PV-ezRACK®

PostMount 8-A with ECO-Rail

Code-Compliant Planning and Installation Guide V 3.1
Complying with AS/NZS 1170.2: 2021

Last Updated - Jun. 2023

Introduction

List of contents

Clenergy PVezRack® PostMount 8-A is a ground mounting system suitable for large scale commercial and utility scale installations. PVezRack® PostMount 8-A has been developed to fit any PV module in the outdoors and uneven ground areas. PVezRack® PostMount 8-A have good compatibility for the different region via the angle adjustment (10°~60°). Using high quality engineered components PostMount 8-A saves developers and installers, time and money when deliveringlarge scale projects.

Please review this manual thoroughly before installing PostMount 8-A. This manual provides the following contents:

1) Installation planning; 2) Installation instructions.

The PVezRack® PostMount 8-A parts, when installed in accordance with this guide, will be structurally adequate and meet the AS/NZS 1170.2: 2021 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.au or contacting your local distributor.

Product Warranty:
Please refer PVezRack® Product Warranty on our website.

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 PVezRack® and other products are appropriate for the particular installation and the installation environment;
- Using only PVezRack® parts and installer supplied parts as specified by PVezRack® project plan (substitution of parts may void the warranty and invalidate the letter of certification);
- Recycling 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 PVezRack® PostMount components as required in AS/NZS 5033: 2021.

