

Suncell BIPV

Building-Integrated Photovoltaic System

System Description and Installation Instructions



Suncell BIPV - System Description and Installation Instructions

Introduction

Thank you for choosing the Suncell BIPV system, a photovoltaic system for roof integration as a replacement for roof tiles, or for facade cladding, featuring an extremely simple and robust design. Please read this document carefully before starting planning and installation work. Failure to follow these instructions may result in personal injury, property damage, and may also affect the validity of the product warranty.

The instructions in this document relate to the installation of Suncell® components. This document is intended for trained PV installers, or alternatively for qualified roofing and/or facade professionals working alongside certified electrical personnel. The requirements for the substructure, which must be completed beforehand, are also defined (Annex 13).

Electrical work is outside the scope of this document, with the exception of connecting the PV modules using the factory-crimped connectors with which they are equipped. All other electrical work in the building must be carried out by certified personnel in compliance with applicable local standards.

The Suncell BIPV system was developed in Switzerland for the Swiss market. It meets high standards in terms of static load resistance, durability, aesthetics and energy efficiency. The system consists of only 3 robust basic components, enabling very simple and fast installation and conferring an extremely long service life.

Please refer to the latest module datasheet, available at www.suncell.ch

Basic Principles

From a structural perspective, each module is held in place in its hooks independently of the other modules. The effect of tensile and deformation forces caused by thermal expansion of the substructure is minimised and does not induce contact or stress between modules, as they are not fixed with clamping brackets but simply rest in hooks.

The fact that the modules have a robust dual-glass structure without a metal frame is also a guarantee of efficiency and durability, for several reasons:

- A frameless module accumulates dirt more slowly than a module with an aluminium frame.
- With a frameless module, natural convection ventilation dissipates heat more effectively from the rear of the module, thereby lowering its average operating temperature throughout its service life.
- A frameless dual-glass PV module assembled with a suitable encapsulant is not subject to degradation caused by the PID (“Potential Induced Degradation”) phenomenon, unlike aluminium-framed modules, which require frame earthing during installation, creating a potential difference between the cells and the frame and leading to faster module degradation.
- Due to the absence of aluminium profiles bonded around the module perimeter, water ingress protection will be maintained for decades, as long as the modules remain in place. This is in contrast to integrated systems where waterproofing depends on the adhesion of aluminium profiles bonded around the module perimeter, with a risk of delamination after several decades that would compromise the system’s water tightness.

System Components



PV Module:

Dual-glass structure, perimeter protected by a POE edge strip with an EPDM profile on the upper side



Hook:

Manufactured in a single piece from solid aluminium, with UV-resistant EPDM protection over the entire contact area with the module



Water Drainage Profile:

Manufactured in a single piece from solid aluminium, with UV-resistant EPDM protection over the entire module support area



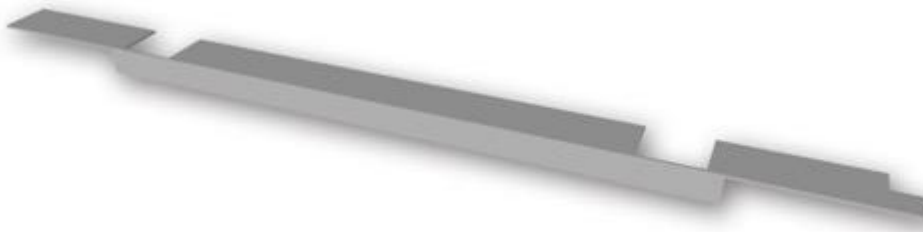
Module Locking Key

Made from extruded EPDM, to prevent the module from being lifted out of the hooks by wind gusts



Vis

Torx screws
4.5x35mm in
stainless steel



Installation

Template:

Aluminium gauge used as an installation guide for fast, precise and error-free work

Installation Principles

The water drainage profiles and hooks are installed at the required centre-to-centre spacing using the installation template on the battens (see Annex 1 and 2).



To install a module, tilt it and first slide its upper edge under the upper hooks, connect the DC connectors, then fold the module down and slide it downwards so that its lower edge is retained in the lower hooks. In areas particularly exposed to wind, fit a locking key in one of the upper hooks to secure the PV module (see Annex 6). The locking key is designed so that it can be easily removed if a module needs to be taken out for maintenance.



Recommendation : The use of 2 glazier's suction cup handles makes it easier to position and make final adjustments to the module.

Installation Steps

Step 1: Batten Installation

Battens with a 100 x 30 mm cross-section (minimum 90 x 30 mm, recommended maximum 120 x 30 mm) must be installed with a batten exposure of 785 mm. Square up precisely and mark the zero point at the eaves using a chalk line, then install the battens starting with the eaves batten aligned on the zero point and working up with a batten exposure of 785 mm. The installation template can be used for verification; its lower section has a spacing of 685 mm and is intended for battens with a 100 x 30 mm cross-section only (see Annex 3).

Step 2: DC Wiring on the Roof

It is recommended to install and label the string cables before fitting the water drainage profiles, following the pre-prepared wiring plan, to avoid having to route them under the profiles afterwards.

Step 3: Installation of Water Drainage Profiles

Before starting profile installation, measure the width of the roof surface once more precisely and draw up a module layout sketch/calculation, to determine exactly how far from the verge the first profile must be installed, as this gap will be closed with a metal flashing profile (see Annex 4). Modules are generally installed with a 10 mm lateral gap between them.

The system allows some flexibility in the spacing of the profiles. To gain a few centimetres in width, the module gap can be increased to up to 20 mm, which depending on the dimensions of the roof surface may allow the width of the verge metal flashing profiles to be reduced.

Once the distance to the roof verges has been calculated, use a chalk line to mark the outer alignment of the profiles on the left side of the roof surface. Fix the first profile at the bottom left. The profile is aligned vertically at mid-height of the upper batten, so it rests 5 cm on its upper batten and is secured with 2 screws (see Annex 4). Continue fixing the profiles from left to right, using the installation template. Installing with the template ensures a consistent mounting grid.

Step 4: Hook Installation

Hook installation is also carried out using the installation template (see Annex 5). Place the template between the profiles on the lower side of the batten, then place the hooks in the openings provided in the template. Drive the 2 upper screws of each hook using a screwdriver fitted with the appropriate bit, then remove the template and drive the 2 lower screws of each hook.

IMPORTANT : when the battens used are not perfectly straight, it is essential to mark a chalk line for the alignment of the lower edge of the hooks, so as to always maintain a batten exposure of 785 mm along the roof slope.

Step 5: Module Installation

Once the hooks and drainage profiles are in place, it is essential to carefully verify that the string cables installed in step 2 are routed and positioned according to the pre-established string plan, updated if necessary based on the actual module layout.

If power optimisers are used, install them before starting module installation, following the manufacturer's instructions. Prepare a layout plan of the module groups connected to each optimiser. With a string inverter, take into account specific shading situations: if there are vertical shading factors, such as the shadow of a higher roof surface, create vertical module groups per optimiser in the expected shading zone; otherwise, prefer horizontal groupings.

Connect the connectors observing the correct +/- polarity. If there are 4 modules per optimiser, create 2 groups of 2 modules, i.e. chain the modules in pairs by connecting the + connector to the – connector of the next module.

The modules are equipped with genuine Stäubli MC4 connectors and must therefore only be connected to compatible connectors in compliance with applicable standards. After each connection, a check must be performed by applying a tensile force of approximately 20 N to the connectors.

When installing with a string inverter, start by installing the module connected to the string cable, ensuring the correct polarity as per the string plan.

There is no absolute rule regarding the order of module installation. When module locking keys are required (areas highly exposed to wind), follow the string route from bottom to top, so that each module has its locking key fitted before the module above it is installed.

Roof Installation Method

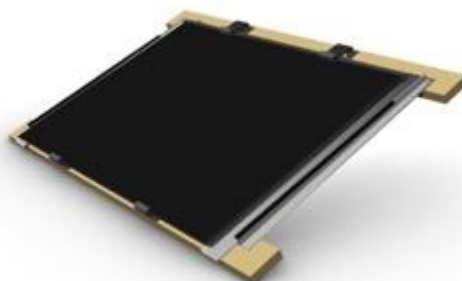
The Suncell BIPV system is extremely easy to install for a roofing and sheet metal contractor or solar installer, in compliance with SIA standard 232/1 for pitched roofs. The minimum recommended roof pitch is 12°. For installation on low-pitch roofs, it is the client's responsibility to ensure that the architect or installer specifies a roof underlay and batten type suited to the applicable load level (see Annex 13), and aluminium battens if there is a risk of moisture accumulation.

