

INSTALLATION INSTRUCTION

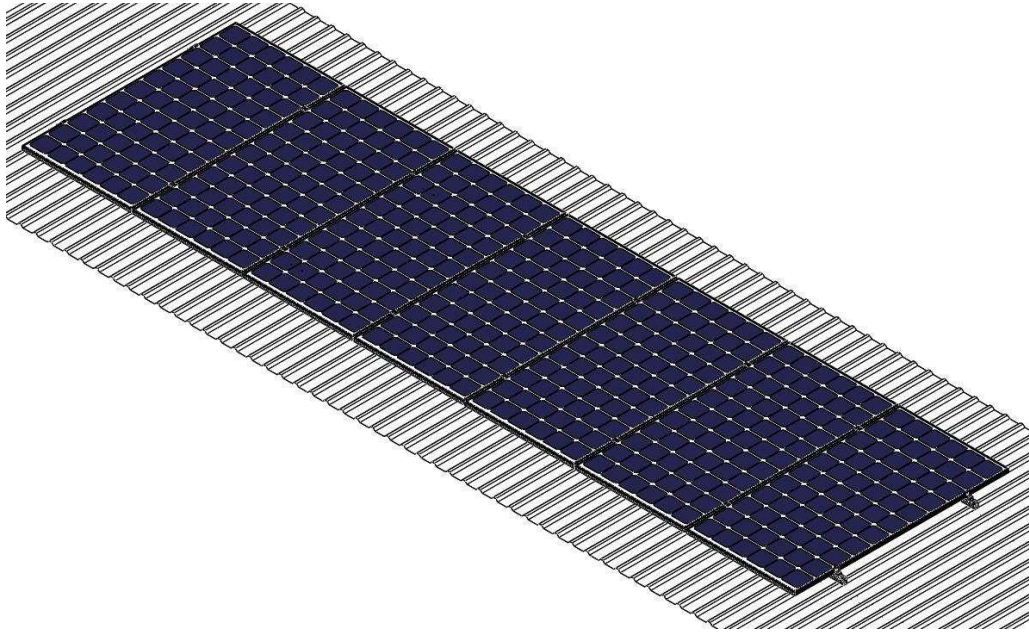


Installation Manual

L feet Solar roof mounting system



ANTAI
Aluminum & AI Tech for Solar



Content

I. Safety Precaution	3
II. Introduction	4
III. Tool	4
IV. Component.....	5
V. Installation Instruction.....	6
5.1 L Feet	6
5.2 Rail	7
5.3 Rail Splice.....	8
5.4 PV Module	9
5.5 Grounding Lug(Skip this chapter if no GL needed).....	11
5.6 Installation diagram.....	12
VI. Installation Precaution.....	13
6.1 Dimension.....	12
6.2 Fastener.	12

I. Safety Precaution

Thank you for purchasing Antai solar mounting system products. Please refer to this installation manual before installation, operation, maintenance, and inspection.

● Cautions

The installation is limited to those who have professional experience and can carry out construction according to the specified items.

Please abide by national or local building regulations and environmental protection regulations.

Please comply with the regulations on the prevention of industrial accidents and the relevant regulations of the insurance union.

There must be at least 2 operators during installation to prevent accidents.

Please wear safety clothes. (Especially protective helmets, boots and gloves)

Please always prepare at least one installation manual while installing.

Please set up scaffolds while working at heights, and carry out construction after eliminating the danger of falling. Please use gloves and seat belts.

- In order to prevent accidents and malfunctions, please do not arbitrarily change the product style.

- Please be careful not to damage the cross section or sharp corners of the mold.

- Please make sure fasteners are all tightened, like bolts, nuts, self-tapping screws, etc.

- Please be careful not to touch the profile section while working on electrical wiring and grounding constructions, which may damage the wiring.

- Please do not use damaged, malfunctioning or deformed products in case injury or accident happens.

Please use our designated products and do not arbitrarily transform and change them.

- Please avoid strong collisions in case any deformations and scratches occurred.

- This manual is related to the installation of the mounting system. Please consider the mounting system during the construction of the foundation, components, inverters, and electrical wirings.

II. Introduction

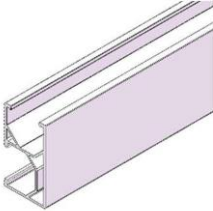
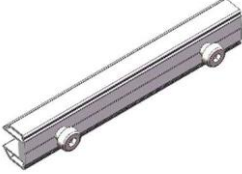
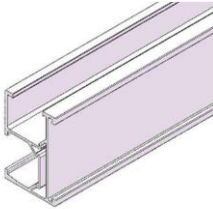
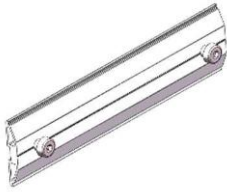
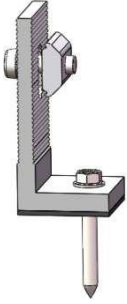
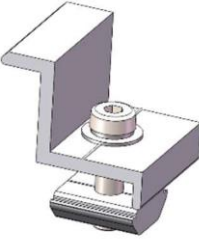
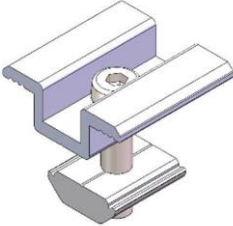
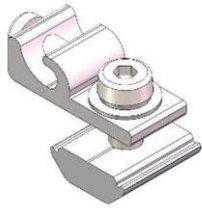
Antai's metal aluminum system is a roof photovoltaic support system applied to metal roof. Based on different types of metal roofs, every clamp is specially designed. In that case, each roof has its corresponding and fitting clamps to fix, which greatly improves the firmness of the connection between the system and the roof. Different types of high-quality clamps and rails not only can meet different demands in different countries and regions, but also improve the stability of the system. The whole system has fewer accessories, which saves the user's installation time and costs. It is an efficient solution for large-scale metal roof projects.

Please read this installation manual carefully before installation!

