



**Mounting
Solutions**

EN

AS 2.1

STANDING SEAM ROOFS

Prior to assembly, please carefully read the safety information located at the end of these assembly instructions. Before commencing with the assembly, please ensure that you are using the latest assembly instructions.

The mounting system should be designed and planned using the **MOUNTING SOLUTIONS Solar.Pro.Tool** software. Please refer to the project report obtained from the Solar.Pro.Tool or your MOUNTING SOLUTIONS sales partner for the required materials and the position and arrangement of the individual components. These data are statically calculated and of great importance for the safe and trouble-free function of the system.

The installer of the photovoltaic system must ensure before assembly that the existing roof substructure is capable of bearing the extra loads.

These assembly instructions explain the mounting sequences for the MOUNTING SOLUTIONS standing seam roof components, their fastening to the roof substructure and the mounting of the modules.

With standing seam roofs, the modules are usually mounted upright so that the carrier profiles lie parallel with the roof ridge. As standard, two carrier profiles are used per module row.

The MOUNTING SOLUTIONS standing seam roof system is designed exclusively for mounting PV modules. Any other use will be regarded as inappropriate.

The use of support pillars on standing seam roofs is not recommended.

The assembly may only be carried out by trained tradesmen. In particular, work on the roof covering should be carried out by a roofer.

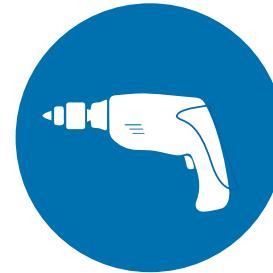
If you should have any further questions, please contact ALUMERO's professional and comprehensive consulting service. Our competent structural engineers and technicians will be glad to help you.

GENERAL INFORMATION

Min. sheet thickness:	Sheet steel min. 0.5 mm Aluminium, Rheinzink min. 0.7 mm		
Roof inclination:	7° – 65°		
Max module field size:	length 3 m		
Screw assembly:	M8 (A2-70)	M10 (A2-70)	Fixing screw M10x1 x12.5
Torque:	15 Nm	30 Nm	18 Nm

The tightening torque of the standing seam clamps is to be limited so that the standing seams are not damaged and the thermal expansion of the sheets is not hindered! A sufficient distance between the clamps and the sliding clip must be ensured.

