

# Mounting instructions

Magic PV Flat Pro photovoltaic mounting systems for flat roofs

## Table of contents

---

### **Magic PV Flat Pro photovoltaic mounting systems for flat roofs**

*Mounting instructions*

## Table of contents

<b>1</b>	<b>About these instructions</b>	<b>5</b>
1.1	Target group	5
1.2	Relevance of these instructions	5
1.3	Types of warning information	5
1.4	Basic standards and regulations	5
1.5	Applicable documents	6
<b>2</b>	<b>Intended use</b>	<b>6</b>
<b>3</b>	<b>Safety</b>	<b>6</b>
3.1	General safety information	6
3.2	Personal protective equipment	7
<b>4</b>	<b>Necessary tools</b>	<b>7</b>
<b>5</b>	<b>System overview</b>	<b>8</b>
<b>6</b>	<b>Installation</b>	<b>13</b>
6.1	Inserting adapters for the truss profile	14
6.2	Shortening truss profiles	15
6.3	Inserting a truss profile	16
6.4	Weighing down the base	18
6.5	Mounting the endcap	19
6.6	Inserting the short and long supports	20
6.7	Attaching the PV module	21
6.7.1	Adjusting the angle of inclination of the supports	22
6.8	Fastening the PV module with universal clamps	22
6.8.1	Mounting the universal clamp as an end clamp	23
6.8.2	Mounting the universal clamp as a middle clamp	24
6.8.3	Fastening the PV module with end clamps at the top and bottom	26
6.9	Fastening the PV module with end/intermediate clamps with springs	27
6.9.1	Fastening the PV module with end clamps with springs at the sides	27
6.9.2	Fastening PV modules with intermediate clamps with springs	29
6.9.3	Fastening the PV module with end clamps with springs at the top and bottom	31
6.10	Replacing the PV module	32
6.10.1	Replacing with side and middle fastening	32
6.10.2	Replacing with top and bottom fastening	33
6.11	Mounting the windbreak	34
6.12	Integrating the system into the equipotential bonding and/or lightning protection system	35
6.13	Connecting truss profiles in a lengthwise manner	37
6.14	Connecting truss profiles transversely	38
6.15	Cable routing beneath the PV modules	39
6.15.1	Mounting the GRM mesh cable tray with UniBase 6	39
6.15.2	Mounting the GRM mesh cable tray with UniBase Glue	41
<b>7</b>	<b>Maintaining the system</b>	<b>45</b>

**8   Dismantling the system.....46**

8.1   Dismantling the short and long supports.....46

**9   Disposing of the system.....47**

**10   Technical data.....47**

# 1 About these instructions

## 1.1 Target group



These instructions are intended for specialists and/or instructed technical personnel (e.g. roofers, solar panel installers, engineers, architects, construction managers, mounting engineers, installation engineers), who have been trained in the mounting of photovoltaic systems and have been charged with the mounting of PV mounting systems.

Only have electrical work, such as the connection and earthing of the systems, carried out by specialist personnel with electrical training.

## 1.2 Relevance of these instructions

These instructions are based on the standards valid at the time of compilation (April 2025).

Please read the instructions carefully before starting mounting. We will not accept any warranty claims for damage and liability caused through non-observance of these instructions.

Any images are intended merely as examples. Mounting results may look different.

## 1.3 Types of warning information



### Type of risk!

Shows a risky situation. If the warning information is not observed, then serious or fatal injuries may occur.



### Type of risk!

Shows a risky situation. If the safety instruction is not observed, then damage to the product or the surroundings may occur.

### Note!

*Indicates important information or assistance.*

## 1.4 Basic standards and regulations

- EN 62305 (VDE 0185-305)
- DIN VDE 0100-712
- EN 61643-32

### 1.5 Applicable documents

The declarations of conformity are linked to the products at [www.obo-bettermann.com](http://www.obo-bettermann.com).

## 2 Intended use

The Magic PV Flat Pro photovoltaic mounting systems for flat roofs are used for the mounting of photovoltaic modules with a height of 30–50 mm on flat roofs with a bitumen seal or sealing with plastic membranes. The roof inclination must be  $< 3^\circ$ . With roofs with an inclination of  $> 3^\circ$ , an individual case study is essential. The systems are suitable for accepting modules with widths of 992–1,134 mm and lengths of 1,640–2,112 mm. The modules can be mounted in an east-west composite or in a southerly direction with an angle of inclination of 13.5 to 15.6°, depending on the module size. The support profiles for the PV modules can be connected up to a maximum length of 20 m, in order to guarantee thermal separation. The mounting systems are not intended for securing people with belts or ropes during roofing work.

The mounting systems are not designed for any purpose other than the one described here. If the photovoltaic mounting systems are used for another purpose, any liability, warranty or damage claims shall be rendered null and void.

## 3 Safety

### 3.1 General safety information

Observe the following general safety information:

- It must be ensured that the planned PV system is intended for the load capacity of the roof. If necessary, consult a statics expert.
- The PV system and its ballasting must be matched to the local wind and snow load zones. Design only according to the planning using the OBO Construct app or a technical planner.
- Before commencing mounting, ensure that the materials such as the roof skin and insulation materials of the roof surface are suitable for accepting a PV system.
- The construction site must be protected against falling objects.
- Mounting must be carried out by at least 2 people.
- The people working must be protected as there is the risk of falling when working high above the ground.
- When working on the roof, care must be taken to avoid damaging the roof skin and insulation of the roof.

- Contact with electrical current can lead to an electric shock. Electrical work may only be performed by qualified specialists.
- Protective clothing must be worn as there is the danger of cutting from sharp profile edges and the risk of injuries to the eyes from flying chips when working with the angle grinder.

### 3.2 Personal protective equipment

List of personal protective equipment to be used:



Use hand protection



Wear safety shoes



Wear eye protection



Use catch protection

## 4 Necessary tools

List of tools to be used:

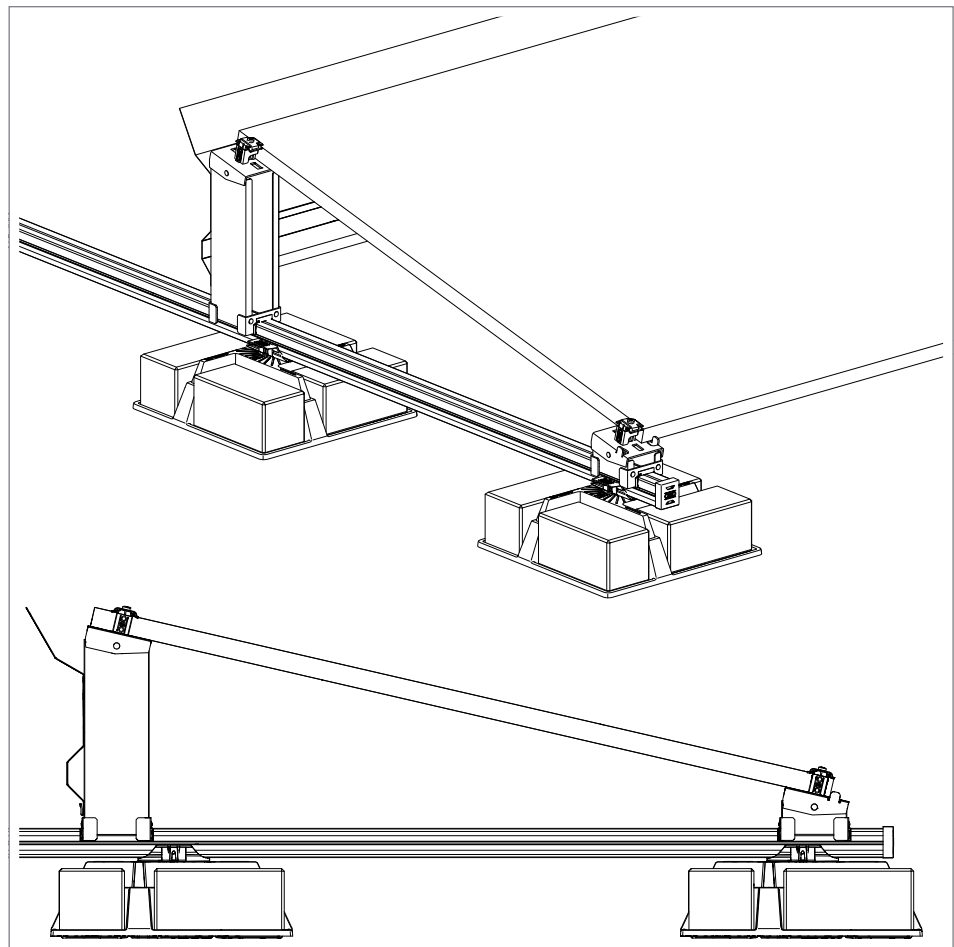
- Folding yardstick/tape measure
- Chalk line
- Angle grinder
- Battery-operated screwdriver (Torx 30/40)
- Torque spanner (WAF 13)
- Screwdriver (Torx 30/40)
- Welding torch or hot air blower or automatic welding device (depending on whether it is a bitumen or plastic roof skin)
- Pressing roller

## 5 System overview

The Magic PV Flat Pro photovoltaic mounting systems (PV mounting systems) for flat roofs consist of:

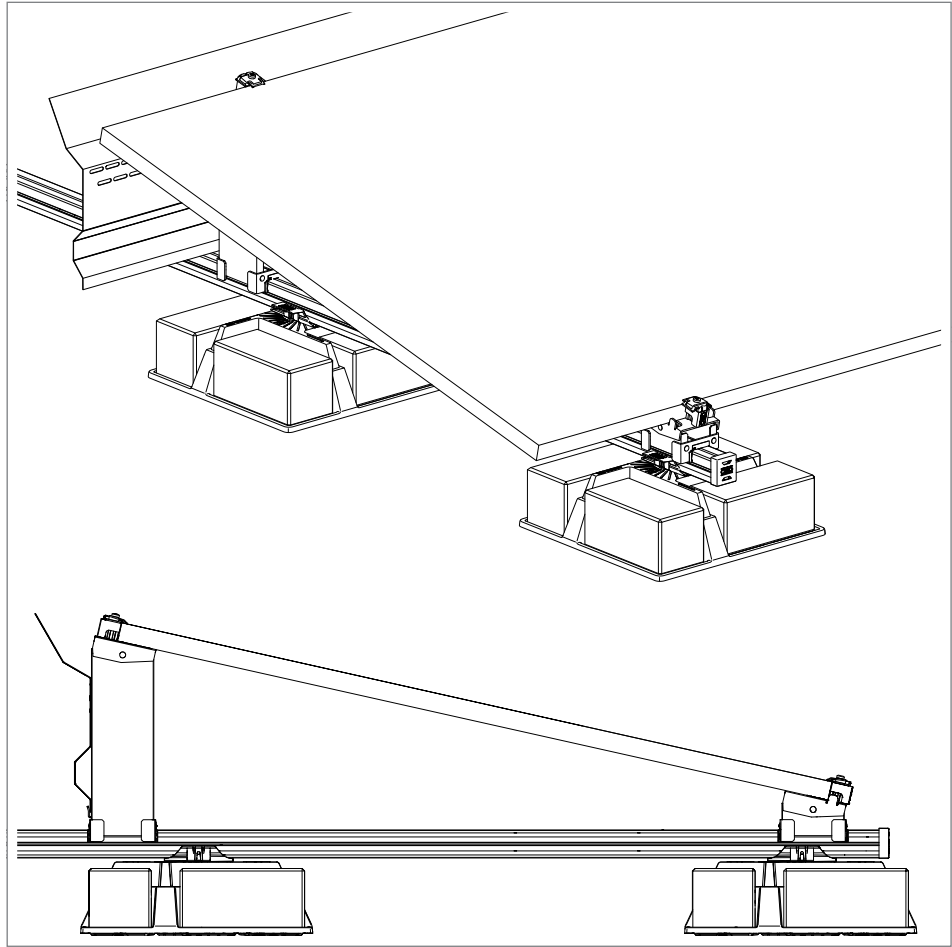
- UniBase 10 universal base (non-degassing, UV-resistant), which must be weighed down with standard blocks with an edge height of 10 cm
- Short and long supports
- Aluminium truss profiles
- Universal clamps as end or middle clamps, or
- End and intermediate clamps with springs for higher load zones.

Windbreaks can be mounted, depending on the alignment of the PV system. The truss profiles are snapped onto the stands without screws using adapters and can be connected with straight or cross-connectors. The short and long supports are snapped onto the truss profiles, and the PV modules onto them. The PV modules are fastened with the universal clamps or end/intermediate clamps with springs. Fastening is possible both at the sides on the short edges of the module or as a quarter-point fastening on the top and bottom edges of the module.



**Fig. 1:** Overview, system structure, side fastening





**Fig. 2:** Overview, system structure, quarter-point fastening top/bottom

The UniBase 6 and UniBase Glue universal bases are available for cable routing on mesh cable trays beneath the PV modules. The UniBase 6 is weighed down using standard blocks with an edge height of 6 cm. The UniBase Glue is welded on with a sleeve made of bitumen or plastic film. The bases each have a seat for an adapter, in order to mount the GRM mesh cable trays.

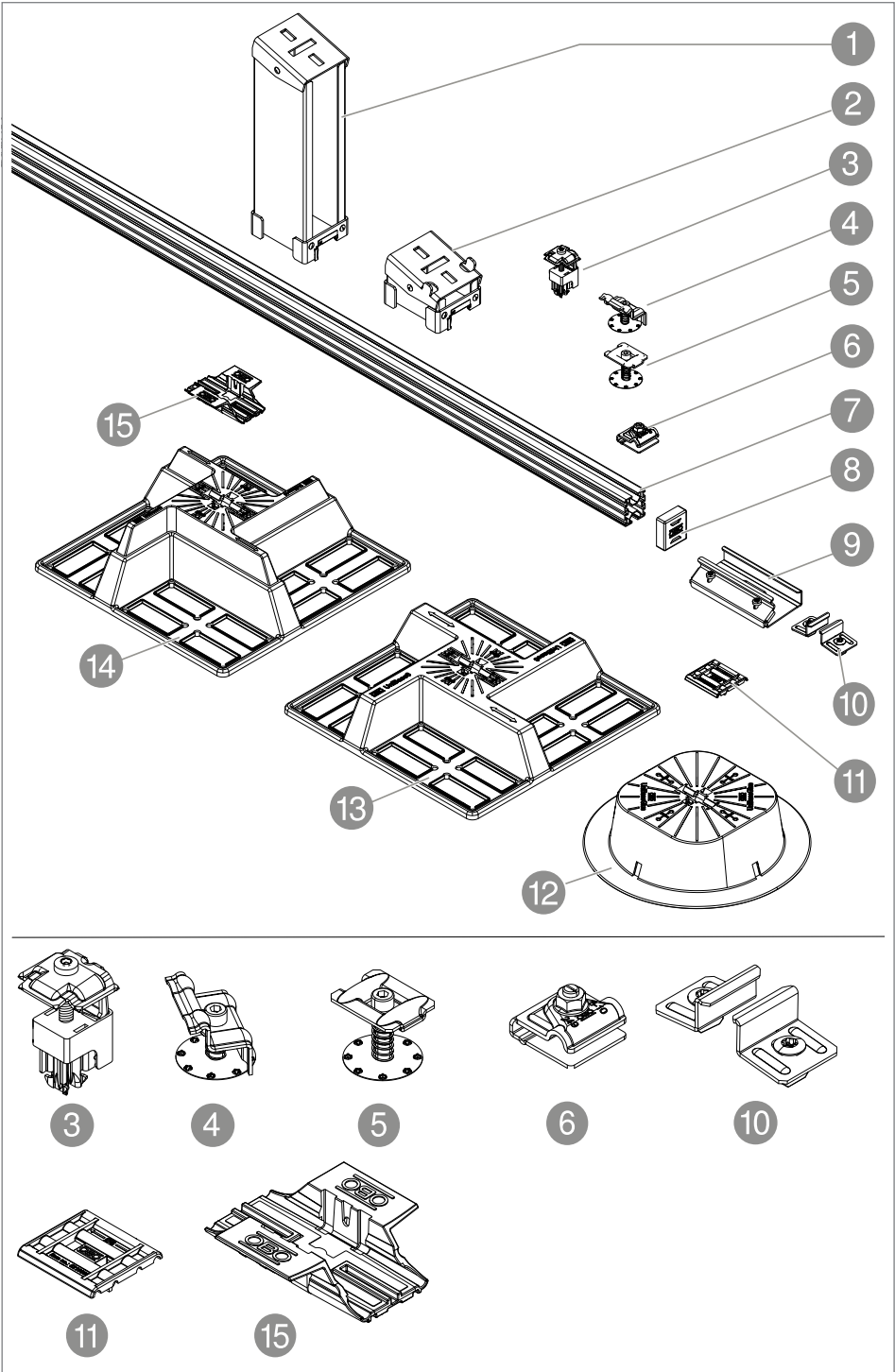
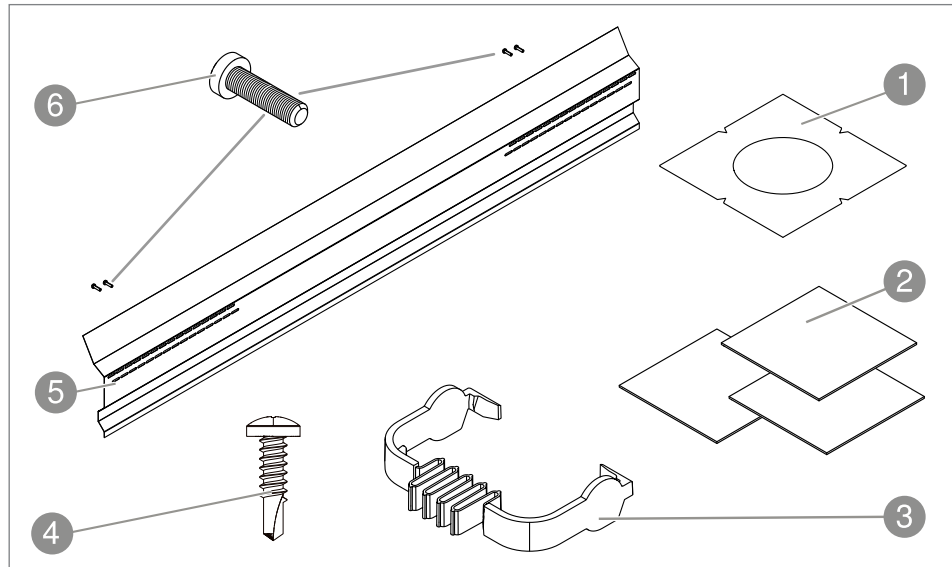