III. Installation Tool

			
8mm Inner Hexagon Spanner	Electric Drill	Tape Measure	Thin Marker
			
Torque Spanner	String	Adjustable Wrench	Socket wrench (M8)

IV. Component

Main List			
			
Rail 1 (Internal lock connection)	Rail splice 1	Rail 2 (External lock connection)	Rail splice 1
			
L feet	End clamp	Mid clamp	Grounding lug

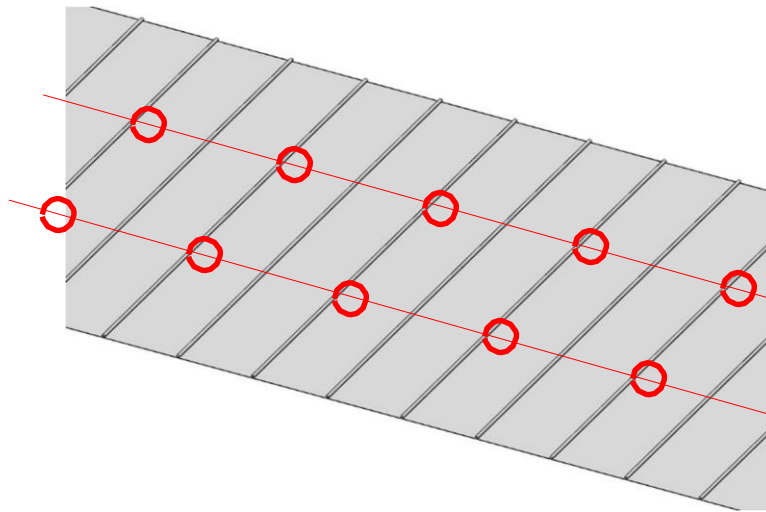
V. Installation Instruction

5.1 L Feet

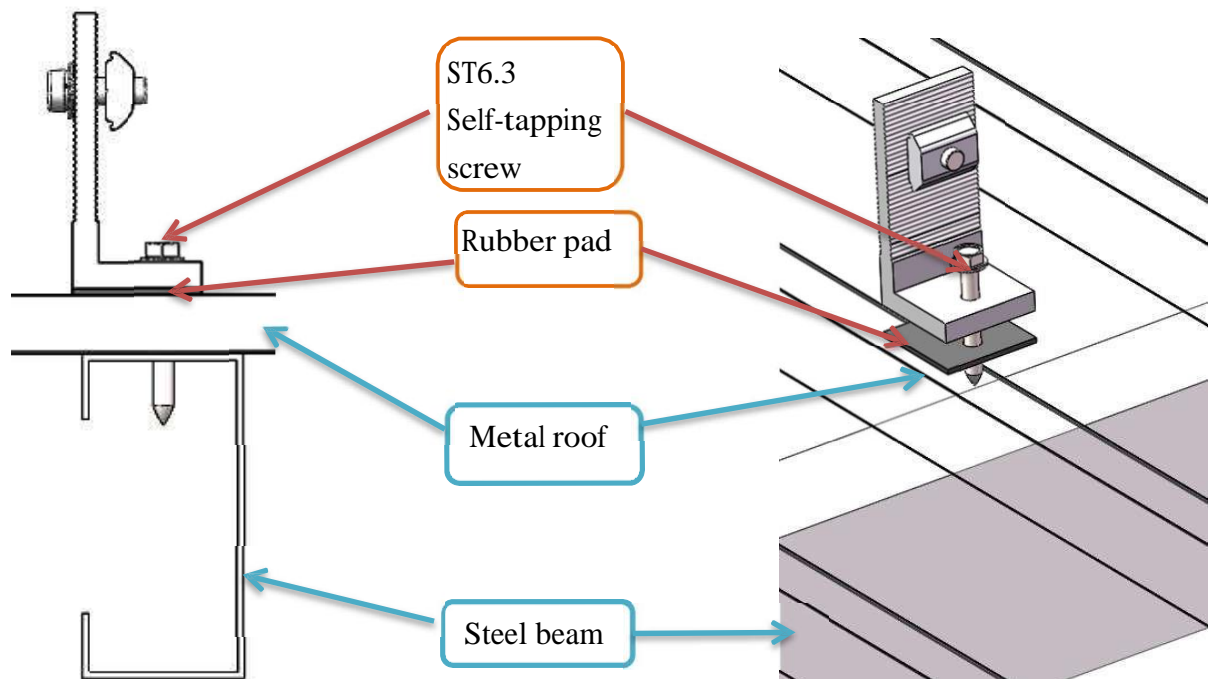
Marking the position of L feet according to drawings and making sure all L feet are installed on the same horizontal line. Install the L feet accordingly and fasten them to steel beams by self-tapping screws.

Shown as bellow:

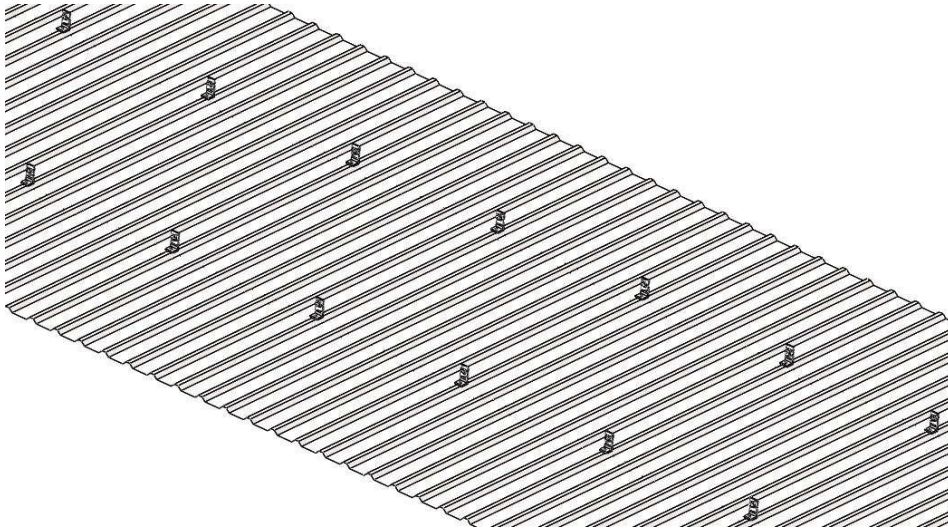
5.1.1 Mark the positions of L feet on metal roof and make sure they are at the same horizontal line.



L feet installation:



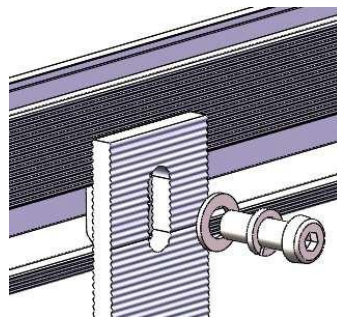
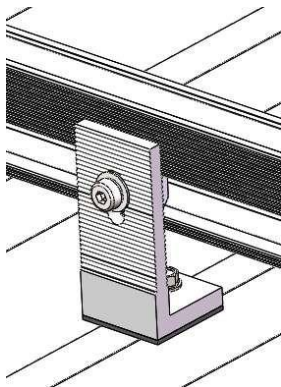
5.1.2 Install all L feet to the metal roof.



