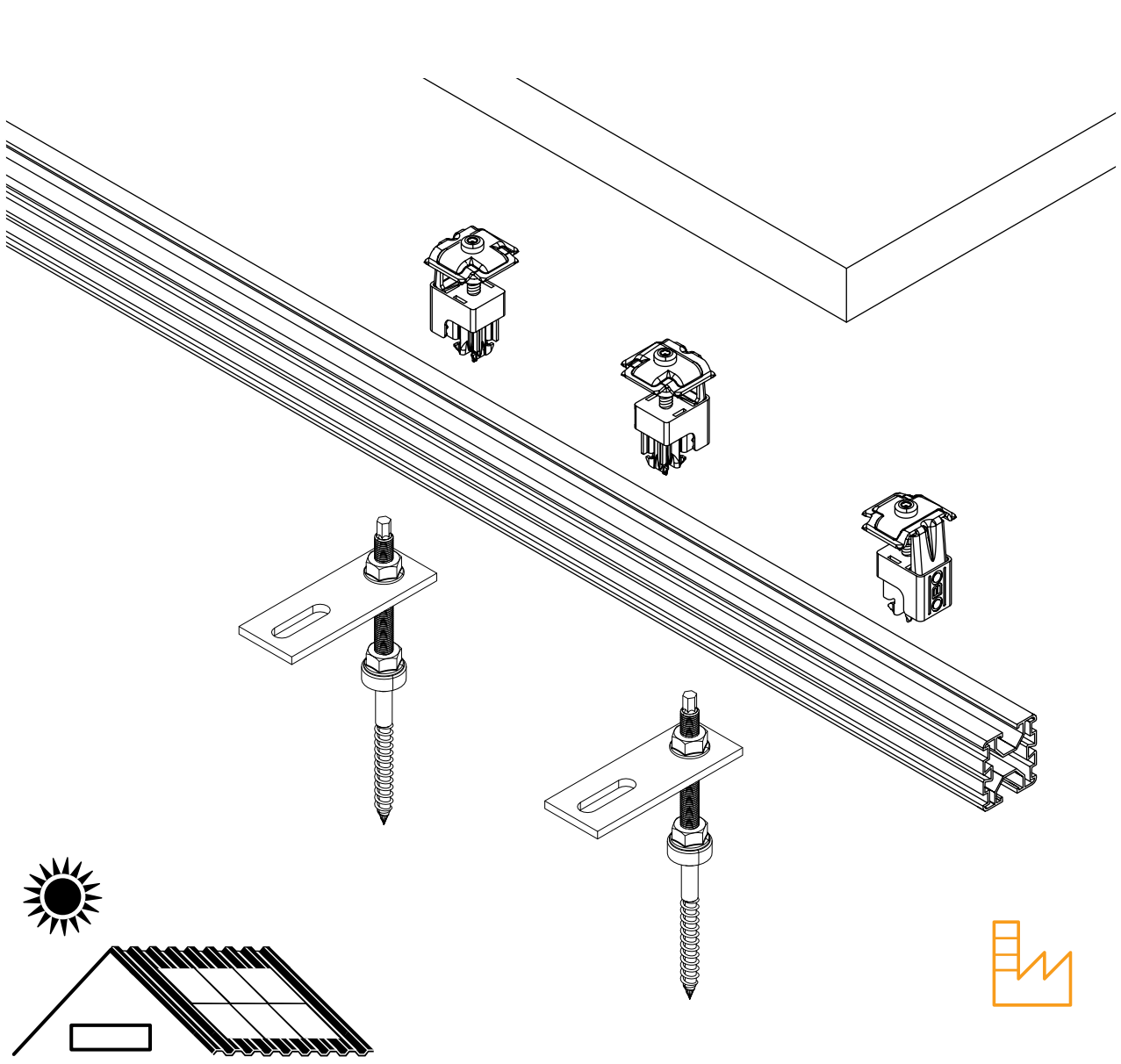

Mounting instructions

PV mounting systems Magic PV Pitch trapezoidal roof/corrugated sheet roof

OBO BETTERMANN

PV mounting systems Magic PV Pitch trapezoidal roof/corrugated sheet roof
Mounting instructions

Table of contents

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 (August 2025).

Please read the instructions carefully before commencing 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.

In these instructions, cables and lines are referred to simply as cables.

In these instructions, mounting is shown with the example of a trapezoidal roof. Mounting for corrugated sheet roofs is done in the same way.

1.3 Types of warning information

WARNING

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

ATTENTION

Type of risk!
Shows a risky situation. If the warning information is not observed, then damage to the product or the surroundings may occur.

Note! *Indicates important information or assistance.*

1.4 Depiction conventions

Explanation of the depictions used:

Correct design

Incorrect design

1.5 Basic standards and regulations

– VDI 6012

– DIN EN 62305 (VDE 0185-305)

– DIN VDE 0100-712

– DIN EN 61643-32

1.6 Applicable documents

The declarations of conformity are linked to the products at www.obo-bettermann.com.

2 Intended use

The photovoltaic mounting systems Magic PV Pitch for trapezoidal and corrugated sheet roofs with a wood subconstruction are used for the mounting of photovoltaic modules. They are suited to roof pitches of 10–70° and modules with a height of 30–50 mm. The support profiles for the PV modules may be connected up to a maximum length of 20 m, in order to guarantee thermal separation. The minimum distance between two unconnected support profiles must be at least 50 mm in length. 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 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.

– The construction site must be protected against falling objects.

– Mounting must be carried out by at least two people.

– The people working must be protected as there is a risk of falling when working high above the ground.

– When working on the roof, care must be taken to avoid damaging the 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; there is a risk of injury during handling and mounting of the system components.

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 ruler

– Pencil

– Angle grinder

– Battery-operated screwdriver (Torx 30/40)

– Torque spanner (Torx 30/40)

– Screwdriver (Torx 30/40)

– Hammer

5 System overview

The photovoltaic mounting systems (PV mounting systems) Magic PV Pitch for trapezoidal and corrugated sheet roofs consist of hanger bolt sets, aluminium support profiles, universal clamps and accessory parts. A hanger bolt set consists of the hanger bolt with combined nuts and washers as well as an adapter plate. The support profiles are fastened to the adapter plates of the hanger bolt sets with bolts and hammer nuts. The height of the adapter plates is infinitely adjustable, in order to compensate for any unevenness in the roof construction. The PV modules are located on the support profiles and are clamped on with universal clamps, which can be used on the outer side as end clamps and, between two modules, as centre clamps.

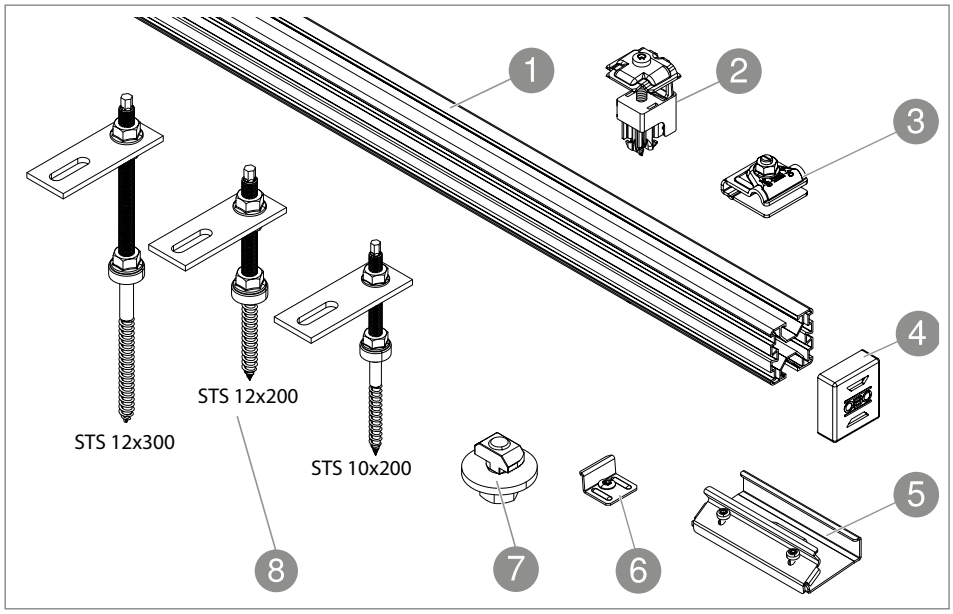

Fig. 1: System overview

	Designation	Type	Function
1	Support profile	TP 45/2350 ALU	Support and mounting rail for PV modules
2	Universal clamp	KLU A2/KLU A2 S	Fastening of PV modules on support profile
3	Universal earthing terminal PV	249 PV10 6-50V2A	Creation of equipotential bonding
4	End cap	EK 45 G/ EK 45 G S	Protection against injuries and ingress of dirt
5	Straight connector	LV 45 DD	Straight connection of support profiles
6	Cross-connectors	KV 45 DD	Cross-connection of support profiles
7	Bolt with hammer nut	SKS HM	Fastening of support profile to adapter of hanger bolt set
8	Hanger bolt set	STSS 10x200 A2 STSS 12x200 A2 STSS 12x300 A2	Fastening on rafters/counter slats, support profile seat

