

Installation Manual for Solpod Mini

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Solpod Mini (patent pending) in flush, north or east-west variants



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Introduction

Thank you for choosing the Solpod Mini solar panel roof mounting system. Made from custom-designed aluminium extrusions and components, Mini's streamlined design and improved frame strength greatly simplify solar panel installation. Mini is backed by a 10-year warranty and is compliant with the AS/NZS 1170.2:2011/Amdt 2:2012 on wind actions and AS/NZS 16641.1:1997 on aluminium structures.

Overview

Mini solar PV arrays are assembled on the roof using channel (or rail), brackets and clamps. The product is suitable for commercial format modules (approximately 2 m x 1 m) with frame heights of 30, 35, or 40 mm. Modules are held in one of three possible orientations:

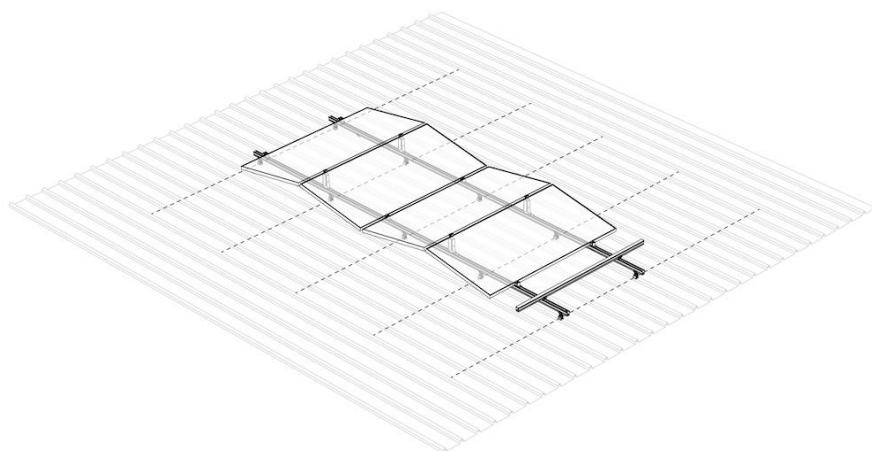
- 10° dual-tilt, so that each module shields the next from the wind, also called “east-west”
- 10° single-tilt, with each module facing in the same orientation, also called “north”
- 0° tilt, also called “flush”

Compliance and certification

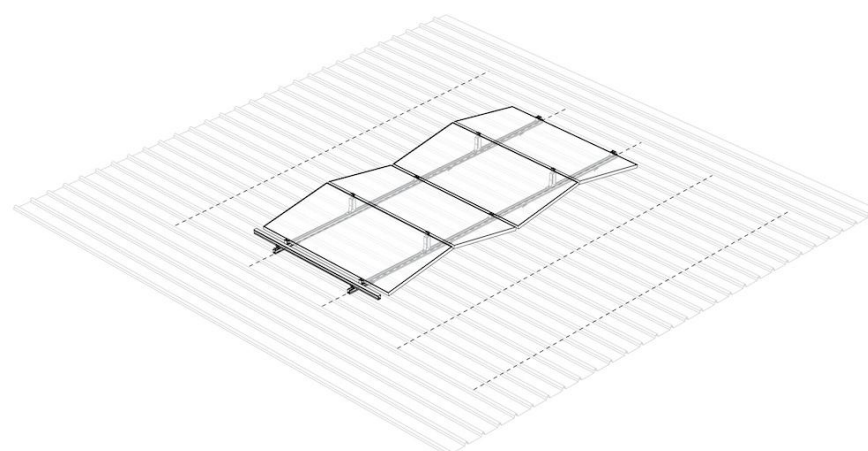
Mini is supplied with a generic certification that suits most buildings, covering wind regions A, B & C, terrain category 2 & 3. Custom certification is also available, e.g. for terrain category 1.5 or 1.0 (near open water), including an assessment of the site wind speed and the as-built conditions of the roof sheet and roof frame. Certification is provided by Tensys Engineers. If the roof is exposed to higher wind loads, such as near open water (Terrain Category 1) please contact Solpod for guidance.

Orientation options

Mini can be installed in landscape ‘columns’ that proceed from gutter to roof ridge; or portrait ‘rows’ that proceed from side to side. The default method is in landscape ‘columns’, where the fixing spacing is equal to the purlin spacing. Each column of modules is fixed to two channels using edge and centre brackets that incline the modules at 10 degrees. Electrical cables can run in the channels. Mini is available in variants to suit modules with a frame height of 30, 35 or 40 mm.



Mini in a column



Mini in a row

‘No reach’ installation

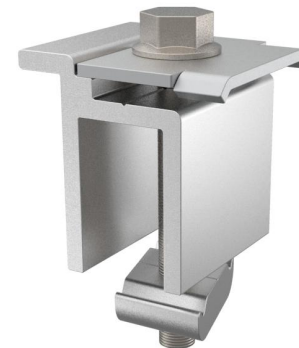
Each module is held at four points using brackets, either edge, centre or flush. Each bracket is double sided, with one side offering a mechanical clamping function, and the other side offering a “push in” function using a C-shaped profile. Assembly occurs by sliding the far edge of the module into the C-shaped profile, then clamping at the near edge. This way, installers don’t have to reach a metre over the module to tighten a fastener.



