

Structural Design Summary Table

LONGLINE TYPE CLAMP ACCREDITATION
For
PV-ezRack Single Tripod, Adjustable tilting system
Double Tripod and Flush mount system
In accordance with AS/NZ 1170.2 2011 Amdt 2-2012

Terrain Category 3

For:

Clenergy Australia
18/20 Duerdin St
Clayton VIC 3168

Job Number: 24905

Date: April 8, 2013

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Our Ref: 24905

12 April 2013

Clenergy Australia
18/20 Duerdin Street
Clayton North VIC 3168

RE:Longline type clamp accreditation for use within Australiaa

Gamcorp (Melbourne) Pty Ltd, being Structural Engineers within the meaning of Australian Building Regulations, have carried out a structural design check of Clenergy Longline Type Clamp PV Mounting System for use in Australia. The design check has been based on the information by Clenergy Australia, and Uplift Load Testing Report (MT-13-133) by Melbourne Testing Services and PV-ezRack SolarRoof_Longline_Code Compliant Installation and Spacing Guide-AU_V1.0

We find the Clenergy Longline Type Clamp PV Mounting System to be structurally sufficient for use at this location based on the following conditions:

- Wind Loads to AS/NZ1170.2:2011 amdt 2-2012
- Wind Terrain Category 3
- Wind average recurrence interval of 50 years
- Wind Region A, B, C
- Building Height up to 20m
- Max. Solar Panel length 1.58 m (for larger panel, refer to the notes on the bottom of the tables)

Refer to attached summary table for interface Spacing.

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

A handwritten signature in blue ink, appearing to read 'Martin Gamble'.

Martin Gamble
Managing Director
MAICD

A handwritten signature in blue ink, appearing to read 'Milan Bjelobrk'.

Milan Bjelobrk
MIEAust, CPEng, NPER 2210984,
RPEQ 12090, RBP EC-38461, NT BPB 139671ES

SUMMARY SHEET NO. 6
T.C. 3 for Regions A, B, C

Roof Interface Bracket Spacing (mm) Across for PV – ezRack Single Tripod and Adjustable Tilting System
Roof Interface Bracket Spacing (mm) Across for PV – ezRack Single Solar Tripod - ER-I-29 fixing anywhere on the Roofing sheet
Two Longline per frame

WIND REGION	A				B							
	qu (kPa)	0.76	0.94	0.88	1.08	0.98	1.20	1.05	1.29	1.2	1.48	1.34
hz	10.0 m	10.0 m	15.0 m	15.0 m	20.0 m	20.0 m	10.0 m	10.0 m	15.0 m	15.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Longline 305	1584	1502	1527	1451	1486	1413	1461	1388	1413	1300	1375	1170
Force (kN/m)	0.62	0.86	0.72	0.98	0.80	1.09	0.86	1.17	0.98	1.35	1.10	1.50

WIND REGION	C					
	qu (kPa)	1.57	1.93	1.81	2.22	2.02
hz	10.0 m	10.0 m	15.0 m	15.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Longline 305	1921	1000	1180	870	1060	780
Force (kN/m)	1.28	1.76	1.48	2.02	1.65	2.25

KlipLok Type	Capacity
Longline 305	1.76



qu = ultimate wind pressure

Roof Interface Bracket Spacing (mm) Across for PV – ezRack Single Tripod and Adjustable Tilting System
Roof Interface Bracket Spacing (mm) Across for PV – ezRack Single Solar Tripod - ER-I-29 fixing on purtin on the Roofing sheet
Two Longline per frame

WIND REGION	A				B							
	qu (kPa)	0.76	0.94	0.88	1.08	0.98	1.20	1.05	1.29	1.2	1.48	1.34
hz	10.0 m	10.0 m	15.0 m	15.0 m	20.0 m	20.0 m	10.0 m	10.0 m	15.0 m	15.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Longline 305	1584	1502	1527	1451	1486	1413	1584	1430	1527	1240	1486	1170
Force (kN/m)	0.62	0.86	0.72	0.98	0.80	1.09	0.86	1.17	0.98	1.35	1.10	1.50

WIND REGION	C					
	qu (kPa)	1.57	1.93	1.81	2.22	2.02
hz	10.0 m	10.0 m	15.0 m	15.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Longline 305	1300	950	1130	830	1010	740
Force (kN/m)	1.28	1.76	1.48	2.02	1.65	2.25

