EASY ROOF FLAT

PV FIXING SYSTEM FOR FLAT ROOF

For all LANDSCAPE-orientated framed modules

ASSEMBLY INSTRUCTIONS

INS-INO2-18-0726 – version 1.5 from the 13 january 2023

Document validated by ENQUETE TECHNIQUE NOUVELLE No. L18.3628

The EASY ROOF FLAT system is insured provide
that the modules have IEC 61215 and IEC 61730 approvals

Module compatibilities: https://edilians.com/compatibilite-solaire

FITTING INSTRUCTIONS

Before installing the EASY ROOF FLAT base, spread footings must be available as stipulated in DTU43.1

SAFETY INSTRUCTIONS

The planning, fitting and commissioning of the installation must only be carried out by qualified personnel. Incorrect execution can result in damage to the system and can put lives in danger.
It is imperative to comply with national and local construction standards, miscellaneous regulations and environmental protection directives in force*.
Safety regulations and accident prevention instructions must be observed. Appropriate fall prevention devices must be used for all work performed at height.
Before assembly, it is your responsibility to check the amount of ballast, the load capacity of the roof and the compatibility of the installation with the various roof coatings/insulations.
Before assembly, check that you have the up-to-date version of the assembly instructions on our website: http://fr.edilians.co.uk/supports/. Throughout the installation operation, make sure that at least one copy of the installation instruction manual is available on site.
Please take into account the module manufacturer's assembly instructions.
To remove the system, apply the installation procedure in reverse.
Compliance with the safety and operating instructions for the system entitles you to a ten-year product warranty, provided that the system is installed on a flat roof.**.

ASSEMBLY ADVICE

This system can be installed on all flat horizontal surfaces, mainly common terrace roofs with a bearing structure of sufficient load capacity and a roof slope of up to 5%.

The distributed surface load of the installation with its ballast must be no more than the residual load capacity of the building. As a rule, all the technical aspects of the support, roof and building must be checked before assembly. When in doubt, a building professional must be consulted.

The process can only be implemented on roofing with a technical opinion or a technical application document that allows the installation of technical components, in accordance with DTU43.1 or DTU43.11.

In particular, the insulation on the underside of the damp proof course must be at least **Class C** in accordance with the CSTB Technical Guide UEAtc (1) for the approval of sealing support insulating systems for flat and sloping roofs (***Specification 2662_V2 - July 2010).***

* Compliance with NF C15-712 is especially important in France.
** EDILIANS fitter training information.

In addition, in accordance with the provisions of §9.1 of DTU43.1 (Roofs receiving permanent heavy equipment, regardless of the destination), the connections between equipment and the terraced roof must allow servicing and overhaul of sealing structures.

The EASY ROOF FLAT process is designed for easy removal (and/or) transport without the need for lifting machinery (the ballast must never be more than 67 kg).

Every component (KITS with reference bases **092406**) will rest on an appropriate resilient material (expanded or extruded polystyrene) or on the footing provided by EDILIANS.

These spread components (intended to prevent any pinching of the damp proof course) will be sized as follows:
The smallest support dimension is no less than **0.40 m**.
The pressure at the sealing coating is limited in the conditions below.

The maximum pressure under every slab must be calculated by the company in charge of equipment implementation (in accordance with §3.1 ag) of FD P 84-204-3].

The project manager verifies the compatibility between the calculated pressures resulting from the equipment and the allowable pressures (in accordance with FD P 84-204-3).

For a coating under reversed insulation, the allowable pressure is the ***smaller of the following two values***:

The one indicated in the table below,
The one indicated in the Technical Application Document for the insulating panel.

For a sealing coating on insulating panel support, the allowable pressure is the ***smaller of the following three values:***

- The one indicated in the table below (caution: remember (see §6.5.1 of DTU43.1) that Class I2 SBS elastomer bilayer coatings are not permitted on insulating panel supports).
- The one indicated for this use in the **application documents for sealing support insulating panels** other than cork-based supports,
- 4 kPa (0.04 daN/cm²) for sealing coatings applied to insulating panels in expanded agglomerated cork.

Table (DTU43.1 extract): Allowable pressure on masonry support coating

Type de revêtement d'étanchéité	Pression admissible 1)
Asphalte 5 + 15	10 kPa soit 0,1 daN/cm²
Asphalte 5 + 20	20 kPa soit 0,2 daN/cm²
Asphalte 5 + 15 avec protection asphalte	60 kPa soit 0,6 daN/cm²
Asphalte 15 + 25	150 kPa soit 1,5 daN/cm²
Bicouche élastomère SBS I2	60 kPa soit 0,6 daN/cm²
Bicouche élastomère SBS I3	120 kPa soit 1,2 daN/cm²
Bicouche élastomère SBS I4	200 kPa soit 2,0 daN/cm²

1) Il est rappelé que ces valeurs ne concernent pas les charges temporaires telles que charges roulantes, charges dues au stationnement des véhicules, ...

EASY ROOF FLAT SYSTEM assembly instructions

Before commencing assembly, make sure that the surface is perfectly clean and flat. Surface irregularities must be eliminated to ensure good support for the system and balanced load transmission.

The minimum distance between neighboring emerging structures should be respected as stated in Article 5.4.1 of DTU43.1.
It is given in the next figure based on the dimension facing the equipment (this stipulation comes from production, servicing and overhaul requirements for sealing structures).

l (m)	d (m)
< 0,4	0,25
0,4 ≤ l ≤ 1,2	0,5
> 1,2	1

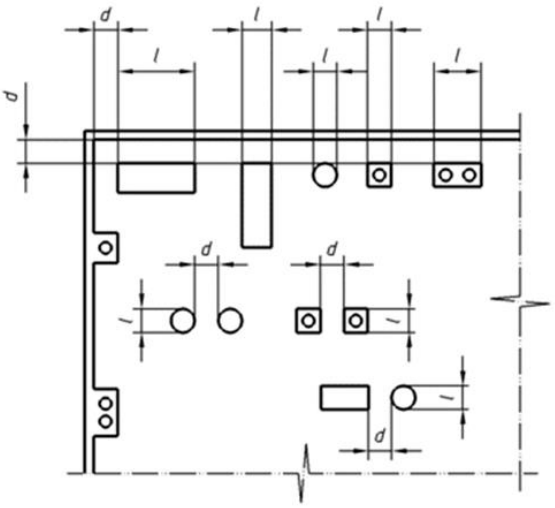


Figure: Installation of emerging structures

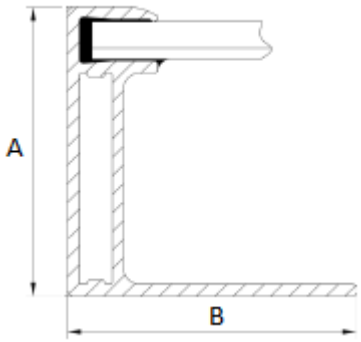
The EASY ROOF FLAT system is suitable for modules v
maximum 1170 mm wide. Frameless modules cannot be us
The assembly instructions from the module manufacturer,
the module frame, must be followed.

PV MODULES COMPATIBILITY ON THE SYSTEM

Framed PV modules within the below dimensions and conditions are mechanically compatible with the EASY ROOF FLAT system :

- PV modules have the IEC 61215 and 61730 certifications.
- The frame of the PV modules is conform to the below specifications :

  - 798 mm ≤ Width ≤ 1170 mm
  - 1257 mm ≤ Lenght ≤ 2200 mm
  - 30mm ≤ Thickness (A) ≤ 50 mm



Contents

1) Parts list

1.1)

Number			Description	Current code	Old code
		1.1.1	FLAT EAVE SUPPORT 125	092409	ASM0P001159A
		1.1.2	FLAT RIDGE SUPPORT 250	092414	ASM0P01160A
		1.1.3	FLA BASE	092406	ASMP0P0413A
		2	SCREW M6X55 A2 DIN912	093232	
Optional parts					
		3	FLAT RAIL STANDART 3000	092449	PRT0P00476A
		4	FLAT RAIL SPLINT 150	092454	PRT0P00477A
		5	FFLA PROTECTION MAT 850*300*6	092476	PRT0P00534A

1.2)

Parts not supplied in the kit	
Numéro	Description
a	Ballast stab (1)

1.3) List of tools required for assembly

Hex key no. 5 and 6

1.4 Ballast calculation

Calculation assumptrions : Photovoltaic modules with dimensions 1800 x 1000 x 40 mm and weight 20 kg. PV array of 3 rows of 3 modules, PV modules inclined at 10°. Location : Latitude 49°, Altitude 600 m, Snow zone A1, Wind zones 1 to 4. Building 8 m long by 8 m wide, roof inclination = 0°. Coefficient of friction of 0.5, with a parapet 0.30 m high and a ridge opening of 0.15 m, the PV field is 0.5 m from the edge of the roof.