5.2 Rail

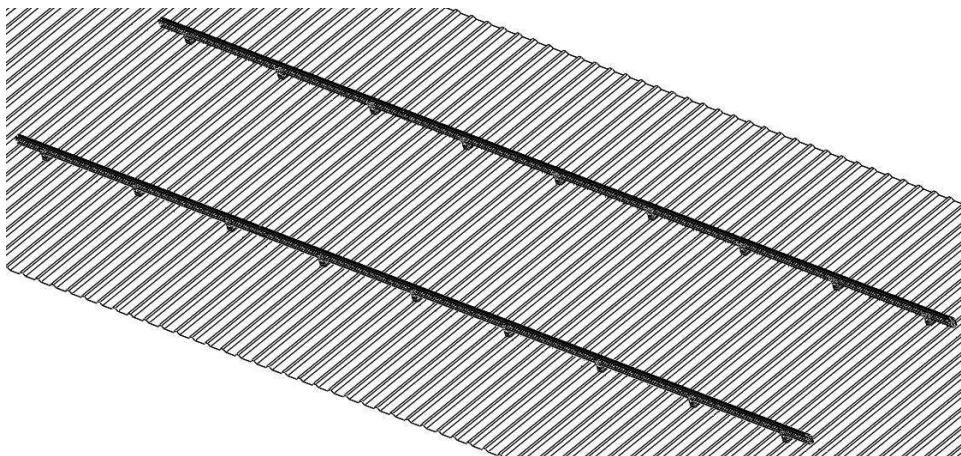
Fix rail to L feet after adjusting the length and height and tighten them by bolts.

5.2.1 Fix L feet and adjust the rail position, slide T module into specified rail (refer to drawings) and then tighten them by bolts.



M8 Hexagon socket bolt
Spring washer
Flat washer
T module

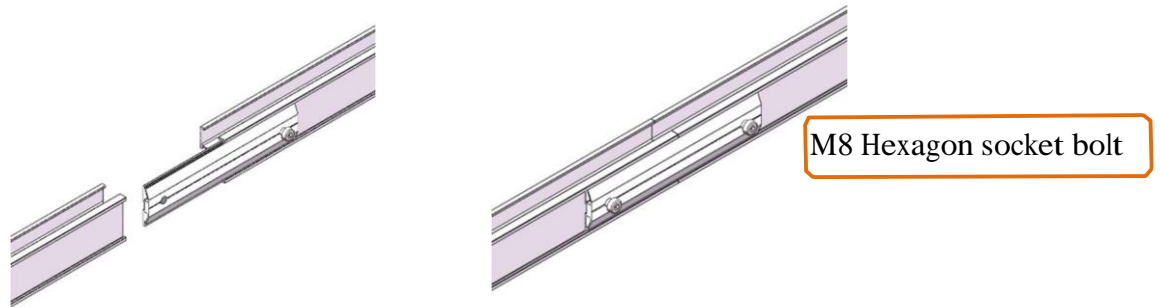
5.2.2 Install other rails accordingly.



5.3 Rail Splice

Rails should be connected by rail splice if needed, as shown below:

5.3.1 Slide half of the rail splice into the first rail, adjust the fixed position, and tighten the bolts. Then Slide the second rail into the rail splice, tighten them by bolts when leveled. Achieve the connection effect.

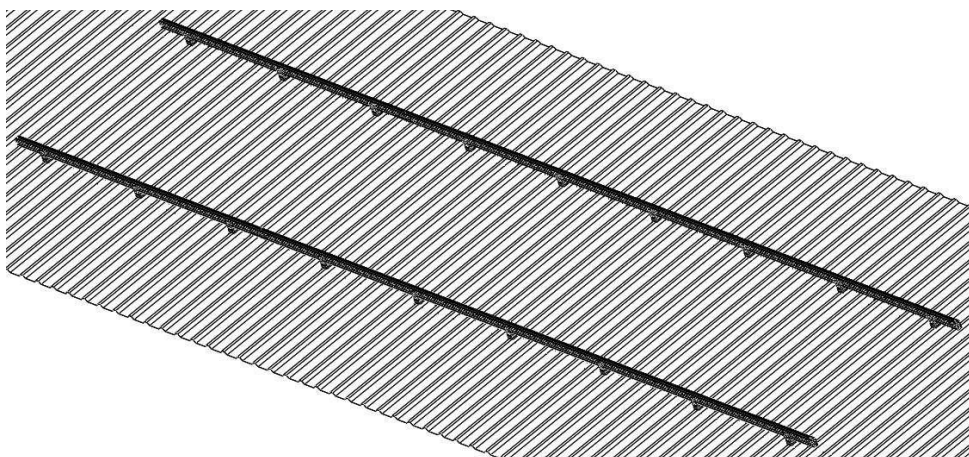


Used for TYN53、CG019、TYN28 and other external lock connection rails



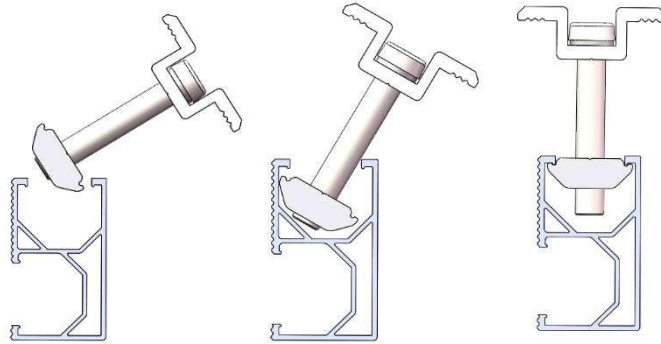
Used for CG010、TYN305、TYN355 and other internal lock connection rails

