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Our Ref: 2242/K.Z

12 September 2016

Xiamen Hopergy Photovoltaic Technology Co. Ltd.
No.630, Tonghong Road
Tongan District, Xiamen 361100
China

PV Array Frame Engineering Certification

Installation of Hopergy Adjustable Tilt Leg Roof Mount Solar System with HOP-SLR03 Rails

Gamcorp (Melbourne) Pty Ltd, being Structural Engineers within the meaning of Australian and New Zealand Building Regulations, have carried out a structural design check of Hopergy Adjustable Tilt Leg Roof Mount Solar System installation within Australia and New Zealand. The design check has been based on the information in the schematic drawings of the system components and test report provided by Hopergy Australia (IMSOLAR).

We find the Installation of Hopergy Adjustable Tilt Leg Roof Mount Solar System for Australian and New Zealand use to be structurally sufficient based on the following conditions:

- Wind loads to AS/NZ1170.2:2011 Admt 3:2013
- Wind region A, B, C, D, W
- Wind terrain category 2 & 3
- Wind average recurrence interval of 500 years
- Maximum building height 20m
- The PV panel dimensions to be 1640mm x 992mm and 2000mm x 1000mm
- Maximum weight of the PV panel and array frame to be 15 kg/m^2
- Rails to be HOP-SLR03
- Rails material to be aluminium graded AL6005-T5 or higher
- The assessment of the rail is based on a deflection limit of 20mm specified by Hopergy Australia (IMSOLAR) as per the test report provided
- The roof interface to be Hopergy adjustable tilt leg as per drawing HOP-ARL01-15/30/60 and front leg as per drawing HOP-FB002-30
- The assessment is based on an assumption that the front leg and tilt leg capacity meet the industrial standard requirements
- 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 roof structure and PV panels

Refer to attached summary table for interface spacing

NOTES:

- **The recommended spacing nominated in this certification is based on the capacity of the array frame, not the roof structure and PV panel. It is the**

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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.**

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

Yours faithfully,
Gamcorp (Melbourne) Pty Ltd

Martin Gamble
Managing Director
MAICD

Mudi Ariyarathna
B.Eng(Civil)(Hons)Monash, M.Eng&Mgt, MIEAust, CPEng, NPER, RBP EC-39699, RPEQ- 15899

ISO 9001:2008 Registered Firm
Certificate No: AU1222

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Consulting Structural & Civil Engineers
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Structural Design Documentation

Solar Adjustable Tilt Legs System Spacing Table

According to AS 1170.2-2011 Amdt 3-2013
with HOP-SLR03 Rail
within Australia & New Zealand
Terrain Category 2 & 3

For: Xiamen Hopergy Photovoltaic Technology Co. Ltd.

Job Number: 2242
Date: 12 September 2016

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ISO 9001:2008 Registered Firm
Certificate No: AU1222

Job No: **2242**
Client: **Xiamen Hopergy Photovoltaic Technology Co. Ltd.**
Project: **Solar Adjustable Tilt Legs System Spacing Table**

Address: **within Australia & New Zealand**

Australian/New Zealand Standards

AS/NZS 1170. 2011 – Structural Design Actions
- Part 0 – General Principles
- Part 1 – Permanent imposed and other actions
- Part 2 – Wind Actions
- Part 3 – Snow and Ice Actions

AS/NZS 1252 – High Strength Structural Bolting
AS 4055 – Wind Loads for Housing
AS 4100 – Steel Structures
AS/NZS 4600 – Cold-Formed Steel Structures

Wind Terrain Category: WTC 2 & 3

Designed: **K.Z**

Date: **Sep-16**

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Client: **Xiamen Hopergy Photovoltaic Technology Co. Ltd.** Job: **2242**
Project: **Solar Adjustable Tilt Legs System Spacing Table** Date: **Sep-16**
Address: **within Australia & New Zealand**
Designed: **K.Z** Checked: **M.A**

PV Frame Spacing Table for Adjustable Tilt Leg System

Type of Rail HOP-SLR03
Type of Interface Adjustable Tilt Leg
Solar Panel Dimension 1.64m x 0.99m
Terrain category **2**