Tools and Components

Tools

Allen Key 6 mm

Spanner

Torque Wrench

5m Tape

Components

ER-R-ECO/2400
ECO-Rail x 12

ER-RT-100/2900
PM6-A Rectangular Tube-Master x 1

ER-RT-70/2600
PM6-A&PM8-A Rectangular TubeLandscape x 3

ER-P-152/3000
Pipe x 1

ER-SC-PM6/PM8
PM6-A, PM8-A Steel Cap Assembly x 1

ER-RT-100/576
PM6-A, PM8-A Adjustable Tube x 1

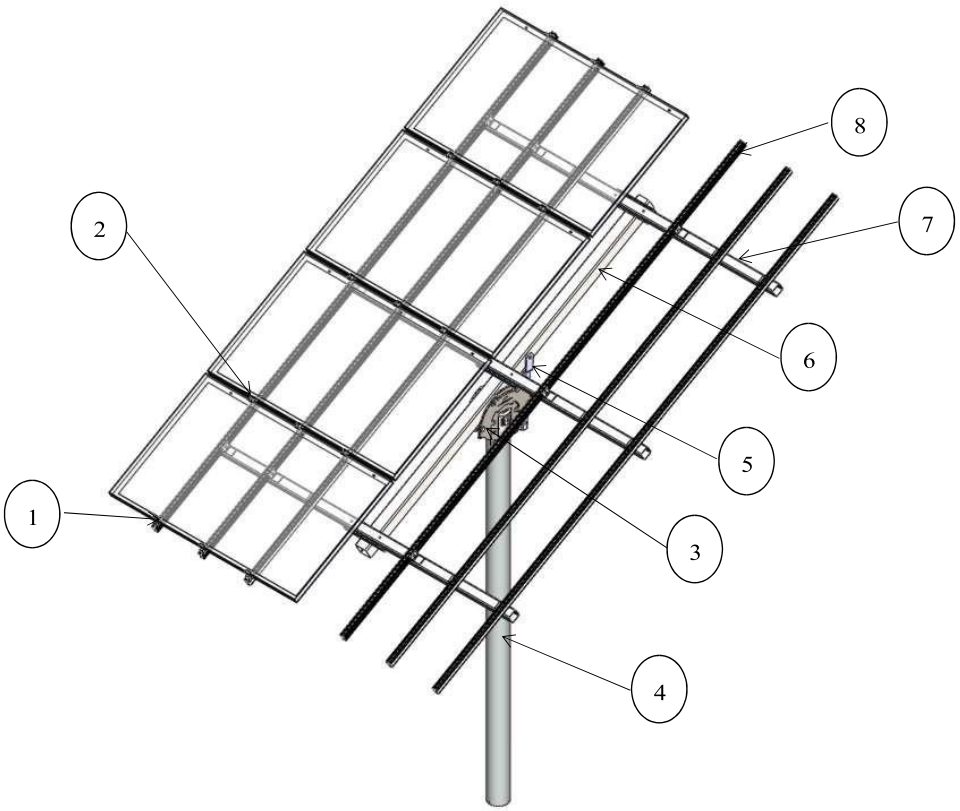
Akashi Clamps x 30

Rail Splice x 6

- Tools and Components -

System Overview

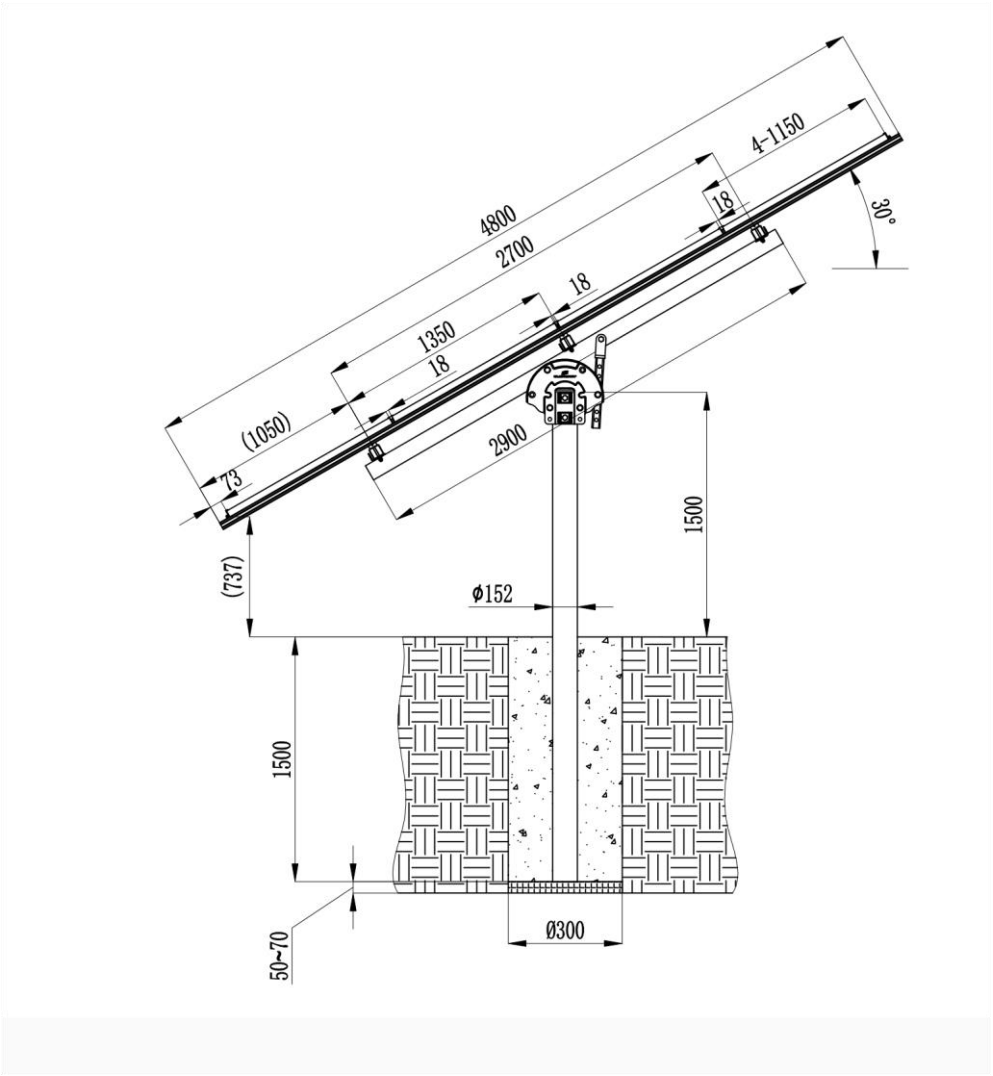
1. PostMount 8-A



1. Akashi Clamp **2**. Akashi Clamp **3**. Steel Cap Assembly **4**. PM8-A Pole **5**. Adjustable Tube

6. Rectangular Tube-Master **7**. Rectangular Tube-Landscape **8**. ECO-Rail

Side view drawing of PVezRack® PostMount 8-A 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.



