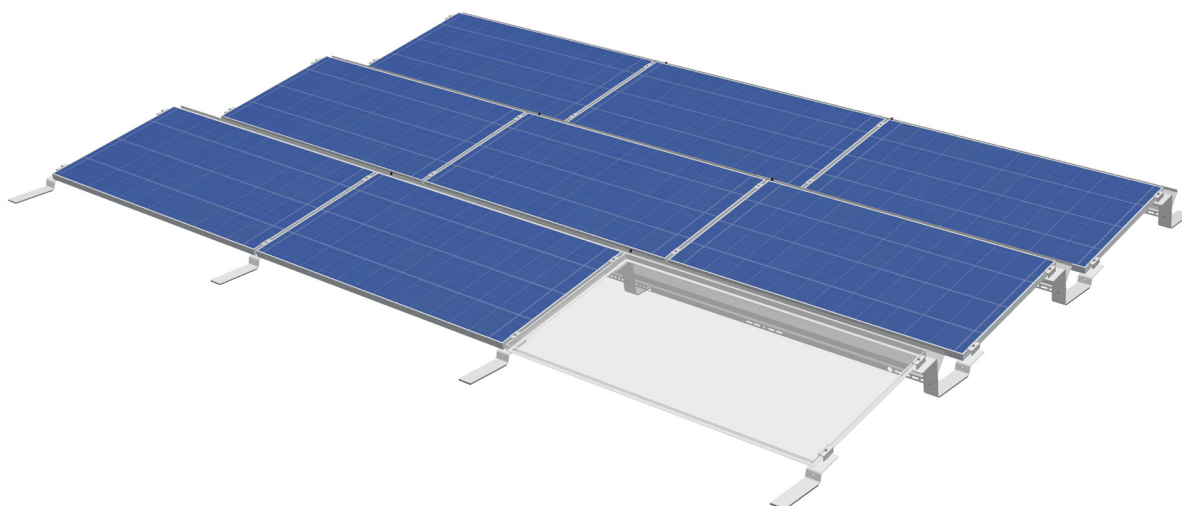
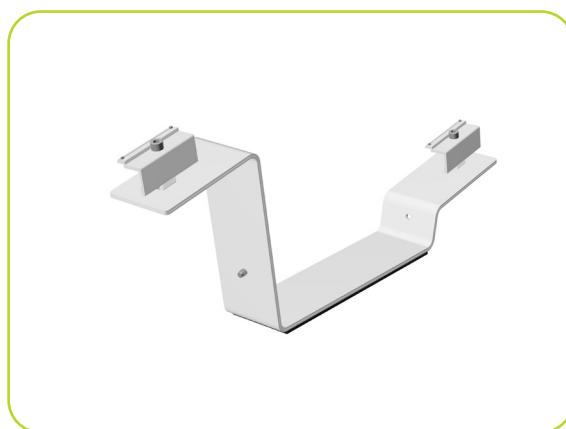




## Installation Instructions

### LEICHTmount CF S

Aerodynamic flat roof system for south orientation



## 1 Introduction

1.1	Intended use	3
1.2	About the document	3
1.3	Warnings	4
1.4	General information — standards and guidelines	4
1.5	Description of the system	6

## 2 Installation — LEICHTmount CF S

2.1	System components	11
2.2	Installation — frame and modules	12
2.3	Installation — Alpine supports	20
2.4	Installation — wind shields	21
2.5	Installation — ballast trays	23
2.6	Installation — ballast	25

## 3 Disassembly and removal

3.1	Disassembly	26
3.2	Disposal	26

## 4 Terms of use and warranty

4.1	User agreement for the LEICHTmount CF S	27
4.2	Warranty / disclaimer	27

Read these installation guidelines carefully before installing the S:FLEX mounting system and retain them for future reference! These installation guidelines are only complete with the project-specific implementation plans (project report)!

## 1.1 Intended use

The S:FLEX LEICHTmount CF S PV mounting system is a rack system for mounting PV modules without roof penetration. It is designed exclusively for the installation of PV modules.

The LEICHTmount CF S is designed for south-facing systems with pitch angles of 5°, 10° and 15°.

The system is configured for horizontal module installation.

It can be used for almost all commercially available modules with the following dimensions:

module width 950 – 1.150 mm; module length 1.500 - 2.250 mm.

The use of modules with deviating dimensions must be tested and approved for each project.

The LEICHTmount CF S system is designed for easy installation on the following standard industrial roof coverings: foil, bitumen, gravel, concrete .

Any use that deviates from this must be regarded as not the intended use. In particular, compliance with the instructions in these installation guidelines constitutes intended use. S:FLEX GmbH accepts no liability for damage resulting from non-observance of the installation guidelines or from misuse or incorrect use of the product.

## 1.2 About this document

This installation guide describes the installation process for the LEICHTmount CF S 10° system on flat roofs. It can also be applied to installation of the LEICHTmount CF S 5° and LEICHTmount CF S 15° systems.

The LEICHTmount CF S system includes suitable solutions for different load zones.

- *LEICHTmount CF Standard Version S5, S10, S15 for standard design loads*
- *LEICHTmount CF Alpine Version S10, S15 for high design loads*

This document shows the installation recommendations for:

- *LEICHTmount CF S with framed PV modules mounted horizontally*
- *LEICHTmount CF S Alpine with framed PV modules mounted horizontally*

It must be ensured that only current and complete installation guides are used for the installation process.

### 1.3 Warnings

The warning information given in these installation guidelines indicate safety-related information. They are:



**Unless observed, there is a major risk of injury as well as a risk of death.**



**Non-compliance may lead to property damage.**

### 1.4 General information - Standards and guidelines

Every photovoltaic system must be installed in accordance with the instructions stipulated in the installation guidelines provided and the project report.

These installation guidelines are based on state-of-the-art technology and many years of experience of installing our systems on site. It must be ensured that only the current and complete installation guidelines are used for the installation, and that a print-out of the installation guidelines is stored 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 of the information given in the project report must be strictly observed. The location-based static calculations are carried out in the project report. The S:FLEX FLAT mounting system must be designed and created with the S:FLEX software.

Since individual project-specific features must be considered with every roof, an expert clarification must always be carried out prior to installation. Before installation, the PV system creator must ensure that the existing roofing and roof substructure are suitable for the occurring additional loads. The condition of the roof substructure, the quality of the roof covering and the maximum load-bearing capacity of the roof construction must be checked by the system creator. Contact a local structural engineer for this purpose.

When installing the PV system, always comply with the module manufacturer's installation instructions. In particular, it is necessary to check that the module manufacturer's instructions regarding the module clamping guidelines (module clamping surface and clamping range) are complied with. If this is not the case, the customer must obtain a declaration of consent from the module manufacturer before the installation, or the mounting system must be adjusted according to the module manufacturer's guidelines.

The requirements for the protection of PV mounting systems against lightning and surges must be met in accordance with the DIN and VDE regulations. The specifications of the relevant power supply company must be observed.

Care must be taken that the PV system to be installed does not impair the functioning of the existing lightning protection system. It is also important to ensure that the PV system is designed so that it can be included in the protection zone of the building's lightning protection system. The separation distances between the PV system and the lightning protection system specified in the relevant regulations must be adhered to. During installation, local fire regulations must be observed, e.g. firewalls must not be built over and a certain distance must be observed.

If the roofing is altered, the manufacturer's guidelines must be observed. During and after the installation, the frame components may not be stepped on or be used as a climbing aid. There is a risk of falling and the roofing underneath could be damaged.

Prior to installation, the creator of the photovoltaic system is to ensure that the installation is carried out while strictly adhering to national and location-specific building regulations, safety and accident prevention regulations, standards and environmental protection regulations.

Every person who installs the S:FLEX PV fastening systems is obligated to independently inform himself/herself of all rules and regulations for a professionally correct planning and installation and to adhere to said rules and regulations during the installation. This also includes compliance with the current state of the rules and regulations.

