

PROFINESS Roof installation instructions for rebated roofs



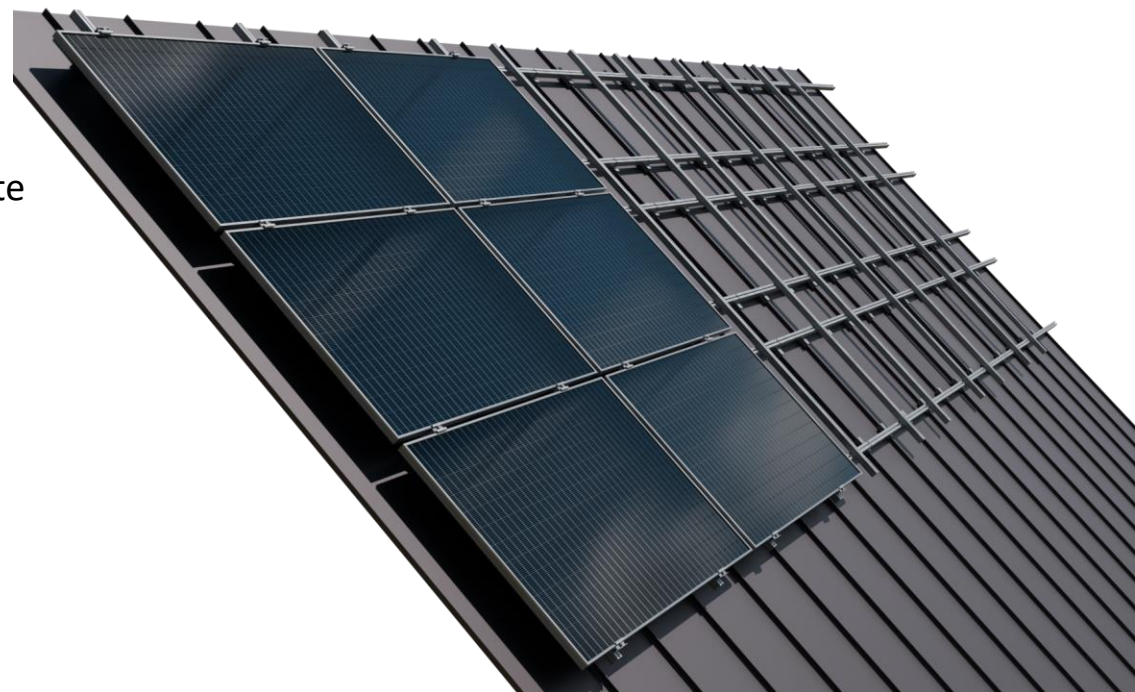
The following installation instructions deal with **the installation of PROFINESS mounting systems for rebated roofs**.

Please read the installation instructions carefully before installation. Always check whether a newer version of these installation instructions is available online (www.profiness.de - Downloads). If you have received a project plan including project statics for your project, these instructions are only complete including this project plan.

Comprehensive knowledge is required for the installation of PROFINESS fastening systems on rebated roofs. We recommend having the fastening carried out or supervised by a trained roofer/tradesman or a similarly qualified person.

You can mount PV modules with the PROFINESS systems on the above-mentioned roof coverings both vertically and horizontally. The various components of the systems are made of aluminium and stainless steel. This ensures high corrosion resistance and the longest possible service life.

The components can also be almost completely reused.





Introduction:	2
Required components :	4-6
Tool List:	7
Tightening torques :	8
The PV module :	9
Rebate sheet designs:	10
Correct choice of clamp	11-12
Material Information:	13
System overview :	14
Mounting the rebate clamp:	15-16
Mounting the rails:	17-21
Assembly of a cross bound:	21-23
Rail connection:	24-27
Alignment and installation of the modules :	28-31
Anti Slip Protection :	32
Further components:	33
General information	
Standards and guidelines:	34-36
Contact:	37

Component	Description
Mounting rail (A)	Roof Performance mounting rail 40x40 with M8 (top) and M10 (bottom) connection or lateral connection for cross-connection mounting with angle bracket. (Art. Nr. 9664 Profiness-[-...])
Basic seam clamp (B)	Roof Basic roof seam clamp for standing seam M10 slotted hole up to max. 3.5 mm seam width with one or two screws A2 stainless steel (9583-Falzklemm#T, 9583-Falzklemm#T-2s) Roof Basic Roof rebate clamp for round rebate (e.g. Kalzip) M10 round hole A2 stainless steel (Art. Nr. 9583-RUNDfalzklemm#T)
Performance seam clamps (B)	Roof Performance standing seam clamps with building inspectorate approval , for which a structural analysis can be verified for standing, round, angled, nail-strip and Rip Roof seam roofs for copper roofs, an inlay or a special brass clamp must be used. (Art. Nr. 9584-[-...])
Adapter plate (C)	Connect Basic adapter plate for M10 82x30x5mm (RL 11mm, LL 11mm) stainless steel A2 (Art. Nr. 9543-2-82x30x5#T)
Screw for adapter plate (D)	Connect Basic 6-point screw M8x16 DIN 6921 with locking serration A2 stainless steel (Art. Nr. 6921-2-8x16Z#T)



Component	Description
Hexagon head screw / hammer head screw (E)	Connect Basic Hexagon head or hammer-head screws are used to connect the mounting rail to the roof hook via the lower channel (M10) (Art. Nr. 933-2-10x25#T)
Hexagon nut (F)	Connect Basic Hexagon nuts with locking teeth hold the respective screw when connecting the roof hooks to the mounting rail. (Art. Nr. 6923-2-10#T)
Cross composite (I)	Connect X Z-clamp set 30x3mm for cross bracing stainless steel Pre-assembled set with M10 hammerhead bolt and DIN6923 locking nut, screw connection in the lower channel of the upper, vertical rail. Clamping then with the lower, horizontal rail also in the M10 channel, alternating from above and below. (Art. Nr. 9701-Profiness28-S10#T)
End clamp (KlickFix quick-fit clamp if necessary) (H)	Connect Basic/Quick end clamps can be pre-assembled as KlickFix quick-fit clamps or used individually with sliding block and hexagon socket screw and are attached as end clamps of a module row. (Art. Nr. 9742-Profiness4 or 5)
Centre clamp (KlickFix quick-fit clamp if necessary) (J)	Connect Basic/Quick centre clamps can be pre-assembled as KlickFix quick-fit clamps or used individually with sliding block and hexagon socket screw and are used to fasten and connect two modules in a module row. (Art. Nr. 9745-Profiness13 or 14)



Component	Description
Cylinder/hexagon socket screws	Connect Basic Cheese head screw M8x35mm with hexagon socket ISO 4762 (old: DIN 912) stainless steel A2. Used to screw the clamps into the slot nut of the upper rail channel (M8). <i>(Art. Nr. 912-2-8x35#T)</i>
Slot nuts	Connect Basic Sliding blocks for M8 track ALU/A2. Can be swivelled into the M8 rail channel at any point and hold the hexagon socket screw used to fasten the clamps. <i>(Art. Nr. 9431-120901#T)</i>
Washer	Connect Basic Lock washers 8.4 mm A2 stainless steel. Serve as a distance equaliser between the hexagon socket screw and the module clamp. Depending on the module frame thickness, the lock washer optimises the screw length. <i>(Art. Nr. 9250-2-8,4#T)</i>
End cap	Close the rail channel at the end of a row of rails. <i>(Art. Nr. 9664-Kappe[...])#T)</i>
Cabel clips	Connect Grid Edge clips : Can be fastened in the rail channel or on the module frame to ensure simple cable routing. <i>(Art. Nr. 9664-Clip[...])</i>
Earthing terminal	Connect Grid Earthing terminal Dehn UNI earthing terminal NIRO for Rd 8-10 mm and conductors 4-50 mm ² with M8x25 hammer-head bolt and nut, for insertion into the Profiness M8 tracks A2 stainless steel. Enables equipotential bonding of rails or modules with an earthing cable or aluminium round wire connection <i>(Art. Nr. 9664-ErdungM8HKS#T)</i>



Tools

- Marker/ chalk
- Levelling line/ chalk line
- Folding rule and tape measure
- Cordless screwdriver, torque spanner 2-40 Nm
- Metal saw, file and angle grinder for metalworking if required
- Ratchet box or spanner set (8, 10, 13, 15, 17, 18 mm)
- Cylinder / hexagon socket 6 mm for DIN 912 M8 and TX 25/30/40

Tool type and design

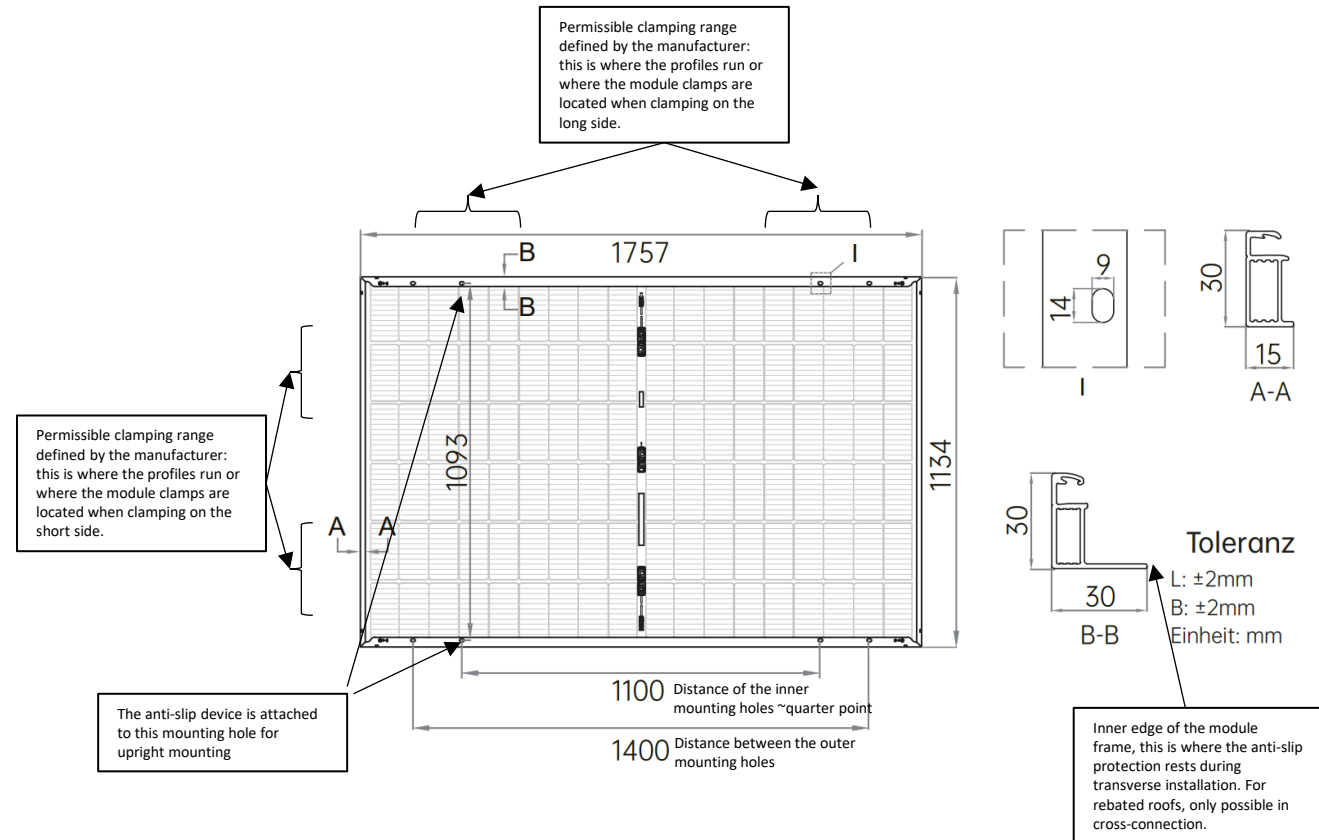
Bezeichnung Art.-Nr.:	M5/ 5 mm	M6/ 6 mm	M8/ 8 mm	M10/ 10 mm	Kommentar
933		SW 10	SW 13	SW 17	Hexagon head screw
6921		SW 10	SW 13		Flange screw
6923		SW 10	SW 13	SW 15	Lock nut
912			IN 6 mm		Cylinder/hexagon socket screw



