SolarTripod Lite

Production Introduction

PV-ezRack® SolarTripod Lite is a pre-assembled mounting system for residential and commercial flat roof. Manufactured from aluminium alloy ensures aesthetic appearance, lightweight and excellent corrosion resistance.

Please review this manual thoroughly prior to installing PV-ezRack® SolarTripod Lite. This manual provides supporting documentation for building permit applications relating to PV-ezRack® SolarTripod Lite.

When installed in accordance with this guide, the PV-ezRack® SolarTripod Lite parts will be structurally adequate. During installation please comply with the appropriate occupational health and safety regulations. Please also pay attention to other relevant regulations of your local region. Please check that you are using the latest version of the installation manual by contacting Clenergy via email at tech@clenergy.com.au, or by contacting your local distributor.

Product Warranty:
Please refer PV-ezRack® Product Warranty on our website.

List of contents

Tools and Components

Tools

Allen Key 6&8 mm	Adjustable Spanner	Torque Wrench	5m Tape	Marker Pen
String				

Note: the above tools are used for mounting system installation only and not included in Clenergy's supply scope. Any tools for electronic parts installation please consult system installer.

Components

ER-EC-ST End Clamp	ER-S-TRIL Support for SolarTripod Lite	ER-IC-ST Inter Clamp	ER-R-ECO ECO-Rail	ER-SP-ECO Splice for ECO-Rail
RC-ECO/G Rail Clamp for ECO-Rail with grounding/earthing pins				

System Overview

System overview of SolarTripod Lite
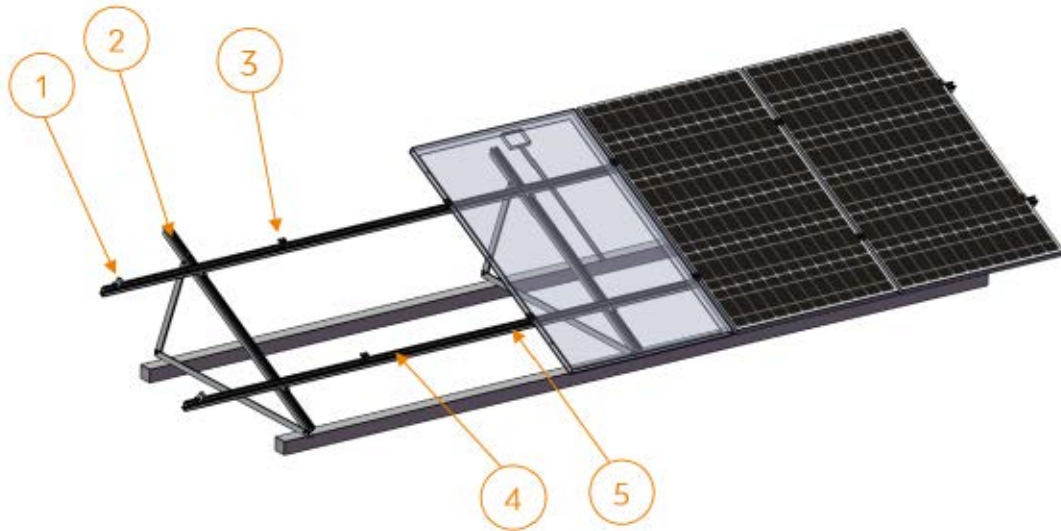
1. End Clamp   2. Support for SolarTripod Lite   3. Inter Clamp   4. ECO-Rail   5. Splice for ECO-Rail

Stainless Steel Fastener Installation Precautions:

Improper operation may lead to bolt and nut deadlock. Follow the steps below to reduce this risk.

1. Friction coefficient reduction

(1) Ensure the thread surface is clean and free of all dirt or contaminants.
(2) Apply lubricant (grease or #40 engine oil) to fasteners prior to tightening to avoid galling or seizing in the threads.

