PV InDaX Adapt Installation Guide

PV InDaX Adapt
Installation Guide V1.0

bmigroup.com

Contents

Section 1 Kit Presentation

1.1 PV INDAX ADAPT SYSTEM

PV InDaX Adapt enables module installation on every type of pitched roof covering (concrete and clay interlocking and plain tiles, slates and composite slates) on new buildings and refurbishment projects.

The mounting system may be installed in a portrait or landscape orientation, with a specific frame for each format, suitable for small installations and large.

PV InDaX Adapt must be installed on the wooden substructure of the buildings and mounted on graded battens. It can be mounted on slopes between 12° and 50°, in accordance with the tile types used.

PV InDaX Adapt is guaranteed for 10 years by the manufacturer. The system requires little maintenance, except regular cleaning of the PV panels to guarantee optimum performance.

1.2 CONTENTS OF THE KIT

Mounting Frame

Portrait Frame

Landscape Frame

Flashings

Flashing Hook

Side Flashing

Flexible Aluminium Flashing

Mounting Clamps

6.5 x 60mm Self-tapping wood screw

6.5 x 40mm Self-tapping wood screw

EPDM Foam

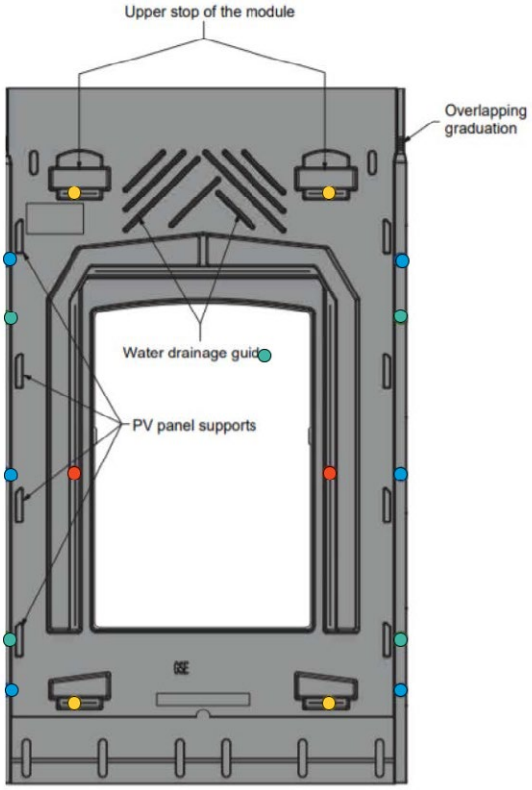
End Clamp

Middle Clamp

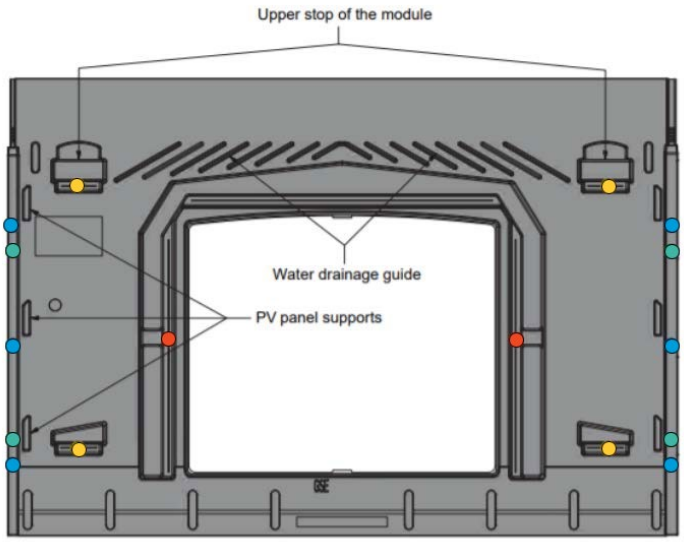
Edge Wedges
Note these come in two sizes

1.3 BMI PV INDAX ADAPT PORTRAIT FRAME

- Frame fixing **(no pre-drilling)**
- Frame fixing **(10mm pre-drilling)**
- Frame fixing (6 clamps) **(10mm pre-drilling)**
- Frame fixing (4 clamps) **(10mm pre-drilling)**



1.4 BMI INDAX ADAPT LANDSCAPE FRAME



- Frame fixing **(no pre-drilling)**
- Frame fixing **(10mm pre-drilling)**
- Frame fixing (6 clamps) **(10mm pre-drilling)**
- Frame fixing (4 clamps) **(10mm pre-drilling)**

1.5 REQUIRED TOOLS

To complete a successful installation, the following tools will be required:

- Tape measure
- Pencil / marker
- Screwdriver
- Rivet gun
- Chalk line
- Hammer
- Metal snip

Section 2 On Site

2.0 SITE PREPARATION

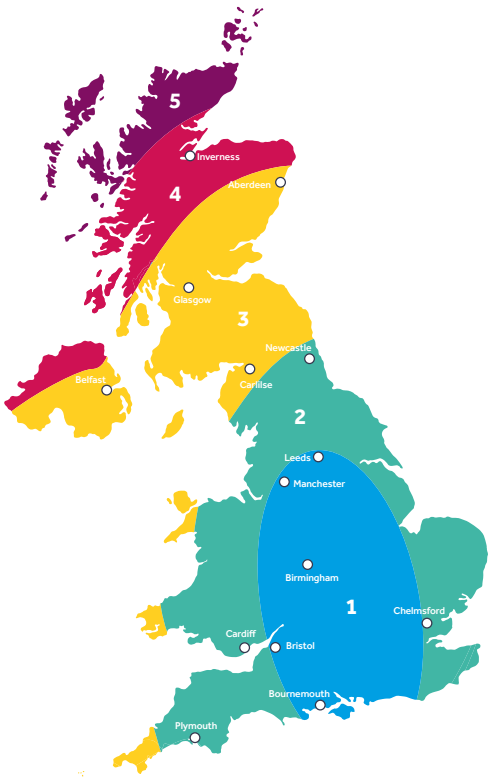
Prior to installation, it is important to plan the project paying particular attention to the PV array and local design wind load conditions, in accordance with relevant Eurocodes and BS 5534.