Fig. 3: Magic PV Flat Pro system overview

	Designation	Type	Function
1	Support, long	STL 15 DD	Sloping stand-off and support for PV module, fastening on truss profile
2	Support, short	STK DD	Sloping stand-off and support for PV module, fastening on truss profile
3	Universal clamp	KLU A2/KLU A2 S	Fastening of PV modules on supports
4	End clamp with spring	KLE F 25 A2 KLE F 30 A2 KLE F 35 A2 KLE F 40 A2	Fastening of PV modules on supports, suitable for high-load zones
5	Intermediate clamp with spring	KLZ F 25 A2 KLZ F 30 A2 KLZ F 35 A2 KLZ F 40 A2	Fastening of PV modules on supports, suitable for high loads
6	Universal earthing terminal PV	249 PV10 6-50V2A	Creation of equipotential bonding
7	Truss profile	TP 45/4700 ALU TP 45/4700 ALU S	Support and mounting rail for PV modules
8	Endcap	EK 45 G/ EK 45 G S	Protection against injuries and ingress of dirt
9	Straight connector	LV 45 DD	Straight connection of truss profiles
10	Cross connector	KV 45 DD	Cross-connection of truss profiles
11	Adapter for mesh cable trays	165 MBG HGRM	Fastening of GRM mesh cable tray on UniBase 6 base and UniBase Glue
12	Universal base, glueing	UniBase Glue	Base for glueing, for mounting systems, acceptance of HGRM adapters to mount GRM mesh cable trays for cable routing
13	Universal base, ballasting, for standard blocks up to 10 x 20 x 6 cm, $\geq 2$ kg	UniBase 6	Base for weighing down, for mounting systems, acceptance of adapters to mount GRM mesh cable trays for cable routing
14	Universal base, ballasting, for blocks up to 10 x 20 x 10 cm, $\geq 4$ kg (according to EN 1338)	UniBase 10	Base for weighing down, for mounting systems, acceptance of adapters with truss profile
15	Truss profile adapter for universal base	UniBase TMP	Connection between UniBase base and truss profile

**Tab. 1:** Magic PV Flat Pro system overview

## Accessories



**Fig. 4:** System accessories

	Designation	Type	Function
①	Sleeve (bitumen or plastic)	UniBase Glue Bit UniBase Glue FPO	Fixing of UniBase Glue
②	Building protection mat	UniBase BSM AL/ UniBase BSM	Non-slip base for UniBase 6/UniBase 10 base
③	Dismantling tool	Does not need to be ordered separately, included with the truss profiles	Release of the short and long supports from the truss profile
④	Drilling screw	BS BKS KB	Optional fastening of truss profiles to adapter
⑤	Windbreak	WSB 2200 DD	Protection against wind load/wind pressure
⑥	Flat-head screw	FKS 6x25 A2	Fastening of windbreak to long support

**Tab. 2:** System accessories

## 6 Installation

### ATTENTION

#### **Danger of breakage and function loss!**

PV modules can be lifted from below through the effect of wind. There is the danger of breakage and function loss. Maintain the spacings between the modules, as intended in the planning, along with the planned ballasting.

### ATTENTION

#### **Risk of shading!**

If, with a southerly alignment, the PV modules are mounted too close to one another, there is the risk of mutual shading and thus reduced power yields. Maintain the spacings between the modules, as intended in the planning.

#### **Erecting the bases**

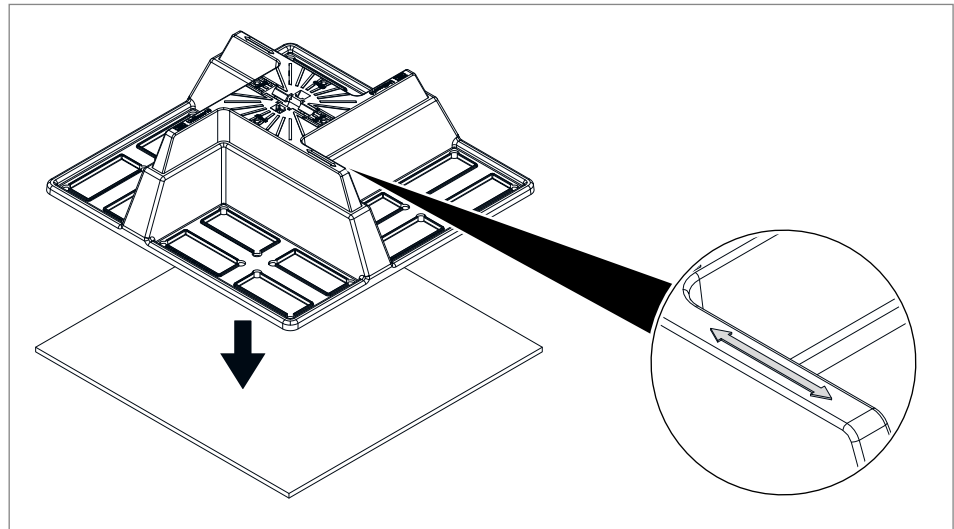
The number, spacing and weighting of the UniBase 10 bases and the number of PV modules are specified by the roof assignment plan from the planner/statics engineer and/or the OBO Construct planning app.

#### **Laying building protection mats**

Building protection mats must be laid under the bases to prevent slippage of the PV system and to protect the roof skin. In addition, smaller height differences can be compensated using a maximum of 3 building protection mats, in order to mount the truss profiles in a flush manner.

In the case of larger height differences, for reasons of stability, the truss profiles may not be mounted continuously, but must be separated. A further, separate mounting system must then be mounted.

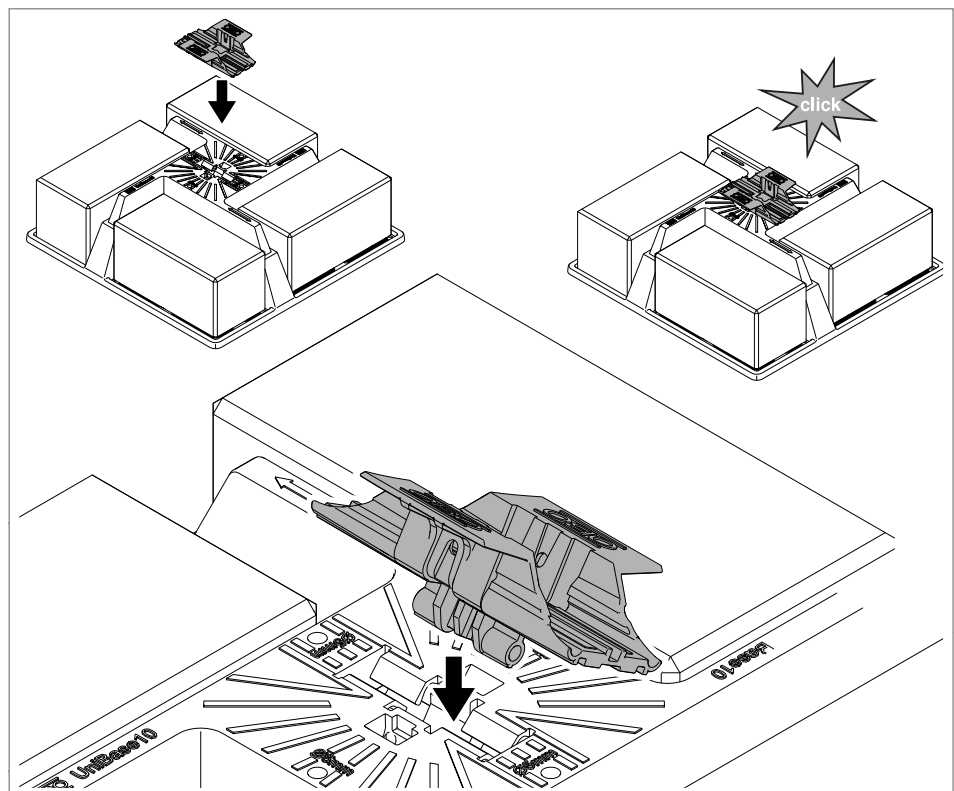
1. Locate and align bases according to the roof assignment plan. The arrows on the bases show the running direction of the truss profiles.



**Fig. 5:** Erecting a base

2. Lay the building protection mats under the bases.

## 6.1 Inserting adapters for the truss profile



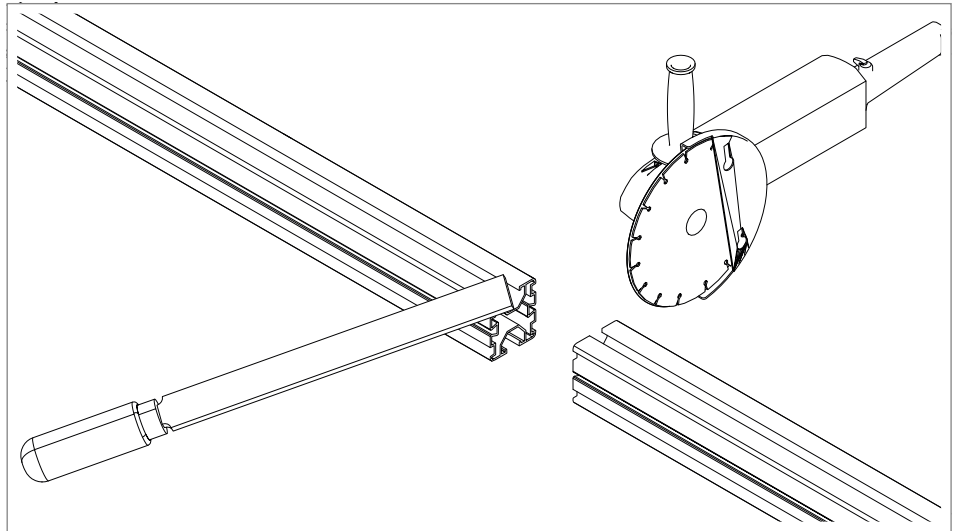
**Fig. 6:** Inserting adapters

1. Engage the UniBase TMP adapter in the seat of the UniBase base.
2. Engage adapters in all the other bases.

## 6.2 Shortening truss profiles

The number and lengths of the truss profiles are specified by the roof assignment plan from the planner/statics engineer and/or the OBO Construct planning app.

It may be necessary to shorten truss profiles.

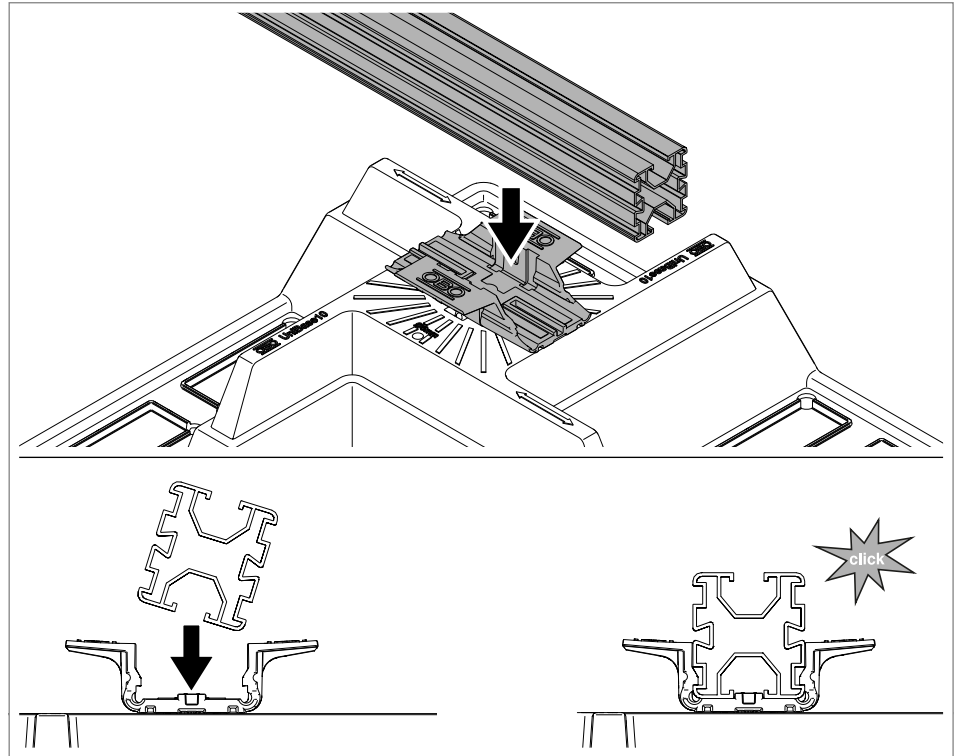


**Fig. 7:** Shortening truss profiles

1. Using an angle grinder, shorten the truss profile to the prescribed length.
2. Deburr cut edges.

### 6.3 Inserting a truss profile

**Note!** *Before insertion, the truss profile must be correctly positioned in the straight direction, as the integrated anti-slip device in the adapter means that it can only then be moved with great difficulty.*



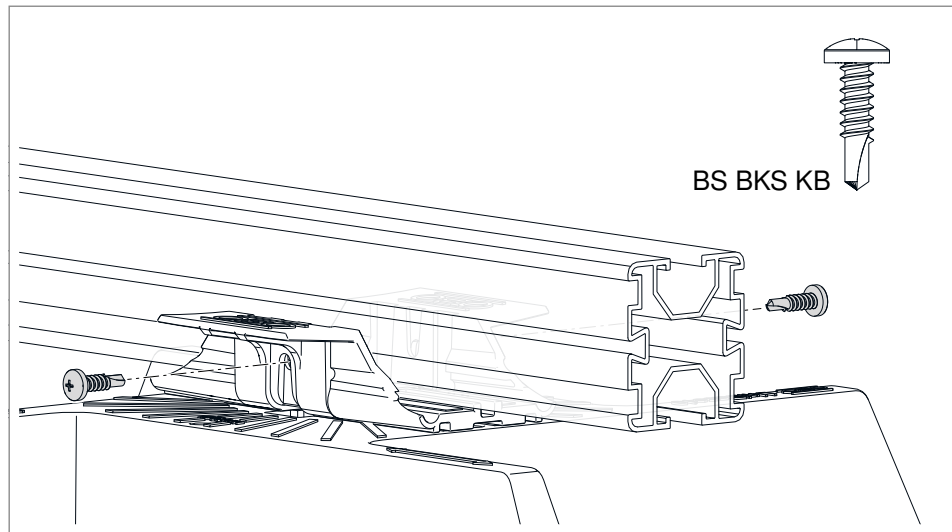
**Fig. 8:** Inserting a truss profile

1. Insert the truss profile into the seat of the adapter at a slight angle and push it horizontally into the necessary position.
2. Engage the truss profile in the adapter.
3. Insert all the remaining truss profiles.
4. Connect the truss profiles at joints with straight connectors (see Chapter „6.13 Connecting truss profiles in a lengthwise manner“ on page 37.