2. General installation instructions

(1) Apply force to fasteners in the direction of the axis of the thread.
(2) Apply force uniformly and 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 the safe torques defined in this guide as shown below. If power tools are required, Clenergy recommends only low-speed tools. High-speed and impact drivers increase the risk of bolt galling (deadlock). If deadlock occurs and you need to cut the fasteners, please ensure that there is no load on the fastener before cutting. Avoid damaging the anodized or galvanized surfaces.
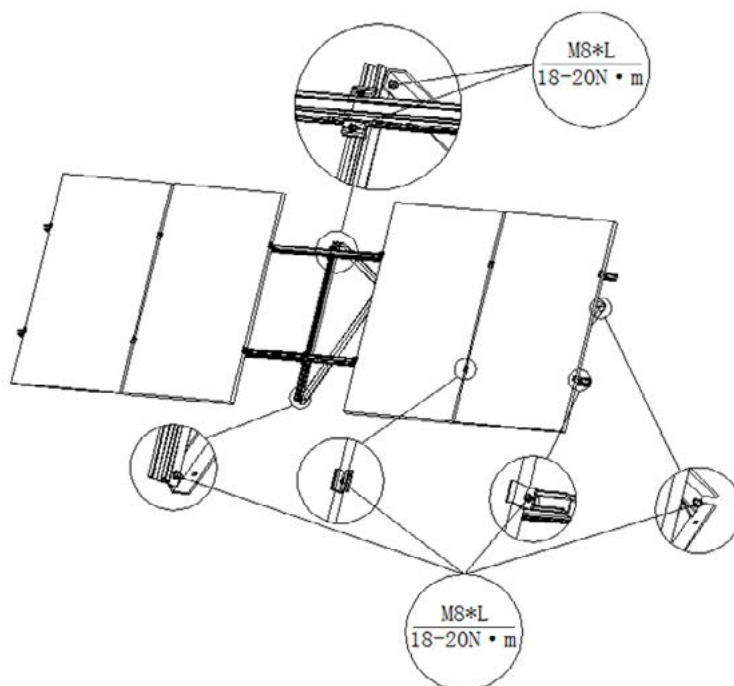
4. These steps should be applied for every stainless steel nut and bolt assembly.

Installation Dimensions

All drawings and dimensions in this installation guide are for a generic reference. The PV-ezRack® SolarTripod Lite is optimized to suit the specific conditions for each project and documented in a construction drawing. As a result, major components of the Clenergy PV-ezRack® SolarTripod Lite may be provided in section sizes and lengths that vary from those shown in this guide. The installation process detailed in this instruction guide remains the same regardless of the component size. If you need to perform any on-site modifications or alteration of the system in a way that differs from the construction drawing, please provide marked up drawings/sketches for Clenergy's review prior to modification for comment and approval.

