



# PoleLock Installation Manual

Version 3.1 – updated November 2012

[www.sunlock.com.au](http://www.sunlock.com.au)



## INTRODUCTION

Thank you for choosing the PoleLock solar photovoltaic (PV) module pole-mounted framing system, part of the SunLock family of solar framing products.

PoleLock is suitable for a wide variety of commercial and remote installations.

PoleLock is backed by a 10-year warranty and are compliant with the Australian / New Zealand Standard on Wind Actions (AS/NZS1170.2.2011).

The PoleLock range of frames can support either one, two or four panels of various sizes, providing a peak power of up to 1kW. If required, multiple PoleLock frames can be installed on one site to provide increased power.



**WARNING**

### **WARNING**

Indicates a hazardous situation which, if not avoided, can result in death or serious injury or moderate injury.



**CAUTION**

### **CAUTION**

Indicates a hazardous condition which, if not avoided, can result in minor or moderate injury.

# SAFETY

## Wind loads

The PoleLock frame has been assessed and rated to be in compliance with AS/NZS1170.2.2011 on Wind Actions, for the following regions:

- Wind region A and B (most of Australia)
- Terrain Category 2, 3, 4 (sites with few obstructions, or built up areas)
- Topographic factor MT = 1.0 (on level or near level ground)

AS/NZS1170.2.2011 provides guidance on determining the wind pressures applicable to your PoleLock installation site, taking in local terrain and topography. Sufficient guidance is given in this document, but you may wish to procure a copy of these standards if your company installs Australia wide.

Any attempt by an unqualified person to install this product could result in death or serious injury.

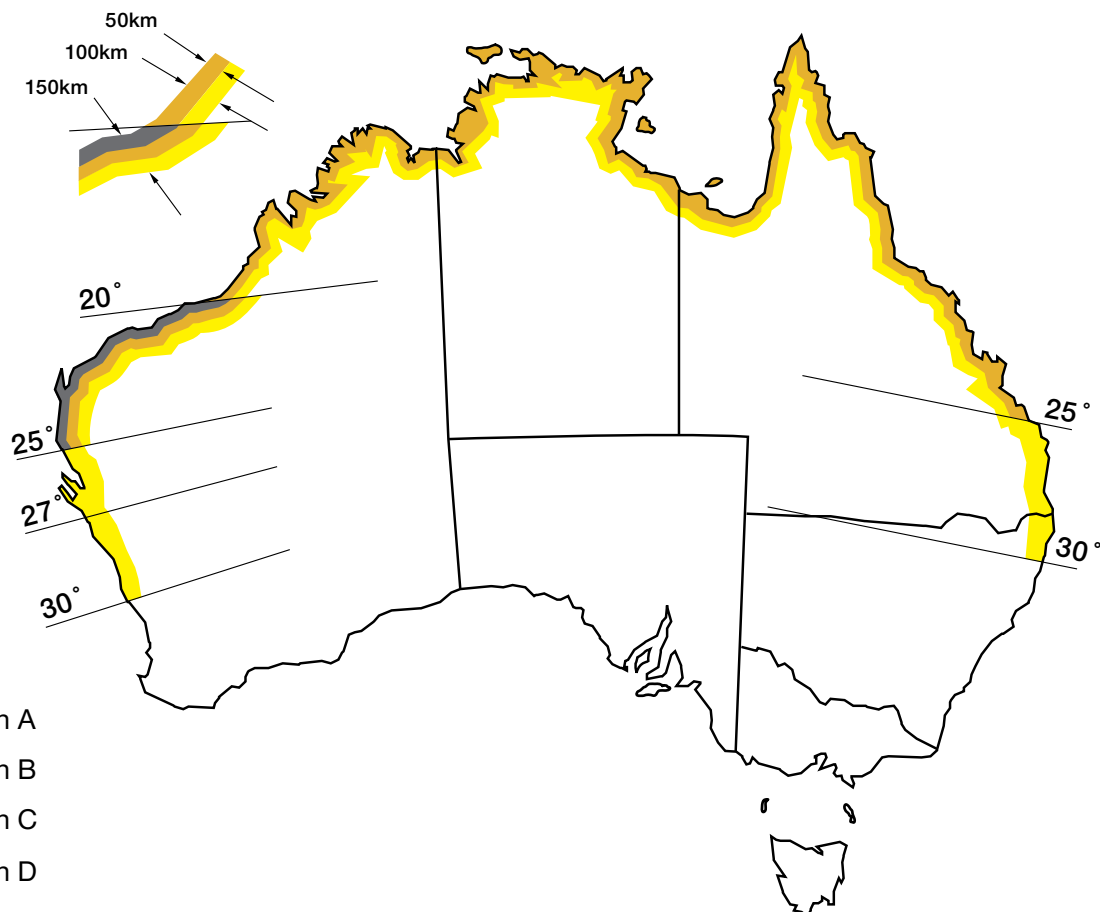
## Footings

The footings for PoleLock have been designed by a registered structural engineer, and are appropriate for natural ground, not topsoil, fill, or disturbed ground.

Check that the soil at the install location is appropriate for this footing design. If it is not appropriate, you will need to get the footing checked by a registered structural engineer.

## Handling

The materials used in the PoleLock frame can have sharp corners or edges. Wear personal protective equipment such as safety glasses, hearing protection and gloves during cutting and handling.