Tilt Angle to Roof 10°-15°
Roof Angle (Φ) – ≤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	**925**	**1416**	**1826**	**2055**	**760**	**1160**	**1573**	**1944**	**688**	**1047**	**1418**	**1889**	**649**	**987**	**1336**	**1859**
B	**568**	**862**	**1164**	**1792**	**468**	**709**	**956**	**1464**	**424**	**642**	**864**	**1320**	**400**	**606**	**815**	**1244**
C	**381**	**576**	**775**	**1182**	**315**	**475**	**638**	**970**	**285**	**430**	**577**	**877**	**269**	**406**	**545**	**827**
D	**235**	**354**	**474**	**719**	**194**	**292**	**392**	**592**	**176**	**265**	**355**	**536**	**166**	**250**	**335**	**506**
W	**714**	**1087**	**1473**	**1882**	**588**	**893**	**1206**	**1784**	**532**	**807**	**1089**	**1673**	**502**	**761**	**1027**	**1575**

Tilt Angle to Roof 16°-29°
Roof Angle (Φ) – ≤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	**505**	**765**	**1032**	**1584**	**416**	**630**	**848**	**1296**	**377**	**570**	**767**	**1169**	**356**	**538**	**723**	**1102**
B	**312**	**471**	**633**	**962**	**258**	**389**	**521**	**791**	**234**	**352**	**472**	**715**	**221**	**333**	**446**	**675**
C	**210**	**317**	**424**	**642**	**174**	**262**	**350**	**529**	**157**	**237**	**317**	**479**	**149**	**224**	**300**	**452**
D	**130**	**195**	**261**	**394**	**107**	**162**	**216**	**325**	**97**	**146**	**196**	**295**	**92**	**138**	**185**	**278**
W	**391**	**592**	**796**	**1214**	**323**	**488**	**655**	**997**	**292**	**441**	**592**	**900**	**276**	**417**	**559**	**849**

Tilt Angle to Roof 30°
Roof Angle (Φ) – ≤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	**411**	**622**	**838**	**1280**	**340**	**513**	**689**	**1050**	**308**	**464**	**623**	**948**	**290**	**438**	**588**	**894**
B	**255**	**384**	**515**	**781**	**210**	**317**	**425**	**643**	**191**	**287**	**385**	**582**	**180**	**271**	**363**	**549**
C	**172**	**258**	**346**	**523**	**142**	**214**	**286**	**431**	**129**	**194**	**259**	**390**	**122**	**183**	**244**	**369**
D	**106**	**160**	**213**	**321**	**88**	**132**	**176**	**266**	**80**	**120**	**160**	**241**	**75**	**113**	**151**	**227**
W	**319**	**482**	**647**	**984**	**263**	**397**	**533**	**809**	**239**	**360**	**482**	**731**	**226**	**340**	**456**	**690**

PV Frame Spacing Table for Adjustable Tilt Leg System

Type of Rail HOP-SLR03
Type of Interface Adjustable Tilt Leg
Solar Panel Dimension 1.64m x 0.99m
Terrain category 2

Tilt Angle to Roof 31°-60°
Roof Angle (Φ) – ≤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	**322**	**486**	**653**	**994**	**266**	**401**	**538**	**817**	**241**	**363**	**487**	**738**	**228**	**343**	**460**	**697**
B	**200**	**301**	**403**	**609**	**165**	**248**	**332**	**502**	**150**	**225**	**301**	**455**	**141**	**213**	**284**	**429**
C	**135**	**203**	**271**	**409**	**111**	**167**	**224**	**337**	**101**	**152**	**203**	**306**	**95**	**143**	**192**	**289**
D	**83**	**125**	**167**	**252**	**69**	**104**	**138**	**208**	**63**	**94**	**125**	**189**	**59**	**89**	**118**	**178**
W	**250**	**377**	**505**	**766**	**207**	**311**	**417**	**631**	**187**	**282**	**377**	**571**	**177**	**266**	**356**	**539**