Installation Planning
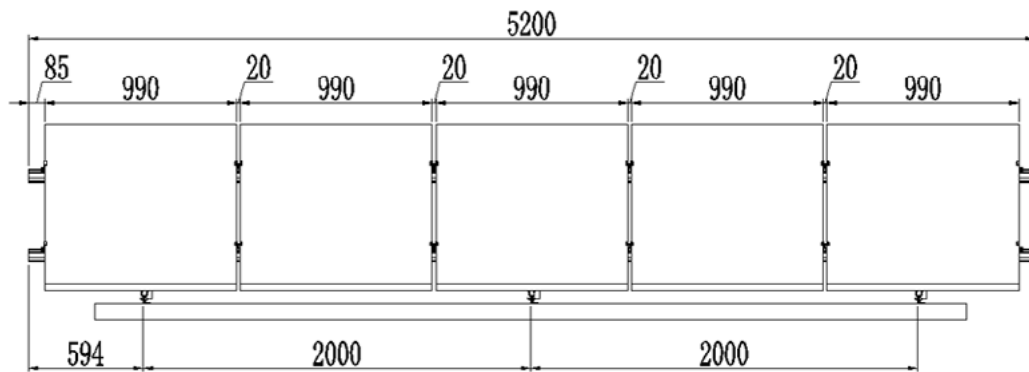
Front View

Side View

Axial View

Upper support

Back support

Base support
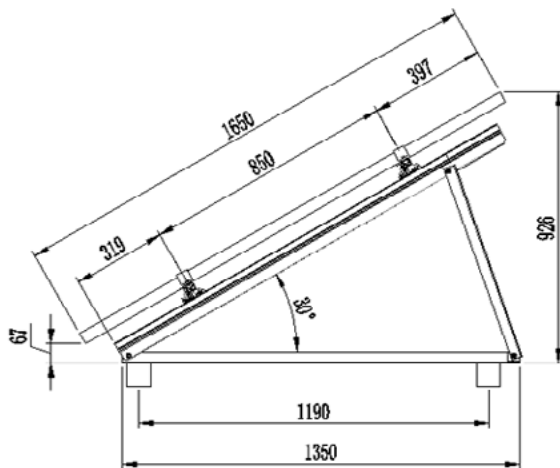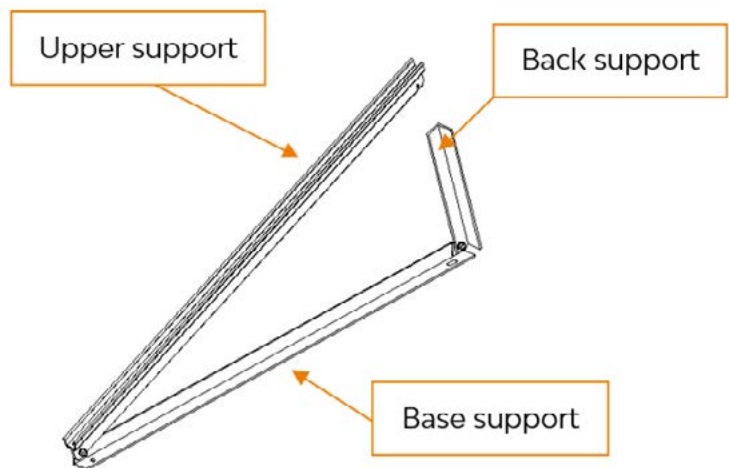
Use PV modules 1650x990x40 (1 row*5 arrays; installation angle is 30°) as example to illustrate how to install PV-ezRack® SolarTripod Lite. All dimensions relating to engineering have to conform to technical drawings for specific project.

Installation Instructions

Install Support for SolarTripod Lite

According to installation planning, unfold the Support for SolaTripod Lite, and use M8 washer, spring washer and nut to fix Base Support on position to be installed as shown in Figure 1 and 2. Do not fasten the bolts tightly for easy adjustment.

Notes:
1. In the fixation scheme of the tripod, bolts for fixing Base support can be embedded ones or expansion ones and its type and length shall be determined according to actual situation of project.
2. Other fixation methods of tripod are determined according to actual situation of project.

Recommended torque: 18-20 N·m for M8 bolt

Figure 1
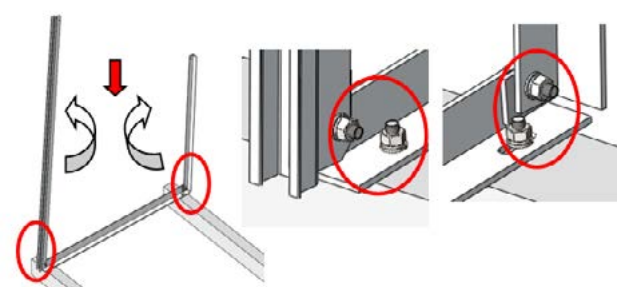
Figure 2

Use bolt M8*25, M8 plain washer, washer and nut to connect Back Support and Upper Support, and fasten tightly. And then fasten other bolts tightly as shown in Figure 3.