5.3.2 Completed installation is as the pic shown below

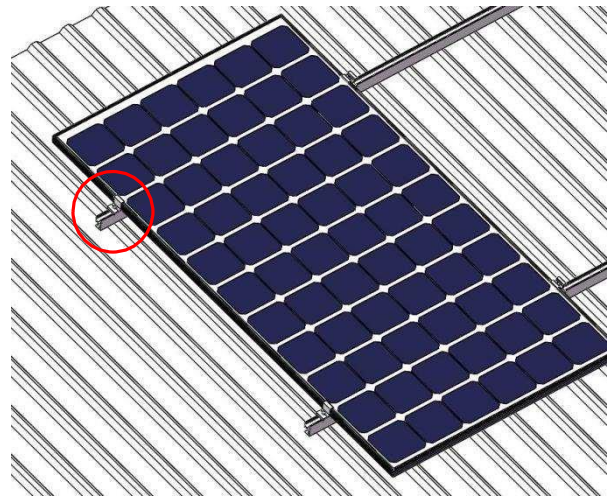
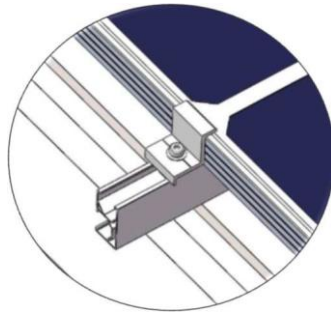


5.4 PV Module

According to the installation dimensions of the drawings, place the PV module on the rail, and fix them with end clamps, mid clamps.

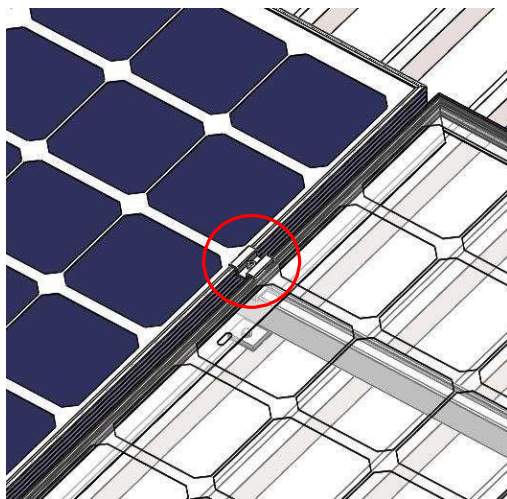


5.4.1 Place the PV module on the rail and adjust the position according to the drawing. then place the end clamp into the rail groove, and fix them with bolts.



M8×30 Hexagon socket bolt
Flat washer
Spring washer
T module

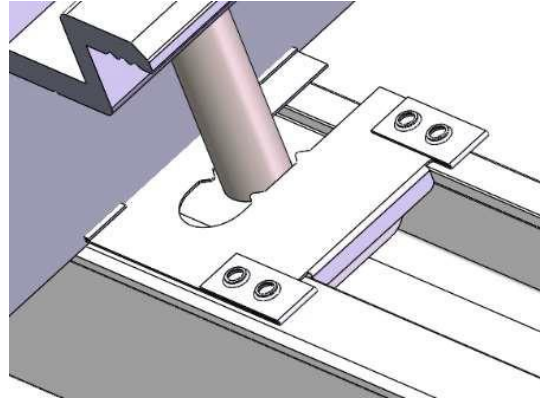
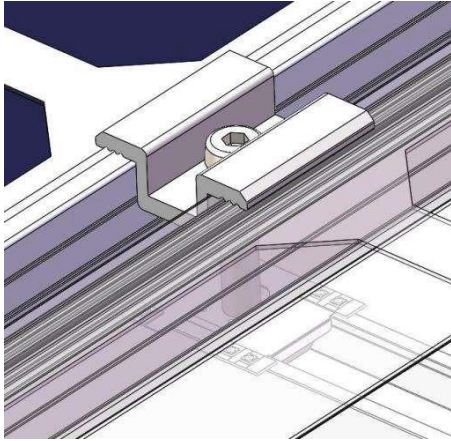
5.4.2 After fixing the end clamp of first PV module, please put the second PV module on the rail at proper position. Connecting firmly the first PV module and the second one with mid clamp and fixing tightly with bolts.



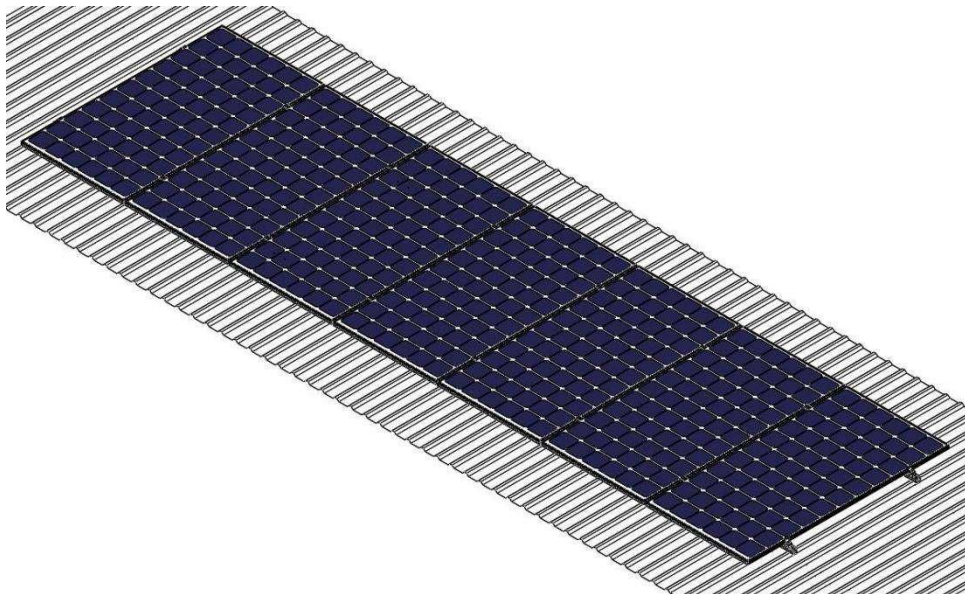
M8 Hexagon socket bolt
Spring washer
T module



5.4.3 If there are earthing clips needed, place them between the PV modules and rails while installing the mid clamps. Adjusting the position to ensure the sharp spikes on earthing clips are pressed by both PV modules. Then tighten the mid clamps by bolts.