The installation of the PV system may only be carried out by trained specialists.



**The installation of the S:FLEX substructure and the PV system may only be carried out by trained specialists. System components must not be used as step ladders. The modules must not be stepped on. When working on roofs, there is a risk of falling off and falling through roofs. A fall can result in injury or death. Ensure that appropriate safe access equipment and fall protection (e.g. scaffolding) are provided as well as protection from falling parts.**



**Check the building statics and construction/condition of the roof substructure before starting the installation. During installation, the instructions in the installation guidelines and project report must be strictly observed. Failure to observe the installation guidelines and the project report may result in damage to the PV system and to the building.**

## 1.5 Description of the system

The LEICHTmount CF S system includes solutions to suit a range of different requirements.

### System properties

Mounting angle:	the LEICHTmount CF S is available with 5°, 10° and 15° mounting angles
Roof edge spacing:	Roof areas F and G can be used
Module dimensions:	950 – 1.150 mm x x 1.500 - 2.250 mm (width x length). The use of modules with deviating dimensions must be tested and approved for each project.
Max. roof pitch:	5°
Building height:	max. 25 m
Wind load:	max. 2.4 kN/m <sup>2</sup> (design value as combined load of dead weight and wind pressure)
Snow load:	LEICHTmount CF Standard or loads up to 2,4 kN/m <sup>2</sup> LEICHTmount CF Alpine for high loads up to 4,4 kN/m <sup>2</sup>
Modules:	The system requires approval for use of modules with this type of fastening (clamp at the short module side and clamp in the middle of the long module side). This approval can either be given generally as part of the module certification or, as the case may be, issued by the module manufacturer on a project-specific basis.
Materials:	Aluminium structural supports EN AW 6060 T64, aluminium module mid clamps EN AW 6063 T66, stainless steel screws, galvanised steel wind shields and ballast trays.
Prerequisites:	Proof of static load capacity of the roof and the roof insulation must be provided by customer. General terms / warranty conditions and usage agreement apply.



**The module manufacturer's installation instructions must always be observed.**

### Flat-roof coverings

The LEICHTmount CF S can be installed on the following flat-roof coverings:  
foil, bitumen, gravel, concrete.

The compatibility of the roof covering and the building screen mats must be ensured. The roof covering (and possibly the insulation layer) must be able to absorb the pressure loads of the PV system. The friction coefficient of the existing roof covering is used as the basis for the ballast chart and must be determined by the customer.

If the roofing gravel lies directly on the water-bearing roof skin, the system must not be placed on the gravel layer. In this case, the gravel must be removed in the area of the supports.



**S:FLEX GmbH may provide a measuring device in order to determine the project-specific friction coefficient.**

## Row spacings

The LEICHTmount CF S is available in the following versions:

LEICHTmount CF S 15 (18°): 790 mm module spacing

LEICHTmount CF S 10 (18°): 527 mm module spacing

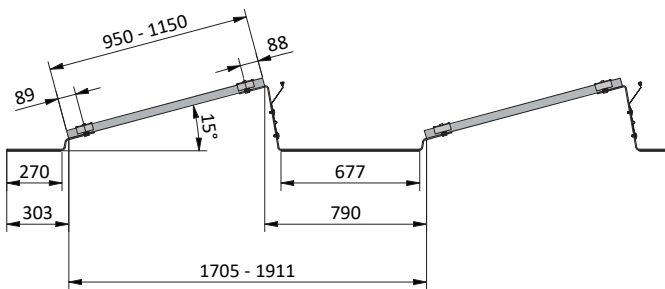
LEICHTmount CF S 5 (15°): 335 mm module spacing

LEICHTmount CF S 15 (25°): 571 mm module spacing

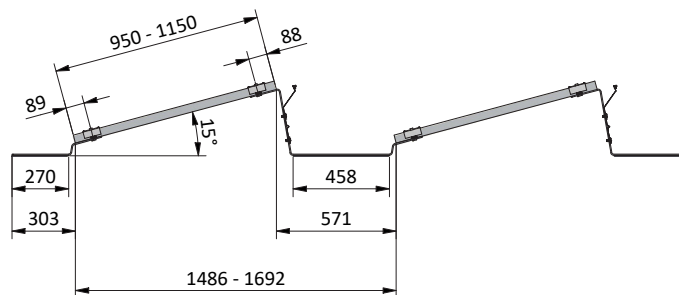
LEICHTmount CF S 10 (25°): 380 mm module spacing

LEICHTmount CF S 5 (30°): 178 mm module spacing

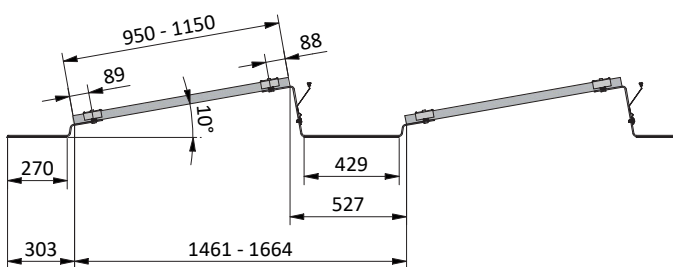
### S15 18° irradiation angle



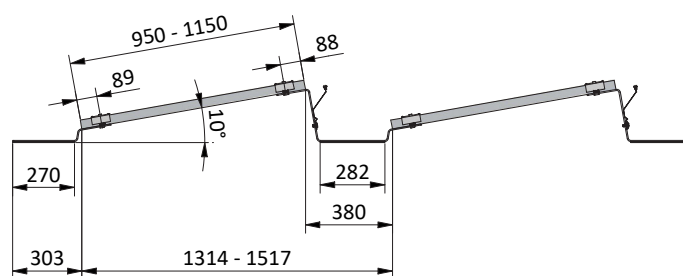
### S15 25° irradiation angle



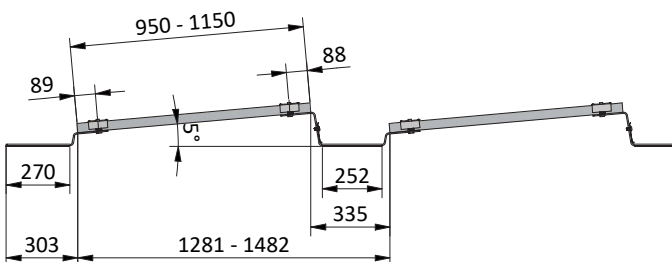
### S10 18° irradiation angle



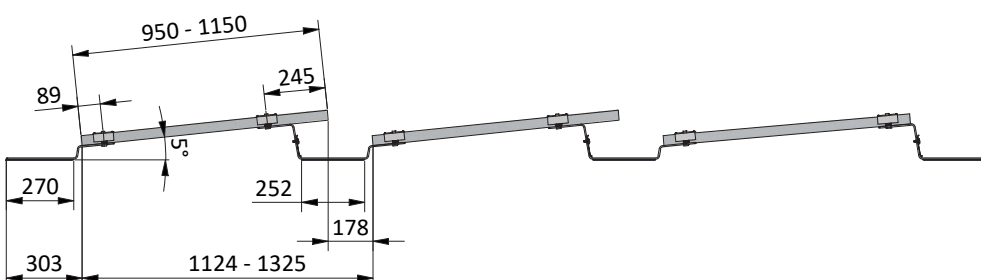
### S10 25° irradiation angle



### S5 15° irradiation angle

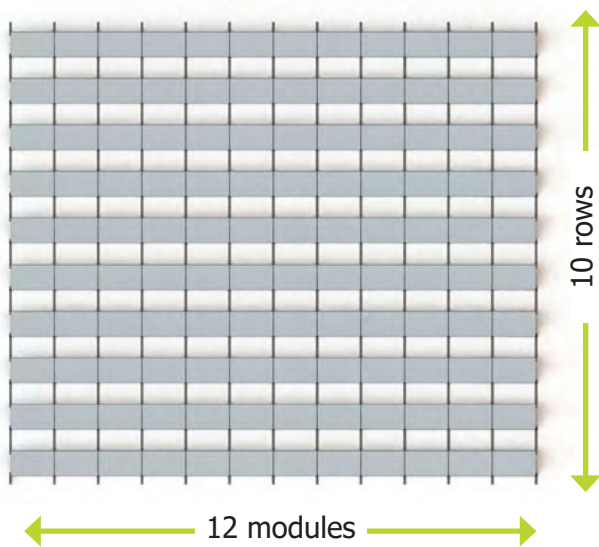


### S5 30° irradiation angle



**Basic conditions for the module array size**

The S:FLEX LEICHTmount CF S system allows a variable module arrangement. This allows optimal utilisation of the roof area. In principle, the module layout should always be based on the module arrangement specified in the project report. The maximum size of the module array is 120 modules (12 modules per row and 10 rows).