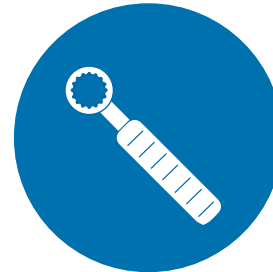
TOOLS REQUIRED



Cordless screwdriver
with bits:
Allen **5AF, 6AF,**
hexagon **13AF**



Open-ended spanner



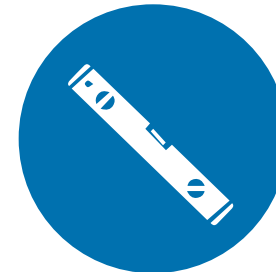
Torque wrench



Tape measure



Chalk line



Spirit level

COMPONENTS

STANDARD



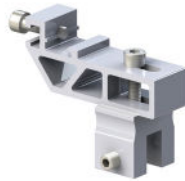
**Double standing
seam clamp
2.1 TPF**

Product number:
802466



**Double standing
seam clamp
2.1 TBK**

Product number:
802467



**Angled standing
seam clamp
2.1 TPF**

Product number:
802462



**Angled standing
seam clamp
2.1 TBK**

Product number:
802463



**Round seam clamp
2.1 TPF**

Product number:
802460



**Round seam clamp
2.1 TBK**

Product number:
802461



Mounting profile

Product number:
80210x



Profile connector

Product number:
80215x



**Click end clamp
with pin**

Product number:
802304CP



**Click end clamp
without pin**

Product number:
802304C



**Middle clamp Click 2.1
30-45 with pin**

Product number:
802301C P1 30-45



**Middle clamp Click 2.1
30-45**

Product number:
802301C 30-45

COMPONENTS

ACCESSORIES



Cable ties incl. clip

Product number:
802604



Wire clamp

Product number:
802603



Aluminium wire

Product number:
802602



End cap

Product number:
802601

OPTIONAL



**Standing
seam clamp**

Product number:
800436



Round seam clamp

Product number:
800435



Hammerhead screw

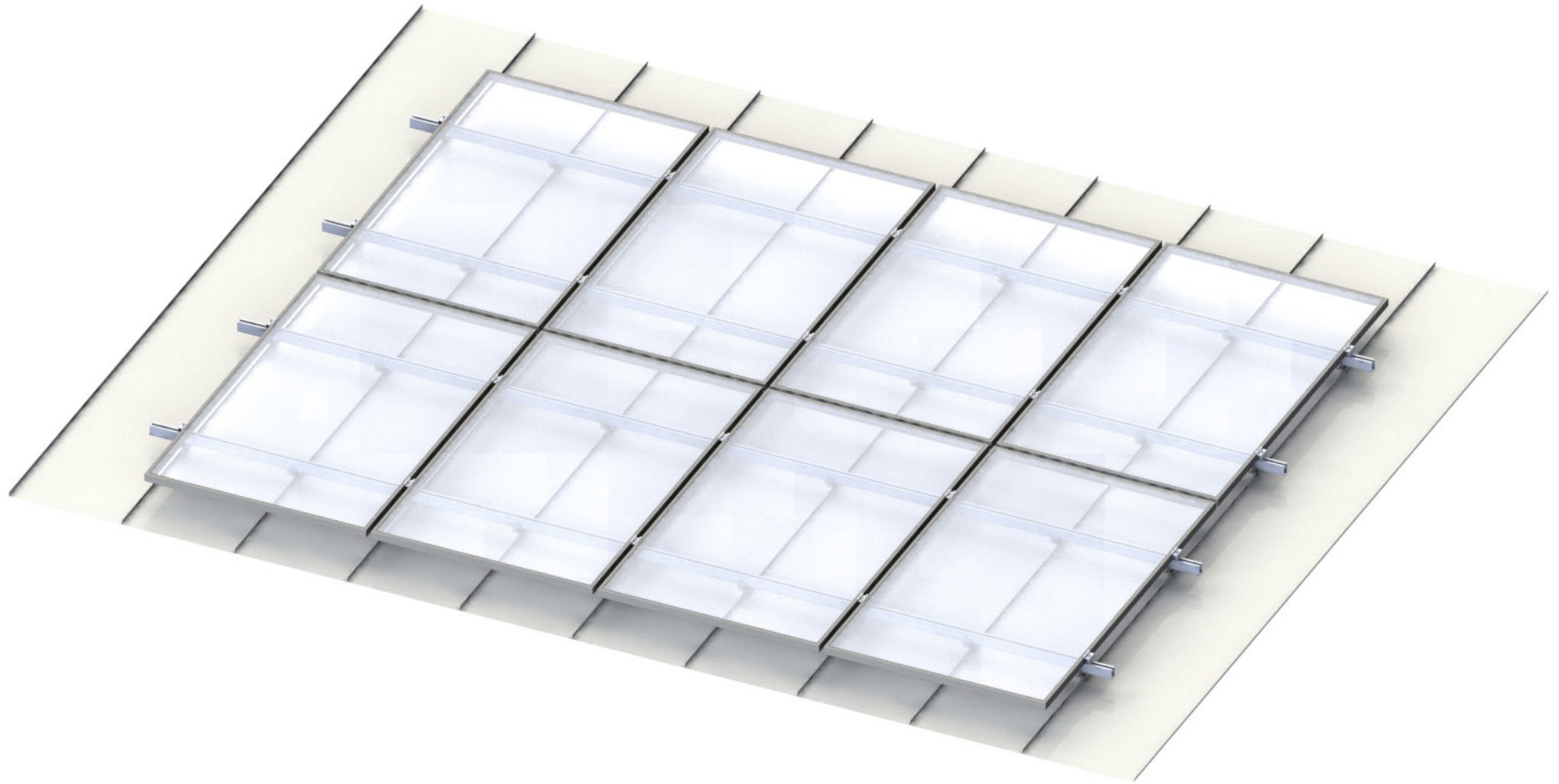
Product number:
800646



Hexagonal nut

Product number:
800634

STRUCTURE OF STANDING SEAM CLAMP 2.1 TPF VERTICAL MODULE ARRANGEMENT



MOUNTING

1

MEASURING AND MARKING POSITIONS

Measure the positions of the standing seam clamps on the roof according to Solar.Pro.Tool project report and mark them with the aid of a chalk line.
Position the standing seam clamps.



2

MOUNTING THE TPF STANDING SEAM CLAMPS

There are two different types of round seam clamps:
Double and angled standing seam clamps in the MOUNTING SOLUTIONS AS 2.1 pitched roof system.

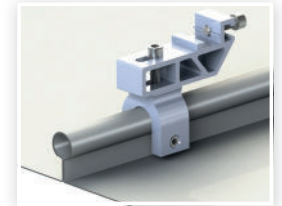
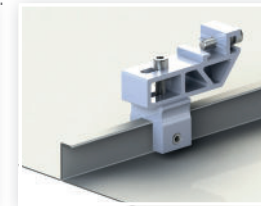
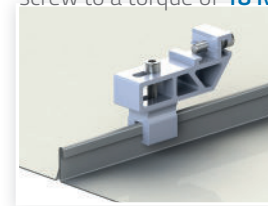
The respective mounting procedures for the **2.1 TPF standing seam clamps** are described below.

Attention: it is recommended that you choose the number and arrangement of the standing seam clamps so as to ensure the most homogeneous load application possible into the existing roof covering and roof construction.

