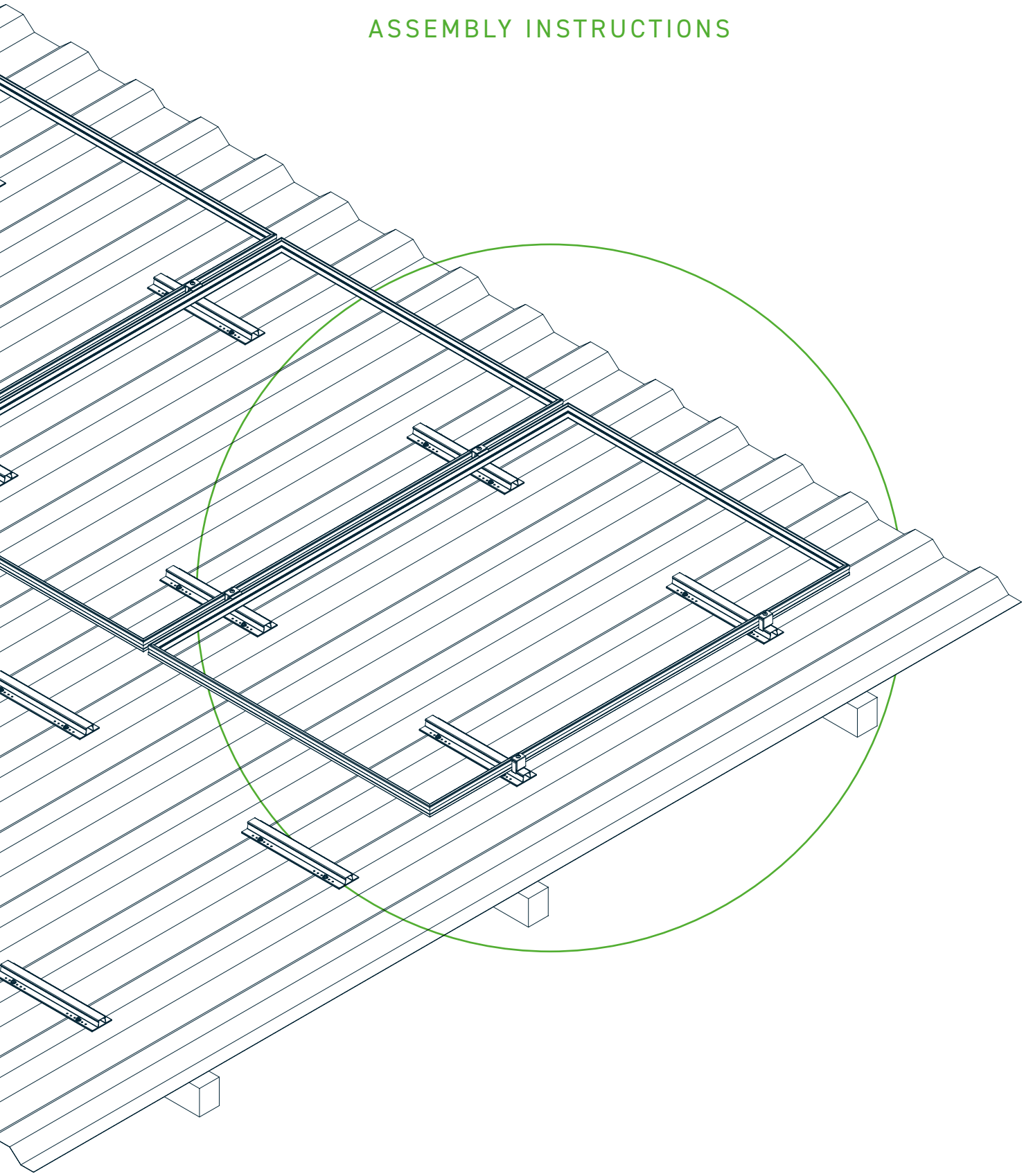
PMT SHORT RAIL

TBSH | TRAPEZOIDAL SHEET METAL RAIL HIGH

ASSEMBLY INSTRUCTIONS



Contents

PMT SHORT RAIL TBSH

INTERACTIVE ASSEMBLY INSTRUCTIONS

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1 Introduction

Please read these assembly instructions carefully before installing the PMT installation system and keep them for future reference!

These assembly instructions are only complete when accompanied by the project-specific implementation plan (project report)!
These Assembly Instructions describe the installation of the PMT PV mounting system on roofs covered with trapezoidal or corrugated sheet metal. They are intended for appropriately qualified personnel who have been instructed by the operator of the PV system. The installation of the PMT PV mounting system on trapezoidal and corrugated sheet-metal roofs requires extensive specialist knowledge. We therefore recommend engaging a qualified roofing contractor to carry out the installation.

The PMT mounting system allows the modules to be installed in portrait orientation.

The PMT PV mounting system for trapezoidal sheet-metal roofs features a very high degree of pre-assembly. Its innovative, patented click technology significantly reduces installation times.

All components are generally made of aluminium and stainless steel. Their high corrosion resistance ensures a long service life and allows the components to be fully recycled.

1.1 Intended Use

The PMT PV mounting system for trapezoidal sheet metal roofs is a racking system for the installation of PV modules.

It is designed exclusively for the mounting of PV modules. Any use other than this must be regarded as not in accordance with the intended purpose. In particular, compliance with the instructions in these installation guidelines forms part of the intended use. PMT accepts no liability for damage resulting from failure to comply with the installation guidelines or from the misuse or improper use of the product.

1.2 About This Document

This document is an internal translation prepared by PMT. In the event of any discrepancies, ambiguities or differences in interpretation, the original German version shall prevail.

The PMT PV mounting system for trapezoidal sheet metal enables the installation of roof-parallel PV systems.

These Assembly Instructions describe installation using TBSH. This is possible with:

- Trapezoidal and corrugated sheet metal
- Sandwich panels, where applicable (provided the manufacturer has approved fixing to the outer skin)

It must be ensured that only current and complete installation recommendations are used for the installation. These Assembly Instructions illustrate the installation using the TBSH 395 as an example.