Tab. 1: System overview

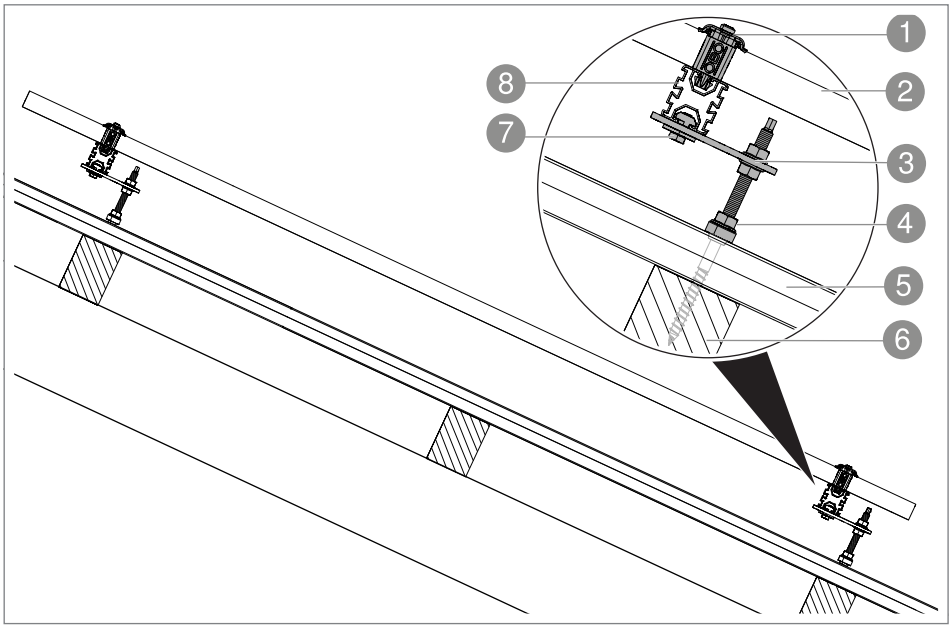

Fig. 2: System structure, trapezoidal roof, side view

	Component
1	Universal clamp
2	PV module
3	Hanger bolt adapter plate
4	Hanger bolt
5	Trapezoidal or corrugated sheet roof
6	Sub-construction
7	Bolt with hammer nut
8	Support profile

Tab. 2: Overview, roof structure of trapezoidal/corrugated sheet roof

6 Mounting the PV mounting system

6.1 Mounting the hanger bolt set

The number, spacing and type of hanger bolts and modules are specified by the roof assignment plan from the planner/statics engineer and/or the OBO Construct app. Before starting mounting, it must be ensured that the roof assignment plan can be implemented and that the intended mounting points for the hanger bolts match the spacings of the slats of the sub-construction.

The hanger bolts are bolted to the slats through the trapezoidal roof. The mounting plates on the hanger bolts, which the support profiles are mounted to, are height-adjustable, e.g. to compensate for any unevenness in the roof construction.

ATTENTION

Unstable construction!
If an insufficient number of hanger bolt sets is mounted, the hanger bolts may deform and the construction becomes more susceptible to loads from wind turbulence. To avoid an unstable construction, all the hanger bolt sets specified by the planning must be mounted.

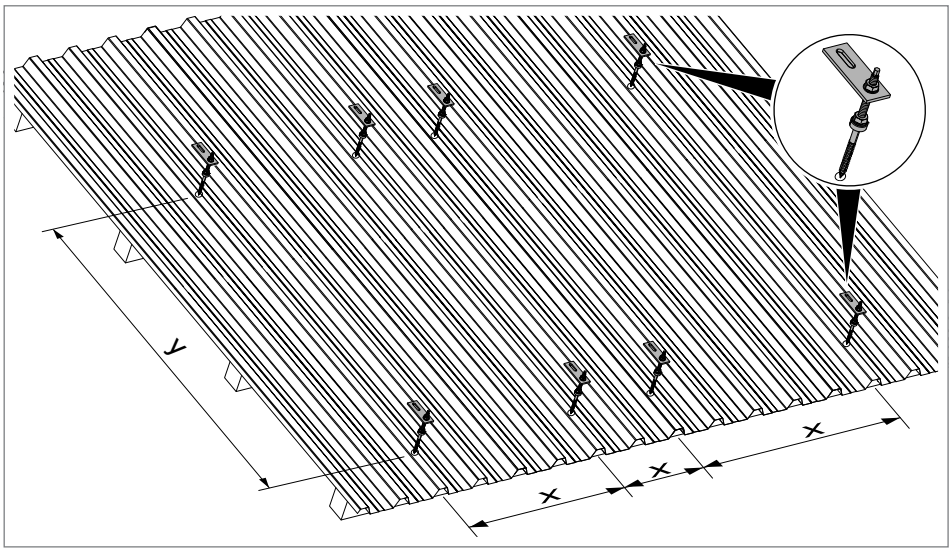

Fig. 3: Determining mounting points for hanger bolt set

1. Refer to the roof assignment plan for spacings x and y and determine the mounting points for the hanger bolt sets on the roof.