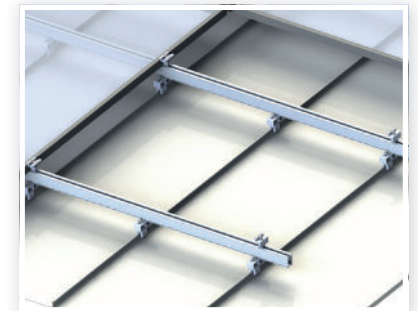
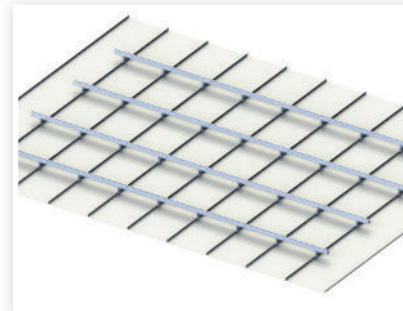
3

DOUBLE STANDING SEAM CLAMP 2.1 TPF / ANGLED STANDING SEAM CLAMP 2.1 TPF / ROUND SEAM CLAMP 2.1 TPF

Place the clamp flush on the seam. The carrier profile fast mounting adapter must point towards the roof ridge. Position the clamps, align them and tighten the fixing screw to a torque of **18 Nm**.

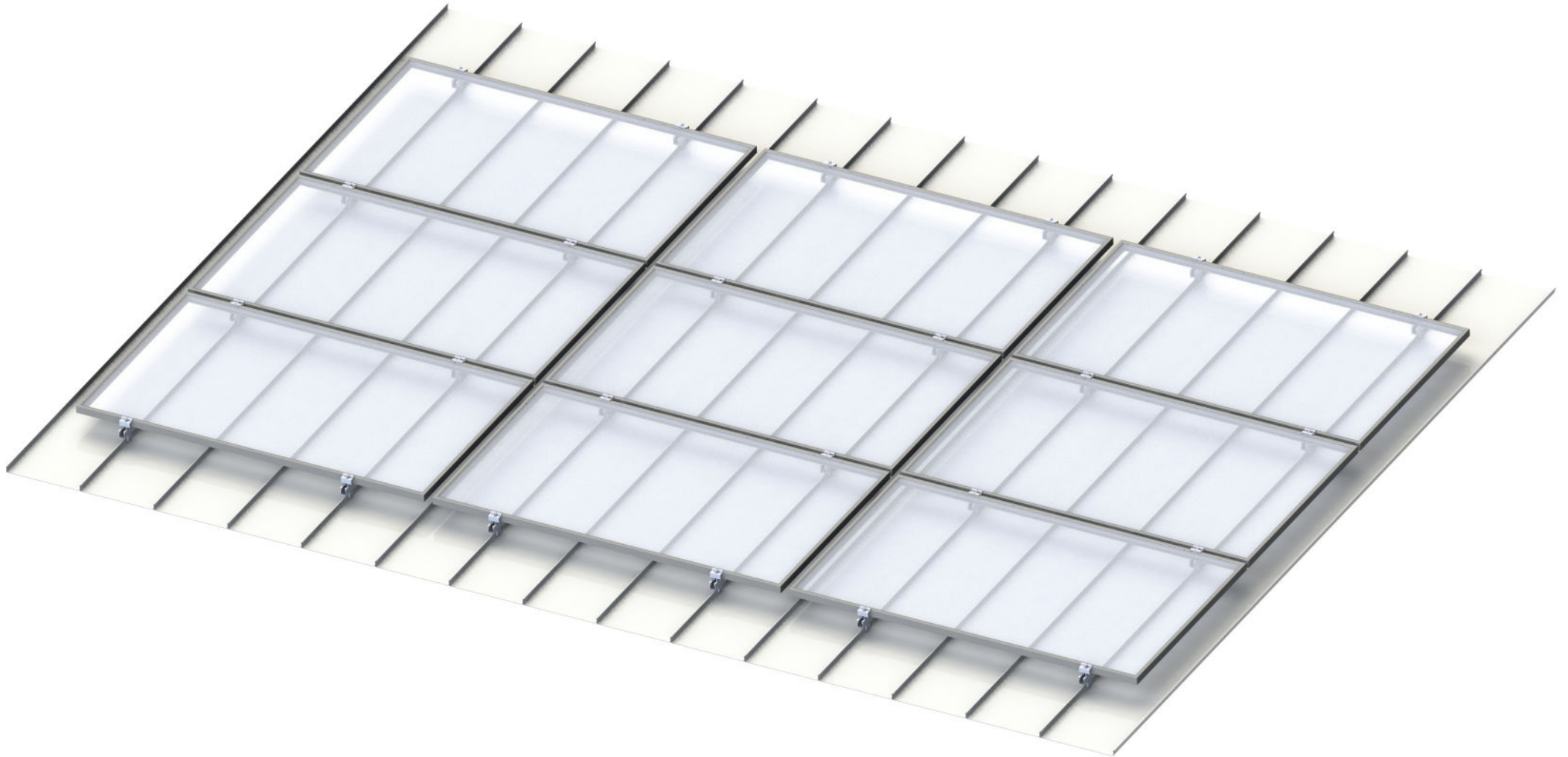


Mount the carrier profiles and tighten them to a torque of **15 Nm**.
The mounting of the carrier profile is described on page 11.