1.3 Warnings

The warnings used in these Assembly Instructions highlight safety-related information.

They consist of:

Failure to comply poses a high risk of injury and may be life-threatening.

Failure to comply may result in property damage.

1.4 General Information - Standards and Guidelines

Every photovoltaic system must be installed in accordance with the specifications set out in these Assembly Instructions and the project report.

These Assembly Instructions are based on the current state of the art and our many years of experience in the on-site installation of our systems. It must be ensured that only the latest and complete version of the Assembly Instructions is used for the installation and that a printed copy of the Assembly Instructions is kept in the immediate vicinity of the system. Subject to technical changes.

1 Introduction

The project report forms part of these Assembly Instructions and is drawn up on a project-specific basis. All information contained in the project report must be strictly adhered to. The structural calculations in the project report are carried out on a site-specific basis. The design and planning of PMT installation systems must be carried out using the PMT software.

As each roof has its own project-specific characteristics that must be taken into account, expert advice must always be sought prior to installation. The installer of the PV system must ensure, prior to installation, that the existing roof covering and roof substructure are designed to withstand the additional loads that will be imposed. The installer must check the condition of the roof substructure, the quality of the roof covering and the maximum load-bearing capacity of the roof structure.
To do this, contact a structural engineer directly on site.
When installing PV systems, care must always be taken to comply with the module manufacturer's installation instructions. In particular, it must be checked whether the module manufacturer's specifications regarding clamping requirements (clamping surface and clamping area on the module) are being met. If this is not the case, the module manufacturer's written consent must be obtained on site prior to installation, or the mounting frame must be adapted to the module manufacturer's specifications.

The lightning and surge protection requirements for PV mounting systems must be implemented in accordance with the applicable DIN and VDE regulations. The requirements of the responsible energy supply company must be observed.

Care must be taken to ensure that the PV system to be installed does not impair the effectiveness of the existing lightning protection system. Care must also be taken to ensure that the PV system is designed in such a way that it can be incorporated into the protection zone of the building's lightning protection system. Separation distances between the PV system and the lightning protection system must be taken from the relevant regulations and adhered to. Fire safety regulations must be observed during installation; for example, fire walls must not be built over and the appropriate distances must be maintained.

When making changes to the roof covering, the manufacturer's instructions must be followed. During and after installation, the frame components must not be walked on or used as a means of access. There is a risk of falling, and the roof covering beneath could be damaged.
Before installation, the installer of the photovoltaic system must ensure that the installation is carried out strictly in accordance with national and site-specific building regulations, health and safety and accident prevention regulations, standards and environmental protection regulations. Any person installing PMT PV mounting systems is obliged to independently familiarise themselves with all rules and regulations governing technically correct planning and installation, and to comply with these during installation. This also includes obtaining the latest version of the relevant rules and regulations.
The installation of the PV system must only be carried out by suitably trained specialists.

All system components must be checked for damage before installation. Damaged components must not be used.

The PMT substructure and the PV system may only be installed by appropriately trained and qualified personnel. System components must not be used as stepladders, and the modules must not be walked on. Roof work involves a risk of falling from a height or falling through the roof. Falls may result in serious injury or death. Suitable access and fall-protection equipment, such as scaffolding, must be provided. Measures must also be taken to protect against falling objects.

Before installation, check the structural stability of the building as well as the structure and condition of the roof substructure. The requirements specified in the Assembly Instructions and the project report must be strictly observed during installation. Failure to comply with these requirements may result in damage to the PV system and the building.

1 Introduction

1.5 System Description

The PMT TBSH offers suitable solutions for different requirements:

TBSH System Characteristics

Applcation:	Trapezoidal and corrugated sheets, and sandwich profiles where applicable
Module type:	framed modules
Module orientation:	Portrait
Roof pitch:	max. 75°
Module array length:	max. 7.00 m continuous module array (larger module arrays are also possible depending on the project. Prerequisite: suitable conditions and corresponding project planning)
Max. load:	5,4 kN/m²
Connection:	Thin-sheet screws
Material:	Aluminium EN AW-6063 / T6, stainless steel
Colour:	Natural, mill finish

Requirements for the Roof Covering

Minimum sheet thickness:	Steel sheet 0.5 mm; aluminium sheet 0.5 mm*
Minimum tensile strength Rm:	Steel sheet 235 N/mm²; aluminium sheet 165 N/mm²*
High-rib installation area:	Hole spacing 162–333 mm; installation at the highest point of the beading

* Calculation basis: PMT. National or regional standards may stipulate different values (DIN EN 1090-04 2020-06) and must be observed accordingly.

The module manufacturer's installation instructions must always be observed. All specifications of the roof manufacturer regarding installation on the roof covering must be complied with.