This data will help check if the system is suitable for the project conditions. The thickness of the support battens must be adapted to the roof battens to ensure the junction with the roof covering is watertight.

2.1 CLIMATIC CONDITIONS

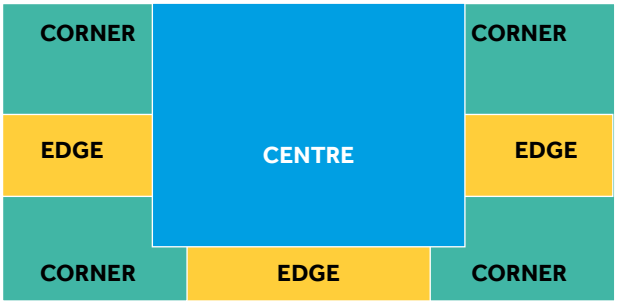
GEOGRAPHICAL WIND ZONE	WIND SPEED (m/s)	DESIGN WIND PRESSURE (kN/m²)
1	22	0,820
2	24	0,975
3	26	1,150
4	28	1,330
5	30	1,600

Maximum design wind uplift resistance: 1,88 kN/m²
(According to MCS 012 BBA 0156 certificate)

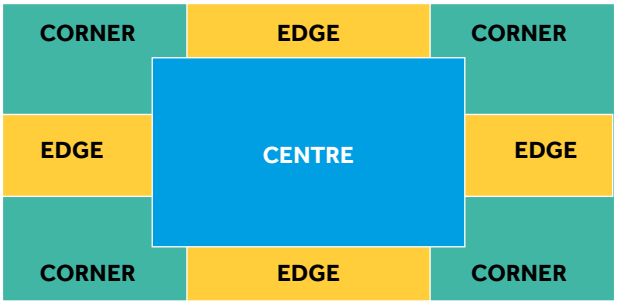


2.2 LOCATION ON THE ROOF

The location of the PV array in the roof has an influence on the wind load value - whether it is in the centre, on the edge or in the corner of the roof.
The worst case (normally in the corners of the roof) should be taken into account.



EAVES
Two-sloped roof



EAVES
One-sloped roof

2.3 DETERMINATION OF THE WIND PRESSURE OF THE PROJECT

Prior to calculating the wind load on the PV array, it is important to be aware of the following parameters:

- Location of the project
- Altitude
- Type of terrain
- Distance from the shoreline
- Ridge height
- Roof pitch
- Array location in roof (centre, edge, corner)

Ideally, climatic load (and especially wind load) should be calculated for each project, but you can refer to the tables below as a guide, if all conditions in the table match with those of the project.

Fixed Conditions

- Terrain category : Country terrain (including Town Terrain)
- Distance from the shoreline : 10 km
- Battens dimension : 25 x 50mm

Example 1: Roof Pitch ≥25°

RIDGE HEIGHT	LOCATION ON ROOF	ZONE 1 (Alt ≤ 250m)	ZONE 2 (Alt ≤ 200m)	ZONE 3 (Alt ≤ 130m)	ZONE 4 (Alt ≤ 100m)	ZONE 5 (Alt ≤ 50m)
6m	Centre	1,26 kN	1,38 kN	1,44 kN	1,58 kN	1,65 kN
	Edges	1,46 kN	1,60 kN	1,67 kN	1,83 kN	1,92 kN
	Corners	1,56 kN	1,72 kN	1,78 kN	1,96 kN	2,05 kN
8m	Centre	1,37 kN	1,51 kN	1,57 kN	1,72 kN	1,80 kN
	Edges	1,59 kN	1,75 kN	1,82 kN	2,00 kN	2,09 kN
	Corners	1,71 kN	1,87 kN	1,95 kN	2,14 kN	2,24 kN
10m	Centre	1,43 kN	1,57 kN	1,63 kN	1,79 kN	1,88 kN
	Edges	1,66 kN	1,82 kN	1,90 kN	2,08 kN	2,18 kN
	Corners	1,78 kN	1,95 kN	2,03 kN	2,23 kN	2,33 kN