- Region A
- Region B
- Region C
- Region D

## Included towns:

### Region A:

- > Callytharra Springs
- > Gascoyne Junction
- > Green Head
- > Kununurra
- > Lord Howe Island
- > Morawa

- > Toowoomba
- > Wittanoom
- > Bourke

### Region B:

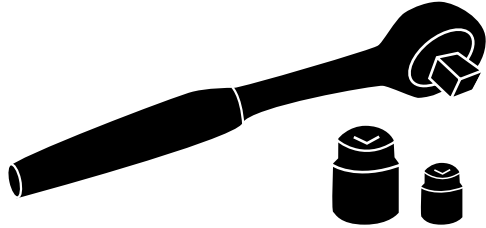
- > Adelaide River
- > Atherton

- > Biloela
- > Brisbane
- > Christmas Island
- > Collinsville
- > Corindi
- > Geraldton
- > Ivanhoe

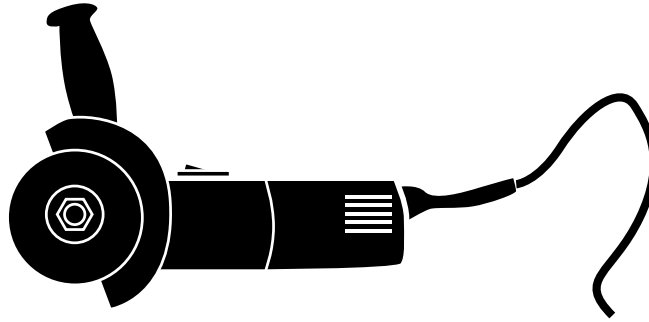
- > Kyogle
- > Marble Bar
- > Mullewa
- > Norfolk Island
- > Torres Strait Islands
- > Wyndham

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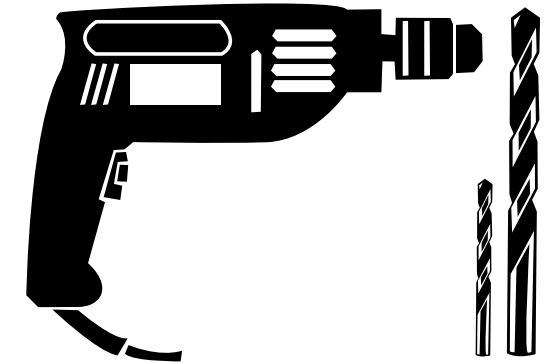
## TOOLS REQUIRED FOR INSTALLATION



**Socket and ratchet** (A 17mm, 19mm & 24mm socket and ratchet for tightening supplied fasteners)

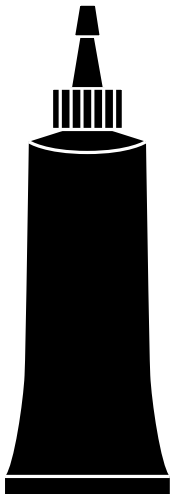


**Angle grinder** (If required, an angle grinder with an aluminium cutting blade can be used to trim the SunLock railing to the desired length)

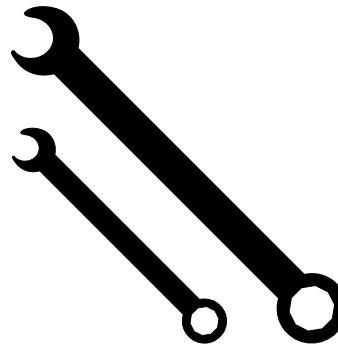


**Hand drill** (An electric hand drill for drilling holes in the base of the mounting post)

**Drill bits** (A 6mm & 13mm drill bit is required to drill holes in the mounting post)



**Anti-galling lubricant** (if required, anti-galling lubricant may be required to aid in the tightening of stainless steel fasteners)



**Ring spanner** (A 17mm, 19mm & 24mm ring spanner for tightening supplied fasteners)



**Hex Key** (A 6mm hex key / driver bit is required to secure the SunLock railing to the L-feet)

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## TYPICAL INSTALLATION

The PoleLock range of frames can support either one, two or four panels of various sizes, providing a peak power of up to 1kW. If required, multiple PoleLock frames can be installed on one site to provide increased power.

PoleLock has been designed to accommodate the following panels:

Class 2 - (600mm x 1200mm) ~ 80W - 90W panels

Class 3 - (675mm x 1500mm) ~ 120W - 160W panels

Class 4 - (808mm x 1580mm) ~ 170W - 210W panels

Class 5 - (1000mm x 1680mm) ~ 215W - 250W panels

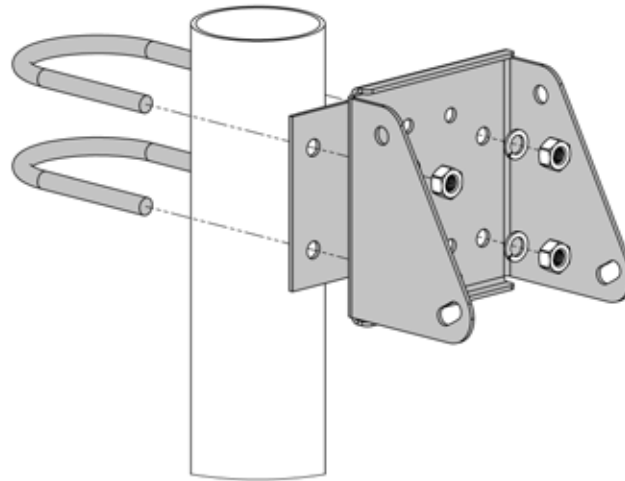


## INSTALLATION – 1 PANEL FRAME

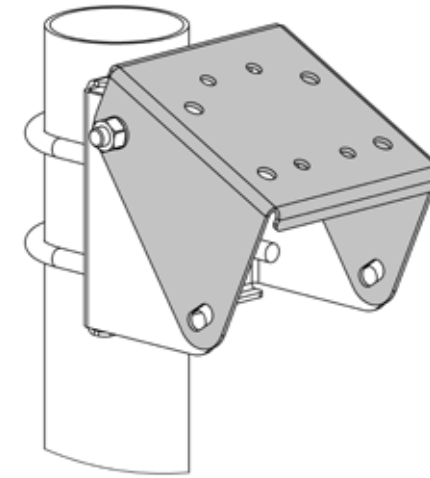
The PoleLock 1-panel frame consists of two parallel SunLock rails connected to a central beam through several L-feet brackets. This frame is connected to a pivot assembly which in turn is mounted on the top of a mounting post.

### Pivot assembly

1. Insert each U-bolt through the corresponding holes in the support plate and pivot bracket and loosely attach spring washers and nuts. Slip the assembly over the top of the mounting pole and tighten. Ensure the pivot flanges are pointing in the intended northerly direction.
2. Take the second pivot bracket and the slide pivot rod through the mating holes ensuring that both brackets rotate freely. Loosely tighten all fasteners.



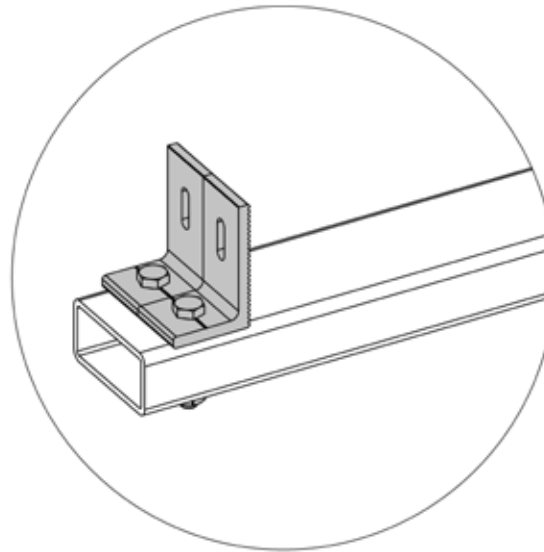
Pivot bracket - pole attachment



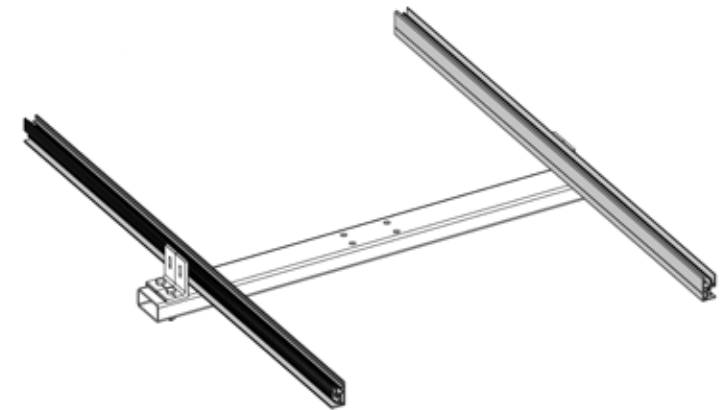
Pivot assembly

### Frame assembly

1. Take the central beam and fasten L-feet brackets onto the ends ensuring that the opposing L-feet are pointing away from each other.
2. Centre and attach the SunLock railing to the L-feet brackets and fasten together with the supplied M8 socket head cap screws and insert keys. Ensure that opposing rails are adjusted and set at the same height to avoid deforming the solar panel frame.



L-feet - central beam attachment



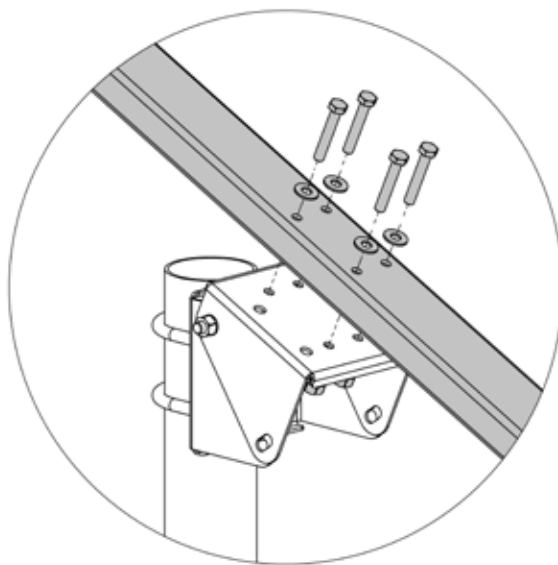
Frame assembly

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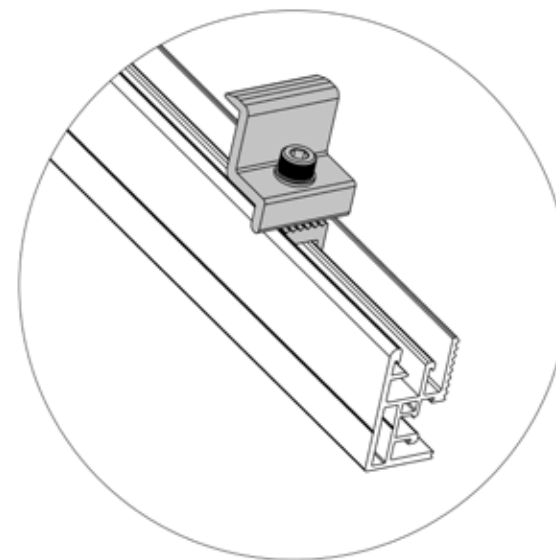
## INSTALLATION – 1 PANEL FRAME