Maximum module array size: 10 rows with 12 modules (120 modules).



## System design

LEICHTmount CF S Standard

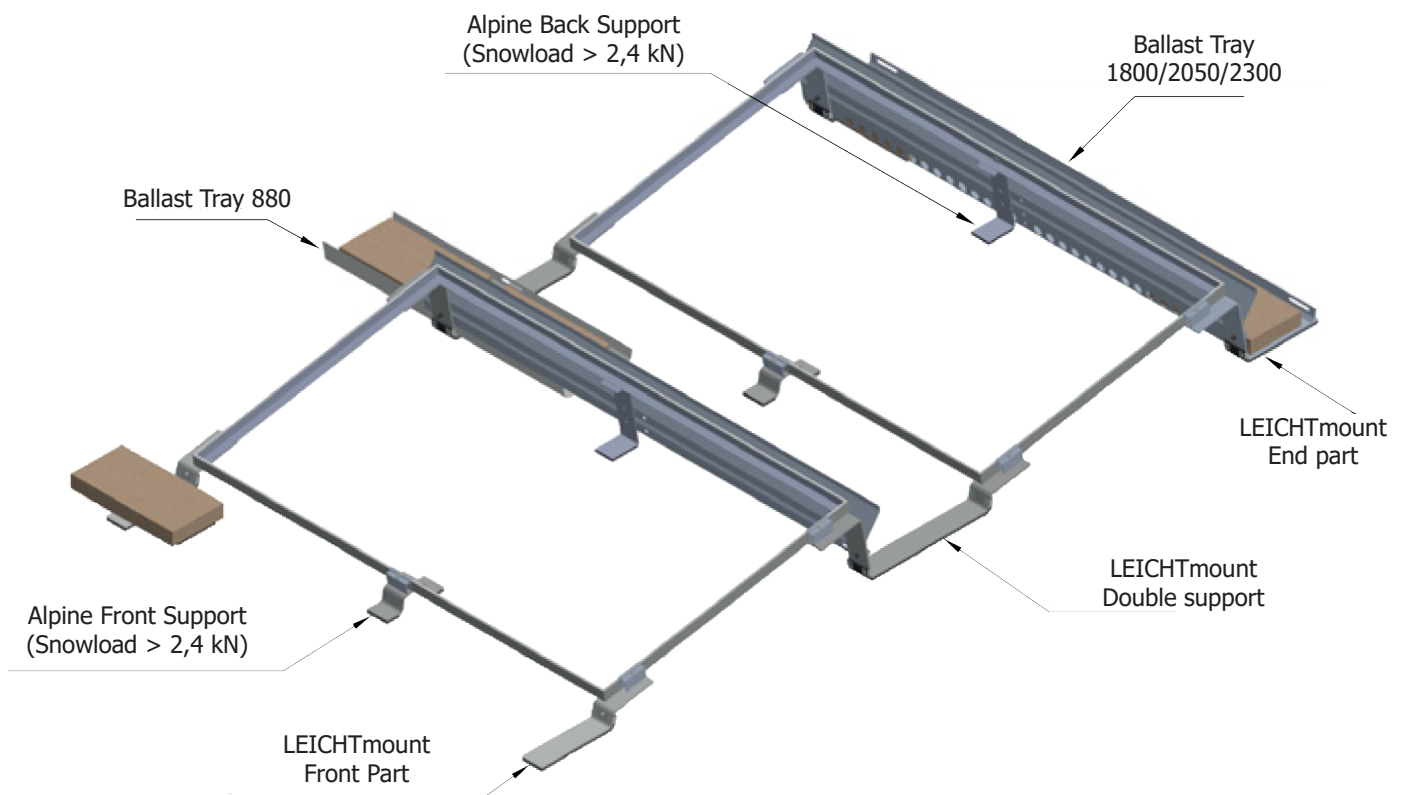
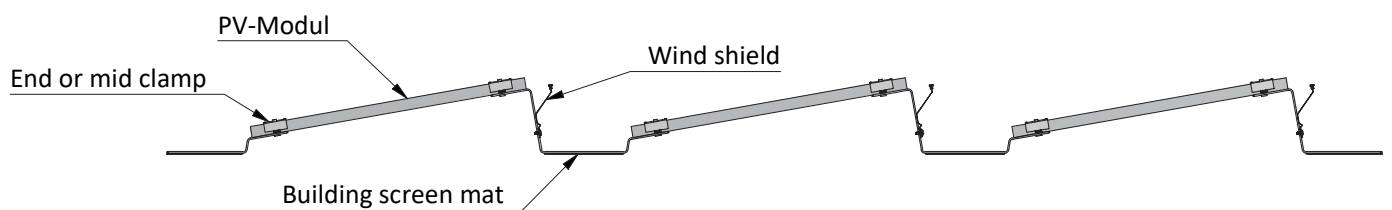
LEICHTmount CF S Alpine for high loads

The standard system is designed for normal wind and snow loads, the Alpine system for high wind and snow loads. All values are design values as a combined load of dead weight, wind and snow pressure.

This information should be used as a rough guide only. The information in the project report always takes priority!

Therefore, first determine the snow and wind load zone in which the system will be used.

The system is wind-tunnel tested and UL-certified.



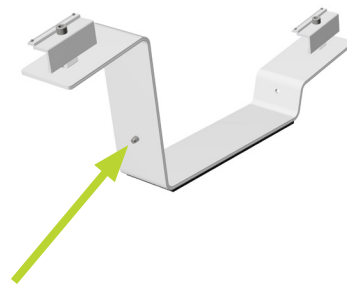
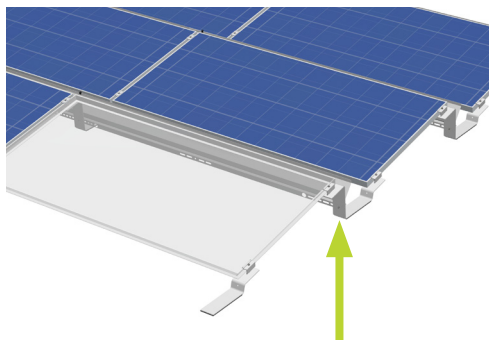
## Grounding

Equipotential bonding between the individual system components must be ensured according to the respective country-specific guidelines and standards.



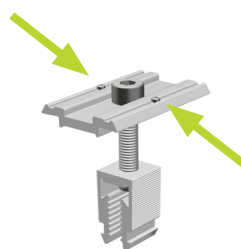
**The module manufacturer's installation instructions must always be observed.**

The requirements for the protection of PV mounting systems against lightning and surges must be met in accordance with the applicable regulations. The specifications of the relevant power supply company must be observed. Care must be taken that the PV system to be installed does not impair the functioning of the existing lightning protection system. It is also important to ensure that the PV system is designed so that it can be included in the protection zone of the building's lightning protection system. The separation distances between the PV system and the lightning protection system specified in the relevant regulations must be adhered to. Contact a local lightning protection specialist.



The grounding cable is attached using the screw of the wind shield.