**Note!**

*The truss profile must be screwed to the adapter using self-tapping screws, if the planning dictates additional securing of the mounting system.*



**Fig. 9:** Securing the truss profile with screws

5. If necessary, additionally screw the truss profile to both sides of the adapter using BS BKS KB self-tapping screws.

## 6.4 Weighing down the base

As standard, the UniBase 10 base is weighed down using baseboard blocks according to EN 1338 of size (length x width x height) 10 x 20 x 10 cm. The weight must be at least 4 kg per block. Alternatively, blocks of other sizes can be used if the specified ballasting is observed. The weights of UniBase 10 ballasts with different block sizes are listed in the following table for guidance

Number of blocks and dimensions in cm	Weight in kg
UniBase 10 inclusive 4 blocks 20x10x6	11,315
UniBase 10 inclusive 4 blocks 20x10x8	15,315
UniBase 10 inclusive 4 blocks 20x10x10	18,915
UniBase 10 inclusive 5 blocks 20x10x6	13,915
UniBase 10 inclusive 5 blocks 20x10x8	18,915
UniBase 10 inclusive 5 blocks 20x10x10	23,415
UniBase 10 inclusive 6 blocks 20x10x6	16,515
UniBase 10 inclusive 6 blocks 20x10x8	22,515
UniBase 10 inclusive 6 blocks 20x10x10	27,915

**Tab. 3:** Weights of different block combinations

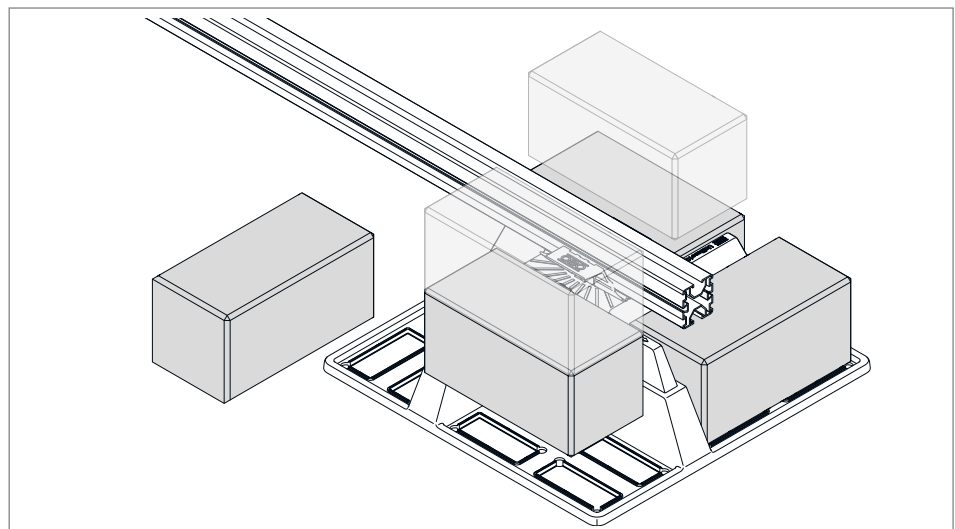
### ATTENTION

#### **Danger of a loss of function and damage!**

If the UniBase base is weighed down with other materials, then there is the risk that it will be damaged or be insufficiently stable.

- Use only blocks with the specified dimensions for weighing down.
- If the weight of an individual unweighted UniBase base is insufficient in any location, then a further UniBase base must be mounted alongside.

1. If necessary, realign the subconstruction of bases and truss profiles exactly before weighing down.

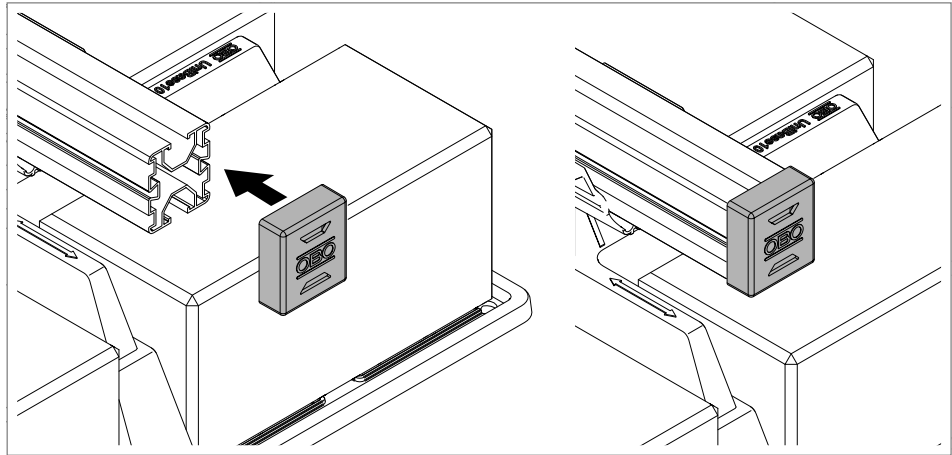


**Fig. 10:** Weighing down the base

2. Weigh down all the bases with up to 6 blocks.

## 6.5 Mounting the endcap

As protection against injuries and the ingress of dirt, the ends of the truss profiles are closed off with endcaps.



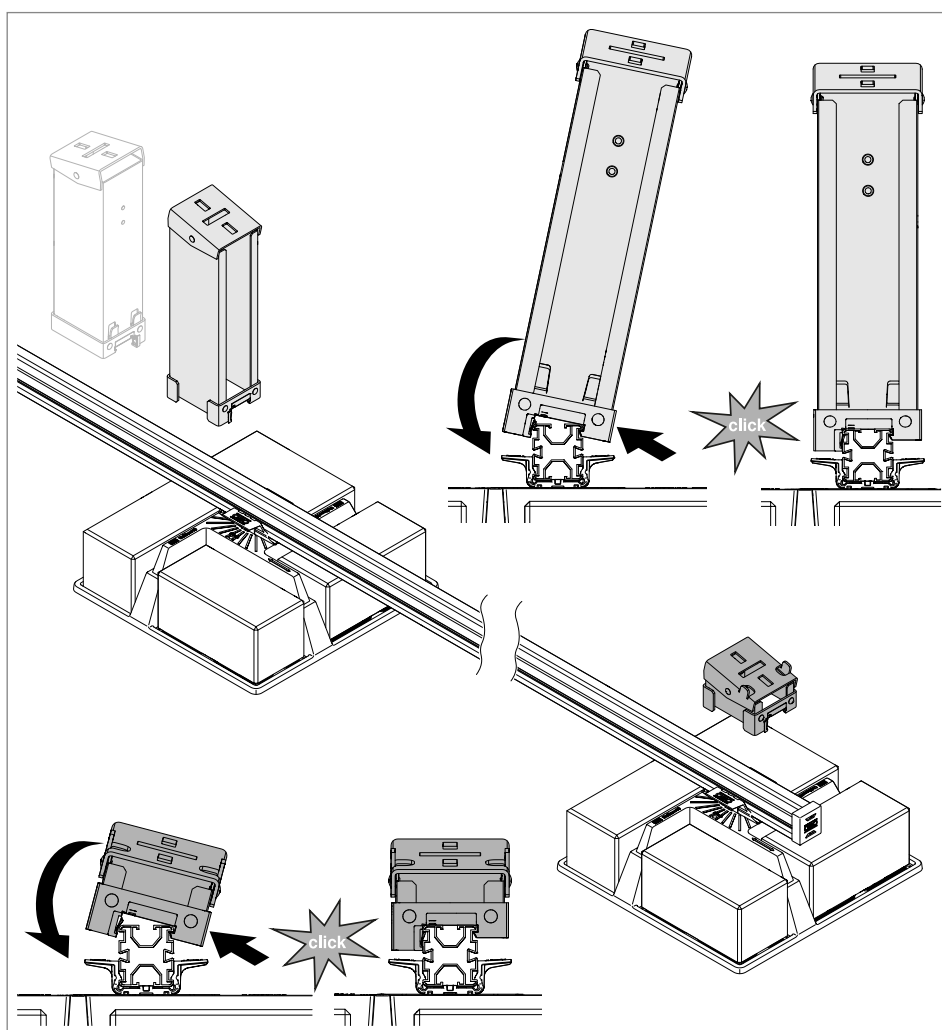
**Fig. 11:** Mounting the endcap

1. Attach the endcap to both ends of the truss profile and press it in.

## 6.6 Inserting the short and long supports

**Note!** *The position of the short and long supports is dependent on the size of the modules and the points in which the universal clamps must be placed. Refer to the planning of the PV system or the OBO Construct planning app for the exact position. The supports can be engaged at any point of the support rail, irrespective of the position of the bases or connectors.*

**Note!** *The short and long supports can be released again using a dismantling tool (see also Chapter „8.1 Dismantling the short and long supports“ on page 46).*



**Fig. 12:** Inserting the supports

1. Hook the long and short supports into the truss profile using the shorter side (➡).
2. Engage the support in the truss profile.
3. Engage all further supports in the truss profiles.

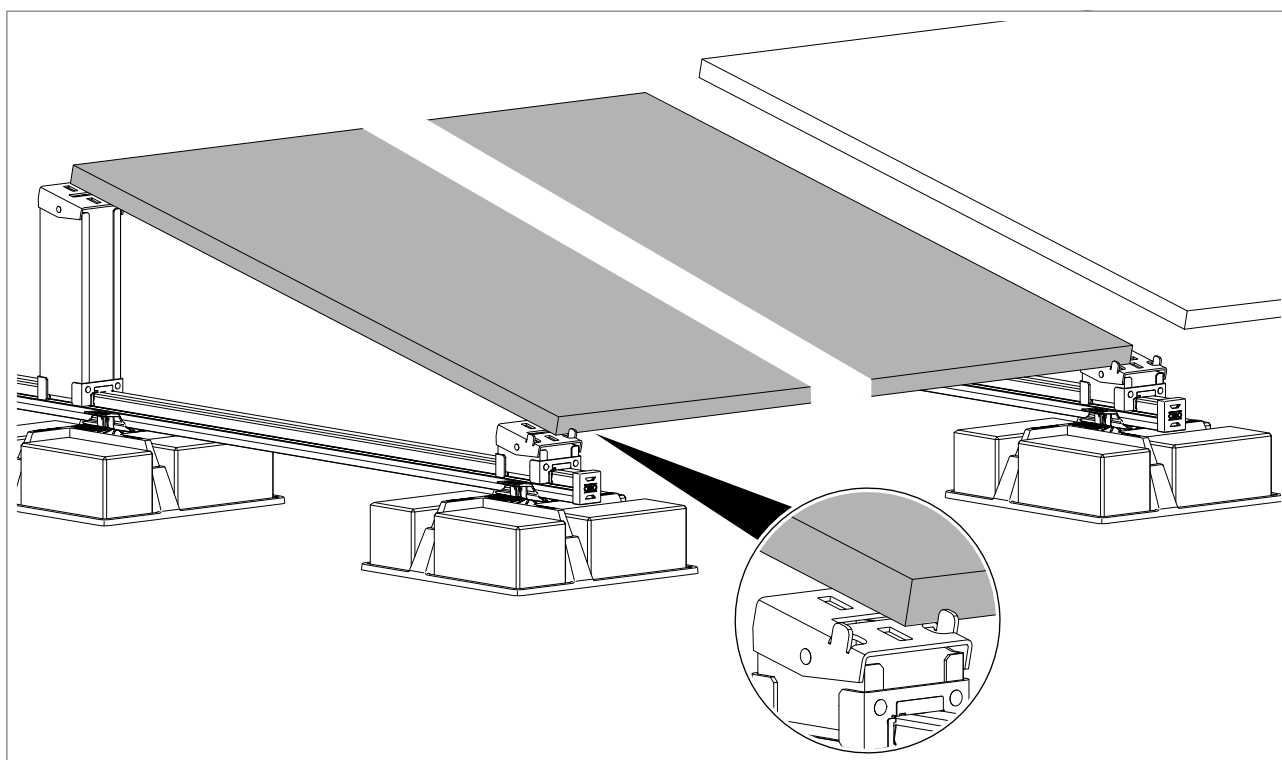
## 6.7 Attaching the PV module

The PV module is placed on the supports and is then fastened to the supports with universal clamps or end/intermediate clamps with springs. For fastening, horizontal and vertical slots are drilled into the supports for the clamps.

**Note!** Depending on the necessary inclination, the support surface of the supports can be adjusted, so that the PV module is flat (see also „6.7.1 Adjusting the angle of inclination of the supports“ on page 22).

**Note!** To avoid slippage of the PV modules during mounting, holding straps are worked into the short supports (see also Fig. 14 and Fig. 15).

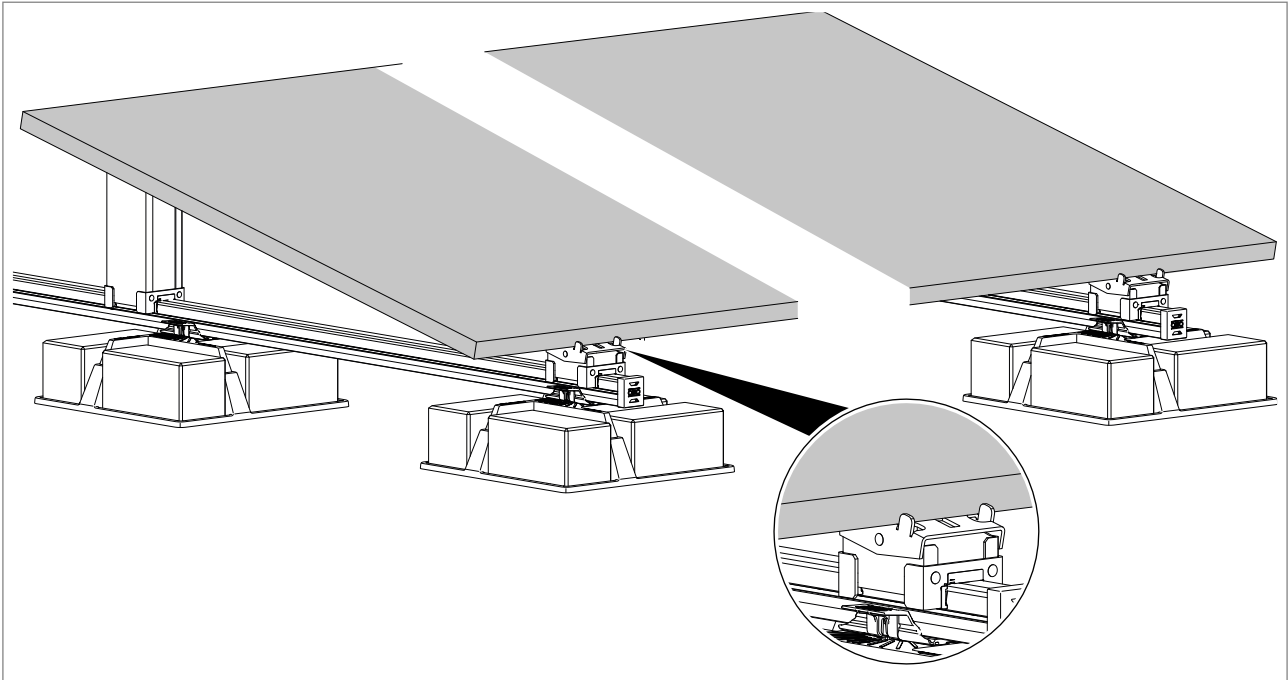
### Attaching the PV module with side fastening



**Fig. 13:** Attaching the PV module with side fastening

1. In case of side fastening, place the PV module so that a clamp can still be placed in the corresponding slot of the support.

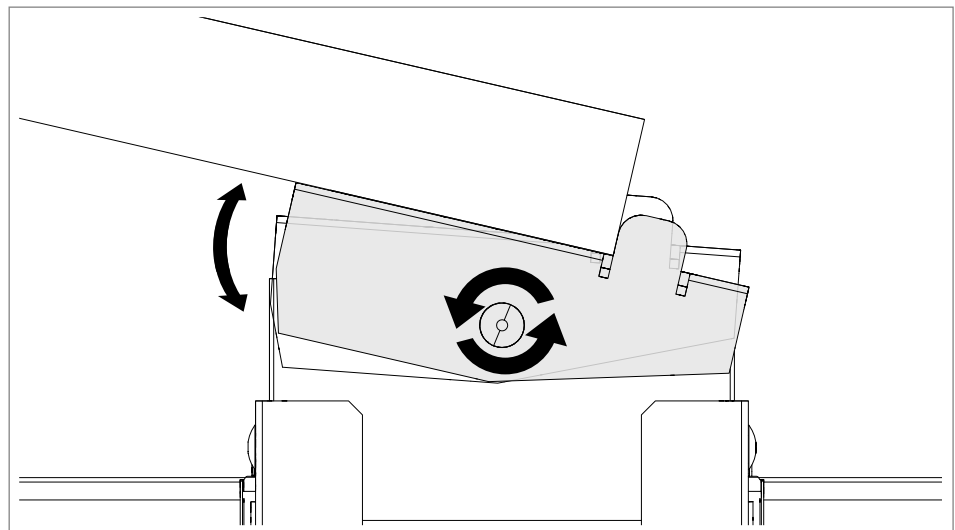
## Attaching the PV module with top/bottom fastening



**Fig. 14:** Attaching the PV module with top/bottom fastening

1. In case of top/bottom fastening, place the PV module so that a clamp can still be placed in the vertical slot of the support.

### 6.7.1 Adjusting the angle of inclination of the supports



**Fig. 15:** Adjusting the angle of inclination of the supports

2. If necessary, adjust the angle of inclination of the support surface of the short and long supports, so that the PV module is flat.