Tightening torques

- Connect Basic clamps with sliding block: **12-14 Nm**
- Connect Quick Klick Fix clamps: **8-10 Nm**
- M8 screw connection (except clamps) **16 Nm**
- M10 screw connection for mounting rails: **25-30 Nm**
- Self-drilling screws on trapezoidal sheet metal roof: **3-5 Nm, ca. 1.200 U/min**
- Steel to steel M10 screw connection (adjustable roof hook): **bis zu 32 Nm**

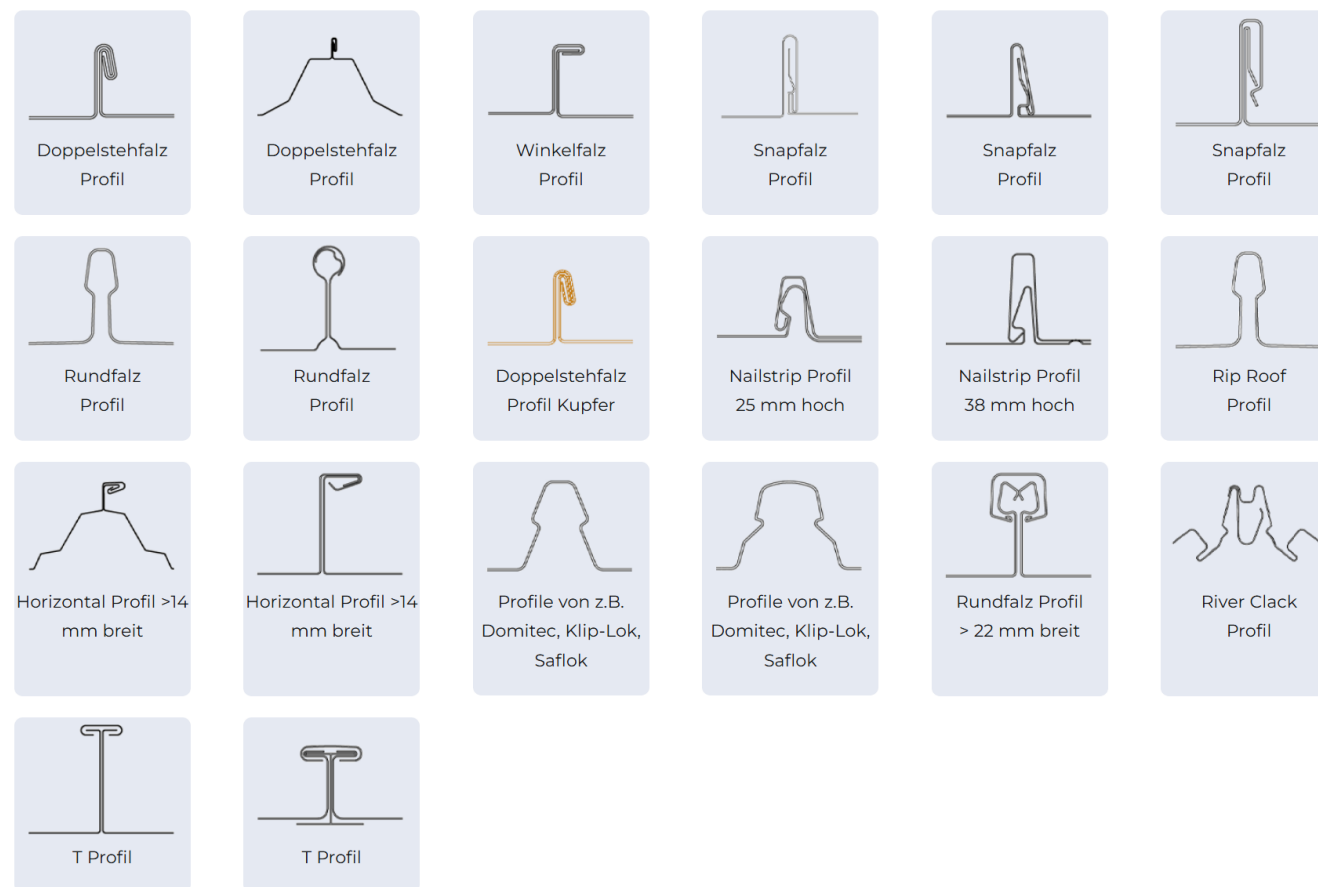
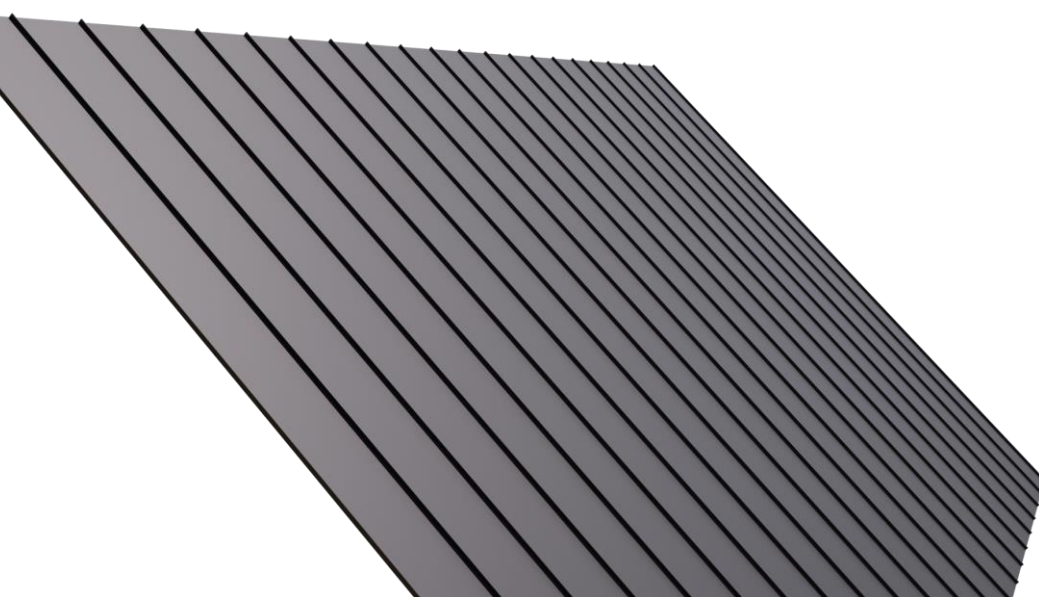
Overview of the design of common PV modules and the dimensions and terms specified in the installation instructions.



The design of the rebate roof largely determines the choice of the appropriate rebate clamp!

You can then create your UK using the familiar PROFINESS mounting system.

A structural calculation of the project can be created with officially approved seam clamps.

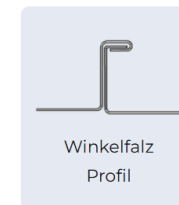




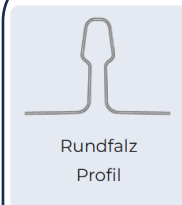
Permanently stable and professional installation solutions on the craftsman's double standing seam roof | approved by the building authorities and comprehensively tested | opening slot of 7 mm | TX 30 grub screw | tightening force 15-17 Nm, if sheet metal > 0.7 mm, then TX-20 Nm | flange with slotted hole 18x11 mm | if M8 thread on top for M8x16 screw, then tightening with 18 Nm |
(Art. Nr. 9584-Doppelstehfalzklemme-FL#T; 9584-Doppelstehfalzklemme-...)



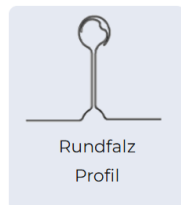
Permanently stable and professional installation solutions on the craftsman's double standing seam roof | building authority approved and comprehensively tested | opening slot of 7 mm | TX 30 grub screw | tightening force 15-17 Nm, if sheet metal > 0.7 mm, then 18 -20 Nm | flange with slotted hole 18x11 mm | if M8 thread on top for M8x16 screw, then tightening with 18 Nm
(Art. Nr. 9584-Doppelstehfalzklemme-FL#T; 9584-Doppelstehfalzklemme-...)



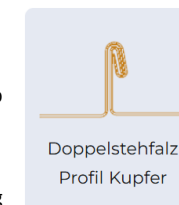
For use on many Snapfalz roofs, e.g. Kliptec, Fischer, Ruukki or craftsman roofs up to 13 mm wide | extensively tested and inspected | opening slot of 14 mm | TX 30 grub screw | tightening force 15-17 Nm, if sheet metal > 0.7 mm, then 18 -20 Nm | top M8 thread for M8x16 screw, tightening force 18 Nm
(Art. Nr. 9584-Winkelfalzklemme#T; 9584-Winkelfalzklemme-...)



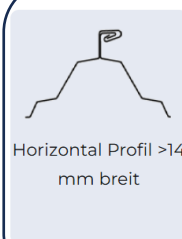
For use on metal roofs with round seam profiles for e.g. Kalzip®, Bemi®, Aluform, Kingspan roofs | building authority approved and comprehensively tested | Opening slot of 22 mm | Additional fitting part on the inside of the clamp | TX 30 grub screw | Tightening force 15-17 Nm, if sheet metal > 0.7 mm, then 18 -20 Nm | Flange (with slotted hole 18x11 mm) | If M8 thread on the top for M8x16 screw, then tighten with 18 Nm | Minimum distance to the roofing brackets according to building authority approval: 17.5 mm
(Art. Nr. 9584-Rundfalzklemme-FL; 9584-Rundfalzklemme [...])



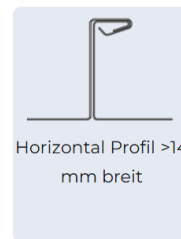
For use on metal roofs with round seam profiles for e.g. Kalzip®, Bemi®, Aluform, Kingspan roofs | building authority approved and comprehensively tested | opening slot of 22 mm | additional fitting part on the inside of the clamp | grub screw TX 30 | tightening force 15-17 Nm, if sheet metal > 0.7 mm, then 18 -20 Nm | flange with slotted hole 18x11 mm | if M8 thread on top for M8x16 screw, then tightening with 18 Nm | minimum distance to the roofing brackets according to building authority approval: 17.5 cm | (Art. (Art. no. 9584-Round seam clamp-FL; 9584-Round seam clamp [...])