KlipLok Type	Capacity
Longline 305	1.68



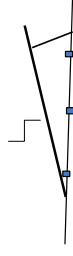
qu = ultimate wind pressure

SUMMARY SHEET NO. 7
T.C. 3 for Regions A, B, C
Roof Interface Bracket Spacing (mm) Across for PV – ezRack Single Tripod -ER-I-29 fixing anywhere on the Roofing sheet
Three Longline per frame

WIND REGION	A				B					
	0.76	0.94	1.08	1.20	1.05	1.29	1.2	1.48	1.34	1.65
qu (kPa)	10.0 m	15.0 m	20.0 m	20.0 m	10.0 m	15.0 m	15.0 m	20.0 m	20.0 m	20.0 m
hz	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Angle	1584	1502	1527	1451	1486	1413	1388	1413	1341	1375
Longline 305	0.45	0.56	0.52	0.64	0.72	0.88	0.62	0.76	0.71	0.88
Force (kN/m)										

WIND REGION		C				
qu (kPa)	1.57	1.93	1.81	2.22	2.02	2.47
hz	10.0 m	15.0 m	15.0 m	20.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Longline 305	1321	1255	1275	1212	1241	1180
Force (kN/m)	0.93	1.14	1.07	1.32	1.20	1.46

KlipLok Type	Capacity
Longline 305	1.76



qu = ultimate wind pressure

Roof Interface Bracket Spacing (mm) Across for PV – ezRack Single Tripod - ER-I-29 fixing on the Roofing sheet
Three Longline per frame

WIND REGION	A				B					
	0.76	0.94	1.08	1.20	1.05	1.29	1.2	1.48	1.34	1.65
qu (kPa)	10.0 m	15.0 m	20.0 m	40.0 m	10.0 m	15.0 m	15.0 m	20.0 m	20.0 m	20.0 m
hz	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Angle	1584	1502	1527	1451	1486	1413	1388	1413	1341	1375
Longline 305	0.45	0.56	0.52	0.64	0.72	0.88	0.62	0.76	0.71	0.88
Force (kN/m)										

WIND REGION		C				
qu (kPa)	1.57	1.93	1.81	2.22	2.02	2.47
hz	10.0 m	15.0 m	15.0 m	20.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Longline 305	1321	1255	1275	1212	1241	1140
Force (kN/m)	0.93	1.14	1.07	1.32	1.20	1.46

KlipLok Type	Capacity
Longline 305	1.68



qu = ultimate wind pressure

General Notes

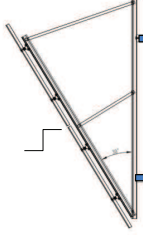
- Roof interface bracket spacing in the above table for panel length of 1.58 m. Roof interface bracket spacing will be reduced by,
 - 6% for solar panel length upto 1.7m
 - 11.5% for solar panel length upto 1.8m
 - 21% for solar panel length upto 2.0m
- The table prepared based on ER-R-ST or ER-R-T50 Rail capacity and Longline bracket pull-out capacity.
- This tables refer to using Longline type interface (ER-I-29) with Adjustable Tilt Leg using 2-M8 bolts for the connection and also with single Tripod using 2-M8 bolts for connection.
- Max. distance allowed from the end of the single Tripod base to fixing of the Longline bracket is 225 mm.
- The above mentioned spacing table is for Roof Interface Bracket fixing including edge of the roof.
- "On purlin" means that distance from the purlin to the Longline type bracket(centre to centre) is not more than 100mm.
- The test position in line with clip at end purlin was not used to obtain the spacing above.

SUMMARY SHEET NO. 8
T.C. 3 for Regions A, B, C
Roof Interface Bracket Spacing (mm) Across for PV – ezRack Double Tripod - ER-I-29 fixing anywhere on the Roofing sheet
Two Longline per frame

WIND REGION	A			B		
	qu (kPa)	0.76	0.94	0.88	1.08	1.20
hz	10.0 m	15.0 m	20.0 m	10.0 m	15.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 15	≤ 30	≤ 15
Longline 305	1300	950	1130	820	1010	740
Force (kN/m)	1.34	1.85	1.56	2.13	1.73	2.36

C			
qu (kPa)	1.57	1.93	1.81
hz	10.0 m	15.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15
Longline 305	630	460	540
Force (kN/m)	2.78	3.80	3.20