Tilt Angle to Roof 31°-60°
Roof Angle (Φ) – 11°-20°

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	**505**	**765**	**1032**	**1584**	**416**	**630**	**848**	**1296**	**377**	**570**	**767**	**1169**	**356**	**538**	**723**	**1102**
B	**312**	**471**	**633**	**962**	**258**	**389**	**521**	**791**	**234**	**352**	**472**	**715**	**221**	**333**	**446**	**675**
C	**210**	**317**	**424**	**642**	**174**	**262**	**350**	**529**	**157**	**237**	**317**	**479**	**149**	**224**	**300**	**452**
D	**130**	**195**	**261**	**394**	**107**	**162**	**216**	**325**	**97**	**146**	**196**	**295**	**92**	**138**	**185**	**278**
W	**391**	**592**	**796**	**1214**	**323**	**488**	**655**	**997**	**292**	**441**	**592**	**900**	**276**	**417**	**559**	**849**

Tilt Angle to Roof 31°-60°
Roof Angle (Φ) – 21°-30°

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	**925**	**1416**	**1826**	**2055**	**760**	**1160**	**1573**	**1944**	**688**	**1047**	**1418**	**1889**	**649**	**987**	**1336**	**1859**
B	**568**	**862**	**1164**	**1792**	**468**	**709**	**956**	**1464**	**424**	**642**	**864**	**1320**	**400**	**606**	**815**	**1244**
C	**381**	**576**	**775**	**1182**	**315**	**475**	**638**	**970**	**285**	**430**	**577**	**877**	**269**	**406**	**545**	**827**
D	**235**	**354**	**474**	**719**	**194**	**292**	**392**	**592**	**176**	**265**	**355**	**536**	**166**	**250**	**335**	**506**
W	**714**	**1087**	**1473**	**1882**	**588**	**893**	**1206**	**1784**	**532**	**807**	**1089**	**1673**	**502**	**761**	**1027**	**1575**

General Notes

Note 1 Screws minimum embedment length into timber 35 mm

Note 2 Recommended screws

Metal Purlins/Battens	**Fasteners to use**
0.55 mm – 1.5 mm	M6-11 TPI RoofZips
1.9 mm	M6-11 TPI RoofZips OR 14g-10 TPI Teks screws
2.4 mm and Above	14g-10 TPI Teks screws
Wood purlins and Rafter	**Fasteners to use**
Pine and Hardwood (35mm embedment and above)	M6 (14g) with 10 TPI

Note 3 Following components are satisfied to use according to AS1170.2011

Components	**Part Number**	**Description**
HOP-SLR03 Rail	HOP-SLR03	HOP-SLR03 Rail

Note 4 For adjustable tilting leg,

Maximum back leg angle to horizontal	-	90°
Minimum back leg angle to horizontal	-	30°

Note 5 Refer Figure 5.3 of AS/NZS 1170.2:2011 for definition of roof zones.

Note 6 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 obstructions per hectare.

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Client: **Xiamen Hopergy Photovoltaic Technology Co. Ltd.** Job: **2242**
Project: **Solar Adjustable Tilt Legs System Spacing Table** Date: **Sep-16**
Address: **within Australia & New Zealand**
Designed: **K.Z** Checked: **M.A**

PV Frame Spacing Table for Adjustable Tilt Leg System

Type of Rail HOP-SLR03
Type of Interface Adjustable Tilt Leg
Solar Panel Dimension 2m x 1m
Terrain category **2**

Tilt Angle to Roof 10°-15°
Roof Angle (Φ) – ≤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	758	1161	1580	1956	624	951	1290	1849	564	859	1163	1798	532	810	1095	1692
B	466	707	955	1469	384	582	784	1201	348	526	708	1083	328	497	668	1020
C	312	473	635	970	258	390	523	796	234	353	473	719	221	333	447	678
D	193	290	389	590	159	240	321	486	144	217	291	440	136	205	275	415
W	585	892	1208	1791	482	732	989	1524	436	662	893	1372	412	624	842	1292

