

		Tilt Legs		created	JM
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INTRODUCTION

Tilt legs are used to elevate the PV modules above the roof so that they are inclined at the optimum angle to the sun. The array also acts as a sail to catch the wind, and can greatly increase the load on the roof frame. For this reason; both the strength of the roof frame and the fixing spacing need to be checked by a structural engineer.



GUIDE TO USE

Strength of the roof frame

An elevated (or tilted) array can catch the wind, doubling the load on the roof frame. For this reason, the strength of the roof frame has to be checked by a structural engineer. The following information needs to be collected and supplied to the structural engineer:

- Site location
- Roof material
- Roof sheet fixing method
- Batten material, size, span and spacing
- Rafter / truss material, size, span and spacing
- Ideally, building & roof plans
- Location of PV array on roof
- Inclination angle of the array, and roof pitch

Number of fixings

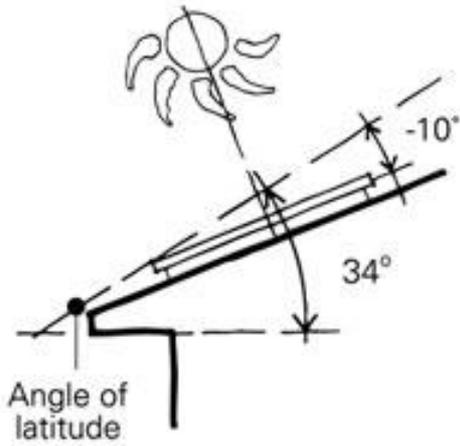
To ensure that the tilt array is securely attached to the roof frame, the correct number of fixings must be used. The SunLock installation manual includes tables of fixing spacings for tilt-legs. Please refer to drawings S7 and S8.

Avoid roof edges

If possible, avoid installing in the edge exclusion zone (near the edge of the roof), as this zone has a higher wind load and requires more fixings. If the array must be installed in the edge exclusion zone, the fixings in the zone should use half the fixing spacing. For more information refer to the SunLock installation manual.

Inclination angle

For standard grid-connected systems, the length of the tilt legs should be chosen to produce an inclination angle 10 degrees lower (flatter) than the latitude of the site. For more information refer to the technical bulletin on inclination.