From a structural standpoint, the basic system withstands very high forces (10,000 Pa/m² in pressure, 5,400 Pa/m² in suction). In cases of extreme mechanical loading (high altitude and/or low roof pitch), the structural performance must be validated, and the installation method may be adapted as follows to withstand higher loads:

- Install 3 hooks per module instead of 2
- Add an intermediate support batten for each row of modules (centred on the module in the vertical axis)

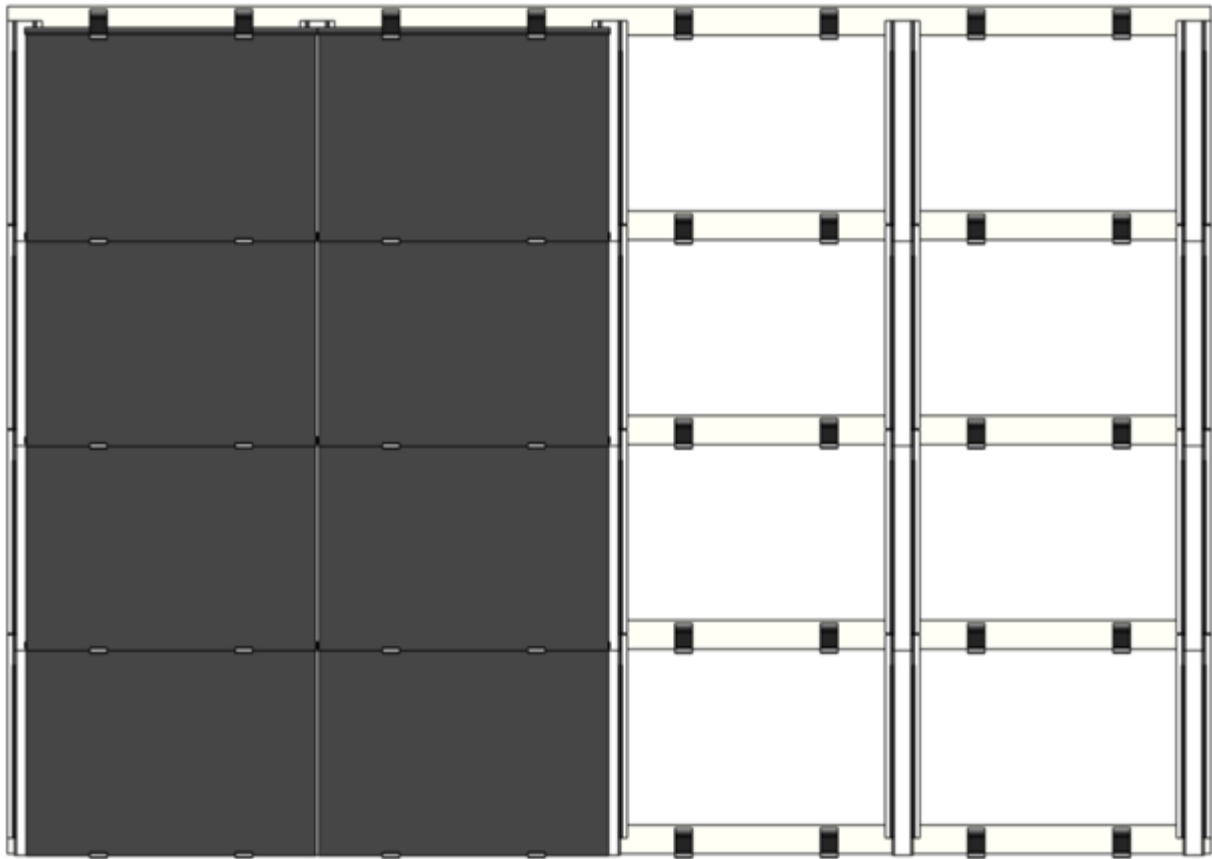
Inactive cover panels cut to size can be used to clad areas where a full module cannot be installed, to cover the surrounds of obstacles (chimneys, roof windows, etc.), or at the verges. They are supplied with the same dimensions as the PV module but can easily be cut on site to the required dimensions. Their colour and visual appearance closely match those of the Suncell BIPV modules.

It is recommended to make the metal flashings in galvanised sheet metal (see Annexes 7, 8 and 9). The risks of galvanic corrosion associated with the use of a metal with a higher potential (copper, stainless steel, etc.) upstream are very low due to the surface treatment of the drainage rails.



Facade Installation Method

The system holds a fire reaction class B(s1,d0) certification according to standard EN 13501-1:2028. It can be used as facade cladding on the same basis as the roof installation method. The design of the aluminium substructure must be the subject of a study by the architect or installer, to ensure structural integrity and compliance with AEA1 2015 fire protection regulations and the transition document for the planning of ventilated photovoltaic facade installations published by Swissolar (www.swissolar.ch). Suncell Energy SA will provide the information required to carry out such a study.



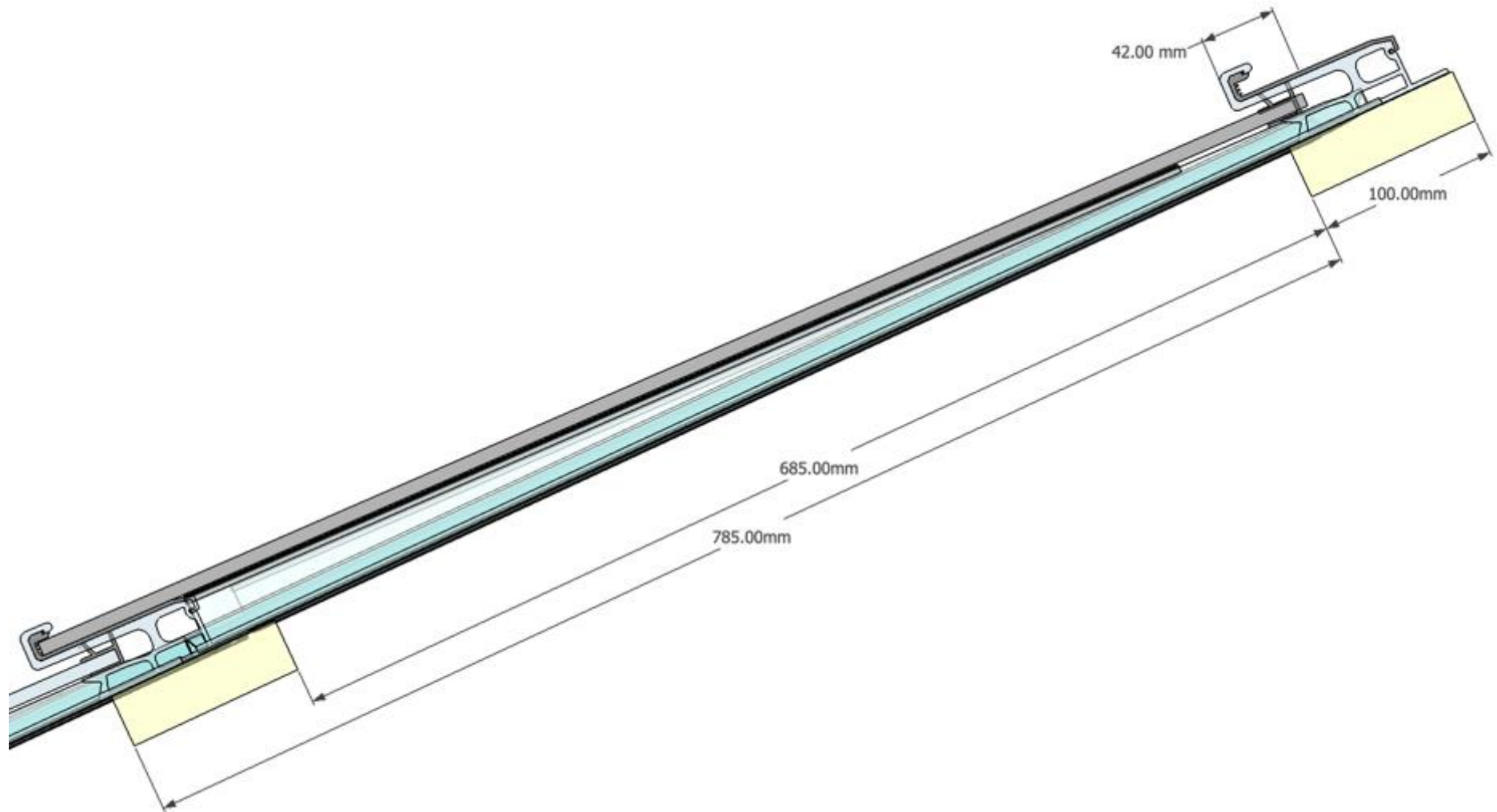
V1.5 - 12/2022

V2.0 - 12/2025

Annex 1

Suncell BIPV - Lateral Cross-Section View

Each SCL-xxxMA-TC48 module rests on 2 hooks at the bottom, 2 hooks at the top, and on each side on the upper edges of the water drainage profiles that follow the module's slope. For the SCL-xxxMA-TC64 module there are 3 hooks across the module width.