For use on copper roofs with standing seam | brass | extensively tested & inspected | opening slot of 6 mm | TX 30 grub screw | tightening force 15-17 Nm | M8 thread on top for M8x16 screw, tightening with 18 Nm | minimum distance to the roofing brackets according to building authority approval: 25 mm | various versions (stainless steel inlay for double standing seam clamp also possible as an alternative)
(Art. Nr. 9584-Doppelstehfalzklemme-M; 9584-Doppelstehfalzklemme-Inlay)



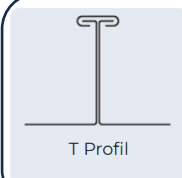
For use on horizontal profiles of different sizes | extensively tested and inspected | opening slot of 32 mm | additional fitting part on the inside of the clamp | grub screw TX 30 | tightening force 15-17 Nm, if sheet metal > 0.7 mm, then 18 -20 Nm | if M8 thread on top for M8x16 screw, then tightening with 18 Nm | (Art. No. 9584 angle seam clamp[...])



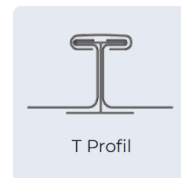
Use on horizontal profiles of different sizes | extensively tested and inspected | opening slot of 32 mm | additional fitting part on the inside of the clamp | TX 30 grub screw | tightening force 15-17 Nm, if sheet metal > 0.7 mm, then 18 -20 Nm | if M8 thread on top for M8x16 screw, then tighten to 18 Nm | if M8x16 screw on top, then tighten to 18 Nm
(Art. Nr. 9584-Winkelfalzklemme[...])



For use on roofs from e.g. Domitec, Saflok, Klip-lok | comprehensively tested & inspected | opening slot depending on inlay | various additional fitting parts on the inside of the clamp | hexagon M8 press-fit screw | tightening force 23 Nm | M8 thread on top for M8x16 screw, tightened to 18 Nm |
(Art. Nr. 9584-Sonderfalz-...)



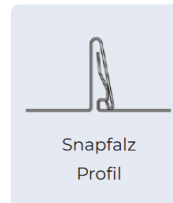
Use on T-shaped rebate profiles | extensively tested and inspected | opening slot of 33 mm | additional fitting part on the inside of the clamp | TX 30 grub screw | tightening force 15-17 Nm, if sheet metal > 0.7 mm, then 18 -20 Nm | M8 thread on top for M8x16 screw, tightening with 18 Nm |
(Art. Nr. 9584-T-Profil-...)



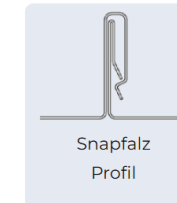
Use on T-shaped rebate profiles | extensively tested and inspected | opening slot of 33 mm | additional fitting part on the inside of the clamp | TX 30 grub screw | tightening force 15-17 Nm, if sheet metal > 0.7 mm, then 18 -20 Nm | M8 thread on top for M8x16 screw, tightening with 18 Nm |
(Art. Nr. 9584-T-Profil-...)



For use on many Snapfalsz roofs, e.g. Kliptec, Fischer, Ruukki or craftsman roofs up to 13 mm wide | extensively tested and inspected | opening slot of 14 mm | TX 30 grub screw | tightening force 15-17 Nm, if sheet metal > 0.7 mm, then 18 -20 Nm | top M8 thread for M8x16 screw, tightening force 18 Nm
(Art. Nr. 9584-Snapfalsz-[...])



For use on many Snapfalsz roofs, e.g. Kliptec, Fischer, Ruukki or craftsman roofs up to 13 mm wide | extensively tested and inspected | opening slot of 14 mm | TX 30 grub screw | tightening force 15-17 Nm, if sheet metal > 0.7 mm, then 18 -20 Nm | top M8 thread for M8x16 screw, tightening force 18 Nm
(Art. Nr. 9584-Snapfalsz-[...])



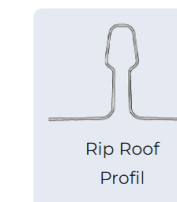
For use on many Snapfalsz roofs, e.g. Kliptec, Fischer, Ruukki or craftsman roofs up to 13 mm wide | extensively tested and inspected | opening slot of 14 mm | TX 30 grub screw | tightening force 15-17 Nm, if sheet metal > 0.7 mm, then 18 -20 Nm | top M8 thread for M8x16 screw, tightening force 18 Nm
(Art. Nr. 9584-Snapfalsz-[...])



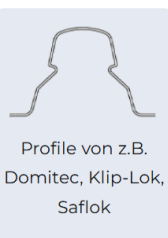
For use on many Nailstrip roofs such as Polmetal, Schleich up to a height of 25 mm | extensively tested and inspected | opening slot of 20 mm | additional fitting part on the inside of the clamp | TX 30 grub screw | tightening force 15-17 Nm, if sheet metal > 0.7 mm, then 18-20 Nm | M8 thread on top for M8x16 screw, tightening with 18 Nm | additionally screw Nailstrips in the area of the clamp fastening without restricting the expansion possibilities too much |
(Art. Nr. 9584-Nailstrip-[...])



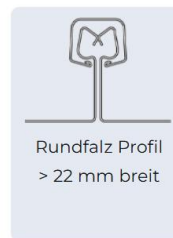
For use on many Nailstrip roofs such as SCH Holland, Schleich up to a height of 38 mm | extensively tested and inspected | opening slot from 12-20 mm | additional fitting part on the inside of the clamp | TX 30 grub screw | tightening force 15-17 Nm, if sheet metal > 0.7 mm, then 18-20 Nm | M8 thread on the top for M8x16 screw, tightening with 18 Nm | screw Nailstrips in the area of the clamp fastening without restricting the expansion possibilities too much |
(Art. Nr. 9584-Nailstrip-[...])



Use on Rip Roof roofs from e.g. GBS or Zambelli | extensively tested and inspected | Opening slot of 18.7-19 mm | If sheet metal >= 0.7 mm, stainless steel saddle (optional) must be inserted between clamp and seam | TX 30 grub screw | Tightening force 15-17 Nm, if sheet metal > 0.7 mm, then 18 -20 Nm | M8 thread on top for M8x16 screw, tightening with 18 Nm |
(Art. Nr. 9584-Nailstrip-[...])



For use on roofs from e.g. Domitec, Saflok, Klip-lok | comprehensively tested & inspected | opening slot depending on inlay | various additional fitting parts on the inside of the clamp | hexagon M8 press-fit screw | tightening force 23 Nm | top M8 thread for M8x16 screw, tightening with 18 Nm | various versions
(Art. Nr. 9584-Sonderfalsz-[...])



For use on metal roofs with a large diameter of the round rebate or if the rebate end is not closing correctly | extensively tested and inspected | Opening slot of 29 mm | Additional fitting part on the inside of the clamp | TX 30 grub screw | Tightening force 15-17 Nm, if sheet metal > 0.7 mm, then 18 -20 Nm | M8 thread on top for M8x16 screw, tightening with 18 Nm |
(Art. Nr. 9584-Rundfalszklemme-FL; 9584-Rundfalszklemme [...])



Specially designed clamp for the River Clack profile | extensively tested | stainless steel screw TX 30 internal thread | tightening force 20 Nm | top flange with slotted hole for M8 thread | two-part clamp that must be inserted and screwed into the channel next to the seam on the profile.
(Art. Nr. 9584-River Clack-[...])

In addition to the shape of the rebate, the material used also plays a role. Some material combinations pose a challenge here.

The installation instructions given do not release you from the obligation to check the possible uses and applications of our products - also in combination with other materials used - for each individual object in advance. The material properties of the metals used, their combinations and the processing instructions and regulations of all manufacturers involved (including those of the metal roof) must be taken into account.

On site, any existing specifications of the roof manufacturer regarding the installation of a photovoltaic mounting must be checked and complied with.

Straight roofs made of

- sheet zinc
- sheet copper

have some special features. Please feel free to contact us

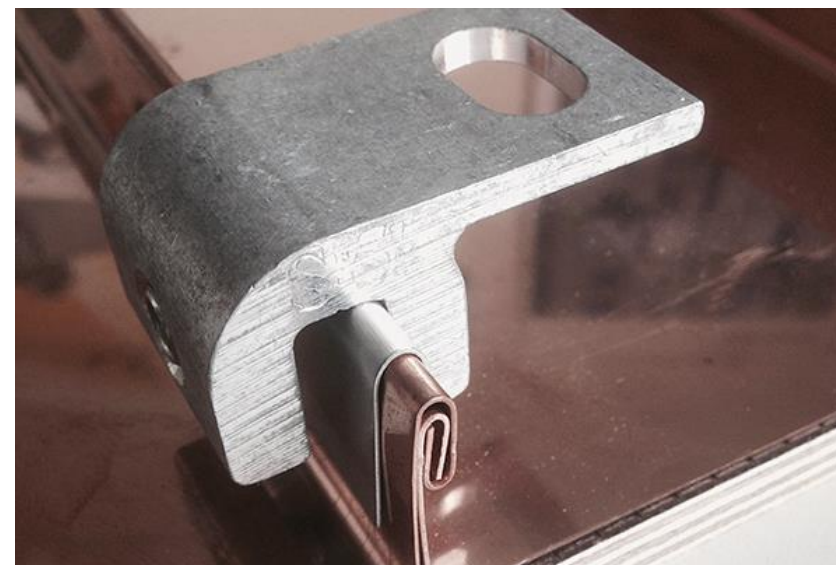
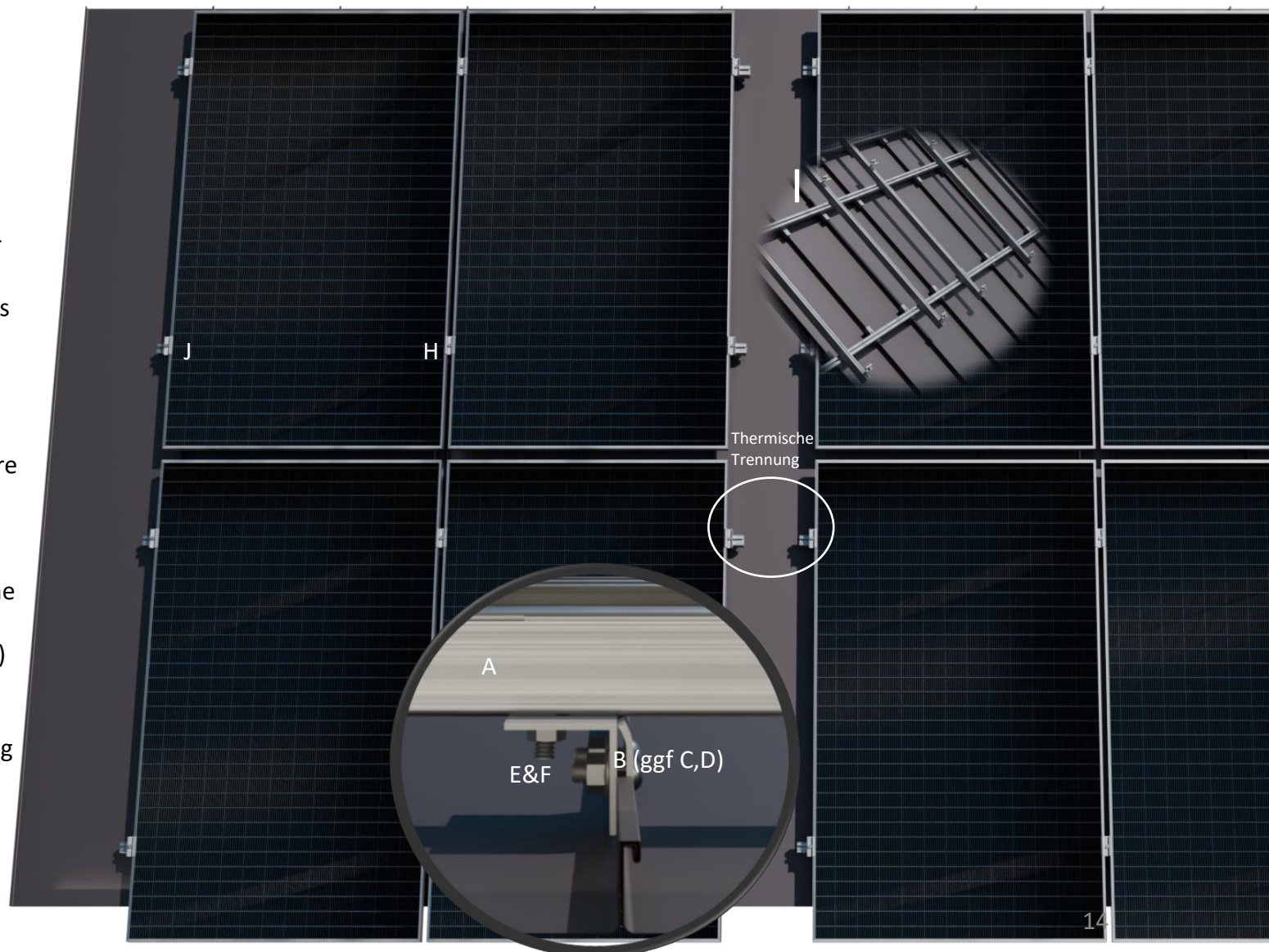