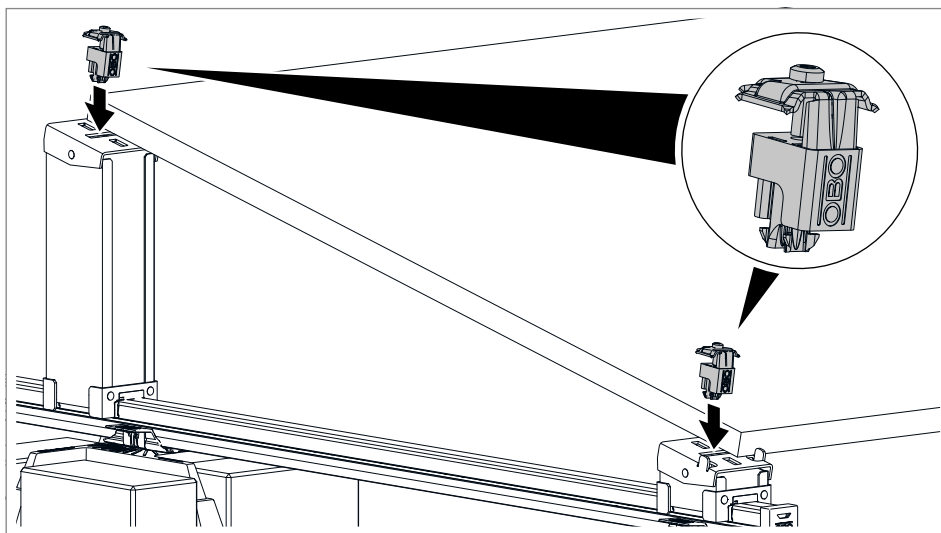
## 6.8 Fastening the PV module with universal clamps

The PV modules are clamped at the edges of the module with at least four universal clamps. With larger modules, six clamping points may be required, depending on the specifications of the module manufacturer.

The universal clamp can be used for the following:

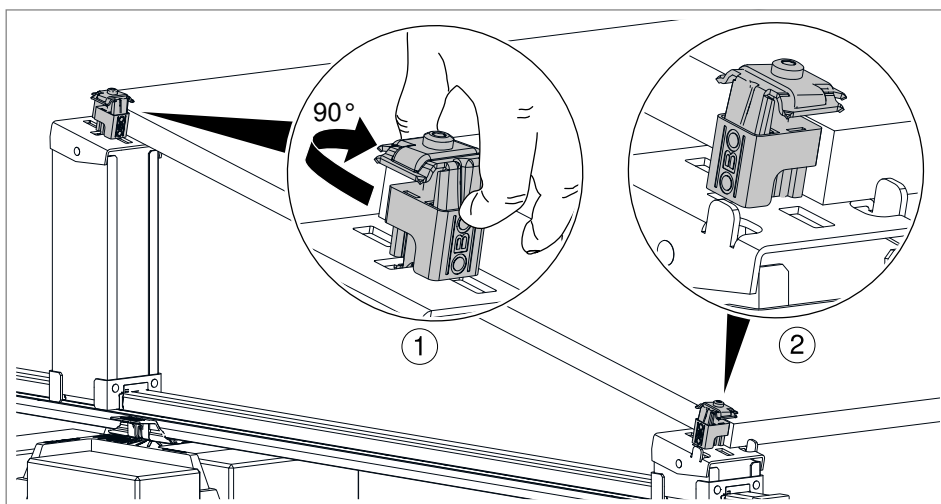
- As an end clamp at the side edges of the module
- As a middle clamp for two modules placed next to each other on the same support
- As an end clamp at the bottom and top edges of the module, if four supports are required per module (quarter-point fastening).

### 6.8.1 Mounting the universal clamp as an end clamp



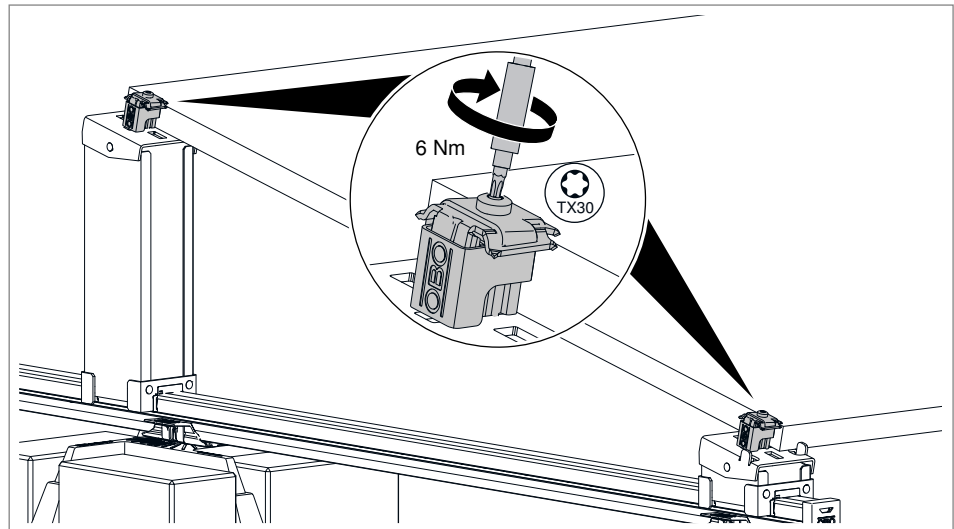
**Fig. 16:** Inserting the universal clamp in the slot

1. Insert the universal clamp in a horizontal slot of the short and long support. The “OBO” label points to the bottom edge of the module.



**Fig. 17:** Manually turning the universal clamp

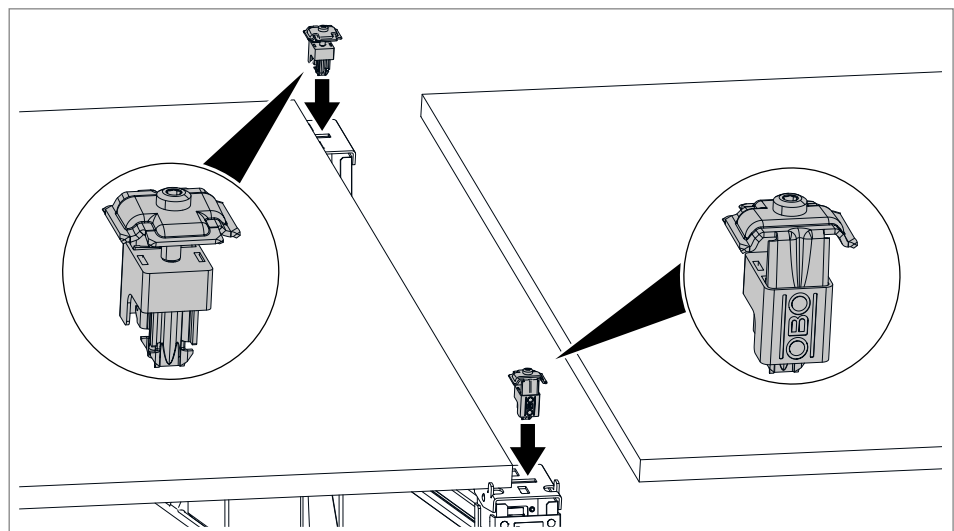
2. Turn the universal slots through 90° in the slot ①. The “OBO” label points outward ②.
3. Push the module up to the universal clamps.



**Fig. 18:** Fastening the universal clamp

4. Tighten the screws of the universal clamps with 6 Nm, in order to clamp the PV module to the supports (observe the max. tightening torque of the module manufacturer).
5. Add additional PV modules and clamp as middle clamps using universal clamps (see „6.8.2 Mounting the universal clamp as a middle clamp“ on page 24) or clamp the module with universal clamps as end clamps at the end of the module row.

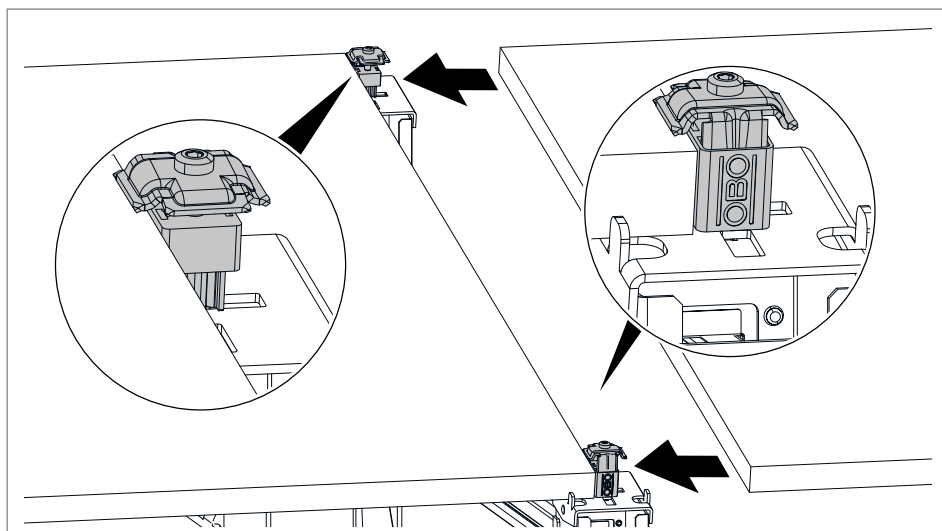
## 6.8.2 Mounting the universal clamp as a middle clamp



**Fig. 19:** Inserting the universal clamp in the slot

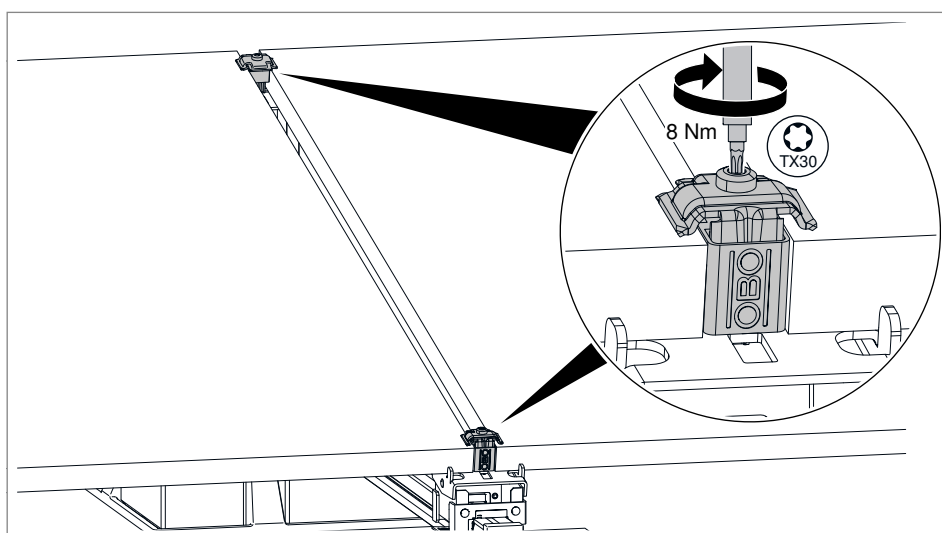
1. Push the universal clamp as a middle clamp into the horizontal slot of the next support. The “OBO” label points to the top or bottom edge of the module.





**Fig. 20:** Inserting the universal clamp in the slot

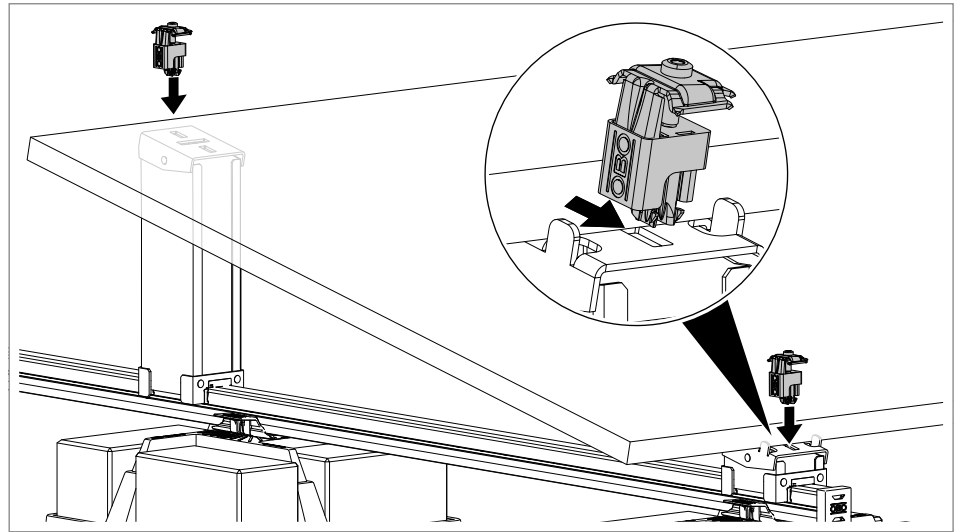
2. Place and align a further PV module and push it up to the universal clamps.



**Fig. 21:** Fastening the PV module centrally with a universal clamp

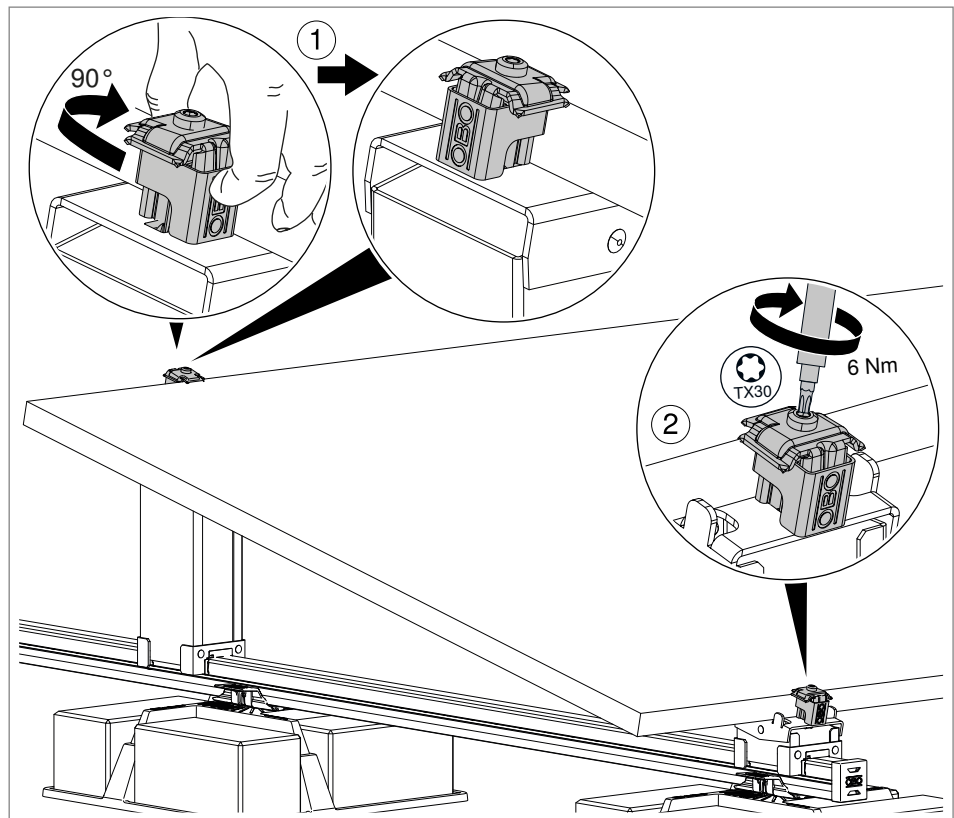
3. Tighten the screws of the universal clamps with 8 Nm, in order to clamp the two adjacent PV modules to the supports (observe the max. tightening torque of the module manufacturer).
4. Add additional PV modules and clamp as middle clamps using universal clamps or clamp the module with universal clamps as end clamps at the end of the module row.

### 6.8.3 Fastening the PV module with end clamps at the top and bottom



**Fig. 22:** Inserting the universal clamp in vertical slots

1. Insert universal clamps in the vertical slots of the short and long support. The “OBO” label points to the side.



**Fig. 23:** Fastening universal clamps

2. Turn the universal clamps through 90° in the slots ①.
3. Tighten the screws of the universal clamps with 6 Nm ②, in order to fasten the PV module to the supports (observe the max. tightening torque of the module manufacturer).
4. Place additional PV modules and fasten with universal clamps.

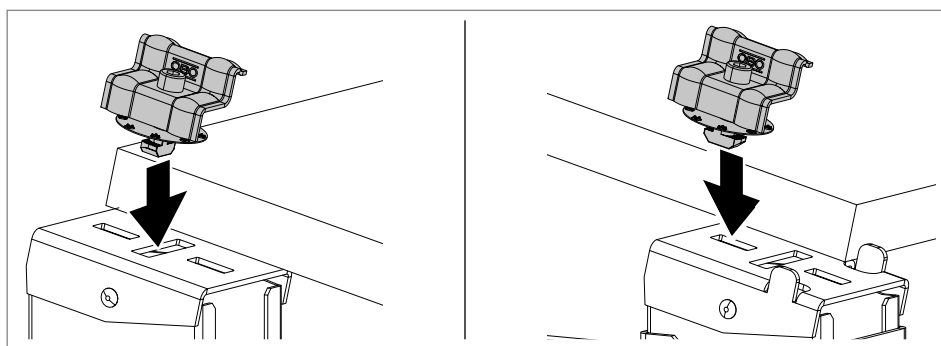
## 6.9 Fastening the PV module with end/intermediate clamps with springs

The end clamps and intermediate clamps with springs offer a higher pressure surface and are used for higher snow and wind loads. The finished teeth on the connection plate press into the aluminium frame of the PV module, offering additional support.