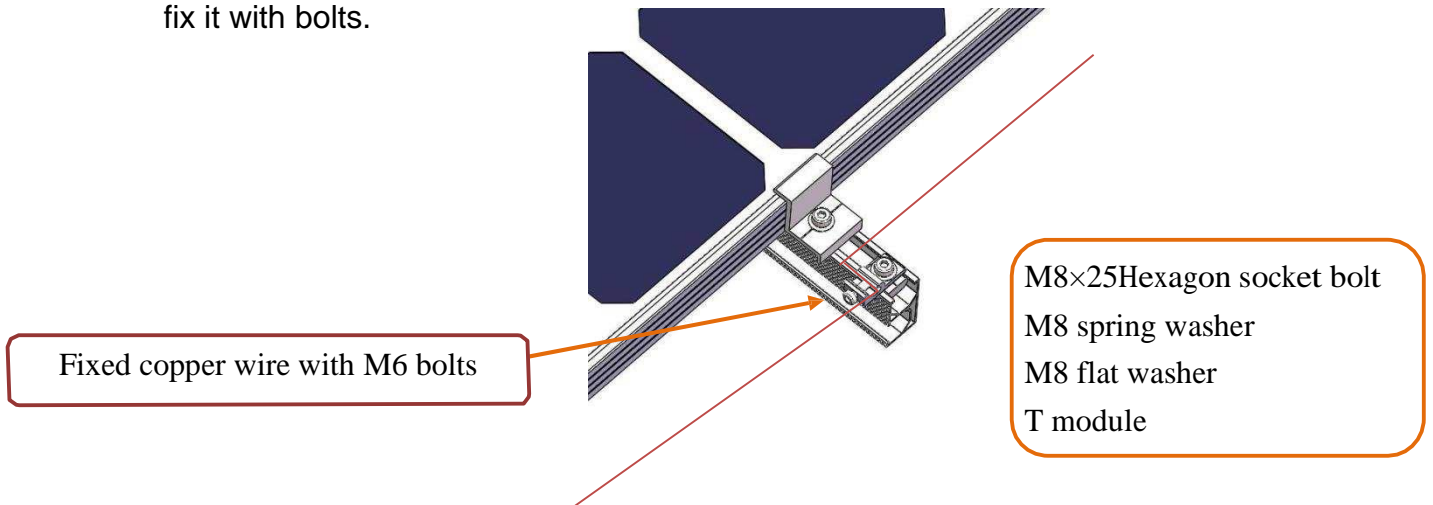


5.4.4 Repeat the steps above. When it comes to the last PV module, fix it with the end clamp and tighten it with bolts.

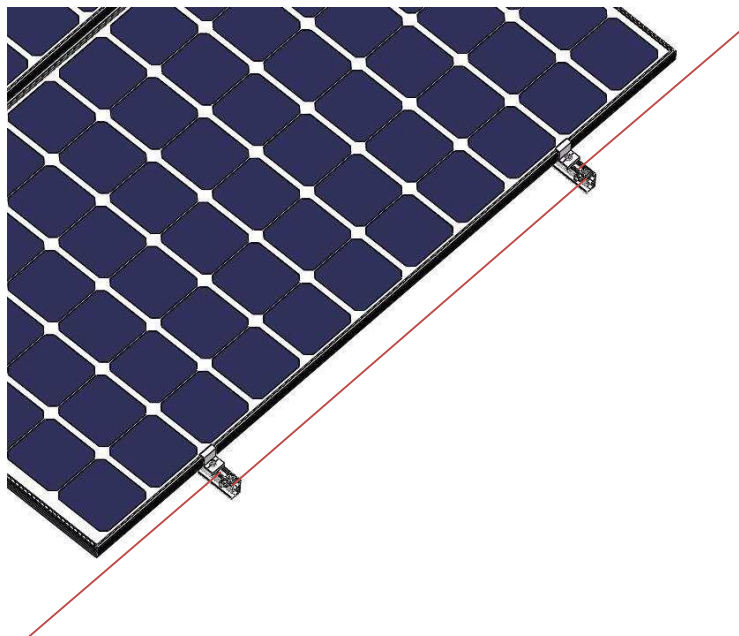


5.5 Grounding Lug (Skip this chapter if no GL needed)

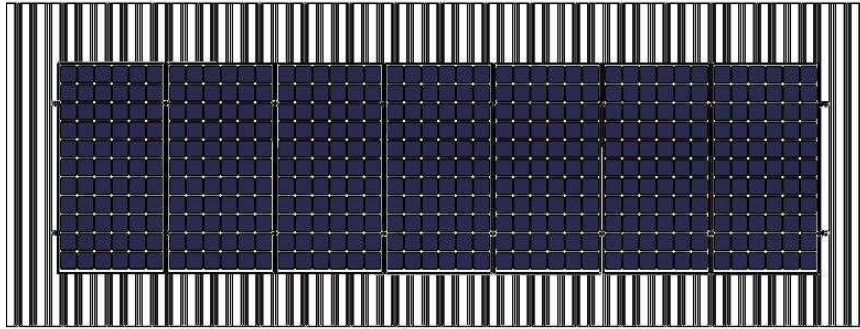
5.5.1 Install grounding lug at the end of the rail as the picture shown below and fix it with bolts.



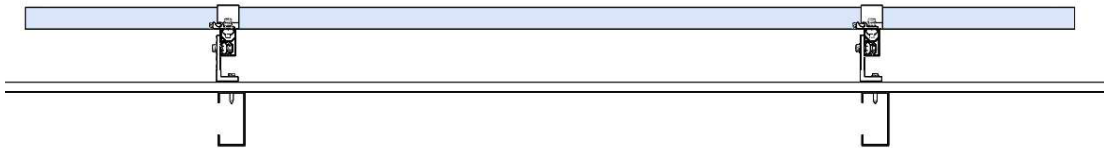
5.5.2 At the edge of the layout, connect each grounding lug with copper wire, fix the copper wire with M6 bolts, and ground the copper wire at the end.