Grounding pins



The functional capability of the earthing arrangements for the system via the module mid clamps with grounding pins, and of the system itself, was verified during UL 2703 certification.



**The requirements for the protection of PV mounting systems against lightning and surges must be met in accordance with the applicable regulations. Contact a local lightning protection specialist. The prescribed separation distance between the PV system and the lightning protection system must be observed. S:FLEX GmbH assumes no liability whatsoever for damage caused by lightning strikes or earthing problems.**

## 2.1 System components

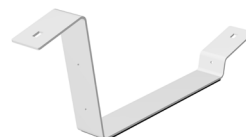
Front part



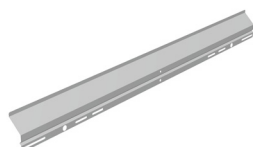
End part



Double support



Wind shield 1800/2050/2300



Ballast tray 880



Ballast tray 1800/2050/2300



Module end clamp



Module mid clamp



Cable clips



Cable clips



Groove screw M8x16



Flat washer M8x30



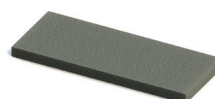
Alpine back support



Alpine front support



Building screen mat (PES)



#### 2.2 Installation — frame and modules



The design and planning of the LEICHTmount system must be undertaken using the S:FLEX Planning Software. Please make sure that the position of the modules on the roof and the ballast distribution correspond exactly to the specifications in the project report. If the module distribution on the roof is changed due to local circumstances, such as interfering surfaces, the static calculation must be repeated using the S:FLEX planning software.



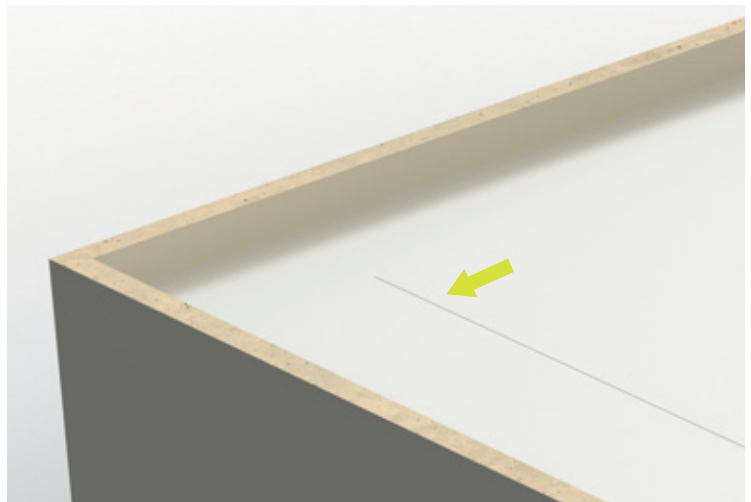
Do not leave the installation site until the wind shield and ballast for each module have been installed in accordance with the ballast chart. Without the wind shields and ballast, the stability of the module array is not guaranteed. The correct position of the ballast blocks and building screen mats should be checked as part of the annual maintenance inspection. It is the responsibility of the installing company to check the specification and weight of the required ballast blocks.

Measure the roof surface.

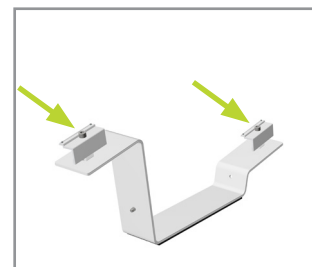
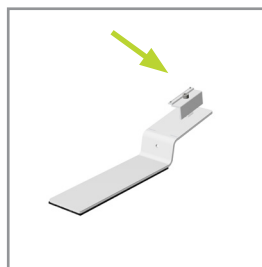
Mark the initial point with a chalk line.



Measure in accordance with the project report.



Place the module end clamps and module mid clamps on the LEICHTmount CF S supports.

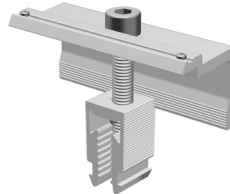


### The module clamps CF MC und EC

The clamps are connected to the mounting bracket by clicking them into the square hole provided.

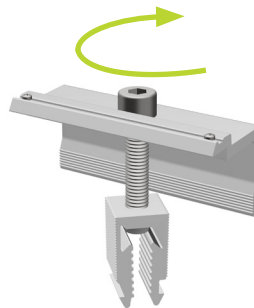
#### 1. Clamp in sliding position

Make sure that the clamp is in the sliding position (the teeth must be visible on the side). The new clamp is able to clamp PV modules with a height of 30 - 46 mm.



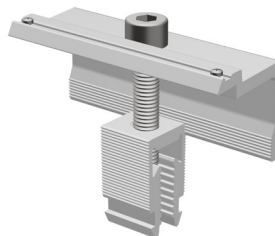
#### 2. Turn clamp and click

To do this, it is necessary to use the grid function of the clamp by turning the upper part of the clamp 90° in the direction of the grid. It is fixed by clicking in. The elongated punching allows the clamp to be moved slightly.



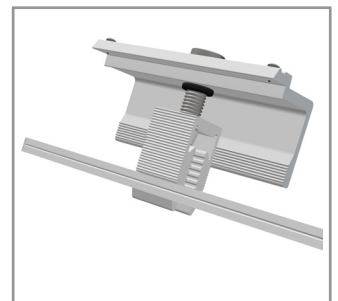
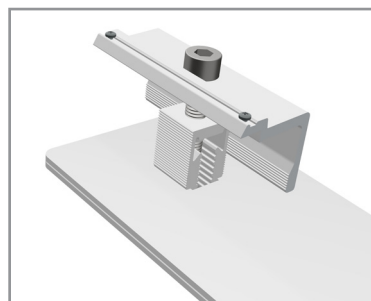
#### 3. Clamp in grid position

With the help of the serration, the clamp can be adjusted to the height of the module leg.



#### 4. Correctly applied clamp on the mounting bracket of the CF system.

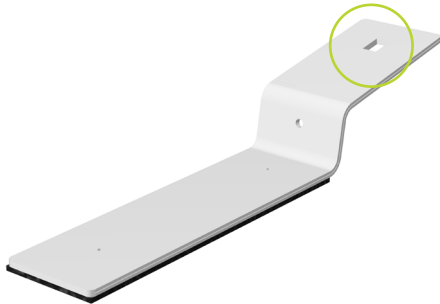
The clamp is locked in the square hole by pressing it in vertically. Make sure that the clamp is well clicked into the punched hole.



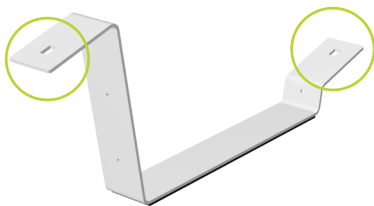
#### Fastening to the mounting bracket with square cut-out

The clamps are connected to the supports by simply clicking them into place. The strength of the connection comes from tightening the pre-assembled hexagon socket screw with the correct torque.

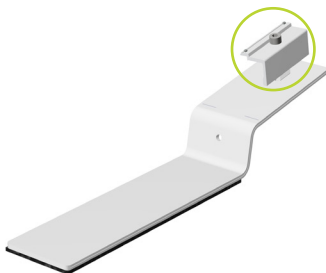
Cut-out for fixing the clamps at the front part.



Punching for fixing the clamps on the top part.