Single line :

Building height 6 meters :

	Ballast for one module (Kg) (Calculation according to Eurocodes 1 NF-EN-1991)							
	EXPOSITION SOUTH				EXPOSITION EAST WEST			
Wind area	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Field category								
II	49,13	62,87	77,57	93,47	19,01	26,94	35,44	42,53
IIIa	31,21	41,49	52,5	64,41	10	14,59	20,95	25,14
IIIb	25,23	34,37	44,15	54,72	10	10	16,13	19,36
IV	23,12	31,85	41,2	51,3	10	10	14,42	17,30

Building height 12 meters :

	Ballast for one module (Kg) (Calculation according to Eurocodes 1 NF-EN-1991)							
	EXPOSITION SOUTH				EXPOSITION EAST WEST			
Wind area	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Field category								
II	64,24	80,89	98,70	117,98	27,73	37,36	47,65	58,78
IIIa	46,32	59,52	73,63	88,92	17,39	25,01	33,17	41,99
IIIb	31,56	41,92	52,99	64,98	10,00	14,83	20,48	28,16
IV	23,12	31,86	41,20	51,30	10,00	10,00	14,42	20,26

Multi line :

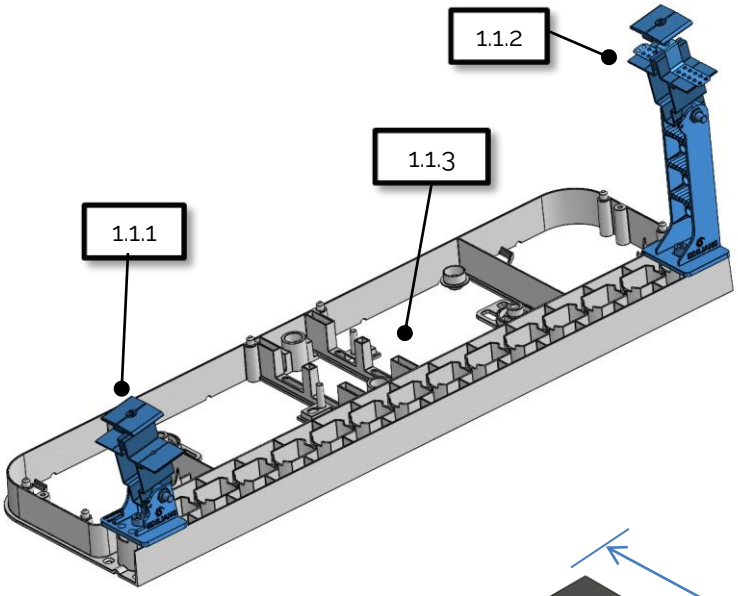
Building height 6 meters :

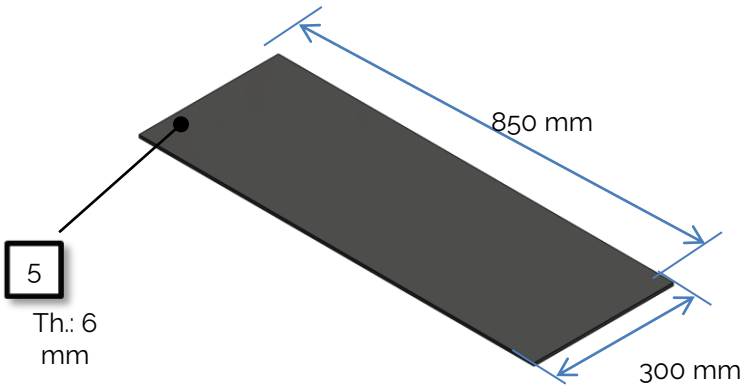
	Ballast for one module (Kg) (Calculation according to Eurocodes 1 NF-EN-1991)							
	SOUTH EXPOSITION				EAST WEST EXPOSITION			
Wind area	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Field category								
II	43,64	56,33	69,89	84,58	10,00	10,00	10,00	10,00
IIIa	27,10	36,59	46,75	57,74	10,00	10,00	10,00	10,00
IIIb	21,59	30,01	39,04	48,80	10,00	10,00	10,00	10,00
IV	19,63	27,70	36,32	45,65	10,00	10,00	10,00	10,00

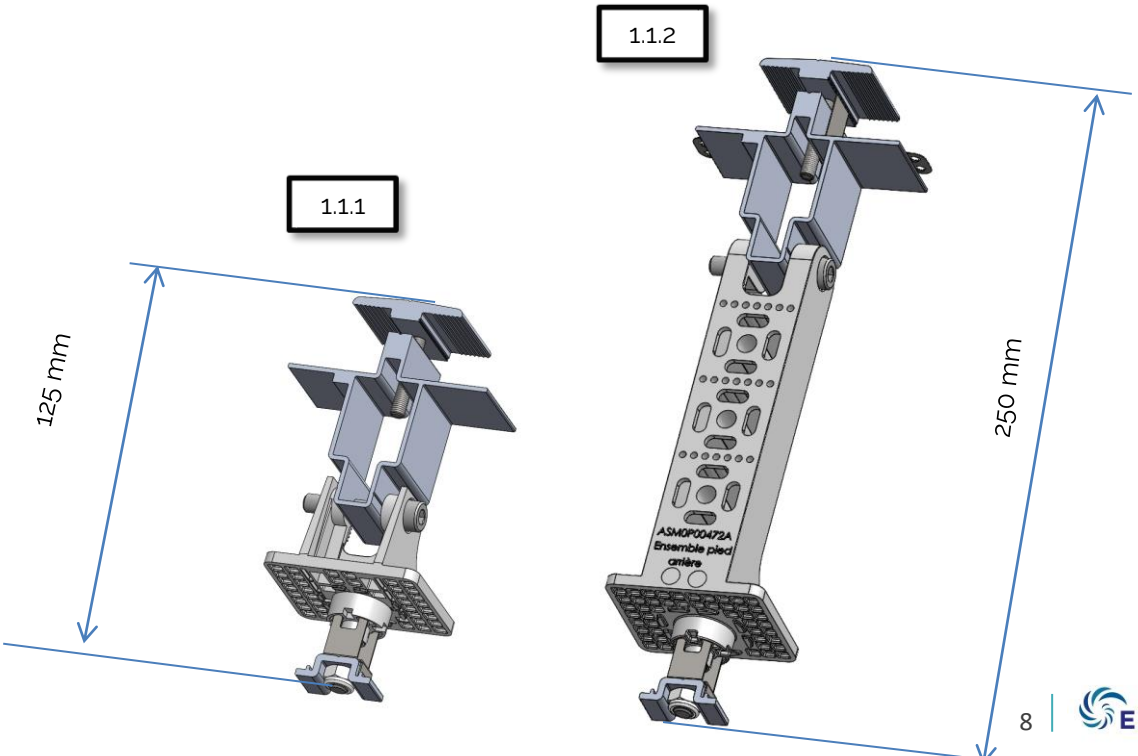
Building height 12 meters :

	Ballast for one module (Kg) (Calculation according to Eurocodes 1 NF-EN-1991)							
	SOUTH EXPOSITION				EAST WEST EXPOSITION			
Wind area	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Field category								
II	57,59	72,96	89,40	107,20	10,00	10,00	10,00	12,89
IIIa	41,05	53,23	66,26	80,36	10,00	10,00	10,00	10,00
IIIb	27,42	36,98	47,21	58,27	10,00	10,00	10,00	10,00
IV	19,63	27,70	36,20	45,65	10,00	10,00	10,00	10,00