2 Installation

2.1 System Components

A TBSH | Trapezoidal Sheet Metal Rail High

B Module Clamps

C Thin-sheet screw

D Anti-Slip Safety Kit

2.2 Direct Roof Attachment Using Thin-Sheet Screws

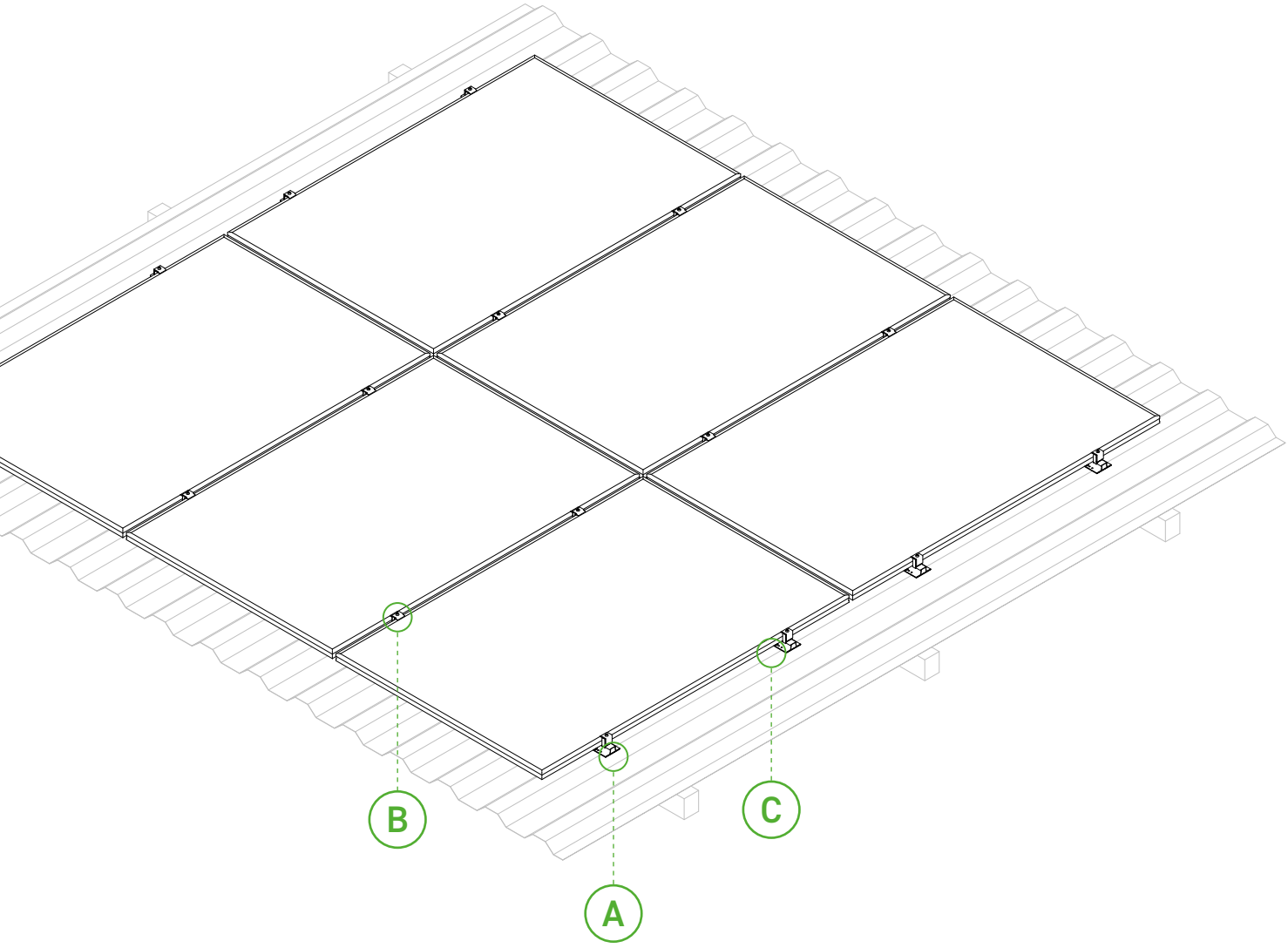
When installing the thin-sheet screws, the requirements specified in the building authority approvals for the thin-sheet screws must be observed (e.g. field of application, pre-drilling diameter, minimum thicknesses of the materials to be joined and hole diameter for existing holes).

The corresponding thin-sheet screws are included in our scope of delivery. The selection of the fasteners depends on the roof covering and the forces occurring. Thin-sheet screws must be positioned exclusively in the area of the crown / corrugation crest.

Thin-Sheet Screw:
4,5 x 25 A2 / Bimetal
4,8 x 20 A2 / Bimetal

Installation:
- Wrench size 8 mm
- Maximum tool outer dimension (socket wrench): ≤ 15 mm

2.3 Single-Layer Installation with Framed PV Modules in Portrait Orientation



A TBSH | Trapezoidal sheet metal rail high

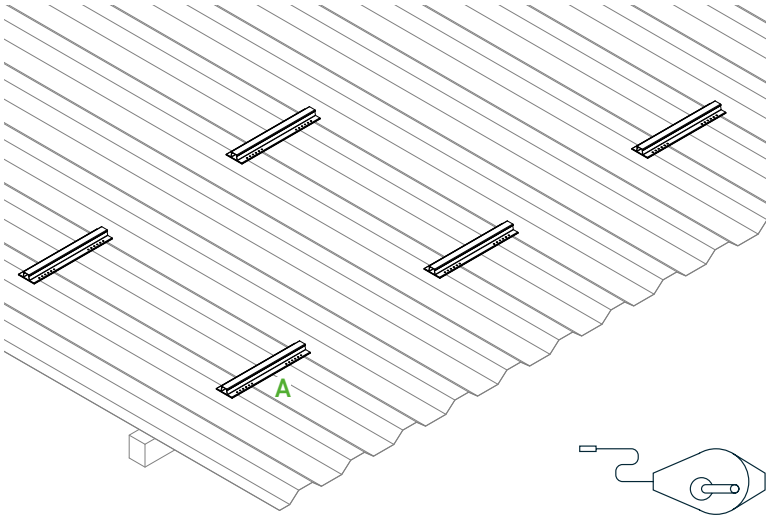
B Module clamps

C Thin-sheet screw

1

SINGLE-LAYER INSTALLATION WITH FRAMED PV MODULES IN PORTRAIT ORIENTATION

The position of TBSH **A** must be determined in accordance with the structural requirements of the location and the installation situation. TBSH **A** must be positioned so that the module end clamp and module mid-clamp B can subsequently be installed between the fastening points on the trapezoidal sheet metal. It must be checked again whether the dimensions used as the basis for planning correspond to the dimensions found on the roof (adjustments may be necessary).
For single-layer substructures, the position of TBSH **A** must be checked against the specified module clamping distances.