Edge Bracket SPEB



Centre Bracket SPCB

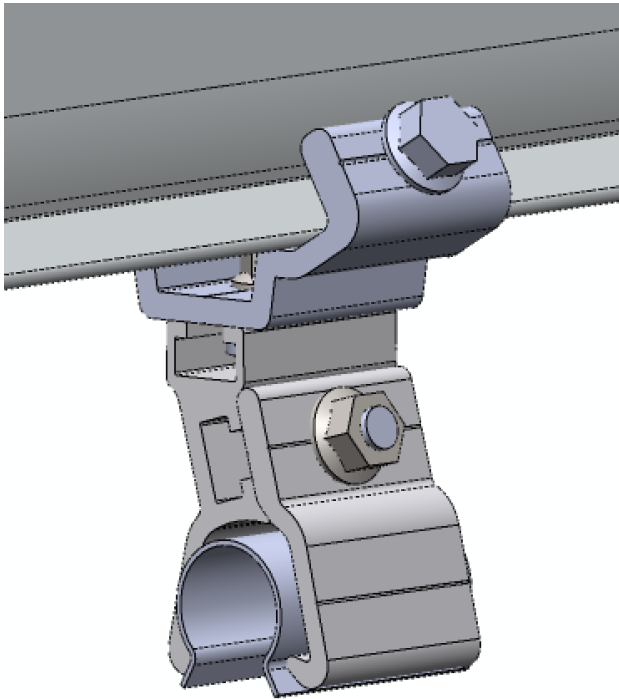


Flush Bracket SPFB

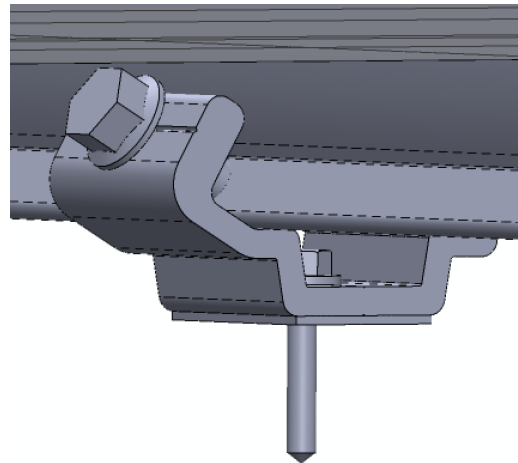
Types of roof fixings

Mini can be fixed to the roof using:

- roof clamps with EPDM rubber sheets,
- channel feet on adhesive tape, or
- channel feet on concrete anchors.



Channel fixed to channel foot, then roof clamp

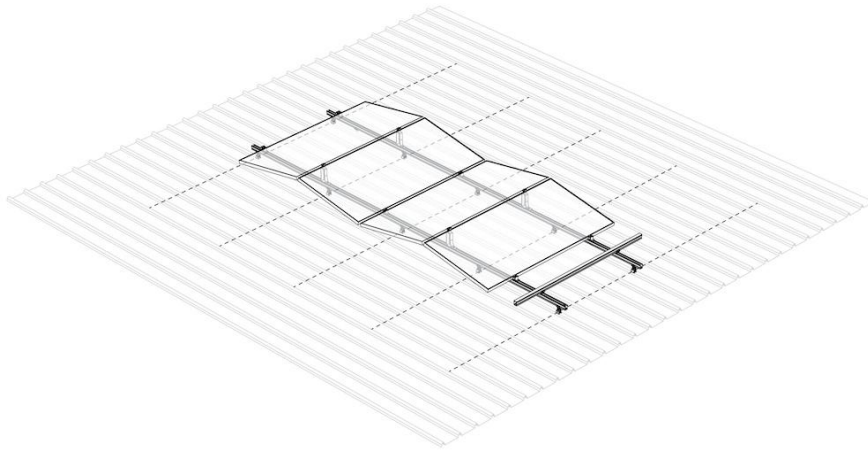


Channel fixed to channel foot, then roof screws to the purlins

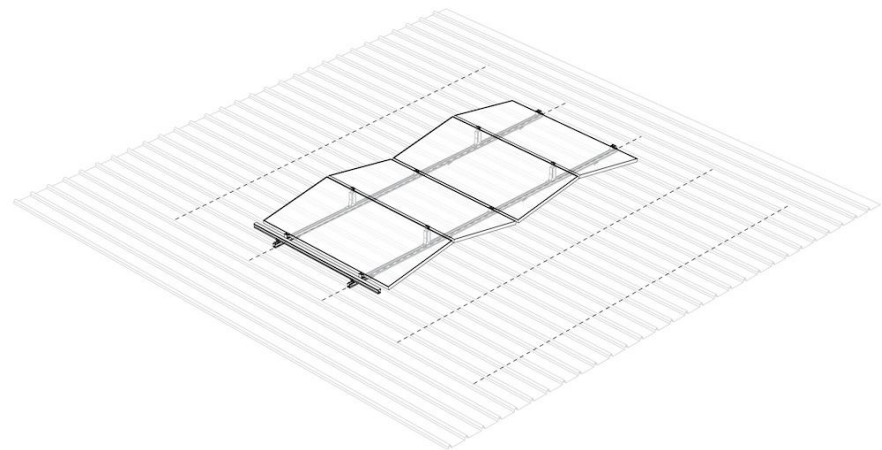
Layout and assembly

Fixing spacing

When Mini is installed in columns, the fixing spacing (distance between channel feet) is equal to the purlin spacing, because a channel foot is used at each point where a channel crosses a purlin. Also, the channels need to be extended past the modules to reach the next purlin (maximum allowable cantilever between fixing and edge of module is 100 mm). When Mini is installed in rows, the fixing spacing can be reduced down to the roof sheet rib spacing. However, the purlin spacing needs to match the approved “clamping zones” defined by the module installation manual, e.g. from 1000 to 1600 mm, to fit the typical “10-25% clamping zones” for a 2 m long module.