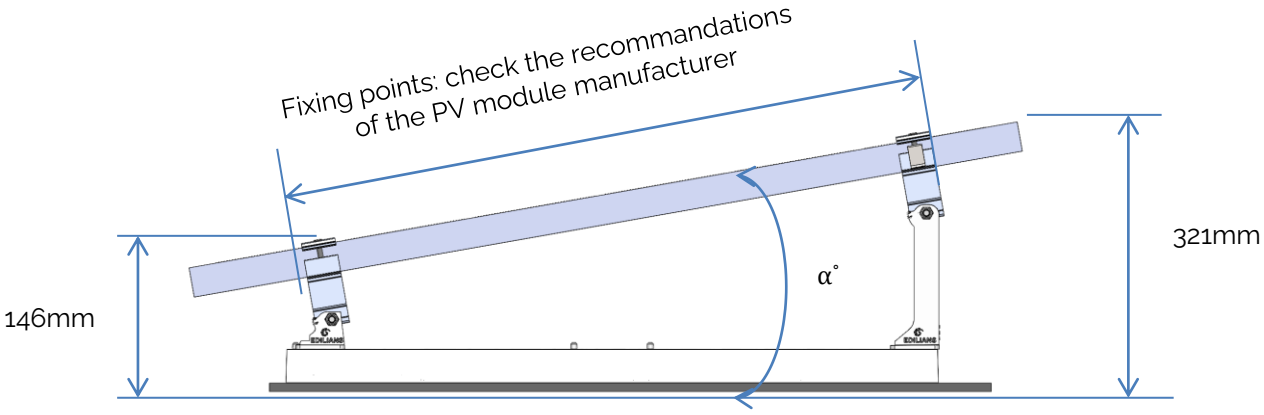
1.5) Presentation of parts

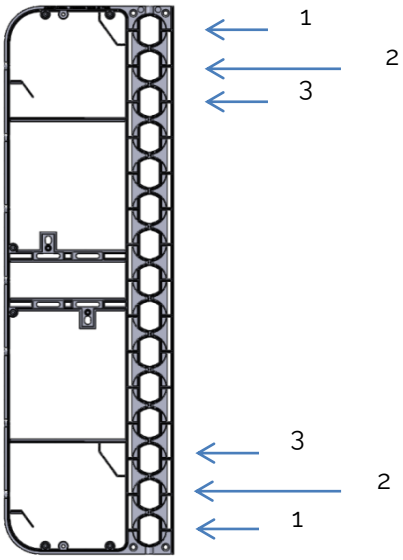




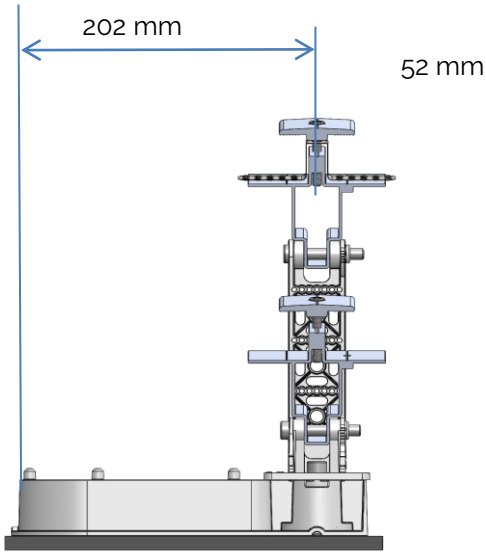


1.5) Presentation of parts



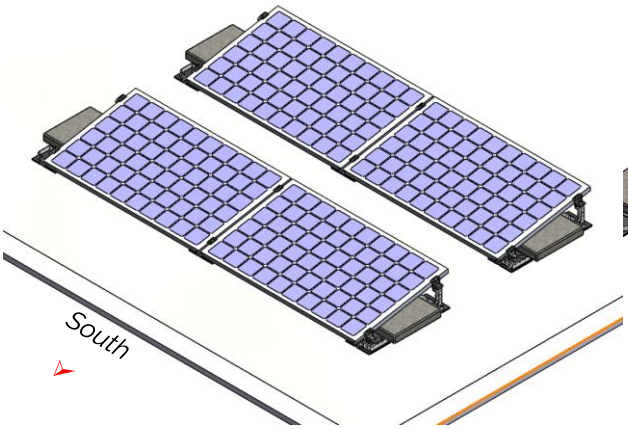


Position	α°
1	10
2	12
3	14

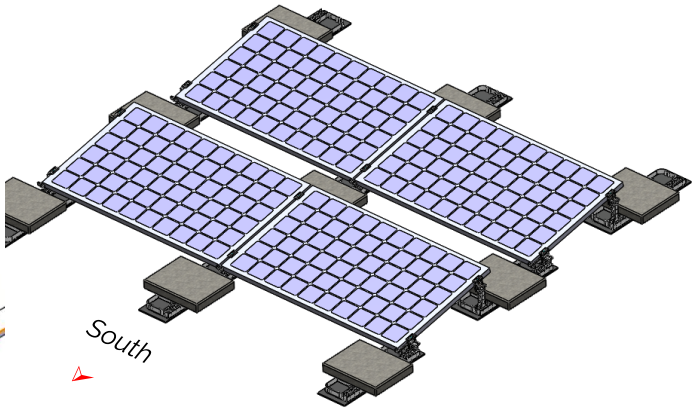


2) Illustration of possible orientations

Facing South

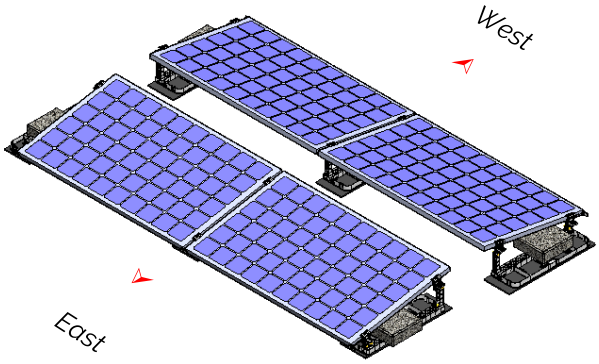


Independent line assembly

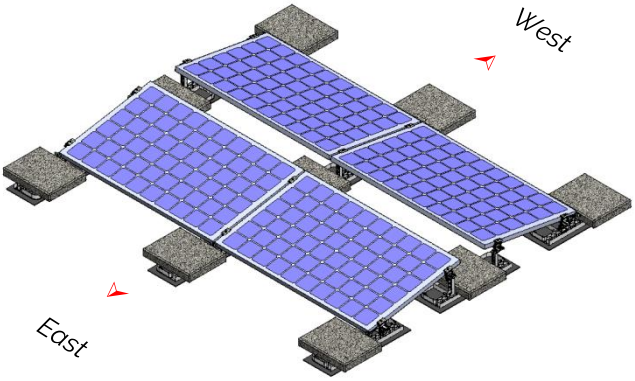


Interline assembly

Facing East-West



Independent line assembly

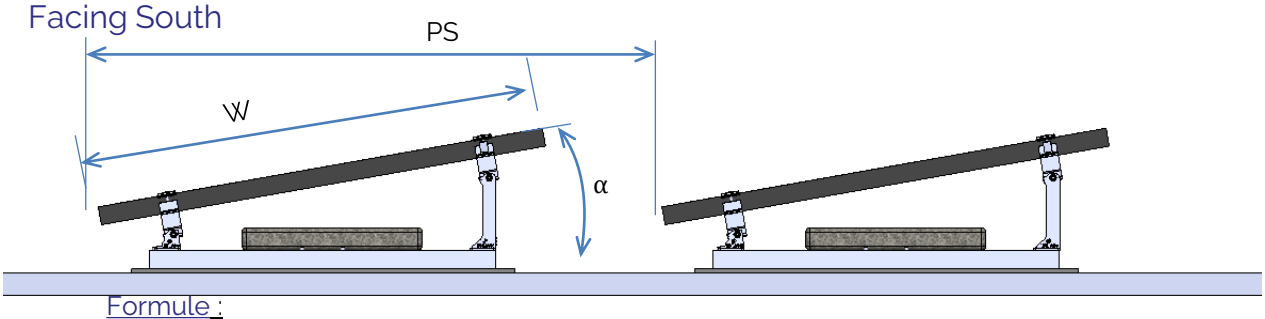


Interline assembly

3) Dimensions of the photovoltaic field

System pitch calculation

Facing South



Formule :

$$PS = \frac{W \times \sin \alpha + W \times \cos \alpha}{\tan(90 - 23{,}45 - Lat)}$$

PS : System pitch facing South

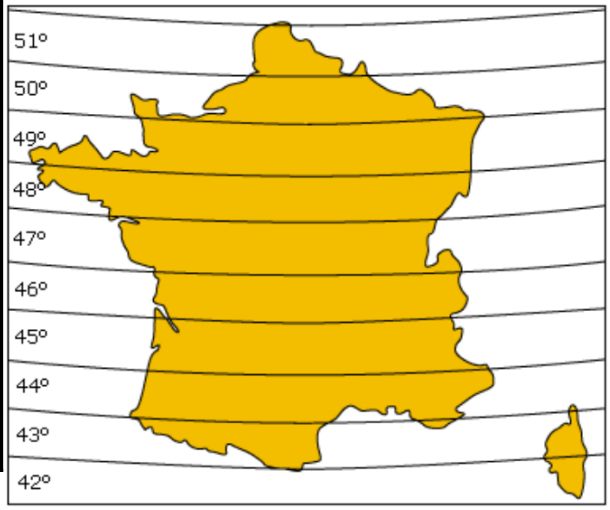
W : Module width

α : Module Tilt angle

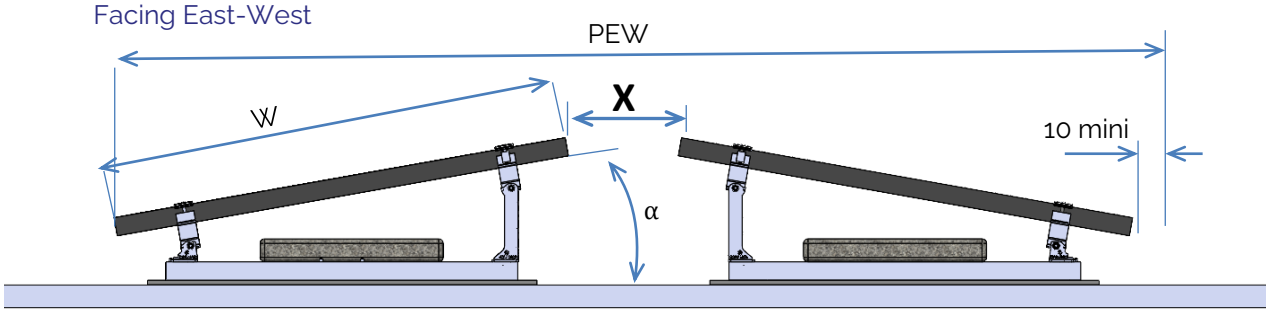
Lat : Latitude (decimal degrees)

(Exemple for one module of 1020 mm wide tilted (α) at 10°)

French cities	Latitude	System pitch (mm)
Ajaccio	41,9	1388
Perpignan	42,7	1402
Marseille	43,3	1413
Toulouse	43,6	1419
Bordeaux	44,8	1445
Lyon	45,8	1467
Poitiers	46,6	1487
Nantes	47,2	1505
Mulhouse	47,8	1519
Brest	48,4	1539
Strasbourg	48,6	1545
Paris	48,8	1553
Reims	49,3	1567
Lille	50,7	1619
Dunkerque	51,0	1635



Facing East-West



PEW : System pitch facing East West

W : Module width

α : Module angle tilt

X : 150 mm mini Space recommended for maintenance

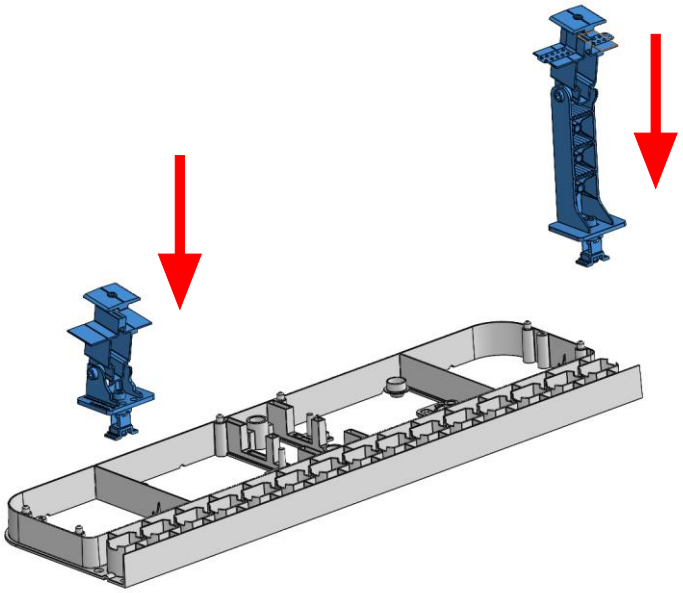
Formule :