Check the planning basis

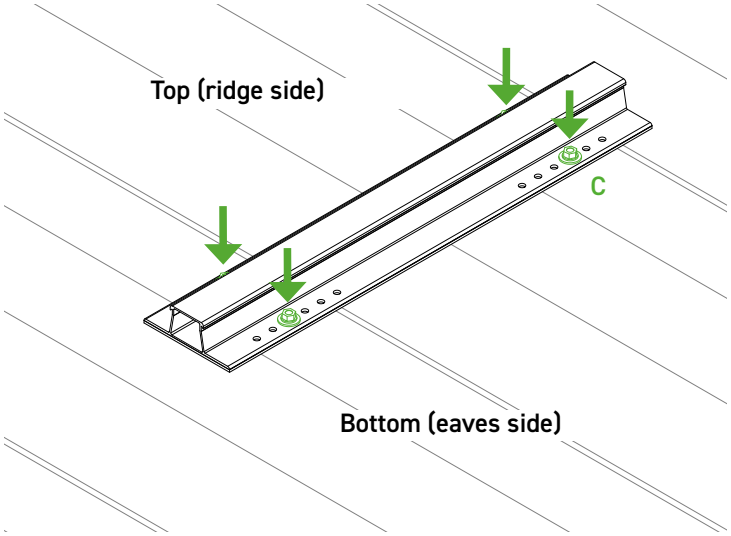
Position in accordance with the structural requirements and the installation situation

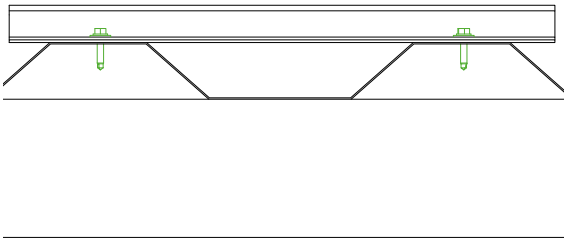
Align the TBSH A using a string line

Install TBSH **A** using the thin-sheet screws **C**. Use four thin-sheet screws **C** per TBSH **A** (two thin-sheet screws **C** per crown or corrugation crest). To prevent water from penetrating between TBSH **A** and the roof covering, TBSH **A** must always be installed on the crown / corrugation crest.
TBSH **A** is pre-drilled to 5.0 mm for common crown spacings / corrugation pitches from 173 mm to 333 mm and is fully covered with EPDM sealing strips on the underside.

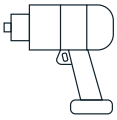
When installing on corrugated sheet roofing, the thin-sheet screws C may only be screwed into the crest of the corrugation. Fastening in the side area of the corrugated sheet jeopardises the structural integrity of the system and the watertightness of the roof.

SINGLE-LAYER INSTALLATION WITH FRAMED PV MODULES IN PORTRAIT ORIENTATION





Trapezoidal sheet metal



Wrench size 8 mm, maximum tool outer dimension </= 15mm

2 thin-sheet screws per crown or corrugation crest (4 pcs. per trapezoidal sheet metal rail)

If TBSH **A** is ordered without EPDM, an EPDM sealing strip must be adhered to the crown or underneath TBSH **A** before installation in order to protect the roof against water penetration. To do this, cut the strips to the appropriate length and adhere them vertically to the crown in the installation area of TBSH **A**. TBSH **A** must be clean and dry for bonding. The application temperature should not be below 5°C.

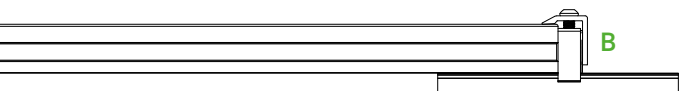
TBSH A is also available without an EPDM seal. To protect the roof against penetrating water in the area of the screw connection, an EPDM sealing strip must always be installed between the bearing surface of TBSH A and the trapezoidal sheet metal.

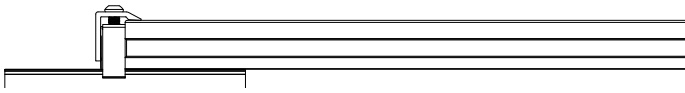
Please note that TBSH A cannot be installed when using trapezoidal sheets with profiled crowns.

SINGLE-LAYER INSTALLATION WITH FRAMED PV MODULES IN PORTRAIT ORIENTATION

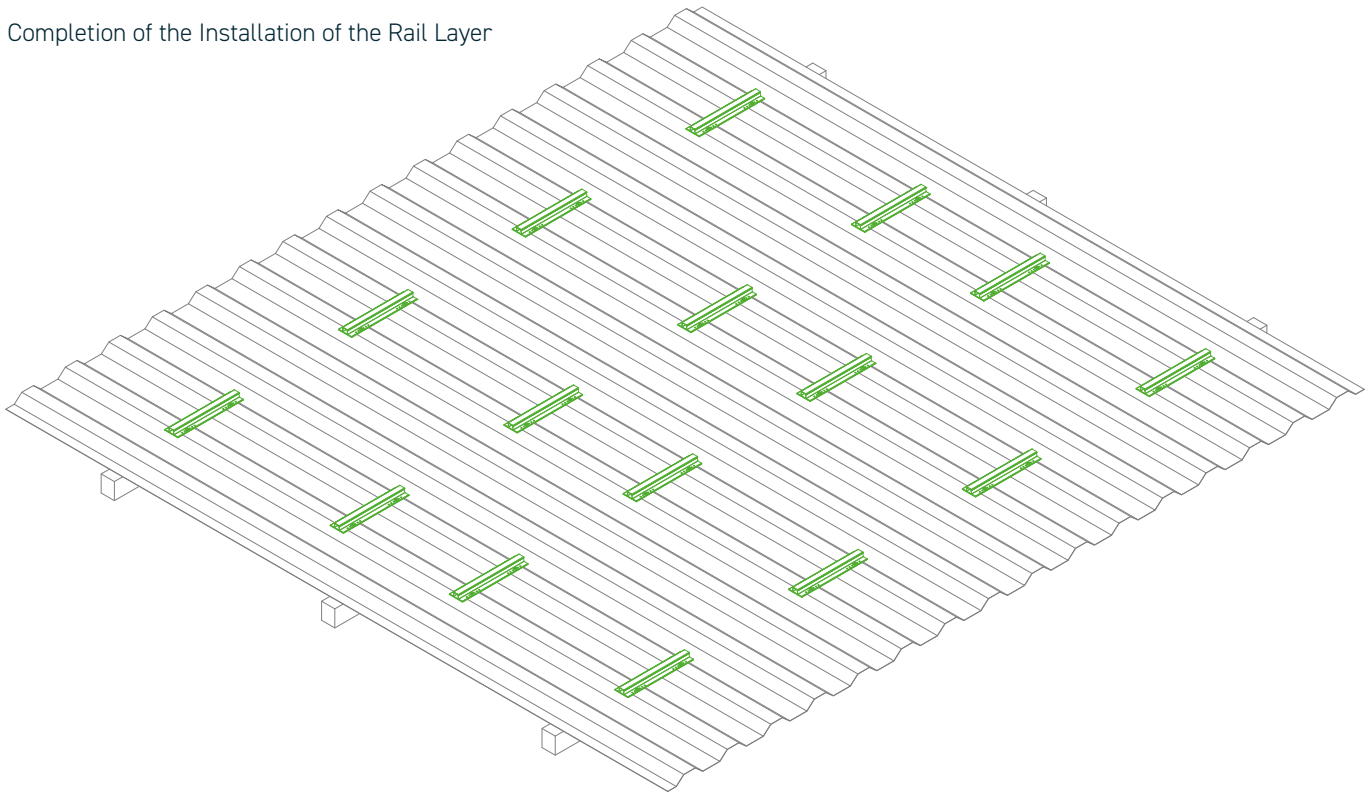
If the module array is longer than 7.00 m parallel to the eaves, it must be separated, in the case of a single-layer substructure, by installing an additional TBSH A with a module end clamp.
TBSH A must be separated in the area between the module end clamps (expansion joint).
The arrangement of the expansion joints must be adapted to the conditions of the roof and the different expansion properties of the materials.