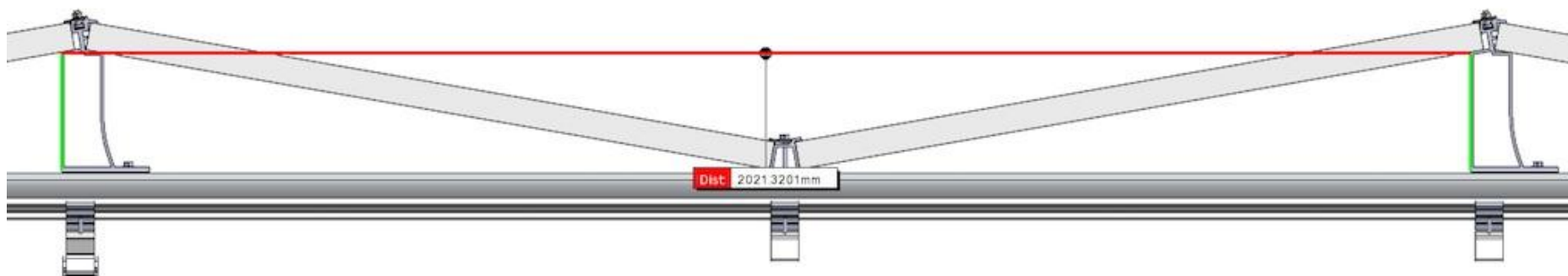
Mini in a column (or landscape format)



Mini in a row (or portrait format)

Length of column or row

Mini suits industry standard modules with nominal dimensions of 1000 x 2000 mm. The length of a column of modules is a function of the exact width of the modules used. For example, if JA Solar JAM72S10 modules are used, they have a width of 996 mm and each pair of modules has a 'repeat distance' of 2021 mm.