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.

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.

General installation instructions

(1) Apply force to fasteners in the direction of thread.

(2) Apply force uniformly to maintain required torque.

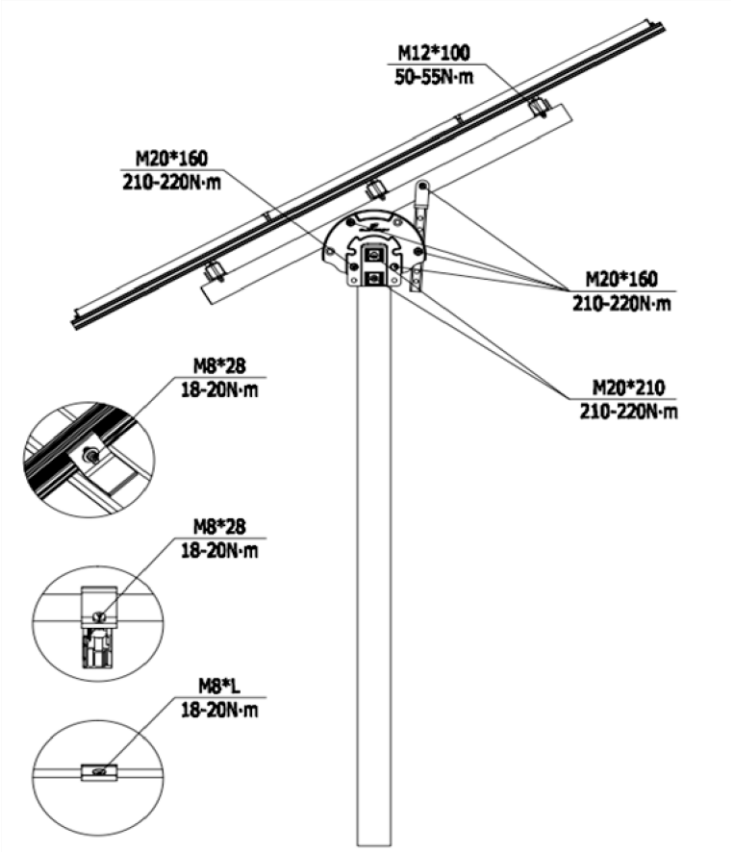
(3) Professional tools and tool belts are recommended.

(4) Avoid using electric tools for final tightening.

(5) Avoid working at high temperatures.

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. Installation Dimensions

All drawings and dimensions in this installation guide are for generic reference. The PVezRack® PostMount 8-A is to be optimized to suit specific conditions for each project and documented in engineering drawings. As a result, major components of the PVezRack® PostMount 8-A 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.

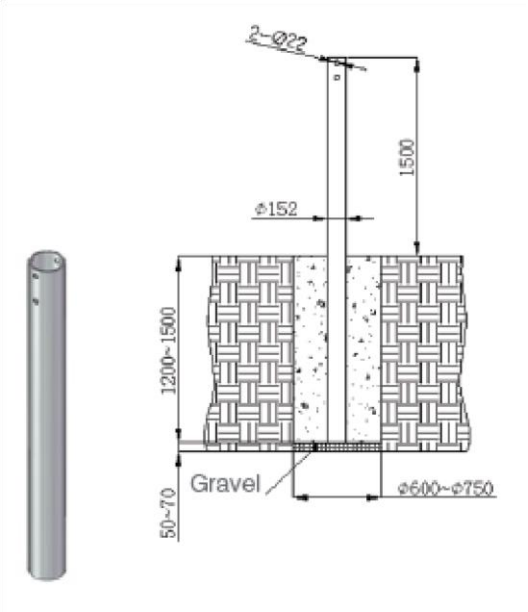
- System Overview -

Installation Instruction

1. Pipe Installation

Dig a hole with the diameter of 300mm .