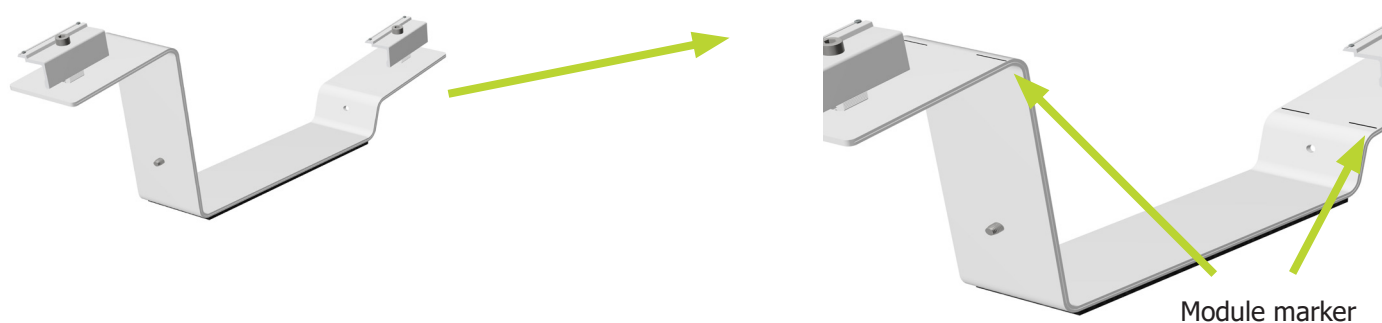


Correct pre-assembly of the end clamp on the front part.

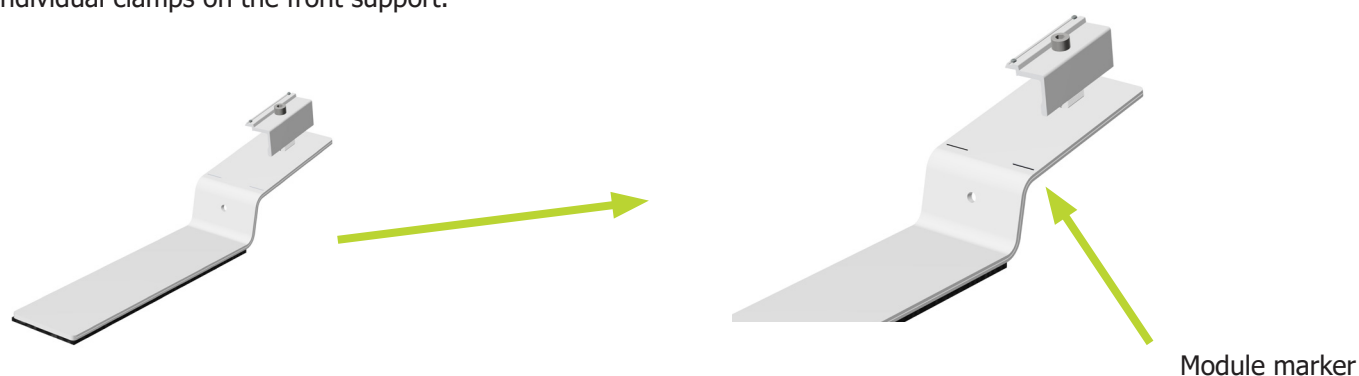


The module clamps are mounted on the short sides. When placing the modules, make sure that the module edge is in contact with the module marking.

Example of the correct pre-assembly of the individual clamps.



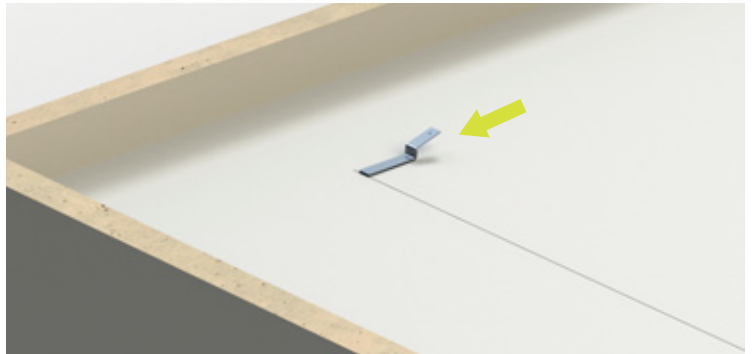
Example of the correct pre-assembly of the individual clamps on the front support.





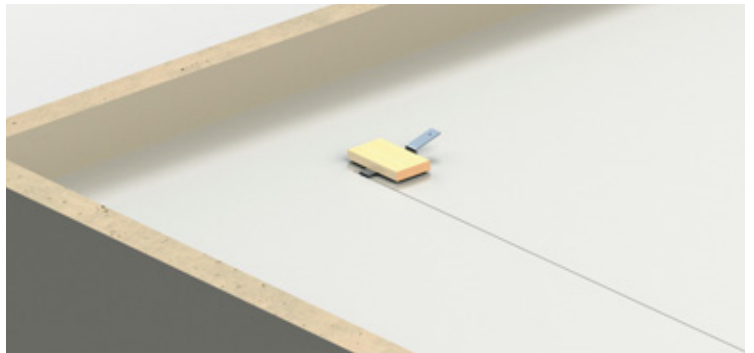
**On bituminous roofs, all supports should be underlaid with an additional layer of bitumen roofing membrane to prevent possible sinking of the columns into the roofing membrane at higher temperatures.**

Position the front part.

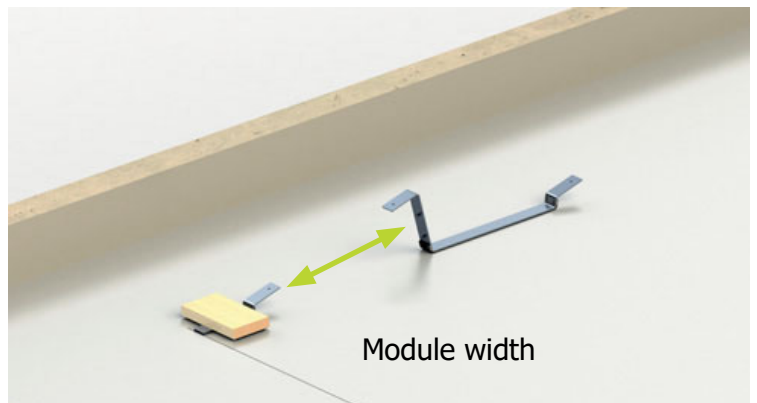


Secure the front part with a ballast block.

Place the ballast block on the front part and the supplied building screen mat (PES) to ensure a stable support.

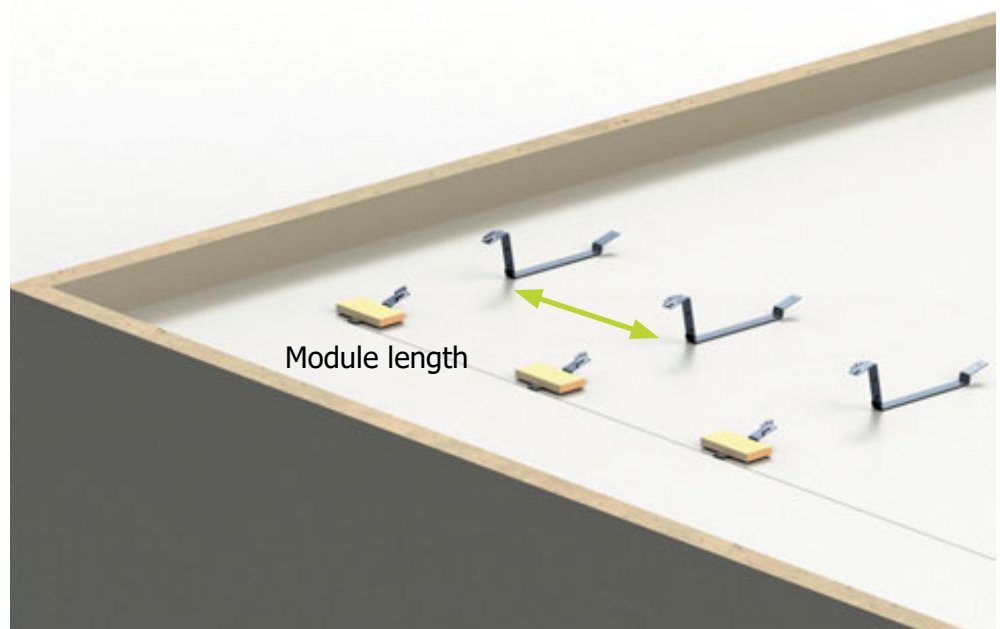


Place the connector at approximately the required vertical distance (module width). The exact distance is adjusted during installation of the module.