Please note: mounted standing seam clamps must not be used as ladders!

STRUCTURE WITH STANDING SEAM CLAMP 2.1 TBK
HORIZONTAL MODULE ARRANGEMENT



MOUNTING

1

MEASURING AND MARKING POSITIONS

Measure the positions of the standing seam clamps on the roof according to Solar.Pro.Tool project report and mark them with the aid of a chalk line.
Position the standing seam clamps.



2

MOUNTING THE TBK STANDING SEAM CLAMPS

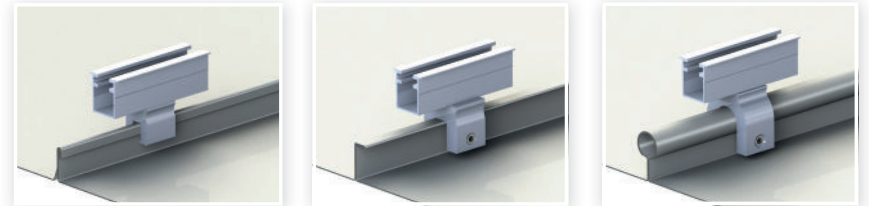
The respective mounting procedures for the **2.1 TBK standing seam clamps** are described below.

Attention: it is recommended that you choose the number and arrangement of the standing seam clamps so as to ensure the most homogeneous load application possible into the existing roof covering and roof construction.

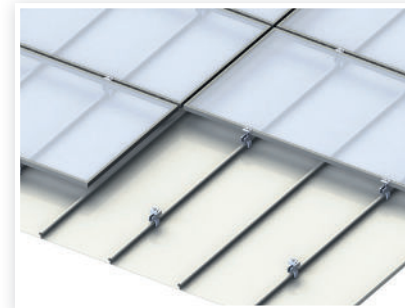
3

DOUBLE STANDING SEAM CLAMP 2.1 TBK / ANGLED STANDING SEAM CLAMP 2.1 TBK / ROUND SEAM CLAMP 2.1 TBK

Place the clamp flush on the seam. Align the clamp and tighten the fixing screw to a torque of **18 Nm**.



No carrier profile is required if using the standing seam clamps 2.1 TBK. The modules are mounted directly on the pre-mounted short rail.



Please note: mounted standing seam clamps must not be used as ladders!

OPTIONAL: VERSION WITH STAINLESS STEEL STANDING SEAM CLAMP AND ROUND SEAM CLAMP

1

MEASURING AND MARKING POSITIONS

Measure the positions of the standing seam clamps on the roof according to Solar.Pro. Tool project report and mark them with the aid of a chalk line. Position the standing seam clamps.



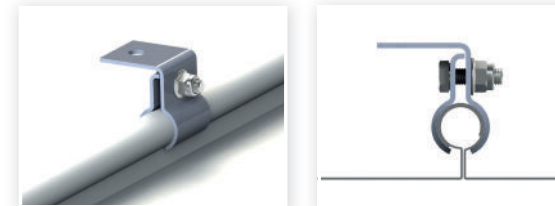
3

STANDING SEAM CLAMP / ROUND SEAM CLAMP

Place the standing seam clamp on the double standing seam, align it and push it upwards as far as it will go. Tighten the lateral screws to a torque of **15 Nm**.



Place the round seam clamp on the Kalzip seam, align it and tighten the lateral screws to a torque of **15 Nm**.



2

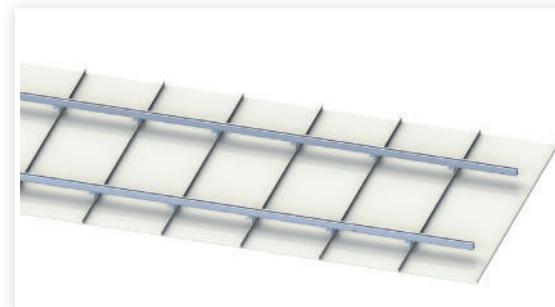
MOUNTING THE STANDING SEAM CLAMP AND ROUND SEAM CLAMP

The respective mounting procedures for the **standing seam clamp** and **round seam clamp** are described below.

Attention: it is recommended that you choose the number and arrangement of the standing seam clamps so as to ensure the most homogeneous load application possible into the existing roof covering and roof construction.



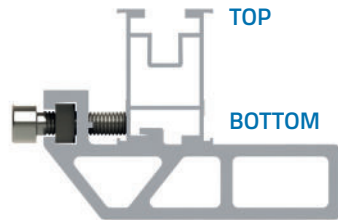
Please note: mounted standing seam clamps must not be used as ladders!