Fig. example: Standing seam clamp on a copper roof with inlay to prevent corrosion.

Overview

- The (previously determined) rebate clamps (B) are mounted on a rebated roof first.
- If the clamp does not already provide for a direct screw connection to the PROFINESS profile from below, an adapter plate must be fitted (C).
- The first rail layer (A) is always fastened at a 90° angle (across the rebate).
- The rails are fastened to the rebate clamps/adapter plates using hexagon/hammer-head screws and lock nuts (E&F).
- Thermal separation plays a major role when installing on rebated sheet metal roofs, which is why short rail sections are generally used.
- If the modules are mounted on edge, the modules are then screwed to the mounting rail using module clamps (H&J).
- If the modules are mounted transversely, but clamping on the short side of the frame is not desired or possible, a second row of rails (parallel to the rebate, so-called cross-bracing (I)) must first be mounted
- Before clamping with module clamps, the additional installation of an anti-slip device is recommended, depending on the roof pitch.



The rebate clamps must be positioned according to the local and static conditions and the installation situation*.

It is helpful if you mark the course of the individual module rows and the outline of the entire module field with chalk on the rebate before installation. Always mark the position of the rebate clamp according to the planning.

The position of the module supports/mounting rails must correspond to the clamping area specified by the module manufacturer.

Step by step

- 1) Check the planning documents.
- 2) Ensure that the rebate clamps are positioned in accordance with local and static requirements.
- 3) Depending on the selected rebate clamp, the respective properties and installation instructions must be observed, which can also be supplemented by PROFINESS on a project-specific basis.
- 4) Mark and position the rebate clamps (use a guide line).
- 5) All adapter plates or flanges of the clamps must point in the same direction



A = Distance between the rebates

B = Distance between the mounting rails

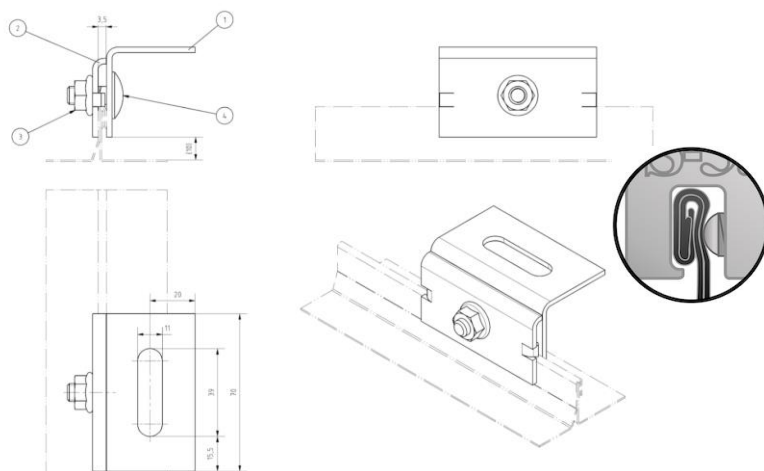
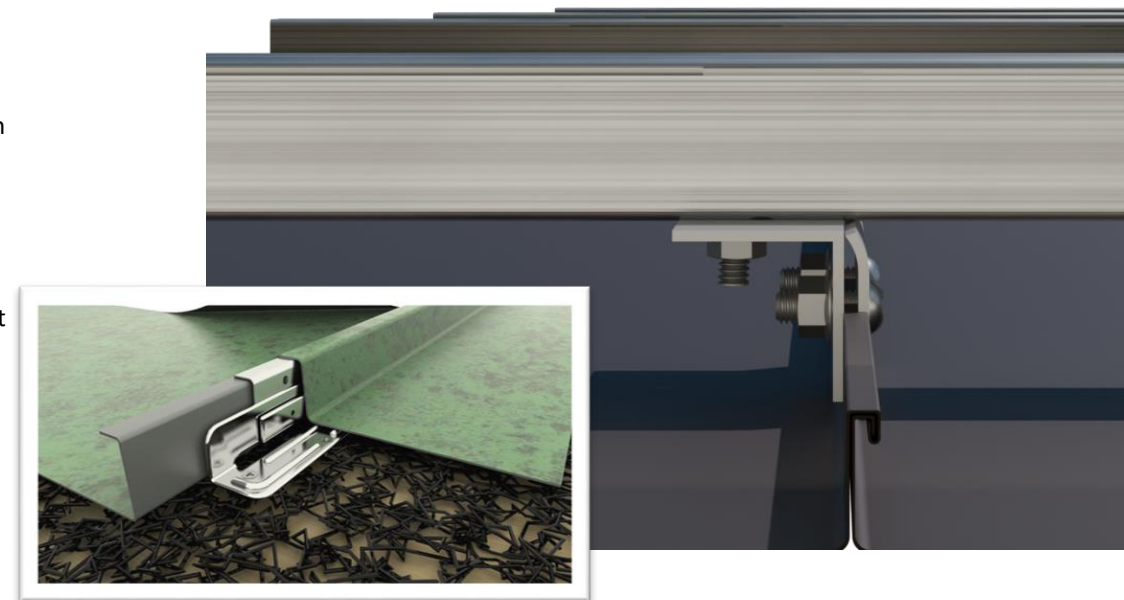
* Unless otherwise verified in the system statics, we assume a rebate clamp on each rebate.

Place the clamps flush on the rebate. When using clamps with grub screws, ensure that they are screwed in on the back of the rebate and that the "nose" of the clamp sits under the rebate.

The clamps may hinder the thermally induced change in length of the rebate sheet if, despite the high clamping point of the clamps, part of the rebate sheet fastening on the substrate (sliding clips) extends into the clamping area of the clamp. In this case, the clamps must be spaced 25 mm apart.
→ see also Thermal separation (p. 18)

Clamps with grub screws (TX 30) must be tightened with a tightening force of 15 - 17 Nm. For galvanised sheet steel covers of more than 0.7 mm, tighten to 18 - 20 Nm. Clamps with a carriage bolt may be tightened with a maximum tightening force of 16 Nm. Only use an electric screwdriver with torque control!

Tighten the grub screws and retighten both again. This slightly deforms the metal of the rebate without damaging or penetrating it. The permanently very high holding forces are achieved by this frictional connection.



Many electric/rechargeable screwdrivers do not always provide a consistent tightening force. The tightening force must therefore be checked with a calibrated torque spanner and the grub screws retightened if necessary. If an M8x16 stainless steel screw in the M8 thread on the top is used for installation, it must be tightened to a torque of 18 Nm.

For structurally relevant clamps, a minimum distance of 500 mm from the end of the standing seam profile must be maintained. The client, owner or operator is responsible for the stability of a structural system. The installer of the system is not only responsible for the system, but also for the roof on which he installs the system. Sufficient holding force of the roofing on the supporting or substructure must always be ensured. Proof must be provided by the customer. In cases of doubt, a structural engineer must be consulted in advance to determine the load and its transfer.

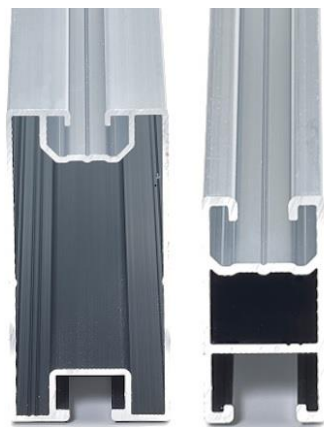
If the clamp is designed without an adapter plate (C), this must be attached afterwards. To do this, insert the screw (D) through the round hole into the upper thread of the rebate clamp.

The rail structure must be separated at regular intervals (after max. 3 metres, as specified by the sheet metal manufacturer) and a thermal break must be inserted to limit deformations in the longitudinal and transverse directions.

In order to meet the structural requirements of the respective location and to be able to plan and install the optimum substructure depending on the installation situation, PROFINESS offers aluminium module supports of various thicknesses for your Roof rebated roof system.



For the lower connection to the rebate clamp, the PROFINESS mounting rails have a rail channel at the bottom for an M10 screw connection. This fastening can be made either with a PROFINESS hammer-head screw, which can be screwed in at any point on the profile, or with an M10 hexagon head screw (DIN 933), which is inserted into the side of the rail channel.



Single-layer installation with modules on edge

- The module supports (e.g. Performance Standard 40x40 profile) are always installed at right angles to the running direction of the rebate on the rebate clamps.
- If clamping the modules on the short side of the frame is not permitted or desired, a second rail layer must be installed parallel to the rebate (cross-bracing) for transverse modules.
- Attach the mounting rails to the rebate clamps or the adapter plate using the lower M10 channel. To do this, use either the hexagon head screws previously pushed into the channel or hammer-head screws (can be screwed in at any point) including lock nuts.
- Check that the hammer-head bolt is correctly positioned in the groove channel and tighten the nut firmly (tightening torque max. 25-30 Nm). The mounting rails must be installed without tension*.



*Level out any unevenness by placing spacer sleeves / washers between the profile and the rebate clamp. The screw may have to be longer depending on the need for height compensation.