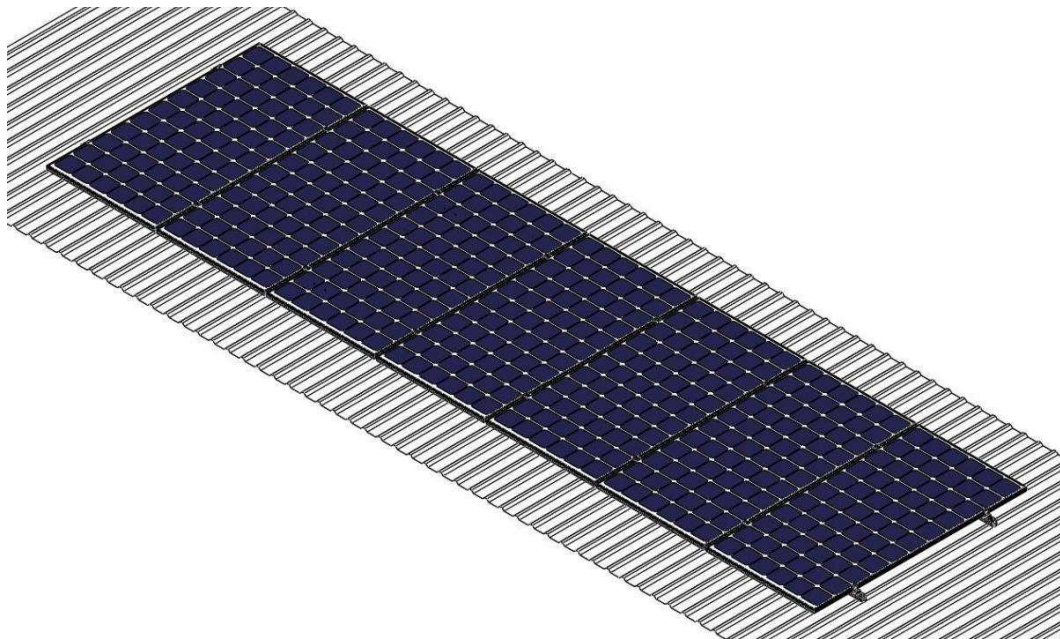
5.6 Installation diagram



Top view



Side view



Axonometric drawing

VI. Installation Precaution

6.1 Dimension

The specific dimensions of engineering installation shall be subject to the engineering construction drawings. This installation manual is only for the instruction of product installation method.

6.2. Fastener

Because of the good ductility for stainless steel, fasteners have big difference with carbon steel one in nature. If used in inappropriate way, it will result in bolts and nuts being locked-up. To avoid this situation, please follow the solutions below:

6.2.1.Reducing the friction coefficient:

(1) Ensure that the screw thread surface is clean (no dust, gravel etc.) (2) Use wax or lubricant during installation. (Such as butter, 40 # engine oil);

6.2.2.Correct method of operation:

(1) Must be perpendicular to the axis of the screw thread when screwing, can never be tilt.

(2) During the tightening process, strength needs to be even.

(3) Use torque wrenches or socket wrenches if possible, avoid using adjustable wrenches or electric wrenches. (If so, pls try to reduce the speed.)

(4) Do not use it when the temperature is high. Do not use it with high speed spin to avoid being locked-up due to the rapid rise of temperature. (Such as electric wrench, etc.)

HQ Add

30F, W Square, 1801 Huandao East Road
Siming District, Xiamen, China

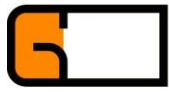
Production Base Add

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Changtai County, Zhangzhou, China

Website

www.antisolar.com





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Structural Design Documentation

Flush Array Frame System Spacing Table For Tin Roof

According to AS/NZS 1170.2-2011 (R2016)
with Rail ATL-TYN-305A
within Australia Terrain
Category 2 & 3

For: ANTAI SOLAR AUSTRALIA PTY LTD
Level 1 suite 1.02/309 Pitt St
Sydney NSW 2000



Job Number: 9670-09

Date: 18 May 2021

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Job No: 9670-09
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Project: Flush Array Frame System Spacing Table For Tin Roof
with Rail ATL-TYN-305A
Address: within Australia

Australian Standards

AS/NZS 1170.0:2002 – Structural design actions, Part 0: General principles

AS/NZS 1170.1:2002 (R2016) – Structural design actions, Part 1: Permanent, imposed
and other actions

AS/NZS 1170.2:2011 (R2016) – Structural design actions, Part 2: Wind actions

AS/NZS 1664.1:1997 – Aluminium structures - Limit state design

AS 4100:2020 – Steel Structures

AS/NZS 4600:2018 – Cold-formed Steel Structures

Wind Terrain Category: WTC2 & 3

Designed: JD
Checked: AA

Date: May-21

Client: ANTAISOLAR AUSTRALIA PTY LTD
 Project: Solar Array Interface Spacing Table
 Address: within Australia
 Designed: JD

Job: 9670-09
 Date: May-21
 Checked: AA

Flush Array Frame System Spacing Table for Tin Roof (mm)

Type of Rail: ATL-TYN-305A
 Type of Interface: L-Feet
 Solar Panel Dimension: 2.3mx1.2m
 Terrain category: 2

Roof Angle (Φ) - $\Phi < 5^\circ$

Wind Region	Building Height - H (m)							
	H \leq 5		5<H \leq 10		10<H \leq 15		15<H \leq 20	
	End	Central	End	Central	End	Central	End	Central
A	1270	1450	665	1275	610	1145	555	720
B	725	1035	605	725	475	665	--	630
C	235	530	--	245	--	--	--	--
D	--	--	--	--	--	--	--	--

Roof Angle (Φ) - $5^\circ \leq \Phi \leq 30^\circ$

Wind Region	Building Height - H (m)							
	H \leq 5		5<H \leq 10		10<H \leq 15		15<H \leq 20	
	End	Central	End	Central	End	Central	End	Central
A	1270	1545	665	1430	610	1355	555	1275
B	725	1225	605	995	475	795	--	725
C	235	625	--	515	--	345	--	245
D	--	290	--	--	--	--	--	--

Roof Angle (Φ) - $30^\circ \leq \Phi \leq 60^\circ$

Wind Region	Building Height - H (m)							
	H \leq 5		5<H \leq 10		10<H \leq 15		15<H \leq 20	
	Intermediate	Internal	Intermediate	Internal	Intermediate	Internal	Intermediate	Internal
A	1470	1735	1325	1610	1190	1545	1125	1510
B	1075	1665	760	1365	680	1225	645	1150
C	555	855	295	695	--	625	--	590
D	--	545	--	445	--	290	--	260

Flush Array Frame System Spacing Table for Tin Roof (mm)

Type of Rail ATL-TYN-305A
 Type of Interface L-Feet
 Solar Panel Dimension 2.3mx1.2m
 Terrain category 3

Roof Angle (Φ) - $\Phi < 5^\circ$

Wind Region	Building Height - H (m)							
	H \leq 5		5<H \leq 10		10<H \leq 15		15<H \leq 20	
	End	Central	End	Central	End	Central	End	Central
A	1445	1565	1445	1565	1330	1480	1180	1415
B	1020	1260	1020	1260	785	1085	675	965
C	525	645	525	645	310	555	--	450
D	--	415	--	415	--	--	--	--