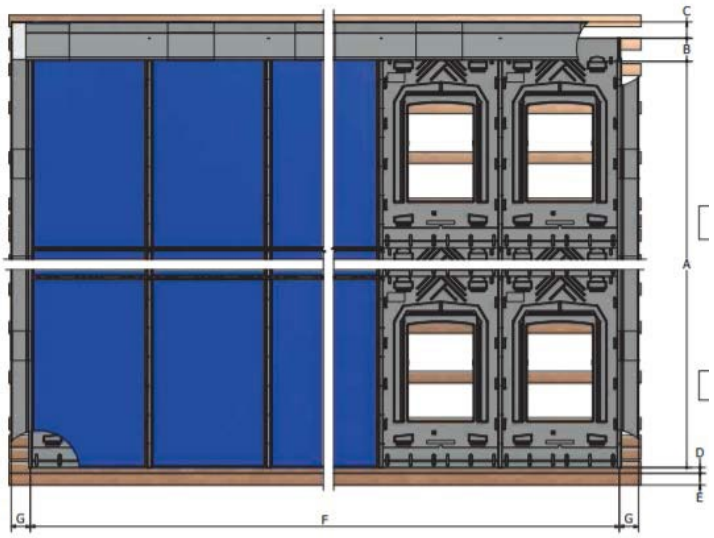
Example 2: Roof Pitch ≥35°

RIDGE HEIGHT	LOCATION ON ROOF	ZONE 1 (Alt ≤ 250m)	ZONE 2 (Alt ≤ 200m)	ZONE 3 (Alt ≤ 130m)	ZONE 4 (Alt ≤ 100m)	ZONE 5 (Alt ≤ 50m)
6m	Centre	1,09 kN	1,19 kN	1,29 kN	1,36 kN	1,43 kN
	Edges	1,36 kN	1,49 kN	1,61 kN	1,71 kN	1,78 kN
	Corners	1,43 kN	1,57 kN	1,69 kN	1,79 kN	1,87 kN
8m	Centre	1,19 kN	1,30 kN	1,40 kN	1,49 kN	1,56 kN
	Edges	1,48 kN	1,63 kN	1,75 kN	1,86 kN	1,95 kN
	Corners	1,56 kN	1,71 kN	1,84 kN	1,95 kN	2,04 kN
10m	Centre	1,24 kN	1,36 kN	1,46 kN	1,55 kN	1,62 kN
	Edges	1,55 kN	1,69 kN	1,83 kN	1,94 kN	2,03 kN
	Corners	1,62 kN	1,78 kN	1,92 kN	2,04 kN	2,13 kN

Section 3 Installation

3.1 PREPARATION OF THE ROOF COVERING

3.1.1 CALCULATION OF THE PV ARRAY DIMENSIONS



Array height (mm) =

((Height Ref. +0 to 35+10) x Nb. lines) + 160 + 150 + 50 + 100[2]

A + B + C + D + E

Array width (mm) =

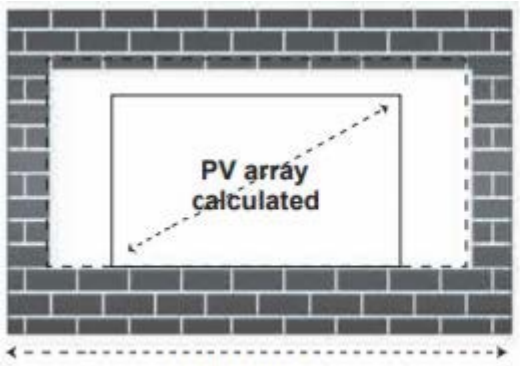
((Width Ref. + 36.5) x Nb. columns) + (2 x 165)

F + 2 x G

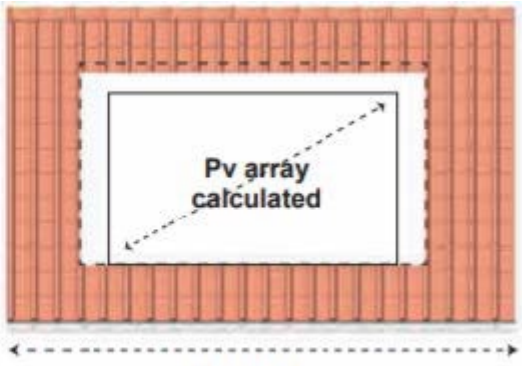
[2] If integrated in the roof center, add a board to equalise with the tile curve height (ie. 3.3)

3.2.2 ROOF COVER INSTALLATION

Remove the roofing covering (tiles or slates) following the PV array dimensions (calculated as in section 3.1.1), and 1 or 2 (depending on roof covering) rows and columns of tiles around the array.