Place the front parts and connectors at approximately the required horizontal distance (module length). The exact distance is adjusted during installation of the module.



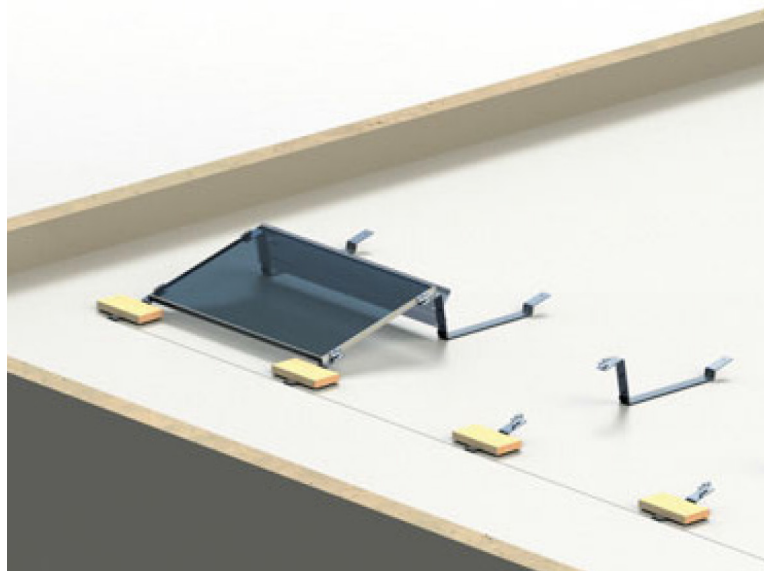
**Align the front part and connector using a guideline.**

Install the module on the front parts in the horizontal orientation and align the top so that it sits flush with the LEICHTmount connector or end part.

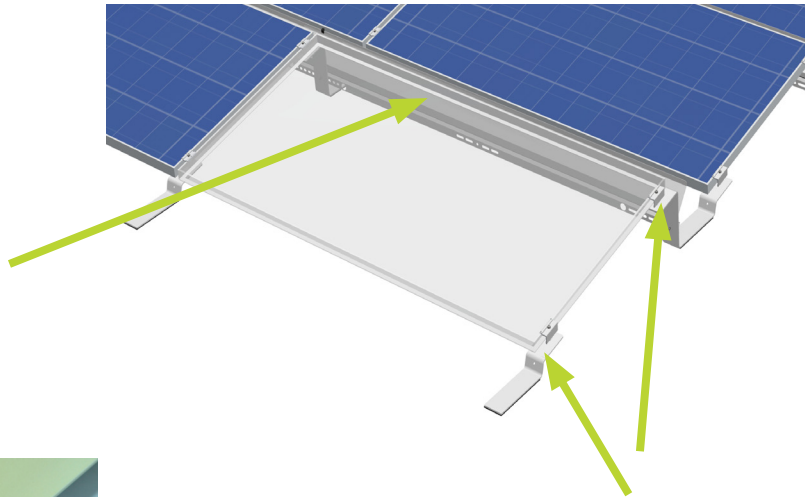
For the S5 variant - shading angle  $30^\circ$ , ensure that the module protrudes above the support and that the dimension between the top edge of the module frame and the center of the clamp is exactly 245 mm (see page 7). Optionally, the LEICHTmount CF S  $5^\circ$  mounting tool can be used for this.

Then install the wind shield and ballast tray (if required). The mounting procedure for the wind shields is shown in section 2.4, the installation of the ballast tray in section 2.5.

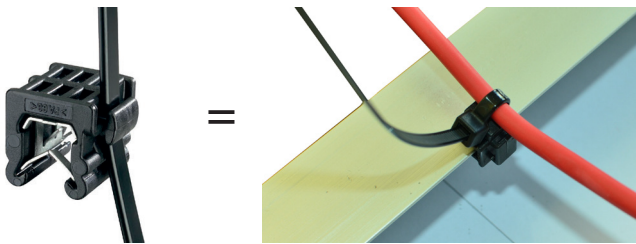
For easier orientation of the modules, markings for the lower and upper edge of the modules have been applied to the front parts and connectors.



The module end clamps or the module mid clamps on the previous module can then be tightened and another module installed. At the end of the row, attach a module end clamp and screw it tightly into position after aligning the last module. The clamps must be tightened with a torque of 15 Nm.



Click cable clips onto the module frame.



Laying the DC cable: The string cables are fixed to the module frame with cable clips.

Laying on the roof: The string cables are combined in cable management ducts. The cable ducts can be mounted on stone slabs and guided between or next to the module rows. The ducts and substructure are not included in the S:FLEX scope of delivery.



**Tighten the module end clamps and mid clamps with 15 Nm.**

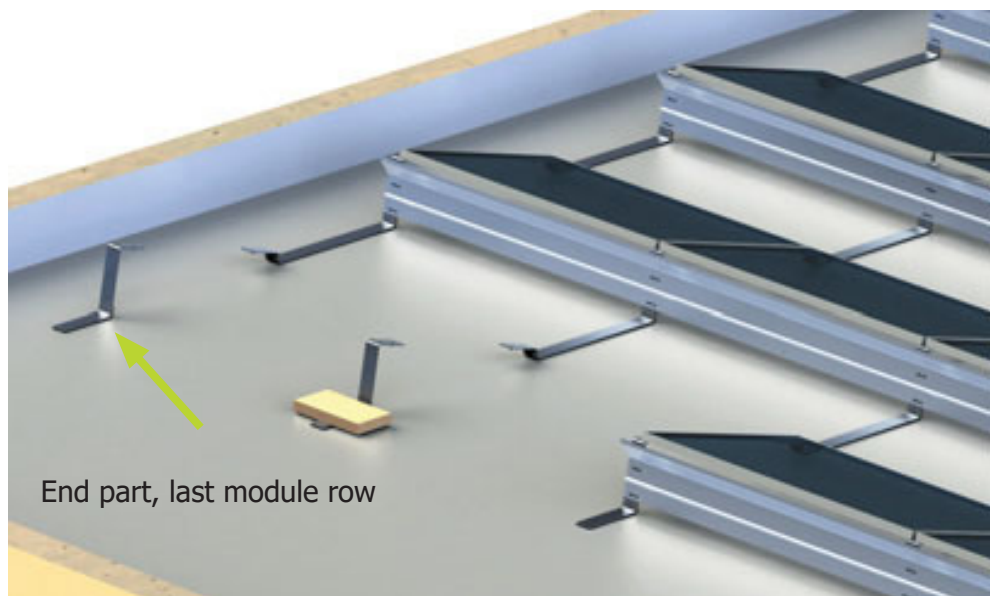


**For easier alignment, align the bottom and upper edge of the module with the markings.**



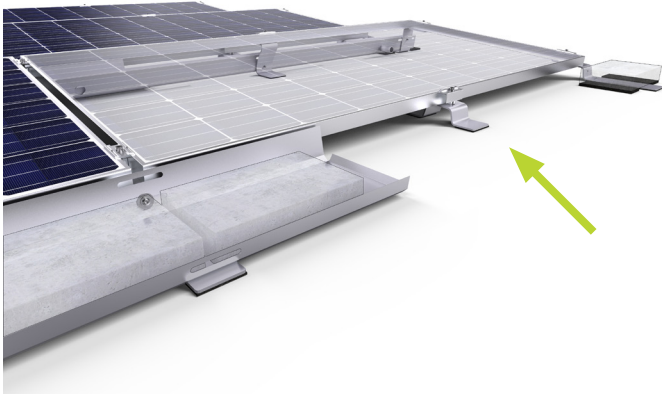
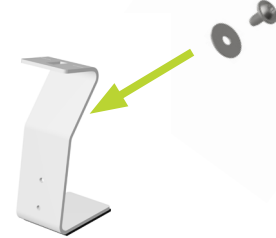
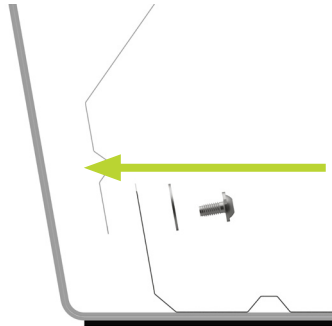
**In order to minimise the installation time, the wind shield is always installed at the same time as the ballast trays. The installation guide for the wind shields and ballast trays can be found in section 2.4 and 2.5.**

The end part is used at the end of the last module row. Mount the modules as described for the connectors. Then install the wind shield and ballast tray (if required).