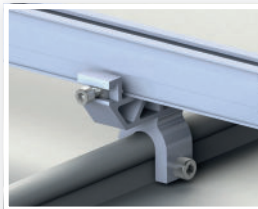
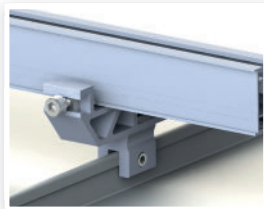
MOUNTING THE CARRIER PROFILE

1

MOUNTING THE CARRIER PROFILE



Mount the carrier profile in parallel with the roof ridge with the correct side facing upwards and tighten to a torque of **15 Nm**.

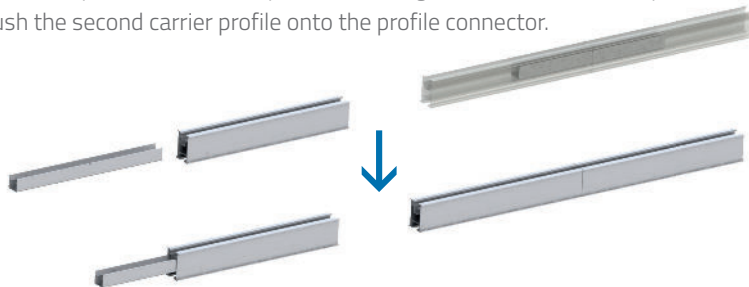


2

CONNECTING THE CARRIER PROFILES

Necessary if the width of the module field is greater than the length of the carrier profile.

Insert the profile connector up to half its length into the first carrier profile and then push the second carrier profile onto the profile connector.

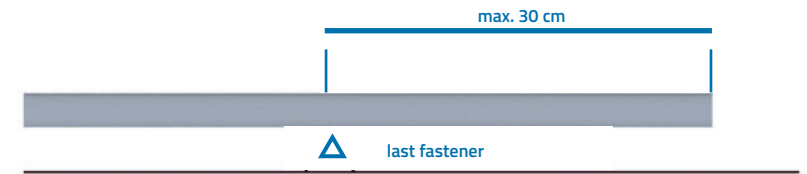


Please note:

- + Fix each carrier profile at a minimum of two fastening points!
- + Carrier profile joints may not be located in the area of fixing points.



- + Carrier profile length: **max. 3 m!**
- + After **max. 3 m**, form an expansion joint of at least **5 cm!**
- + Overhang of the carrier profile beyond the last fastening: **max. 30 cm!**
The overhang should be the same on both sides.



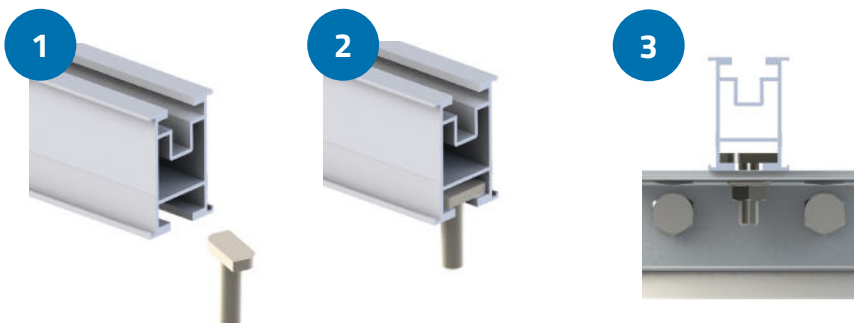
- + Measure the positions of the profile connectors on the roof according to the Solar Pro.Tool and optionally **screw** the profile connectors.



3

OPTIONAL: MOUNTING WITH HAMMERHEAD SCREW

Insert hammerhead screw with the hammerhead in the lower profile channel of the carrier profile and turn it so that it sits crosswise to the profile channel. Fix the carrier profile to the seam clamp with a hexagonal nut.

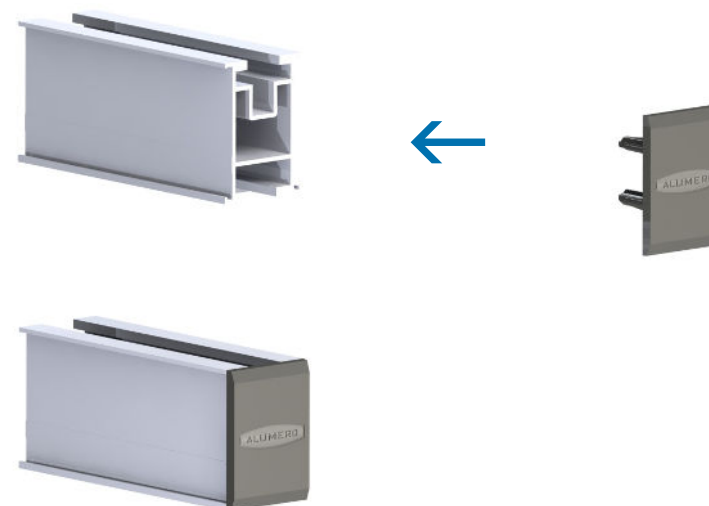


Attention: If the hammerhead screw is loosened and tightened several times, make sure it is aligned correctly in the profile channel. This is indicated by a slot in the screw.

4

MOUNTING THE END CAPS

Press the end caps by hand into the end of the carrier.