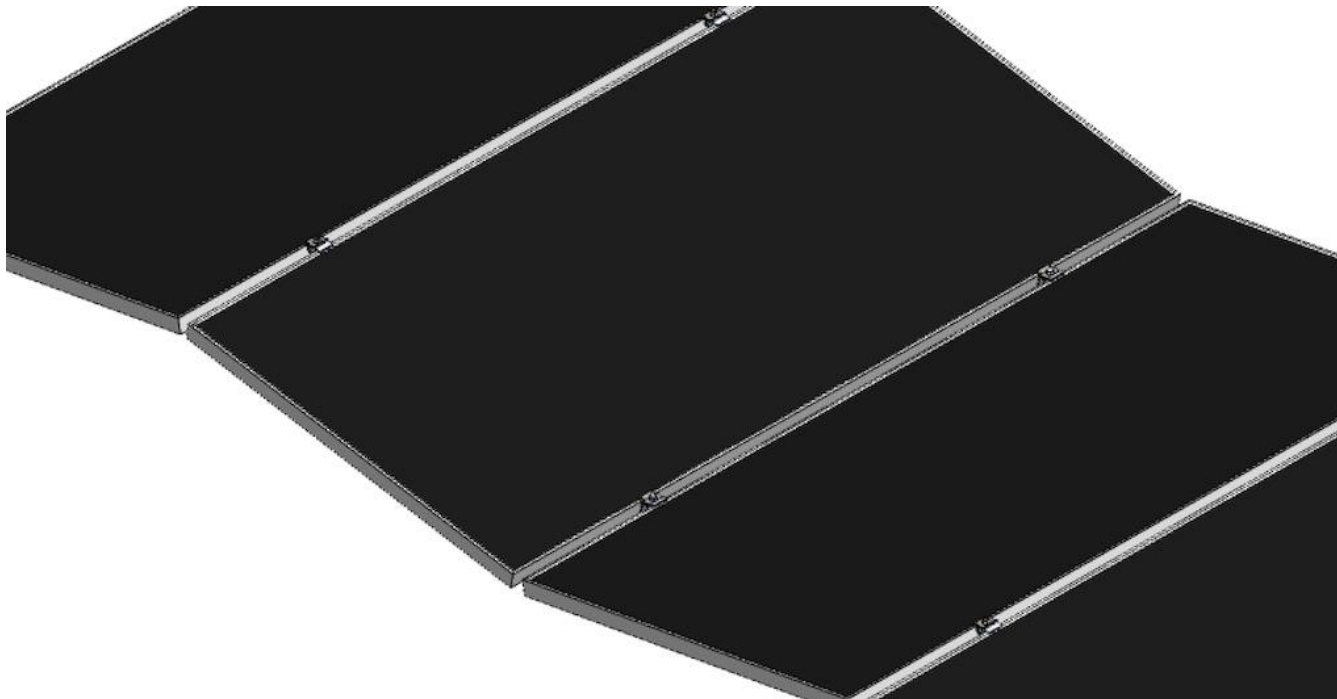


Repeat length of each pair of JA Solar JAM72S10 modules (996 mm wide) is 2021 mm

Assembly

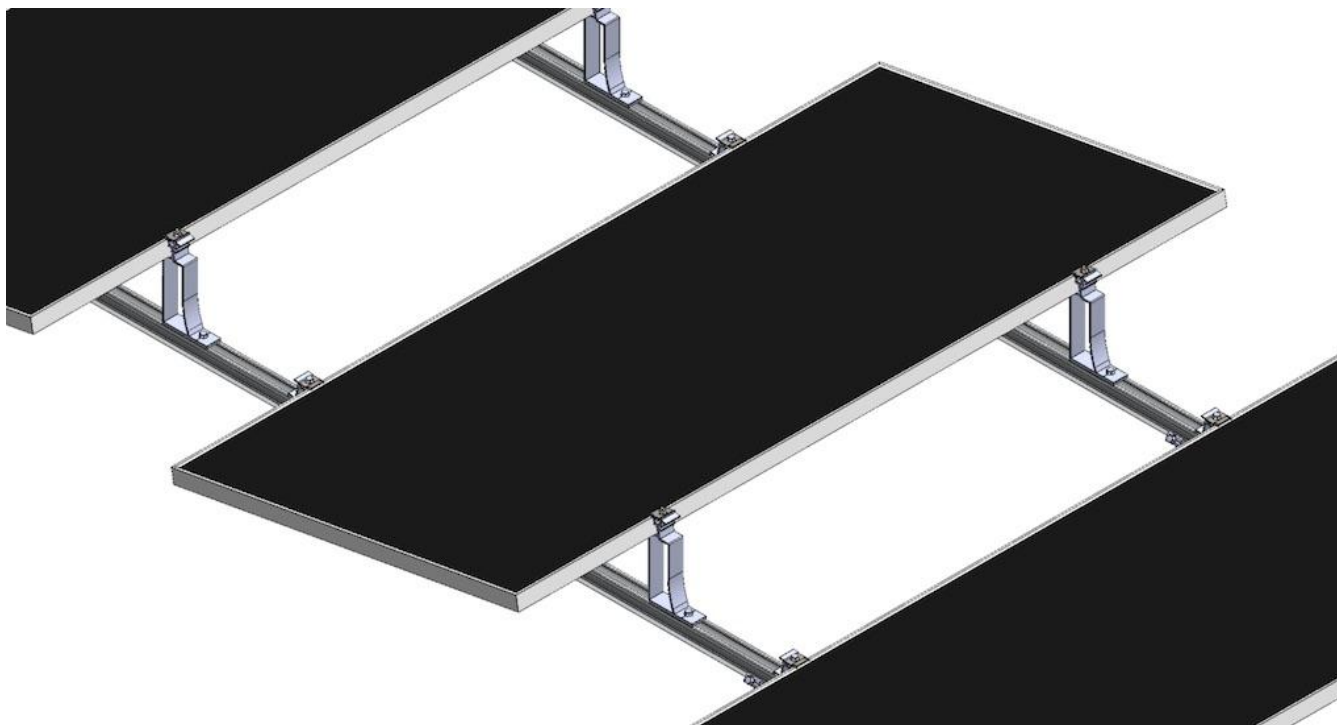
Assembly of Mini east-west occurs as follows:

1. Mark out the array, including any cable trays and walkways
2. Fasten the channels to the roof using roof clamps or roof screws
3. Fasten the first pair of edge brackets to the channels, using an edge bracket spacer for each
4. Slide the far edge of the first module into the C-sections offered by the edge brackets, then position two centre brackets and clamp the near edge of the module into place
5. Slide the far edge of the second module into the C-sections offered by the centre brackets, then position two edge brackets and clamp the near edge of the module into place
6. Continue to assemble the entire column or row



