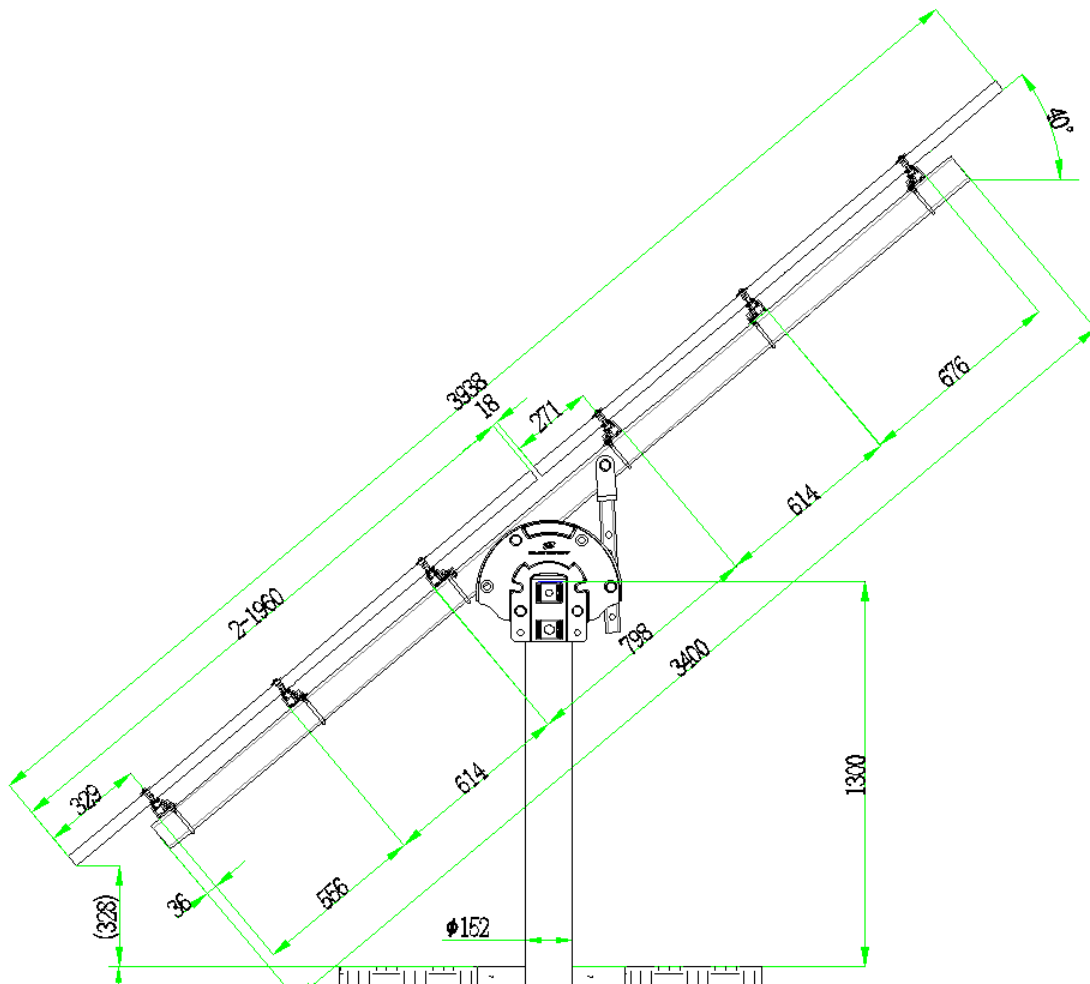
MW Engineering Melbourne Pty Ltd, being Structural Engineers within the meaning of Australian and NZ Building Regulations, have carried out a structural design check of the PV-ezRack Postmount PM4-A/2100 within Australia. The design check has been based on the information in the *PV-ezRack PM4-A/2100 Planning and Installation Guide* and schematic drawings of the system components, provided by Clenergy Australia.