### Total assembly

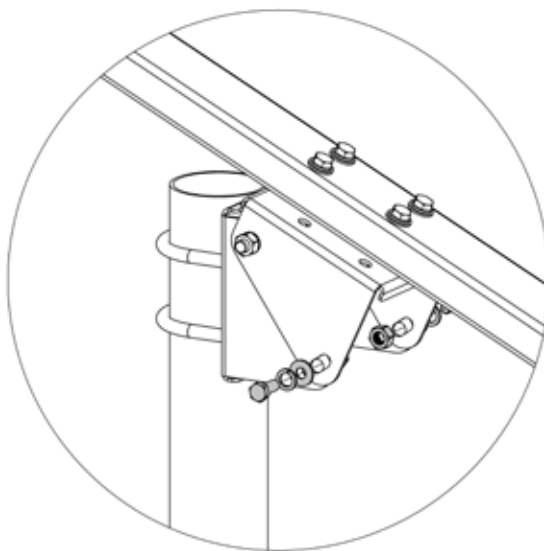
1. Place frame assembly on top of the pivot assembly and tighten all fasteners.
2. Loosely attach the required panel clamps to the end of the SunLock rail.
3. Place solar panel on top of the frame and fasten down the end clamps ensuring that the clamps securely hold down the panel.
4. Set the desired inclination angle of the solar array by placing bolts through the two sets of slots in the pivot bracket.
5. Securely tighten all fasteners and ensure assembly is rigid.



Frame - Pivot assembly attachment



End clamps



Set desired inclination angle

## INSTALLATION – 2 / 3 / 4 PANEL FRAME

The PoleLock 2 / 3 / 4 panel frames consist of sets of parallel SunLock rails connected to an aluminium sub-frame through the attachment of several L-feet brackets. This sub-frame is hinged to a pivot assembly which in turn is mounted on the top of a mounting post.

### Pivot assembly

1. Take each pivot bracket and loosely join them together with six M12 fasteners. Insert the M16 threaded rod through the upper hole of each bracket and loosely attach supplied nuts.
2. Slip pivot assembly over the top of the mounting pole and tighten. Ensure that the pivot rod is resting on top of the mounting pole.
3. Place each pivot beam over the outside of the pivot brackets and attach via the use of the M16 threaded rod. Loosely tighten the required nuts / washers ensuring that the beam can freely rotate as required.
4. Insert each M12 bolt through the holes joining the pivot beam and the adjustable angle brace and attach required fasteners.

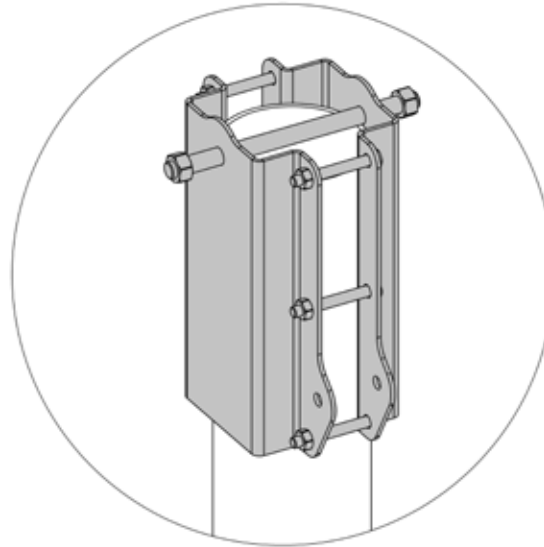
NOTE: Leave the adjustable angle braces resting loose until the rest of the frame is assembled.

### Frame assembly

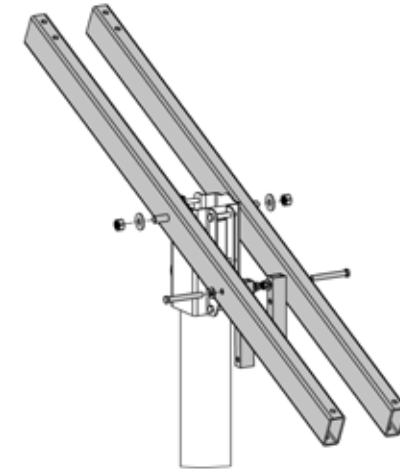
1. Ensuring that the pivot beam is free to rotate, place each cross beam on top of the pivot beam and secure with M12 fasteners.

NOTE: For the installation of the 4 panel frame (in terrain categories 2 & 3), the additional upper cross beam must be added for extra strength.