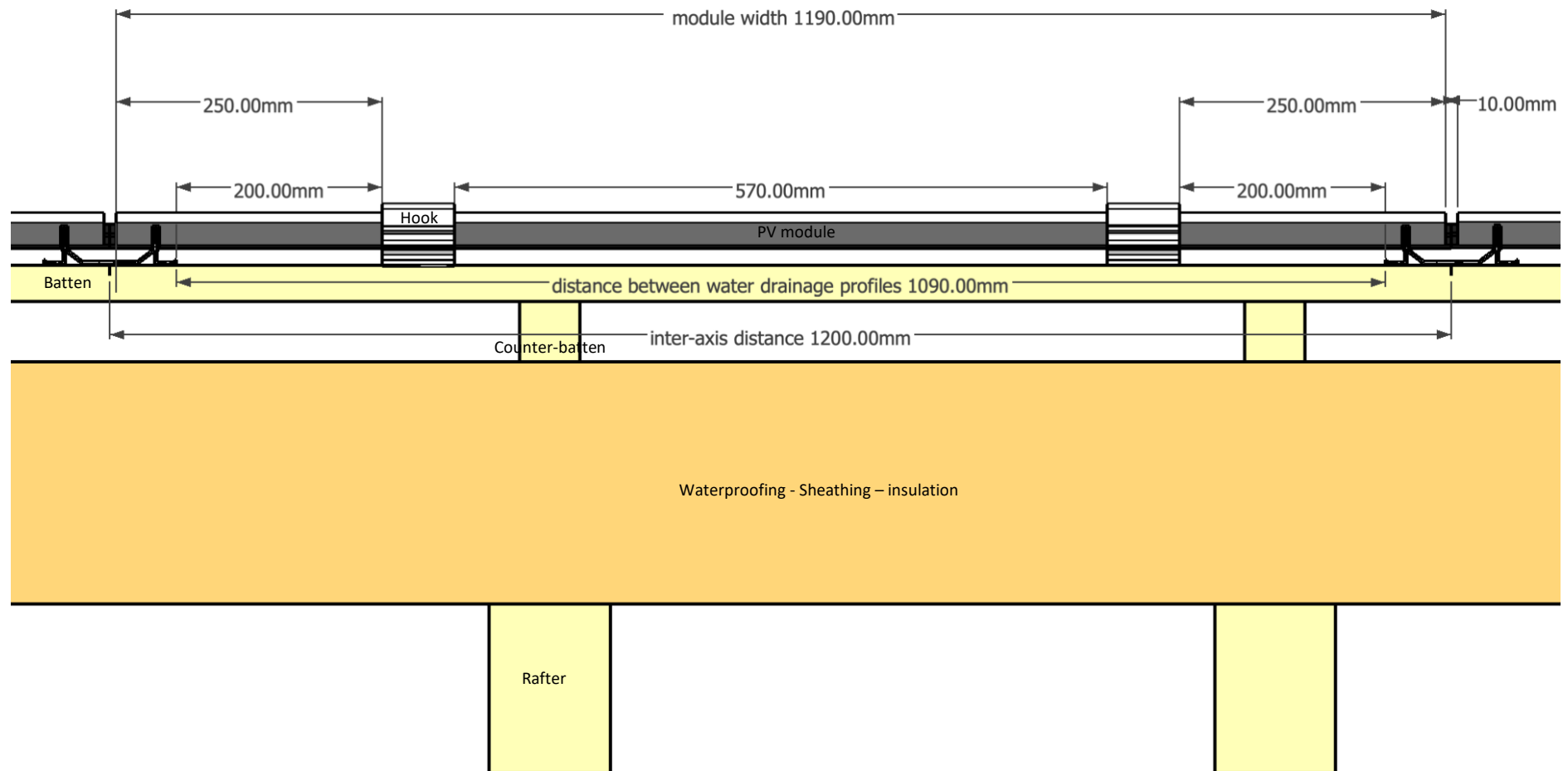
V2.0 - 12/2025

Annex 2.1

Suncell BIPV – modules SCL-xxxMA-TC48 - Front View

The standard SCL-xxxMA-TC48 module rests on 2 hooks at the bottom side and 2 hooks at the top side.

Installation using the installation template guarantees the correct arrangement of system components, respecting the spacings shown below.

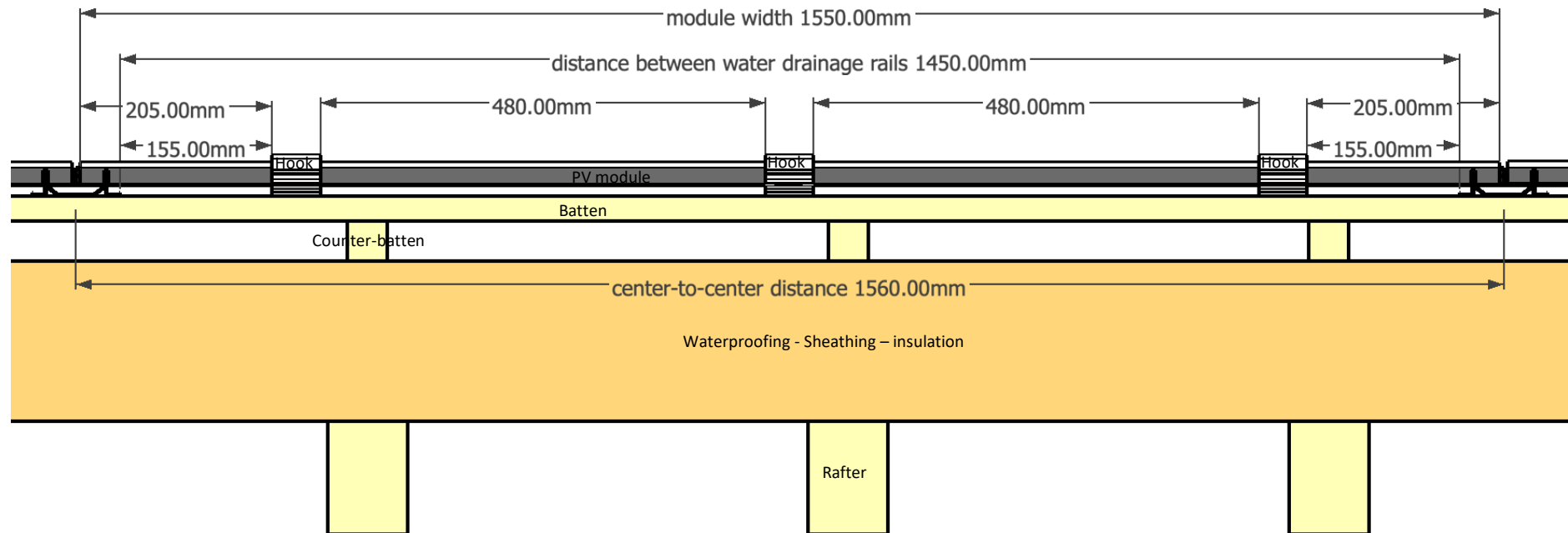


Annex 2.2

Suncell BIPV – modules SCL-xxxMA-TC64 - Front View

The SCL-xxxMA-TC64 module rests on 3 hooks at the bottom side and 3 hooks at the top side.