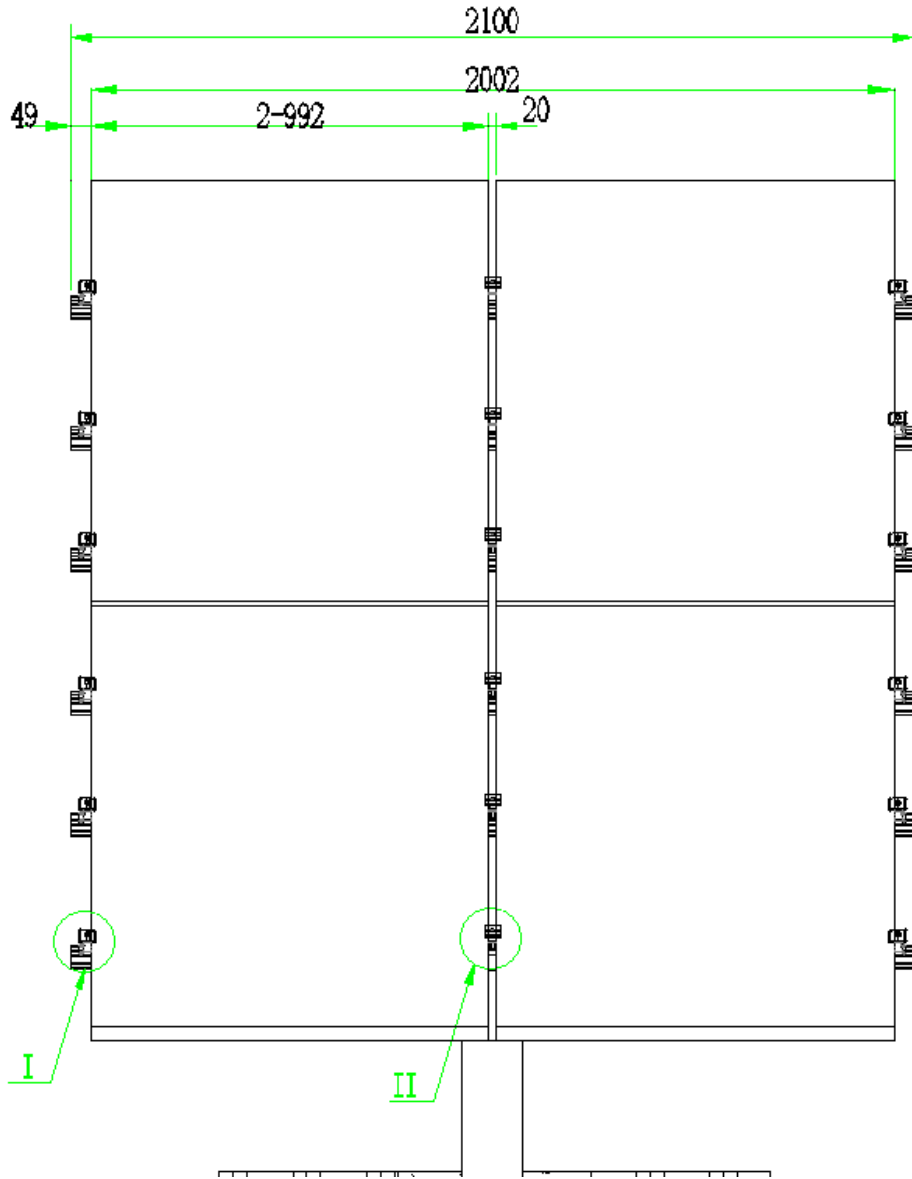
Part number	Description
ER-R-ECO/2100	PV-ezRack ECO Rail 2100mm
ER-RT-100/3400	PV-ezRack PM4, Rectangular Tube-Master 100*100*3400*T5
ER-RT-100/576	PV-ezRack (PM6-A,PM8-A), Adjustable Tube 100*50*576
ER-P-152/3000	PV-ezRack, Pipe $\phi$ 152*3000*T6
ER-SC-PM6/PM8	PV-ezRack PM6-A,PM8-A, Steel Cap Assembly
C-U/30/46-G	PV-ezRack, Universal Clamp for Frame Height 30-46mm with Grounding Clip

We find the Postmount PM4-A/2100 to be structurally sufficient for Australian and New Zealand use, based on the following conditions:

- Wind Loads to AS/NZ1170.2:2011, Amendment 4-2016:
  - Wind Terrain Category: 2;
  - Wind average recurrence interval of 100 years- For ultimate state, 25 years- service-ability;
  - Wind region A, B, C & D;
- Max Solar Panel Length 2.1m, width 1.1m;
- Yield Strength:

- Steel 300 MPa,
- Aluminium 240 MPa;
- Maximum tilt angle options: refer to tables;
- Dimension as shown here on the picture;







Maximum Tilt Angle Options

	<b>Wind Region</b>			
	<b>Region A</b>	<b>Region B</b>	<b>Region C</b>	<b>Region D</b>
Wind speed (m/s)	41	48	-	-
Maximum tilt angle (°)	30	20	-	-
<b>Soil Type</b>	<b>Post Embedded in concrete pier: 300 mm diameter concrete piers minimum depth (m)</b>			
<b>Hard class soil</b> [Gravels; dry (hard) clays]	1.15	1.07	-	-
<b>Very Firm class soil</b> [Dry (Stiff) clays; clayey sands; coarse sands; compact sands]	1.22	1.13	-	-
<b>Firm class soil</b> [Damp clays; sandy clays; damp sands]	-	1.25	-	-
<b>Soft class soil</b> [wet clays; silty loams; wet loose sands]	-	1.60	-	-