Modules must not bridge expansion joints.
There is no electrically conductive connection to ground.
This connection must be established without restricting the function of the expansion joint.





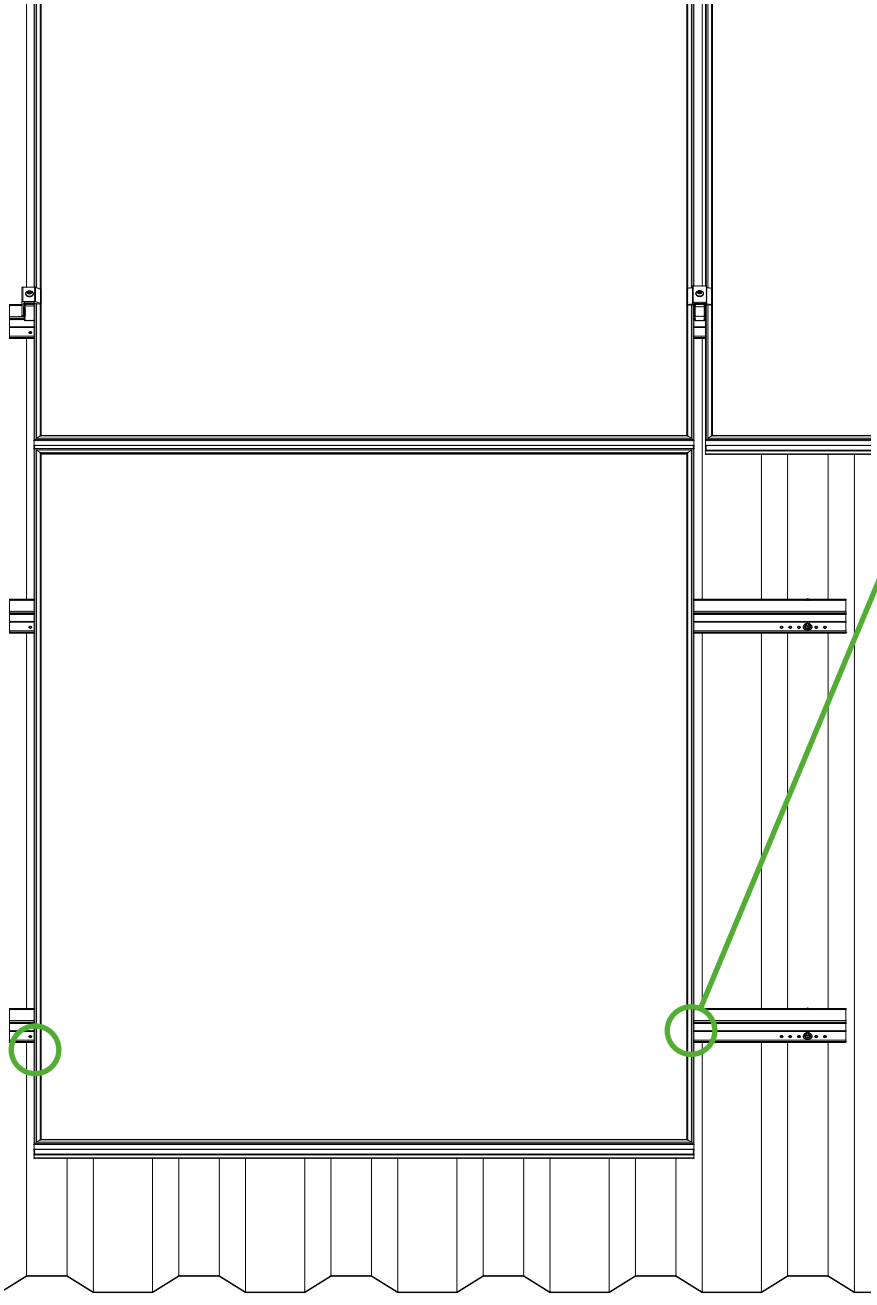
Completion of the Installation of the Rail Layer