KlipLok Type	Capacity kN
Longline 305	1.76



qu = ultimate wind pressure

Roof Interface Bracket Spacing (mm) Across for PV – ezRack Double Tripod - ER-I-29 fixing on purlin on the Roofing sheet
Two Longline per frame

WIND REGION	A			B		
	qu (kPa)	0.76	0.94	0.88	1.08	1.20
hz	10.0 m	15.0 m	20.0 m	10.0 m	15.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 15	≤ 30	≤ 15
Longline 305	1240	900	1070	780	960	710
Force (kN/m)	1.34	1.85	1.56	2.13	1.73	2.36

C			
qu (kPa)	1.57	1.93	1.81
hz	10.0 m	15.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15
Longline 305	600	440	520
Force (kN/m)	2.78	3.80	3.20

KlipLok Type	Capacity kN
Longline 305	1.68



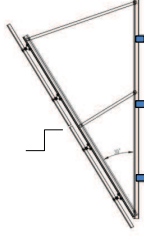
qu = ultimate wind pressure

SUMMARY SHEET NO. 9
T.C. 3 for Regions A, B, C
Roof Interface Bracket Spacing (mm) Across for PV – ezRack Double Tripod - ER-I-29 fixing anywhere on the Roofing sheet
Three Longline per frame

WIND REGION	A				B						
	qu (kPa)	0.76	0.94	1.08	0.98	1.20	1.05	1.29	1.2	1.48	1.34
hz	10.0 m	10.0 m	15.0 m	20.0 m	20.0 m	10.0 m	10.0 m	15.0 m	15.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 30
Longline 305	1584	1450	1527	1270	1400	1300	1060	1140	920	1020	830
Force (kN/m)	0.97	1.21	1.13	1.39	1.26	1.35	1.65	1.54	1.90	1.72	2.12

WIND REGION C						
qu (kPa)	1.57	1.93	1.81	2.22	2.02	2.47
hz	10.0 m	10.0 m	15.0 m	15.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Longline 305	870	710	750	610	670	550
Force (kN/m)	2.01	2.48	2.32	2.85	2.59	3.17

KlipLok Type	Capacity
Longline 305	1.76



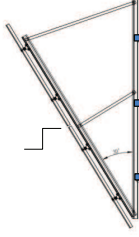
qu = ultimate wind pressure

Roof Interface Bracket Spacing (mm) Across for PV – ezRack Double Tripod - ER-I-29 fixing on the purlin on the Roofing sheet
Three Longline per frame

WIND REGION	A				B						
	qu (kPa)	0.76	0.94	1.08	0.98	1.20	1.05	1.29	1.2	1.48	1.34
hz	10.0 m	10.0 m	15.0 m	20.0 m	20.0 m	10.0 m	10.0 m	15.0 m	15.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 30
Longline 305	1584	1390	1480	1210	1330	1240	1010	1090	880	970	790
Force (kN/m)	0.97	1.21	1.13	1.39	1.26	1.35	1.65	1.54	1.90	1.72	2.12

WIND REGION C						
qu (kPa)	1.57	1.93	1.81	2.22	2.02	2.47
hz	10.0 m	10.0 m	15.0 m	15.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Longline 305	830	670	720	590	640	530
Force (kN/m)	2.01	2.48	2.32	2.85	2.59	3.17

KlipLok Type	Capacity
Longline 305	1.68



qu = ultimate wind pressure

General Notes

- 1 Roof interface bracket spacing in the above table for panel length of 1.58 m. Roof interface bracket spacing will be reduced by,
 - 6% for solar panel length upto 1.7m
 - 11.5% for solar panel length upto 1.8m
 - 21% for solar panel length upto 2.0m
- 2 The table prepared based on ER-R-T50 Rail capacity and Longline bracket pull-out capacity.
- 3 This tables refer to using Longline type interface (ER-I-29) with Double Tripod using 2-M8 bolts for connection.
- 4 Max. distance allowed from the end of the Double Tripod base to fixing of the Longline bracket is 500 mm.
- 5 The above mentioned spacing table is for Roof Interface Bracket fixing including edge of the roof.
- 6 "On purlin" means that distance from the purlin to the Longline type bracket(centre to centre) is not more than 100mm.
- 7 The test position in line with clip at end purlin was not used to obtain the spacing above.