Recommended torque: 18-20 N·m. for M8 bolt

Note:
The direction of all M8*25 bolt heads are as same as installed bolt heads on Base support of Support for Solar Tripod Lite.
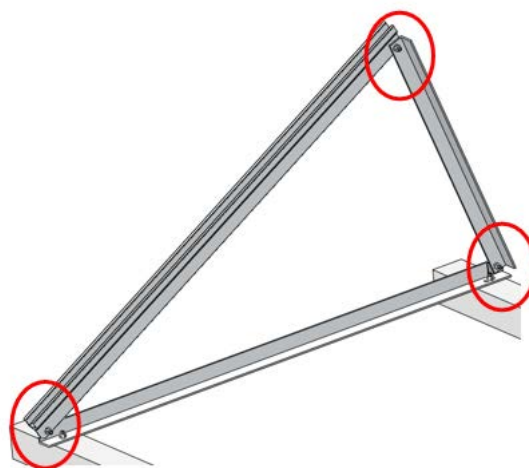
Figure 3

Repeat the above steps to fix other Supports for Tripod Lite of the same unit. Adjust installation position of all Supports to guarantee lower end faces of Upper Support are on the same line and installation faces of Upper Support are on the surface of same height. Fasten all bolts tightly as shown in Figure 4.

Recommended torque: 18-20 N·m. for M8 bolt
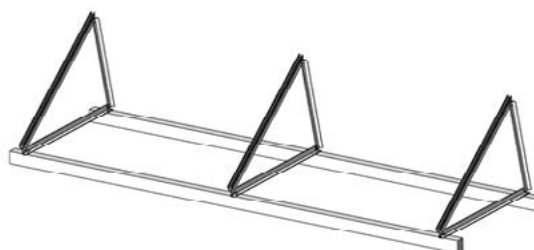
Figure 4

ECO-Rail Installation

Use Splice for ECO-Rail to connect ECO-Rails and fasten with M8 bolt assemblies tightly as shown in Figure 5.

Recommended torque :18-20 N·m. for M8 bolt
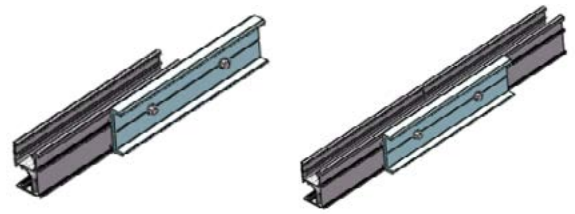
Figure 5

Use Rail Clamp for ECO-Rail or with grounding/earthing pins to fix the connected ECO-Rail on the Upper Support and fasten bolts tightly as shown in Figure 6.

Recommended torque: 18-20 N·m for M8 bolt
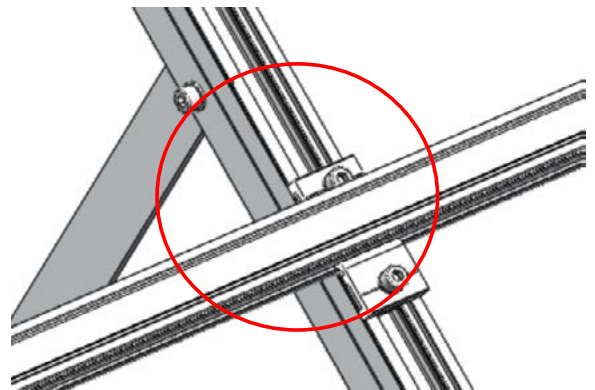
Figure 6

Repeat the above operations to install other ECO-Rails. The ECO-Rails installation are completed as shown in Figure 7.
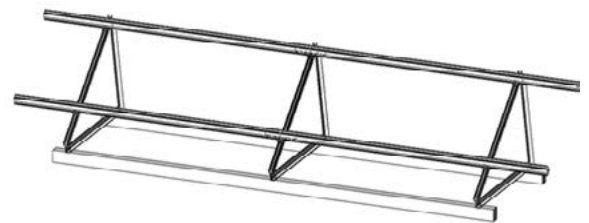
Figure 7

PV Module Installation

According to engineering drawing, place the first PV module on appropriate position. Slide the End Clamp and Inter Clamp tightly against the PV module and fasten them as shown in Figure 8.