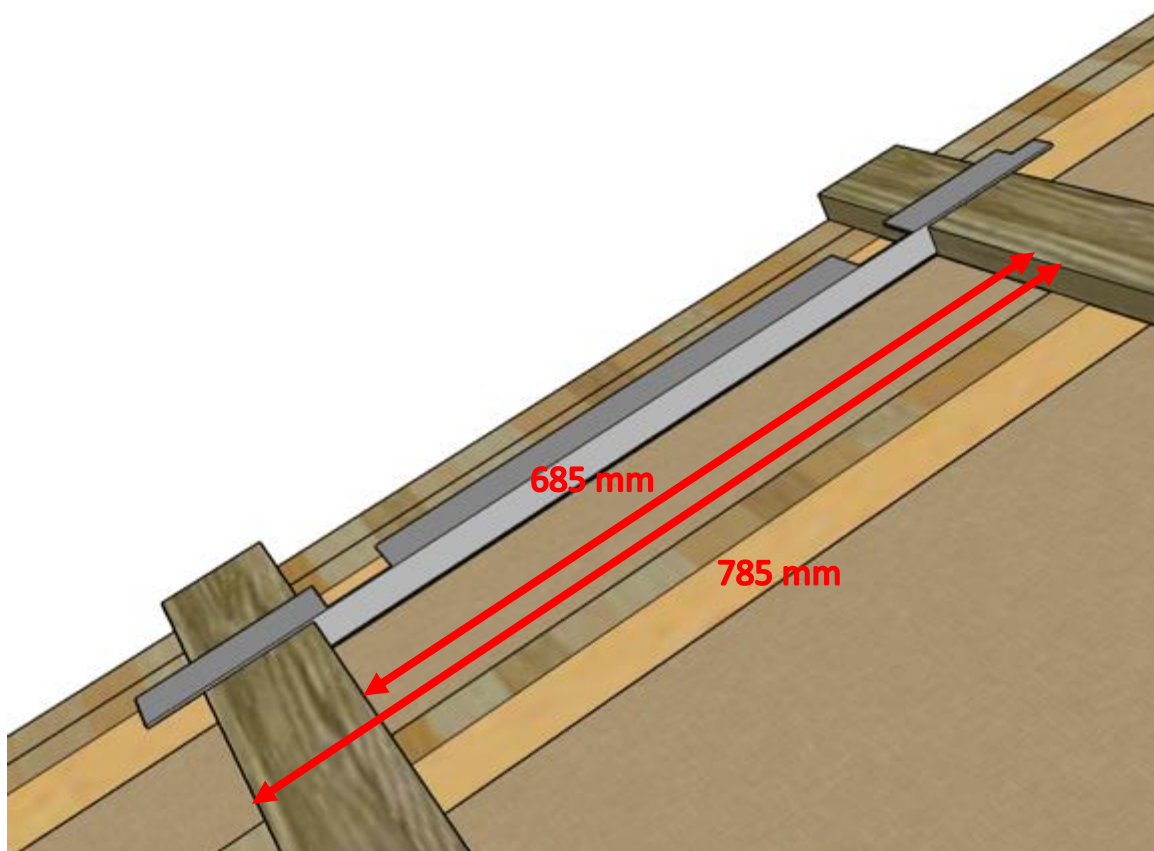
Installation using the installation template guarantees the correct arrangement of system components, respecting the spacings shown below.



Annex 3

Suncell BIPV – Batten Installation Using the Installation Template

Battens with a 100 x 30 mm cross-section must be installed with a batten exposure of 785 mm (685 mm spacing). Square up precisely and mark the zero point at the eaves using a chalk line, then install the battens starting with the eaves batten precisely aligned on the zero point and working up with a batten exposure of 785 mm. With 100 x 30 mm battens, the installation template can be used for verification, as its lower section has a spacing of 685 mm. Alternatively, battens with a minimum cross-section of 90 x 30 mm and a recommended maximum of 120 x 30 mm may be used, provided the 785 mm batten exposure is respected.



Alignment of the bottom of each batten relative to the zero point marked at the eaves:

batten	distance (mm)
16	11775
15	10990
14	10205
13	9420
12	8635
11	7850
10	7065
9	6280
8	5495
7	4710
6	3925
5	3140
4	2355
3	1570
2	785
1	0

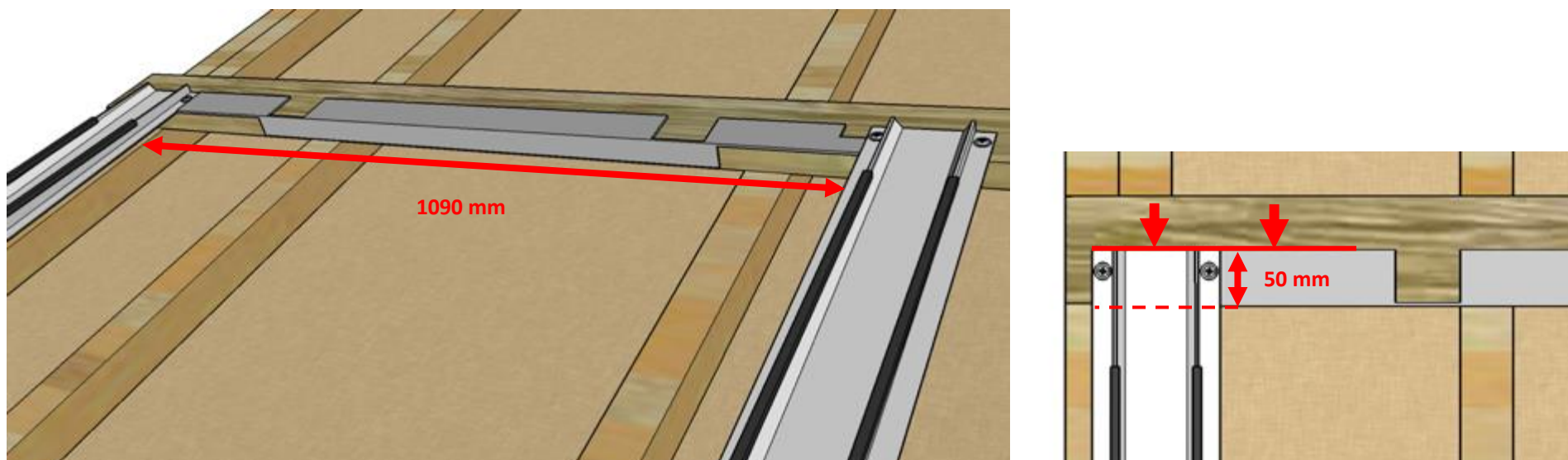
IMPORTANT: Always measure from the zero point to avoid propagating a measurement error upwards

Annex 4

Suncell BIPV – Water Drainage Profile Installation Using the Installation Template

Place the installation template on the bottom of the upper batten, with the side with 2 openings facing upwards. The top of the drainage profile must be aligned with the top of the installation template; this way, the profile rests on the lower 5 cm of the batten.

The total length of the installation template corresponds to the required 1090 mm spacing between the water drainage profiles. Once the first profile has been installed at the far left of the roof surface, use the installation template to install the subsequent profiles at the required spacing.

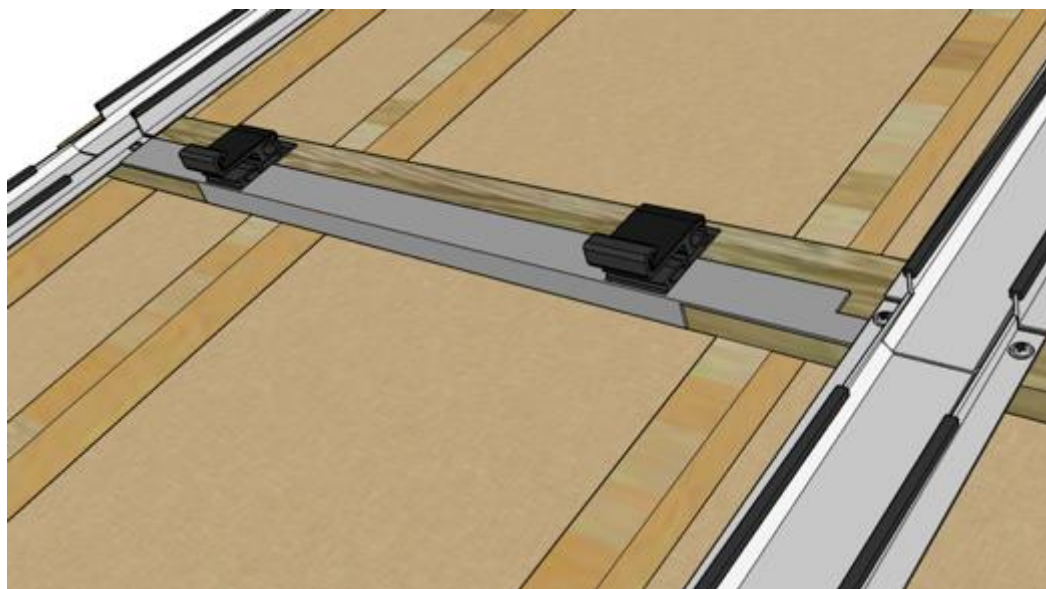
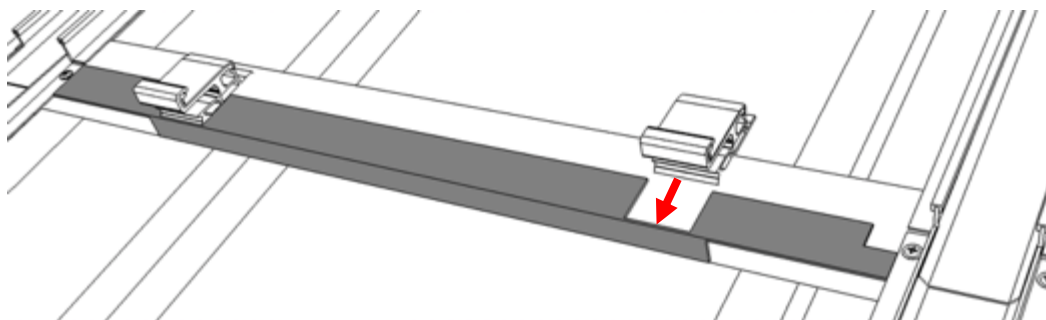


For the installation of SLC-xxx-DH8N-64 modules, another installation template is available to allow a spacing of 1450 mm between the water drainage profiles.