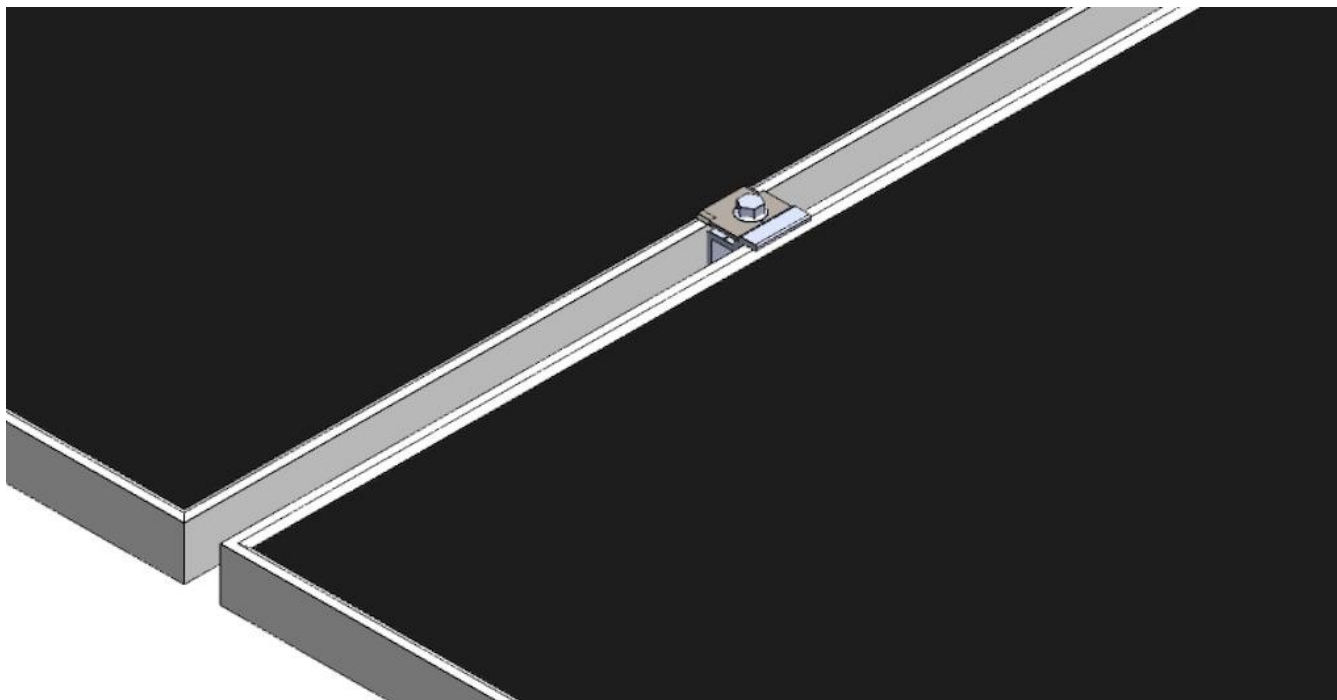
Mini in dual-tilt format

Assembly of Mini single-tilt (or 'north') is similar, using the same brackets. Note that the edge brackets are always oriented so that the stainless steel clamp plate faces the module.



Mini single-tilt format, assembled using the same brackets as for dual-tilt

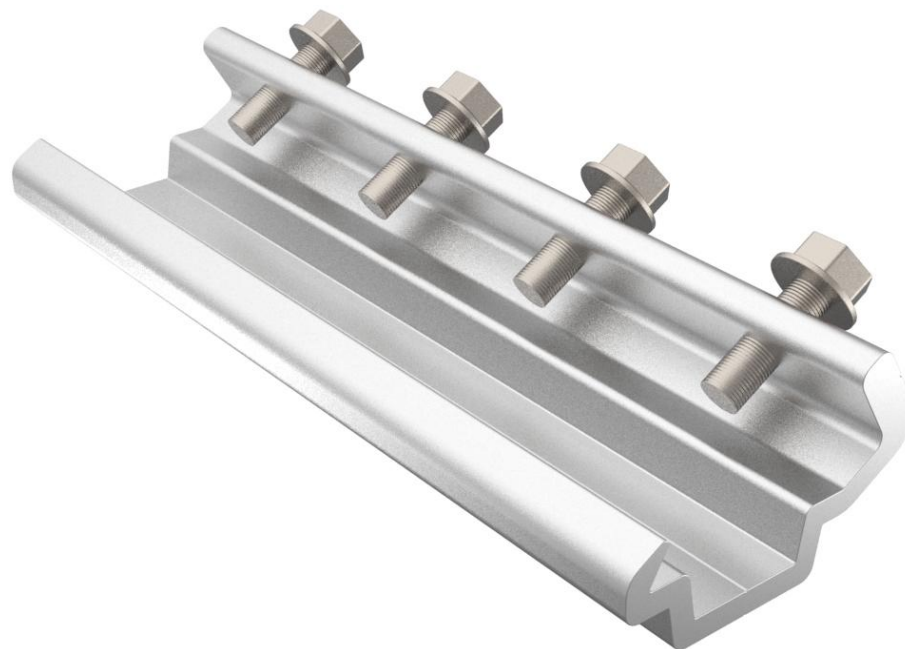
Assembly of Mini flush is even simpler, using the Solpod Flush Bracket, SPFB.



Mini v2 in flush format, assembled using SPFB brackets

Joining channels

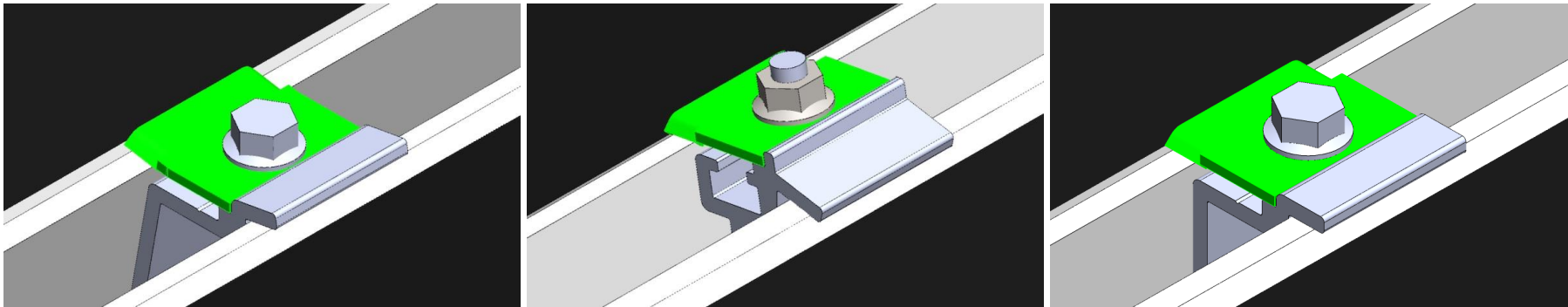
Channels can be joined and extended with joiners:



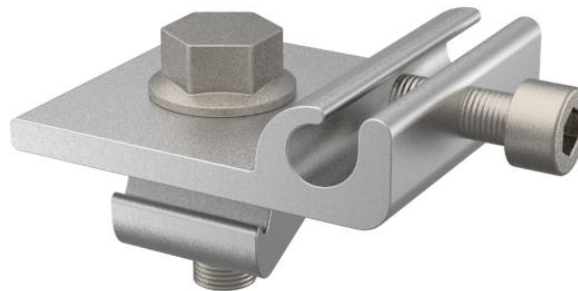
Solpod Channel Joiner 02, SPCJ02

Earthing

Every solar PV installation needs to comply with applicable codes and standards, including for earthing the PV module frame and array frame. On each Mini v2, the module frames are electrically earthed to the array frames via the stainless steel module clamp plates. Each module is held using two clamp plates. Each clamp plate has two sharp edges that penetrate the aluminium oxide layer on the frame of the solar module. Thus, if the array frame is earthed (using the SPEL earth lug) then the module frame will also be earthed, and vice versa. Note that the array frame components are mill finish (non anodised) aluminium, so do not have an anodised layer that needs to be pierced.



Module clamp plate (highlighted in green) on edge bracket, centre bracket and flush bracket



Solpod Earth Lug SPEL

Installation using roof clamps

Mini can be installed on roof clamps. Channel feet are supplied as an assembly with the roof clamp. Use product codes:

- SPCF305 (Solpod Channel Foot 305), to suit a variety of standing seam roof sheet profiles, such as Lysaght Longline 305
- SPCF406 (Solpod Channel Foot 406), to suit a variety of narrower roof sheet profiles, such as Lysaght Klip-Lok 406
- SPCF700 (Solpod Channel Foot 700), to suit a variety of wider roof sheet profiles, such as Lysaght Klip-Lok 700 Hi-Strength



SPCF305



SPCF406



SPCF700

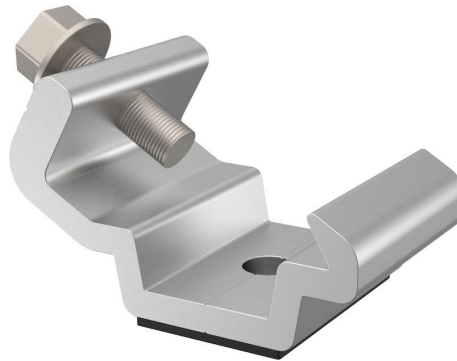
Roof clamps can be rotated 90 degrees by loosening the fastener that connects it to the channel foot, then re-tightening.

Roof clamps should be installed directly on top of the purlin, i.e. on top of the concealed clip which holds the roof sheet to the purlin. Channel should be extended past the last module frame to overlap the next available purlin.

Roof clamps 406 and 700 are supplied with EPDM mats, which provides a level of separation from the roof sheet, and corrosion protection for the roof sheet. According to the BlueScope technical bulletin CTB-12 (Rev 3, November 2003) on dissimilar metals, aluminium accessories are compatible with all common roofing materials, including galvanised iron, Zincalume and Colorbond. Therefore, the aluminium channel foot is permitted to directly contact the roof sheet. However, Solpod recommends the use of the EPDM mat where possible. Roof clamp 305 is not suited to the use of EPDM mats, because the oval point fastener needs to compress directly against the roof sheet.

Installation using roof screws

Mini can be installed using roof screws that fix into purlins. Use the product code SPCF01 (Solpod Channel Foot 01), to suit standard 14g roof screws.



SPCF01 with EPDM on the base

The channel foot is supplied with an EPDM mat fixed to the base. The EPDM mat prevents water ingress. The leak path is the annular gap between the roof sheet and the roof screw. This is sealed by the thick EPDM washer located between the L-foot and the roof sheet. As the roof screw is tightened the base of the channel foot presses down on the EPDM, causing the EPDM to bulge inwards and press tightly around the roof screw, thus creating the waterproof seal.