Recommended torque for M8 bolts is 18 ~20 N·m.
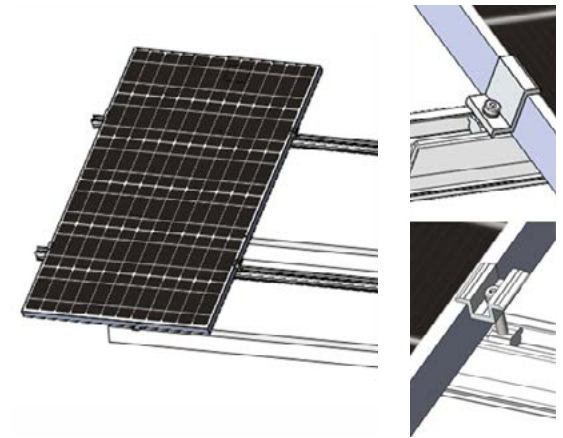
Figure 8

Repeat above operation to install other PV modules one by one. The whole system is completed as shown in Figure 9.
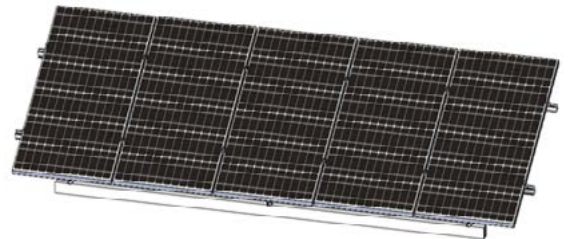
Figure 9

Certification

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Our Ref: 3918 Rev.1/K.Z

6 December 2017

Clenergy Australia
Ground Floor
10 Duerdin St,
Clayton, VIC 3168
Australia

Clenergy
Innovating renewable energy

PV Array Frame Engineering Certification

Installation of Clenergy PV-ezRack Solar Tripod Light with ER-R-ECO Rails

Gamcorp (Melbourne) Pty Ltd, being Structural Engineers within the meaning of Australian Building Regulations, have carried out a structural design check of Clenergy PV-ezRack Solar Tripod Light installation within Australia. The design check has been based on the information and the schematic drawings of the system and its components provided by Clenergy Australia.

We find the Installation of Clenergy PV-ezRack Solar Single Tripod Light for Australian use to be structurally sufficient based on the following conditions:
- Wind loads to AS/NZ1170.2:2011
- Wind region A, B, C, D
- Wind terrain category 1.5, 2, 2.5 & 3
- Wind average recurrence interval of 200 years
- Maximum building height 20m
- The maximum PV panel dimensions to be 2000mm x 1000mm and 1700mm x 1000mm
- Maximum weight of the PV panel and array frame to be 15 kg/m^2
- Rails to be ER-R-ECO
- The roof interface to be Clenergy PV-ezRack Solar Tripod Light as per drawing PZ35-0-004-10 and PZ35-0-005-10
- The ECO rail clamp is assessed based on test report PZ35-TR04-10
- The universal panel clamp is assessed based on test report PZ01-TR77-10 & PZ01-TR78-10
- The assessment is based on 2 x screw fixings' pull-out capacity of 14g Tek screw into 1.5BMT steel structure and JD5 timber structure.
- Each PV panel to be installed using 2 rails minimum in all circumstances
- Installation of PV array to be done in accordance with the PV installation manual
- The certification **excludes** assessment of building structure and PV panels

Refer to attached summary table for interface spacing

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NOTES:

- **The recommended spacing nominated in this certification is based on the capacity of the array frame and fixing, not building structure and PV panel. It is the responsibility of the installer to adopt the most critical spacing.**

- **If any of the above conditions cannot be met, the structural engineer must be notified immediately.**

- **Next review date of this document is 21 September 2019.**

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

Yours faithfully,
Gamcorp (Melbourne) Pty Ltd

Martin Gamble
Managing Director
MAICD

Kevin Zhang
Structural Engineer
B.Eng(Civil), M.Eng(Structural)

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Structural Design Documentation

PV-ezRack Tripod Light System
Interface Spacing Table

with ER-R-ECO Rails
within Australia
Terrain Category 1.5, 2, 2.5 & 3

For: Clenergy Australia

Proud Member of:
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Representing Engineering Excellence

Job Number: 3918
Date: 6 December 2017

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Job No: 3918

Client: Clenergy Australia

Project: Tripod Light Interface Spacing Table

Address: within Australia

Australian Standards
AS/NZS 1170. 2011 – Structural Design Actions
Part 0 – General Principles
Part 1 – Permanent imposed and other actions
Part 2 – Wind Actions
AS 4055 – Wind Loads for Housing
AS/NZS 1664 – Aluminium Structures
AS 4100 – Steel Structures
AS/NZS 4600 – Cold-Formed Steel Structures

Wind Terrain Category: WTC 1.5, 2, 2.5 & 3

Designed: K.Z

Date: Dec-17

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Client:	**Clenergy Australia**	Job:	**3918**
Project:	**Tripod Light Interface Spacing Table**	Date:	**Dec-17**
Address:	**within Australia**		
Designed:	**K.Z**	Checked:	**J.Z**

Tripod Light Interface Spacing Table

Type of Rail	ER-R-ECO
Type of Interface	S-TRIL-S15&30/135/G; S-TRIL-S15&30/170/G
Solar Panel Dimension	2m x 1m; 1.7m x 1m
Terrain category	**3**
Tilt Angle from Roof	Φ = 15°
Roof Angle –	≤10°

Wind Region	Building Height – H (m)															
	H≤5				5<H≤10				10<H≤15				15<H≤20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	755	1164	1596	2064	755	1164	1596	1995	652	1002	1368	1883	582	891	1214	1802
B	508	776	1054	1642	508	776	1054	1642	440	670	907	1407	393	597	808	1248
C	189	301	387	624	189	301	387	624	164	261	334	538	147	233	298	479
D	123	194	249	398	123	194	249	398	106	169	216	344	95	151	193	307

Tilt Angle from Roof	Φ = 30°
Roof Angle –	≤10°

Wind Region	Building Height – H (m)															
	H≤5				5<H≤10				10<H≤15				15<H≤20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	333	506	683	1050	333	506	683	1050	289	438	590	905	259	392	527	806
B	226	342	460	702	226	342	460	702	196	297	398	606	176	265	356	541
C	85	134	171	273	85	134	171	273	74	117	149	236	66	104	133	211
D	55	87	111	176	55	87	111	176	48	76	97	153	43	68	86	137

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Client:	**Clenergy Australia**	Job:	**3918**
Project:	**Tripod Light Interface Spacing Table**	Date:	**Dec-17**
Address:	**within Australia**		
Designed:	**K.Z**	Checked:	**J.Z**

Tripod Light Interface Spacing Table

Type of Rail	ER-R-ECO
Type of Interface	S-TRIL-S15&30/135/G; S-TRIL-S15&30/170/G
Solar Panel Dimension	2m x 1m; 1.7m x 1m
Terrain category	**2.5**

Tilt Angle from Roof Φ = 15°
Roof Angle – ≤10°

Wind Region	Building Height – H (m)															
	H≤5				5<H≤10				10<H≤15				15<H≤20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	684	1052	1438	1918	609	933	1272	1833	545	834	1134	1758	501	765	1040	1619
B	461	702	952	1479	410	625	846	1308	368	560	756	1166	339	515	695	1068
C	172	273	351	565	153	243	312	501	137	218	280	448	127	201	257	412
D	111	177	226	361	99	158	201	321	89	142	181	288	82	130	166	265