Tilt Angle to Roof 16°-29°
Roof Angle (Φ) – ≤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	414	628	846	1299	341	517	695	1063	309	468	629	959	292	441	593	904
B	256	386	519	789	211	319	427	649	191	289	387	586	181	273	365	553
C	172	260	348	527	142	215	287	434	129	194	260	393	122	184	246	371
D	106	160	214	323	88	132	177	267	80	120	160	242	75	113	152	228
W	321	485	652	996	265	400	537	817	240	362	486	738	227	342	459	696

Tilt Angle to Roof 30°
Roof Angle (Φ) – ≤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	337	510	687	1049	278	421	565	861	252	381	511	777	238	360	482	733
B	209	315	422	641	173	260	348	527	156	236	315	477	148	223	298	450
C	141	212	284	429	116	175	234	354	106	159	212	320	100	150	200	302
D	87	131	175	264	72	108	145	218	65	98	131	197	62	93	124	186
W	262	395	530	807	216	326	437	663	196	295	396	600	185	279	374	566

PV Frame Spacing Table for Adjustable Tilt Leg System

Type of Rail HOP-SLR03
Type of Interface Adjustable Tilt Leg
Solar Panel Dimension 2m x 1m
Terrain category 2

Tilt Angle to Roof 31°-60°
Roof Angle (Φ) – ≤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	**264**	**399**	**535**	**815**	**218**	**329**	**441**	**670**	**198**	**298**	**399**	**605**	**187**	**281**	**377**	**571**
B	**164**	**247**	**330**	**500**	**135**	**204**	**273**	**412**	**123**	**185**	**247**	**373**	**116**	**174**	**233**	**352**
C	**110**	**166**	**222**	**335**	**91**	**137**	**184**	**277**	**83**	**124**	**166**	**251**	**78**	**118**	**157**	**237**
D	**68**	**103**	**137**	**206**	**57**	**85**	**113**	**171**	**51**	**77**	**103**	**155**	**48**	**73**	**97**	**146**
W	**205**	**309**	**414**	**628**	**169**	**255**	**342**	**517**	**153**	**231**	**309**	**468**	**145**	**218**	**292**	**442**

Tilt Angle to Roof 31°-60°
Roof Angle (Φ) – 11°-20°

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	**414**	**628**	**846**	**1299**	**341**	**517**	**695**	**1063**	**309**	**468**	**629**	**959**	**292**	**441**	**593**	**904**
B	**256**	**386**	**519**	**789**	**211**	**319**	**427**	**649**	**191**	**289**	**387**	**586**	**181**	**273**	**365**	**553**
C	**172**	**260**	**348**	**527**	**142**	**215**	**287**	**434**	**129**	**194**	**260**	**393**	**122**	**184**	**246**	**371**
D	**106**	**160**	**214**	**323**	**88**	**132**	**177**	**267**	**80**	**120**	**160**	**242**	**75**	**113**	**152**	**228**
W	**321**	**485**	**652**	**996**	**265**	**400**	**537**	**817**	**240**	**362**	**486**	**738**	**227**	**342**	**459**	**696**

Tilt Angle to Roof 31°-60°
Roof Angle (Φ) – 21°-30°

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	**758**	**1161**	**1580**	**1956**	**624**	**951**	**1290**	**1849**	**564**	**859**	**1163**	**1798**	**532**	**810**	**1095**	**1692**
B	**466**	**707**	**955**	**1469**	**384**	**582**	**784**	**1201**	**348**	**526**	**708**	**1083**	**328**	**497**	**668**	**1020**
C	**312**	**473**	**635**	**970**	**258**	**390**	**523**	**796**	**234**	**353**	**473**	**719**	**221**	**333**	**447**	**678**
D	**193**	**290**	**389**	**590**	**159**	**240**	**321**	**486**	**144**	**217**	**291**	**440**	**136**	**205**	**275**	**415**
W	**585**	**892**	**1208**	**1791**	**482**	**732**	**989**	**1524**	**436**	**662**	**893**	**1372**	**412**	**624**	**842**	**1292**