Place the pole into the middle of the hole and fill it with concrete (min 25 MPa strength). Maintain the position of the post. The allowed vertical tolerance is ±2°. Keep the axle of the 2- Ø22 holes parallel to East-West; keep the vertical angle deviation within ±5°. For more than one system on one site maintain all the axles of 2- Ø22 holes aligned.

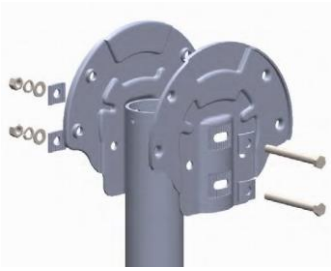


2. Steel Cap Installation

Connect the Pipe to the corrugated washer and Steel Cap Assembly with M20*210 hexagonal bolt, spring washer 20, M20 nut .
Combine two Steel Caps with M20*160 hexagonal bolt, spring washer 20, M20 hex nut.

Note:

1. **Do not fasten the Bolt prior to complete the assembly of PM8-A Rectangular Tube-Master.**
2. **Keep all the Bolt head aligned.**



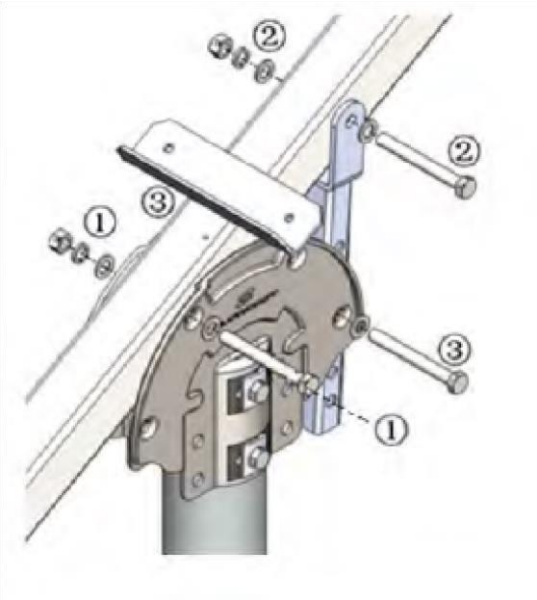
- Installation Instruction -

3. PM8-A Rectangular Tube-Master Installation

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).

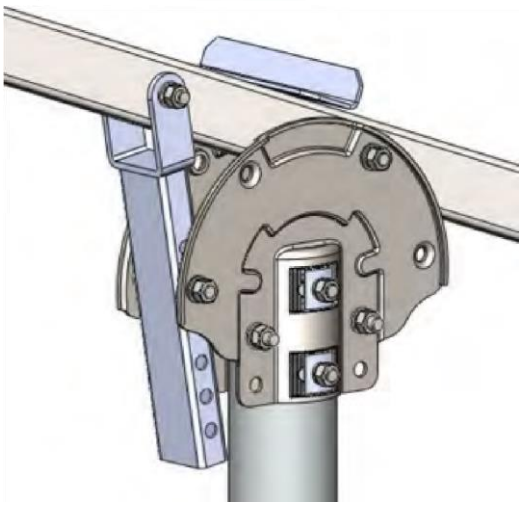
2) Fix the Adjustable Tube at Rectangular Tube-Master with M20*160 hex bolt, plain washer 20, and spring washer 20, M20 nut. See the mark (2).

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 differrent holes.

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.

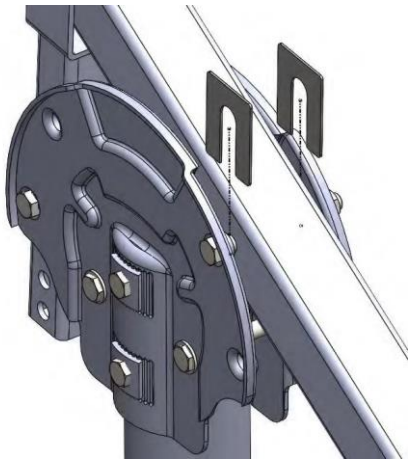


Recommended torque for M20 bolts is 210~220 N·m.