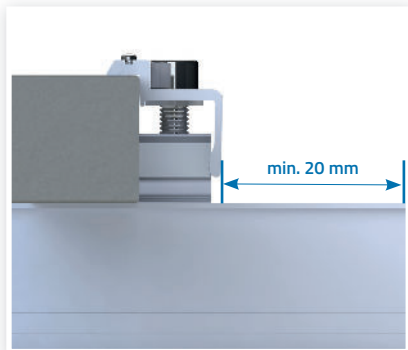
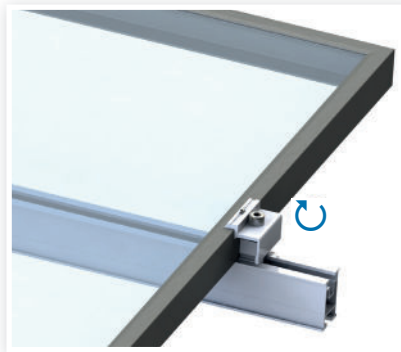
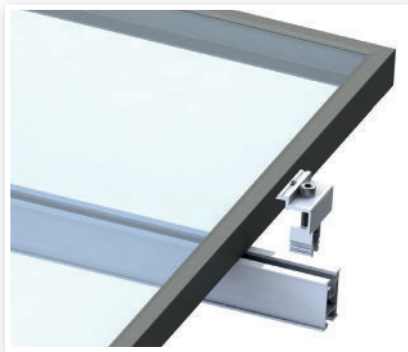
MOUNTING THE MODULES

1

MOUNTING THE END CLAMP

Begin with the lowest module row. Place the first module on the carrier profile and align it.

Snap in the Click end clamp at a slight angle and push it up to the module frame. Tighten the hex socket head screw to a torque of **15 Nm**.



Please note: The end clamps must be mounted at least 20 mm from the end of the respective mounting profile.

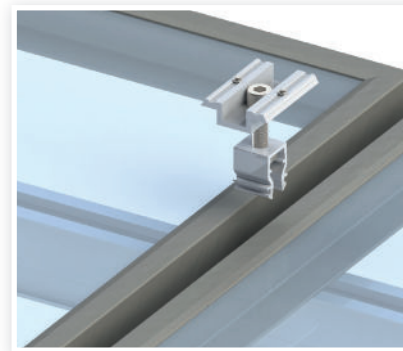


Attention: When using end clamps with threaded plates, attention must be paid to the alignment. The threaded plate must sit crosswise to the profile channel.

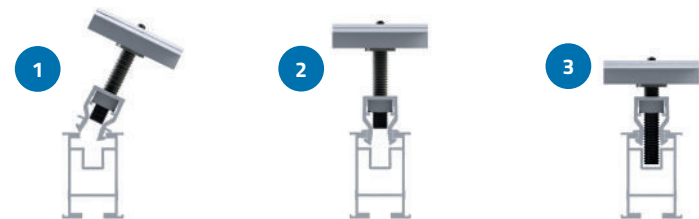
2

MOUNTING THE MIDDLE CLAMPS

Place the Click middle clamp on the frame of the preceding module and snap it in at a slight angle. Push the module against it so that both modules are firmly contacting it. Tighten the hex socket head screw to a torque of **15 Nm**.



Mount the last module in each row with end clamps as already described. Mount the remaining module rows in the same way.



Please note:

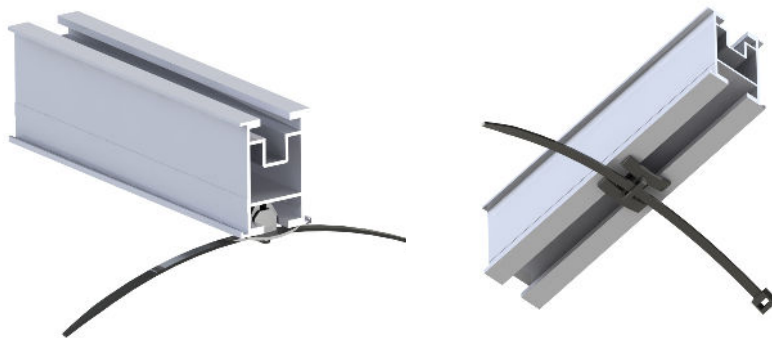
- + Distance of the clamp from the ends of the carrier profile: **min. 20 mm!**
- + Middle clamps must not be mounted directly besides the carrier joint!
- + The modules may only be clamped in the prescribed fastening areas! These can be taken from the module manufacturer's data sheet for the module.
- + Distance (horizontal and vertical) between modules: **approx. 20 mm!**

FASTENING THE MODULE CABLE

1

Module cables should not hang down or lie on the roof covering. Press the clip attached to the cable tie into a profile channel of the carrier profile. Tie the cables together with the cable tie.

The clip is dismounted by pushing it sideways out of the profile channel.