Tilt Angle from Roof Φ = 30°
Roof Angle – ≤10°

Wind Region	Building Height – H (m)															
	H≤5				5<H≤10				10<H≤15				15<H≤20			
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	303	459	619	950	270	409	551	843	243	367	494	754	223	338	454	692
B	206	311	417	636	184	277	372	566	165	249	334	507	152	229	307	466
C	77	122	156	248	69	109	139	221	62	98	125	198	57	90	115	182
D	50	79	101	160	45	71	90	143	40	64	81	128	37	59	75	118

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Client:	**Clenergy Australia**		Job:	**3918**
Project:	**Tripod Light Interface Spacing Table**		Date:	**Dec-17**
Address:	**within Australia**			
Designed:	**K.Z**		Checked:	**J.Z**

Tripod Light Interface Spacing Table

Type of Rail	ER-R-ECO
Type of Interface	S-TRIL-S15&30/135/G; S-TRIL-S15&30/170/G
Solar Panel Dimension	2m x 1m ; 1.7m x 1m
Terrain category	**2**

Tilt Angle from Roof   Φ = 15°
Roof Angle –   ≤10°

| Wind Region | Building Height – H (m) | | | | | | | | | | | | | | | |
| | H≤5 | | | | 5<H≤10 | | | | 10<H≤15 | | | | 15<H≤20 | | | |
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	623	955	1303	1849	512	782	1062	1656	463	705	957	1485	436	665	901	1396
B	420	639	866	1340	346	525	709	1091	313	475	640	983	296	448	604	925
C	157	249	319	513	129	205	263	420	117	186	237	380	111	175	224	358
D	102	161	206	329	84	133	170	270	76	120	154	244	72	114	145	231

Tilt Angle from Roof   Φ = 30°
Roof Angle –   ≤10°

| Wind Region | Building Height – H (m) | | | | | | | | | | | | | | | |
| | H≤5 | | | | 5<H≤10 | | | | 10<H≤15 | | | | 15<H≤20 | | | |
	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal	Corner	Edge	Intermediate	Internal
A	276	419	564	863	228	345	464	707	207	312	419	638	195	295	396	602
B	188	284	381	579	155	234	314	476	141	212	284	430	133	200	268	406
C	70	111	142	226	58	92	117	186	53	83	106	168	50	79	100	159
D	46	73	92	146	38	60	76	121	34	54	69	109	33	51	65	103

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Client:	**Clenergy Australia**	Job:	**3918**
Project:	**Tripod Light Interface Spacing Table**	Date:	**Dec-17**
Address:	**within Australia**		
Designed:	**K.Z**	Checked:	**J.Z**

Tripod Light Interface Spacing Table

Type of Rail	ER-R-ECO
Type of Interface	S-TRIL-S15&30/135/G; S-TRIL-S15&30/170/G
Solar Panel Dimension	2m x 1m; 1.7m x 1m
Terrain category	**1.5**

Tilt Angle from Roof	Φ = 15°
Roof Angle –	≤10°

Wind Region	Building Height – H (m)															
	H≤5				5<H≤10				10<H≤15				15<H≤20			
	Corner	Edge	Interm ediate	Internal	Corner	Edge	Interm ediate	Internal	Corner	Edge	Interm ediate	Internal	Corner	Edge	Interm ediate	Internal
A	534	816	1109	1732	454	691	937	1455	416	634	858	1328	394	599	811	1252
B	361	548	740	1140	307	466	628	963	282	427	576	881	267	404	544	833
C	135	214	274	439	115	182	233	372	105	167	214	341	100	158	202	323
D	88	139	177	282	75	118	151	240	69	109	139	220	65	103	131	208