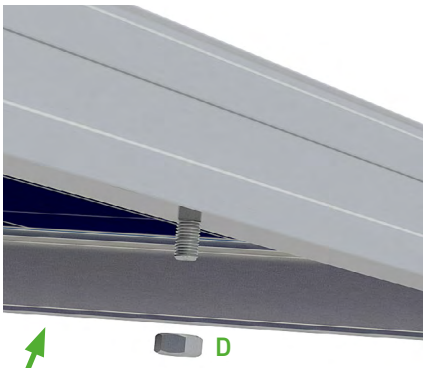


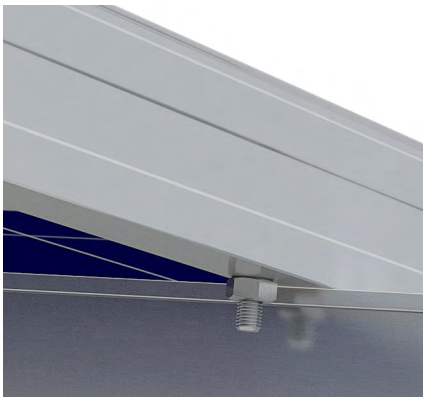
2

Module Installation, Anti-Slip Protection D for roof pitches greater than 5°

Before installing the modules in the lowest module row, the modules must generally be fitted with the anti-slip safety kit D. The same applies to modules with no other module directly adjacent below them (modules above obstructing objects, e.g. windows, chimneys, etc.).
For this purpose, fasten two M6 × 20 screws (with the shanks pointing downwards) using M6 nuts in two frame holes (8 mm) in the modules. The screws must be positioned at the same height and, when installed, must be located above at least one horizontal system support layer, where applicable so that the screws on the underside of the module frame make contact with the horizontal system support from above. If the lower fastening hole is larger than 8 mm, use a corresponding suitable screw.





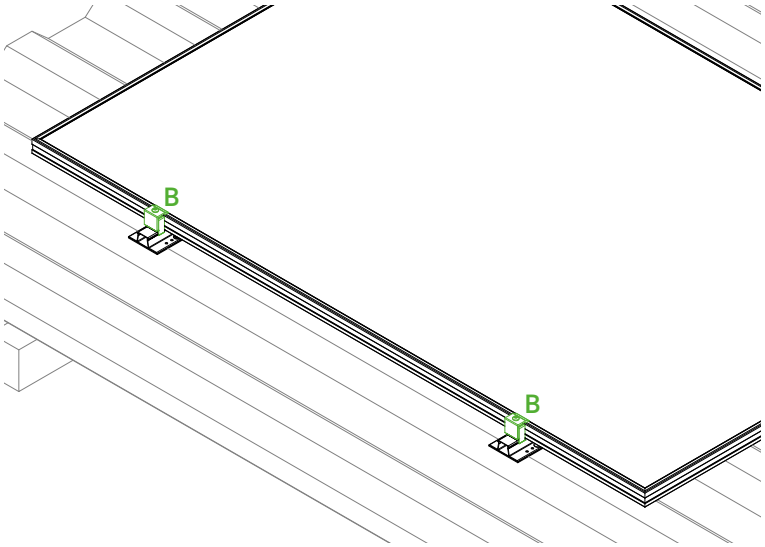


3

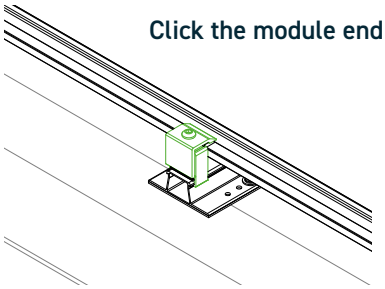
Module Installation, Module End Clamp

Place the module on TBSH **A**. Install the module end clamp **B**. To do this, click the module end clamp **B** onto TBSH **A** and push it against the module. Ensure that the module end clamp **B** is clicked into both sides of TBSH **A**. Then adjust the module end clamp **B** to the module height and tighten the screw (tightening torque: 10 Nm). Ensure that the module end clamp **B** clamps the module frame within the defined clamping area specified by the module manufacturer.

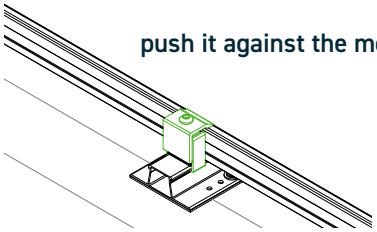
The module end clamps **B** must be installed between the fastening points of TBSH **A**. Installation of the module end clamps **B** outside the fastening points / on the cantilever is not permitted.