SUMMARY SHEET NO. 10

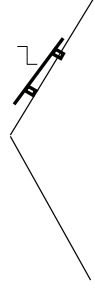
T.C. 3 for Regions A, B, C

Direct Mounting of the panels or using L-feet (ER-I-05) with two rails per panel
 Roof Interface Bracket Spacing (mm) Across for PV – ezRack single Panel - ER-I-29 fixing anywhere on the Roofing sheet

WIND REGION	A			B		
	qu (kPa)	0.76	0.94	0.88	1.08	1.20
hz	10.0 m	≤ 15	≤ 30	15.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Longline 305	1584	1502	1527	1451	1486	1413
Force (kN/m)	0.66	0.82	0.77	0.94	0.86	1.05

WIND REGION	C		
	qu (kPa)	1.57	1.93
hz	10.0 m	≤ 15	≤ 30
Angle	≤ 15	≤ 30	≤ 15
Longline 305	1280	1040	1110
Force (kN/m)	1.37	1.69	1.58

KlipLok Type	Capacity kN
Longline 305	1.76



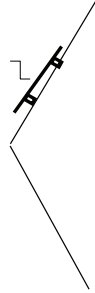
qu = ultimate wind pressure

Roof Interface Bracket Spacing (mm) Across for PV – ezRack single panel - ER-I-29 fixing on purlin on the Roofing sheet

WIND REGION	A			B		
	qu (kPa)	0.76	0.94	0.88	1.08	1.20
hz	10.0 m	≤ 15	≤ 30	15.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Longline 305	1584	1502	1527	1451	1486	1413
Force (kN/m)	0.66	0.82	0.77	0.94	0.86	1.05

WIND REGION	C		
	qu (kPa)	1.57	1.93
hz	10.0 m	≤ 15	≤ 30
Angle	≤ 15	≤ 30	≤ 15
Longline 305	1220	990	1060
Force (kN/m)	1.37	1.69	1.58

KlipLok Type	Capacity kN
Longline 305	1.68



qu = ultimate wind pressure

General Notes

- 1 Roof interface bracket spacing in the above table for panel length of 1.58 m. Roof interface bracket spacing will be reduced by,
 - 6% for solar panel length upto 1.7m
 - 11.5% for solar panel length upto 1.8m
 - 21% for solar panel length upto 2.0m
- 2 The table prepared based on ER-R-ST Rail capacity and Longline bracket pull-out capacity.
- 3 This tables refer to using Longline type interface (ER-I-29) with single panel Flush mount using 1-M8 bolts for connection.
- 4 The above mentioned spacing table is for Roof Interface Bracket fixing including edge of the roof.
- 5 "On purlin" means that distance from the purlin to the Longline type bracket (centre to centre) is not more than 100mm.
- 7 The test position in line with clip at end purlin was not used to obtain the spacing above.

Structural Design Summary Table

LONGLINE TYPE CLAMP ACCREDITATION

For

PV-ezRack Single Tripod, Adjustable tilting system

Double Tripod and Flush mount system

In accordance with AS/NZ 1170.2 2011 Amdt 2-2012

Terrain Category 2

For:

Clenergy Australia
18/20 Duerdin St
Clayton VIC 3168

Job Number: 24905

Date: April 8, 2013

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Our Ref: 24905

12 April 2013

Clenergy Australia
18/20 Duerdin Street
Clayton North VIC 3168

RE: Longline type clamp accreditation for use within Australia

Gamcorp (Melbourne) Pty Ltd, being Structural Engineers within the meaning of Australian Building Regulations, have carried out a structural design check of Clenergy Longline Type Clamp PV Mounting System for use in Australia. The design check has been based on the information by Clenergy Australia, and Uplift Load Testing Report (MT-130-33) by Melbourne Testing Services and PV-ezRack SolarRoof_Longline_Code Compliant Installation and Spacing Guide-AU_V1.0.

We find the Clenergy Longline Type Clamp PV Mounting System to be structurally sufficient for use at this location based on the following conditions:

- Wind Loads to AS/NZ1170.2:2011
- Wind Terrain Category 2
- Wind average recurrence interval of 50 years
- Wind Region A, B, C
- Building Height up to 20m
- Max. Solar Panel length 1.58 m

Refer to attached summary table for interface Spacing.

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

A handwritten signature in blue ink, appearing to read 'Martin Gamble'.

Martin Gamble
Managing Director
MAICD

A handwritten signature in blue ink, appearing to read 'Milan Bjelobrk'.