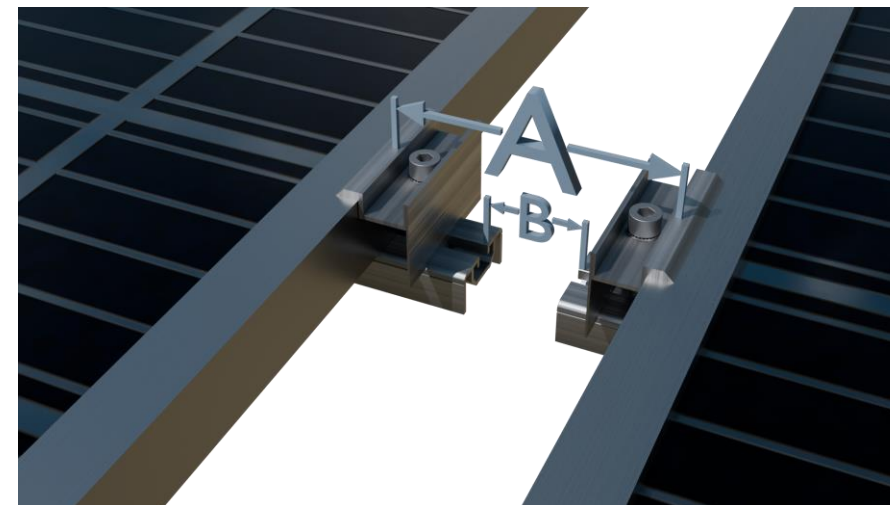
The thermally induced change in length of the metal cladding must not be hindered! With some roofs made of profiled sheets (e.g. round seam, snap seam, RibRoof seams, etc.), care must be taken to ensure that the clamps in the sliding area of the sheets are not mounted on or next to the roofing brackets. In the case of double standing seam roofing, the clamps may hinder the thermally induced change in length of the seamed sheet if, despite the high clamping point, the base of a sliding seam extends into the clamping area of the clamp. In this case, the clamps must be positioned 25 mm away from the sliding clips.

The module array must be separated at regular intervals and an expansion joint inserted. In the case of standing seam roofs, for example, it is assumed that a separation should be made after a maximum of 3 metres in order to limit deformations due to thermally induced changes in the length of the materials (in the longitudinal and transverse direction).

The early thermal break required must match the grid dimensions of the modules, rails and rebates and must therefore always be determined on a project-specific basis.

This results in a larger space requirement.

In general, the arrangement of expansion joints depends on the roof construction and the local temperature conditions. Therefore, a local roofer or builder/manufacturer of the roof structure should always be consulted.



Distance A from module to module = 140 mm (55 mm from module frame to rail end), here using the Profiness 40x40 rail as an example. The distance between the rail ends should be at least B= 30 mm

In order not to lose too much space, the rebate clamps and mounting rails can be mounted offset to an expansion joint when installing on edge. In this case, two rails are placed directly on top of each other so that one row ends and a new row begins. The clamping area is thus maintained and the modules do not have to be installed offset.

Likewise, the modules should not be installed butt-jointed in the direction from eaves to ridge* (module frame directly to module frame), but at least 1 cm apart.

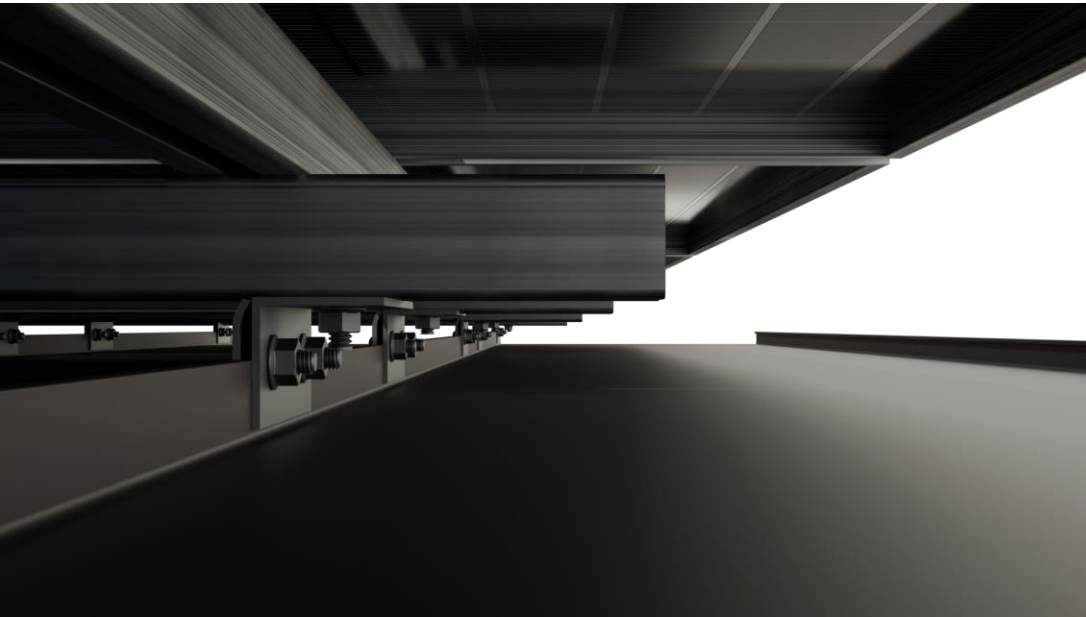
Expansion joints must not be built over with modules. There is no earth-locking connection. This must be established without restricting the effectiveness of the expansion joint.

Then fit the anti-slip protection, position the modules and fasten them to the rails using centre and end clamps.



*or proceed in reverse for transverse mounting

The module supports (e.g. Performance Standard 40x40 profile) are mounted on our rebate clamps in the first rail layer in a horizontal direction only (90° to the course of the rebate).



Ensure that the mounting rails are aligned evenly and parallel to the ridge and that the mounting rails are aligned in the clamping area of the modules.



Double-layer installation for transverse framed photovoltaic modules

Install the vertical module supports on the lower, horizontal mounting profiles using cross connectors.

The clamping range of the modules (shown in the module manufacturer's product descriptions) determines the distance between the upper supports.



Always mount the vertical module supports from bottom to top. Check that the cross connector is correctly fitted and tighten the screw (see following page for tightening torque).

A cross connector is fitted at each crossing point.

The vertical module supports are connected/extended in the same way as the horizontal mounting profiles. The connection positions must lie between two crossing points so that no cantilever arm is created after a connection point.



Quick and easy attachment of the PROFINESS **Connect X | quick-fit clamp Z-bracket** (always mounted alternately above and below the horizontal profiles) and the standard Performance mounting rail and the reinforced Strong mounting rail (40x40 in each case).



Fastening with PROFINESS **Connect X cross connector plate** with performance rails (40x40 mm, 20x40 mm and 80x40 mm) with bottom connection (M10) and Strong mounting rails.

Plate with two slotted holes for M8 screw connection and one slotted hole for M10 screw connection. Additional hexagon socket screws (M8x16) and sliding blocks (M8) are required.



Fastening with PROFINESS Connect X cross connector bracket and **Profiness Performance mounting rail** (40x40 mm) on the side.

Additional hexagon socket screws (M8x16) and sliding blocks (M8) are required.

If a module row is longer than the mounting rail, it can be extended using rail connectors.

ATTENTION:

- When installing on rebated roofs, it is unusual to extend profiles 90° to the direction of the rebate, as an expansion joint should often be created after 3 metres.
- In the upper layer, profiles parallel to the rebate, a longer connection of the profiles is possible and usually permissible.

When extending the Performance Standard mounting rail (40x40 mm), for example, two Connect Basic slide-in connectors are pushed halfway into the already installed module support and lightly hammered in (e.g. with a rubber mallet). The connectors can be secured with additional self-tapping screws.

The module support / mounting rail is then pushed flush onto the profile connector. When the mounting rails are joined together using connectors, an electrically conductive connection is created (important when creating potential equalisation).

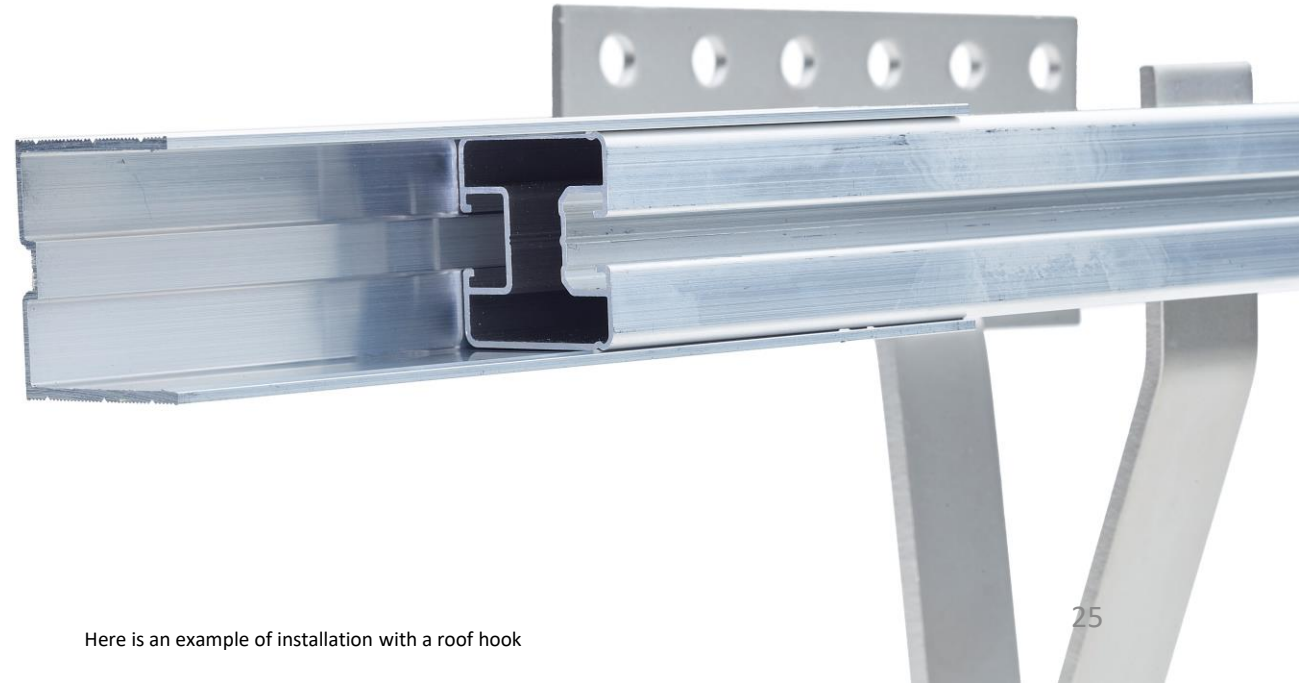


Here is an example of installation with a roof hook

Alternatively, the rails can be connected using four-hole connectors and a quadruple screw connection with hexagon bolts and lock nuts.



Another connection option is offered by U-connectors, which are also placed around the rails afterwards and fastened with four self-tapping screws.



The following installation instructions must be observed for the different versions of rail connectors :

Connector type	
Connect Basic slide-in connector	Two connectors are required per connection point. Both mounting rails are pushed together flush on the connector using pressure. This creates a conductive connection (if relevant for integration into the lightning or earthing concept, this should be checked professionally on site after installation).
Connect Basic	This U-connector can also be slid over the connection point at a later date. The connector is fixed in place with four 5.5x25 self-drilling screws. Suitable for our 40x40 profiles or 80x40 profiles.
Connect Basic perforated plate 4-hole connector	The 4-hole connector is fastened in the lower M10 profile channel using four screws (hexagon head screw or hammer-head screw) and nuts. Suitable for all mounting rails with an M10 channel at the bottom.
Connect Basic further slide-in connectors	Slide-in connector for Strong mounting rail (80x40) or Performance mounting rail (40x20). One connector per connection point. The connector is fixed with four 5.5x25 or self-tapping screws.