Annex 5

Suncell BIPV – Hook Installation Using the Installation Template

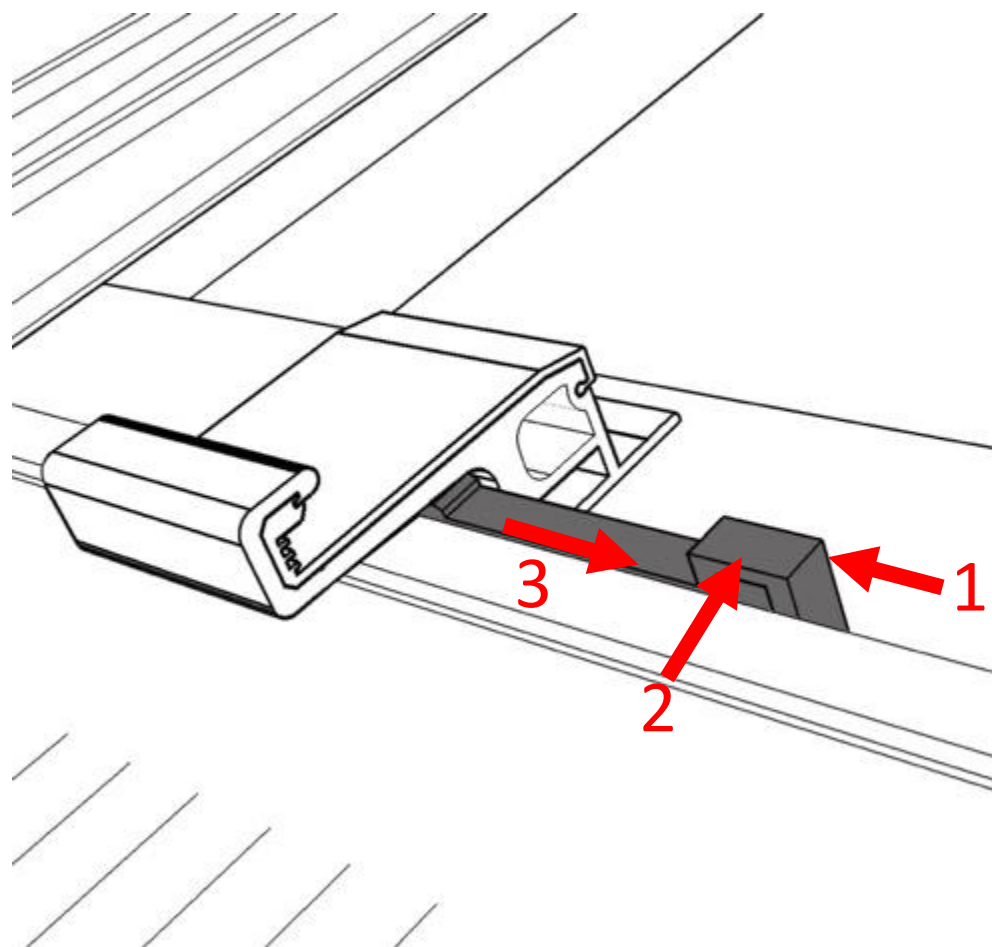
Place the installation template on the bottom of the batten, with the side with 2 openings facing upwards, between 2 drainage profiles. Place one hook in each of the 2 openings as shown below. Drive 2 Panhead 4.5 x 35 screws through the holes on the top of the hook, perpendicular to the batten. Then remove the installation template and drive the 2 lower screws of the hook, which enter at 45° through the lower holes of the hook. For SLC-xxx-DH8N-64 module installation there are 3 hooks.



Annex 6

Suncell BIPV – Fitting the Module Locking Key

Only in areas highly exposed to wind gusts, a module locking key must be fitted on each PV module and each cover panel, in the upper right hook. This key prevents the module from being lifted out of its hooks by wind gusts. Slide the locking key into the hook above the module on the right side. The key must be inserted all the way in, so that its head presses against the side of the hook.



1. Fitting the locking key: slide the key all the way into the hook until you feel it held in place by the ridges at the end of the key.

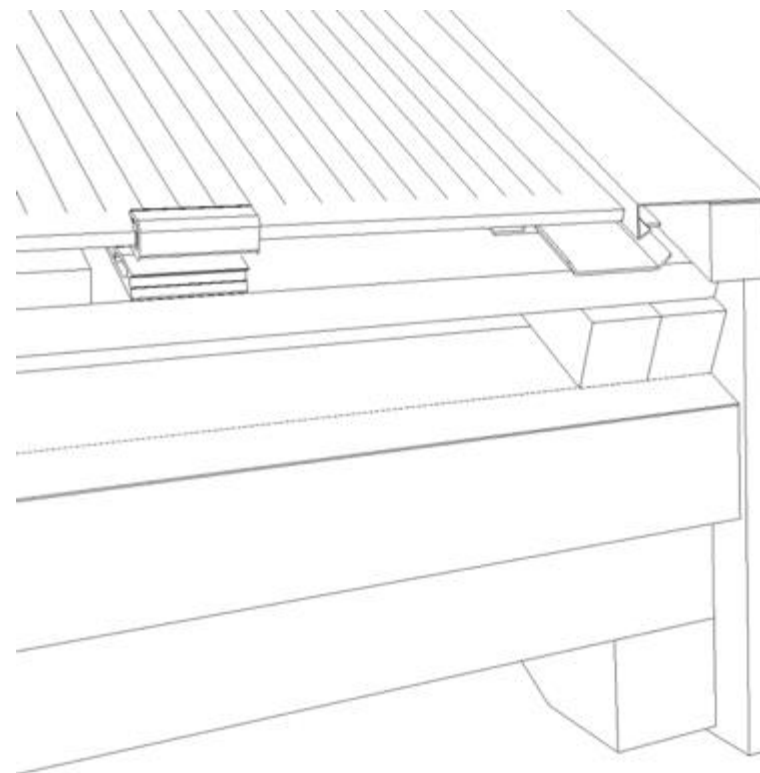
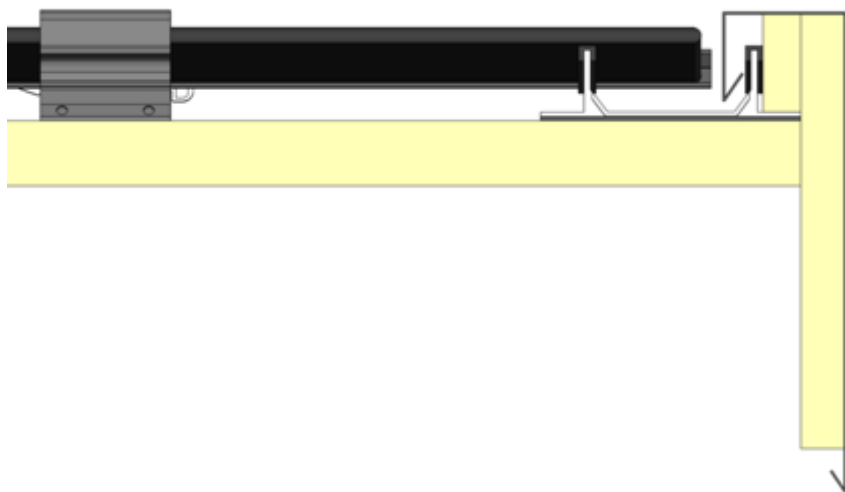
2./3. To remove the locking key during maintenance work requiring access under the modules, insert a flat-head screwdriver under the upper module through the head of the key. Then pull to the right to withdraw the key from the hook. The module can then be slid upwards and removed from its hooks.

Annex 7

Suncell BIPV – Verge Metal Flashing Suggestions

Modules at the roof verges must be protected by a verge flashing profile, or alternatively by verge tiles. It is recommended to make a verge flashing profile of the required width, letting it fall into the system profile, which then acts as a water drainage channel to the roof eaves.

When the remaining gap between the modules and the verge is too wide to be covered by a metal flashing, cover panels cut to the required width (minimum width 25 cm) shall be installed. Alternatively, a border of roof tiles can be used with a galvanised sheet metal flashing between the tiles and the PV modules, this flashing using the system drainage profile as a water drainage channel.