Note:

1) Adjust the angle of the allation, the angle of the Rectangular TubeMaster 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 adjustable washers to fill gaps between the Rectangular Tube-Master and the Adjustable Tube and Steel Cap. Image on the right shows adjustable washers inserting between the Rectangular Tube-Master and Steel Cap.



- Installation Instruction -

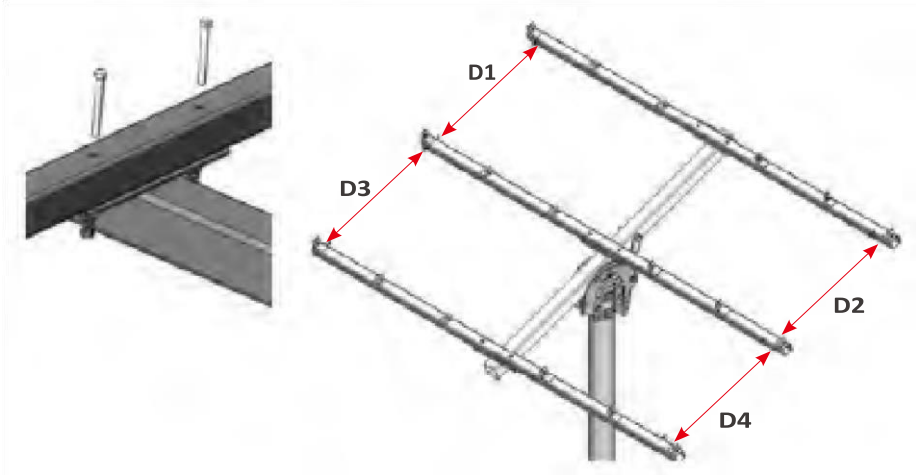
4. Rectangular Tube-Landscape Installation

Fix the 3pcs PM8-A Rectangular Tube-Landscapes at Rectangular Tube-Master on pre-welded L profile angle bracket with 2pcs M12*100 hex bolts, 2pcs M12 nuts , 2pcs plain washers 12 and 2pcs spring washers 12. Do not fasten the Nut until 3 Rectangular Tube-Landscapes aligned.

Note:

Adjust the Rectangular Tube- Landscapes until the dimension D1=D2=D3=D4.

Recommended torque for M12 bolts is 50~55 N·m



5. ECO-Rail Installation

Join 2 x 2400mm ECO rails to make 1 x 4800mm ECO rail with ECO rail splice provided, repeat until you have 6 x 4800mm rails

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 as shown in Figure 11 and 12.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 for M8 bolts is 10~12 N·m

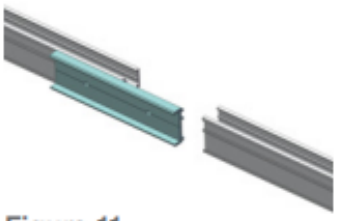


Figure 11

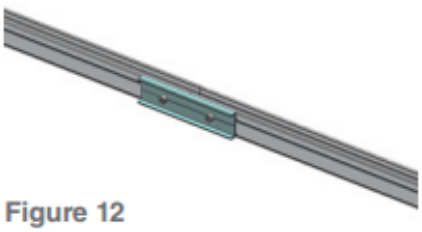


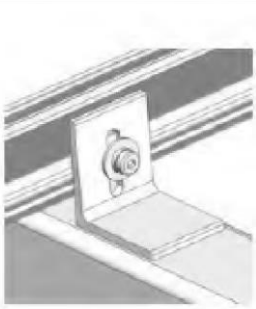
Figure 12

Fix the ECO-Rail to Rectangular Tube-Master with M8*20 hex socket bolt, Z module, Spring washer 8, Washer 8.

Note:

Make sure that the rail ends align horizontally and that the rails are parallel to each other.