Milan Bjelobrk
MIEAust, CPEng, NPER 2210984,
RPEQ 12090, RBP EC-38461, NT BPB 139671ES

SUMMARY SHEET NO. 1
T.C. 2 for Regions A, B, C
Roof Interface Bracket Spacing (mm) Across for PV – ezRack Single Tripod and Adjustable Tilting System
Roof Interface Bracket Spacing (mm) Across for PV – ezRack Single Solar Tripod - ER-I-29 fixing anywhere on the Roofing sheet
Two Longline per frame

1578.85

WIND REGION	A					B										
	qu (kPa)	0.77	0.97	1.11	1.36	1.22	1.50	1.29	1.59	1.11	1.39	1.52	1.87	1.68	2.06	1.77
hz	5.0 m	10.0 m	15.0 m	15.0 m	15.0 m	20.0 m	20.0 m	20.0 m	5.0 m	10.0 m	10.0 m	15.0 m	15.0 m	20.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Longline 305	1579	1490	1441	1370	1407	1280	1388	1210	1441	1362	1332	1030	1280	930	1210	880
Force (kN/m)	0.63	0.88	0.91	1.24	1.00	1.37	1.05	1.45	0.91	1.27	1.24	1.70	1.37	1.88	1.45	1.98

KlipLok Type	Capacity kN
Longline 305	1.76

WIND REGION			C					
qu (kPa)	1.74	2.17	2.28	2.80	2.52	3.09	2.66	3.27
hz	5.0 m	10.0 m	10.0 m	15.0 m	15.0 m	20.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Longline 305	1230	890	940	690	850	620	800	590
Force (kN/m)	1.42	1.98	1.86	2.55	2.06	2.81	2.17	2.98



qu = ultimate wind pressure

Roof Interface Bracket Spacing (mm) Across for PV – ezRack Single Tripod and Adjustable Tilting System
Roof Interface Bracket Spacing (mm) Across for PV – ezRack Single Solar Tripod - ER-I-29 fixing on the Roofing sheet
Two Longline per frame

WIND REGION	A					B										
	qu (kPa)	0.77	0.97	1.11	1.36	1.22	1.50	1.29	1.59	1.11	1.39	1.52	1.87	1.68	2.06	1.77
hz	5.0 m	10.0 m	15.0 m	15.0 m	15.0 m	20.0 m	20.0 m	20.0 m	5.0 m	10.0 m	10.0 m	15.0 m	15.0 m	20.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Longline 305	1579	1490	1441	1350	1407	1230	1388	1160	1441	1320	1332	980	1220	890	1160	840
Force (kN/m)	0.63	0.88	0.91	1.24	1.00	1.37	1.05	1.45	0.91	1.27	1.24	1.70	1.37	1.88	1.45	1.98

KlipLok Type	Capacity kN
Longline 305	1.68

WIND REGION			C					
qu (kPa)	1.74	2.17	2.28	2.80	2.52	3.09	2.66	3.27
hz	5.0 m	10.0 m	10.0 m	15.0 m	15.0 m	20.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Longline 305	1180	850	900	650	810	590	770	560
Force (kN/m)	1.42	1.98	1.86	2.55	2.06	2.81	2.17	2.98



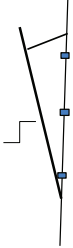
qu = ultimate wind pressure

SUMMARY SHEET NO. 2
T.C. 2 for Regions A, B, C
Roof Interface Bracket Spacing (mm) Across for PV – ezRack Single Tripod -ER-I-29 fixing anywhere on the Roofing sheet
Three Longline per frame

WIND REGION	A					B										
	qu (kPa)	0.77	0.97	1.11	1.36	1.22	1.50	1.29	1.59	1.11	1.39	1.52	1.87	1.68	2.06	1.77
hz	5.0 m		10.0 m		15.0 m		40.0 m		5.0 m		10.0 m		15.0 m		20.0 m	
Angle	≤ 15		≤ 30		≤ 15		≤ 30		≤ 15		≤ 30		≤ 15		≤ 30	
Longline 305	1579	1490	1441	1370	1407	1336	1368	1317	1441	1362	1332	1265	1299	1235	1282	1217
Force (kN/m)	0.46	0.57	0.66	0.81	0.72	0.89	0.95	1.17	0.66	0.82	0.90	1.11	1.00	1.22	1.05	1.29