General Notes

Note 1 Screws minimum embedment length into timber 35 mm

Note 2 Recommended screws

Metal Purlins/Battens	**Fasteners to use**
0.55 mm – 1.5 mm	M6-11 TPI RoofZips
1.9 mm	M6-11 TPI RoofZips OR 14g-10 TPI Teks screws
2.4 mm and Above	14g-10 TPI Teks screws
Wood purlins and Rafter	**Fasteners to use**
Pine and Hardwood (35mm embedment and above)	M6 (14g) with 10 TPI

Note 3 Following components are satisfied to use according to AS1170.2011

Components	**Part Number**	**Description**
HOP-SLR03 Rail	HOP-SLR03	HOP-SLR03 Rail

Note 4 For adjustable tilting leg,

Maximum back leg angle to horizontal	-	90°
Minimum back leg angle to horizontal	-	30°

Note 5 Refer Figure 5.3 of AS/NZS 1170.2:2011 for definition of roof zones.

Note 6 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 obstructions per hectare.

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Client: **Xiamen Hopergy Photovoltaic Technology Co. Ltd.** Job: **2242**
Project: **Solar Adjustable Tilt Legs System Spacing Table** Date: **Sep-16**
Address: **within Australia & New Zealand**
Designed: **K.Z** Checked: **M.A**

PV Frame Spacing Table for Adjustable Tilt Leg System

Type of Rail HOP-SLR03
Type of Interface Adjustable Tilt Leg
Solar Panel Dimension 1.64m x 0.99m
Terrain category **3**

Tilt Angle to Roof 10°-15°
Roof Angle (Φ) – ≤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**	**Inter mediat e**	**Internal**
A	**1339**	**1774**	**1925**	**2175**	**1339**	**1774**	**1925**	**2175**	**1157**	**1707**	**1850**	**2083**	**1033**	**1579**	**1793**	**2016**
B	**819**	**1248**	**1689**	**2105**	**819**	**1248**	**1689**	**2105**	**710**	**1079**	**1457**	**2018**	**635**	**963**	**1299**	**1954**
C	**549**	**832**	**1120**	**1716**	**549**	**832**	**1120**	**1716**	**476**	**721**	**969**	**1480**	**426**	**644**	**866**	**1319**
D	**338**	**510**	**684**	**1039**	**338**	**510**	**684**	**1039**	**293**	**442**	**593**	**899**	**263**	**396**	**530**	**804**
W	**1031**	**1576**	**1768**	**1985**	**1031**	**1576**	**1768**	**1985**	**892**	**1361**	**1701**	**1906**	**797**	**1214**	**1642**	**1847**

Tilt Angle to Roof 16°-29°
Roof Angle (Φ) – ≤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**	**Inter mediat e**	**Internal**
A	**728**	**1107**	**1496**	**1827**	**728**	**1107**	**1496**	**1827**	**631**	**957**	**1292**	**1757**	**564**	**855**	**1152**	**1705**
B	**449**	**679**	**913**	**1393**	**449**	**679**	**913**	**1393**	**390**	**589**	**791**	**1204**	**349**	**527**	**707**	**1074**
C	**302**	**456**	**611**	**927**	**302**	**456**	**611**	**927**	**263**	**396**	**530**	**803**	**235**	**354**	**474**	**718**
D	**187**	**281**	**376**	**568**	**187**	**281**	**376**	**568**	**162**	**244**	**326**	**492**	**145**	**219**	**292**	**441**
W	**563**	**854**	**1150**	**1681**	**563**	**854**	**1150**	**1681**	**489**	**740**	**995**	**1520**	**437**	**661**	**889**	**1355**

Tilt Angle to Roof 30°
Roof Angle (Φ) – ≤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**	**Inter mediat e**	**Internal**
A	**593**	**899**	**1212**	**1728**	**593**	**899**	**1212**	**1728**	**514**	**778**	**1048**	**1602**	**460**	**696**	**936**	**1428**
B	**366**	**553**	**743**	**1129**	**366**	**553**	**743**	**1129**	**318**	**480**	**644**	**977**	**285**	**429**	**576**	**873**
C	**247**	**372**	**498**	**754**	**247**	**372**	**498**	**754**	**214**	**323**	**432**	**653**	**192**	**289**	**387**	**584**
D	**153**	**229**	**307**	**463**	**153**	**229**	**307**	**463**	**133**	**199**	**266**	**402**	**119**	**179**	**239**	**359**
W	**459**	**695**	**934**	**1426**	**459**	**695**	**934**	**1426**	**399**	**602**	**809**	**1231**	**357**	**539**	**723**	**1099**