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



- Installation Instruction -

6. PV Module Installation

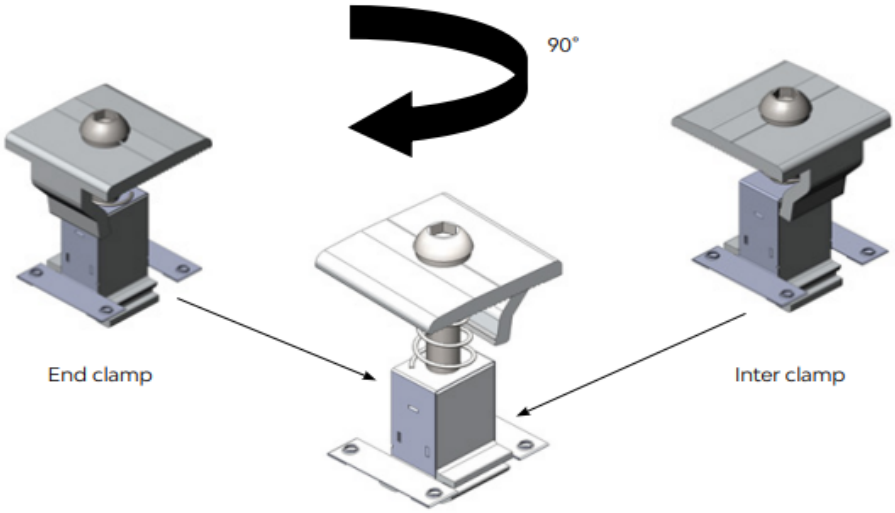
Fix the PV panel to Rail, via Akashi Clamps step by step until all the panels complete.

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

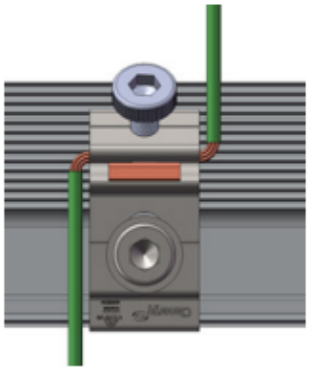
When the side of the Akashi Clamp close the narrow side of the Akashi Clamp Buckle, it can be used as End Clamp, and when the side of the Akashi Clamp close the wide side of the Akashi Clamp Buckle, it can be used as Inter Clamp, as shown in the figure on the right. The Akashi Clamp can be directly rotated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



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



Certification

MW Engineering

REF: CL-825-S-REV1
Internal REF: 00569

25 May 2023

Client: **Clenergy Australia**
1/10 Duerdin Street
Clayton, VIC 3168

Array Frame Engineering Certificate

Postmount PM8-A 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 PM8-A within Australia. The design check has been based on the information in the *PV-ezRack PM8-A Planning and Installation Guide* and schematic drawings of the system components, provided by Clenergy Australia.

Part Number	Part Number (sub-component)	Item Description
ER-R-ECO/XXXX		PV-ezRack ECO Rail, length XXXX
R-ECO/XXXX/AUMF		PV-ezRack Australian Made Mill Finish ECO Rail, length XXXX
ER-SP-ECO		PV-ezRack Splice for ECO-Rail
ER-EC-STXX		PV-ezRack End Clamp - Standard XX
ER-IC-STXX		PV-ezRack Inter Clamp - Standard XX
ER-RT/SC/AP-PM8A	ER-RT-70/2600	PV-ezRack PM6-A&PM8-A, Rectangular Tube-Landscape 70*70*2600mm
	ER-RT-100/2900	PV-ezRack PM8-A, Rectangular Tube-Master 100*100*2900mm
	ER-RT-100/576	PV-ezRack Postmount 6-A&8-A, Adjustable Tube 100*50*576mm
	ER-SC-PM6/PM8	PV-ezRack PM6-A, PM8-A, Steel Cap Assembly
	ER-AP-PM6/8/A	PV-ezRack PM6-A&PM8-A, Accessory Package
	EZ-GL-ST/UC	PV-ezRack Grounding Lug, with Clenergy Logo, with U-Shape Copper Channel
	EZ-GC-ST	PV-ezRack Grounding Clip, with Clenergy Logo
ER-P-152/3000		PV-ezRack, Pipe Ø152*3000mm
C-U/30/46-G		PV-ezRack, Akashi Clamp for Frame Height 30-46mm with Grounding Clip
C-U/30/46		PV-ezRack, Akashi Clamp for Frame Height 30-46mm