WIND REGION	C		
	qu (kPa)	1.74	2.17
hz	5.0 m		10.0 m
Angle	≤ 15		≤ 30
Longline 305	1288	1219	1204
Force (kN/m)	1.03	1.29	1.35

KlipLok Type	Capacity
	Longline 305
	1.76




qu = ultimate wind pressure

Roof Interface Bracket Spacing (mm) Across for PV – ezRack Single Tripod - ER-I-29 fixing on the Roofing sheet
Three Longline per frame

WIND REGION	A					B										
	qu (kPa)	0.77	0.97	1.11	1.36	1.22	1.50	1.29	1.59	1.11	1.39	1.52	1.87	1.68	2.06	1.77
hz	5.0 m		10.0 m		15.0 m		40.0 m		5.0 m		10.0 m		15.0 m		20.0 m	
Angle	≤ 15		≤ 30		≤ 15		≤ 30		≤ 15		≤ 30		≤ 15		≤ 30	
Longline 305	1579	1490	1441	1370	1407	1336	1368	1317	1441	1362	1332	1265	1299	1235	1282	1217
Force (kN/m)	0.46	0.57	0.66	0.81	0.72	0.89	0.95	1.17	0.66	0.82	0.90	1.11	1.00	1.22	1.05	1.29

WIND REGION	C		
	qu (kPa)	1.74	2.17
hz	5.0 m		10.0 m
Angle	≤ 15		≤ 30
Longline 305	1288	1219	1204
Force (kN/m)	1.03	1.29	1.35

KlipLok Type	Capacity
	Longline 305
	1.68



qu = ultimate wind pressure

General Notes

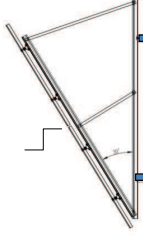
- Roof interface bracket spacing in the above table for panel length of 1.58 m. Roof interface bracket spacing will be reduced by,
 - 6% for solar panel length upto 1.7m
 - 11.5% for solar panel length upto 1.8m
 - 21% for solar panel length upto 2.0m
- The table prepared based on ER-R-S or ER-R-T50 Rail capacity and longline bracket pull-out capacity.
- This tables refer to using longline type interface (ER-I-29) with Adjustable Tilt Leg using 2-M8 bolts for the connection and also with single Tripod using 2-M8 bolts for connection.
- Max. distance allowed from the end of the single Tripod base to fixing of the longline bracket is 225 mm.
- The above mentioned spacing table is for Roof Interface Bracket fixing including edge of the roof.
- "On purlin" means that distance from the purlin to the longline type bracket(centre to centre) is not more than 100mm.
- The test position in line with clip at end purlin was not used to obtain the spacing above.

SUMMARY SHEET NO. 3
T.C. 2 for Regions A, B, C
Roof Interface Bracket Spacing (mm) Across for PV – ezRack Double Tripod - ER-I-29 fixing anywhere on the Roofing sheet
Two Longline per frame

WIND REGION	A					B										
	qu (kPa)	0.77	0.97	1.11	1.36	1.22	1.50	1.29	1.59	1.11	1.39	1.52	1.87	1.68	2.06	1.77
hz	5.0 m	≤ 15	≤ 30	≤ 30	15.0 m	≤ 15	≤ 30	20.0 m	5.0 m	≤ 15	10.0 m	≤ 30	15.0 m	≤ 15	≤ 30	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Longline 305	1290	920	890	650	810	590	770	560	890	640	650	470	590	430	560	400
Force (kN/m)	1.36	1.91	1.96	2.68	2.16	2.96	2.28	3.13	1.96	2.74	2.69	3.68	2.97	4.06	3.13	4.30

WIND REGION	C		
	qu (kPa)	1.74	2.17
hz	5.0 m	≤ 15	≤ 30
Angle	≤ 15	≤ 30	≤ 15
Longline 305	570	410	390
Force (kN/m)	3.08	4.28	4.48

Kiplok Type	Capacity kN
Longline 305	1.76



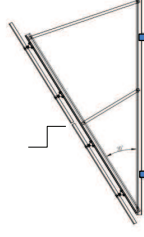
qu = ultimate wind pressure

Roof Interface Bracket Spacing (mm) Across for PV – ezRack Double Tripod - ER-I-29 fixing on purlin on the Roofing sheet
Two Longline per frame