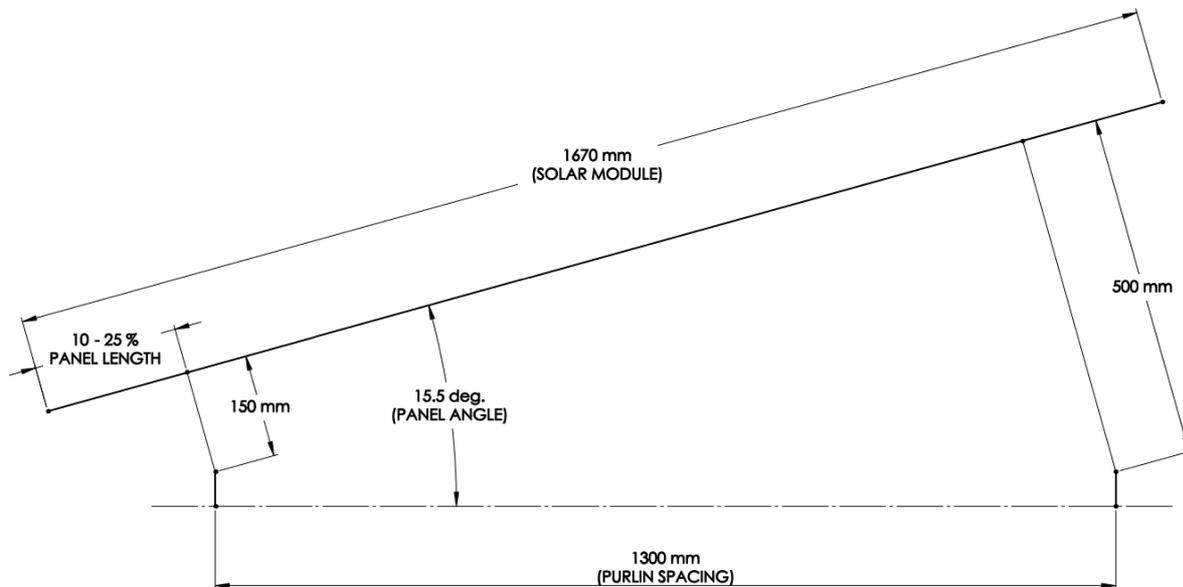


Example: Sydney's latitude is 34°. The optimum inclination is 10° lower, or 24°

Angle of panel array in relation to purlin spacing and leg length

Purlin Spacing	SunLock Tilt Leg				
	SLTL300	SLTL500	SLTL600	SLTL700	SLTL800
900	10°	23°	N/A	N/A	N/A
1000	9°	21°	27°	N/A	N/A
1100	8°	19°	24°	30°	N/A
1200	7°	17°	22°	27°	33°
1300	6°	15°	20°	25°	30°

Based on REC 250W Solar Module



SunLock channel

If the spacing between the front and rear tilt-legs does not match the batten spacing, then SunLock channel can be used for the rear legs to bridge the gap, as shown in the image below. This has the added advantage of doubling the number of fixings for the rear legs, which have the highest loading.

For more information, refer to the technical bulletin on SunLock channel.



Diagonal braces

A diagonal brace (SLDB1200) should be fitted to each end of each row. This stiffens the structure against side winds. The braces should be installed at approximately 45 degrees (± 15 degrees).