slates roof :
2 extra lines removed



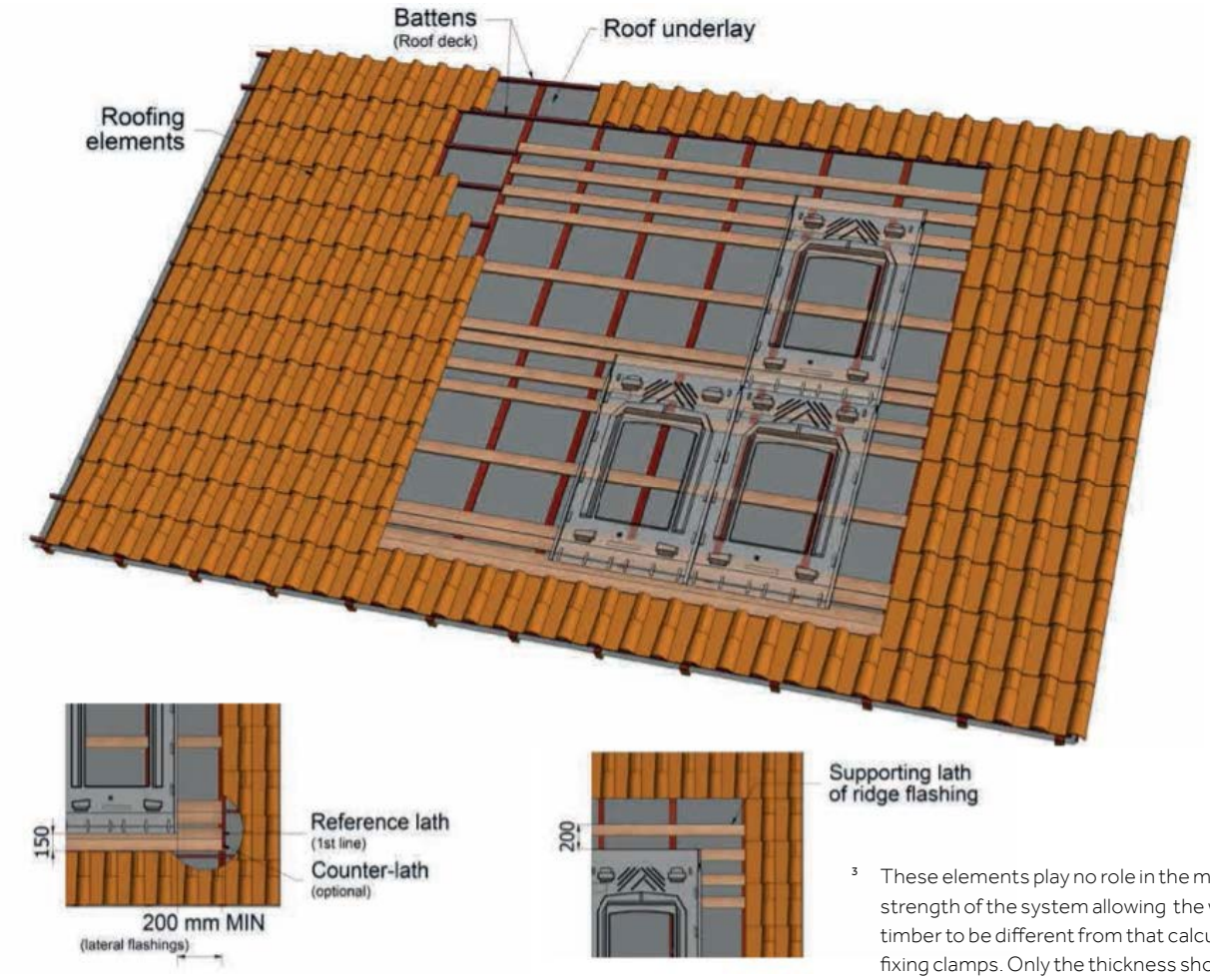
tiles roof :
1 extra line removed

3.2 **FIXING THE SUPPORT BATTENS**

Prior to starting any work, the installer must ensure the battening is flat and a roof underlay has been installed in accordance with BS 5534 with sufficient drape up to a maximum of 15 mm to allow free drainage of any moisture in the batten space down the underlay and into the eaves gutter.

Place wooden battens to the following locations:

- Fixing points of the clamps
- Fixing points of the frames
- Junction between the frame rows[3]
- Support of the sealing strip[3]
- Mounting hooks of top flashings[3]



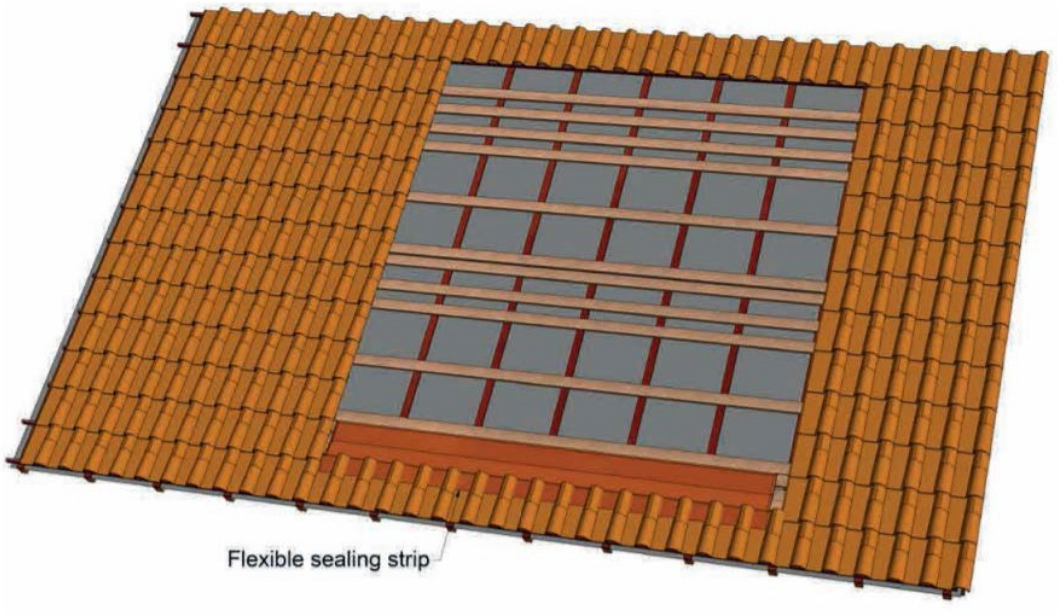
[3] These elements play no role in the mechanical strength of the system allowing the width of the timber to be different from that calculated for the fixing clamps. Only the thickness should be identical.

3.3. **INSTRUCTIONS**

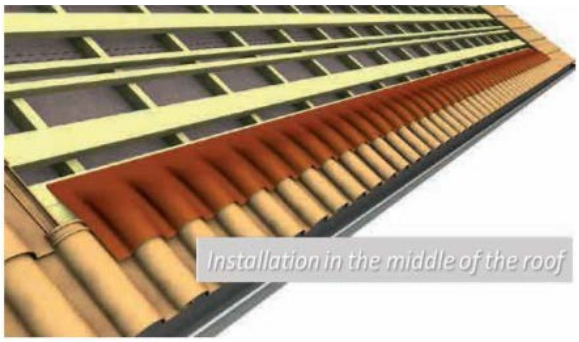
A minimum of six fixings are required for the frame and modules. The placement of these fixings can vary and the tiles battens can be used for this purpose, if they are located in the correct locations.

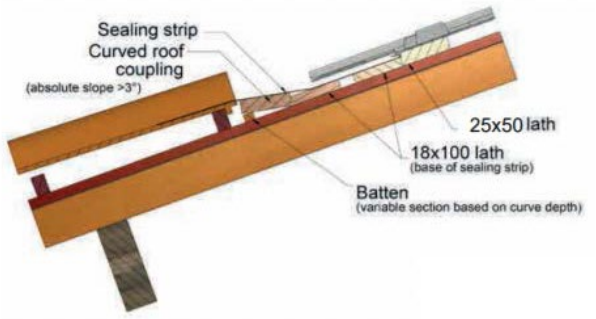
- Each frame has four fixed fixing points, as shown in sections 1.3 and 1.4.
- Additional supports must be used under the top and bottom flashings to avoid a negative fall - a minimum of 150mm of flashing cover is required on the course of tiles directly beneath the installation.
- If installing multiple rows of PV InDaX Adapt, measure 320mm up from the top of the upper fixing batten of the lower course, to find the lower fixing point of the next row.