WIND REGION	A					B										
	qu (kPa)	0.77	0.97	1.11	1.36	1.22	1.50	1.29	1.59	1.11	1.39	1.52	1.87	1.68	2.06	1.77
hz	5.0 m	≤ 15	≤ 30	≤ 30	15.0 m	≤ 15	≤ 30	20.0 m	5.0 m	≤ 15	10.0 m	≤ 30	15.0 m	≤ 15	≤ 30	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Longline 305	1230	870	850	620	770	560	730	530	850	610	620	450	560	410	530	390
Force (kN/m)	1.36	1.91	1.96	2.68	2.16	2.96	2.28	3.13	1.96	2.74	2.69	3.68	2.97	4.06	3.13	4.30

WIND REGION	C		
	qu (kPa)	1.74	2.17
hz	5.0 m	≤ 15	≤ 30
Angle	≤ 15	≤ 30	≤ 15
Longline 305	540	390	370
Force (kN/m)	3.08	4.28	4.48

Kiplok Type	Capacity kN
Longline 305	1.68



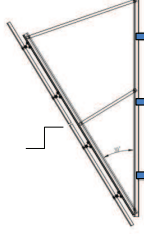
qu = ultimate wind pressure

SUMMARY SHEET NO. 4
T.C. 2 for Regions A, B, C
Roof Interface Bracket Spacing (mm) Across for PV – ezRack Double Tripod - ER-I-29 fixing anywhere on the Roofing sheet
Three Longline per frame

WIND REGION	A					B									
	0.77	0.97	1.11	1.36	1.50	1.29	1.59	1.11	1.39	1.52	1.87	1.68	2.06	1.77	2.18
qu (kPa)	5.0 m	≤ 15	≤ 30	10.0 m	15.0 m	20.0 m	20.0 m	5.0 m	10.0 m	10.0 m	15.0 m	15.0 m	20.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 30
Longline 305	1579	1410	1230	1000	1120	910	1060	860	1230	980	730	810	660	770	620
Force (kN/m)	0.99	1.24	1.42	1.74	1.56	1.92	1.65	2.04	1.42	1.78	1.95	2.40	2.15	2.64	2.27
Force (kN/m)	0.99	1.24	1.42	1.74	1.56	1.92	1.65	2.04	1.42	1.78	1.95	2.40	2.15	2.64	2.27

WIND REGION	C				
	1.74	2.17	2.28	2.80	2.52
qu (kPa)	5.0 m	10.0 m	15.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15
Longline 305	780	630	600	490	540
Force (kN/m)	2.23	2.78	2.92	3.59	3.23
Force (kN/m)	2.23	2.78	2.92	3.59	3.23

Kiplok Type	Capacity
Longline 305	1.76



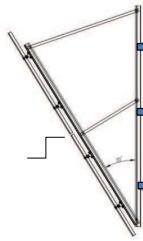
qu = ultimate wind pressure

Roof Interface Bracket Spacing (mm) Across for PV – ezRack Double Tripod - ER-I-29 fixing on purlin on the Roofing sheet
Three Longline per frame

WIND REGION	A					B									
	0.77	0.97	1.11	1.36	1.50	1.29	1.59	1.11	1.39	1.52	1.87	1.68	2.06	1.77	2.18
qu (kPa)	5.0 m	≤ 15	≤ 30	10.0 m	15.0 m	20.0 m	20.0 m	5.0 m	10.0 m	10.0 m	15.0 m	15.0 m	20.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 30
Longline 305	1579	1350	1180	960	1070	870	1010	820	1180	940	860	700	630	740	600
Force (kN/m)	0.99	1.24	1.42	1.74	1.56	1.92	1.65	2.04	1.42	1.78	1.95	2.40	2.15	2.64	2.27
Force (kN/m)	0.99	1.24	1.42	1.74	1.56	1.92	1.65	2.04	1.42	1.78	1.95	2.40	2.15	2.64	2.27

WIND REGION	C				
	1.74	2.17	2.28	2.80	2.52
qu (kPa)	5.0 m	10.0 m	15.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15
Longline 305	750	600	570	460	510
Force (kN/m)	2.23	2.78	2.92	3.59	3.23
Force (kN/m)	2.23	2.78	2.92	3.59	3.23