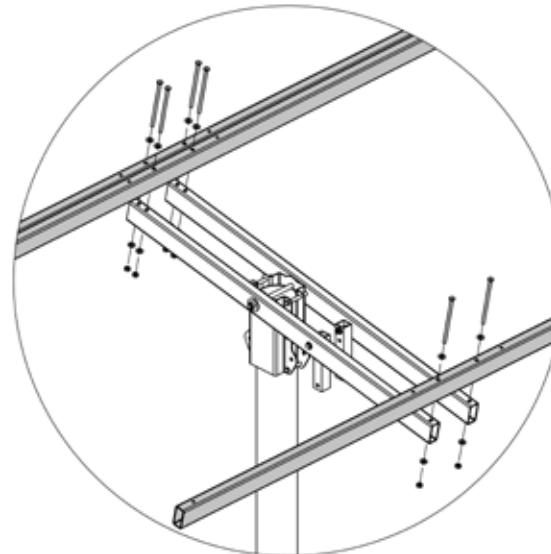
2. On top of each cross beam, place two L-feet (2 / 3 panel frame) or four L-feet (4 panel frame) ensuring the feet are pointing towards the centre of the frame assembly. Loosely tighten the required M10 fasteners ensuring that each L-foot can rotate.
3. Rotate the pivot assembly around to attach the opposing cross beam and repeat Steps 1-2.



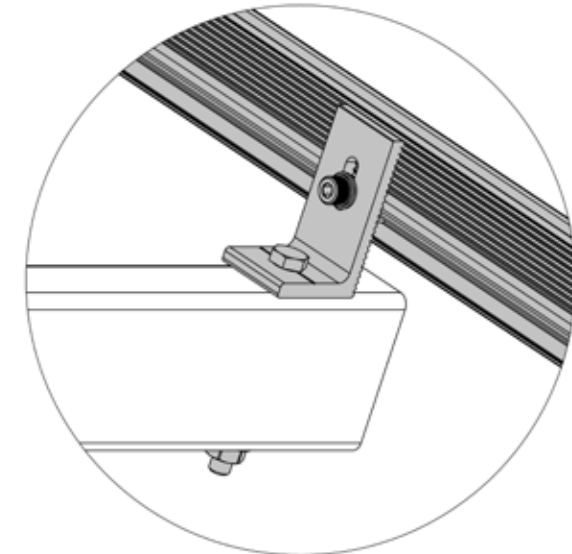
Pivot bracket assembly



Pivot beams



Cross beams



L-foot & SunLock rail



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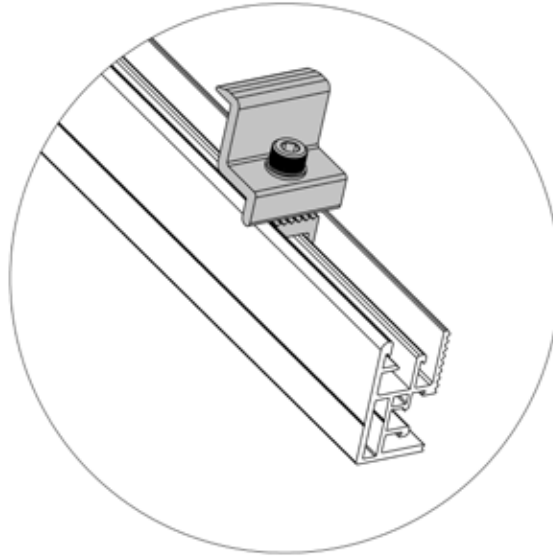
## INSTALLATION – 2 / 3 / 4 PANEL FRAME

### SunLock railing

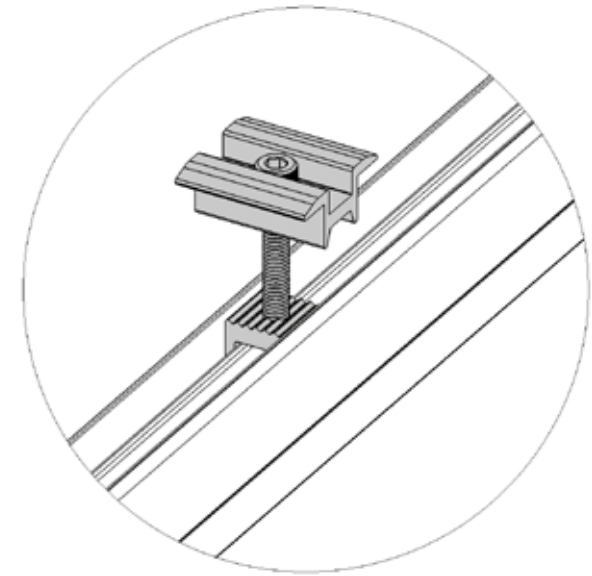
1. Span each pair of L-feet with the supplied lengths of SunLock railing. Ensure that the overhanging section of rail is evenly distributed over each end. Tighten the M8 socket head cap screw ensuring that the height of the rail in relation to each of the L-feet is even.

### Total assembly

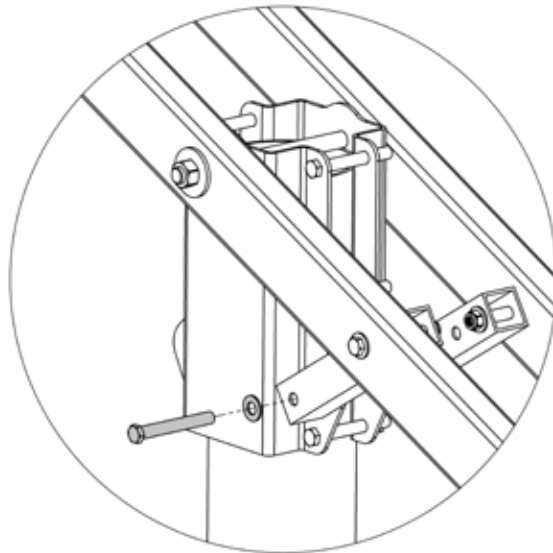
1. Loosely attach the supplied end clamps to the end of the SunLock rail.
2. Place solar panel on top of the frame and fasten down the end clamps ensuring that the clamps securely hold down the panel.
3. Attach and fasten the supplied mid clamps to the other side of the panel.
4. Rotate the assembly around and repeat steps 1 & 2 for the opposite row of panels.
5. Ensure all clamps are sufficiently fastened to prevent panels dislodging from the frame.
6. Set the desired inclination angle of the solar array by placing an M12 bolt through the holes joining the two pivot brackets to the angle brace and secure with associated fasteners.
7. Securely tighten all fasteners and ensure assembly is rigid.