3.4 **APRON INSTALLATION**

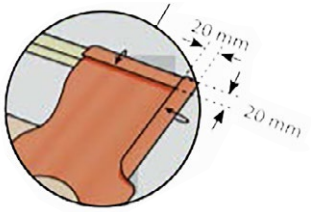


The apron is laid out to link up with the bottom part of the roof (PV array in the middle of the roof).



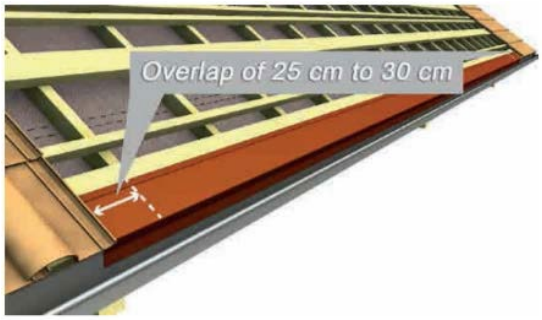


Cut and fix a support board of appropriate material that finishes flush with the top of the tile (as shown in Figure 2) to prevent a backfall on the bottom apron flashing. Extend the board 150mm either side of the planned array. Always maintain a minimum slope of 3°.



When installing the apron with profiled tiles, make sure to press it down well so that it follows the roof tile's shape correctly. Make a 20mm fold on the top and side parts to prevent wind-driven rain ingress.

When installing an array that goes all the way to the eaves, the apron is laid to enable waterflow directly into the gutter.

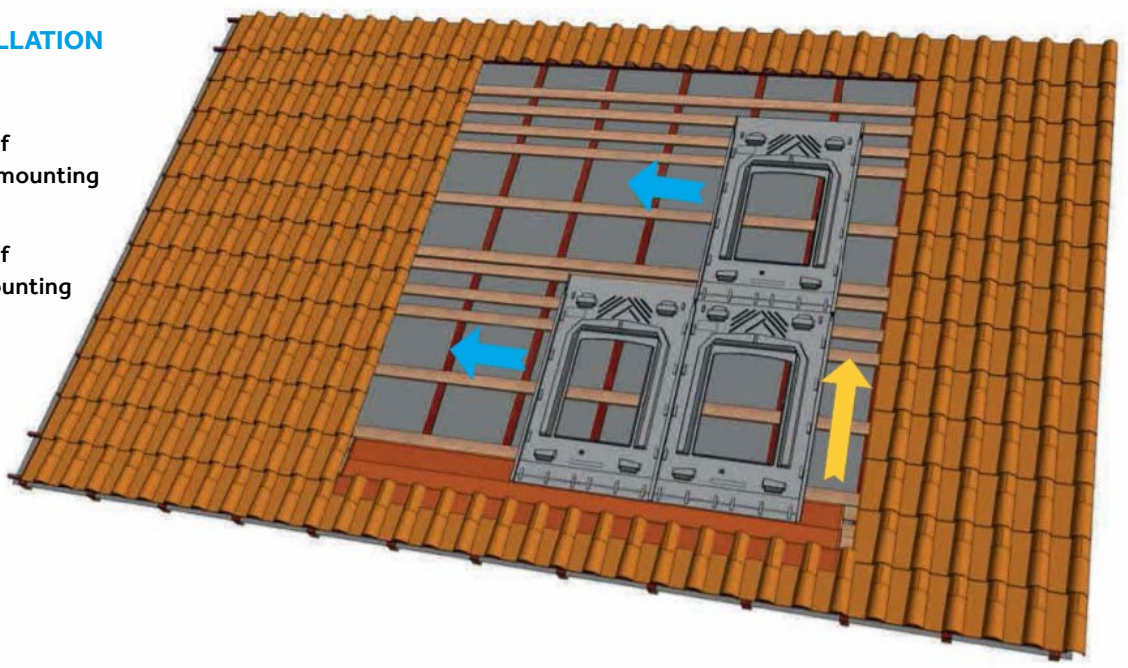


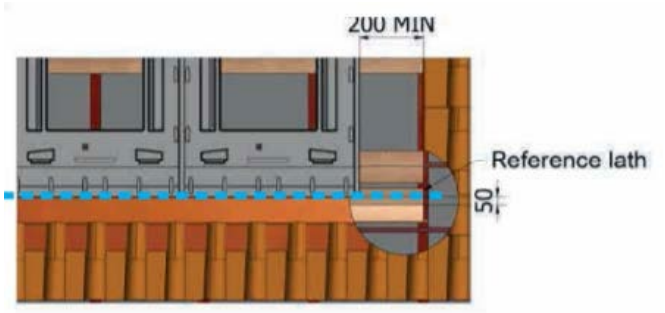
Whichever installation type is chosen, ensure the apron overlaps the lower course of tiles by a minimum of 150mm and secure to the reference batten.

3.5 FRAME INSTALLATION

Direction of horizontal mounting

Direction of vertical mounting



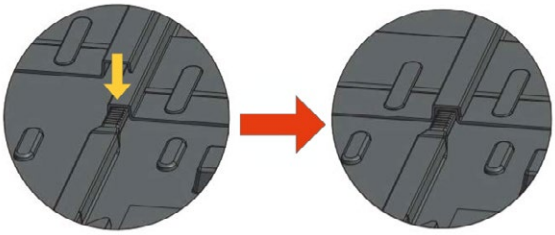


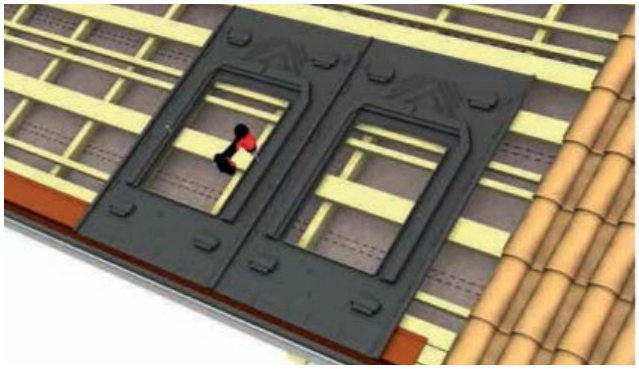
Draw a chalk line along the bottom of the first row, in the middle of the reference batten.