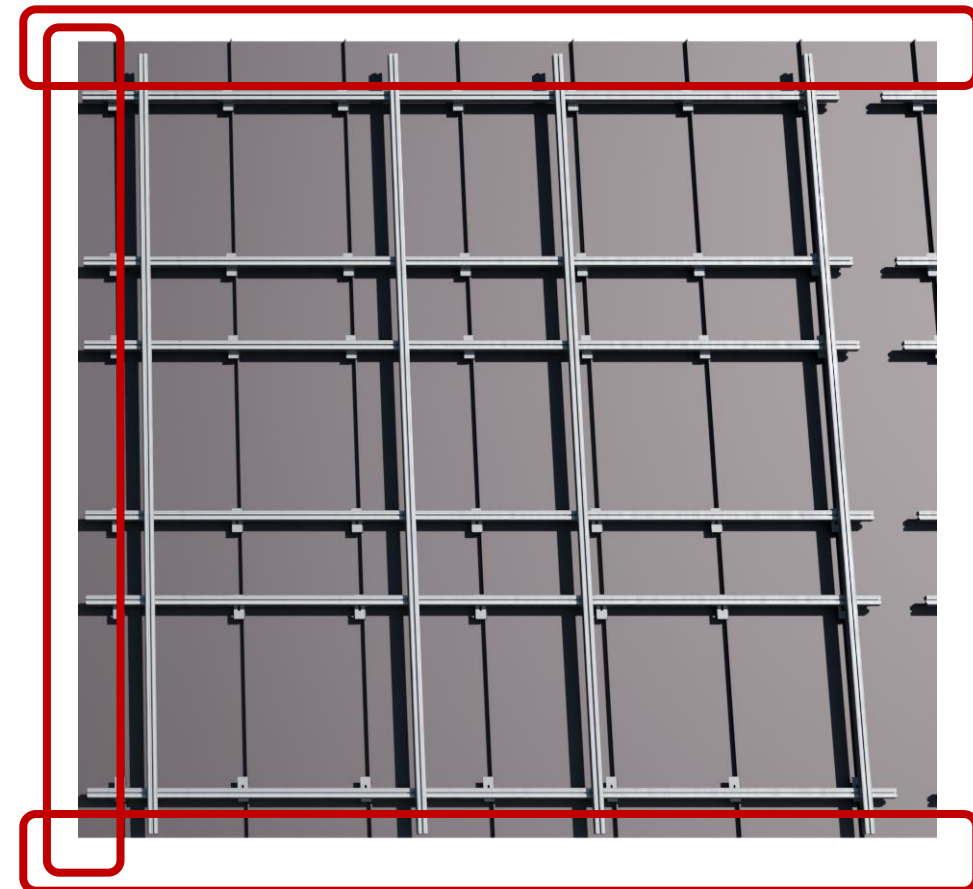


Connectors may only be used between two fixing points (rebate clamp or cross connector clamp/bracket/plate).

No cantilevers (projection beyond the last crossing point) may be created with connectors.



Permissible range for connectors



Non-permissible area for connectors

As soon as the mounting rails are aligned and secured, the modules can be clamped onto them.

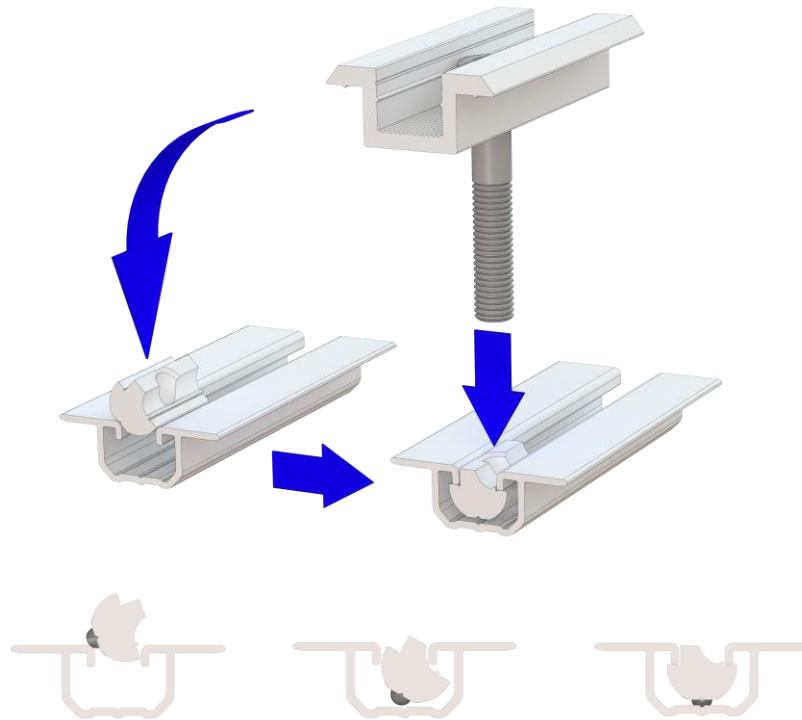
In the following, we first describe the installation of upright modules on the mounting rails.

First place the modules in the desired position.

The respective clamping of the modules can be found in the explanations on the following pages.

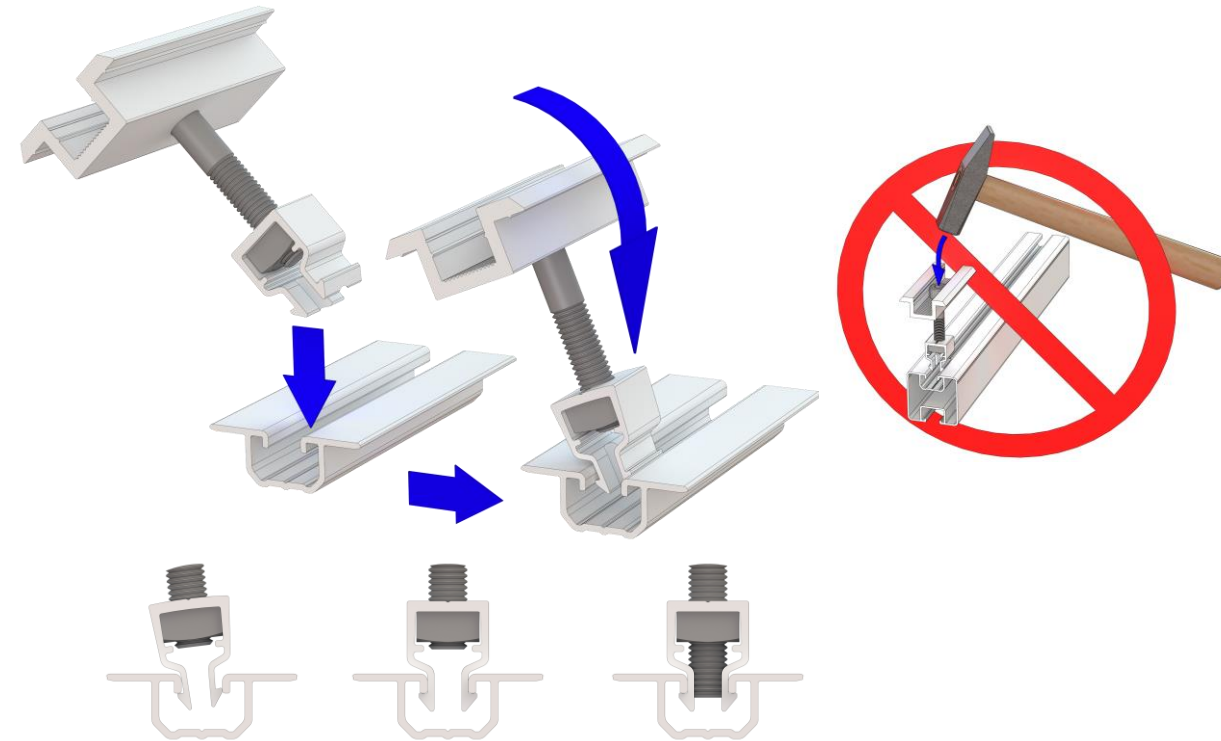


PROFINESS Connect Basic Modulklemmen



- The sliding blocks can be swivelled laterally into the upper channel (M8) of the mounting rails.
- The lock washer is then guided through the centre or end clamp together with the hexagon socket screw and screwed into the thread of the sliding block.

PROFINESS Connect Quick Modulklemmen



- Klick Fix clamps are already pre-assembled and are swivelled in sideways with a little effort.
- The screw is then tightened
- Caution - Do not hammer in the click clamps!

Module installation - Positioning the end clamp

Place a module on the module support and screw on the end clamp. To do this, fit the end clamp just before the end of the module and push it onto the module. Make sure that the screw can be screwed into the slot nut or click module (with click system) without force to prevent the screw from being overtightened in the thread during installation.

Make sure that the click module (when using the click clamp) is fully engaged in the groove channel.

Now tighten the screw firmly.
(Tightening torque max. 12-14 Nm for screw and sliding block or max. 8-10 Nm for the screw connection of click clamps). Check whether the end clamp clamps the module with the clamping surface specified by the module manufacturer and whether this is within the clamping range of the modules.

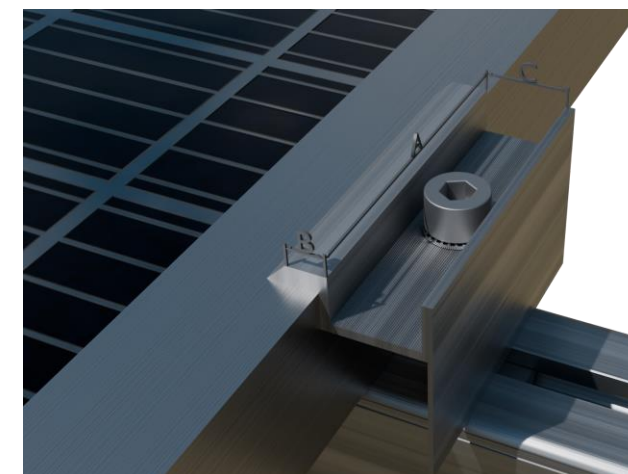


Module installation - Positioning the end clamp at the row end

End clamps are installed at the end of the module row or an expansion joint. To do this, attach them to the slot nut that you previously clicked into the slot channel and slide the clamp onto the module. Now tighten the screw

(Tightening torque max. 12-14 Nm for screw and sliding block or max. 8-10 Nm for screw connection of click clamps).

Check whether the end clamp clamps the module frame on the clamping surface specified by the module manufacturer. The distance between the module frame and the end of the rail must be at least 35 mm.