$$PEW = 2 \times (W \times \cos \alpha) + X + 10\ mm$$

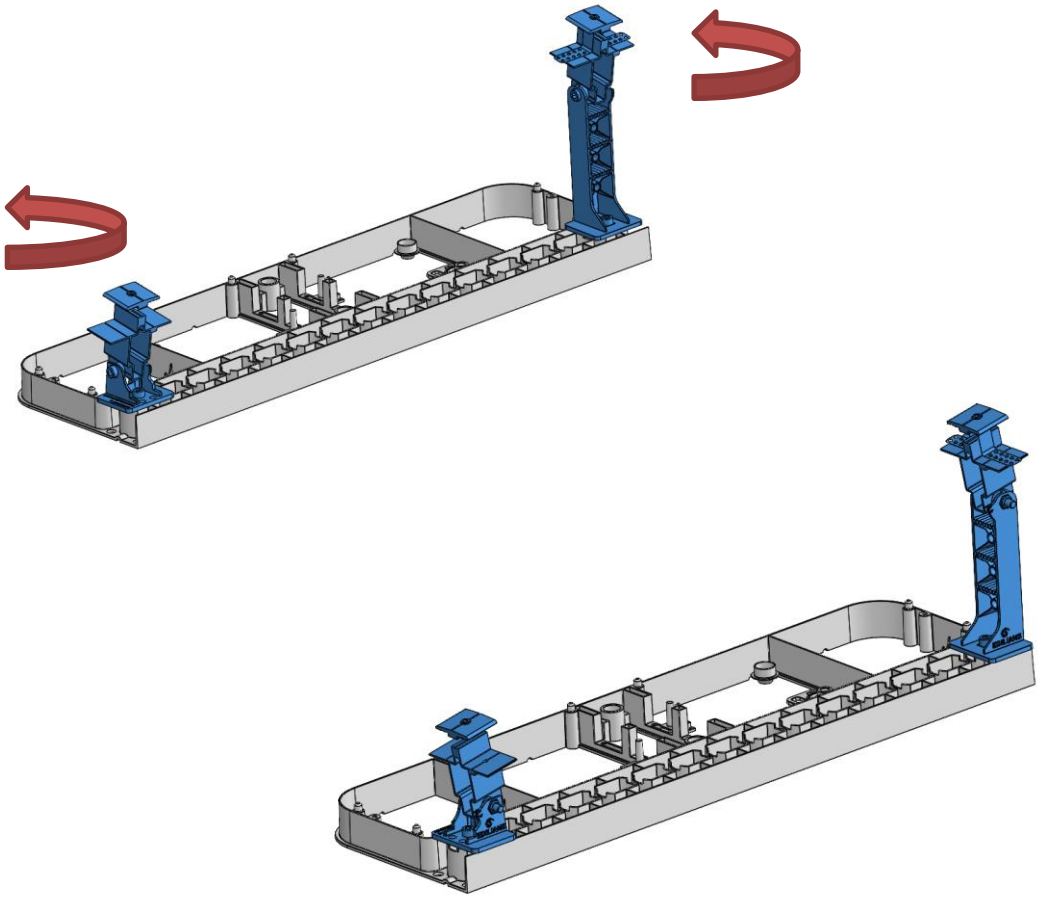
4) EASY ROOF FLAT system assembly instruction

4.1) Feet onto base assembly

Insert the support 125 (1.1.1) and support 250 (1.1.2) onto the FLAT base (1,1,3).

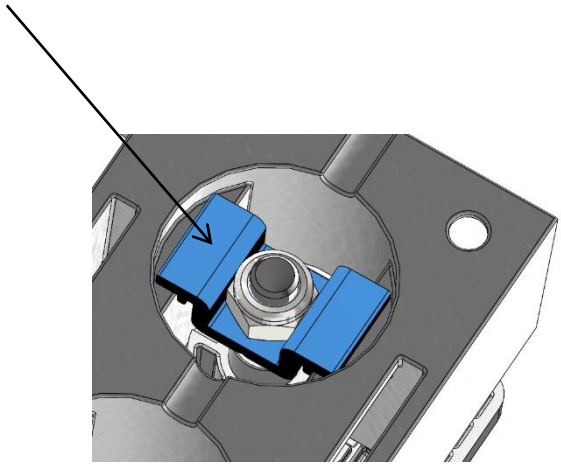


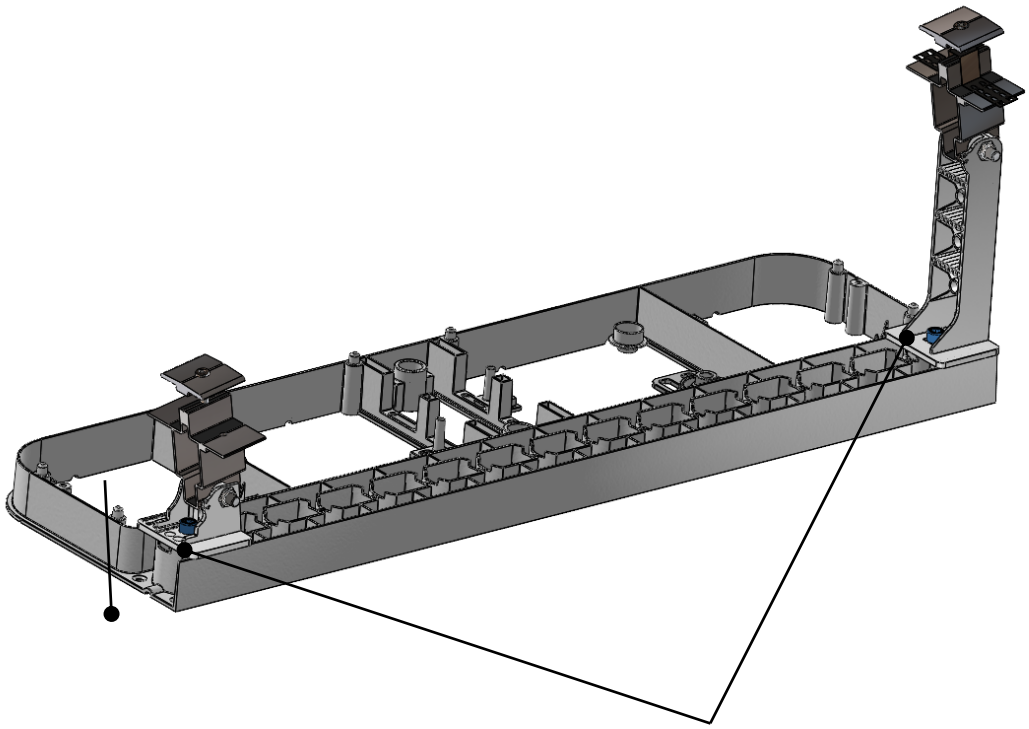
Turn the support 125 (1.1.1) and support 250 (1.1.2) by a quarter of a turn.



4.1)

Check the good position of the nut.

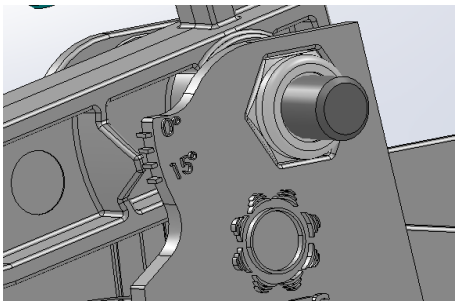




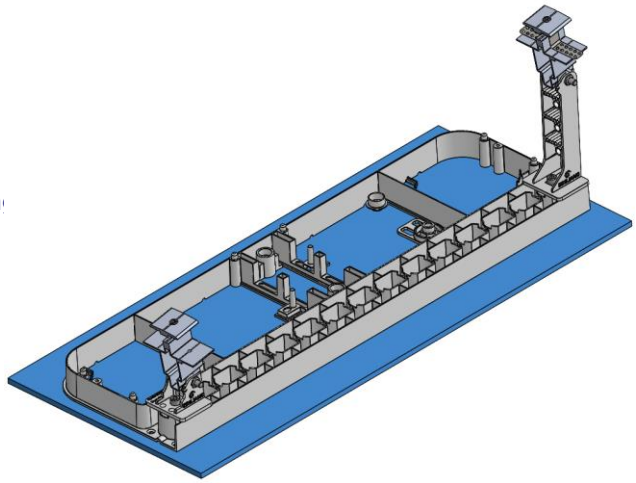
Tighten the feet onto the base (torque: 3 Nm)

4.2) Adjusting and fitting to the roof

Slope the feet 10°



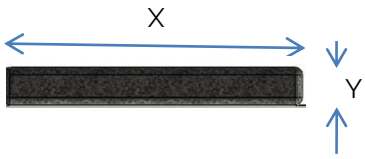
Fit the assembly onto the footin



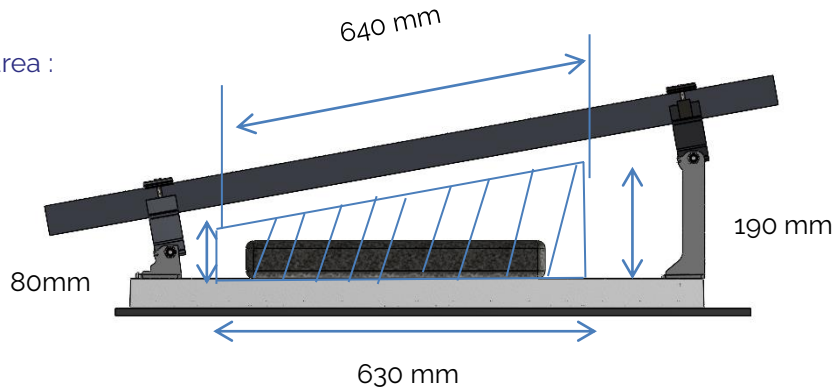
When the system can't be fixed by anchor bolt, it's possible to fit ballast onto the base by means of concrete slabs.