Tilt Angle from Roof	Φ = 30°
Roof Angle –	≤10°

Wind Region	Building Height – H (m)															
	H≤5				5<H≤10				10<H≤15				15<H≤20			
	Corner	Edge	Interm ediate	Internal	Corner	Edge	Interm ediate	Internal	Corner	Edge	Interm ediate	Internal	Corner	Edge	Interm ediate	Internal
A	238	359	483	738	203	306	411	626	186	281	377	574	176	266	357	543
B	162	244	327	496	138	208	279	422	127	191	256	387	120	181	242	367
C	61	96	122	194	52	82	104	165	48	75	96	152	45	71	91	144
D	40	62	79	126	34	53	68	107	31	49	62	99	29	46	59	93

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General Notes

Note 1 Following components are satisfied to use according to AS/NZS 1170.2 - 2011

Components	Part Number	Description
ECO Rail	ER-R-ECO	panel supporting rail
Tripod Light (60 cells)	S-TRIL-S15/135/G; S-TRIL-S30/135/G	as per drawing PZ35-0-004-10
Tripod Light (72 cells)	S-TRIL-S15/170/G; S-TRIL-S30/170/G	as per drawing PZ35-0-005-10
Universal Panel Clamp	C-U/30/46-G	as per test report PZ01-TR77-10 & PZ01-TR78-10
Rail Clamp for ECO Rail	RC-ECO/G	as per test report PZ35-TR04-10

Note 2 Refer attached Gamcorp Roof Definition and Figure 5.3 of AS/NZS 1170.2:2011 for definition of roof zones

Note 3 Terrain Category 2 (TC2) refers to open terrain, including grassland, with well-scattered obstructions having heights generally from 1.5 m to 5 m, with no more than two obstruction per hectare.

Terrain Category 3 (TC3) refers to numerous closely spaced obstructions having heights generally from 3m to 10m. For example, suburban housing or light industrial estates. Refer clause 4.2.1 of AS/NZS 1170.2-2011 Amdt 3-2013 for definition of Terrain Category 3.

Note 4 All holes must be pre drilled, with minimum screw embedment of 35 mm into timber.

Note 5 Recommended Screws

Metal Purlin/Batten	Fasteners to Use
BMT 1.2mm - 2.4mm	14g-10 TPI Teks screws
Timber Rafter & Purlin/Batten	**Fasteners to Use**
Softwood and Hardwood (35mm embedment depth or more)	14g-10 TPI (T17's)

Above spacing tables are applicable to minimum 1.5mm BMT steel purlin and JD4 seasoned timber.

Note 6 Splice connection is recommended to be placed at quarter length of the spacing of the interfaces. No Splice connection should be placed at the centre of spacing or over the interface.
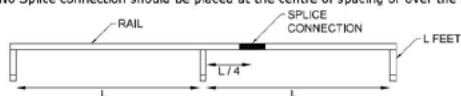
Note 7 The interface spacing tables are determined based on screw fixing into minimum 1.5BMT steel or JD5 timber.

Note 8 Number of universal panel clamps required per panel

Wind Region/ Tilt Angle	Terrain Category/Building Height – H (m)															
	TC 3				TC 2.5				TC 2				TC 1.5			
	5m	10m	15m	20m	5m	10m	15m	20m	5m	10m	15m	20m	5m	10m	15m	20m
A 15	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
A 30	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
B 15	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
B 30	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
C 15	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
C 30	4	4	4	6	4	4	6	6	4	6	6	6	6	6	6	6
D 15	4	4	4	4	4	4	4	4	4	4	4	6	4	4	4	6
D 30	6	6	8	8	6	8	8	8	6	8	8	10	8	8	10	10

The above recommended number of panel clamps is only applicable to roof internal and intermediate zones
Severe local wind zone including edge zone and corner zone must be checked separately if required for installation.

Note 9 Next review date of this document is 21 September 2019.

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