A = Clamp length (70 mm)
B = Contact surface of the clamp (10 mm)
C = Total width clamp (30 mm)

Installing the modules - centre terminal

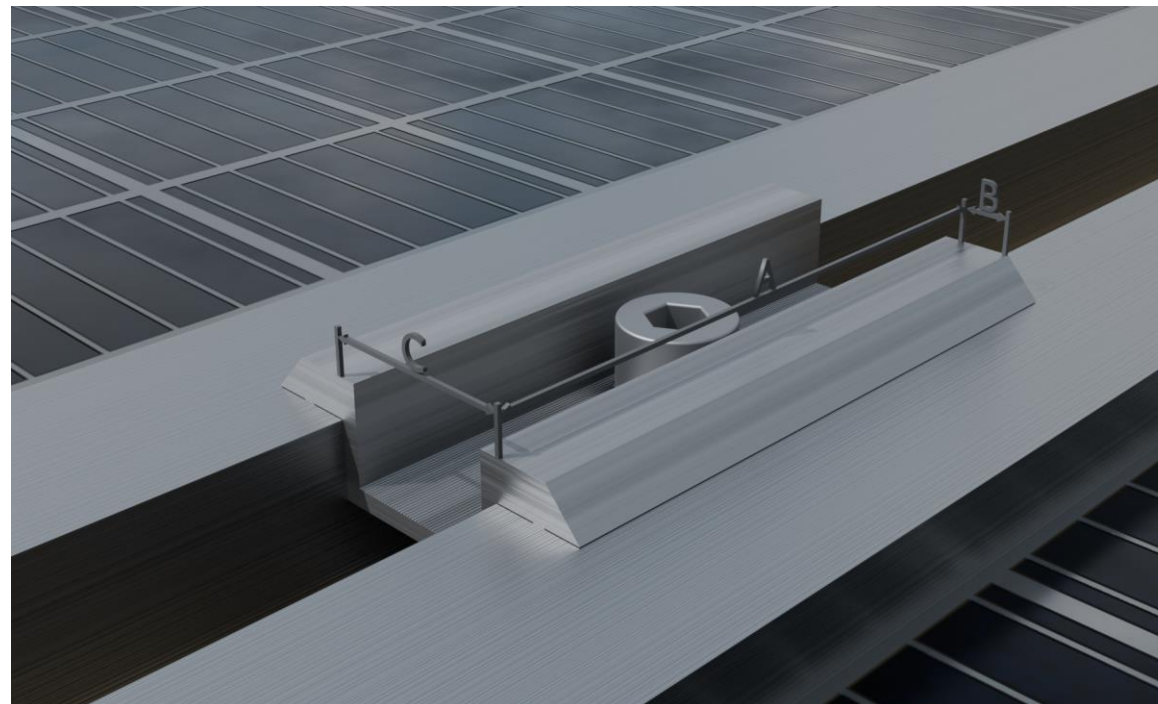
To install the centre terminal, attach it to the module support as previously described in the chapter on end terminals and slide it onto the module.

As with the end clamp, make sure that the click modules (for click clamps) are clicked in correctly and that the screws can be turned easily in the threads.

You can now slide the next module under the centre clamps and tighten the screws (**tightening torque max. 12-14 Nm for screw and sliding block or max. 8-10 Nm for the screw connection of click clamps**).

We recommend the use of earthing plates ("Grid Potiklemme") to facilitate potential equalisation. This must be fitted before the centre terminal is installed. The earthing plate is pressed against the module support when the centre clamp is installed and thus establishes potential equalisation between two modules.

You can align the modules in the upper module row using a bricklaying cord or a levelling device. Slide the module under the centre clamps and tighten the screws.



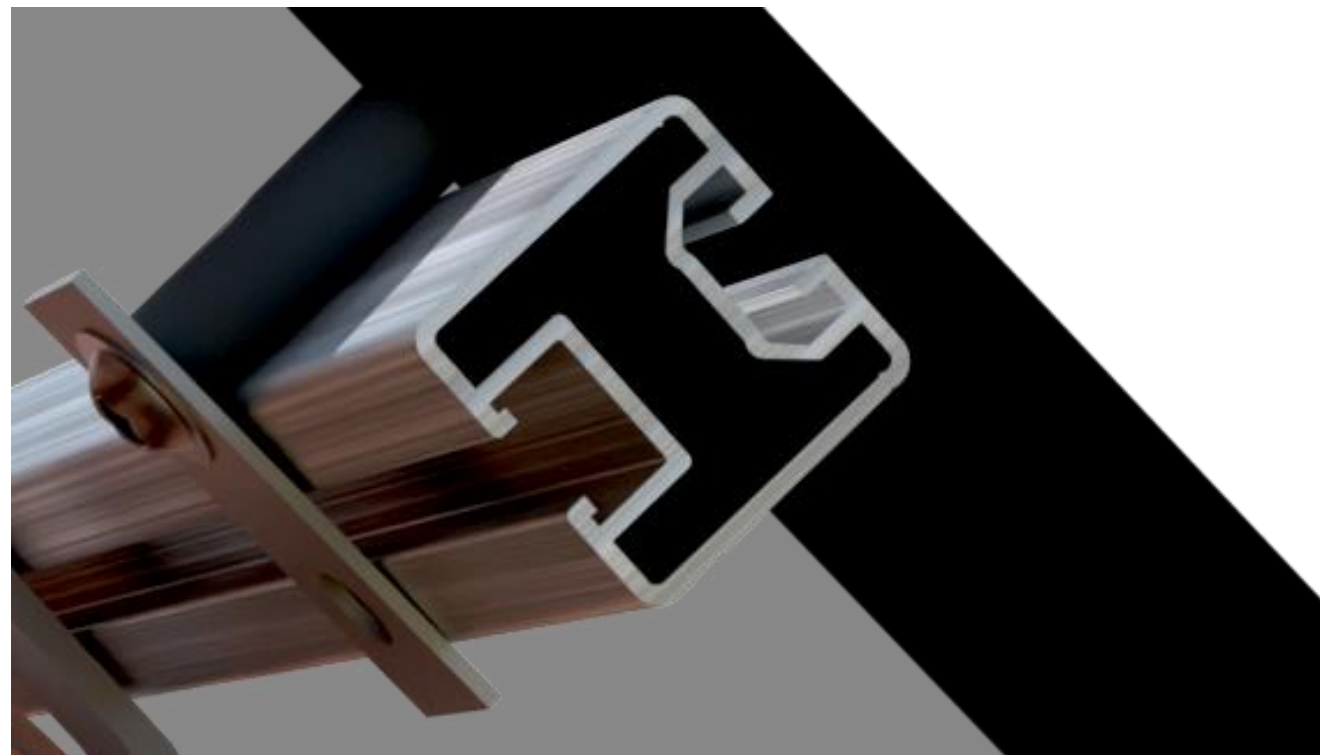
A = Clamping length (70 mm | for standard)
B = Contact surface of the clamp (10 mm)
C = Terminal spacing (30 mm)

If the installed modules have a higher inclination, it is recommended to secure the bottom row of modules against slipping. This also applies to modules that are not followed downwards by another module (e.g. in front of obstacles).

To do this, fit two screws (usually M6x20/M8x20 mm) with two nuts in the holes in the module frame, above the bottom rail section, so that this set touches the rail section after installation.

If the holes in the module are larger, use screws with a larger diameter.

Alternatively, fit an anti-slip device to each of the two upper holes in the module (as shown here on the right). Then hook the module onto the upper mounting rail (40x40) and finally attach the centre and/or end clamps. Installation without clamps is not permitted.



Cover caps

PROFINESS offers matching cover caps in various designs and colours for the standard 40x40 mm and 80x40 mm profiles.

Earthing terminals

PROFINESS offers material to ensure potential equalisation between the modules and the substructure.

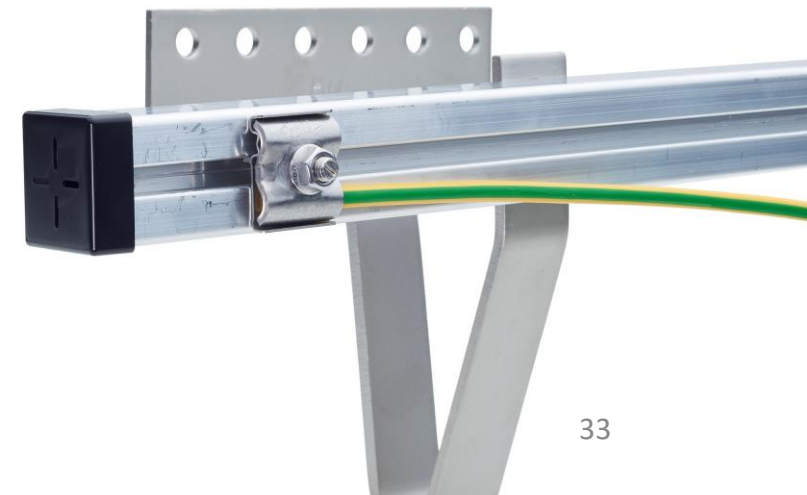
To ensure potential equalisation, we offer various earthing clips for the module rows as well as earthing clamps for the rail channel. It is essential that you discuss the topic of potential equalisation and earthing of your PV system with your installer or electrician on site.

The minimum cross-section for the electrical connection of an equipotential bonding can be assumed to be $\geq 6 \text{ mm}^2$ for copper and $\geq 16 \text{ mm}^2$ for aluminium.

The minimum cross-section for the electrical connection to lightning protection can be assumed to be $\geq 16 \text{ mm}^2$ for copper and $\geq 25 \text{ mm}^2$ for aluminium.

Most of our components are lightning current carrying, test class N (50kA) tested in accordance with DIN EN 62561-1:2017-1.

As a rule, however, this is only necessary if the DC is to replace part of the external lightning protection. It is essential that you discuss the topic of potential equalisation, earthing of the PV system and lightning protection with your installer or electrician on site.



Introduction

On the following pages you will find further installation instructions, which refer in particular to building regulations and standards. These guidelines must be observed when installing any PROFINESS mounting system.

Please read these installation instructions carefully before installation and keep them for future reference. Always check whether a newer version of these installation instructions is available online (<https://www.profiness.de/> – Downloads). If you have received a project plan for your project, including project statics, these instructions are only complete including this project plan.

These installation instructions deal with the installation of PROFINESS mounting systems for pitched roofs with interlocking sheet metal roofing.

Fundamentals

These installation instructions are intended for professionally qualified persons instructed by the photovoltaic system operator.

Comprehensive knowledge is required for the installation of PROFINESS fastening systems on roofs with interlocking sheet metal cladding. We recommend having the fastening carried out or supervised by a trained roofer or similarly qualified person.

The various components of the systems are made of aluminium and stainless steel. This ensures high corrosion resistance and the longest possible service life, as well as the possibility of almost complete recycling.

At least one copy of the Profiness installation instructions must be available to the installers carrying out the work by the time the installation work is completed.

General safety instructions

The following general safety instructions must be observed when installing PROFINESS systems.

Systems may only be installed and commissioned by persons who are able to ensure that the work is carried out in accordance with the regulations due to their professional qualifications (e.g. training or activity) or experience.

Before installation, it must be checked whether the product fulfils the static requirements on site. For roof systems, the on-site load-bearing capacity of the roof must always be checked.

National and local building regulations, standards and environmental protection regulations must be complied with. Occupational safety and accident prevention regulations, corresponding standards and regulations of the employers' liability insurance association must be complied with! In particular, the following must be observed:

- Safety clothing must be worn (especially safety helmet, work shoes and gloves).
- The regulations for working on the roof (e.g. Fall protection, scaffolding with safety gear from an eaves height of 3 metres, etc.) must be observed.
- In principle, at least two people must be present on the construction site during installation.

The installation instructions of the respective module manufacturer must be observed.

Equipotential bonding between the individual system components must be carried out in accordance with the respective country-specific regulations.

PROFINESS accepts no liability for defects and damage resulting from non-compliance with our installation instructions and installation manuals and non-utilisation of all system components as well as the installation and removal of components that were not purchased from us. A warranty is excluded in this case.

PROFINESS components are available in stainless steels of different corrosion resistance classes. In each case, the expected corrosion load for the respective structure or component must be checked.