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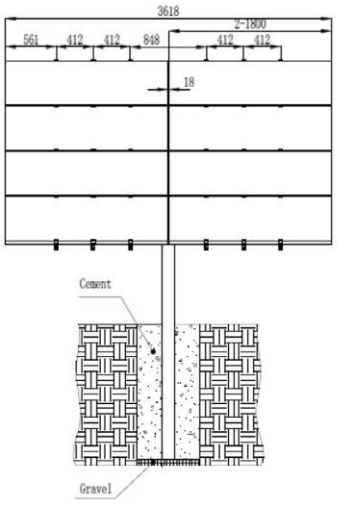
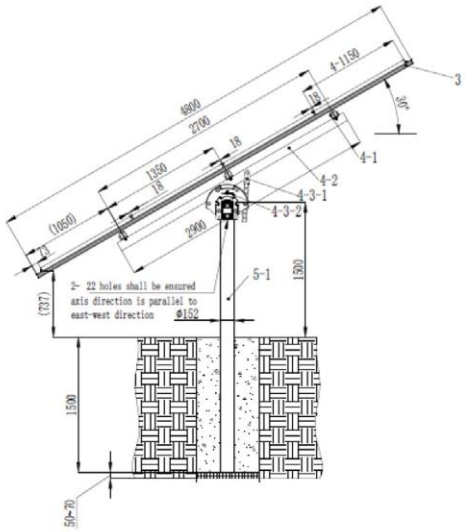
We find the PM8-A to be structurally sufficient for Australian use, based on the following conditions:

- Wind Loads to AS/NZ1170.2:2021:
  - Design life: 25 years
  - Wind Terrain Category: 2;
  - Wind average recurrence interval of 100 years- for ultimate state, 25 years- service-ability;
  - Wind region A, B1, and B2;
- Max Solar Panel Length 1.8m, width 1.15m;
- Panel weight calculated: 23.8 kg
- Number of rails per panel: 3
- Yield Strength:
  - Steel: 300 MPa,
  - Aluminium: 240 MPa;
- Maximum tilt angle options: refer to tables;
- Dimensions as shown on the below picture;





Maximum Tilt Angle Options

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	Wind Region				
	Region A	**Region B1**	**Region B2**	**Region C**	**Region D**
Wind regional speed (m/s)	41	48	48	N/A	N/A
Maximum tilt angle (◦)	30	20	10	N/A	N/A
Soil Type	**Post Embedded in concrete pier: 300 mm diameter concrete piers minimum depth (m)**				
Hard or very dense soil [Gravels; dry (hard) clays]	1.45	1.50	1.53	N/A	N/A
Very Firm or dense soil [Dry (Stiff) clays; clayey sands; coarse sands; compact sands]	1.66	1.70	1.73	N/A	N/A
Firm or medium dense soil [Damp clays; sandy clays; damp sands]	1.88	1.91	1.95	N/A	N/A
Soft or loose soil [wet clays; silty clays and sands; silty loams; wet loose sands]	2.45	2.50	2.55	N/A	N/A

Notes:

1. The assessment is based on the capacity of the fixings and the solar array frame. This document does not include or certify the PV panel; however, both the panel weight and geometry have been considered when designing the array frame.
2. Clamping zone of the PV panels must be according to the manufacturer's specifications.
3. For Terrain Category (TC) definition, please refer to clause 4.2.1 of AS/NZS 1170.2:2021.
4. Wind Direction Multiplier (Md) taken as 1.0. Refer to clause 3.3 of AS/NZS 1170.2:2021 for more information.
5. Shielding Multiplier (Ms) taken as 1.0. Refer to clause 4.3 of AS/NZS 1170.2:2021 for more information.
6. Topographic Multiplier (Mt) taken as 1.0. Refer to clause 4.4 of AS/NZS 1170.2:2021 for more information.
7. This certificate cannot be used if the site is located on a hill, ridge or escarpment. Contact Clenergy if the aforementioned condition is met on site.
8. 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.
9. Contact Clenergy if pier dimeter requirements is different from 300 mm.