POTENTIAL EQUALISATION

The potential equalisation between the individual system components must be carried out in accordance with the respective country-specific regulations. One possible way of earthing the MOUNTING SOLUTIONS standing seam roof system is shown below. Cable cross-sections and the overall earthing concept are not included in these instructions and must be calculated or created by the installer in accordance with applicable standards and guidelines. Professional earthing methods other than those listed here are also possible.

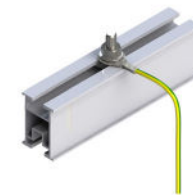
1

EARTHING THE CARRIER PROFILE ROWS

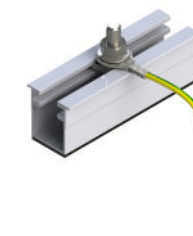
Insert a wire clamp in the lower profile channel of the carrier profile in every carrier profile row. Place the aluminium wire in the wire clamp and fasten it by tightening the screw. In this way, establish a conductive connection of all module rows to one another.



Fastening the aluminium wire by means of a wire clamp



Fastening the earthing wire by means of a hammerhead screw



2

EARTHING THE MODULES

The module manufacturer will indicate in the respective module data sheet whether the modules have to be earthed. If so, the potential equalisation of the modules can be established in following way, which is recommended by ALUMERO:

To integrate the modules into the potential equalisation, you can use MOUNTING SOLUTIONS end and middle clamps with a pin. The pins sit in the clamps between the module frames and thus establish a conductive connection of all module rows to one another.



Click end clamp with pin



Click middle clamp with pin



All product illustrations contained in these assembly instructions are for illustrative purposes and are not true to scale. Subject to changes and errors!

PLEASE OBSERVE THE FOLLOWING INFORMATION!

We recommend that you read the following information attentively, as it is very important for the handling of the product. Please inform yourself about the safety regulations for the other system components.

SAFETY INFORMATION AND WARNINGS

The AS 2.1 pitched roof system is designed exclusively for the mounting of PV modules. Any other use will be regarded as inappropriate. Use for the intended purpose also includes compliance with the specifications in these assembly instructions. MOUNTING SOLUTIONS accepts no liability for damage resulting from failure to observe the assembly instructions, in particular the safety information, as well as from misuse of the product.

- + MOUNTING SOLUTIONS accepts no liability for performance losses or damage to the module of any kind.

You should follow these instructions to the word when carrying out any work on the PV system. Installation, commissioning, maintenance and repairs may only be carried out by persons who are appropriately qualified and authorised to do so.

Please observe the valid regulations and safety information.

These accident prevention regulations must be observed:



- + BGV A 1 – General regulations
- + BGV A 3 – Electrical systems and equipment
- + BGV C 22 – Construction work (personal protective equipment to prevent falling)
- + BGV D 36 – Ladders and steps
- + Regulations of the employer's liability insurance associations for occupational health and safety: BGR 203 (Roof work) and EN 516 Installations for roof access
- + Work clothes and occupational health and safety regulations in accordance with the regulations of the employer's liability insurance association



You must comply with the following DIN standards:



- + DIN 18299 – General regulations for construction work of any kind
- + DIN 18338 – Roofing and roof sealing work
- + DIN 18360 – Metalwork, locksmith's work
- + DIN 4102 – Fire behaviour of building materials and components



Work on the systems from MOUNTING SOLUTIONS PV Systems GmbH may only be carried out by authorised personnel. The system user has the following safety-relevant duties:

- + We require that inspection and maintenance of the installed AS 2.1 pitched roof system components and the roof covering will take place at least once a year, during which at least the following items should be checked:
 - » all mechanical connections are correctly seated and tight
 - » the position of the system on the roof and the system itself with regard to deformations
 - » that the wiring is intact
 - » the PV modules for damage
- + The frame may only be mounted by persons with appropriate qualifications, manual skills and basic knowledge of mechanics.
- + It is necessary to ensure that the persons assigned are able to assess the work entrusted to them and to identify possible hazards.
- + The assembly instructions are part of the product and must be available during the assembly.
- + It must be ensured that the assembly instructions and in particular the safety information are read and understood by the personnel assigned prior to the assembly.
- + The regulations of the employer's liability insurance association, the local occupational health and safety regulations and the rules of technology must be complied with.
- + Suitable hoists and ladders must be used for the assembly. Leaning ladders must not be used.
- + It is necessary to have an examination of the existing building statics carried out by an expert civil engineer with regard to the additional loads due to a PV system.
- + Any general load limiting measures specified by MOUNTING SOLUTIONS PV Systems GmbH (e.g. necessity of snow clearing to limit the snow load) must be taken into account.



GUARANTEE / PRODUCT LIABILITY (EXCLUSION)

The notes on dimensioning contained in these instructions are merely hints based on practical experience. Binding mounting frame statics can be created with the MOUNTING SOLUTIONS Solar.Pro.Tool program.

As an installation company, you are responsible for the correct execution of the assembly. MOUNTING SOLUTIONS PV Systems GmbH accepts no liability for the dimensioning information contained in commercial system quotations.