End clamp



Mid clamp

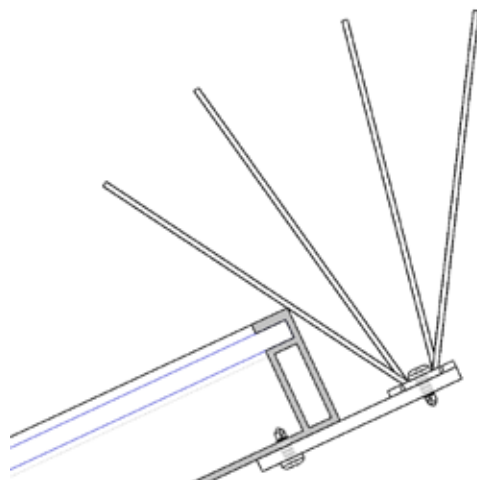


Angle brace

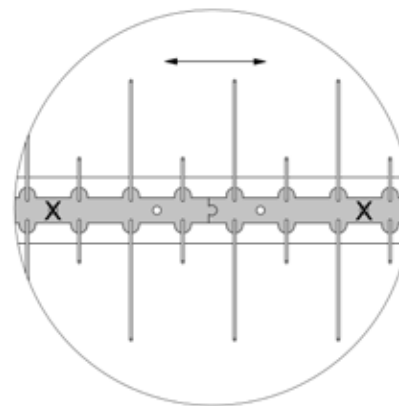
## INSTALLATION – ANTI-BIRD SPIKE MOUNTING KIT (OPTION)

### 1 PANEL FRAME

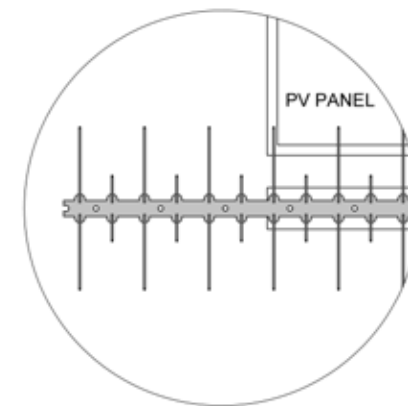
1. Cut aluminium strap to the desired length (ideally to match length of solar panel)
2. Connect lengths of anti-bird spikes together to match length of the aluminium strap. Mark excess portions and trim to suit.
3. Attach the lengths of anti-bird spikes using tek screws in 150mm intervals (or every third mounting hole). Ensure that the bird spikes are mounted as close to the edge of the strap as possible to allow for connection to the solar panel.
4. Use the supplied tek screws to attach the aluminium strap to the return flange of the solar panel frame.



1 Panel Frame - Attach anti-bird spikes to underside of panel



1 / 2 / 3 / 4 Panel Frame - Tek screw fastening spacing



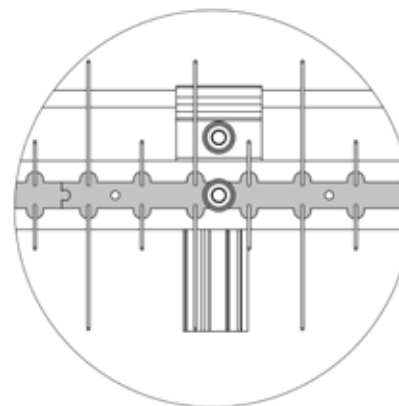
1 / 2 / 3 / 4 Panel Frame - Trim excess length of anti-bird spikes

### 2 / 3 / 4 PANEL FRAME

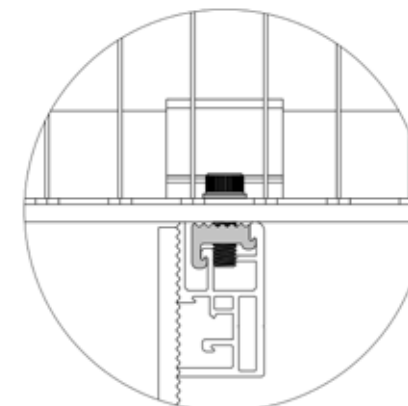
Anti-bird spike mounting kits are effective in the prevention of perching and nesting of birds. The spikes act as a preventative measure and will not cause any harm to the animal.

1. Cut aluminium strap to the desired length (ideally to match length of solar panel)
2. Connect lengths of anti-bird spikes together to match length of the aluminium strap. Mark excess portions and trim to suit.
3. Attach the lengths of anti-bird spikes using tek screws in intervals of 150mm (or every third mounting hole)
4. Noting the distance between each of the connecting SunLock rails, drill two 8.5mm holes into the assembly, insert two cap screws, star washers and key inserts ensuring the assembly is firmly attached to the array frame.