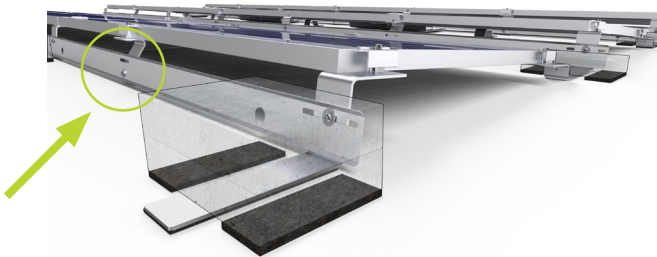


### 2.3 Installation — Alpine supports

For snow loads from 2.4 kN (design load), additional support feet must be mounted in the module's centre. Align the Alpine back and front supports centrally with the module and secure the front support using a module end clamp.



Mounting the Alpine front support: fasten in the middle of the module's longer side with module end clamp.



Screw the upper Alpine support to the wind shield using a groove screw and flat washer.



**Tighten the groove screw with 15 Nm.**

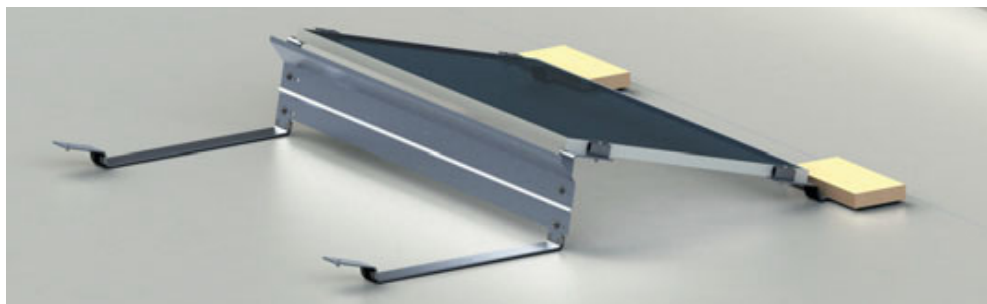
## 2.4 Installation — wind shield

The wind shield is installed with an overlap on the connectors and end parts, and is secured using the supplied groove screws and flat washers. The groove screws are screwed to the respective row with 15 Nm after the modules have been installed.

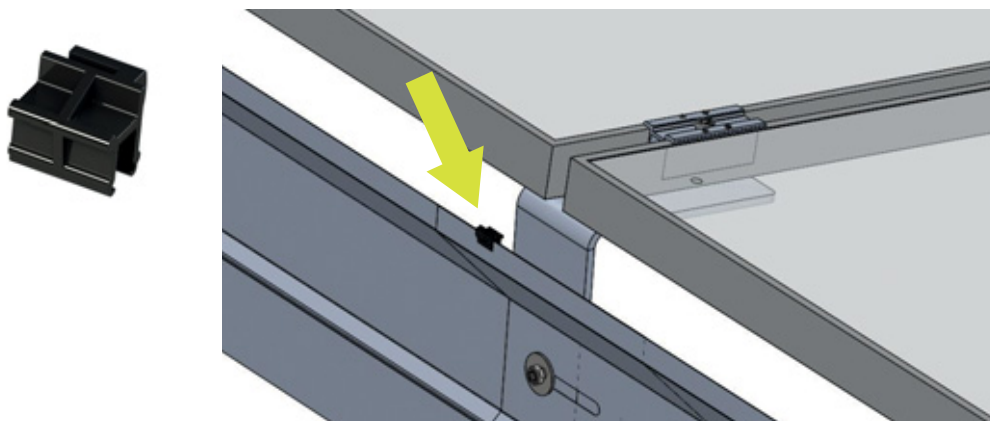
If necessary, the ballast tray is mounted in the same step using the same fasteners.



- 1 groove screw M8x16 per connector or end part for the LEICHTmount S5°
- 1 groove screw M8x16 per connector or end part for the LEICHTmount S10°
- 2 groove screws M8x16 per connector or end part for the LEICHTmount S15°



In the area of the overlap of the wind shields, the shields are connected via a cable clip attached to the upper edge of the shield.



The wind shield is available in two sizes for different module dimensions:

Type	Modul width	x	Modul length
Wind shield 1800	950 - 1.150 mm	x	1.500 - 1.750 mm
Wind shield 2050	950 - 1.150 mm	x	1.751 - 2.000 mm
Wind shield 2300	950 - 1.150 mm	x	2.001 - 2.250 mm



**In order to minimise the installation time, the wind shield is always installed at the same time as the ballast trays. The installation guide for the ballast trays can be found on the next page.**



**With the S5 system, the long ballast trays can replace the wind deflectors. Wherever long ballast pans are fitted, do not fit wind deflectors.**

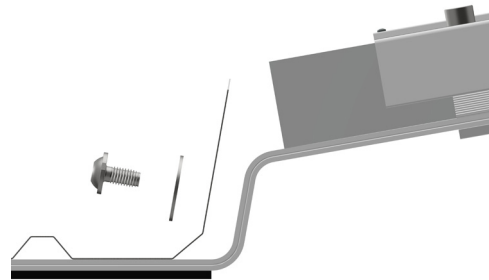
The ballast distribution must correspond to the plan in the project report. The quantity and distribution of the ballast depend on parameters such as location, building height, building surroundings, roofing type and roof pitch.

#### 2.5 Installation — ballast trays

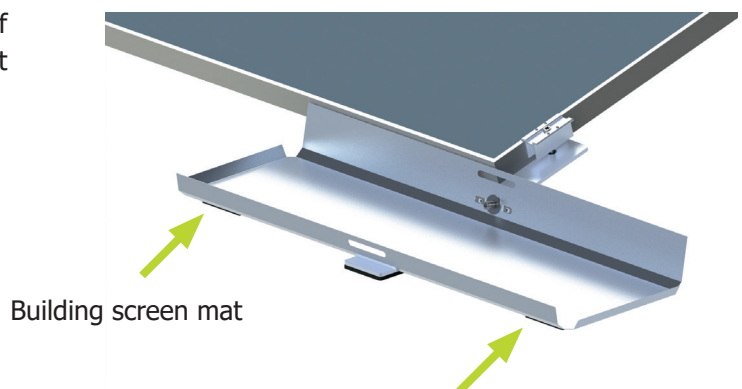
The ballast trays must be used as soon as the specified ballast weight per support is exceeded. In this case, a distinction is made between the standard ballast tray (880 mm) and the long ballast tray (1.800 mm / 2.050 mm / 2.300 mm), depending on the system and ballast blocks being used. The length of the ballast tray depends on the length of the module. The ballast trays are also used if the point load is too high for the roof skin. This ensures that the weight is spread over a larger supporting surface.