PV Frame Spacing Table for Adjustable Tilt Leg System

Type of Rail HOP-SLR03
Type of Interface Adjustable Tilt Leg
Solar Panel Dimension 1.64m x 0.99m
Terrain category **3**

Tilt Angle to Roof 31°-60°
Roof Angle (Φ) – ≤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	**464**	**701**	**943**	**1439**	**464**	**701**	**943**	**1439**	**402**	**608**	**817**	**1243**	**360**	**544**	**730**	**1109**
B	**287**	**433**	**580**	**880**	**287**	**433**	**580**	**880**	**249**	**376**	**503**	**762**	**223**	**336**	**450**	**681**
C	**194**	**291**	**390**	**589**	**194**	**291**	**390**	**589**	**168**	**253**	**338**	**511**	**151**	**227**	**303**	**457**
D	**120**	**180**	**240**	**362**	**120**	**180**	**240**	**362**	**104**	**156**	**209**	**315**	**93**	**140**	**187**	**282**
W	**360**	**543**	**729**	**1108**	**360**	**543**	**729**	**1108**	**312**	**471**	**632**	**958**	**280**	**421**	**565**	**856**

Tilt Angle to Roof 31°-60°
Roof Angle (Φ) – 11°-20°

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	**728**	**1107**	**1496**	**1827**	**728**	**1107**	**1496**	**1827**	**631**	**957**	**1292**	**1757**	**564**	**855**	**1152**	**1705**
B	**449**	**679**	**913**	**1393**	**449**	**679**	**913**	**1393**	**390**	**589**	**791**	**1204**	**349**	**527**	**707**	**1074**
C	**302**	**456**	**611**	**927**	**302**	**456**	**611**	**927**	**263**	**396**	**530**	**803**	**235**	**354**	**474**	**718**
D	**187**	**281**	**376**	**568**	**187**	**281**	**376**	**568**	**162**	**244**	**326**	**492**	**145**	**219**	**292**	**441**
W	**563**	**854**	**1150**	**1681**	**563**	**854**	**1150**	**1681**	**489**	**740**	**995**	**1520**	**437**	**661**	**889**	**1355**

Tilt Angle to Roof 31°-60°
Roof Angle (Φ) – 21°-30°

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	**1339**	**1774**	**1925**	**2175**	**1339**	**1774**	**1925**	**2175**	**1157**	**1707**	**1850**	**2083**	**1033**	**1579**	**1793**	**2016**
B	**819**	**1248**	**1689**	**2105**	**819**	**1248**	**1689**	**2105**	**710**	**1079**	**1457**	**2018**	**635**	**963**	**1299**	**1954**
C	**549**	**832**	**1120**	**1716**	**549**	**832**	**1120**	**1716**	**476**	**721**	**969**	**1480**	**426**	**644**	**866**	**1319**
D	**338**	**510**	**684**	**1039**	**338**	**510**	**684**	**1039**	**293**	**442**	**593**	**899**	**263**	**396**	**530**	**804**
W	**1031**	**1576**	**1768**	**1985**	**1031**	**1576**	**1768**	**1985**	**892**	**1361**	**1701**	**1906**	**797**	**1214**	**1642**	**1847**

General Notes

Note 1 Screws minimum embedment length into timber 35 mm

Note 2 Recommended screws

Metal Purlins/Battens	**Fasteners to use**
0.55 mm – 1.5 mm	M6-11 TPI RoofZips
1.9 mm	M6-11 TPI RoofZips OR 14g-10 TPI Teks screws
2.4 mm and Above	14g-10 TPI Teks screws
Wood purlins and Rafter	**Fasteners to use**
Pine and Hardwood (35mm embedment and above)	M6 (14g) with 10 TPI

Note 3 Following components are satisfied to use according to AS1170.2011

Components	**Part Number**	**Description**
HOP-SLR03 Rail	HOP-SLR03	HOP-SLR03 Rail

Note 4 For adjustable tilting leg,

Maximum back leg angle to horizontal - 90°

Minimum back leg angle to horizontal - 30°

Note 5 Refer Figure 5.3 of AS/NZS 1170.2:2011 for definition of roof zones.