As an installation company, you are responsible for the mechanical durability of the assembled interface connections on the building envelope, especially for their leak-tightness. The components of the MOUNTING SOLUTIONS PV Systems GmbH are designed according to the expected loads and the current state of the art. For this purpose, you must specify all general technical conditions in writing in the project registration form (information on the support structure, snow load zone, building heights, wind loads, etc.) as part of the request/purchase order to MOUNTING SOLUTIONS PV Systems GmbH).

MOUNTING SOLUTIONS PV Systems GmbH accepts no liability for improper handling of the installed parts.

Use in coastal areas is excluded on account of the risk of corrosion.

With proper handling, dimensioning according to the static boundary conditions and normal environmental and ambient conditions, MOUNTING SOLUTIONS PV Systems GmbH assumes a guarantee of two years regarding the service life and durability of the frame systems. This applies in the context of the generally prevailing weather and environmental conditions.

Material and processing guarantee: MOUNTING SOLUTIONS PV Systems GmbH assumes a guarantee of 10 years for the materials used regarding material and processing. Please refer to the terms of the guarantee for further information.

NOTES ON THE ELECTRICAL INSTALLATION



All electrical work is to be carried out by qualified electricians only. The applicable DIN standards, VDE regulations, VDEW directives, VDN directives, accident prevention regulations and the regulations of the local electricity supply companies (EVU) are authoritative here.

- + DIN VDE 0100 (erection of high-tension systems with rated voltages up to 1000 V)
- + VDEW directive for the parallel operation of own generating systems
- + with the low-voltage grid of the electricity supply company
- + VDI 6012 directive for decentralised energy systems in buildings: Photovoltaics
- + Information sheet on the VDEW directive "Own generating systems connected to the low-voltage grid"
- + VDN directive "Own generating systems connected to the low-voltage grid"
- + DIN/VDE regulations, DIN/VDE 0100 "Erection of high-tension systems with grid voltages up to 1000 V", in particular VDE 0100 Part 410 "Protection against direct and indirect contact" (DC voltages > 120 V, < 1000 V DC voltage) and the "Accident Prevention Regulations of the Employer's Liability Insurance Associations" VBG4 "Electrical systems and equipment"
- + DIN VDE 0100-540 Selection and construction – earthing, protective earth conductors and potential equalisation conductors
- + VDE 0185 Erection of a lightning protection system and VDS 2010

IMPORTANT WARNINGS



Solar modules generate electricity as soon as they are exposed to light, so they are always live. The fully insulated plug-in contacts provide contact protection, but attention must be paid to the following when handling the solar modules:

- + Do not insert electrically conductive parts into the plugs and sockets.
- + Do not mount solar modules and cables with wet plugs and sockets.
- + Carry out all work on the cables with extreme caution.
- + Do not carry out any electrical installation in wet conditions.
- + Even with poor lighting conditions, very high DC voltages are created on the series connection of solar modules, which are life-threatening when touched. In particular, consider the possibility of secondary complications in the event of electric shocks.



In the inverter, high contact voltages can be present even when disconnected:

- + Be particularly careful when working on the inverter and the cables.
- + After switching off the inverter and before further work, be sure to keep to the time intervals prescribed by the manufacturer so that the high-voltage components can discharge.
- + Please also observe the installation regulations of the inverter manufacturer.



When opening a closed line (e.g. when disconnecting the DC cable from the inverter under load), a deadly arc can occur:

- + Never disconnect the solar generator from the inverter as long as it is connected to the grid.

STANDARDS AND DIRECTIVES

All listed standards and directives are issued for and must be applied in Germany. The respective current version must be used. Please also observe the corresponding national standards and directives when outside Germany.

NOTES ON THE FRAME INSTALLATION

For installation in the roof area, you must observe the currently valid rules of construction technology, in particular the requirements formulated in the DIN standards and in the "Rules of the German Roofing Trade".



- + Check that all screwed connections are tight.
- + Adhere to the specified torques.
- + Regardless of verifiable statics, you must ensure that the product meets the static requirements on site in accordance with EN 1991 prior to each installation.
- + EN 1991 "Actions on structures" – and all related national application documents
 - » Part 1-1: Weights, dead weight and payloads in building construction
 - » Part 1-3: Snow loads
 - » Part 1-4: Wind loads
- + EN 1990: "Basis of structural framework planning" – and all related national application documents
- + The mounting frame is designed in accordance with EN 1993 "Design of steel structures" and EN 1999 "Design of aluminium structures"
- + Make sure that the substructure is suitable with regard to the load-bearing capacity (dimensioning, condition, suitable material characteristics), the support structure and other layers affected by it (e.g. insulation layer).
- + Make sure that the drainage of rainwater is not hindered.
- + Consider the building physics aspects (e.g. possible condensation when penetrating insulation layers).



PRODUCT LIABILITY

The technical documentation is part of the product. MOUNTING SOLUTIONS PV Systems GmbH accepts no liability for damage resulting from failure to observe the assembly instructions, in particular the safety information, as well as from misuse of the products.

IHR HÄNDLER



Mounting Solutions

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