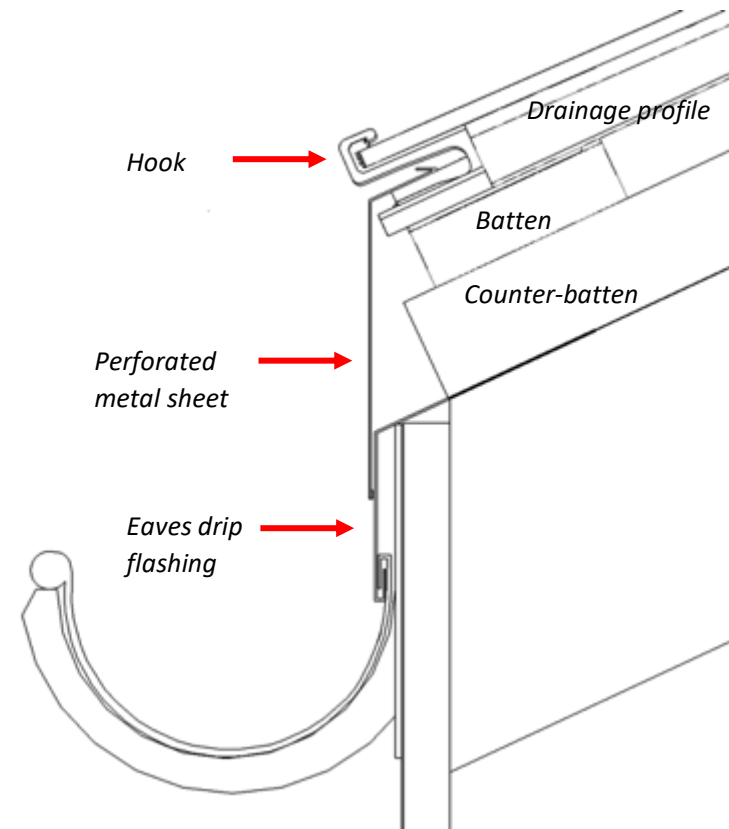
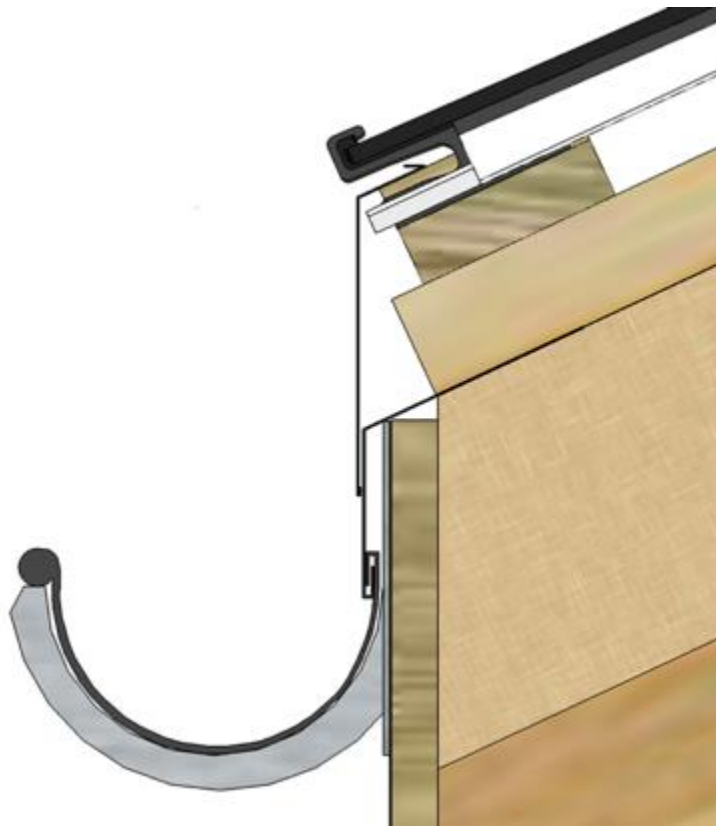


Annex 8

Suncell BIPV – Eaves Metal Flashing Suggestions

An eaves drip flashing is installed under the counter-battens before module installation begins and drops into the gutter, so that water collected by the system's drainage profiles does not reach the roof underlay.

A perforated metal sheet is installed to close the gap between the PV modules and the eaves. Good ventilation, in compliance with SIA standard 232, is all the more important with a PV system as poor heat dissipation under the roof can significantly reduce module efficiency. It is advisable to fit this sheet metal with a return that rises into the lower opening of the PV system hooks, fixing it to a support batten (thickness 19 to 22 mm) mounted on the lower batten, with segments of approximately 45 cm fixed between the system hooks.



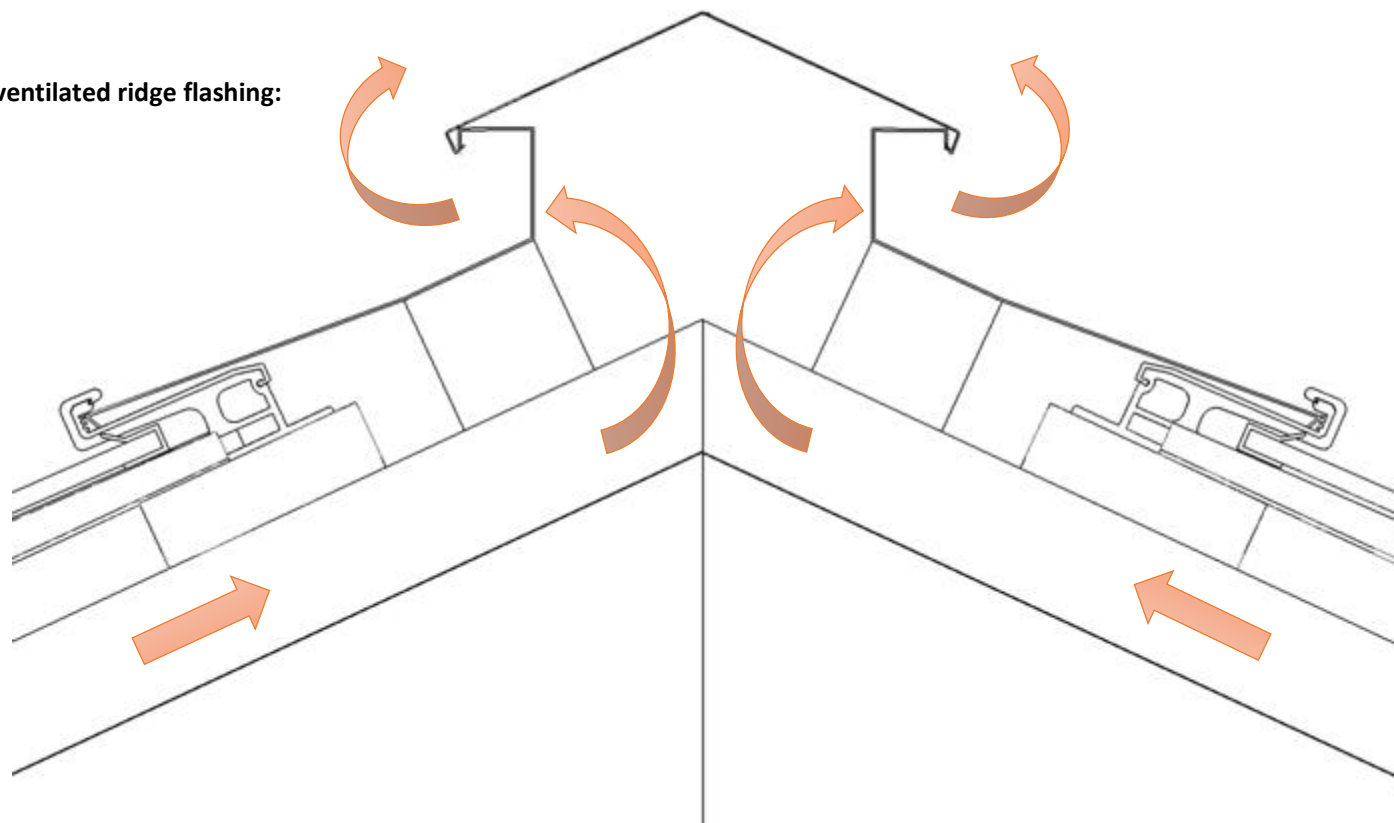
Annex 9

Suncell BIPV – Ridge Metal Flashing Recommendations

A ventilated ridge flashing is mandatory. Ensure that the size of the perforated area of the fascia flashing sheet at the ridge corresponds to that of the closing flashing sheet at the eaves, so that the air gap allows continuous heat dissipation under the PV modules by natural convection.