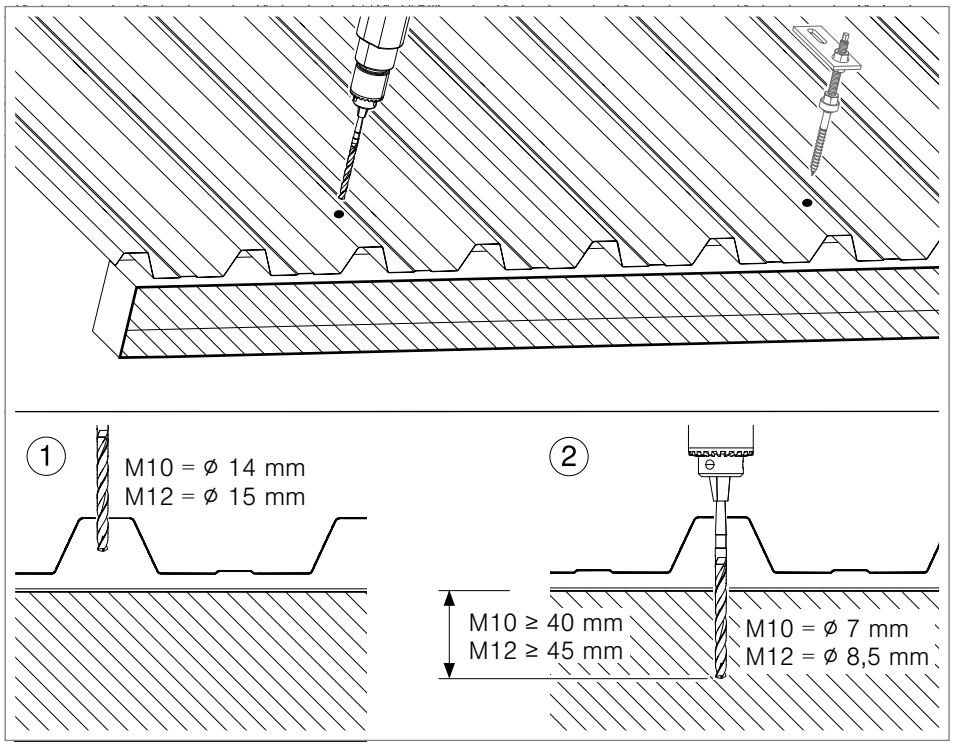

Fig. 4: Pre-drilling sheet and sub-construction

2. Pre-drill sheet ①, drill hole diameter depends on the bolt diameter.

3. Pre-drill sub-construction ②, drill hole diameter and depth depend on the bolt diameter.

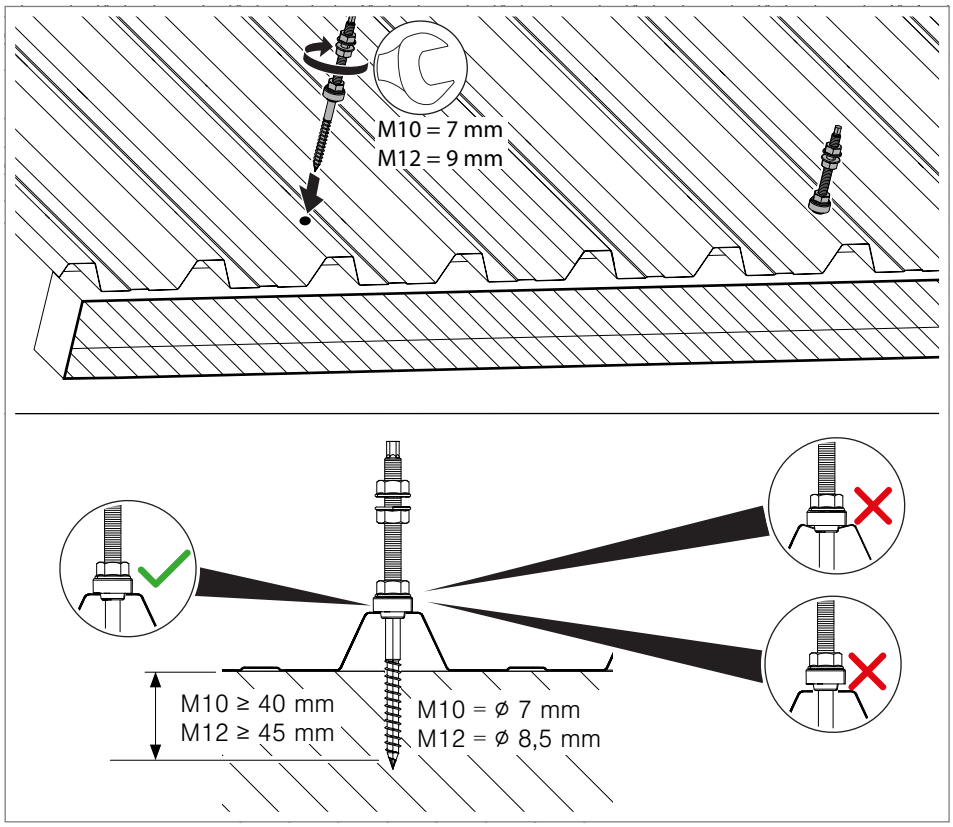

Fig. 5: Screw in hanger bolt (correctly/incorrectly)

4. Screw in the hanger bolt until the seal is on the sheet. Do not over-tighten or under-tighten the bolt.

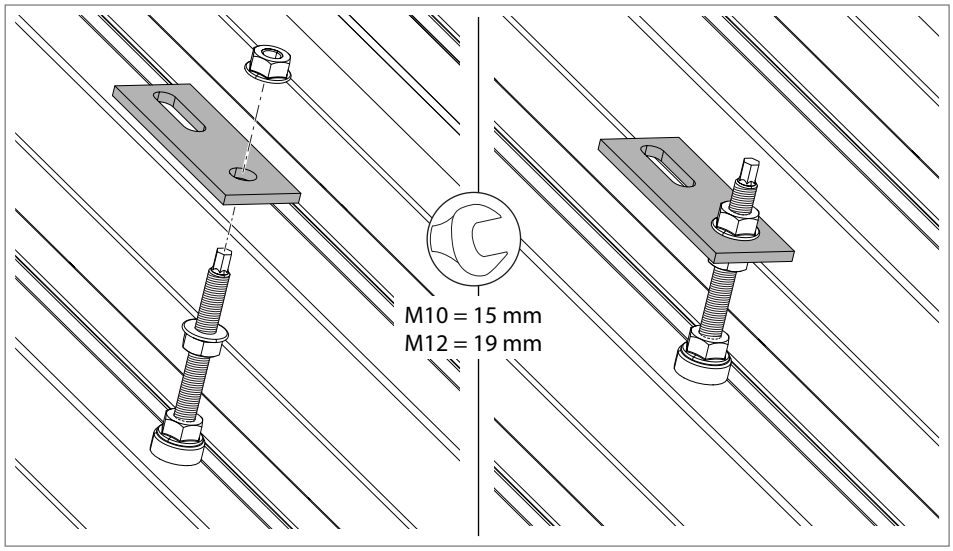

Fig. 6: Mounting adapter plate

5. Insert the adapter plate and align it with the roof ridge.

6. Screw on the combined nuts.

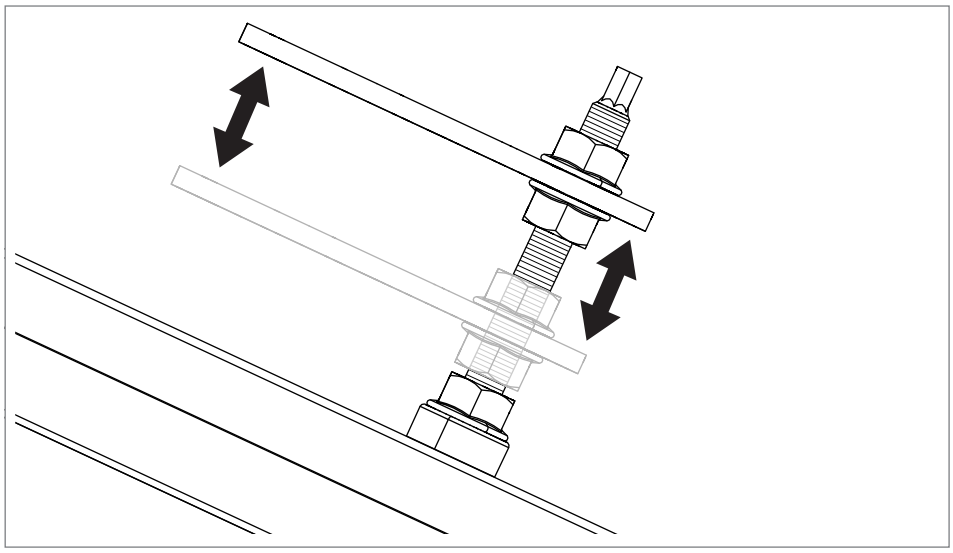

Fig. 7: Adapter plate height adjustment

7. If necessary, adjust the height of the adapter plate.

8. Tighten the combined nuts.

6.2 Mounting the support profile to hanger bolts

The support profiles are mounted to the adapter plates of the hanger bolts with bolts and type SKS HM hammer nuts.

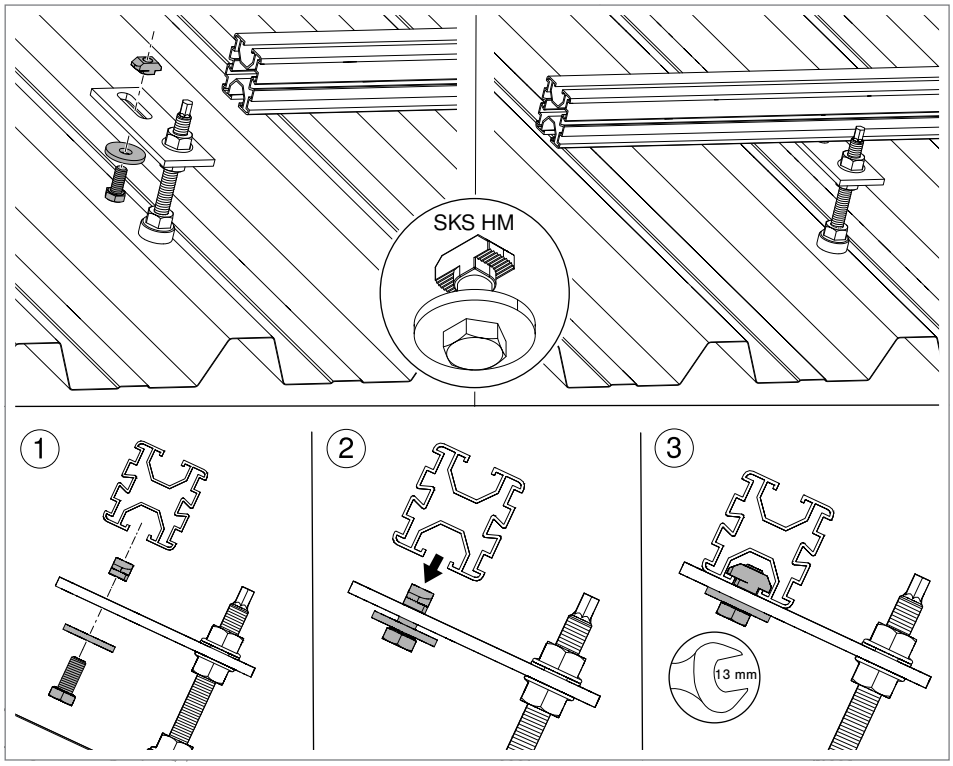

Fig. 8: Mounting support profile

1. Push the bolt through the hole on the adapter plate from below.
2. Lightly screw the hammer nut onto the bolt from the top side of the adapter plate.
3. Attach the support profile and tighten the bolt to 20 Nm so that the hammer nut engages in the support profile.