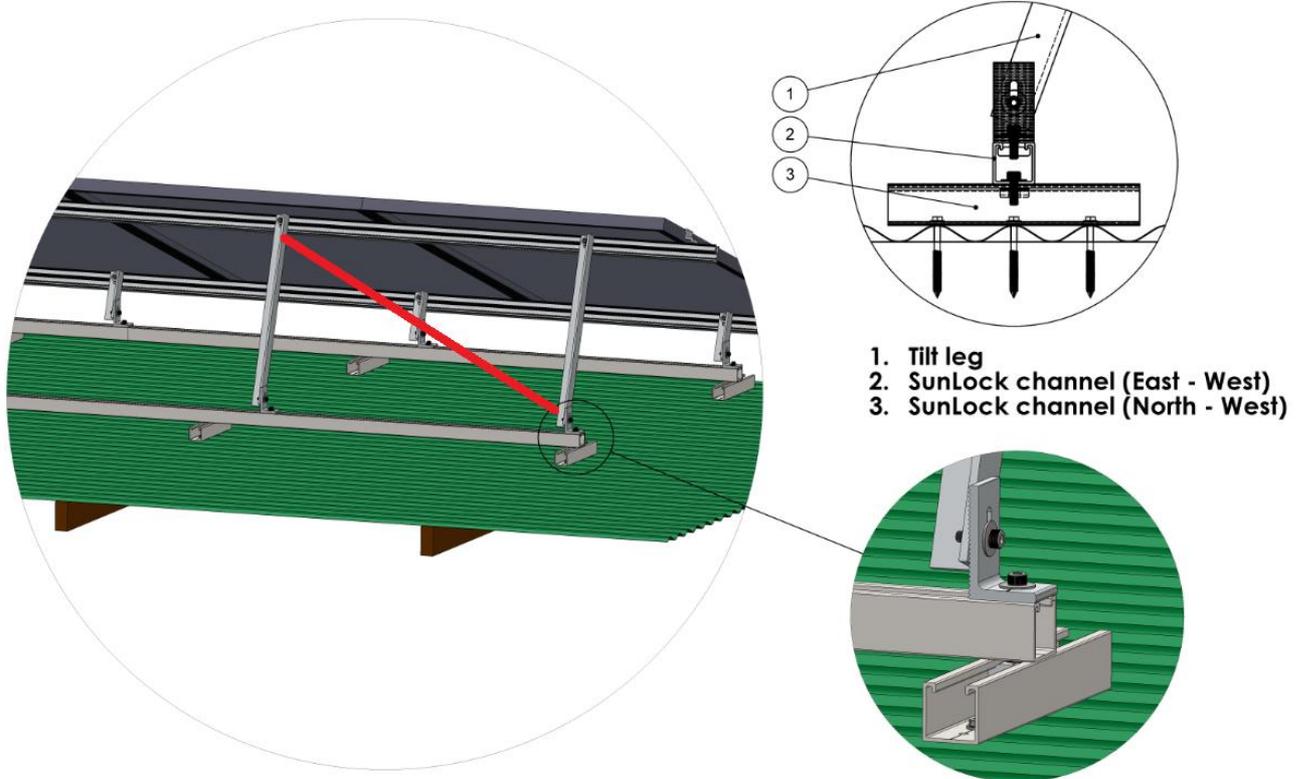


The diagonal brace can cross several tilt legs if required, as shown below:



MOUNTING TILT LEGS ON NORTH-SOUTH PURLINS

A tilt array can be installed on a roof where the purlins run north-south instead of east-west. The key issue is to use sufficient fixing points (roofing screws) and to position them correctly. In most cases a sub-frame will be required.



1. Tilt leg
2. SunLock channel (East - West)
3. SunLock channel (North - West)

Guide to use

Consider a tilted array in wind region B, in the intermediate zone with timber purlins spaced at a distance of 1200 mm. The installation manual shows the following:

MAXIMUM L-FOOT SPACING IN mm FOR TIMBER BATTENS/PURLINS					
WIND REGION		A	B	C	D
INTERNAL ZONE	SHORT LEG	1270	1025	690	430
	LONG LEG	1000	625	420	260
INTERMEDIATE ZONE	SHORT LEG	1090	685	460	285
	LONG LEG	665	415	280	175
EDGE ZONE	SHORT LEG	820	510	345	215
	LONG LEG	500	310	210	130

As the minimum specified L-foot spacing of the front and rear legs is less than the actual purlin spacings (685 mm and 415 mm compared with 1200 mm), extra screws need to be attached to each purlin to provide a sufficient amount of fixings. To solve this issue, offcuts of SunLock channel can be attached along each purlin crossing to gain additional fixings.

To calculate how many fixings are required per offcut of SunLock channel, take the average purlin spacing (1200 mm) and divide it by each respective value in the installation manual (685 mm / 415 mm). This calculates to be:

Front fixing (1200 / 685) = 1.75. Rounding up gives 2 screws per offcut

Rear fixing (1200 / 415) = 2.89. Rounding up gives 3 screws per offcut



On top of each channel offcut, lengths of SunLock channel should be installed spanning each purlin. Each tilt leg assembly can be attached to the length of channel in the normal manner with 1 metre spacing between legs. Ensure that diagonal braces are installed at each end of the array

NOTE: Do not install on roofs with purlin spacings exceeding 1300 mm.

TECHNICAL & SUPPLY CHAIN INFORMATION

Sales code	SLTL300, SLTL500, SLTL600, SLTL700, SLTL800 (each kit contains a 150 mm front leg, and a longer rear leg)
Material	Aluminium 6060-T5, with stainless steel fasteners.
Australian Standard Certification	Certificate of structural adequacy to AS/NZS1170.2:2011 as included in the SunLock installation manual.

Sales code	SLDB1200 (diagonal brace)
Material	Aluminium 6060-T5, with stainless steel fasteners.
Australian Standard Certification	Certificate of structural adequacy to AS/NZS1170.2:2011 as included in the SunLock installation manual.

Sales code	SLCA1500 (SunLock Channel Assembly) SLCA2000 SLCA3000
Material	Aluminium 6061-T6, with stainless steel fasteners.
Australian Standard Certification	Certificate of structural adequacy to AS/NZS1170.2:2011 as included in the SunLock installation manual.

FURTHER INFORMATION

For further information contact Apollo Energy on 1300 855 484 or sunlock@apolloenergy.com.au.