Insert the plastic edge wedges into the channels on the rear of the frames in line with the locations of the reference batten, Batten 2 and Batten 4, to coincide with the array ends.

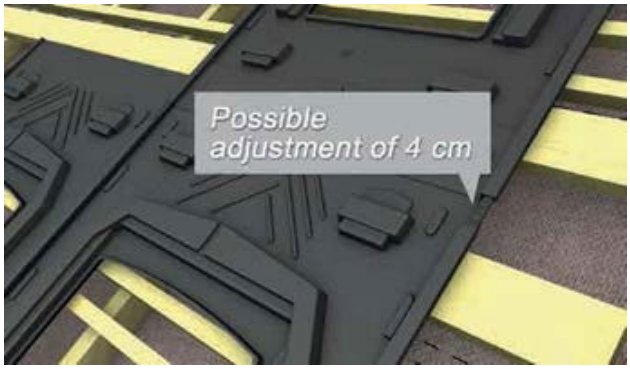
NB: a supporting wedge must always be employed beneath the right and left hand fixing clamps.

Interlock the plastic frames and check that the interlocking is firmly connected.



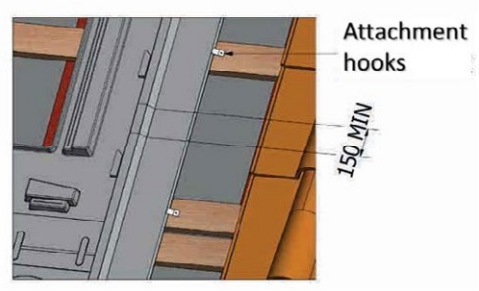


Attach the panels to Batten 2, whilst ensuring that they remain straight



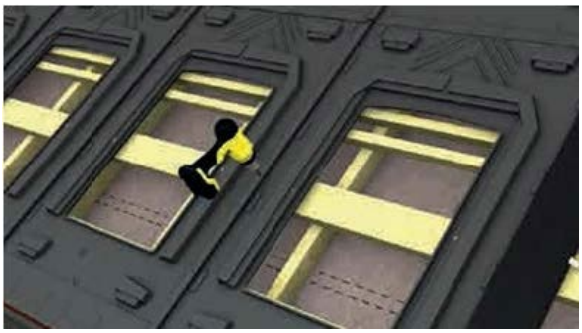
When installing the subsequent rows, adjust how one row covers the other using the adjustment to suit.

3.6 SIDE FLASHING INSTALLATION



Place the side flashings at the bottom of the first row of panels. Ensure that the overlap between side flashing pieces is a minimum of 150 mm.

Fix each flashing in place with a flashing hook attached to each tiling batten.



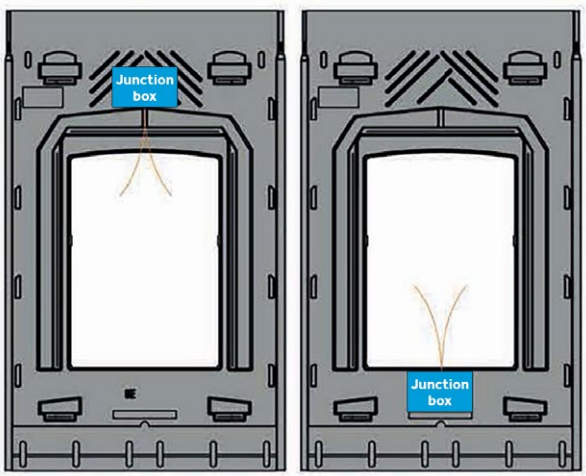
Pre-drill using a 10 mm wood drill bit on the 4 remaining attachment points of the frame, then attach the frame using 4 screws.

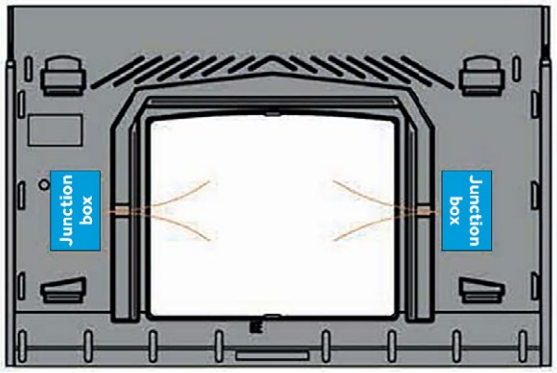
For the end clamp locations, pre-drill through the flashing, the frame's raised edge and the plastic wedges.

CAUTION!
Never drill outside of the approved drilling zones as this could compromise the watertightness of the system.

3.6.1 **CABLE PREPARATION**

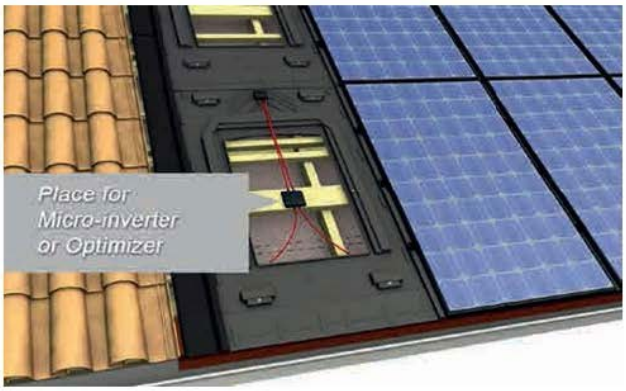
Position the module in such a way that the cables of the junction box pass through the designated space.