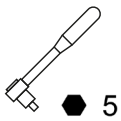
Click the module end clamp into place

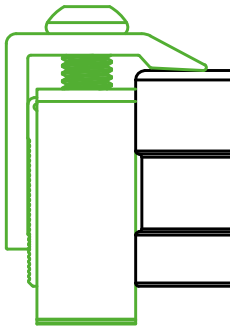


push it against the module and tighten

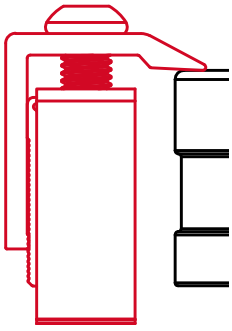


Install the module end clamp

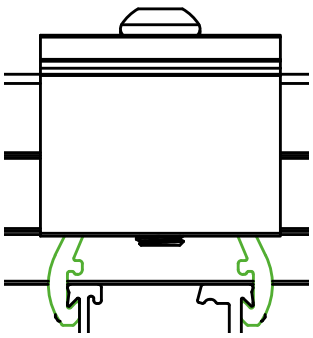




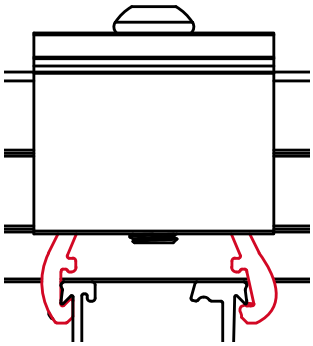
Defined clamping area



Incorrect



Clicked into place on both sides



Incorrect

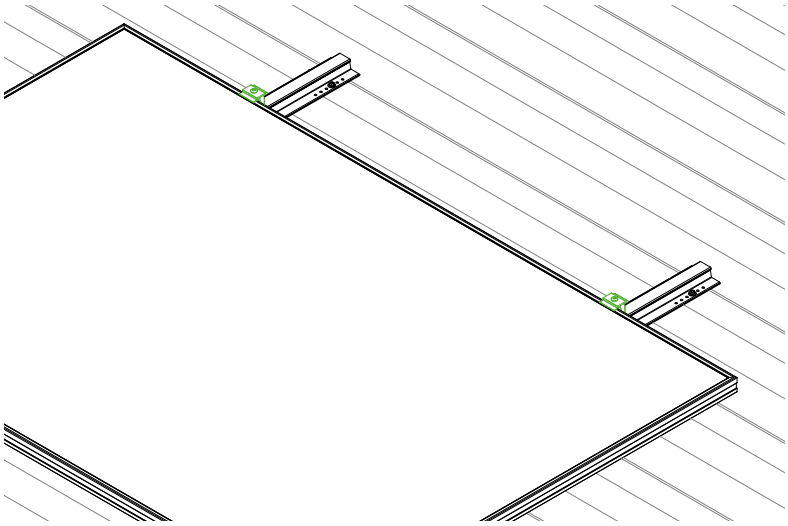
Module end clamps **B** are approved for one-time installation only. Check that the module end clamps **B** have clicked into place.

Observe the module manufacturer's specifications: Check the defined clamping area.

4

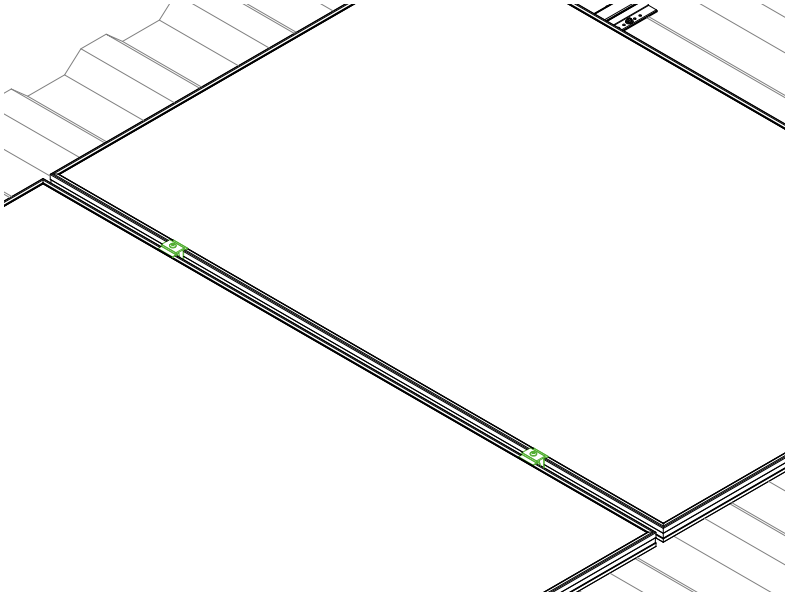
Module Installation, Module Middle Clamp

Now install the module middle clamp **B**. To do this, click the module middle clamp **B** onto TBSH **A** and push it against the module. Ensure that the module middle clamp **B** is clicked into both sides of TBSH **A**.



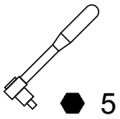
Click the module middle clamp B into place and push it against the module

Now slide the next module underneath the module middle clamp **B**, adjust the module middle clamp **B** to the module frame height and tighten the screws (tightening torque: 10 Nm).
The module middle clamps B must be installed between the fastening points of TBSH **A**. Installation of the module end clamp **B** outside the fastening points / on the cantilever is not permitted.

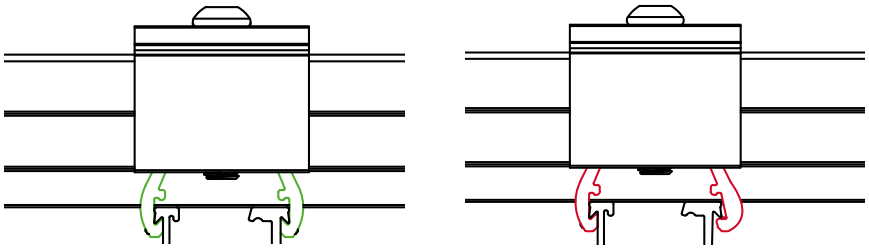


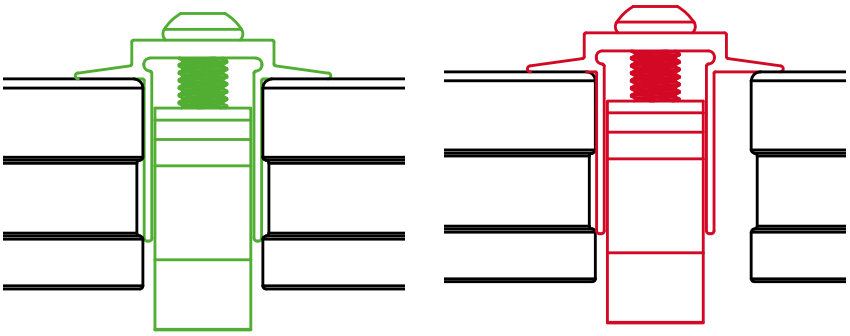
Slide the module underneath and tighten the module middle clamp B

Install the module middle clamp



Ensure that the module middle clamp **B** clamps both module frames within the defined clamping area specified by the module manufacturer.





Defined clamping area

Incorrect

Module middle clamps B are approved for one-time installation only. Check that the module middle clamps B have clicked into place.