Table below provides indicative weight of the concrete slabs :

Concrete slabs Weight (Kg)according to thickness **Y**			
X \ Y	40 mm	45 mm	50 mm
300 x 300 mm	8,6	9,6	10,7
350 x 350 mm	11,7	13,2	14,6
400 x 400 mm	15,3	17,2	19,1
450 x 450 mm	19,3	21,8	24,2



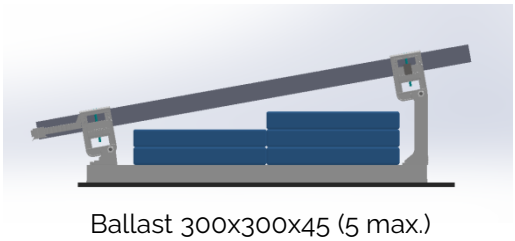
Possible ballast area :



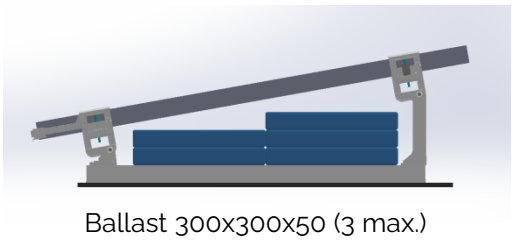
4.2) Adjusting and fitting to the roof

Values are given for information with feet position A onto the base (α°=10°)
(see page 8)

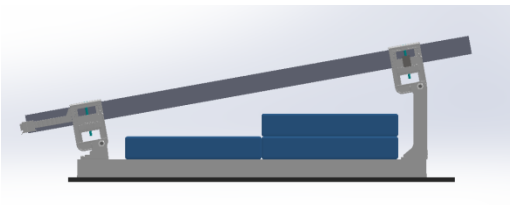
Ballast 300x300x40 (5 max.)



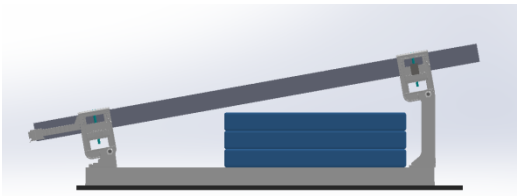
Ballast 300x300x45 (5 max.)



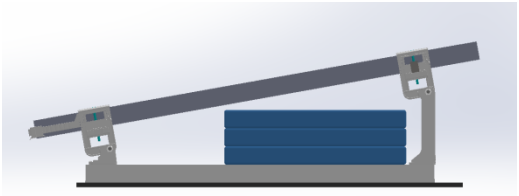
Ballast 300x300x50 (3 max.)



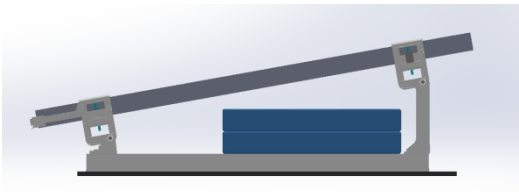
Ballast 400x400x40 (3 max.)



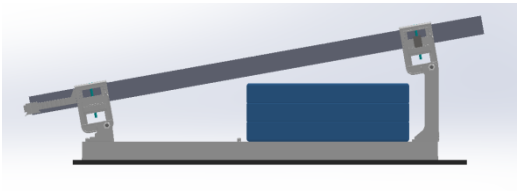
Ballast 400x400x45 (3 max.)



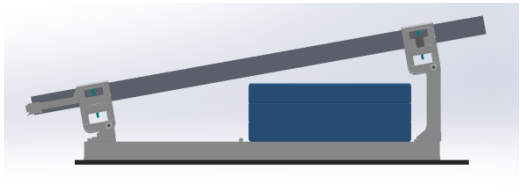
Ballast 400x400x50 (2 max.)



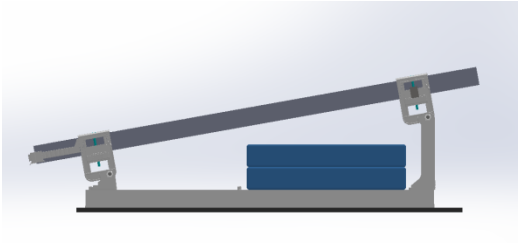
Ballast 350x350x40 (3 max.)



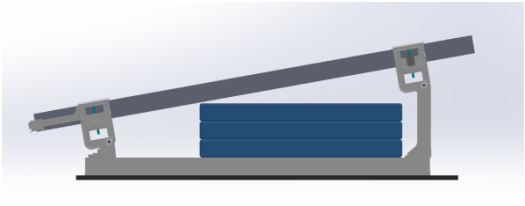
Ballast 350x350x45 (3 max.)



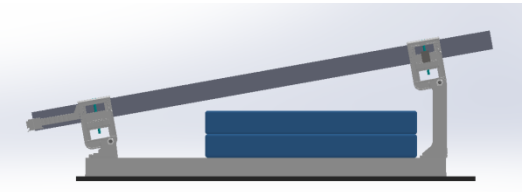
Ballast 350x350x50 (2 max.)



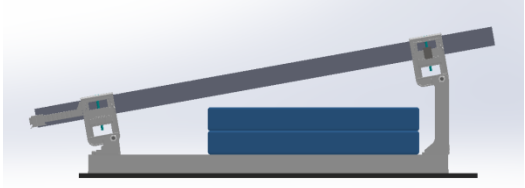
Ballast 450x450x40 (3 max.)



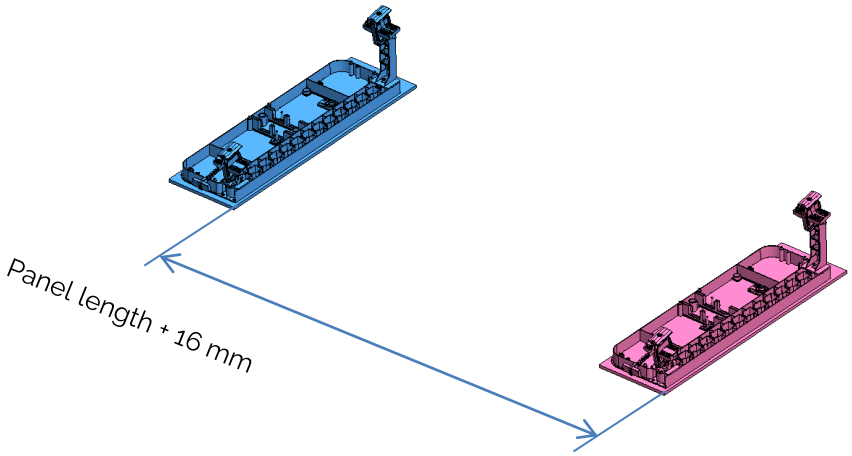
Ballast 450x450x45 (2 max.)



Ballast 450x450x50 (2 max.)

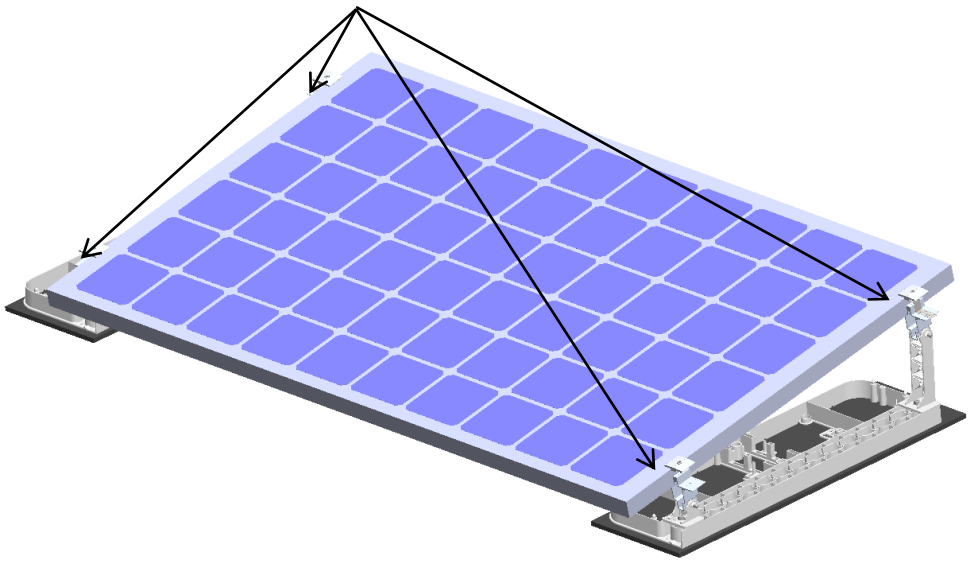


4.2) Space the two bases according to the length of the PV module

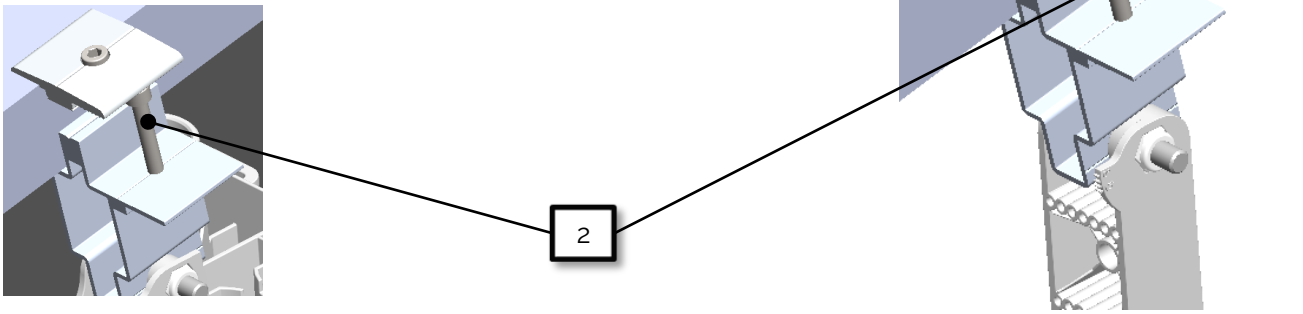


Please note : if attachment is achieved by ballasting the base, put concrete slabs onto the base before clamping modules.