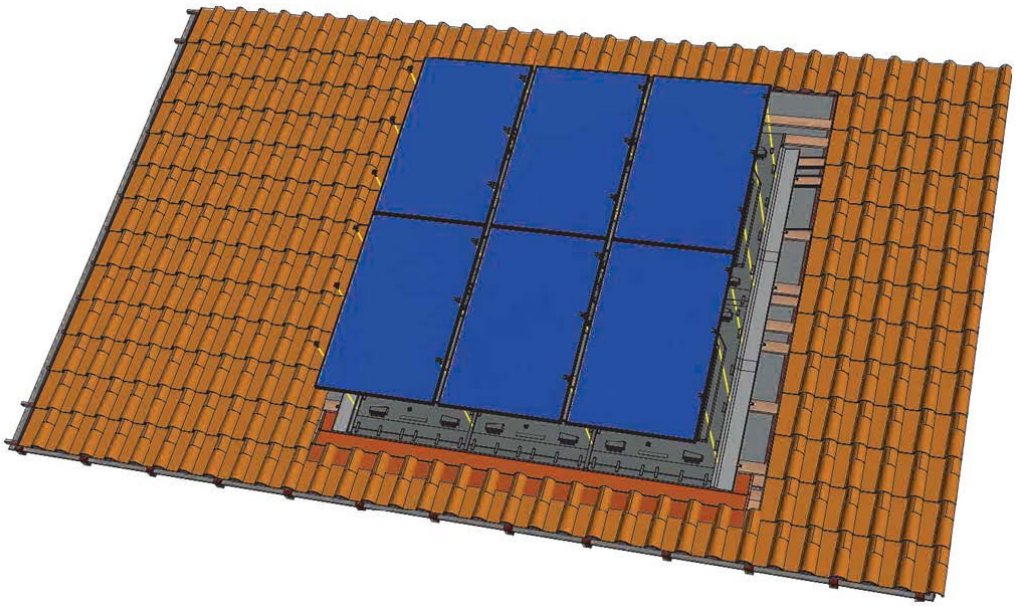
When using micro-inverters, attach them to a board in line with the frame's central hole.

Always refer to the inverter manufacturer's installation manual to ensure correct installation.

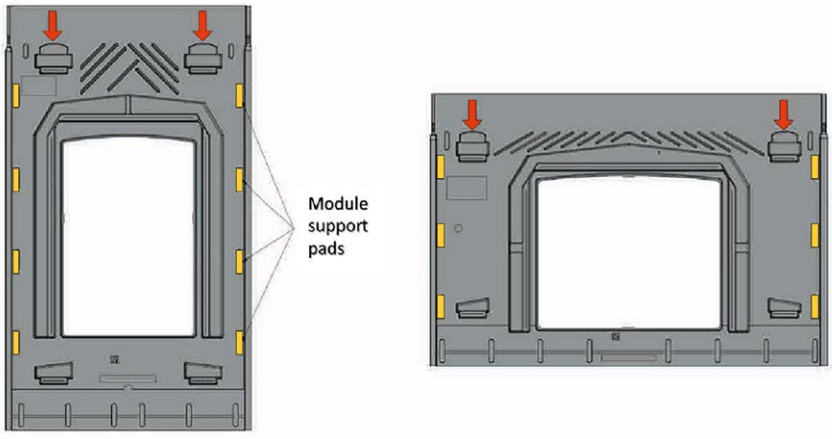


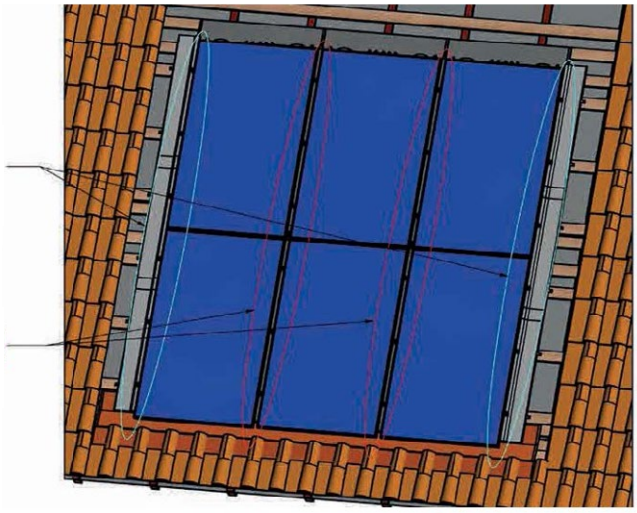
Grounding cables can be placed under the frames, however ensure that an induction loop is not created.

3.6.2 **FIXING THE PV MODULES**



Position the modules in such a way that they rest on the support pads (marked below in yellow) and are hooked over the upper pads (shown by the orange arrows).





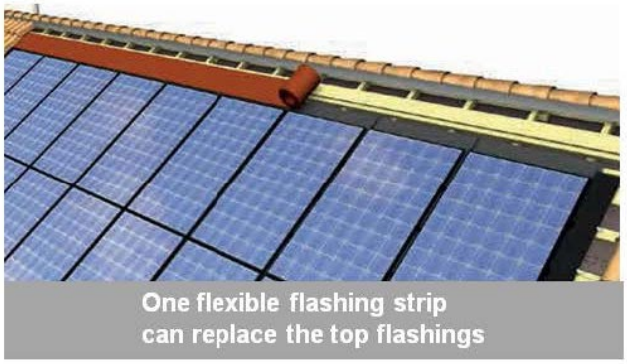
Wipe the underside of the clamp to ensure it is clean and dry, then stick the EPDM foam under the clamps and pre-drill them, by screwing and unscrewing to remove material.

Attach the modules by screwing the fixing clamps into Batten 1, Batten 2 and Batten 3 for each PV course.