6.3 Fastening PV modules with universal clamps

The PV modules are located on the support profiles and are clamped to the long outer edges with four universal clamps per module. The universal clamps are used as end clamps on the outer edges of the outer PV modules. In the case of two modules adjacent to each other, the universal clamps are used as middle clamps and one universal clamp each clamps both modules to the support profile.

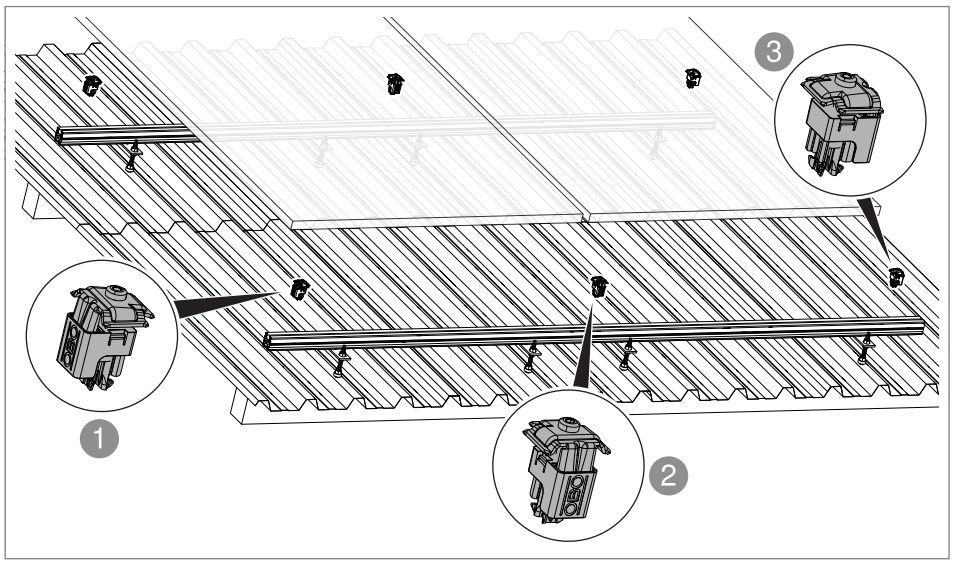

Fig. 9: Universal clamp alignment

1 End clamp left

2 Centre clamp

3 End clamp right

6.3.1 Mounting the universal clamp as an end clamp on the left

There are 2 ways to insert the universal clamp into the support profile from the left:

Variant 1: Slide the universal clamp into the support profile from the left

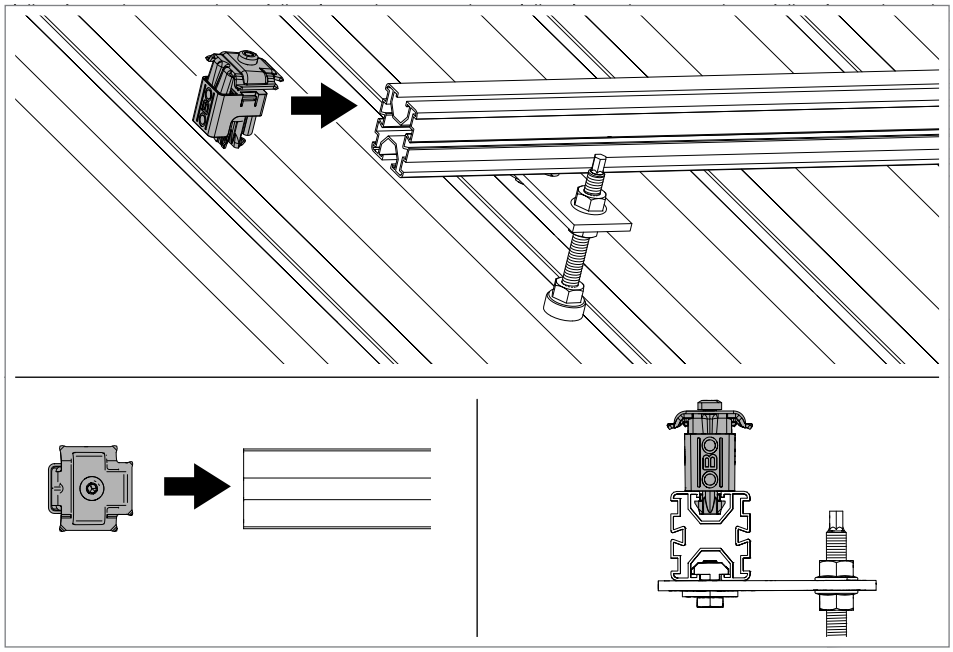

Fig. 10: Sliding in the universal clamp as an end clamp from the left

1. Slide the universal clamp into the support profile from the left. The “OBO” label points outward.

Variant 2: Engage the universal clamp into the support profile on the left

Note! *The clamps are easier to grasp and turn when wearing work gloves.*

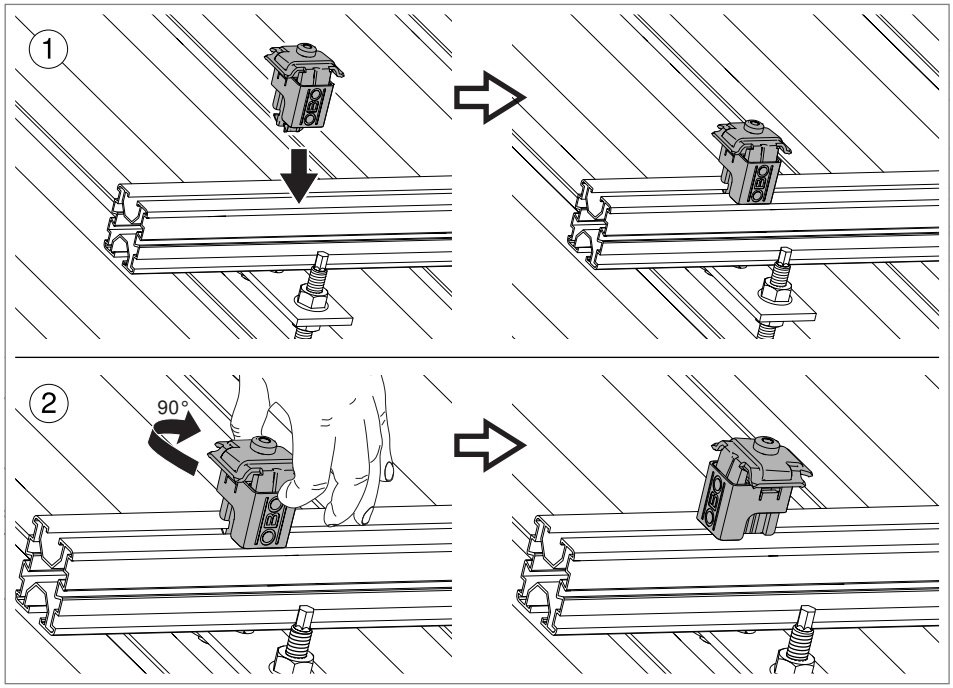

Fig. 11: Engaging the universal clamp as an end clamp on the left

1. Engage the universal clamp into the support profile from above. The “OBO” label points to the top or bottom edge of the module ①.