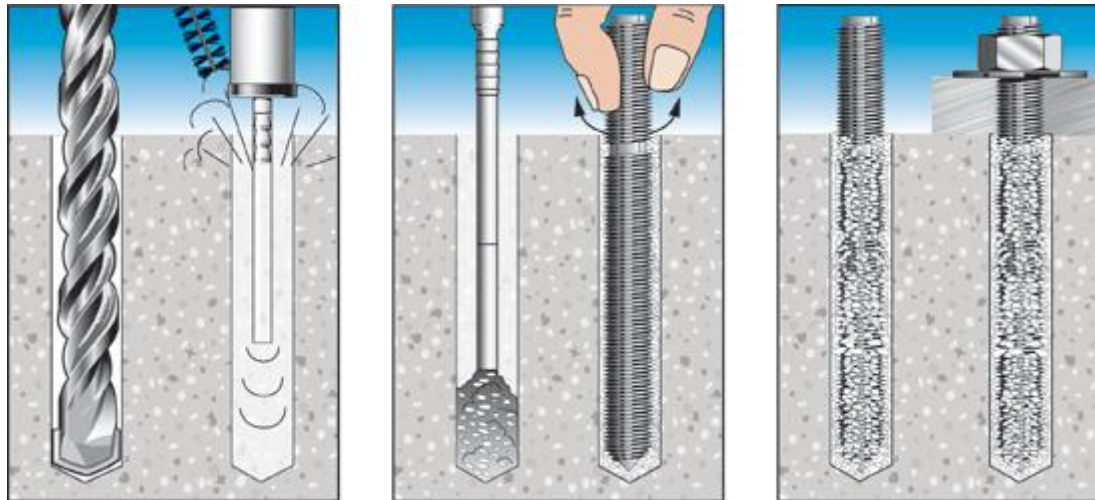
The EPDM mat also provides a level of separation from the roof sheet, and corrosion protection for the roof sheet. According to the BlueScope technical bulletin CTB-12 (Rev 3, November 2003) on dissimilar metals, aluminium accessories are compatible with all common roofing materials, including galvanised iron, Zinalume and Colorbond. Therefore, the aluminium channel foot is permitted to directly contact the roof sheet. However, Solpod recommends the use of the EPDM mat.

Other considerations:

- Roof screws are not supplied. Solpod recommends 14g fasteners (to replace the typical 12g roof screw) with a Class 4 anti-corrosion coating, as described in ISO 9223-2012 and AS 4312-2008.
- Channel should be extended past the last module frame to overlap the next available purlin.
- Always install channel feet on the roof crest, not in the pan. This eliminates the majority of the risk of water ingress.
- Timber purlins should be pre-drilled, especially old hardwood that is prone to splitting.
- The roof screw should be tightened in accordance with the installation manual for the roof sheet. The roof screw should not be over tightened – the roof sheet should not be deformed or crushed.
- The fixing capacity of the channel foot is limited by either the roof screw or purlin it is screwed into. The channel foot itself is not the limiting factor. Typically, the fixing capacity is in the range of 1-2 kN.

Installation using concrete anchors

Mini can be installed using concrete anchors that fix to a concrete slab. Use the product code SPCF05 (Solpod Channel Foot 05), with a 9 mm hole in the base to suit a M8 anchor, e.g. a stainless steel chemset.



Standard M8 chemsets can be used to fix a SPCF05 channel foot

Installation using ballast

Mini can be installed using ballast. A site specific certification is required, and a typical ballast requirement is 120 kg per panel, depending on site wind speed and panel area. Use SPCF05 (Solpod Channel Foot 05), with a 9 mm hole in the base to suit a M8 anchor, i.e. a stainless steel M8 chemset. Ballast can comprise concrete sleepers, e.g. Austral Masonry Explorer Smooth, two per panel, 2000 x 200 x 75 mm, weighing 67 kg each.