Note 6 Terrain category 3(TC3) refers to numerous closely spaced obstructions having heights generally from 3 m to 10 m. 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.

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Relationships built on trust

Client: **Xiamen Hopergy Photovoltaic Technology Co. Ltd.** Job: **2242**
Project: **Solar Adjustable Tilt Legs System Spacing Table** Date: **Sep-16**
Address: **within Australia & New Zealand**
Designed: **K.Z** Checked: **M.A**

PV Frame Spacing Table for Adjustable Tilt Leg System

Type of Rail HOP-SLR03
Type of Interface Adjustable Tilt Leg
Solar Panel Dimension 2m x 1m
Terrain category **3**

Tilt Angle to Roof 10°-15°
Roof Angle (Φ) – ≤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	**1098**	**1688**	**1832**	**2070**	**1098**	**1688**	**1832**	**2070**	**949**	**1454**	**1760**	**1982**	**847**	**1294**	**1707**	**1918**
B	**672**	**1023**	**1385**	**2003**	**672**	**1023**	**1385**	**2003**	**582**	**884**	**1195**	**1841**	**520**	**790**	**1065**	**1637**
C	**450**	**682**	**919**	**1407**	**450**	**682**	**919**	**1407**	**390**	**591**	**795**	**1214**	**349**	**528**	**710**	**1082**
D	**277**	**418**	**561**	**852**	**277**	**418**	**561**	**852**	**241**	**363**	**486**	**737**	**215**	**325**	**435**	**659**
W	**845**	**1293**	**1682**	**1889**	**845**	**1293**	**1682**	**1889**	**732**	**1116**	**1513**	**1814**	**654**	**995**	**1347**	**1758**

Tilt Angle to Roof 16°-29°
Roof Angle (Φ) – ≤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	**597**	**907**	**1226**	**1739**	**597**	**907**	**1226**	**1739**	**517**	**785**	**1059**	**1627**	**463**	**701**	**945**	**1448**
B	**368**	**557**	**749**	**1142**	**368**	**557**	**749**	**1142**	**320**	**483**	**649**	**987**	**286**	**432**	**580**	**881**
C	**248**	**374**	**501**	**760**	**248**	**374**	**501**	**760**	**215**	**324**	**435**	**658**	**193**	**290**	**389**	**588**
D	**153**	**230**	**308**	**466**	**153**	**230**	**308**	**466**	**133**	**200**	**268**	**404**	**119**	**179**	**240**	**361**
W	**462**	**700**	**943**	**1445**	**462**	**700**	**943**	**1445**	**401**	**606**	**816**	**1247**	**359**	**542**	**729**	**1111**

Tilt Angle to Roof 30°
Roof Angle (Φ) – ≤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	**486**	**737**	**994**	**1524**	**486**	**737**	**994**	**1524**	**422**	**638**	**859**	**1314**	**377**	**570**	**767**	**1171**
B	**300**	**454**	**609**	**926**	**300**	**454**	**609**	**926**	**261**	**394**	**528**	**801**	**234**	**352**	**472**	**716**
C	**202**	**305**	**408**	**618**	**202**	**305**	**408**	**618**	**176**	**265**	**354**	**536**	**157**	**237**	**317**	**479**
D	**125**	**188**	**252**	**379**	**125**	**188**	**252**	**379**	**109**	**163**	**218**	**329**	**97**	**146**	**196**	**295**
W	**377**	**570**	**766**	**1169**	**377**	**570**	**766**	**1169**	**327**	**494**	**663**	**1010**	**293**	**442**	**593**	**901**

PV Frame Spacing Table for Adjustable Tilt Leg System

Type of Rail HOP-SLR03
Type of Interface Adjustable Tilt Leg
Solar Panel Dimension 2m x 1m
Terrain category **3**