2. Rotate the universal clamp by 90° in the support profile ②. The “OBO” label points outward.

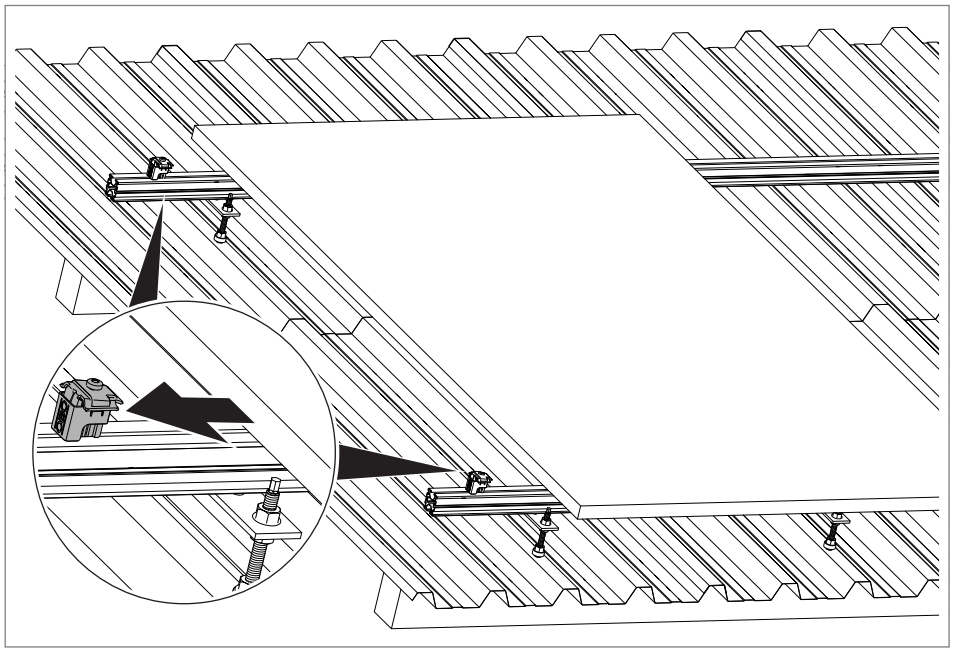

Fig. 12: Attaching the PV module

3. Place the PV module on the support profiles and push it up to the universal clamp.

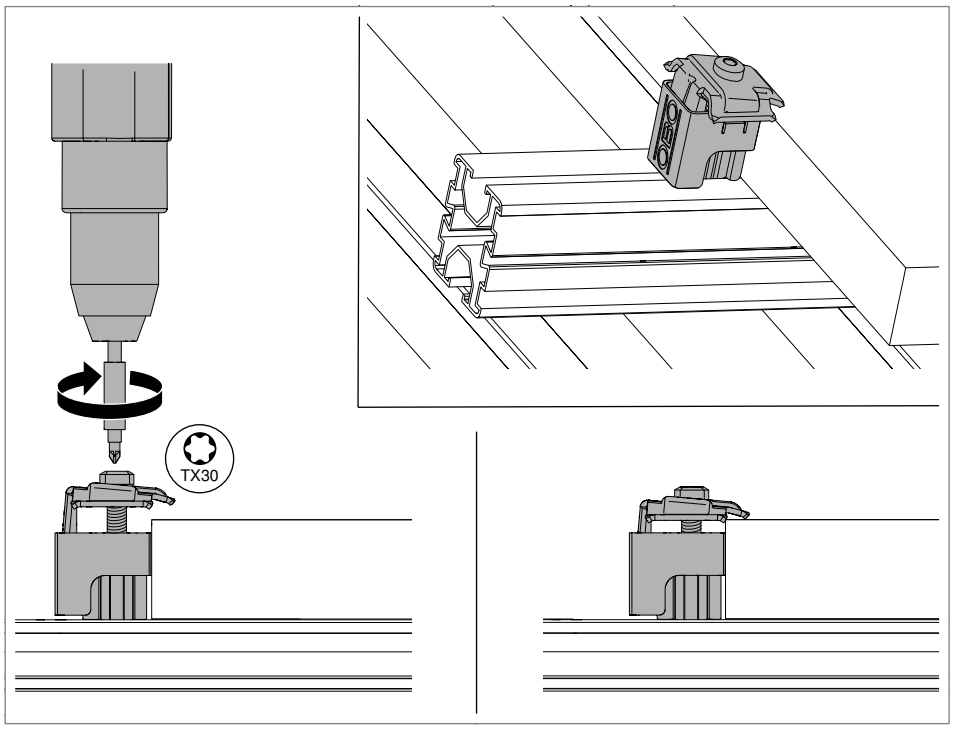

Fig. 13: Screwing in the universal clamp as an end clamp on the left

4. Screw the universal clamp to the outer edge of the module with 8 Nm.

6.3.2 Mounting the universal clamp as a middle clamp

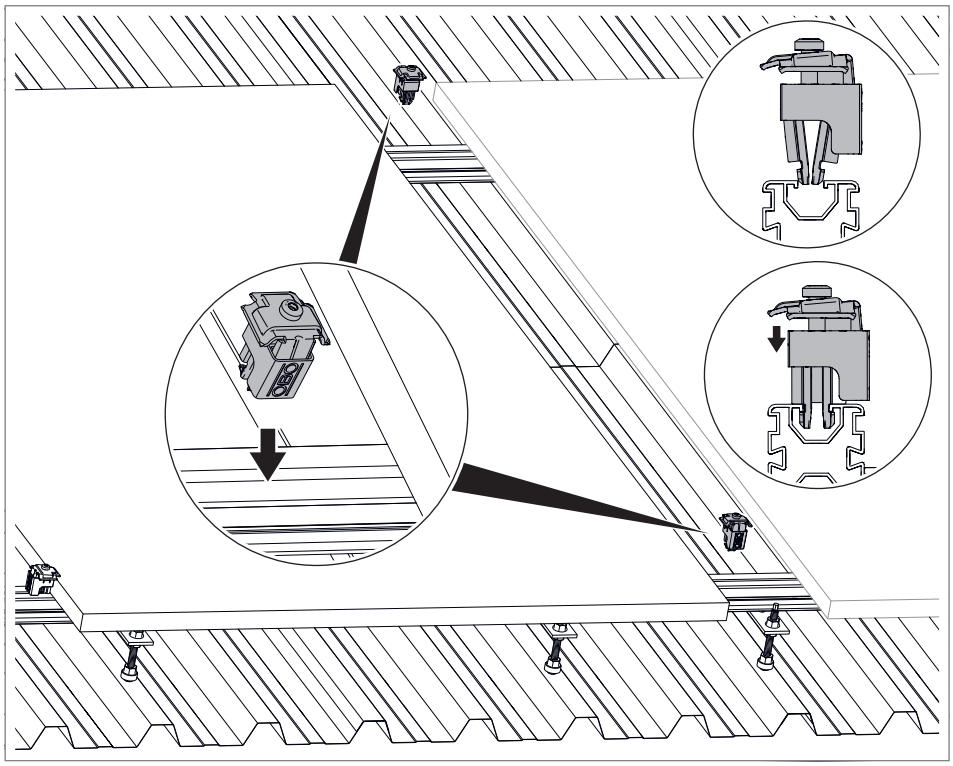

Fig. 14: Inserting the universal clamp as a middle clamp

1. Engage the universal clamp into the support profile from above. The “OBO” label points to the top or bottom edge of the module.