The end/intermediate clamps can be used for the following:

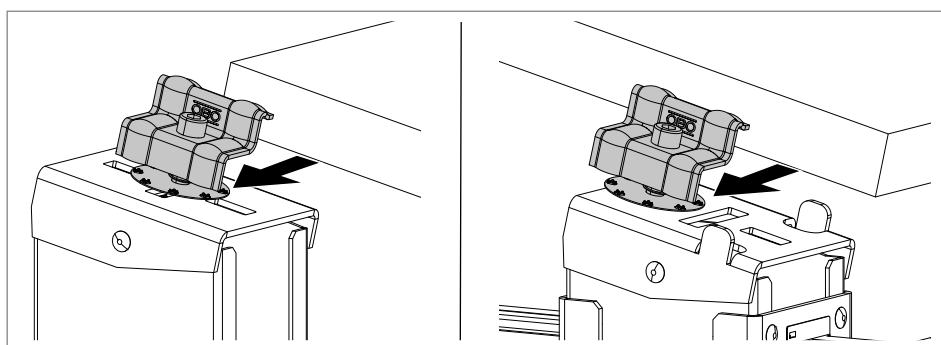
- As an end clamp at the side edges of the module
- As an intermediate clamp for 2 modules placed next to each other on the same support
- As an end clamp at the bottom and top edges of the module, if four supports are required per module (quarter-point fastening).

### 6.9.1 Fastening the PV module with end clamps with springs at the sides



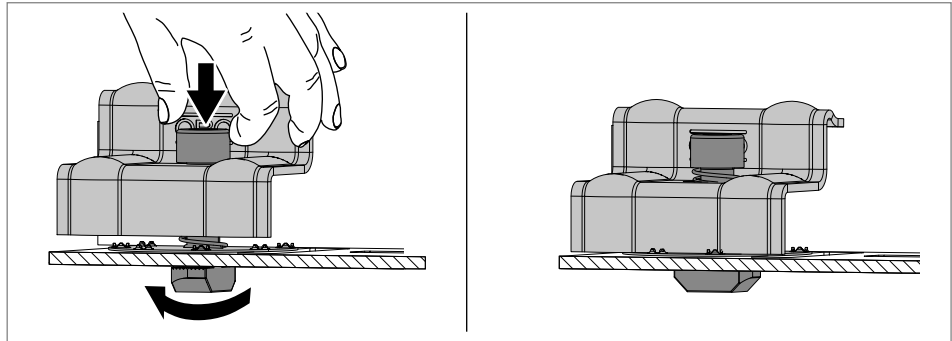
**Fig. 24:** Inserting end clamps in slots

1. Insert slide nuts of the end clamps in slots (long support = horizontal slot, short support = top vertical slot).



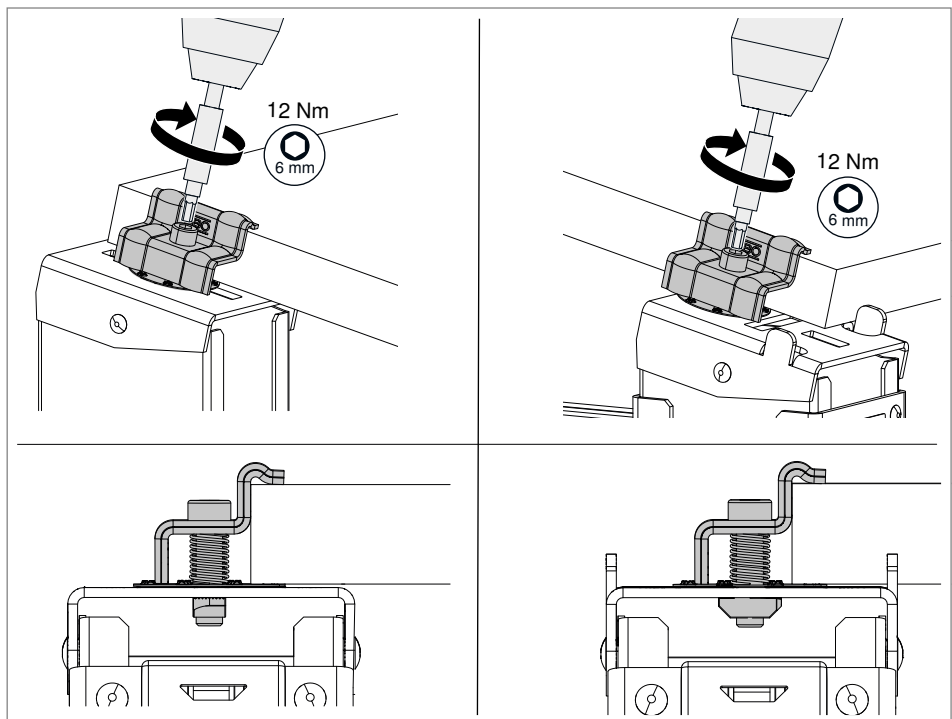
**Fig. 25:** Pushing PV module up to the end clamps

2. Push the PV module up to the end clamps.



**Fig. 26:** Engaging the slide nut

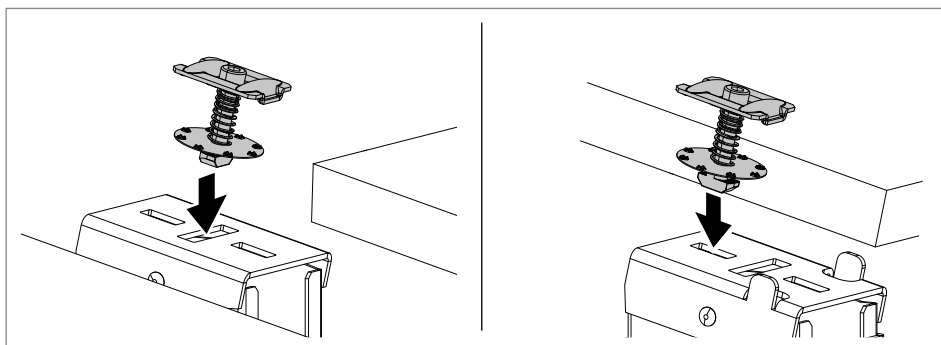
3. Press down lightly on the screw with spring and turn until the slide nut engages.



**Fig. 27:** Tightening the end clamp screws

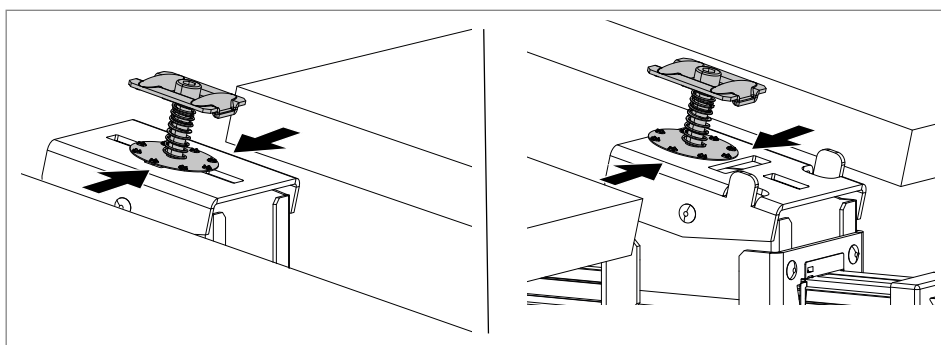
4. Tighten the screws with 12 Nm.

### 6.9.2 Fastening PV modules with intermediate clamps with springs



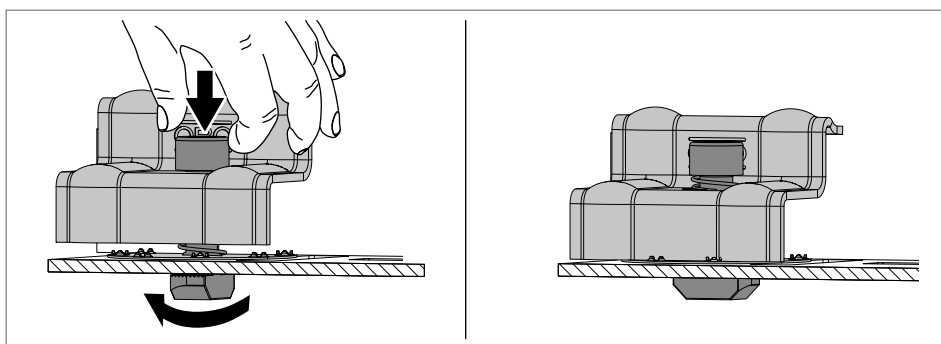
**Fig. 28:** Inserting intermediate clamps in slots

1. Insert slide nuts of the intermediate clamps in slots (long support = horizontal slot, short support = top vertical slot).



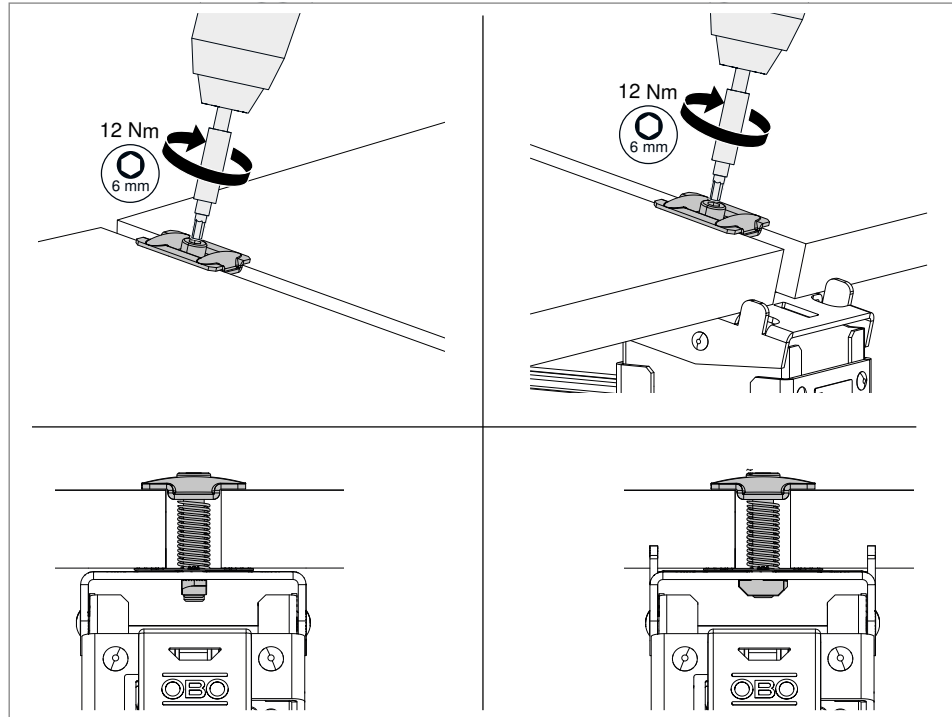
**Fig. 29:** Pushing PV modules up to the connection clamps

2. Push the PV modules up to the intermediate clamps on the right and left.



**Fig. 30:** Engaging the slide nut

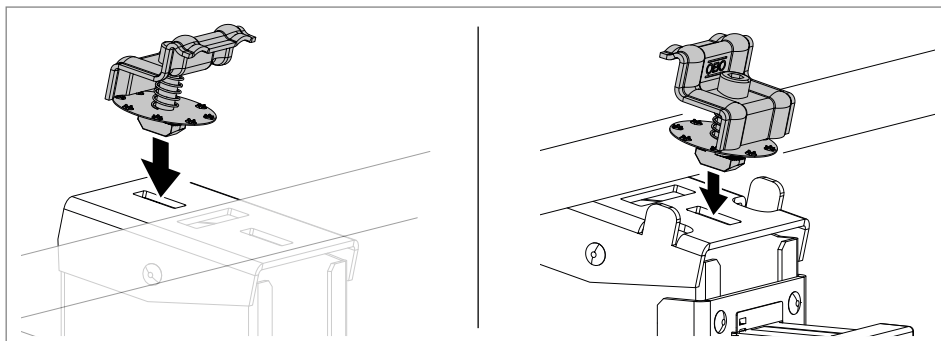
3. Press down lightly on the screw with spring and turn until the slide nut engages.



**Fig. 31:** Tightening the intermediate clamp screws

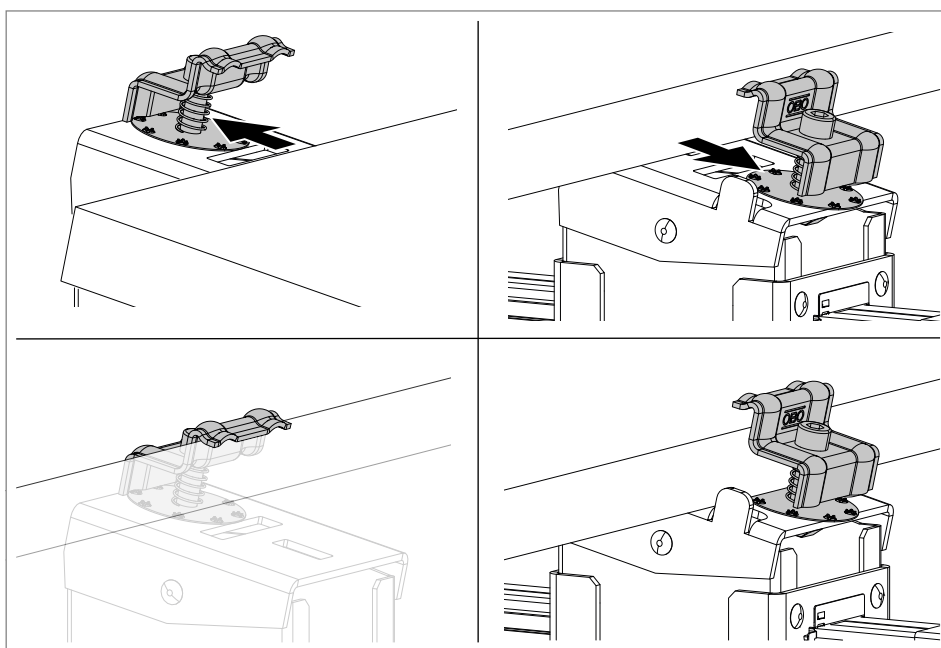
4. Tighten the screws with 12 Nm.

### 6.9.3 Fastening the PV module with end clamps with springs at the top and bottom



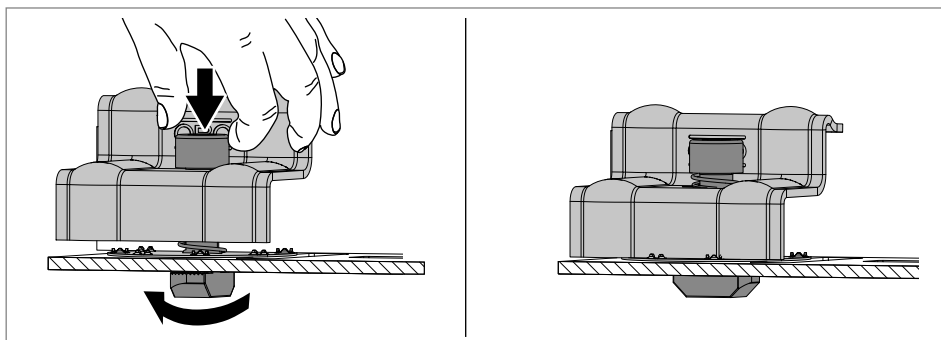
**Fig. 32:** Inserting end clamps in slots

1. Insert slide nuts of the end clamps in vertical slots (long support = top slot, short support = bottom slot).



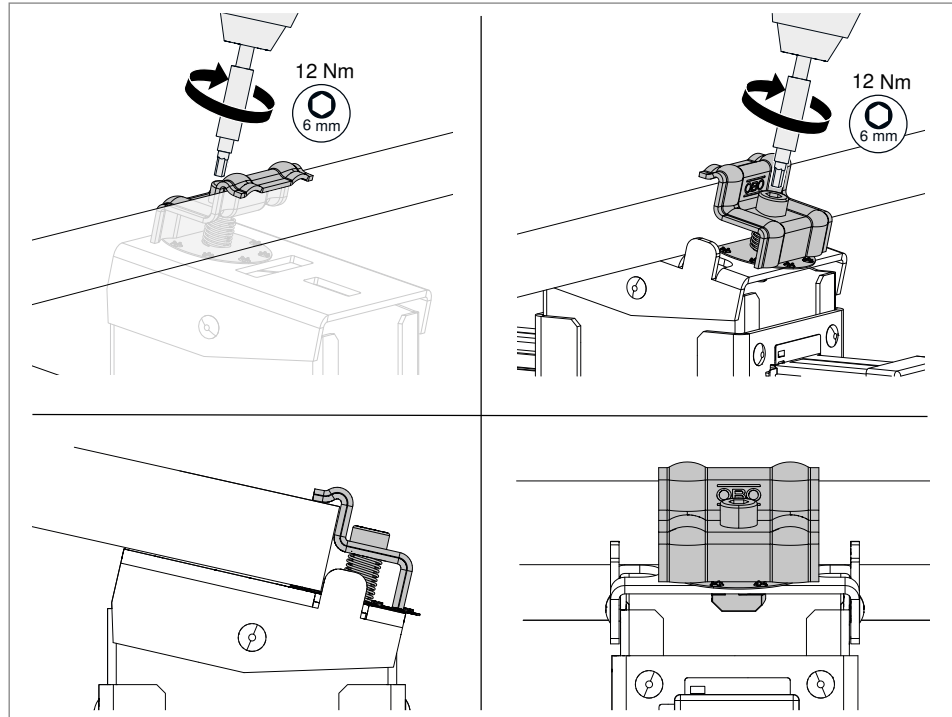
**Fig. 33:** Pushing PV module up to the end clamps