Clamp the panel using the screws on each foot (tightening torque 6 Nm)

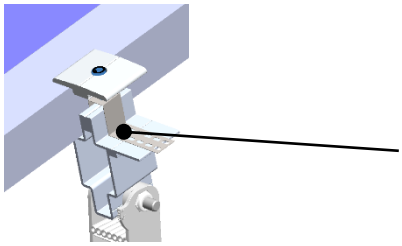


At the end of the line, use the screw M6*55 (2) to maintain the clamp. Remove easygrounding and ajust the position of the scew so the clamp is parallel to the panel.



5.1) Earthing instruction

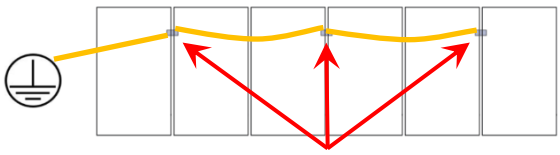
Each rear foot must be earthed using EASY GROUNDING



EASY GROUNDING

There are two ways of wiring the PV field earth, depending on the regulations in force in the country.

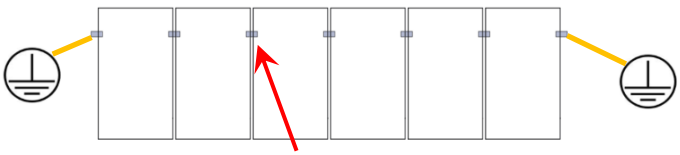
Possibility 1 (France)



one earthing part every two modules

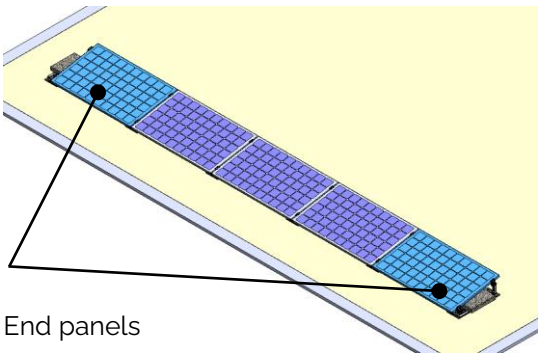
Connexion is realized by screwing the earth wire on the module frame

Possibility 2



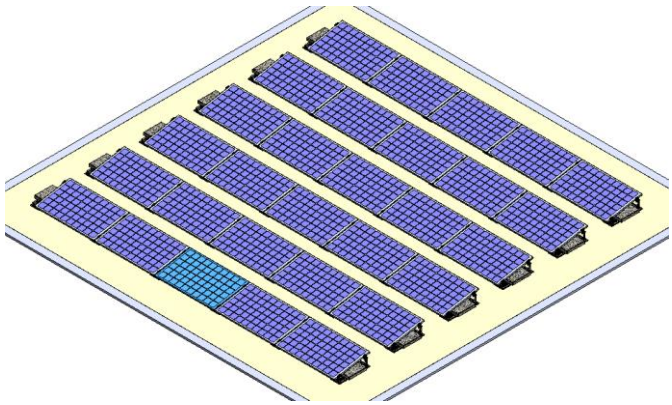
one earthing part on every module

Connect the end panels to the earth

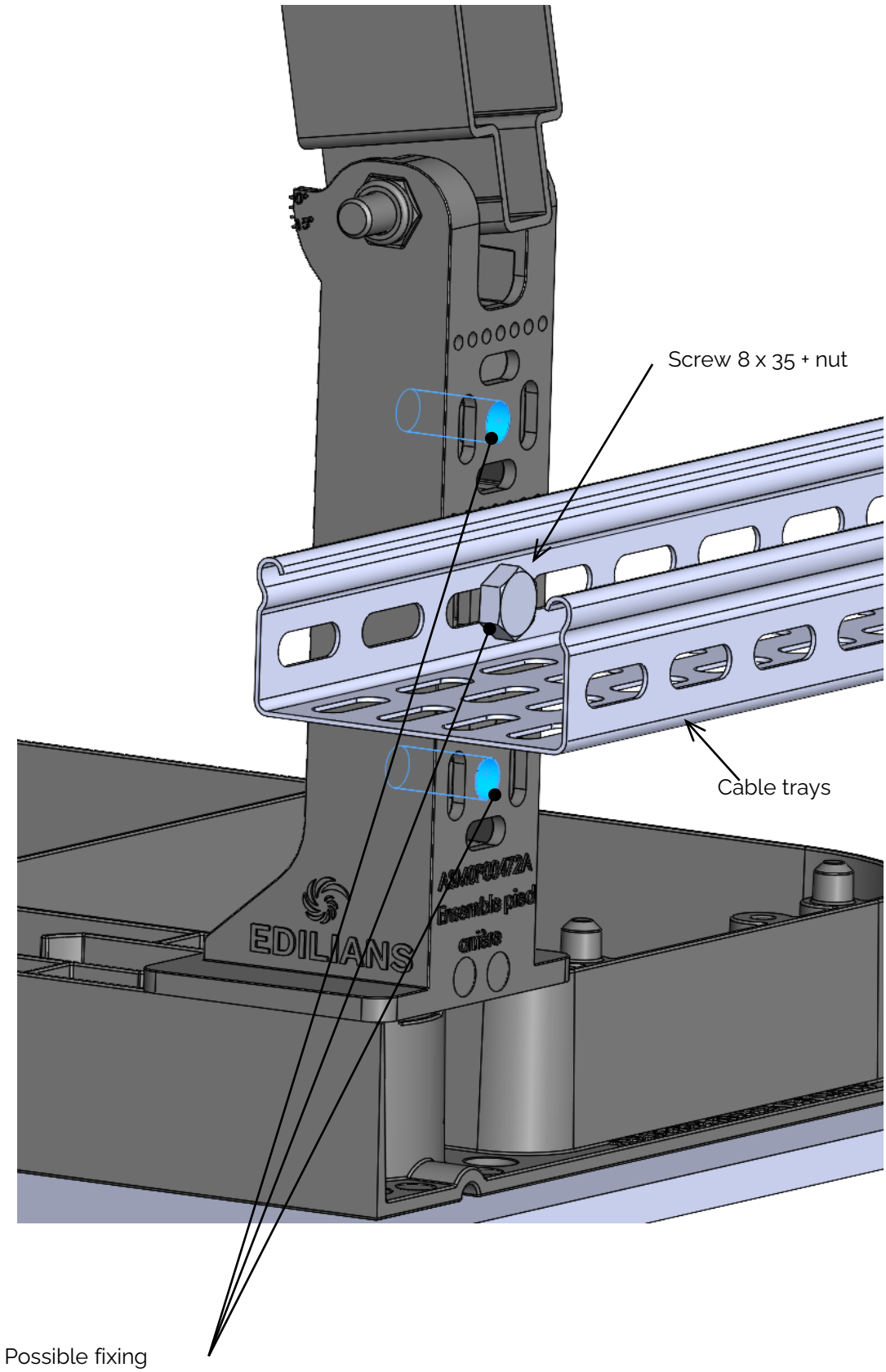


End panels

To avoid breaking the earth continuity, EDILIANS only permits one panel per line to be dismantled at once unless they are adjacent.