Kiplok Type	Capacity
Longline 305	1.68



qu = ultimate wind pressure

General Notes

- Roof interface bracket spacing in the above table for panel length of 1.58 m. Roof interface bracket spacing will be reduced by,
 - 6% for solar panel length upto 1.7m
 - 11.5% for solar panel length upto 1.8m
 - 21% for solar panel length upto 2.0m
- The table prepared based on ER-R-150 Rail capacity and longline bracket pull-out capacity.
- This tables refer to using longline type interface (ER-I-29) with Double Tripod using 2-M8 bolts for connection.
- Max. distance allowed from the end of the Double Tripod base to fixing of the longline bracket is 500 mm.
- The above mentioned spacing table is for Roof Interface Bracket fixing including edge of the roof.
- "On purlin" means that distance from the purlin to the longline type bracket(centre to centre) is not more than 100mm.
- The test position in line with clip at end purlin was not used to obtain the spacing above.

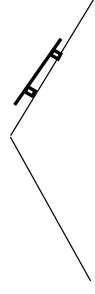
SUMMARY SHEET NO. 5
T.C. 2 for Regions A, B, C

Direct Mounting of the panels or using L-feet (ER-I-05) with two rails per panel
Roof Interface Bracket Spacing (mm) Across for PV – ezRack single Panel - ER-I-29 fixing anywhere on the Roofing sheet

WIND REGION	A					B										
	qu (kPa)	0.77	0.97	1.11	1.36	1.22	1.50	1.29	1.59	1.11	1.39	1.52	1.87	1.68	2.06	1.77
hz	5.0 m	10.0 m	15.0 m	20.0 m	15.0 m	20.0 m	20.0 m	20.0 m	5.0 m	10.0 m	10.0 m	15.0 m	15.0 m	15.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Longline 305	1579	1490	1441	1370	1407	1336	1388	1260	1441	1362	1320	1070	1190	970	1130	920
Force (kN/m)	0.67	0.85	0.97	1.19	1.07	1.31	1.13	1.39	0.97	1.21	1.33	1.63	1.47	1.80	1.55	1.90

WIND REGION	C							
	qu (kPa)	1.74	2.17	2.28	2.80	2.52	3.09	2.66
hz	5.0 m	10.0 m	15.0 m	15.0 m	15.0 m	20.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Longline 305	1150	920	880	710	790	650	750	610
Force (kN/m)	1.52	1.90	1.99	2.45	2.20	2.70	2.32	2.86

Kiplok Type	Capacity kN
Longline 305	1.76

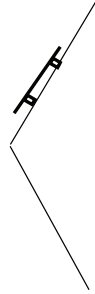


qu = ultimate wind pressure

Roof Interface Bracket Spacing (mm) Across for PV – ezRack single panel - ER-I-29 fixing on purlin on the Roofing sheet

WIND REGION	A					B										
	qu (kPa)	0.77	0.97	1.11	1.36	1.22	1.50	1.29	1.59	1.11	1.39	1.52	1.87	1.68	2.06	1.77
hz	5.0 m	10.0 m	15.0 m	20.0 m	15.0 m	20.0 m	20.0 m	20.0 m	5.0 m	10.0 m	10.0 m	15.0 m	15.0 m	15.0 m	20.0 m	20.0 m
Angle	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30	≤ 15	≤ 30
Longline 305	1579	1490	1441	1370	1407	1280	1368	1200	1441	1362	1260	1140	1080	930	1080	880
Force (kN/m)	0.67	0.85	0.97	1.19	1.07	1.31	1.13	1.39	0.97	1.21	1.33	1.63	1.47	1.80	1.55	1.90

Kiplok Type	Capacity kN
Longline 305	1.68



qu = ultimate wind pressure

General Notes

- 1 Roof interface bracket spacing in the above table for panel length of 1.58 m. Roof interface bracket spacing will be reduced by,
 - 6% for solar panel length upto 1.7m
 - 11.5% for solar panel length upto 1.8m
 - 21% for solar panel length upto 2.0m
- 2 The table prepared based on ER-R-ST Rail capacity and longline bracket pull-out capacity.
- 3 This tables refer to using longline type interface (ER-I-29) with single panel Flush mount using 1-M8 bolts for connection.
- 4 The above mentioned spacing table is for Roof Interface Bracket fixing including edge of the roof.
- 5 "On purlin" means that distance from the purlin to the longline type bracket(centre to centre) is not more than 100mm.
- 6 The test position in line with clip at end purlin was not used to obtain the spacing above.