The system must be properly maintained, checked and serviced. This includes regular visual inspections. We recommend an annual visual inspection. All system components must be checked for damage caused by e.g. weather influences, animals, dirt, deposits, build-up, vegetation, roof penetrations, seals, stability and corrosion.

In addition, the tightness of screw connections must be checked and, if necessary, tightened in accordance with the tightening torques specified in the installation instructions.

After exceptionally strong impacts (e.g. from earthquakes, heavy snowfall, storm events, etc.), the system must always be inspected. This inspection must be carried out by qualified specialist companies or experts. It must be checked whether the system has visible or hidden defects that will no longer sufficiently guarantee the load-bearing capacity, stability and functionality of the system in

the future. If the inspection reveals plastic deformation, e.g. in the module clamping area, or damage, such components must be replaced.

The system is dismantled in reverse order to the assembly steps

Intended use

PROFINESS provides you with a fastening system for mounting photovoltaic modules. The design is for photovoltaic modules only. If the installation deviates from this, it is not in accordance with the actual intended use. Observance of these installation instructions is a basis for the intended use. PROFINESS GmbH is not liable for damage resulting from disregarding the installation recommendations, nor if the products are misused or not used as intended.

Before starting installation, the compatibility of the roof cladding and the installation system must be checked and ensured. The roof must be checked for damage of any kind. These must be recorded in the roof inspection report. Repair work may be necessary.

In the case of uneven roofs or roof waterproofing, equalisation measures may have to be taken to ensure an even load transfer.

To ensure that the substructure rests flat on the roof cladding, **the roof surface must be cleaned before the start of construction** and impurities such as moss, leaves, rubble, stones, etc. must be removed.

The necessary distances to the roof edges specified in the project documents must be observed. The maximum module array size depends on the type of roof. For roofs with substrate or gravel fill, ensure that a sufficiently non-slip connection is created.

The surface load must not exceed the residual load-bearing capacity of the building. Care must be taken to ensure that the drainage of rainwater is not impeded. The roof drainage system must be included in the system planning.

General information - Standards and guidelines

Each photovoltaic system must be installed in accordance with the specifications in these installation instructions and the project report.

These installation instructions are based on the state of the art and many years of practical experience with PROFINESS systems. It must be ensured that only up-to-date and complete installation instructions are used for installation and that a printout of the installation instructions is kept in the immediate vicinity of the system (subject to technical changes).

The project report is part of the installation instructions and is created on a project-specific basis. All information in the project report must be adhered to. In the project report, the structural calculations are carried out on a site-specific basis. The PROFINESS mounting systems must be designed and planned using the PROFINESS software (Profiness Planning Tool) or by a structural engineer commissioned by Profiness.

As the individual characteristics of each roof must be taken into account, expert clarification must always be carried out before installation. Before installation, the PV system installer must ensure that the existing roof covering and roof substructure are designed for the additional loads that will occur. 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. Contact a structural engineer directly on site.

When installing the PV systems, the module manufacturer's installation instructions must always be observed. In particular, it must be checked whether the module manufacturer's specifications regarding the module clamping specifications (clamping surface and clamping area on the module) are complied with. If this is not the case, the module manufacturer's declaration of consent must be obtained on site before installation or the frame must be adapted to the module manufacturer's specifications.

The requirements for lightning and surge protection of mounting systems for PV systems must be produced in accordance with DIN and VDE regulations. The specifications of the responsible energy supply company must be complied with. Care must be taken to ensure that the PV system to be installed does not impair the effect 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 included in the protection area 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 complied with. Fire protection regulations must be observed during installation, e.g. no fire protection walls must be built over and appropriate distances must be maintained.

If changes are made to the roof covering, the manufacturer's instructions must be observed. During and after installation, the frame parts must not be walked on or used as a climbing aid. There is a risk of falling and the roof covering underneath 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, occupational safety and accident prevention regulations, standards and environmental protection regulations.

Every person who installs PROFINESS PV mounting systems is obliged to inform themselves independently about all rules and regulations for technically correct planning and installation and to comply with them during installation. This also includes obtaining the current status of all rules and regulations.

The installation of the PV system may only be carried out by appropriately trained specialists who can ensure that it is carried out in accordance with the regulations.

Detailed information on folded sheet metal roofs

The installation of PROFINESS mounting systems and the photovoltaic system may only be carried out by adequately trained specialists. The components of the frame construction must not be used as stepping aids and the modules must not be stepped on. When working on the roof, there is always a risk of falling and falling through, resulting in a risk of injury or death. Suitable safety devices must be provided for access and for protection against falling (e.g. scaffolding) and falling parts.

The client must inspect both the condition and the structure of the roof construction before commencing installation. The installation instructions (and, if available, the project report) must always be followed during installation.

Failure to observe the installation instructions may result in damage to the building and the photovoltaic system to be installed.

Before installation, check that all frame parts are intact. If parts are damaged, they must not be installed.

The bolted connection between the profile rails and the roof structure (seam plate) has the task of transferring the occurring forces into the roof structure in order to ensure the stability of the system to be installed.

Please note the material and material thickness of the rebate sheets and the specifications for installation on rebate roofs.

We recommend using stainless steel self-drilling screws with building authority approval.

Before installation, it must be checked whether the roof structure is fundamentally capable of bearing the load of the photovoltaic system and the resulting changes in load. A structural engineer must be consulted on site for this purpose. In the case of existing roofs, the condition of the wooden structure must also be assessed on site.

The regional and currently valid building regulations must be observed. Under the given conditions, the screw connection must be calculated in accordance with the building authority approval. The result shows whether the selected number of screws can transfer the forces of the roof hooks into the roof structure.

Local building regulations must be checked on site with regard to the permissibility of installation on certain sheet thicknesses. The project planning including project statics by Profiness and / or the planning in the Profiness planning tool always only includes the verification of the mounting structure on the respective sheet metal in accordance with the fully completed checklist.

Utilisation agreement

PROFINESS assembly systems are sold within the framework of a purchase agreement. Neither the purchase by third parties nor installation and processing are carried out in the name of or on behalf of PROFINESS GmbH.

Processing and installation must be carried out by specialised personnel qualified for this purpose and in compliance with these installation instructions. A structural engineer commissioned by PROFINESS will provide project-related support on request.

PROFINESS GmbH is not responsible for the calculation of the statics of the roof structure, the procurement and documentation of the approval of the roof manufacturer for the installation of corresponding fastening components on the roof (in terms of warranty claims against the roof manufacturer or manufacturer) and the professional installation.

Damage and faults as well as insufficient or limited function of the assembly system due to faulty installation and/or installation deviating from the assembly instructions and/or project report shall exclude a material defect for which PROFINESS GmbH is responsible. The purchaser's rights due to a material defect shall lapse in the event of improper installation.

Any guarantees only apply if all components of the mounting frame have been purchased from PROFINESS GmbH.

Disclaimer

The information on dimensioning contained in this document is merely practical advice. Binding, project-related frame statics can only be generated by a structural engineer commissioned by PROFINESS.

As the installer, you are responsible for ensuring that the installation is carried out correctly. PROFINESS GmbH is not liable for dimensioning information contained in commercial offers and order confirmations.

As the installer, you are responsible for the mechanical durability of the installed connections to the building envelope, and in particular for their tightness. PROFINESS GmbH components are designed according to the expected loads and the current state of the art. For this design, you must provide all the necessary framework conditions (information on the roof structure, local loads, etc.) in writing in the PROFINESS enquiry forms at the enquiry/order stage.

PROFINESS GmbH is not liable for improper handling of the installed components. Due to the risk of corrosion, installation near the sea must be clarified with PROFINESS GmbH depending on the project.

Wearing parts are generally excluded from any warranties.

Documentation

In order to guarantee traceability in the event of complaints or problems, archive existing product/packaging labels.

Standards and regulations to be observed

Before and during the installation of a photovoltaic system, the installation instructions of the module manufacturer must be observed.

The following regulations / standards / provisions must also be complied with:

- BGV A2 Electrical installations and equipment
- BGV C22 Construction work
- BGV D35 Ladders and steps
- BGV A1 Accident prevention regulations
- DIN EN 1995-1-1 +
- DIN EN 1995-1-1/NA Timber structures: Mechanical connections
- DIN EN 1991-1 +
- DIN EN 1991-1/NA Actions on supporting structures
- DIN 18299 General regulations for all types of construction work
- DIN 18451 Scaffolding
- Subject to technical changes.

At least one copy of the PROFINESS installation instructions must be available to the installers carrying out the work by the time the installation work is completed.

Earthing

Equipotential bonding between the system components must be established in accordance with the country-specific standards and regulations. In some cases, system and material-specific properties can be utilised for this purpose.

These installation instructions do not include an earthing concept. This must be created or calculated by the installer in accordance with the applicable guidelines and standards. However, the PROFINESS Connect Grid earthing terminal can be used to establish a connection to the substructure.

Profile connectors are used to achieve an earth-locking connection of the module support profiles (only when using continuous profiles in a cross-connection).

In addition, the modules can be connected to the mounting system with an earth connection using the PROFINESS Connect Grid potential equalisation clamp under the centre clamps. Please also observe the module manufacturer's specifications.

Please do not confuse "earthing" with lightning protection! A specialist company must be contacted for the installation of a lightning protection system so that

they can draw up a project-specific lightning protection plan. The module manufacturer's installation specifications must also always be observed in this context.

Demontage

A PROFINESS mounting system may only be dismantled by adequately trained specialist personnel. Observe the same guidelines, standards and safety instructions that apply to installation.

Carry out the disassembly in the reverse order of the previously described installation.

Disconnect the photovoltaic system from the grid before dismantling and disconnect all cables / electrical lines and plug connections of the modules and the mounting system.

Then uninstall the modules and store them on a secure surface. Carry out the disassembly professionally and properly to prevent damage to the photovoltaic modules.

Now dismantle the mounting system. If the mounting system leaves openings in the roof structure / roof cladding, these must be professionally sealed in accordance with the instructions and guidelines of the roofing trade.

Waste disposal

The PROFINESS mounting system consists of aluminium, stainless steel, steel and cellular rubber components. These can be recycled after deinstallation. Ensure that they are disposed of correctly by a specialised company and check the applicable national standards and guidelines.

All information on standards, guidelines and current legislation was provided to the best of our knowledge at the time of compilation. Nevertheless, there is no claim to completeness or correctness of the regulations listed. The installer is always responsible for checking and complying with the applicable framework conditions and regulations.

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Subject to change without notice. Product illustrations are examples and may differ from the original.

Technical sales

Jan Matten

+49 (0)208 - 30 96 19 – 03

j.matten@profiness.de

Sabine Plott

+49 (0)208 - 30 96 19 – 05

s.plott@profiness.de

Björn ter Schüren

+49 (0)208 - 30 96 19 – 04

b.terschueren@profiness.de

Mats Michel

+49 (0)208 - 30 96 19 – 08

m.michel@profiness.de

Ulrich Kamp

+49 (0)208 - 30 96 19 – 01

u.kamp@profiness.de

Order processing

Uta Straberg

+49 (0)208 - 30 96 90 – 00

u.straberg@profiness.de

Logistik

Alexander Stroncik

+49 (0)208 - 30 96 19 – 07

a.stroncik@profiness.de

Corporate development/ marketing

Thomas Drewitz

+49 (0)208 - 30 96 19 – 02

t.drewitz@profiness.de

CEO | Management

Michael Schreiber

+49 (0)208 - 30 96 19 – 0

m.schreiber@profiness.de