Notes:

1. Terrain Category 2 (TC2) refers to open terrain, including grassland, with well-scattered obstructions having heights generally from 1.5m to 5m, with no more than two obstructions per hectare. This certificate will only cover Postmount PM4-A/2100 installed on TC2.
2. Panel weight calculated: 28kg
3. Solar Panels structural check by others.
4. Other piers dimensions are possible, contact Clenergy, if required.
5. For concrete pier foundations, use 25Mpa strength concrete (minimum).
6. The scope of this certification is for projects located at a maximum altitude of 100m above sea level. No snow loads have been assessed.
7. If depth of footing is less than length of post below ground (embedment depth of post) the post must be cut to suit the new level.



REF: CL-10129-S  
Internal REF: 00142

8. Footing depths are for reference only. The characteristics of the soil must be checked on site by a technical expert. A soil report assessment is always recommended and Clenergy must be informed on the outcome of the soil report.

Construction is to be carried out strictly on accordance with the instruction manual. This work was designed in accordance with the provisions of Australian Building Regulations and in accordance with sound, widely accepted engineering principles.

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

Best Regards,

A handwritten signature in black ink, appearing to be "AA" or similar initials, written in a cursive style.

Alberto Escobar  
Civil/Structural Engineer  
**BEng MIEAust NER**  
BRP EC 46542  
RPEQ 18759  
[info@mwengineering.melbourne](mailto:info@mwengineering.melbourne)

# 10 Year Product Warranty



As the manufacturer of quality solar mounting systems, Clenergy Australia provides a warranty for all PV-ezRack® products it supplies in Australia and New Zealand ("Products"). The warranty provided by Clenergy Australia is subject to the conditions contained in this document ("Warranty"). No other warranty provision implied or otherwise is to be assumed. Your Warranty coverage is in accordance with this document.

### Product Warranty Table for Installations in Corrosivity Category 1, 2, 3, 4 and 5 (ISO 9223)

# Product	Material	Standard or Customized Product	Product Warranty			
			Corrosivity Category 1, 2 and 3	Corrosivity Category 4	Corrosivity Category 5	
1	Aluminium Components	6005CL-T5 mill finish	Standard	10 years	10 years*	10 years*
		6005-T5 anodized to 10 microns	Standard	10 years	10 years*	10 years*
		6005-T5 anodized to 15 microns	Customized	10 years	10 years	10 years*
		6005-T5 anodized to 20 microns	Customized	10 years	10 years	10 years
2	Galvanized Steel Components	Galvanized Steel at 85 microns in average	Standard	10 years	10 years	Not warranted
3	Stainless Steel Components	SUS304	Standard	10 years	10 years	10 years
4	Fasteners (bolts/nuts/washers)	SUS304	Standard	10 years	10 years	10 years
		SUS316	Customized	10 years	10 years	10 years
5	Buildex Screws for Tile Interface	Carbon Steel SAE 1022 with Climaseal 3 Finish	Standard	10 years	10 years**	10 years**
6	Buildex Screws for Tin Interface	Carbon Steel SAE 1022 with Climaseal 3 Finish	Standard	10 years	Not warranted	

\* Subject to interface spacing reduction as advised by Clenergy Australia. Please contact us for more details.

\*\*The screws under tile interface are assumed to be installed a category 1, 2 or 3 micro-climate within the roof structure.

#### Warranty Scope:

Your solar mounting Product has been manufactured to high standards, however, should any manufacturing defect arise, please contact Clenergy Australia. We will arrange for an inspection of the affected Product(s) to determine the extent of the problem.

Details are provided below as to the extent of your Warranty coverage and any exclusions that may apply. Please read these provisions carefully to ensure you receive the appropriate assistance and support in a timely manner. Please also contact Clenergy Australia if any part of this Warranty is unclear, or you wish to discuss your rights and remedies under this Warranty.

If your Product fails during the Warranty periods set out in the Warranty table above due to a defect in:

- (a) materials and/or workmanship on and from the date of the Product's delivery; or
- (b) structural integrity on and from the date of the Product's installation,

Clenergy Australia will at its election either repair or resupply the defective Product provided that:

- The Product was installed correctly by a Clean Energy Council ("CEC") accredited or equivalent accreditation installer, following the Clenergy installation manual provided at time of purchase.
- The Product has been maintained correctly in accordance with section "Care of your Product" below.