3.7 TOP FLASHING INSTALLATION

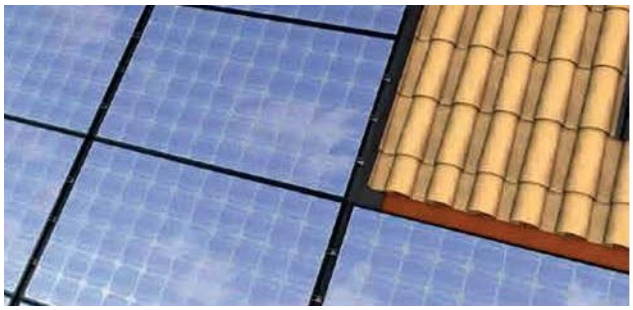
Install a supporting board between the battens at the top of the system then roll out the flexible flashing roll ensuring it lines up with the outer edge of the side flashing.

Shape a 2-cm fold in the upper and side parts of the strip to prevent any water upwelling and apply the pre-compressed seal on the perimeter (20mm from the outside edge) of all the flashing to ensure complete watertightness. The seal must reach the bottom of the lower apron to prevent any potential infiltration of water or solid particles.



3.8 PV ARRAYS WITH INNER OR OUTER ANGLES

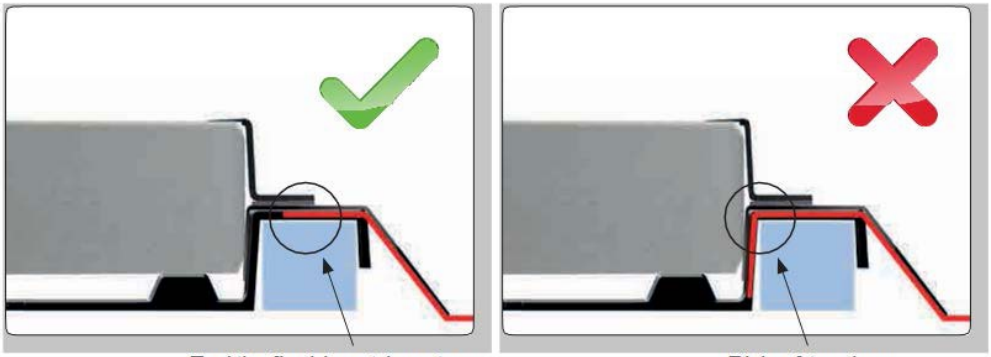
In the case of a non-rectangular PV array, inner and outer angles must be connected to the roofing using flexible flashing roll.



INNER EDGE

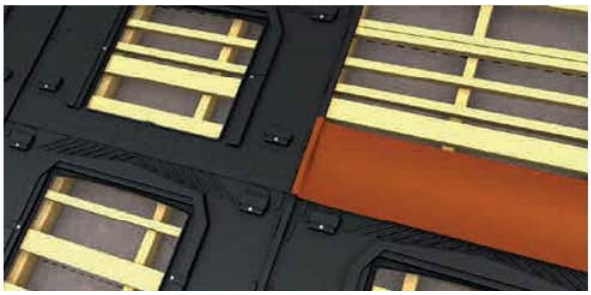
OUTER EDGE

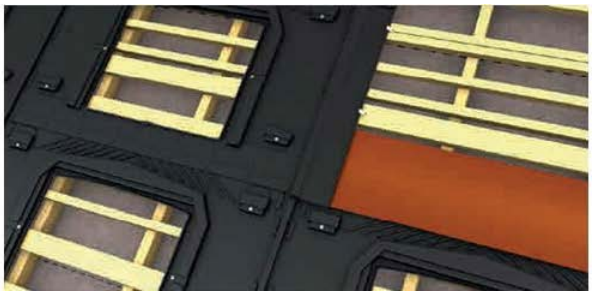
In order to avoid tearing the flexible flashing roll, ensure that the strip is fixed to the top of the corrugated part of the frame.



3.8.1 INNER ANGLE (L-SHAPE)

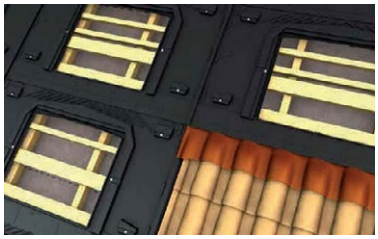
Place the flexible flashing roll strip on the top of the frames below up to the corrugation of the adjacent frame, then cover the strip with the side flashing piece.





3.8.2 OUTER ANGLE (T- SHAPE)

Place the side flashing on the lower-row panel and tile in covering the side flashing. Place the flexible flashing roll strip so that it overlaps with the last row of tiles by at least 150mm, ensuring that there is a 2-cm fold in the upper section, then position the frame so that it is overlapping the Wakaflex Rapid Flashing strip.



3.9 FINISHING THE ROOF

Position the side and upper sections of the roofing elements to make a continuous and water tight connection with the roof, remembering to mechanically fix small cuts where appropriate.

Section 4 Maintenance and Servicing

4.1 ANNUAL CHECKS

It is important to check once a year whether leaves and/or other debris have gone under the photovoltaic system or between the panels; compressed air can be used to remove any debris, if required. Do not use solvents to clean the polypropylene frame.

BMI recommends a maintenance contract that includes an annual visit to check electrical production, electrical components, PV modules, panel supports, attachments, precompressed joints and sealing strips.

4.2 PV MODULE REPLACEMENT

Disconnect the PV array from the AC consumer unit and proceed as follows:

1. Unscrew the fixing clamp, remove the PV module and remove the edge wedges
2. Place a new polypropylene wedge under the corrugation if it is located on an array edge. Insert a screw in the location of the previous hole and tighten.
3. Make a new 10mm hole, 25mm above the position of the previous hole.
4. Place the new PV module in position, and reclamp.

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