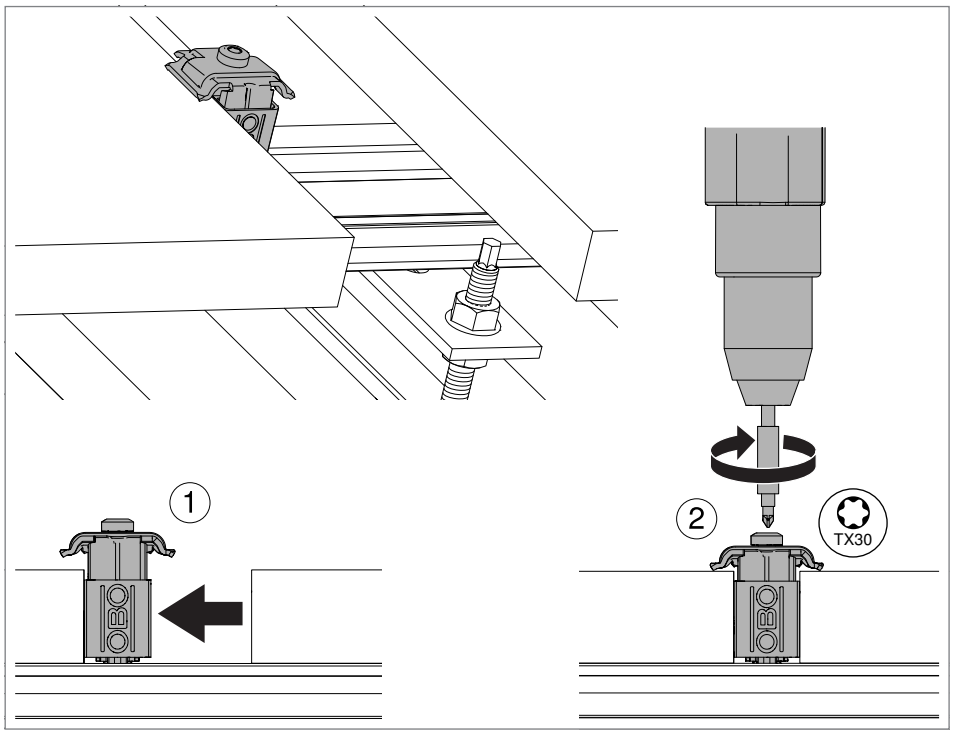

Fig. 15: Screwing in the universal clamp as a middle clamp

2. Push a second PV module up to the universal clamp ①.

3. Screw in the universal clamp between the two modules with 10 Nm ②.

6.3.3 Mounting the universal clamp as an end clamp on the right

There are 2 ways to insert the universal clamp into the support profile from the right:

Variant 1: Slide the universal clamp into the support profile from the right

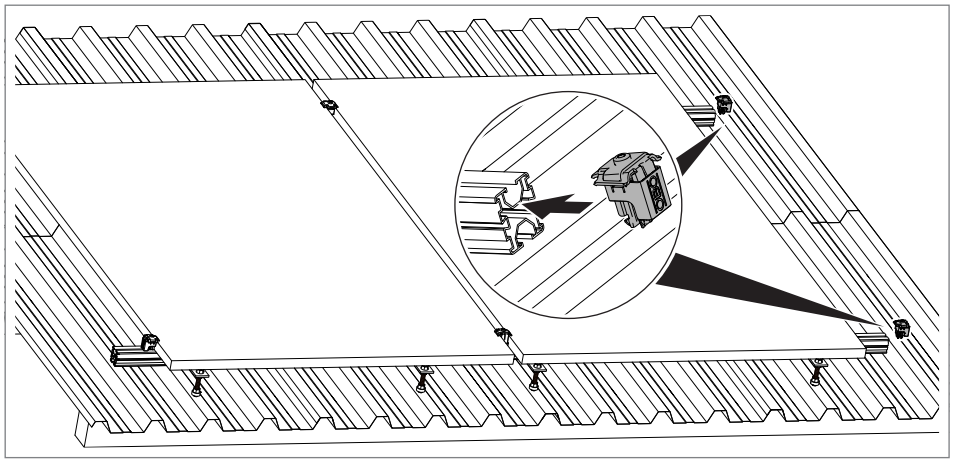

Fig. 16: Sliding in the universal clamp as an end clamp from the right

1. Slide the universal clamp into the support profile from the right. The “OBO” label points outward.

Variant 2: Engage the universal clamp into the support profile on the right

Note! *The clamps are easier to grasp and turn when wearing work gloves.*

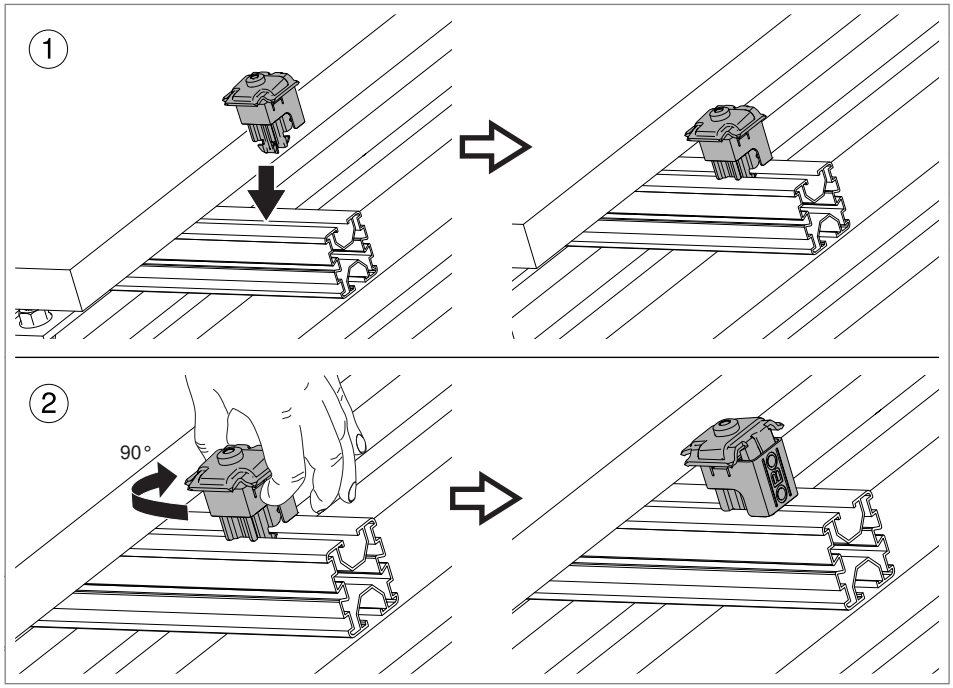

Fig. 17: Engaging the universal clamp as an end clamp on the right

1. Engage the universal clamp into the support profile from above. The “OBO” label points to the top or bottom edge of the module ①.
2. Rotate the universal clamp by 90° in the support profile ②. The “OBO” label points outward.