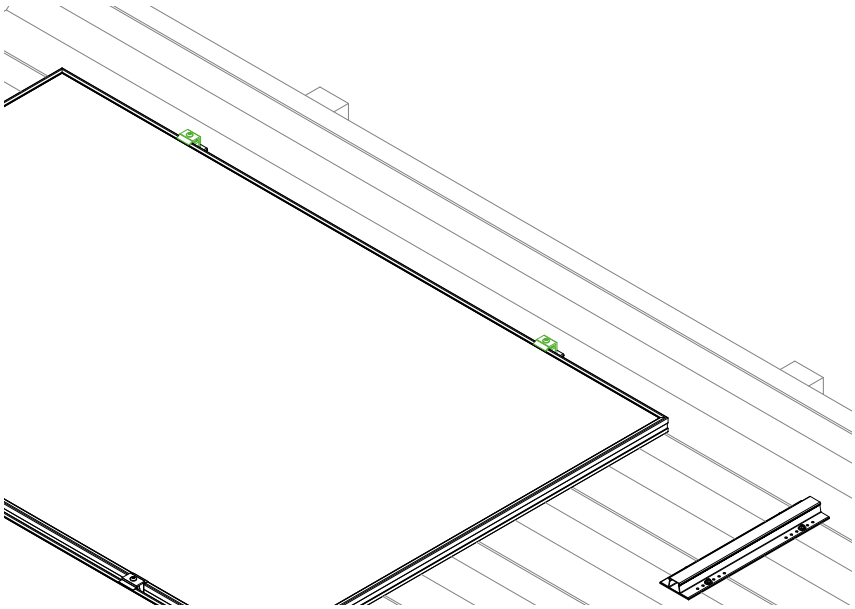
Observe the module manufacturer's specifications: Check the defined clamping area.

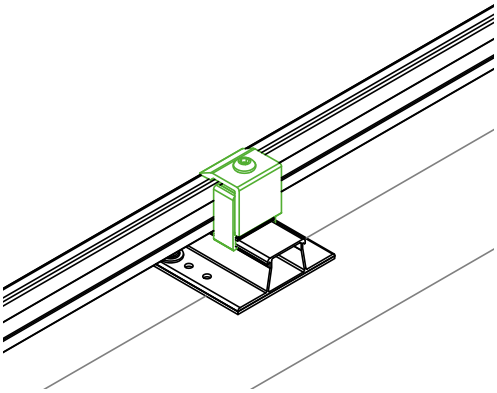
5

Module Installation, Module End Clamp at the End of the Row

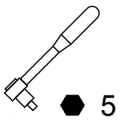
Module end clamps B must be installed again at the last module in the row (or at expansion joints, if applicable). To do this, click the module end clamp **B** onto TBSH **A** and push it against the module. Ensure that the module end clamp **B** is clicked into TBSH **A**. Then adjust the module end clamp **B** to the module height and tighten the screw (tightening torque: 10 Nm).

Ensure that the module end clamp **B** clamps the module frame within the defined clamping area (see Installation 3).

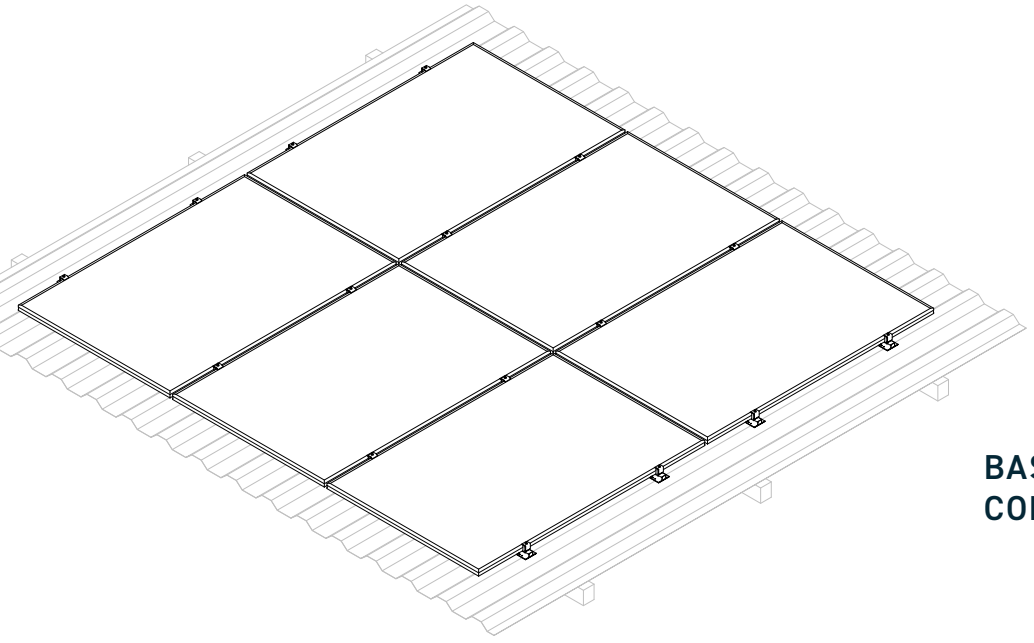




Install the module end clamp B at the last module.



Proceed with the following rows as described.



BASE SYSTEM COMPLETE!

3 Disassembly and Disposal

3.1 Disassembly

The PMT mounting system may only be disassembled by appropriately trained and qualified personnel. The same safety instructions, standards and guidelines as for installation must be observed. Disassembly must generally be carried out in the reverse order of the installation described.

Before disassembly, disconnect the PV modules from the grid. Disconnect all electrical cables of the PV modules, including string cables and plug connections, and detach them from the mounting system.

Then remove the modules and store them safely. Improper disassembly may damage the modules.

Disassemble the mounting system and store all components safely. Any openings in the roof covering must be properly sealed by qualified personnel.

3.2 Disposal

The PMT mounting system consists of aluminium, stainless-steel and steel components. After disassembly, these components can be sent for recycling. Dispose of the mounting system only through a certified waste management company (EFB). Observe the applicable national standards and guidelines.

Service-Hotline

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We are happy to advise you.

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Assembly Instructions-PMT-SHORT RAIL TBSH–08/2026