Roof Angle (Φ) - $5^\circ \leq \Phi \leq 30^\circ$

Wind Region	Building Height - H (m)							
	H \leq 5		5<H \leq 10		10<H \leq 15		15<H \leq 20	
	End	Central	End	Central	End	Central	End	Central
A	1445	1670	1445	1670	1330	1575	1180	1505
B	1020	1495	1020	1495	785	1285	675	1140
C	525	760	525	760	310	655	--	585
D	--	485	--	485	--	415	--	250

Roof Angle (Φ) - $30^\circ \leq \Phi \leq 60^\circ$

Wind Region	Building Height - H (m)							
	H \leq 5		5<H \leq 10		10<H \leq 15		15<H \leq 20	
	Intermediate	Internal	Intermediate	Internal	Intermediate	Internal	Intermediate	Internal
A	1590	1850	1590	1850	1500	1765	1435	1695
B	1310	1780	1310	1780	1130	1700	1005	1565
C	670	1040	670	1040	580	890	515	795
D	430	660	430	660	250	570	--	505

General Notes

Note 1 Following components are satisfied to use according to AS/NZS 1170.2-2011(R2016)

Components	Part Number	Description
Rail	ATL-TYN-305A	As per drawing & test report provided by client
Splice	ATL-TYN-304/54	
L Feet	ATL-FWNY-05	

Note 2 Spacing calculated based on 1.9mm steel purlin or 35mm screw embedment length into timber (JD4 seasoned timber).

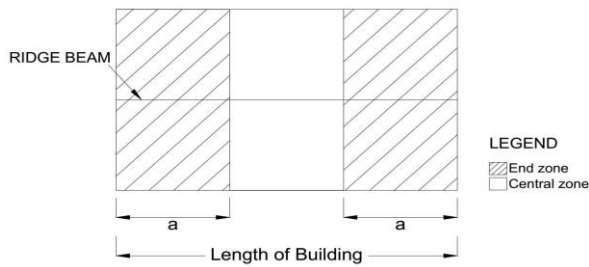
Note 3 Recommended screws

Metal Purlins/Battens 14g-10 TPI Tek screws or approved equivalent
 Timber Purlins/Battens 14g-10 TPI T17 screws or approved equivalent

Note 4 Maximum uplift wind pressure is limited to 5 kPa. "--" states more uplift pressure.

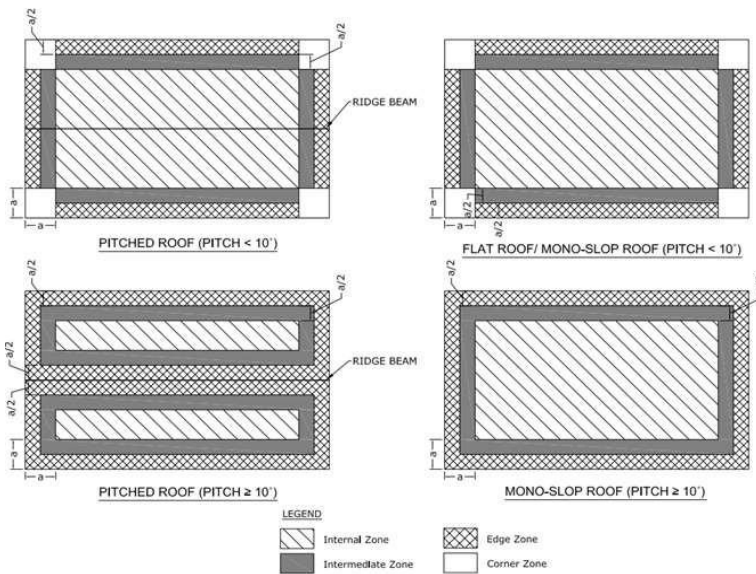
Note 5 Deflection is limited to Minimum of L/120 and 15mm

Note 6 For definition of (End/Central) roof zones, Refer Figure D9 of AS/NZS 1170.2:2011 (R2016) or Figure A as below
 For definition of intermediate and internal roof zones, Refer Figure B as below



In Figure A, the value of dimension "a" is 1/3 of the length of building

Figure A



In Figure B, the value of dimension "a" is the minimum of 0.2b, 0.2d and h. (b & d are building dimensions and h is its height)

Figure B

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Project: Solar Array Interface Spacing Table
Address: within Australia
Designed: JD

Job: 9670-09
Date: May-21

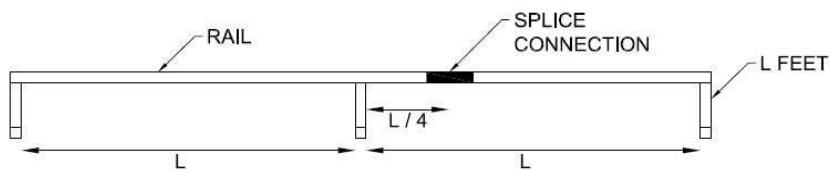
Checked: AA

Note 7

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 obstructions per hectare, e.g. farmland and cleared subdivisions with isolated trees and uncut grass.
Terrain Category 3 (TC3) refers to terrain with numerous closely spaced obstructions having heights generally from 3 m to 10 m. The minimum density of obstructions shall be at least the equivalent of 10 house-size obstructions per hectare, e.g. suburban housing, light industrial estates or dense forests.

Note 8

The optimised location of rail splice connection is at quarter length of the spacing of the interface. No Splice connection should be placed at the centre of spacing or over the interface.



Structural Design Documentation

Flush Array Frame System Spacing Table For Tin Roof

According to AS/NZS 1170.2-2011 (R2016)
with Rail ATL-TYN-305B
within Australia Terrain
Category 2 & 3

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Wind Terrain Category: WTC2 & 3

Designed: JD
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Flush Array Frame System Spacing Table for Tin Roof (mm)

Type of Rail: ATL-TYN-305B
 Type of Interface: L-Feet
 Solar Panel Dimension: 2.3mx1.2m
 Terrain category: 2

Roof Angle (Φ) - $\Phi < 5^\circ$

Wind Region	Building Height - H (m)							
	H \leq 5		5<H \leq 10		10<H \leq 15		15<H \leq 20	
	End	Central	End	Central	End	Central	End	Central
A	1270	1400	615	1275	525	1135	--	640
B	665	1035	500	665	--	610	--	555
C	--	420	--	--	--	--	--	--
D	--	--	--	--	--	--	--	--