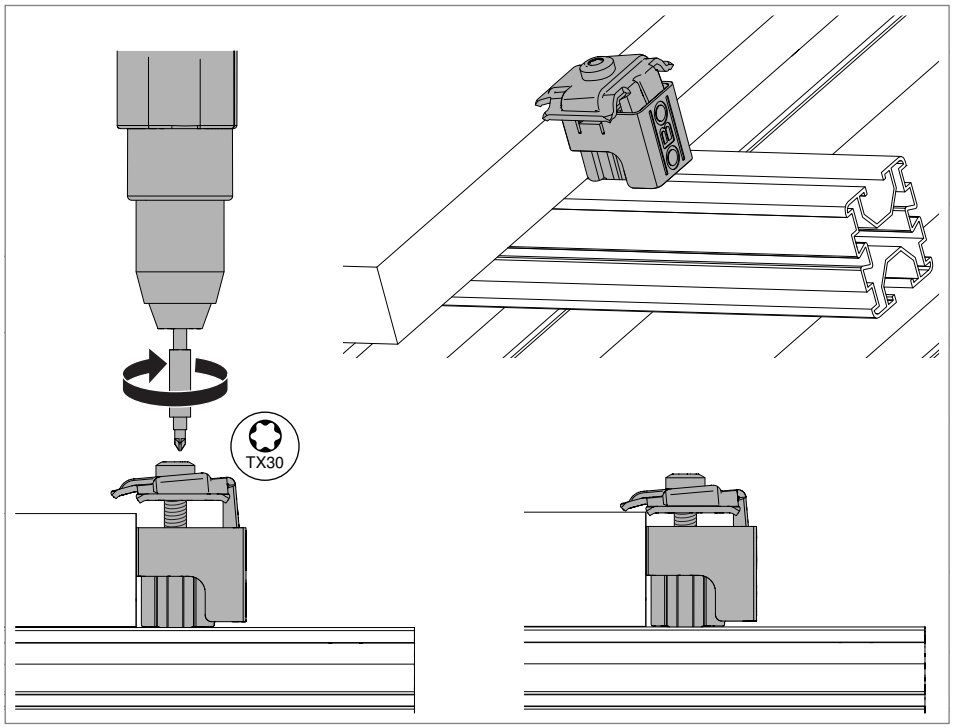

Fig. 18: Screwing in the universal clamp as an end clamp on the right

3. Screw the universal clamp to the outer edge of the module with 8 Nm.

6.4 Replacing the PV module

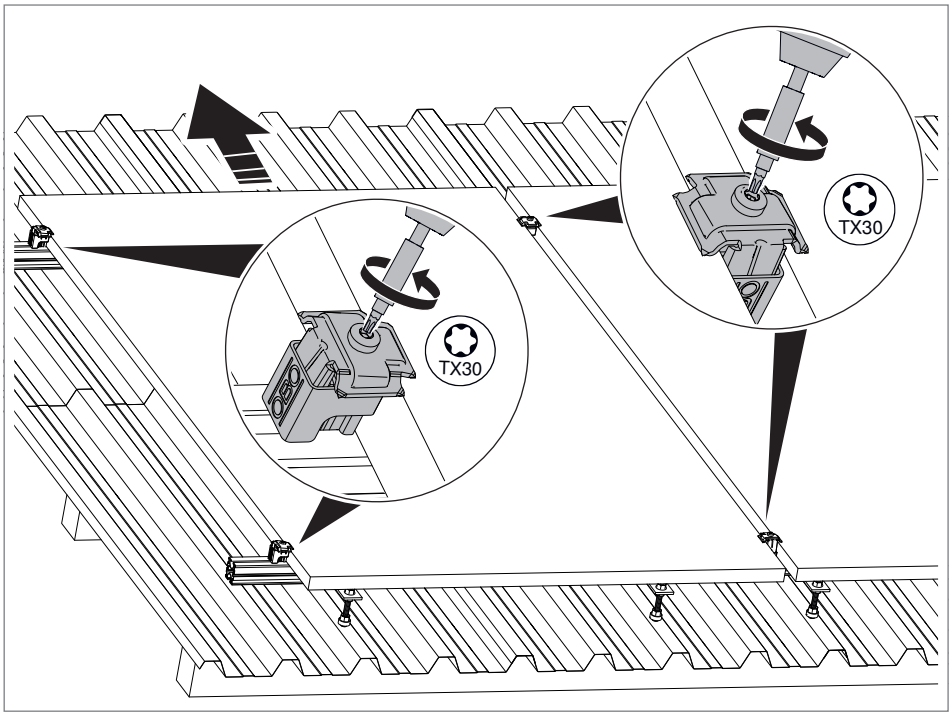

Fig. 19: Releasing universal clamps

1. Unscrew the screws of the universal middle and end clamps slightly.
2. Push the PV module upwards or downwards and out to exchange it.
3. Push in the new PV module.
4. Fasten the universal clamps with the prescribed tightening torque.

Note! *If the module cannot be pushed upwards or downwards and out, then the universal end clamps must be removed from the side of the support profile, in order to remove the module.*

6.5 Mounting the protective cap

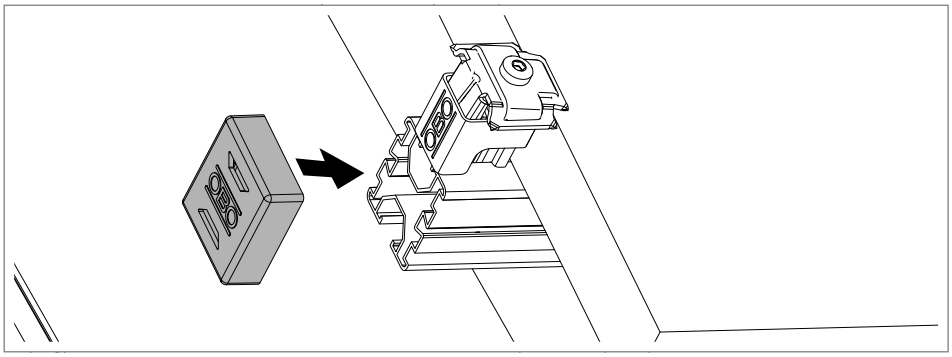

Fig. 20: Mounting the protective cap

1. Attach the protective cap at the ends of the support profile and press it in.

6.6 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 DIN 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 support profiles must be interconnected, in order to guarantee continuous, low-ohmic equipotential bonding.

A round conductor of ∅ 8–10 mm and/or an equipotential bonding conductor of 6–50 mm² can be mounted on the universal earthing clamp.

WARNING

Risk of electric shock!
In the event 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 support 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 support profile and the earthing clamp is guaranteed.

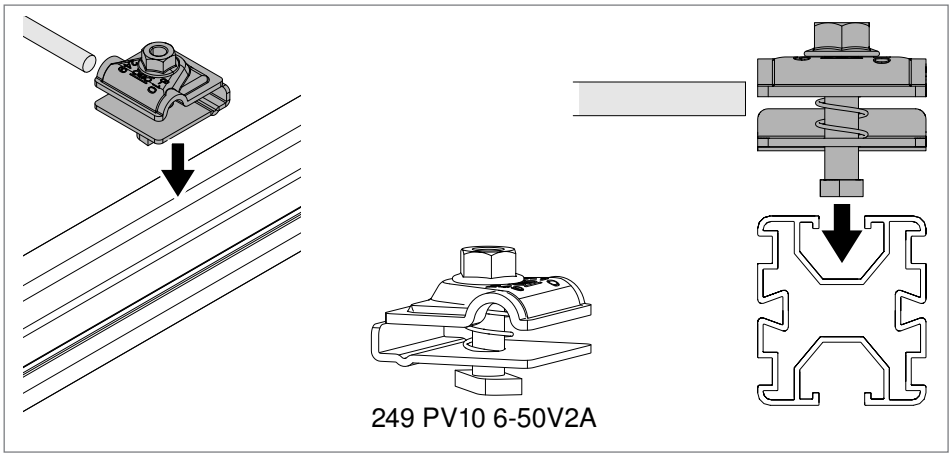

Fig. 21: Inserting the universal earthing clamp in the support profile

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

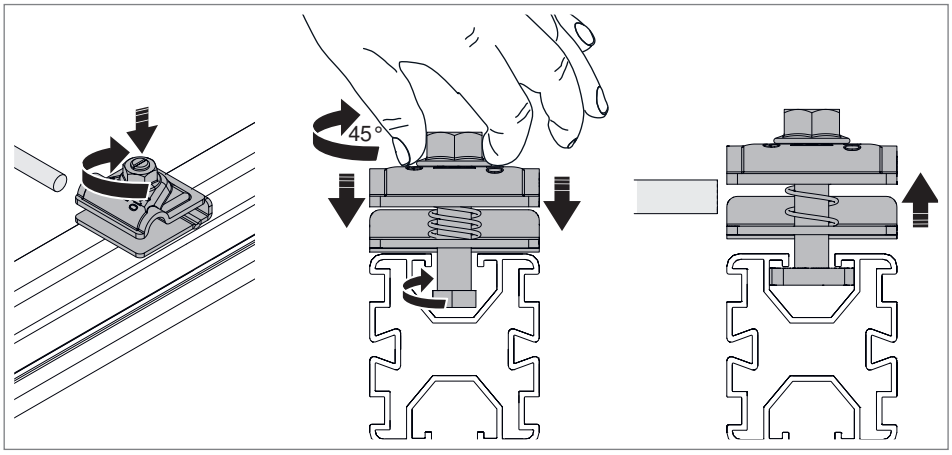

Fig. 22: Engaging the hammerhead bolt in the support profile

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 support profile.

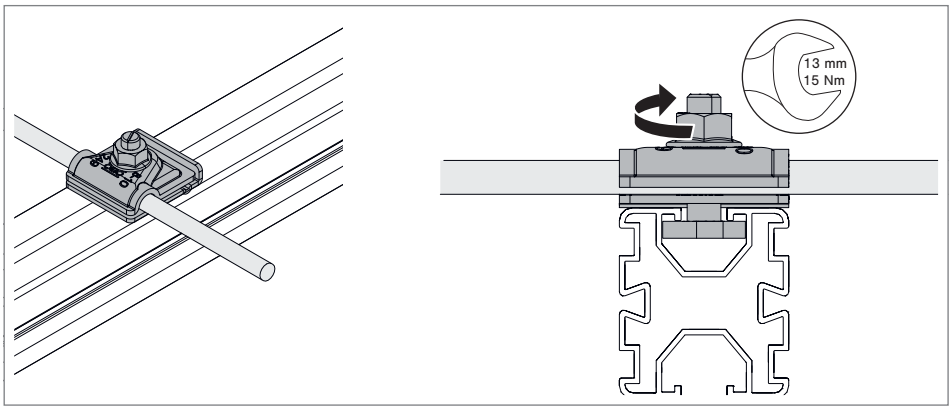

Fig. 23: Mounting the conductor in the universal earthing clamp

4. Insert the round conductor and/or equipotential bonding conductor.

5. Tighten the nut of the clamp with 15 Nm.

6.7 Connect support profiles in a lengthwise manner

Support profiles can be connected lengthwise using straight connectors of type LV 45 DD. The length of a support profile must correspond to at least the distance between two adjacent rafters.