The width of the flashing sheet will be sized to compensate for the difference between the roof slope dimension and the length of the PV module array, since at the eaves the modules are aligned with the bottom of the roof surface. This sheet rests on the top of the hooks of the upper row of the PV system and is retained under the hook return. It is fixed to a timber block with a 50x50mm or 60x60mm cross-section, so as to deflect water over the top row of modules. The module layout plan must allow for a minimum distance of 15 cm between the upper edge of the last PV module and the ridge line to allow a proper ventilated ridge flashing to be installed.

example of ventilated ridge flashing:

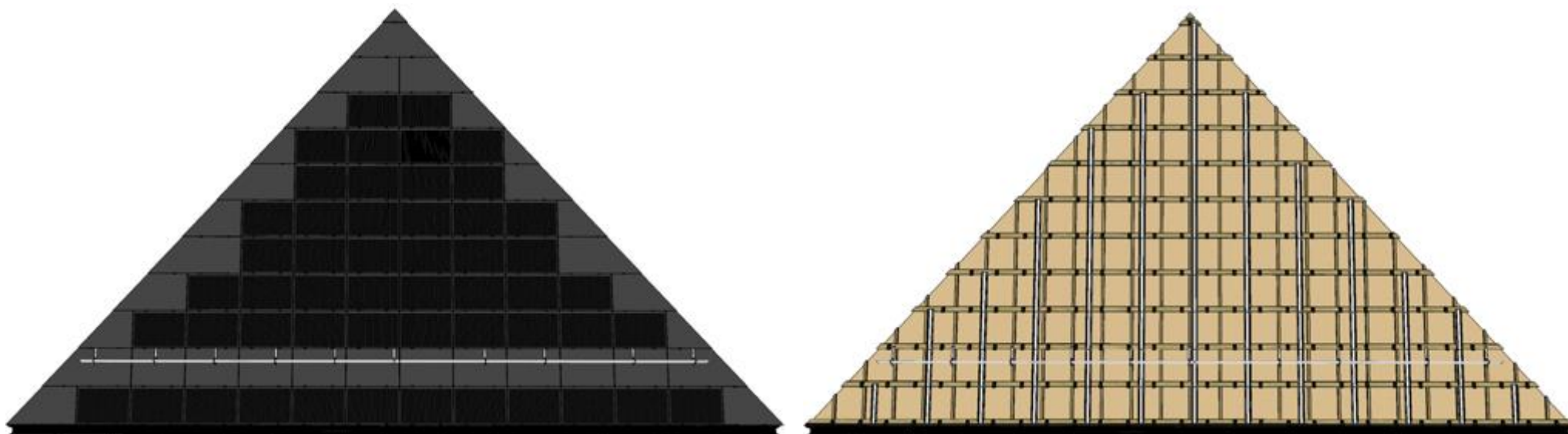


Annex 10**Suncell BIPV – Hip Roof**

As the active PV modules have a fixed size, the Suncell BIPV system also includes inactive cover panels that can be cut to the required shape and dimensions, so as to cover a roof surface uniformly without having to make joins with tiles or any other type of roofing material.

The example below shows the arrangement of cover panels for a triangular roof. The same applies to a trapezoidal roof. When a panel is cut diagonally by the hip/valley, it is recommended to treat it as an extension of the laterally adjacent panel, as a single cover panel. If the upper edge of a cover panel cut by the hip/valley is more than 25 cm wide, it can be treated as a separate panel, and a hook shall be placed on its upper side. Cover panels are available in 3 dimensions: 1 x the PV module length; 1.5 x the PV module length; 2 x the PV module length, so that they can be cut and adjusted for each situation. The edges of the cover panels shall be fixed with the supplied fixing screws, whose heads match the colour of the panel. The upper side must be be fitted with the supplied EPDM profile, which is to be cut on site to the required length and bonded using the supplied double-sided adhesive tape (polyacrylate base).

In the case of an inverted trapezoidal roof surface, the drainage profiles must extend down into the valley under the cover panels. In this case they shall be cut following the valley line to channel water into the valley metal flashing.

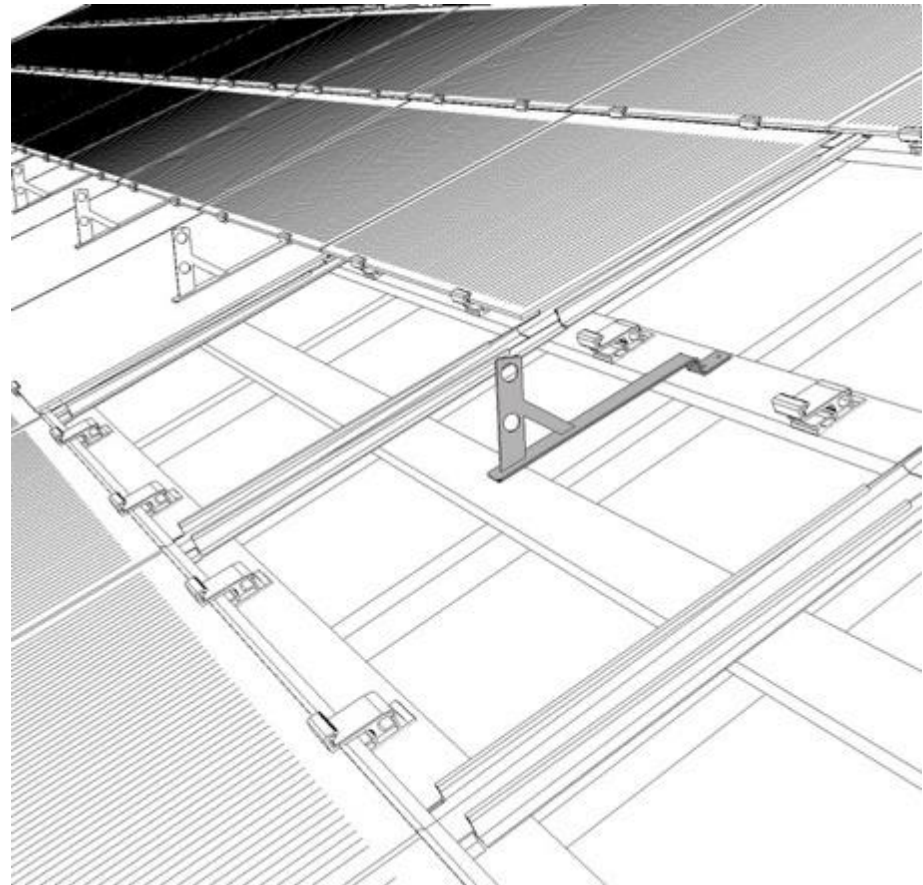
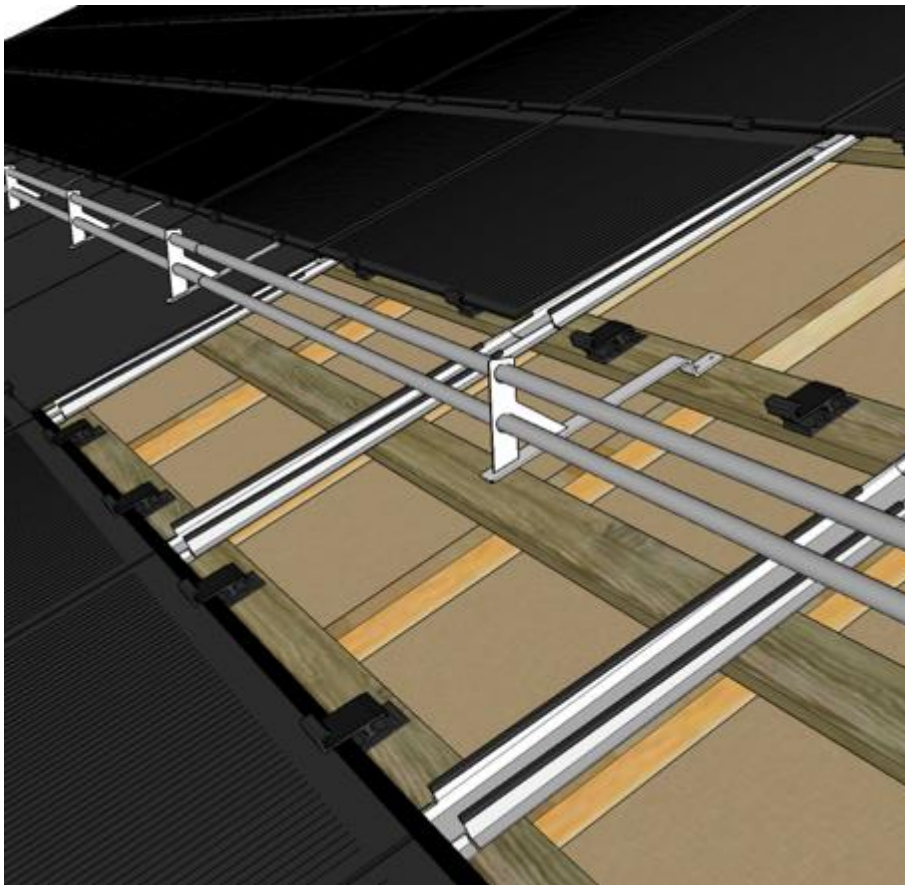


Annex 11

Suncell BIPV – Snow Guard Installation

We recommend the use of snow guard hooks from the Glaromat solar snow guard range www.glaromat.ch. These hooks are available in different finishes and versions. Please refer to the manufacturer's installation instructions.