#### Warranty Conditions:

- Any and all costs for repair or replacement outside the Warranty period are the responsibility of the customer.
- Where Clenergy attends a site and finds that the Product is not faulty, the costs for the visit will be payable by the customer.
- Defective Products shall be uninstalled and/or reinstalled at the customer's expense and risk.
- Under certain conditions, the Warranty can be extended to more than 10 years at an extra cost, available upon request.

#### Warranty Exclusions:

- Product finish (natural surface oxidation) or any natural impairment or surface corrosion that does not compromise the structural integrity.
- Products sold or installed outside of Australia and New Zealand unless approved previously in writing by Clenergy Australia.
- Damage caused by transport, mishandling, incorrect storage, improper loading or willful conduct.
- Any Product not correctly installed in accordance with our installation manual, or any specific design instruction or special conditions as advised by Clenergy Australia.
- Damage caused by the Product being modified in any way unless previously agreed to in writing by Clenergy Australia.
- The use of the Product for purposes other than the mounting of PV solar panels.
- Installations where the environment is excluded in the "Products Warranty Table" above, and for galvanized steel ground system Products, where the pH level is outside the range of 6-8, unless agreed to in writing by Clenergy Australia prior to installation.

- Damage caused by extreme weather conditions or any other natural or man-made event outside of our control.
- Damage caused by attachments not designed or approved for connection to the Product.
- Damage caused by lightning strikes or excessive currents through the earthing/grounding clamps, clips or lugs.

Our Products may come with guarantees that cannot be excluded under the Australian Consumer Law. You may be entitled under statute to a replacement or refund for a major defect in the Products. You may also be entitled under statute to have the products repaired for any defect which does not amount to a major defect. The benefits given by this Warranty are in addition to any statutory rights and remedies you may have under Australian law.

### Product Care:

Clenergy Products are designed to be durable with minimal care, however it is important that you maintain your mounting Product in accordance with proper practices. This includes regular maintenance and inspection to avoid damage.

The aluminum components are made from either AL 6005CL-T5 or AL6005-T5 and may also have a clear anodization. The aluminum may undergo some surface oxidization in service. Please note that this is normal and part of the natural ageing process. The result may even be beneficial to the longevity of the Product, as the oxidization can provide additional protection against degradation by pollution and atmospheric corrosion.

- The torque values of fastener connections on mounting system must be checked annually and corrected if needed in accordance with Clenergy Australia's installation manual.
- Regular cleaning to remove any soil or other possible contaminants must also be performed. Cleaning should be performed in accordance with guidelines recommended by the Galvanizers Association of Australia (GAA) (for Products supplied in Australia) or the Galvanizers Association of New Zealand (GANZ) (for Products supplied in New Zealand) or any other similar organisations (as applicable). 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.
- You should not use harsh chemicals or highly abrasive materials that may damage Product surfaces. Use only cleaners that are designed for aluminium and always wash them off with clean water afterwards. Steel components should be inspected before and after installation and any damage to the galvanizing should be treated immediately to prevent rusting. It is normal for galvanized Products to develop a surface barrier (the 'patina'), which helps to protect the surface from contaminants in the atmosphere and does not adversely affect the Product.
- You should also ensure that if the Product is stored prior to installing that it is not contaminated by contact with rusty items or other impurities such as dirt and chemicals. Should this occur, you must clean the Product and make any repairs using approved methods such as galvanized paint and antirust treatments immediately before installation.



## Innovating renewable energy

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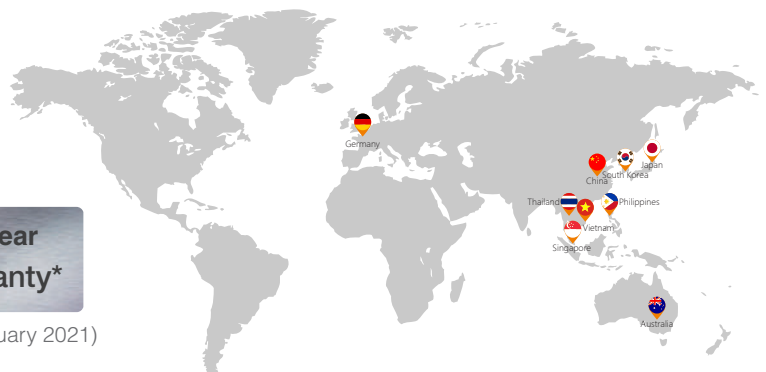
### Clenergy Vietnam

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## Worldwide Network



10 Year  
 Warranty\*

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