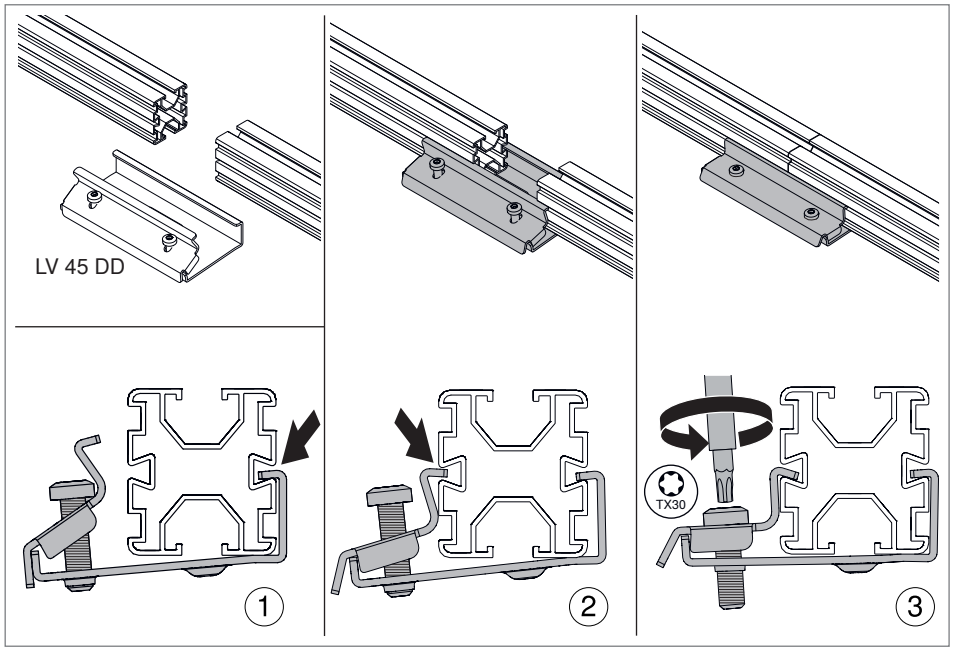

Fig. 24: Mounting a straight connector

1. Insert straight connectors in the groove on one side of the support profiles 1. The butt of the support profile must be located in the centre of the straight connector.

2. Hook the variable piece of the straight connector into the support profiles 2.

3. Tighten the screws on the straight connector with 6 Nm 3.

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

6.7.1 Connecting support profiles transversely

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

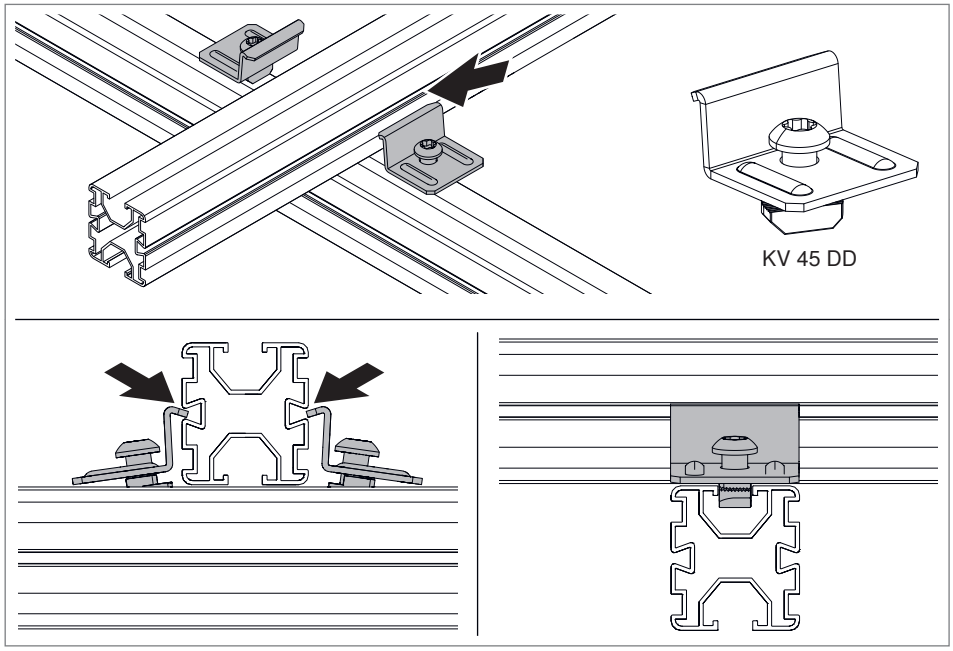

Fig. 25: Inserting cross-connectors

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

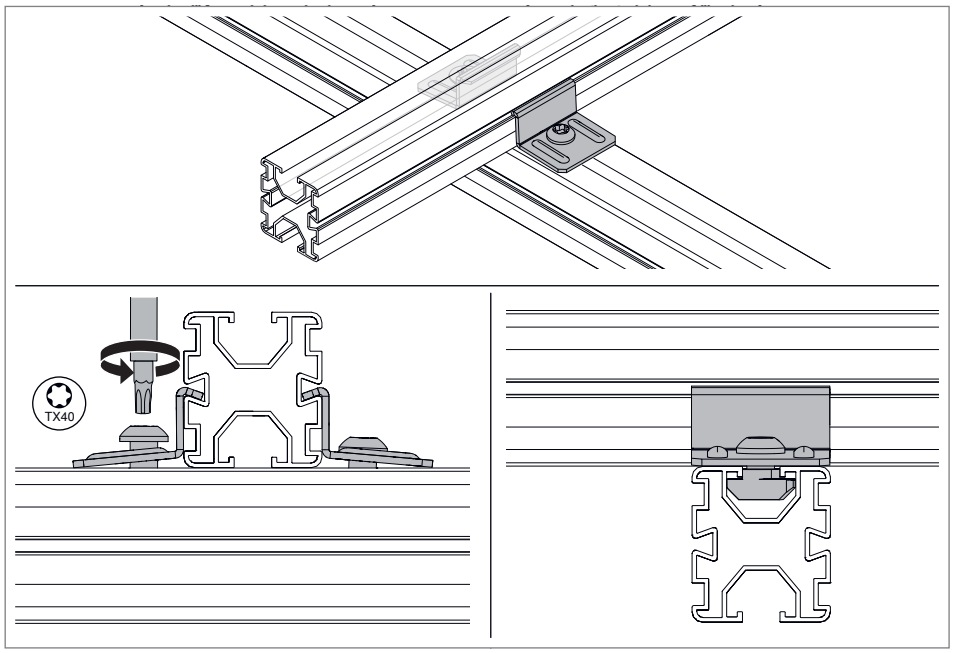

Fig. 26: Screwing on the cross-connectors

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

7 Maintaining the PV mounting system

The PV mounting system is maintenance-free.

8 Disassembling the PV mounting system

All the elements of the PV mounting systems are dismantled in the reverse order to the mounting. The universal clamp can be removed from the side of the support profile.

9 Disposing of the PV mounting 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	Item number
Support profile, for flat-/ pitched-roof system	TP 45/2350 ALU	40 x 45 x 2,350	Aluminium	5900405
Support profile, for flat-/ pitched-roof system	TP 45/4700 ALU	40 x 45 x 4,700	Aluminium	5900410
Support profile, for flat-/ pitched-roof system	TP 45/4700ALU S	40 x 45 x 4,700	Aluminium, black	5900412
Hanger bolt set	STSS 10x200 A2	200 x 40 x 27	Stainless steel A2	5901820
Hanger bolt set	STSS 12x200 A2	200 x 40 x 30	Stainless steel A2	5901826
Hanger bolt set	STSS 12x300 A2	300 x 40 x 30	Stainless steel A2	5901828
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
Bolt with hammer nut, for pitched-roof system	SKS HM A2	Ø 28 x 24	Stainless steel A2	5901850
Universal earthing terminal PV	249 PV10 6-50V2A	43 x 40 x 34	Stainless steel A2	5051520
End cap for support profile	EK 45 G	44 x 49 x 16	Polyethylene grey	5901722
End cap for support profile	EK 45 S	44 x 49 x 16	Polyethylene black	5901720
Straight connector for support profile	LV 45 DD	40 x 69 x 150	Steel double dip	5901210
Cross-connector for support profiles	KV 45 DD	30 x 40 x 40	Steel double dip	5901250

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Date 08/2025

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Building Connections