NOTE: The anti-bird spike kit should be mounted as close to the solar panel / end clamp as possible.



2 / 3 / 4 Panel Frame - Bolted attachment



2 / 3 / 4 Panel Frame - Bolted attachment

## INSTALLING POST

NOTE: PoleLock is certified for use with the following mounting posts.

### 1 Panel Frame:

90 DN DuraGal pole (101.6mm outer diameter / 4mm wall thickness)

250 MPa

3200mm pole length

### 2 Panel Frame:

100 DN DuraGal pole (114.3mm outer diameter / 4.5mm wall thickness)

250 MPa

3200-3600mm pole length

### 3 / 4 Panel Frame:

125 DN DuraGal pole (141.3mm outer diameter / 5mm wall thickness)

250 MPa

3400-3600mm pole length

1. Ensure location is suitable for pole mounted solar installation.
2. Ensure no building / trees are shading the modules.
3. Dig holes in undisturbed, natural ground with a soil friction angle of 22 degrees or greater.

#### 1 Panel Frame:

450mm diameter pier - 1200mm depth

#### 2 Panel Frame:

450mm diameter pier - 1400mm depth

600mm diameter pier - 1200mm depth

#### 3 Panel Frame:

450mm diameter pier - 1500mm depth

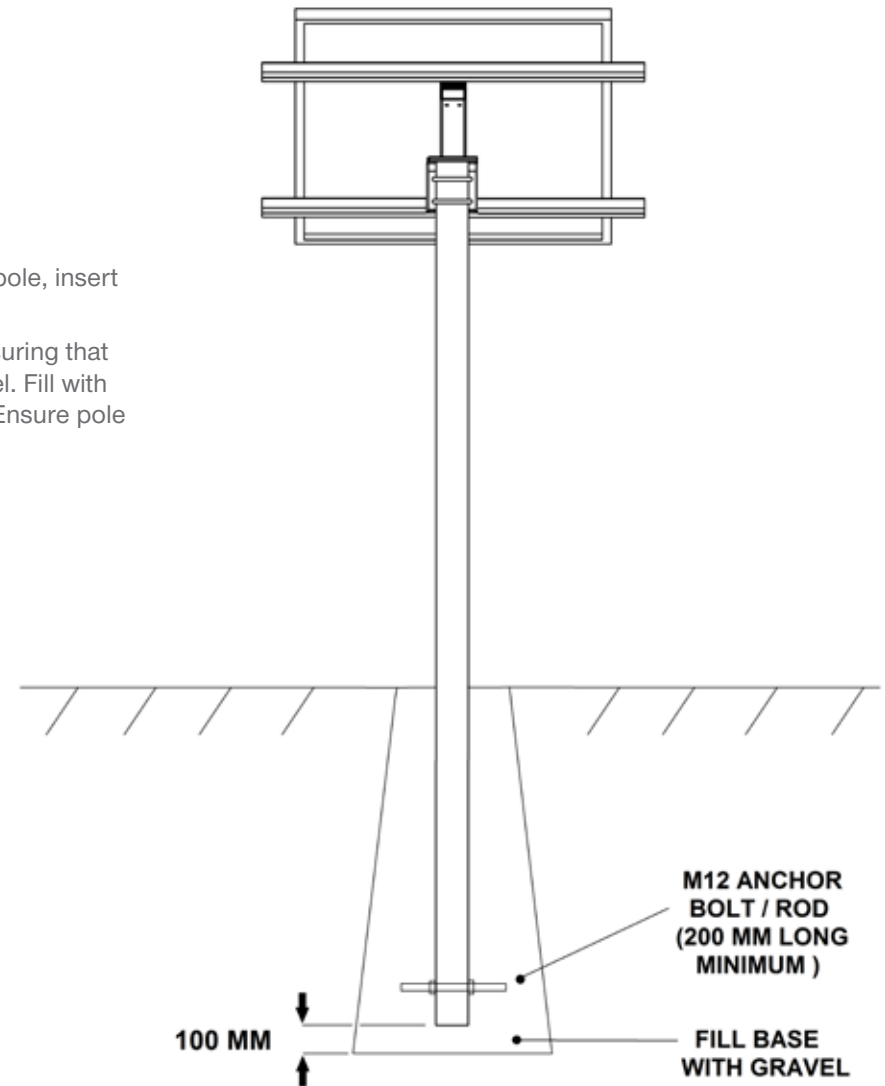
600mm diameter pier - 1300mm depth

#### 4 Panel Frame:

450mm diameter pier - 1600mm depth

600mm diameter pier - 1400mm depth

4. Drill a hole in the end of the mounting pole, insert M12 bolt/rod and fasten.
5. Place galvanised pole into the hole ensuring that the pole sits on a 100mm base of gravel. Fill with required amount of 25 MPa concrete. Ensure pole is orientated plumb.



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## MAINTENANCE AND CLEANING

Galvanised steel, aluminium and stainless steel are largely maintenance free. Only in highly polluted or marine conditions is rinsing with clean water required, during scheduled panel cleaning.

## WARRANTY CONDITIONS

Energy Matters Pty Ltd (trading as Energy Matters and Apollo Energy) (**Energy Matters**) is the manufacturer of its Polelock solar photovoltaic (PV) module pole-mounted framing system (the **PoleLock System**).

Energy Matters warrants, on the terms set out below, that the PoleLock System will be free from defects in materials and workmanship for a period of 10 years from the date on which the PoleLock System is purchased from Energy Matters (**Warranty against Defects**).