Snow guard hooks must **never be mounted on active PV modules**, but only on inactive cover panels. An intermediate batten shall be installed under the row of cover panels to prevent deformation caused by the snow guard hooks bearing on them.

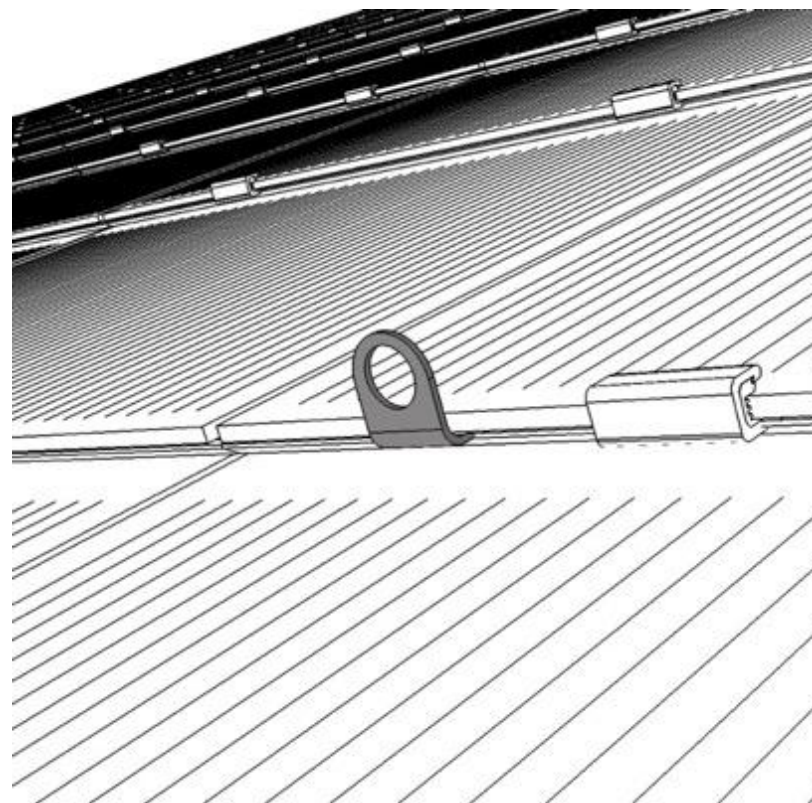
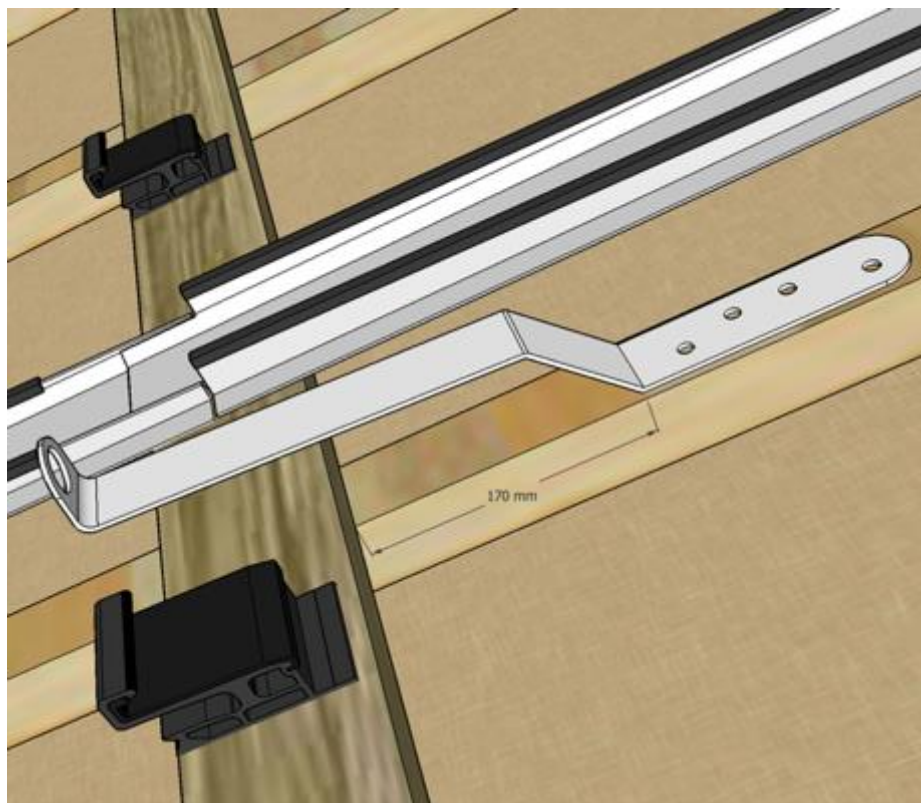


Annex 12

Suncell BIPV – Safety Anchor Point Installation

Safety anchor points can be fixed within the PV module array to define a roof access safety concept in compliance with SUVA regulations. The responsibility for defining the roof access safety concept lies with the installer, who shall submit it to the SUVA inspector for validation and hand it over to the client.

We recommend a product such as the Glaro_SL_F safety anchor point from the manufacturer Glaromat www.glaromat.ch, shown in the sketches below. They are certified to EN 795:2012 type A for timber mounting, for 1 person in all load directions. Install the device strictly following the manufacturer's instructions, so that the head of the anchor point protrudes by no more than 15 mm below the PV module. The anchor point must under no circumstances cover or obscure the cells of the lower PV module.



Annex 13

Suncell BIPV – Substructure Requirements

The flatness of the roof structure is considered compliant if the deflection does not exceed 1/200. The centre-to-centre spacing between rafters / counter-battens must not exceed 700 mm.

The table below summarises the substructure and support structure requirements according to the roof pitch and the location of the building.

Basic Requirements	Roof construction in accordance with SIA standard 232/1, roof underlay for heavy duty loads.
Location particularly exposed to wind	Drainage of underlay water into the gutter generally recommended, mandatory in regions with wind pressure 1.1 kN/m ² (see SIA map)
High-altitude installation (reference altitude h₀ > 800 m per SIA 261)	Roof underlay for extraordinary loads (SIA 232/1). According to SIA standard 261, the reference altitude h ₀ equals the altitude of the location plus a correction factor corresponding to the snow load in the region. This factor is defined on the “Reference Altitude as a Function of Snow Loads” map (SIA 232/1). Depending on the case, this correction factor may vary between -200 m and +500 m. With a roof underlay installed for extraordinary loads, drainage of underlay water into the gutter is mandatory (SIA232/1:2011).
Pitch < 20°	Roof underlay for extraordinary loads (SIA 232/1). With a roof underlay for extraordinary loads, drainage of underlay water into the gutter is mandatory (SIA232/1:2011).
Pitch < 10°	Roof underlay meeting the requirements for flat roof waterproofing per SIA 271, battens and counter-battens protected from moisture, or made of moisture-resistant material
Pitch < 7°	Roof underlay meeting the requirements for flat roof waterproofing per SIA 271, aluminium battens and counter-battens
Roofs with pitch > 40° and reference altitude <800 m	Roof underlay for normal loads (SIA232/1), if location is not exposed to wind and wind pressure zone ≤ 1.1 kN/m ²
>55 to <80° pitch: specifications to be defined in consultation with Suncell Energy SA	Roof underlay for normal loads (SIA232/1). For locations exposed to wind: roof underlay for heavy duty loads (SIA232/1).
≥ 80°	Facade membrane according to SIA 232/2 in the case of closed joints, or roof underlay for normal loads according to SIA232/1

Annex 14

Suncell BIPV – Storage and Handling Instructions for PV Modules

These instructions must be strictly observed:

- Always handle solar modules with the utmost care.
- Avoid any impact on the corners and edges of the modules.
- Transport solar modules only in their original packaging.
- Store modules in their original packaging in a dry, well-ventilated area.
- Do not use sharp or blunt instruments during unpacking and handling.
- Always carry modules with both hands, preferably one hand on the lower side and one on the upper side, wearing clean protective gloves.
- Never use the junction box or connection cables to carry the module.
- Avoid subjecting modules to bending forces. Do not place loads on modules or drop them.
- Always keep electrical contacts clean and dry.
- Never place modules on a hard surface such as concrete, stone, glass or metal.
- Although modules can withstand a person's weight without issue, it is recommended not to walk directly on them but to use a roof ladder with a soft protection on its lower side.
- Always avoid walking on modules when their temperature exceeds 50°C, or when they are wet, frosted or covered in snow
- Work safely and in accordance with applicable safety procedures, wearing sturdy high-ankle boots protecting the ankle, with clean soft rubber soles (beware of gravel caught in the treads).