Roof Angle (Φ) - $5^\circ \leq \Phi \leq 30^\circ$

Wind Region	Building Height - H (m)							
	H \leq 5		5<H \leq 10		10<H \leq 15		15<H \leq 20	
	End	Central	End	Central	End	Central	End	Central
A	1270	1490	615	1385	525	1330	--	1275
B	665	1225	500	990	--	700	--	665
C	--	625	--	390	--	--	--	--
D	--	250	--	--	--	--	--	--

Roof Angle (Φ) - $30^\circ \leq \Phi \leq 60^\circ$

Wind Region	Building Height - H (m)							
	H \leq 5		5<H \leq 10		10<H \leq 15		15<H \leq 20	
	Intermediate	Internal	Intermediate	Internal	Intermediate	Internal	Intermediate	Internal
A	1420	1685	1320	1555	1190	1490	690	1460
B	1075	1610	690	1365	630	1225	605	1150
C	545	855	--	695	--	625	--	590
D	--	545	--	325	--	250	--	--

Flush Array Frame System Spacing Table for Tin Roof (mm)

Type of Rail ATL-TYN-305B
 Type of Interface L-Feet
 Solar Panel Dimension 2.3mx1.2m
 Terrain category 3

Roof Angle (Φ) - $\Phi < 5^\circ$

Wind Region	Building Height - H (m)							
	H \leq 5		5<H \leq 10		10<H \leq 15		15<H \leq 20	
	End	Central	End	Central	End	Central	End	Central
A	1400	1510	1400	1510	1325	1430	1180	1370
B	1020	1260	1020	1260	690	1085	620	770
C	405	645	405	645	--	555	--	305
D	--	285	--	285	--	--	--	--

Roof Angle (Φ) - $5^\circ \leq \Phi \leq 30^\circ$

Wind Region	Building Height - H (m)							
	H \leq 5		5<H \leq 10		10<H \leq 15		15<H \leq 20	
	End	Central	End	Central	End	Central	End	Central
A	1400	1610	1400	1610	1325	1520	1180	1455
B	1020	1495	1020	1495	690	1285	620	1140
C	405	760	405	760	--	655	--	585
D	--	485	--	485	--	300	--	--

Roof Angle (Φ) - $30^\circ \leq \Phi \leq 60^\circ$

Wind Region	Building Height - H (m)							
	H \leq 5		5<H \leq 10		10<H \leq 15		15<H \leq 20	
	Intermediate	Internal	Intermediate	Internal	Intermediate	Internal	Intermediate	Internal
A	1535	1805	1535	1805	1450	1720	1385	1640
B	1310	1735	1310	1735	1130	1645	1005	1565
C	670	1040	670	1040	575	890	390	795
D	310	660	310	660	--	570	--	505

General Notes

Note 1 Following components are satisfied to use according to AS/NZS 1170.2-2011(R2016)

Components	Part Number	Description
Rail	ATL-TYN-305B	As per drawing & test report provided by client
Splice	ATL-TYN-304/54	
L Feet	ATL-FWNY-05	

Note 2 Spacing calculated based on 1.9mm steel purlin or 35mm screw embedment length into timber (JD4 seasoned timber).

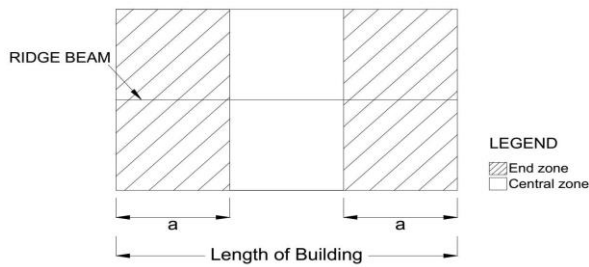
Note 3 Recommended screws

Metal Purlins/Battens 14g-10 TPI Tek screws or approved equivalent
 Timber Purlins/Battens 14g-10 TPI T17 screws or approved equivalent

Note 4 Maximum uplift wind pressure is limited to 5 kPa. "--" states more uplift pressure.

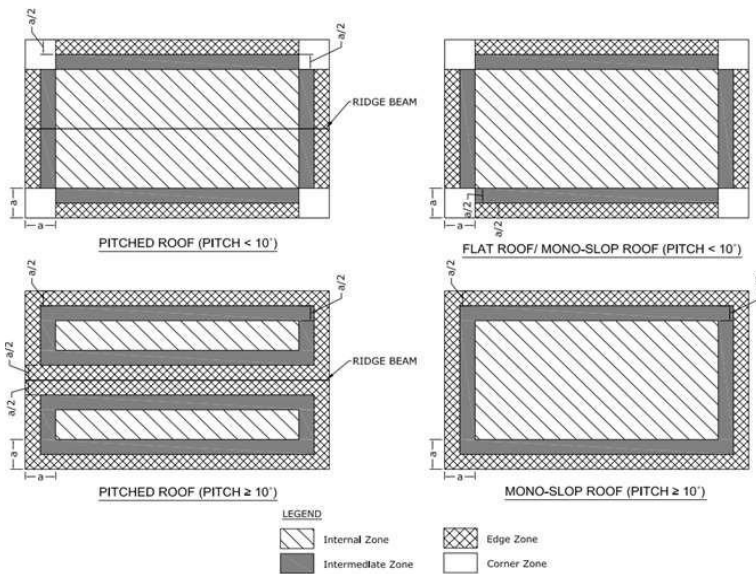
Note 5 Deflection is limited to Minimum of L/120 and 15mm

Note 6 For definition of (End/Central) roof zones, Refer Figure D9 of AS/NZS 1170.2:2011 (R2016) or Figure A as below
 For definition of intermediate and internal roof zones, Refer Figure B as below



In Figure A, the value of dimension "a" is 1/3 of the length of building

Figure A



In Figure B, the value of dimension "a" is the minimum of 0.2b, 0.2d and h. (b & d are building dimensions and h is its height)

Figure B

Relationships built on trust

Client: ANTAISOLAR AUSTRALIA PTY LTD
Project: Solar Array Interface Spacing Table
Address: within Australia
Designed: JD

Job: 9670-09
Date: May-21

Checked: AA

Note 7

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 obstructions per hectare, e.g. farmland and cleared subdivisions with isolated trees and uncut grass.
Terrain Category 3 (TC3) refers to terrain with numerous closely spaced obstructions having heights generally from 3 m to 10 m. The minimum density of obstructions shall be at least the equivalent of 10 house-size obstructions per hectare, e.g. suburban housing, light industrial estates or dense forests.

Note 8

The optimised location of rail splice connection is at quarter length of the spacing of the interface. No Splice connection should be placed at the centre of spacing or over the interface.