### Transferability

Our Warranty against Defects is only provided to the original purchaser of the PoleLock System from Energy Matters (Purchaser) or, where the Purchaser is an installer or builder who on-supplies the PoleLock System to another party, to that other party (End-User). Our Warranty against Defects is not otherwise transferable.

### Making a claim

If you believe that the PoleLock System is defective and you are an End-User, you may either make a claim against the installer or builder from whom you purchased the PoleLock System or you may make a claim against us directly.

In order to make a claim against us, you must post, fax or email us a notice, using the contact details set out below. In your notice you must provide:

- › details of why you believe the PoleLock System is defective;
- › a copy of your invoice, receipt or any other document which provides proof of purchase;

- › details of any expenses you have incurred in making your claim; and
- › details of how we should contact you.

Within a reasonable time after receipt of your claim we will contact you to arrange a time to attend the premises at which the PoleLock System is located.

### Remedies

If we determine that the PoleLock System is defective and the defect is not a major failure then, if possible, we will try to repair the defective PoleLock System at the premises. If this is not possible, we will remove the defective PoleLock System and provide a replacement PoleLock System at our expense.

If we determine that the PoleLock System is defective and the defect is a major failure then you have the option of rejecting the PoleLock System and obtaining a refund from us, rejecting the PoleLock System and obtaining a replacement PoleLock System from us at our expense or of keeping the PoleLock System and receiving compensation from us for the difference between the actual value of the PoleLock System and the amount you paid for the PoleLock System.

If we determine that the PoleLock System is defective we will also pay the substantiated reasonable expenses incurred by you in making your claim.

### Your obligations

In order to have the benefit of our Warranty against Defects:

- › if you are a Purchaser, you must have paid all amounts owed by you to Energy Matters in relation to the purchase of the PoleLock System;
- › you must have complied with all reasonable instructions of Energy Matters (whether written or verbal) in relation to the transport, installation, care, repair and use of the PoleLock System; and
- › you must not have misused, neglected, damaged or modified the PoleLock System.

## Exclusions

Our Warranty against Defects does not include:

- › damage caused to the PoleLock System during shipment or storage of the PoleLock System by a party other than Energy Matters;
- › damage caused to the PoleLock System during installation by a party other than Energy Matters;
- › damage caused by 'Acts of God', vermin, animals or pests or by other causes or acts outside Energy Matters' reasonable control; or
- › normal wear and tear, including normal weathering.

## Jurisdiction

Our Warranty against Defects is to be construed in accordance with the laws of Victoria and any disputes will be determined by the exclusive jurisdiction of the courts of Victoria.

## CONSUMER GUARANTEES

In addition to our Warranty against Defects, the PoleLock System also comes with guarantees that cannot be excluded under the Australian Consumer Law (**Consumer Guarantees**).

In the event that the PoleLock System fails to satisfy a Consumer Guarantee, you are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the PoleLock System repaired or replaced if the PoleLock System fails to be of acceptable quality and the failure does not amount to a major failure.

Please note that in addition to the rights and remedies set out in this document, you may also have other rights and remedies available to you under the law.

## REFERENCES

AS/NZS1170.2.2011, structural design actions,  
Part 2: Wind actions

## CONTACT DETAILS

**Energy Matters Pty Ltd (trading as  
Energy Matters and Apollo Energy)**

**Address:** Level 2, 101-105 Clarke Street,  
South Melbourne, VIC, 3205

**Postal Address:** PO Box 5265,  
South Melbourne, VIC, 3205

**Sales and Service:**  
1300 855 484 (local call from anywhere in Australia)


**International:** +61 3 9697 1990

**Fax:** +61 3 9697 1919

**Email:** sunlock@apolloenergy.com.au

## CERTIFICATE

AS/NZS1170.2.2011 certificate of structural adequacy  
from registered structural engineer, Partridge Partners:



November 28<sup>th</sup> 2012

Energy Matters Pty Ltd  
Level 2, 101-105 Clarke Street  
South Melbourne VIC 3205

**Attention: Mr James Mumford**

**CERTIFICATE OF STRUCTURAL ADEQUACY**


**Project Description: PoleLock Pole Mounted Solar Panel Mounting System  
PoleLock Installation Manual Version 3.1, November 2012**

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We, Partridge Structural Pty Limited, being Professional Structural Engineers within the meaning of the Building Code of Australia, hereby certify that we have reviewed the structural design of the PoleLock Solar Panel Mounting System and associated footings as detailed in the PoleLock Installation Manual Version 3.1, dated November 2012, by Energy Matters Pty Ltd and that this work is in accordance with the relevant provisions of the Standard Building Codes and in accordance with accepted engineering practice and principles.

This certification is subject to the limitations imposed on the system as detailed in the Manual. This document does not constitute certification of the adequacy of the ground or soil in which the footings are placed.

This certificate shall not be construed as relieving any other party of their responsibilities, liabilities or contractual obligations.

  
Rob O'Reilly  
BE(Hons) MIEAust CPEng NPER(Structural) RPEQ  
For and on behalf of:  
**Partridge Structural Pty Ltd**

Level 3, 1 Chancery Street, St Leonards NSW 2055 Australia  
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Partridge Structural Pty Ltd - 72 382 411 925  
Partridge E-vent Pty Ltd - 161 548 922 412  
Partridge Remedial Pty Ltd - 88 341 388 521

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