Tilt Angle to Roof 31°-60°
Roof Angle (Φ) – ≤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	**380**	**575**	**773**	**1180**	**380**	**575**	**773**	**1180**	**330**	**498**	**670**	**1020**	**295**	**446**	**598**	**910**
B	**235**	**355**	**476**	**721**	**235**	**355**	**476**	**721**	**204**	**308**	**413**	**625**	**183**	**276**	**369**	**558**
C	**159**	**239**	**320**	**483**	**159**	**239**	**320**	**483**	**138**	**208**	**278**	**419**	**124**	**186**	**248**	**375**
D	**98**	**148**	**197**	**297**	**98**	**148**	**197**	**297**	**85**	**128**	**171**	**258**	**76**	**115**	**153**	**231**
W	**295**	**445**	**597**	**908**	**295**	**445**	**597**	**908**	**256**	**386**	**518**	**786**	**229**	**346**	**463**	**702**

Tilt Angle to Roof 31°-60°
Roof Angle (Φ) – 11°-20°

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	**597**	**907**	**1226**	**1739**	**597**	**907**	**1226**	**1739**	**517**	**785**	**1059**	**1627**	**463**	**701**	**945**	**1448**
B	**368**	**557**	**749**	**1142**	**368**	**557**	**749**	**1142**	**320**	**483**	**649**	**987**	**286**	**432**	**580**	**881**
C	**248**	**374**	**501**	**760**	**248**	**374**	**501**	**760**	**215**	**324**	**435**	**658**	**193**	**290**	**389**	**588**
D	**153**	**230**	**308**	**466**	**153**	**230**	**308**	**466**	**133**	**200**	**268**	**404**	**119**	**179**	**240**	**361**
W	**462**	**700**	**943**	**1445**	**462**	**700**	**943**	**1445**	**401**	**606**	**816**	**1247**	**359**	**542**	**729**	**1111**

Tilt Angle to Roof 31°-60°
Roof Angle (Φ) – 21°-30°

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	**1098**	**1688**	**1832**	**2070**	**1098**	**1688**	**1832**	**2070**	**949**	**1454**	**1760**	**1982**	**847**	**1294**	**1707**	**1918**
B	**672**	**1023**	**1385**	**2003**	**672**	**1023**	**1385**	**2003**	**582**	**884**	**1195**	**1841**	**520**	**790**	**1065**	**1637**
C	**450**	**682**	**919**	**1407**	**450**	**682**	**919**	**1407**	**390**	**591**	**795**	**1214**	**349**	**528**	**710**	**1082**
D	**277**	**418**	**561**	**852**	**277**	**418**	**561**	**852**	**241**	**363**	**486**	**737**	**215**	**325**	**435**	**659**
W	**845**	**1293**	**1682**	**1889**	**845**	**1293**	**1682**	**1889**	**732**	**1116**	**1513**	**1814**	**654**	**995**	**1347**	**1758**

General Notes

Note 1 Screws minimum embedment length into timber 35 mm

Note 2 Recommended screws

Metal Purlins/Battens	**Fasteners to use**
0.55 mm – 1.5 mm	M6-11 TPI RoofZips
1.9 mm	M6-11 TPI RoofZips OR 14g-10 TPI Teks screws
2.4 mm and Above	14g-10 TPI Teks screws
Wood purlins and Rafter	**Fasteners to use**
Pine and Hardwood (35mm embedment and above)	M6 (14g) with 10 TPI

Note 3 Following components are satisfied to use according to AS1170.2011

Components	**Part Number**	**Description**
HOP-SLR03 Rail	HOP-SLR03	HOP-SLR03 Rail

Note 4 For adjustable tilting leg,

Maximum back leg angle to horizontal	-	90°
Minimum back leg angle to horizontal	-	30°

Note 5 Refer Figure 5.3 of AS/NZS 1170.2:2011 for definition of roof zones.

Note 6 Terrain category 3(TC3) refers to numerous closely spaced obstructions having heights generally from 3 m to 10 m. 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.