2. Push the PV module up to the end clamps at the top and bottom.



**Fig. 34:** Engaging the slide nut

3. Press down lightly on the screw with spring and turn until the slide nut engages.



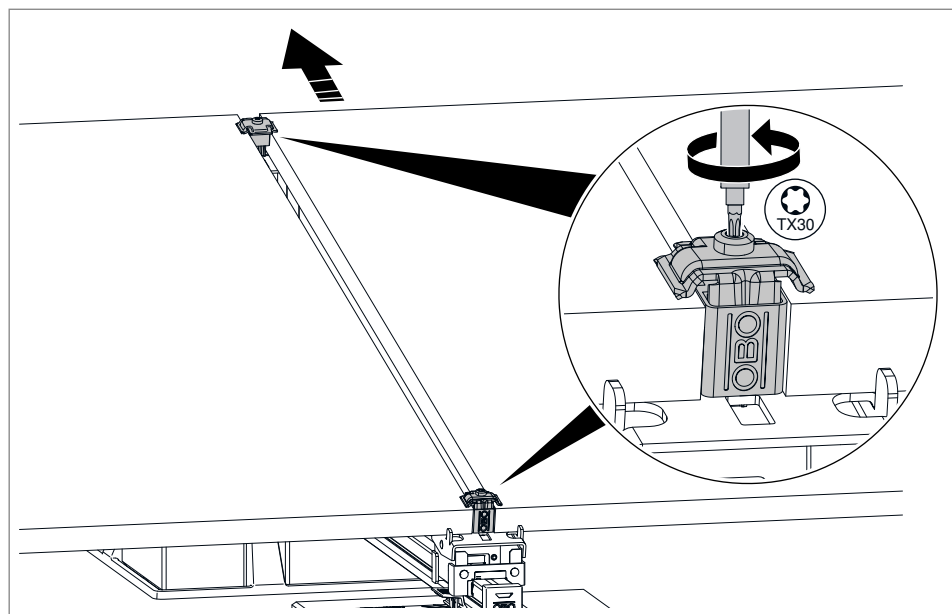
**Fig. 35:** Tightening the end clamp screws

4. Tighten the screws with 12 Nm.

## 6.10 Replacing the PV module

The following only shows replacing of the PV module fastened with universal clamps. If the modules are fastened with end/intermediate clamps with springs, the screws of the clamps are unscrewed in the same way and the PV module removed accordingly.

### 6.10.1 Replacing with side and middle fastening

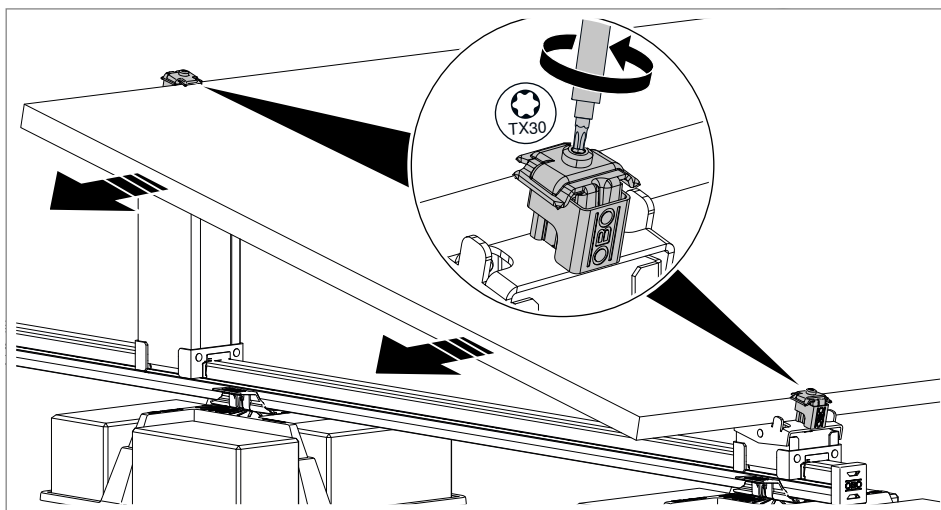


**Fig. 36:** Replacing the PV module, side and middle fastening



1. Slightly unscrew the screws of the universal middle and end clamps.
2. Push the PV module upwards and out to exchange it.
3. Push in the new PV module from above.
4. Fasten the universal clamps with the prescribed tightening torque.

#### 6.10.2 Replacing with top and bottom fastening

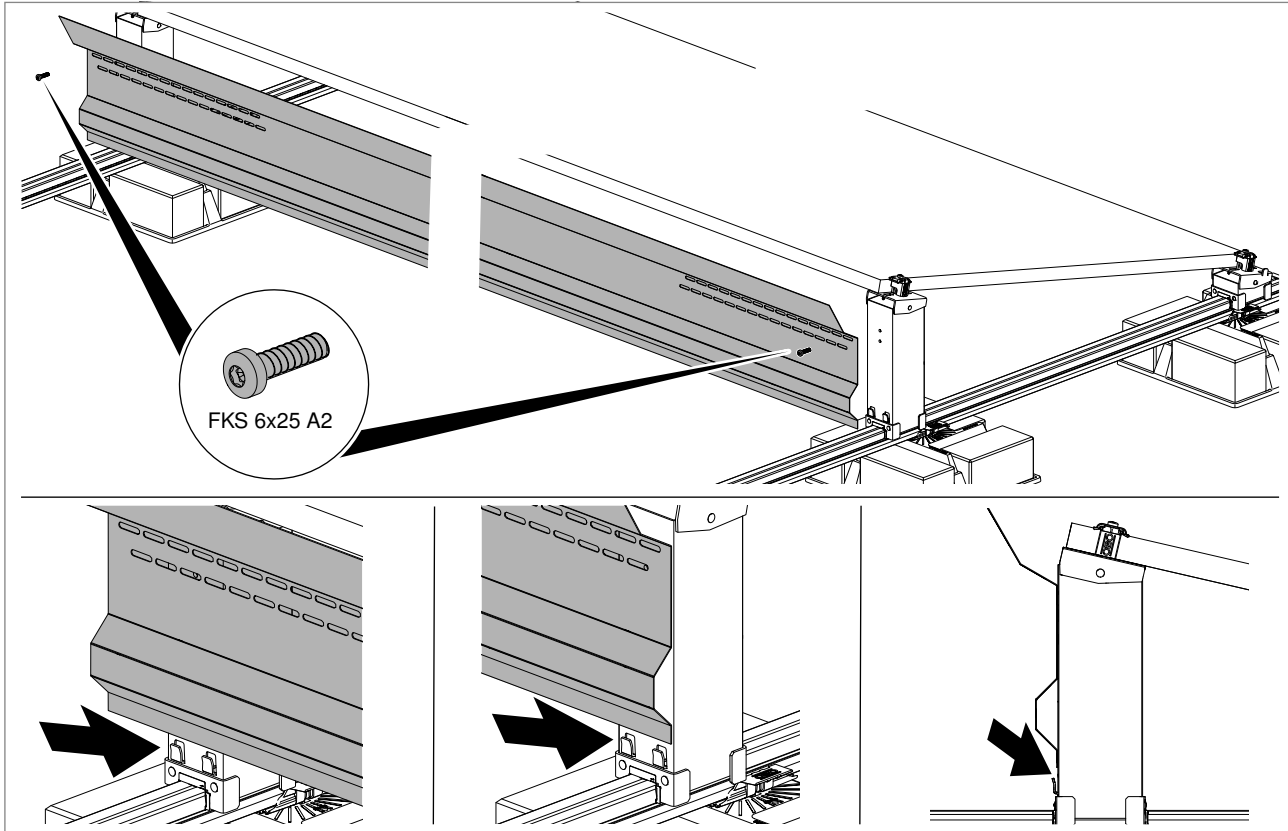


**Fig. 37:** Replacing the PV module, top and bottom fastening

1. Loosen the screws on the universal clamps slightly.
2. Slide the PV module out at the side to replace it.
3. Push in the new PV module at the side.
4. Fasten the universal clamps with the prescribed tightening torque.

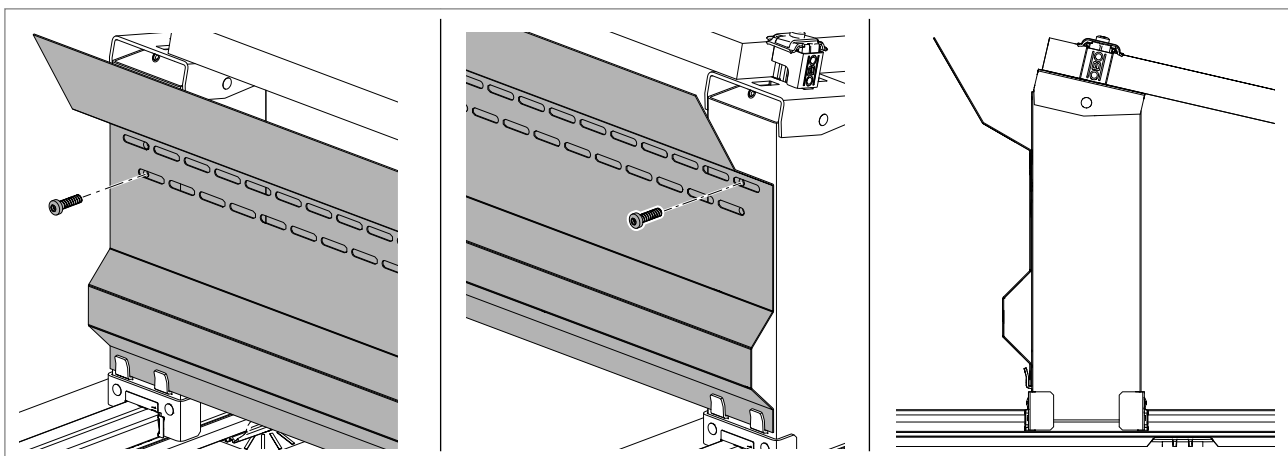
## 6.11 Mounting the windbreak

To prevent the PV mounting system from becoming unstable or damaged due to the impact of wind from below, windbreaks must be mounted on the long supports of south-facing PV systems.



**Fig. 38:** Clamping the windbreak

1. Clamp windbreak behind the straps on the rear side of the long supports.



**Fig. 39:** Screwing on the windbreak

2. Screw the windbreak to long supports with FKS 6x25 screws (6 Nm), using the predrilled fastening holes.

## 6.12 Integrating the system into the equipotential bonding and/or lightning protection system

To ensure the safety of the PV system, it must be integrated into the equipotential bonding system. If the risk analysis according to EN 62305-2 requires an external lightning protection system for the building, and if the separation distance between the PV system and the lightning protection system cannot be maintained, then both of these systems must be interconnected so that they can carry lightning current.

The universal earthing clamp can be used for both applications. The individual truss profiles must be interconnected, in order to guarantee continuous, low-ohmic equipotential bonding.

A round conductor of  $\varnothing$  8–10 mm and/or an equipotential bonding conductor of 6–50 mm<sup>2</sup> can be mounted on the universal earthing clamp.

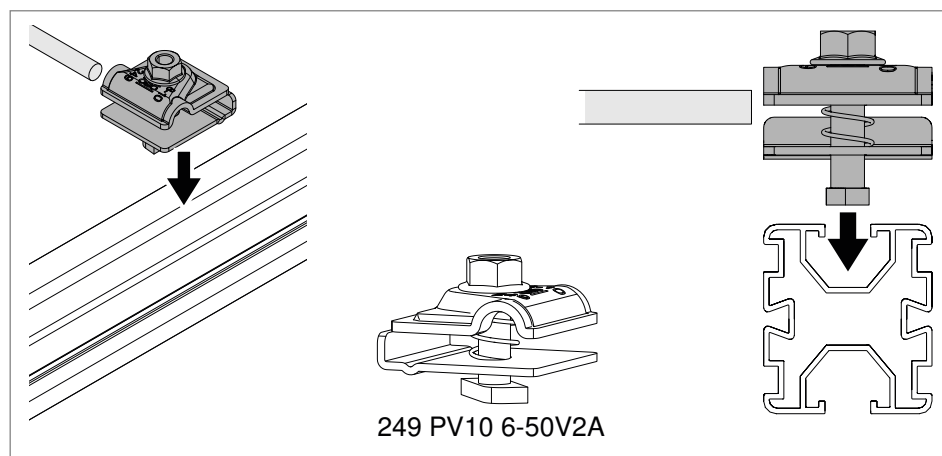


**WARNING**

### Risk of electric shock!

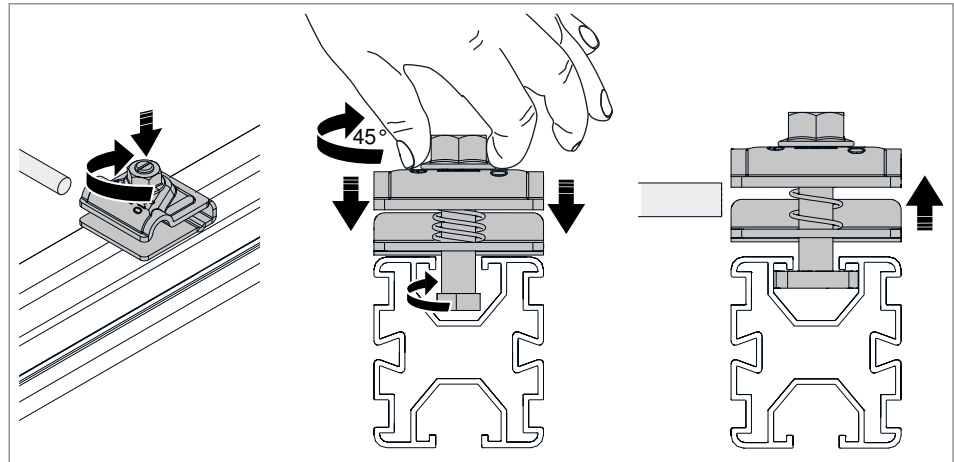
In the case of a lightning strike in the lightning protection system, lethal voltages can occur in the system. Do not work on the lightning protection system during a thunderstorm or if there is the risk of one.

1. If the truss profile is anodised, then the anodisation must be scratched off in the area of the universal earthing clamp, so that a low-ohmic contact between the truss profile and the earthing clamp is guaranteed.



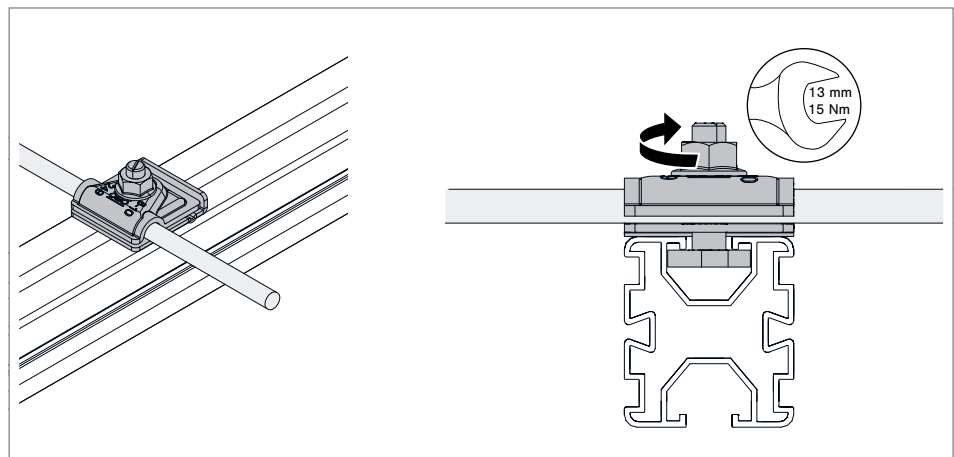
**Fig. 40:** Inserting the universal earthing clamp in the truss profile

2. Insert the hammerhead bolt of the universal earthing clamp in the truss profile.



**Fig. 41:** Engaging the hammerhead bolt in the truss profile

3. Push the hammerhead bolt with spring downwards, turn it through 45° and release it. In so doing, ensure that the hammerhead is firmly engaged in the truss profile.



**Fig. 42:** Mounting the conductor in the universal earthing clamp

4. Insert the round conductor and/or equipotential bonding conductor.
5. Tighten the nut of the clamp with 15 Nm.

### 6.13 Connecting truss profiles in a lengthwise manner

Truss profiles can be connected lengthwise using straight connectors of type LV 45 DD.