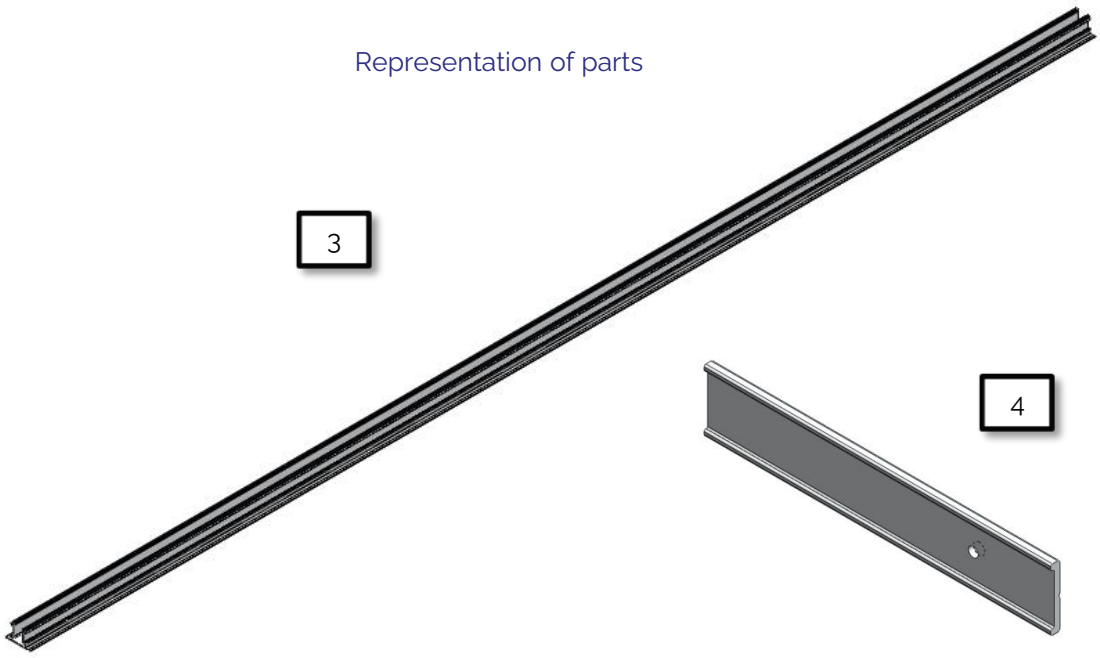
5.2) Fixing the trunking



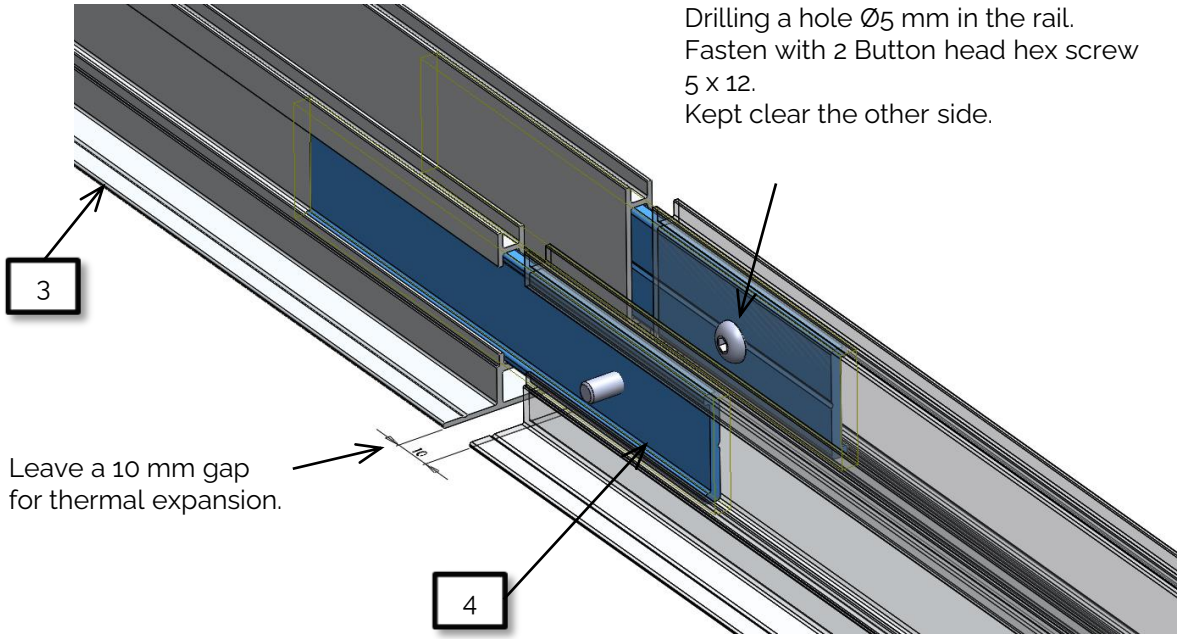
6.1) Fixing to rail

Parts supplied in the kit			
Number	Description	Current code	Old code
3	FLA RAIL STD 3000	092449	PRT0P00476A
4	FLAT RAIL SPLINT 150	092454	PRT0P00477A

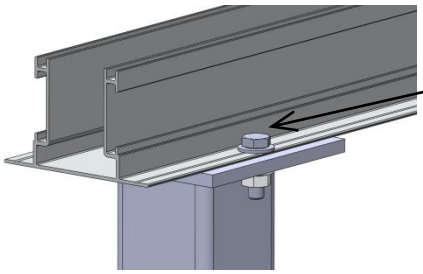
Representation of parts



Centre the spliced connection between the rail.
Drilling a hole Ø5 mm in the rail.
Fasten with 2 Button head hex screw 5 x 12.
Kept clear the other side.

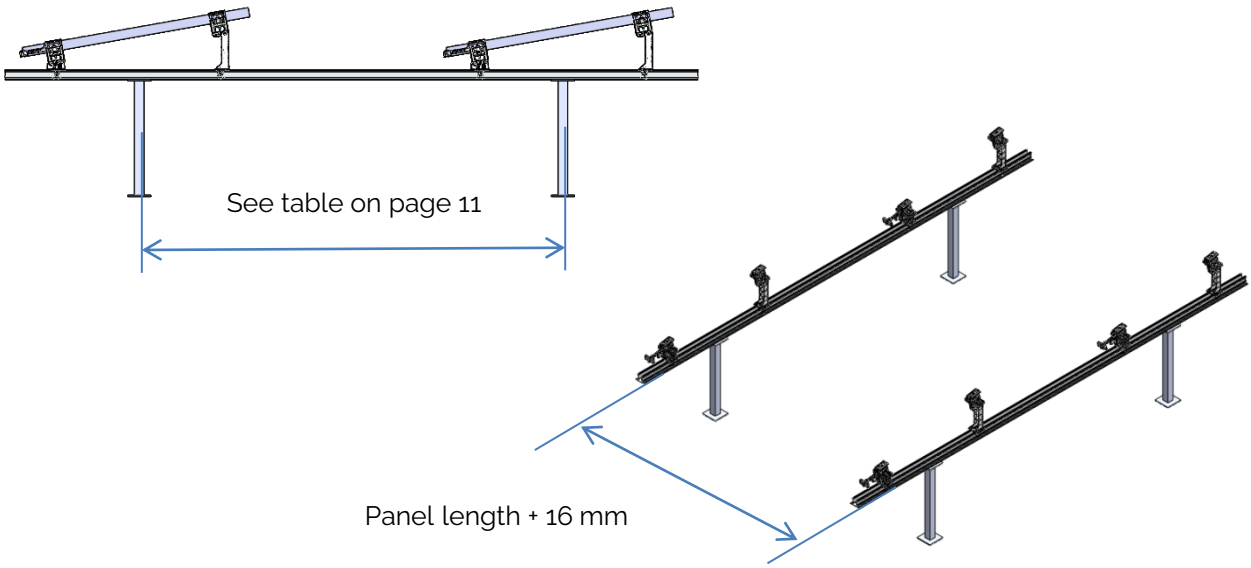


6.1) Fixing to rail



Exemple of fixing the rail onto the posts.
Drilling 2 holes Ø7mm in the rail.
Fasten with 2 Hex head machine screw 6 x 20 + washers Ø6 + nuts M6.

The centre between distances of the posts depthwise on the installation will be as per the tables on page 11.
The centre between distances of the posts widthwise will be equal to the panel length + 16 mm.



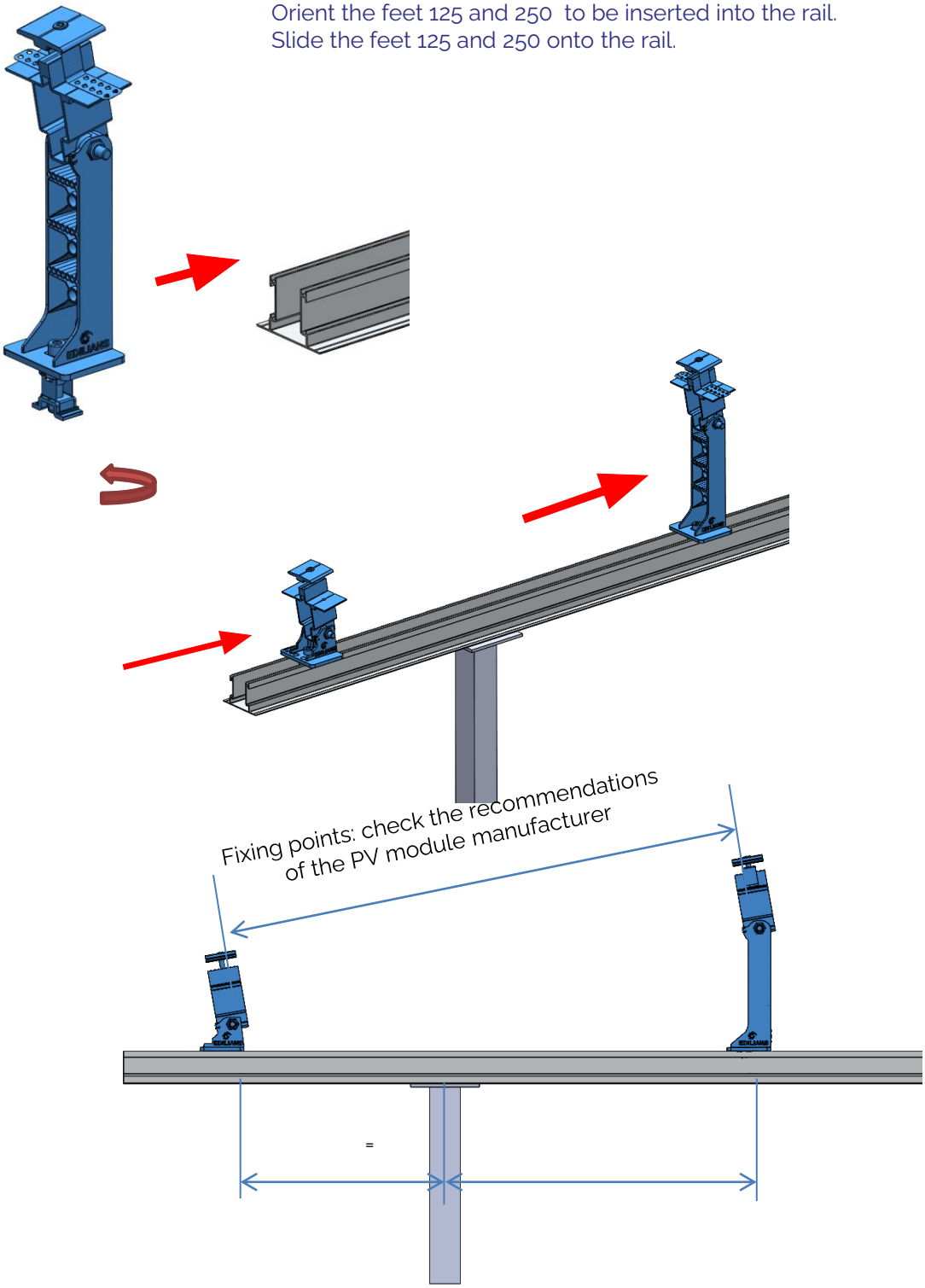
The rail is fixed to metal legs (stainless steel A304L or aluminium ENW6063 T66) using **A2 stainless steel bolts** (not supplied by EDILIANS, size decided by the fitter).