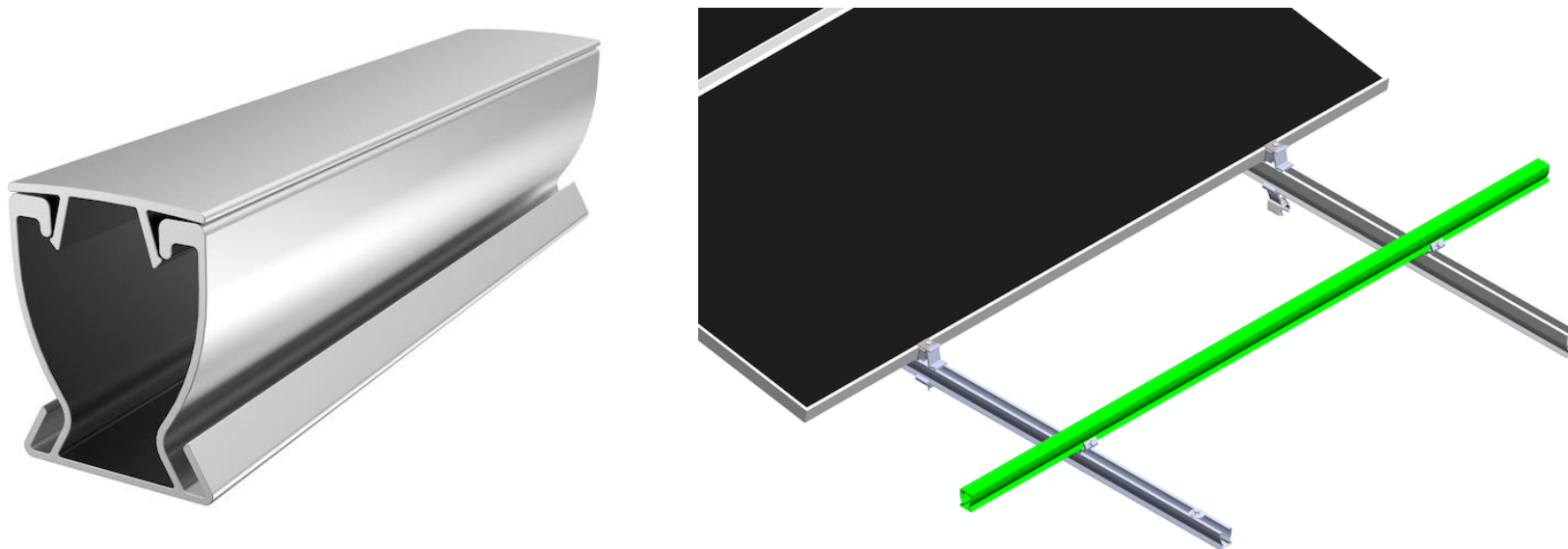


Mini dual-tilt on concrete ballast

Cable trays

Solpod Channel as a cable tray

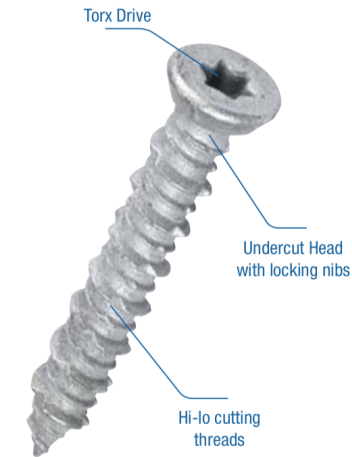
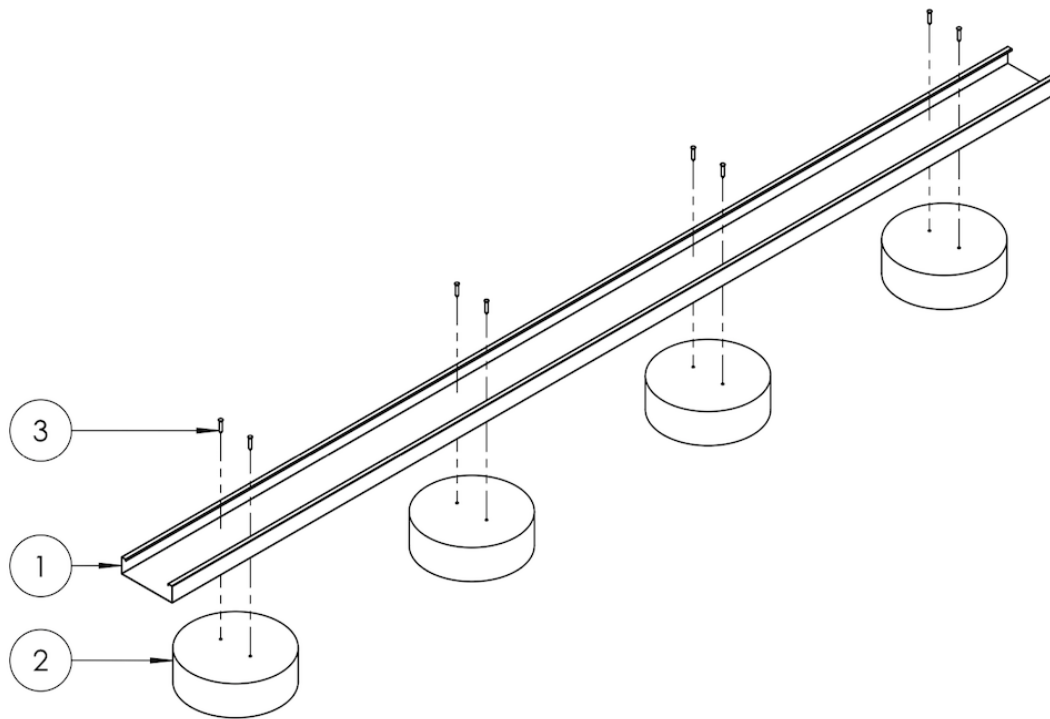
Solpod channel, channel lid, and channel feet can be used as an alternative to galvanised steel cable tray. Channel feet can be fixed down via roof clamps, roof screws, masonry screws, or channel feet with a channel nut (SPCF03) that fixes to a lower channel.



Solar cables can be mechanically protected in Solpod channel, covered by channel lid SPCL-3, available in 3 m lengths

Cable trays on a concrete roof

Cable trays can be installed on a concrete roof by fixing to a row of concrete sole plates, 300 mm diameter x 100 mm high. The sole plates can be spaced up to 1200 mm apart. A sole plate can support a join between two sections of cable tray. Fasteners are Masonry Torx Screw 7.5 mm diameter x 40 mm length, part 1CCT1C407.5040, into a pre-drilled 6 mm diameter hole.



Cable tray fixed to concrete sole plates

Electrical design considerations

Mini locates pairs of modules in a dual-tilt or 'back to back' orientation to decrease wind loads. Each module faces a different direction and therefore receives different solar insolation, so must be located in separate strings (unless module level power electronics are used).

The remaining electrical installation, including DC cabling, DC isolators, inverter and AC cabling, is conducted using standard solar PV installation methods and procedures.

The Solpod Mini frame is fabricated from mill-finish aluminium, requiring only a single earthing attachment per row or column, via a Solpod Earth Lug.

Maintenance

The mill-finish aluminium used in Solpod Mini is largely maintenance free. Only in highly polluted or marine conditions is rinsing with clean water required, during scheduled panel cleaning.