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10. Footing depths are for reference only.
11. For concrete pier foundations, use a minimum 25 Mpa concrete compressive strength should be used.
12. According to AS 1726.1993 (Geotechnical site investigations), the soil can be identified as per below table (*)

Soil Type	Soil Parameters			Visual Classification Based on texture	
	Bearing capacity Clays (kPa)	Bearing capacity Sands (kPa)	Field guide	Clay	Sand
Hard or very dense soil [Gravels; dry (hard) clays]	>200	>300	Can be indented with difficulty by thumb nail	Particles may be described as powdery, can be moulded, playdough texture.	Particles may be described as 'rounded', 'sub-rounded', 'sub-angular', or 'angular'.
Very Firm or dense soil [Dry (Stiff) clays; clayey sands; coarse sands; compact sands]	100-200	300	Can be indented by thumb nail		
Firm or medium dense soil [Damp clays; sandy clays; damp sands]	25-50	150	Can be moulded by strong finger pressure		
Soft or loose soil [wet clays; silty clays and sands; silty loams; wet loose sands]	>12 - 25	<50	Can be moulded by light finger pressure		

(*) the above table is only for guidance and it must not be taken for final installations.

13. This certificate cannot be used if the following is present on the soil:
    a. **Organic matter** such as: Fibrous peat, charcoal, wood fragments, root and root fibres.
    b. **Waste fill** such as: Domestic refuse, oil, bitumen, brickbats, concrete rubble, fibrous plaster, wood pieces, wood shavings, sawdust, iron filings, drums, steel bars, steel scrap, bottles, broken glass and leather.
14. We highly recommend to check the characteristics of the soil on site by a geotechnical expert. Clenergy must be informed on the outcome of the soil report.
15. The following soil and/or terrain conditions are not covered on this engineering certificate and we highly recommend to carry out a soil test report if you find the below conditions on site.

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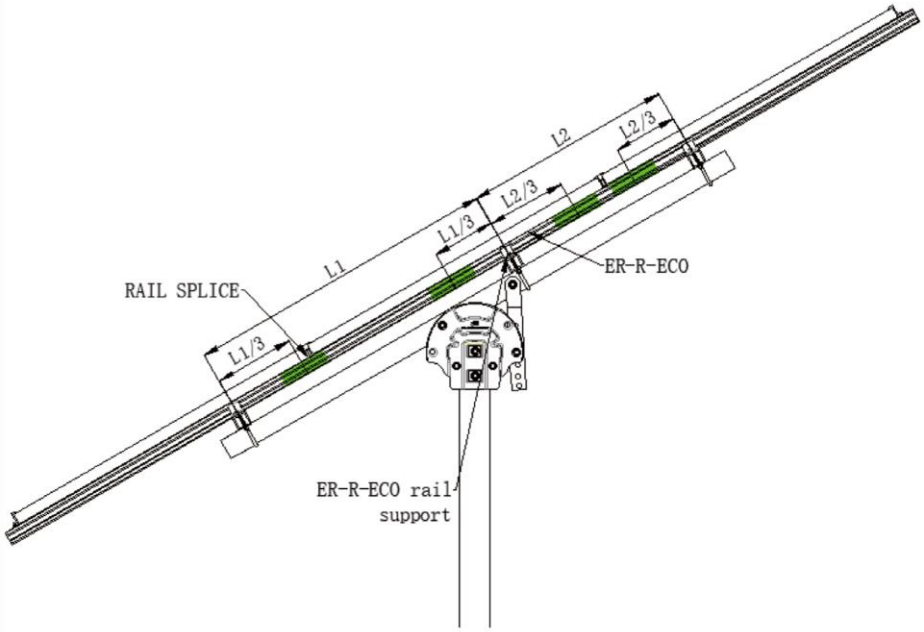
a. Unstable slopes
b. Soil with visible poor drainage
c. Uncontrolled fill
d. Areas close to a river/creek
e. Undulating, hilly, or mountainous terrains

16. ER-R-ECO Rail splice must not be placed at the end of the rail or on top of rail overhang.
17. ER-R-ECO Rail must be continuous to comply with Note 16.
18. Rail splice should be placed within 1/3 length (L) of the nearest rail support.



19. System is suitable for installation up to ISO corrosivity category C4.
20. 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.
21. 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.

MW Engineering

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Internal REF: 00569

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

Best Regards,

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