#### ATTENTION

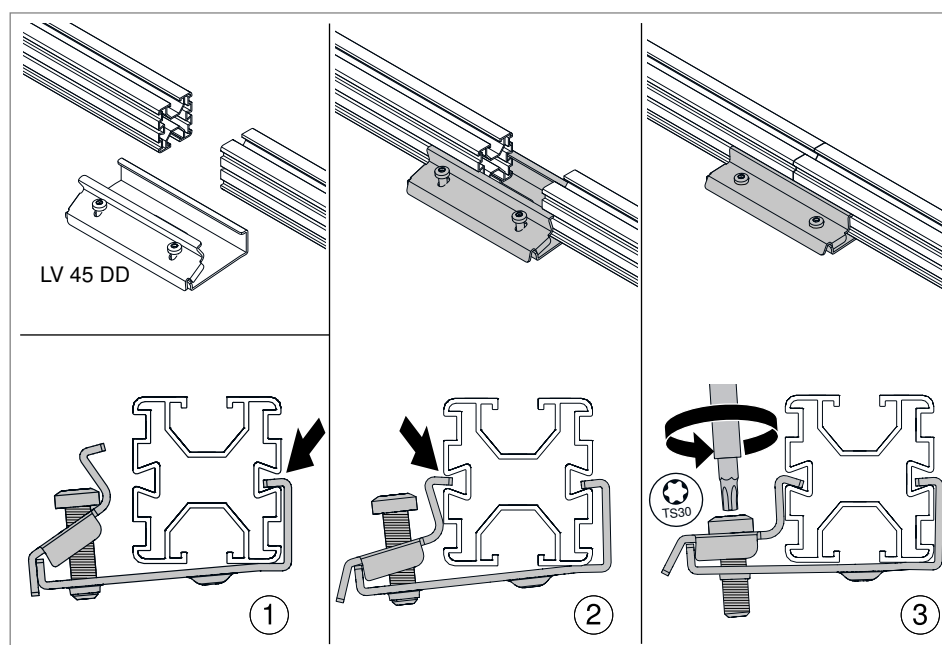
#### Risk of damage due thermal expansion!

If too many truss profiles are connected lengthwise, this may result in excessive thermal expansion of the profiles. In turn, this may result in system instability and damage to the roof skin.

- Only connect truss profiles up to a maximum length of 20 m.
- Maintain minimum distance of 50 mm between 2 truss profiles that are not connected lengthwise.

#### Note!

*Straight connectors may not be mounted in the area of the supports, to avoid obstruction of the insertion of the truss profile in the adapter.*



**Fig. 43:** Mounting a straight connector

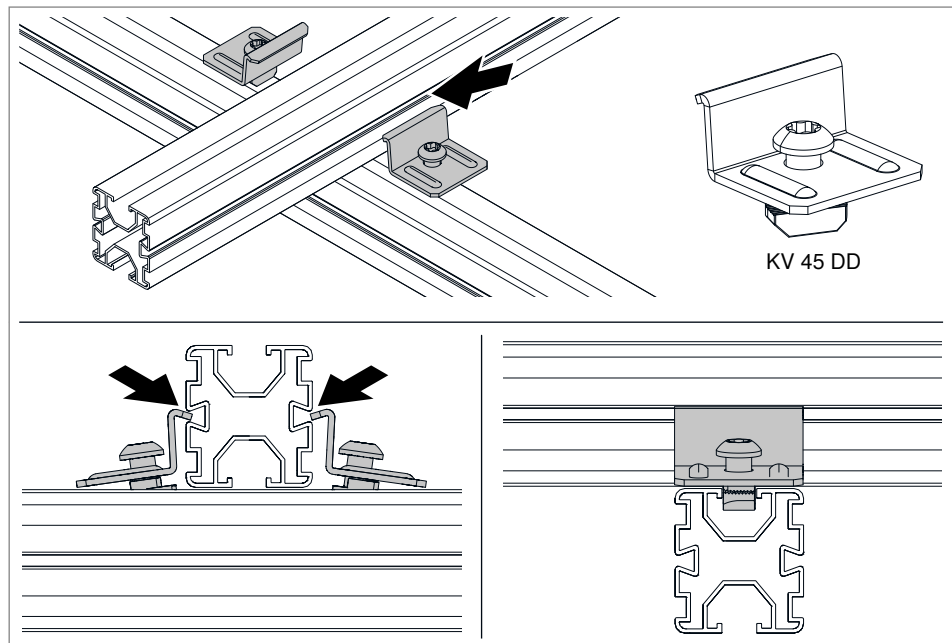
1. Insert straight connectors in the groove on one side of the truss profiles ①. The butt of the truss profile must be located in the centre of the straight connector.
2. Hook the variable piece of the straight connector into the truss profiles ②.
3. Tighten the screws on the straight connector with 6 Nm ③.

#### Note!

*Alternatively, the truss profiles can also be pushed into the straight connectors and the screws then tightened.*

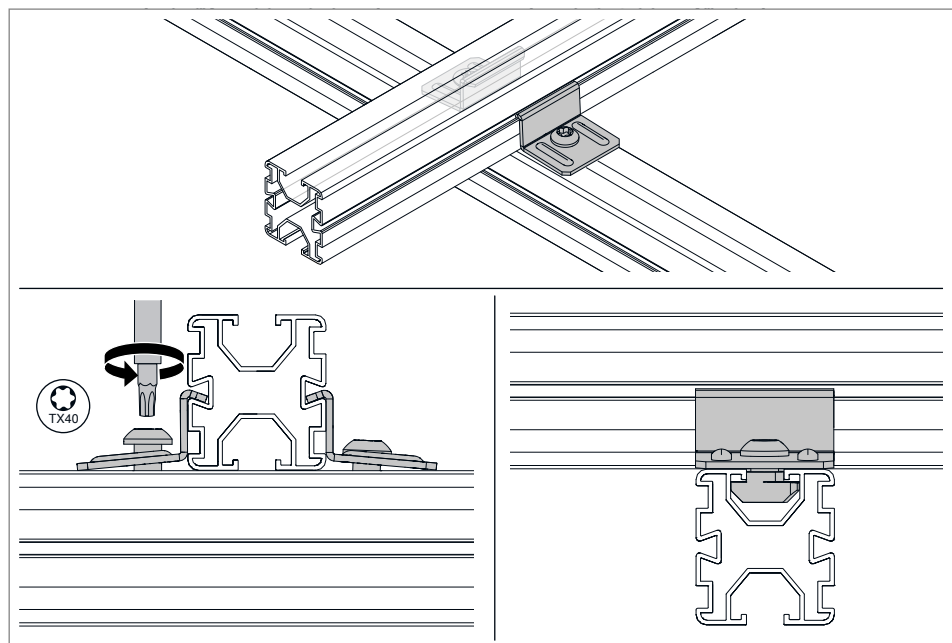
## 6.14 Connecting truss profiles transversely

Truss profiles can be connected transversely using cross connectors of type KV 45 DD.



**Fig. 44:** Inserting cross connectors

1. Insert cross connectors with slide nuts into the lower truss profile.
2. Hook the cross connectors into the transverse truss profile.



**Fig. 45:** Screwing on the cross connectors

3. Tighten the screws on the cross connectors with 6 Nm.

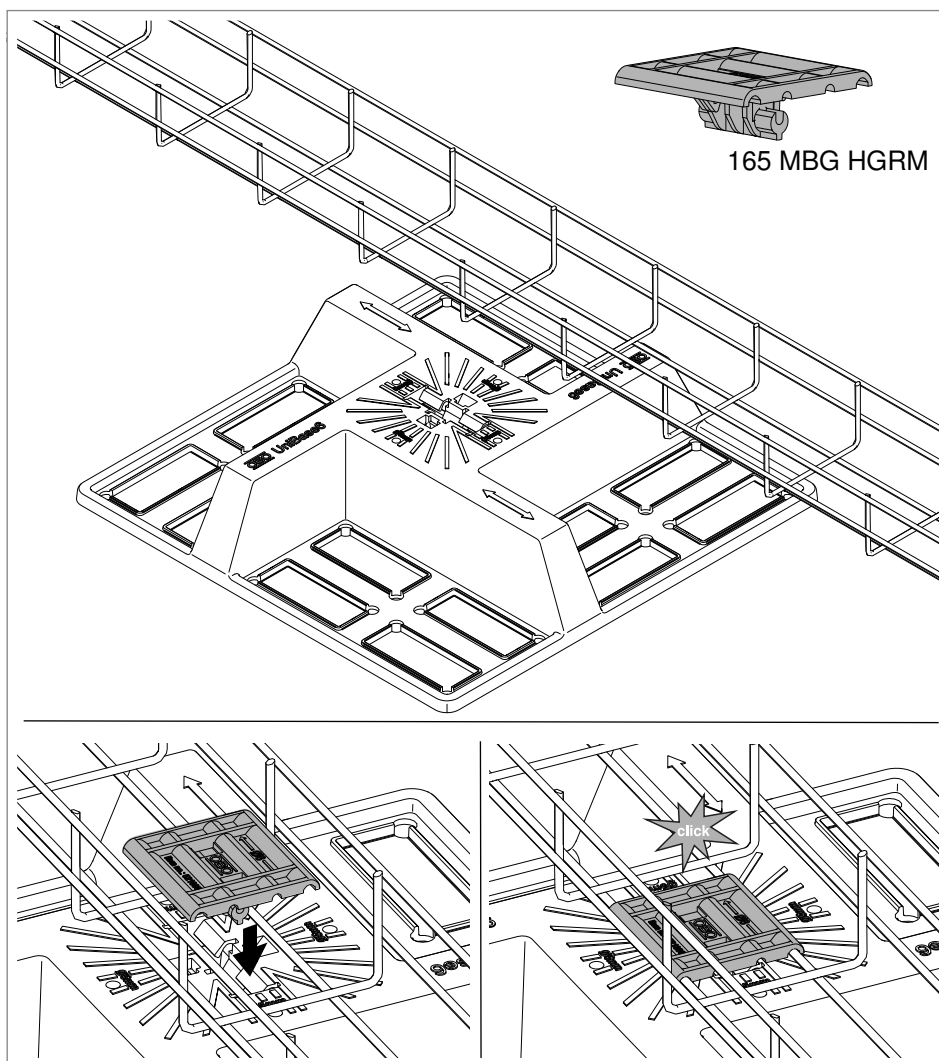
## 6.15 Cable routing beneath the PV modules

Using the lighter, lower UniBase 6 and UniBase Glue bases, cable guides are mounted on mesh cable trays of type GRM beneath the PV system. The UniBase 6 base is weighed down using basead blocks of size (length x width x height) 10 x 20 x 6 cm, whilst the UniBase Glue is welded on with a sleeve. The mesh cable trays are fastened to the bases with the 165 MBG HGRM adapter.

### 6.15.1 Mounting the GRM mesh cable tray with UniBase 6

4. Locate and align bases according to the roof assignment plan, maximum support spacings between the bases = 1.5 m.
5. Lay building protection mats under the bases (see „Laying building protection mats“ on page 13).

**Note!** *The arrows on the bases show the running direction of the truss profiles.*



**Fig. 46:** Fastening the mesh cable tray on UniBase 6

6. Place the mesh cable tray on the bases ①.

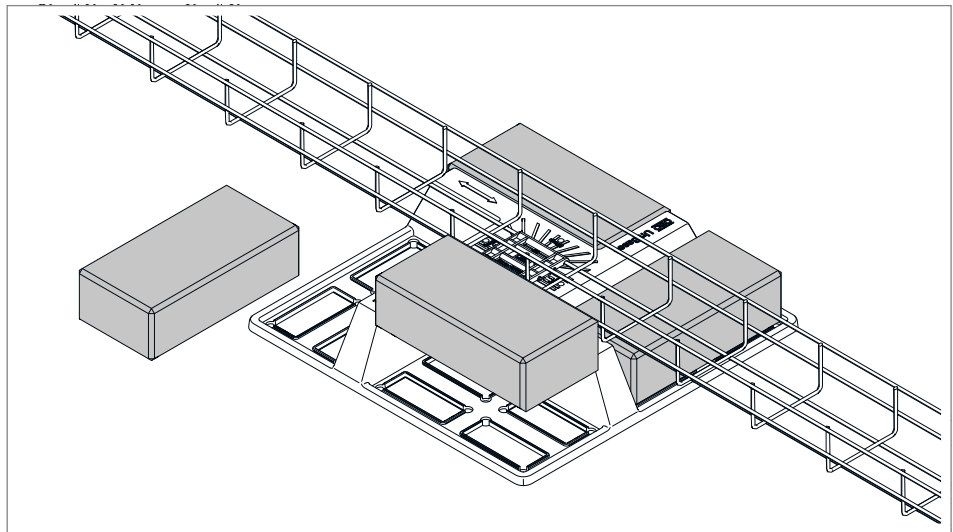
7. Click the adapter into the bases, ensuring that the straight wires of the mesh cable tray are clamped ② ③.
8. If necessary, realign the subconstruction of bases and mesh cable trays exactly before weighing down.

### ATTENTION

#### **Danger of a loss of function and damage!**

If the UniBase base is weighed down with other materials, then there is the risk that it will be damaged or be insufficiently stable.

- Use on blocks with the specified dimensions for weighing down.
- If the weight of an individual unweighted UniBase base is insufficient in any location, then a further UniBase base must be mounted alongside.



**Fig. 47:** Weighing down the base

9. Weigh down all the bases with up to 4 blocks (the level of weighing is specified by the planning of the OBO Construct app or the planner/static engineer).



### 6.15.2 Mounting the GRM mesh cable tray with UniBase Glue

The UniBase Glue base is not glued directly onto the roof membrane, but is held in position using a welded sleeve. Depending on the roof skin, a plastic sleeve or a bitumen sleeve of a rectangular shape is welded on. The plastic sleeve is welded on using a hot-air blower and pressing roller or with an automatic welding device. The bitumen sleeve is welded on with a welding torch and pressing roller. The following section only shows mounting with the welding torch.



#### WARNING

#### Risk of fire

When the sleeve is welded, there is the risk of igniting the roof. Only use materials and devices suitable for the purpose and follow the manufacturer's instructions for laying and use.

#### Note!

*When processing plastic sleeves, stripping and shearing tests must be carried out when starting work and the temperature, welding temperature and processing speed logged.*

#### Preparing the substrate

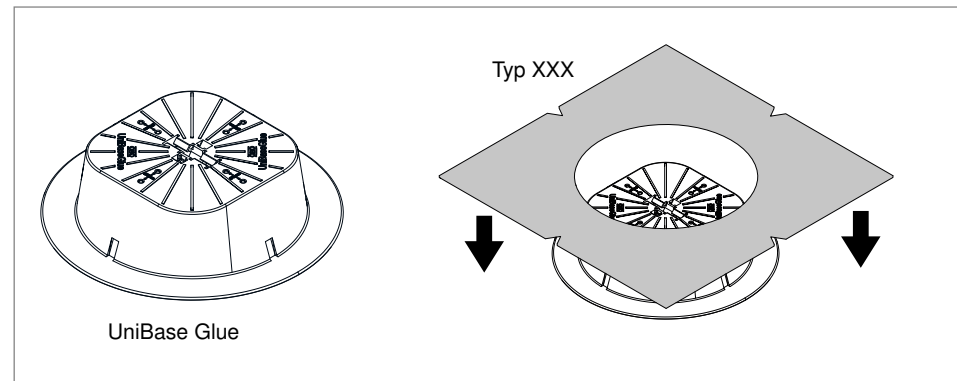
1. Clean the substrate thoroughly.
2. If necessary, clean the plastic films with an appropriate cleaner, in order to remove substances impairing adhesion.
3. If necessary, grind the substrate.

## Attaching the sleeve

### Note!

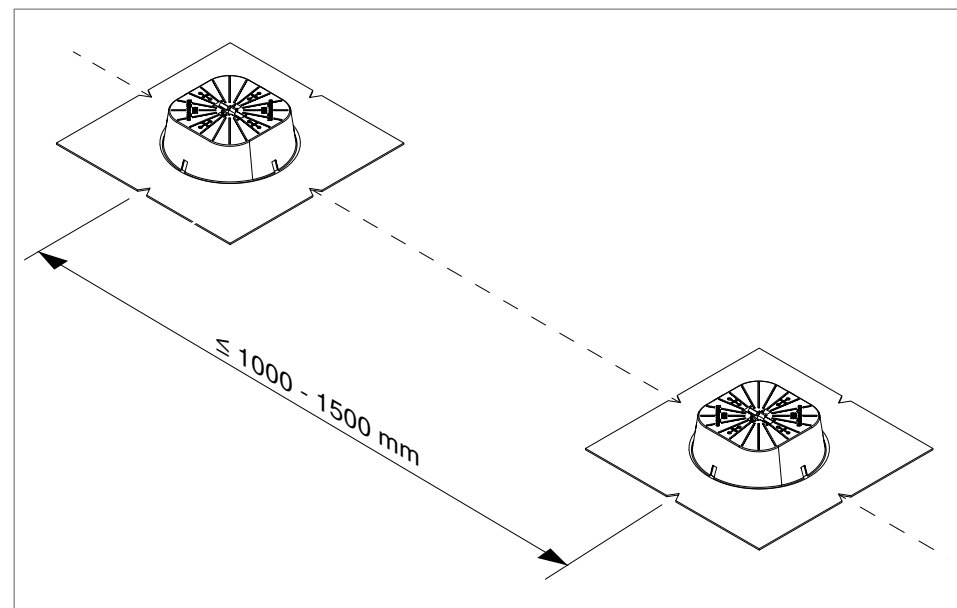
*The sleeve possesses notches, in order to align them exactly with a marked line, which can be created with a chalk line or laser, for example.*

1. Locate the bases according to the roof assignment plan. Select selection spacings according to the design of the cable support system (baseard support spacings of mesh cable trays 1–1.5 m).