##### Ballast tray 880

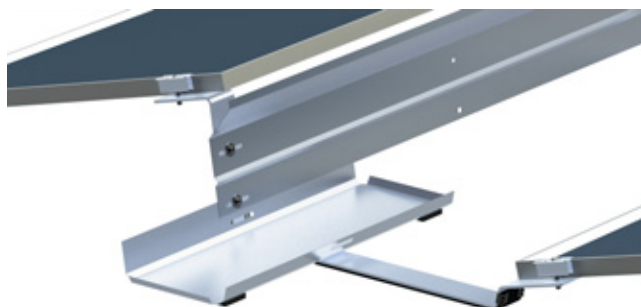
The ballast tray for the front part is attached using a groove screw.



Place a building screen mat (PES, included in the scope of supply) on the left and right side underneath the ballast tray.

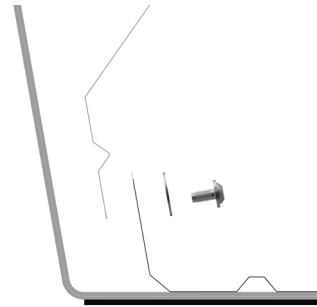
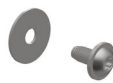


The ballast tray is mounted to the connector or end part using the screw on the wind shield. The tray is attached between the support and the wind shield.



#### Ballast tray 1.800/2.050/2.300

For higher loads, the ballast tray 1.800/2.050/2.300 must be used. The tray is installed in front of the wind shield and secured with the same groove screw. The tray is additionally secured in the middle of the wind shield using a groove screw and flat washer. If several ballast trays follow each other, they are laid out in such a way that they overlap at the connectors or end feet.



**Tighten the groove screw with 15 Nm.**

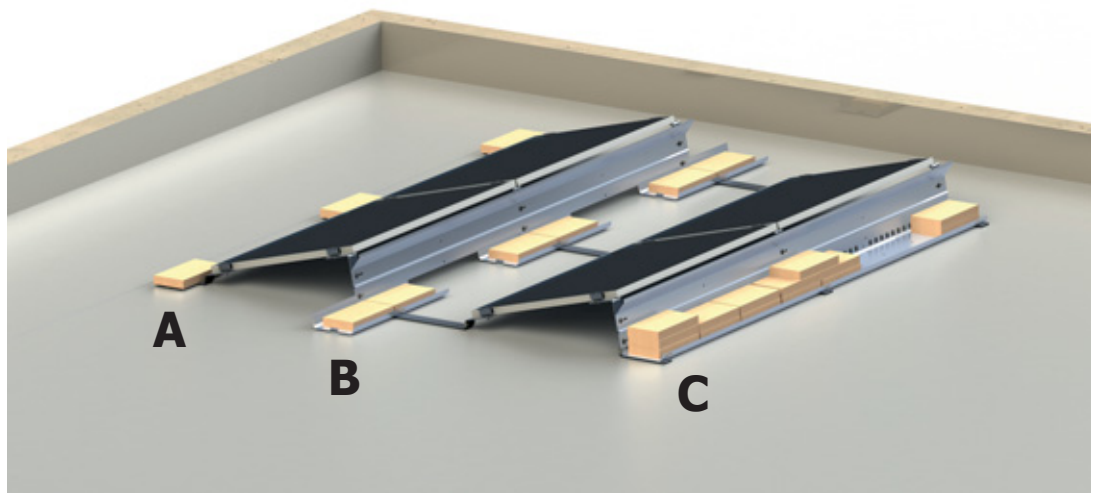


## 2.6 Installation — ballast

Place all required ballast blocks on the front parts, connectors, end parts and ballast trays in accordance with the structural calculation in the project report. Always attach building screen mats (PES) on the left and right side underneath the ballast blocks and trays. We recommend using two building screen mats (PES) per ballast block or ballast tray 880. The following building screen mats (PES) are provided for the ballast trays:

- for ballast tray 1.800: 3 building screen mats
- for ballast tray 2.050: 4 building screen mats
- for ballast tray 2.300: 5 building screen mats

The maximum width of a ballast block for the system is 200 mm. The blocks used must be able to withstand the local weather conditions and have a compressive strength of at least 21 N/mm<sup>2</sup>.



**Variant A:** Standard ballast without tray; ballast lies directly on the front parts, end parts and connectors.

**Variant B:** Ballast tray 880 attached to a support

**Variant C:** Ballast tray 1.800/2.050/2.300 attached to two supports



**The position of the ballasting must always be carried out in strict adherence to the planning documents. A different distribution or omission of ballast elements endangers the stability of the entire plant and represents an enormous risk.**

**Do not leave the installation site until the ballast for each module has been installed in accordance with the ballast chart.**

**The correct position of the ballast blocks and the building screen mats (PES) should be checked as part of the annual maintenance inspection. It is the responsibility of the installing company to check the specification and weight of the required ballast blocks.**

### 3.1 Disassembly

Disassembly of the S:FLEX mounting system may only be carried out by trained specialist personnel. Observe the same safety instructions, standards and guidelines as provided for the installation. In general, disassembly is carried out in reverse order to the described installation procedure.



**Before disassembly, disconnect the PV modules from the mains network. Disconnect all of the PV modules' electrical cables (string lines and plug connectors) and remove them from the frame system.**



**Then remove the modules and store them safely. Improper disassembly can lead to damage to the modules.**



**Disassemble frame system and safely store all of the parts. Any holes in the roof must be sealed by a specialist.**

### 3.2 Disposal

The S:FLEX mounting system consists of aluminium, stainless steel and steel components. These materials can be recycled after disassembly. The frame system must only be disposed of by a specialist waste management company. Observe the applicable national standards and guidelines.

#### 4.1 User agreement for the LEICHTmount CF S

We wish to point out that the mounting system is sold under a purchase contract.

Installation/processing or its acquisition by a third party is not carried out in the name of, or on behalf of, S:FLEX GmbH. It must be undertaken by appropriately qualified personnel and strictly in accordance with the installation instructions.

The design and planning of the system must be undertaken using the S:FLEX Planning Software. S:FLEX GmbH is neither responsible for the project-specific structural analysis of the roof structure, nor for obtaining and documenting the consent of the roof manufacturer in respect of being able to use the relevant mounting system on the roof in question (in the terms of the warranty), nor for the correct installation of the mounting system.

S:FLEX GmbH will not be liable for faults and damage and/or a restricted or limited operational capability of the system which has resulted from defective installation and/or installation which was not undertaken in accordance with the installation instructions and/or the project report. In the case of improper installation, the buyer's right to assert claims for material defects shall expire.

The system warranty is only valid if all system components are acquired from S:FLEX GmbH.

The system requires approval for the modules to also be mounted in the indicated manner (i.e. clamped on the modules' shorter side). This approval can either be given generally as part of the module certification or, as the case may be, issued by the module manufacturer on a project-specific basis.

#### 4.2 Warranty / disclaimer

The information regarding dimensioning provided in these instructions are merely suggestions based on prior experience. Binding installation frame structural analyses can be created using the S:FLEX planning software.

As an installation company, you are responsible for the correct execution of the installation. S:FLEX GmbH is not liable for the dimensional information contained in commercial system quotations.

As an installation company, you are responsible for the mechanical durability of the interface connections mounted on the building's structure. In particular, this includes ensuring that these are leak-tight. The components supplied by the company S:FLEX GmbH are designed for the expected loads in accordance with the current technological state of the art.

In this context, you must provide the company S:FLEX GmbH with information about all general technical conditions in writing via the project data collection sheet (information about the supporting structure, snow load zone, building heights, wind loads, etc.).

S:FLEX GmbH is not liable if the installed components are not properly handled. Any use close to the sea needs to be clarified with S:FLEX GmbH directly on a case-by-case basis due to the increased risk of corrosion. Provided that the system is handled properly and dimensioned according to the structural conditions and normal environmental and ambient conditions, the company S:FLEX GmbH provides a warranty from transfer of risk to the warranty holder, which guarantees that the metallic components of the racks will remain free from defects with regard to material and workmanship for a period of 10 years. This warranty does not apply to wear parts. For additional information, please refer to the separate warranty provisions.

This applies within the context of generally prevalent weather and environmental conditions.