The fitter is responsible for sizing this rail/post interface:
The tensile loads to be considered are taken from the table on page 6 of this document.
Any momentary effects (induced by the altitude of the PV field in relation to the sealing level) are decided by the project management and/or the contractor that has to size these components.

In this case, please refer to §5.4.2 of DTU43.1 which states in particular that if the equipment can be dismantled when overhauling the sealing (the case here as each component weighs less than 90 kg), **the height between the sealing plane and the underside of the rails can be reduced to 0.30 m**.
The minimum value required (clearance under equipment) is 300 mm

6.1) Fixing to rail

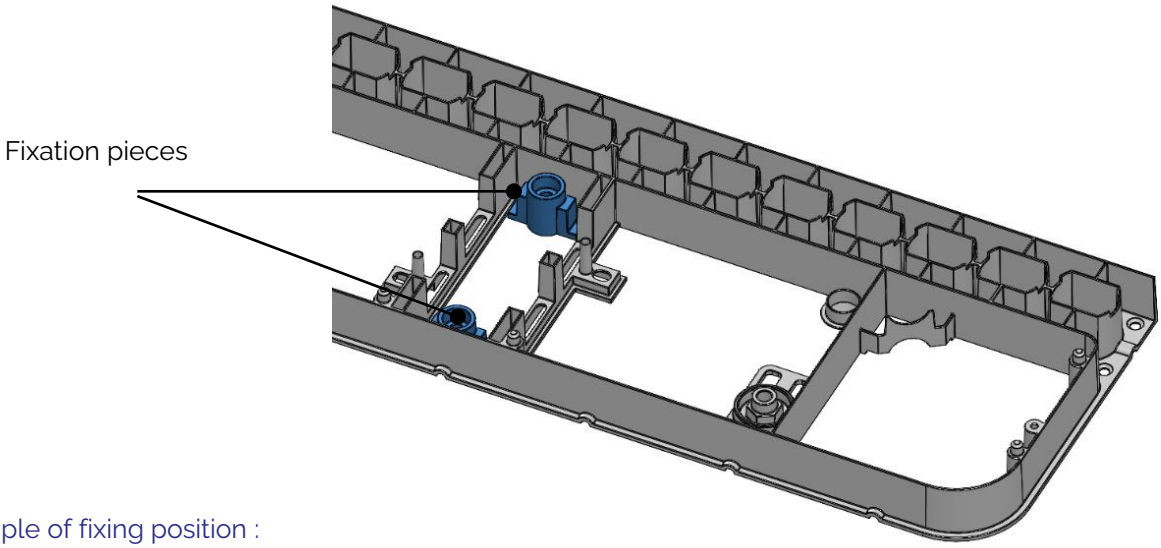
Orient the feet 125 and 250 to be inserted into the rail.
Slide the feet 125 and 250 onto the rail.



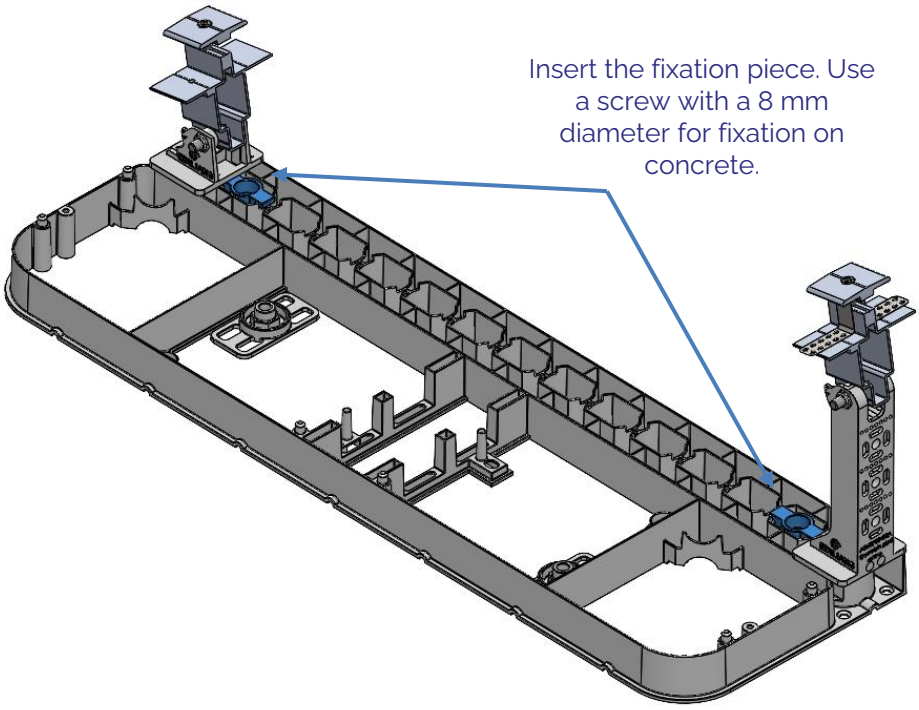
Tighten the feet onto the rails as per the recommandations.

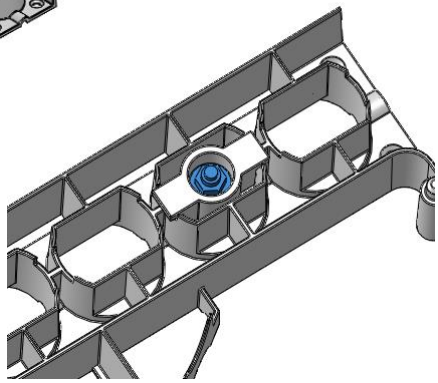
6.2) Fixing to concrete

Detach the base fixings and insert them in the closest feet cells.

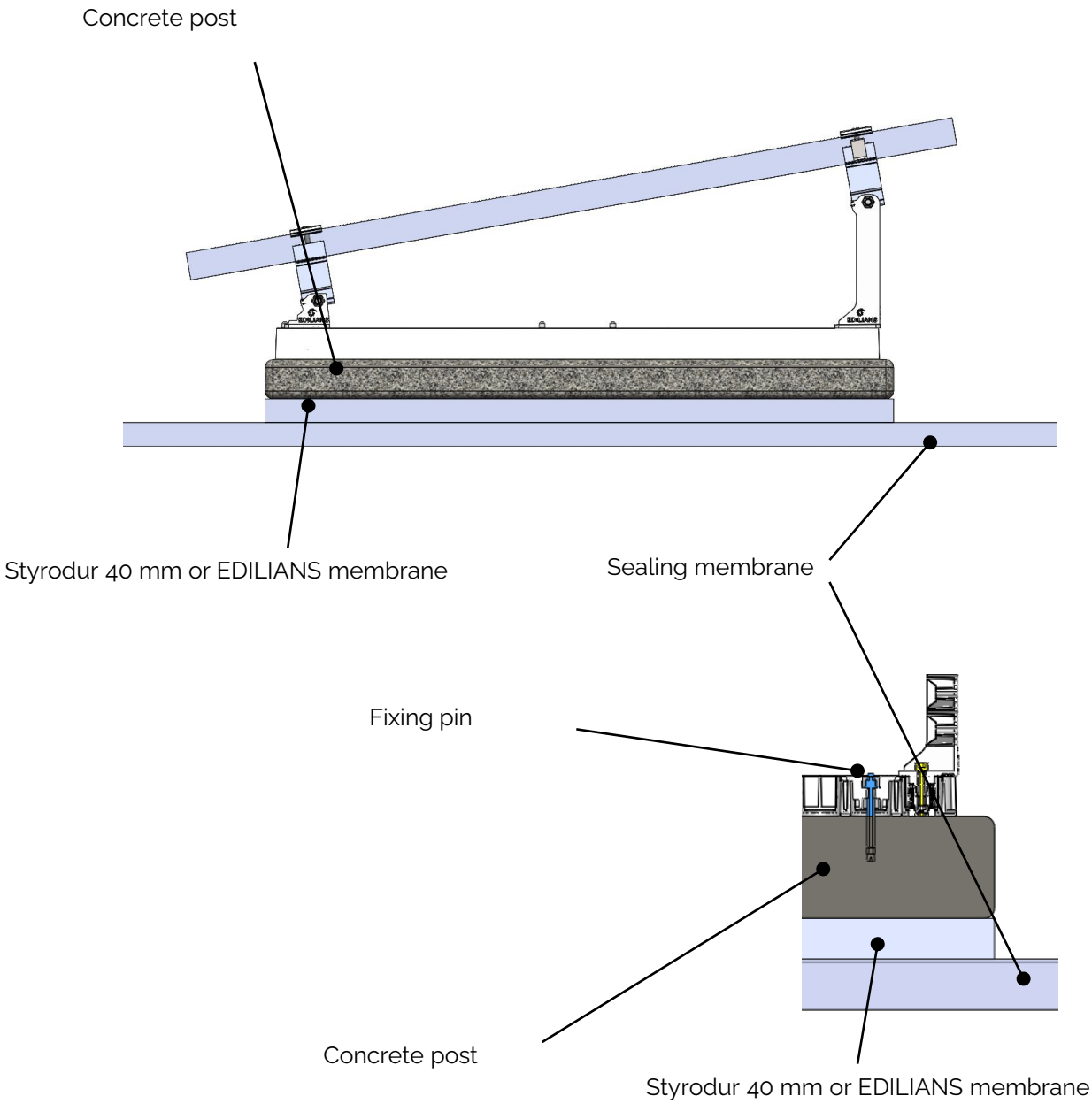


Example of fixing position :





6.2) Fixing to concrete



In this assembly, it is important for the **pins** (and the **drillholes** in the concrete slabs) to be no **longer** than the thickness of the spread slab (see p.3), to avoid disturbing the damp proof course.
The fitter will use the calculations on the ballast values in the table on page 6 of this document **as a basis**: the spread slab + pin system must compensate for the upward forces.

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