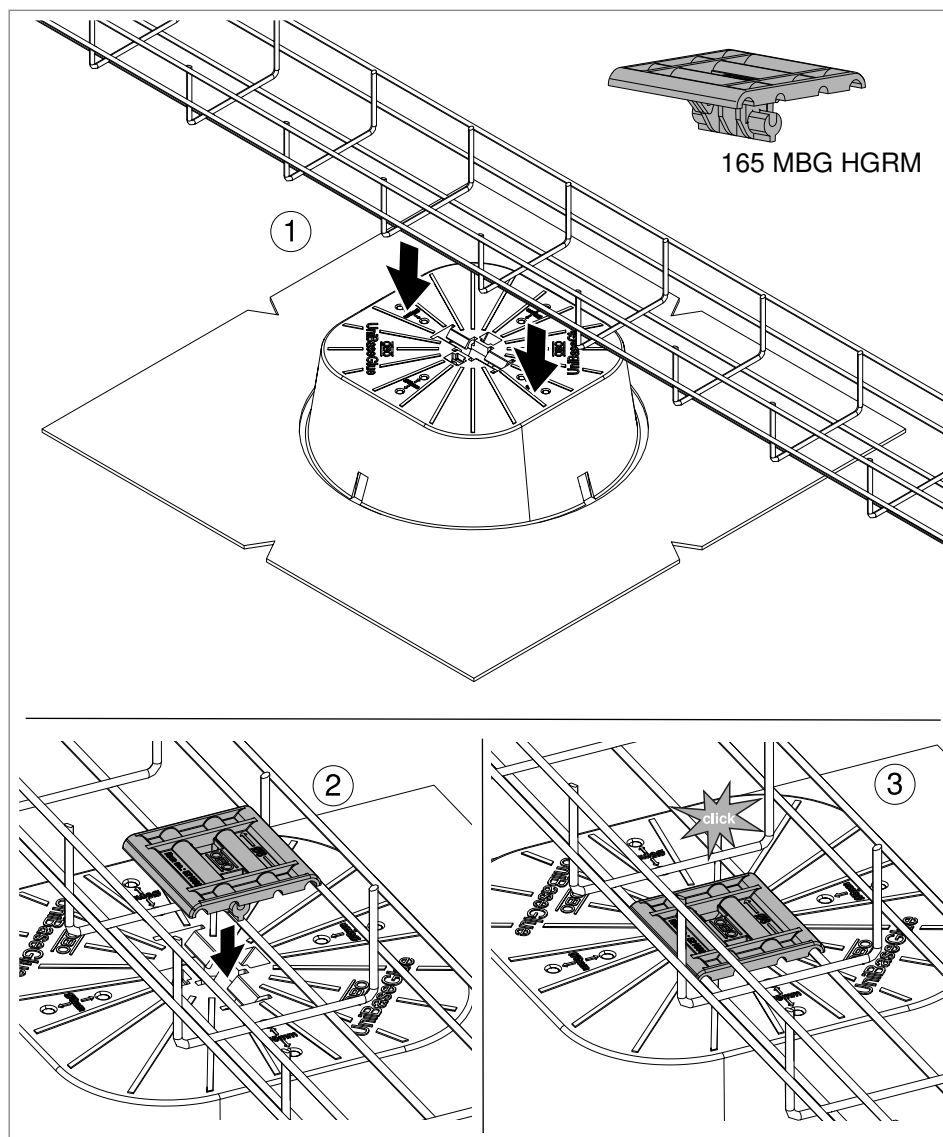
**Fig. 48:** Attaching the sleeve

2. Place the sleeve around the base.



**Fig. 49:** Aligning the UniBase Glue with sleeves

3. Align the bases using the notches in the sleeve.

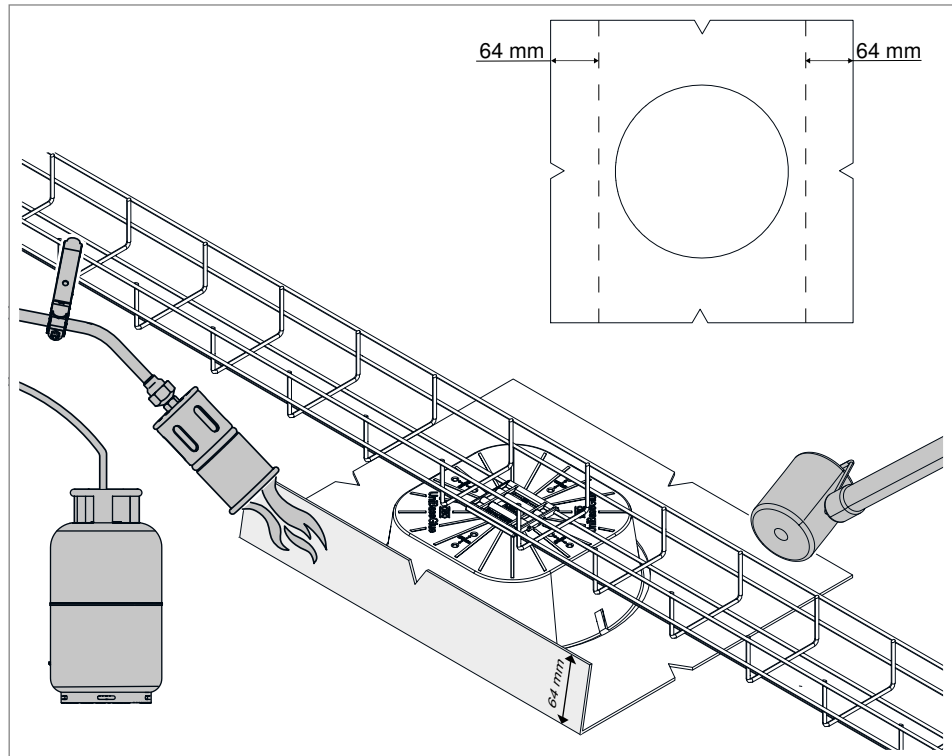


**Fig. 50:** Mounting the mesh cable tray on UniBase Glue

4. Place the mesh cable tray on the bases ①.
5. Click the adapter into the bases, ensuring that the straight wires of the mesh cable tray are clamped ② ③.
6. Lay and align the entire course of the cable support system.

**Note!**

*To guarantee an exact alignment of the cable support system, welding of the sleeves may only be commenced when the entire course has been laid and aligned.*



**Fig. 51:** Welding on the sleeve

7. Melt the underside of the sleeve to a width of 64 mm on both sides parallel to the mesh cable tray and press with a pressing roller.
8. Weld on all further sleeves.

## 7 Maintaining the system

The PV mounting systems must be maintained once a year. Maintenance includes a visual inspection as well as the testing of different system components, repairing damage and removing impurities.

### Visual inspection of the system

- Repair any obvious damage such as corrosion, deformations or cracks.
- Tighten the module fastenings, such as loose screws or clamps.
- Repair or replace worn materials, e.g. seals or fastenings.
- Check the number and condition of the ballast blocks and increase and/or replace if necessary.
- If installed, check the state and position of the building protection mats and fix them if necessary.

### Check the fastening system

- Check the stability and secure positioning of the support structure and repair if necessary.
- Check the tightening torque of screws, nuts and connection elements and tighten if necessary.
- Check the wind and snow load protection and repair or replace if necessary.

### Check the seals and corrosion protection

- Check the roof seal in the area of the fastening points and repair or replace if necessary.
- Identify any potential water entry points and seal if necessary.
- Check corrosion protection and repair if necessary.

### Check the electrical components

- Perform a visual inspection of the cable paths and plug connections and repair if necessary.
- Repair any damage due to UV radiation, animals or mechanical loads.
- Ensure proper earthing of the mounting system.

### Clean the system

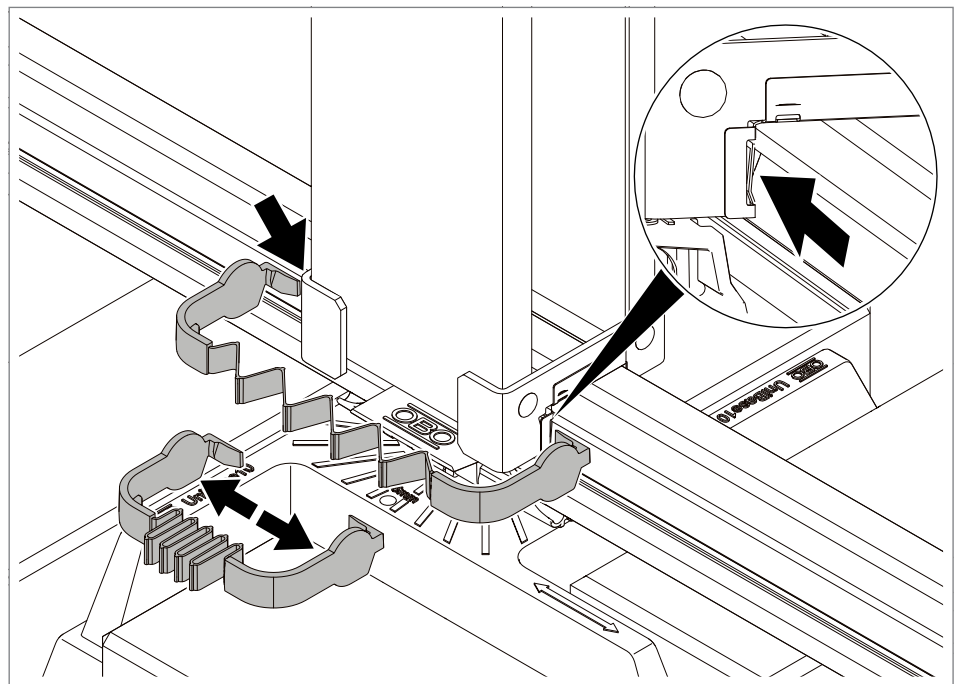
- Eliminate any impurities that can negatively affect performance.
- If necessary, remove dirt and leaves from the support structure.

## 8 Dismantling the system

The PV mounting systems are dismantled in the reverse order to the mounting. The UniBase TMP and 165 MBG HGRM adapters cannot be dismantled. The universal clamp cannot be dismantled without being destroyed. The long and short supports can be dismantled with a dismantling tool, which is included with the truss profiles.

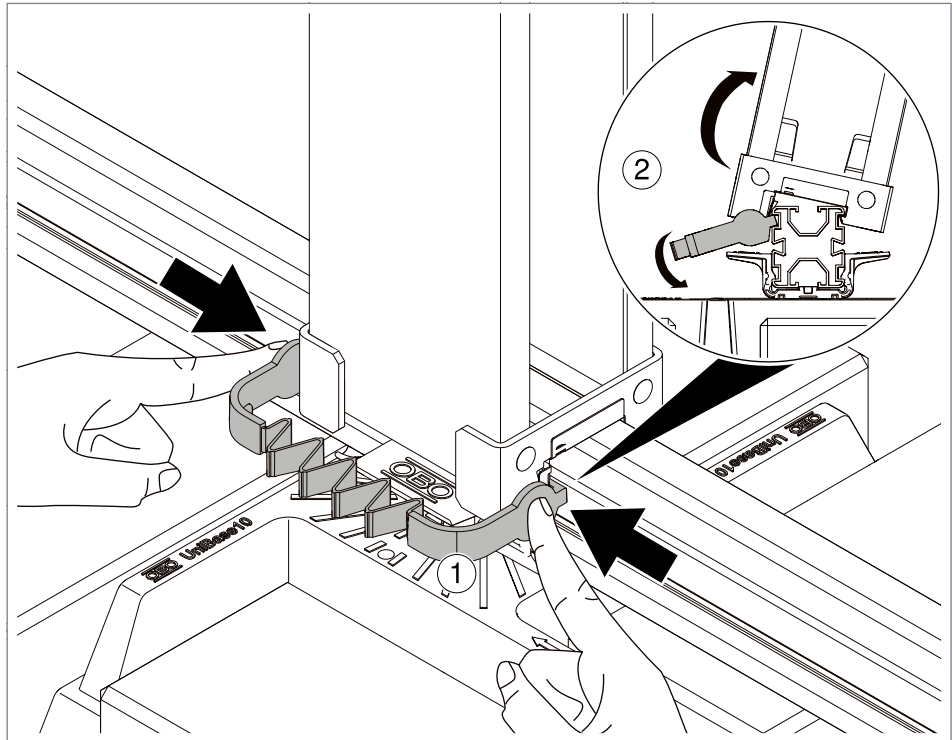
### 8.1 Dismantling the short and long supports

To be able to release the support from the truss profile, the dismantling tool must be used, which is included with the truss profiles.



**Fig. 52:** Applying the dismantling tool

1. Pull the dismantling tool apart and apply it to the springs of the support.



**Fig. 53:** Removing the support

2. Push the dismantling tool together ① to open the springs.
3. Press down on the dismantling tool to tilt the support and remove it ②.

## 9 Disposing of the system

Comply with the local waste disposal regulations.

- Metal parts: As scrap metal
- Plastic parts/accessories: As plastic
- Packaging: As household waste/as metal (depending on packaging type)

## 10 Technical data

Designation	Type	Dimension mm	Material/surface	Article number
Truss profile, for flat/pitched roof system	TP 45/4700 ALU	40 x 45 x 4700	Aluminium	5900410
Truss profile, for flat/pitched roof system	TP 45/4700 ALU S	40 x 45 x 4700	Aluminium, black	5900412
Universal base, bonding	UniBase Glue	Ø 314 x 79	Acrylnitrile-styrene-acrylate (ASA)	5403395
Universal base, ballasting, for blocks up to 10 x 20 x 10 cm	UniBase 10	373 x 118	Acrylnitrile-styrene-acrylate (ASA)	5403393
Universal base, ballasting, for blocks up to 10 x 20 x 6 cm	UniBase 6	373 x 79	Acrylnitrile-styrene-acrylate (ASA)	5403391
Building protection mat for UniBase, without aluminium lamination	UniBase BSM	410 x 410 x 6	PUR-composite rubber granules	5403402
Building protection mat for UniBase, with aluminium lamination	UniBase BSM AL	410 x 410 x 6	PUR-composite rubber granules with aluminium coating	5403404
Universal clamp, for flat/pitched roof system	KLU A2	41 x 42 x 79	Stainless steel A2	5901010
Universal clamp, for flat/pitched roof system	KLU A2 S	41 x 42 x 79	Stainless steel A2 black	5901012
End clamp with spring	KLE F 25 A2	56x46x48	Stainless steel A2	5901092
	KLE F 30 A2	56x46x53		5901093
	KLE F 35 A2	56x46x58		5901094
	KLE F 40 A2	56x46x63		5901095
Intermediate clamp with spring	KLZ F 25 A2	50x40x48	Stainless steel A2	5901062
	KLZ F 30 A2	50x40x53		5901063
	KLZ F 35 A2	50x40x58		5901064
	KLZ F 40 A2	50x40x63		5901065
Short support for flat roof systems	STK DD	86 x 166 x 107	Steel doubledip	5901650
Long support for flat roof system	STL DD	86 x 166 x 300	Steel doubledip	5901655
Truss profile adapter for universal base	UniBase TMP	91 x 110 x 42	Acrylnitrile-styrene-acrylate (ASA)	5403397
Universal earthing clamp PV	249 PV10 6-50V2A	43 x 40 x 34	Stainless steel A2	5051520
Endcap for truss profile	EK 45 G	44 x 49 x 16	Polyethylene grey	5901722
Endcap for truss profile	EK 45 S	44 x 49 x 16	Polyethylene black	5901720
Straight connector for truss profile	LV 45 DD	40 x 69 x 150	Steel doubledip	5901210
Cross connector for truss profile	KV 45 DD	30 x 40 x 40	Steel doubledip	5901250
Windbreak for flat roof systems	WSB 2200 DD	44 x 372 x 2200	Steel doubledip	5901610



Designation	Type	Dimension mm	Material/ surface	Article number
Flat-head screw for windbreak	FKS 6x25 A2	Ø 12 x 30	Stainless steel A2	5901880
Bitumen sleeve	UniBase Glue Bit	444 x 444	Bitumen	5403410
Plastic sleeve	UniBase Glue FPO	444 x 444	FPO (Flexible polyolefines)	5403412
Dismantling tool	Does not need to be ordered separately, included with the truss profiles			

**Tab. 4:** Technical data

**OBO Bettermann Holding GmbH & Co. KG**  
P.O. Box 1120  
58694 Menden  
GERMANY

**Technical Office**  
Tel.: +49 (0)2373 89-1300

[technical-office@obo.de](mailto:technical-office@obo.de)

[www.obo-bettermann.com](http://www.obo-bettermann.com)

Date 04/2025

230082.02

---

**Building Connections**

