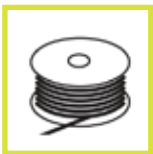




Assembly Instructions

LEICHTmount 2.1 S

Aerodynamic flat roof system for single pitch orientation



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2 Montage - LEICHTmount 2.1 S

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The LEICHTmount 2.1 S system for flat roofs is an aerodynamic frame system that enables installation of photovoltaic (PV) modules without roof penetration. It consists of prefabricated aluminium brackets with self-adhesive building protection mats (PES fleece, plasticizer-free), wind deflectors and all necessary small parts to ensure easy and safe installation.

The LEICHTmount 2.1 S is designed for south-facing systems with pitch angles of 5°, 10° and 15°. The system is configured for transverse module installation. It can be used for almost all commercially available modules with the following dimensions: module width 950 – 1050 mm; module length 1559 – 1993 mm.

All components are made of aluminium and stainless steel. Their high degree of corrosion resistance ensures a long service life and offers the possibility of complete recycling.

1.1 Intended use

The LEICHTmount 2.1 S system for flat roofs is an aerodynamic frame system that enables installation of PV modules without roof penetration. It is designed exclusively for the installation of PV modules.

The LEICHTmount 2.1 S system is designed for easy installation on the following standard industrial roof coverings: foil, bitumen, gravel, green, concrete.

Any use that deviates from this is classified as not intended. In particular, compliance with the specifications of this installation guide is part of the intended use.

An important part of this installation guide is the supplied project report, which includes a site-specific structural analysis. The design and planning of the LEICHTmount 2.1 S must be carried out using the S:FLEX software (Solar.Pro. Tool).

S:FLEX GmbH accepts no liability for damage resulting from non-observance of the installation guide or from misuse or incorrect use of the product.

1.2 About the document

This installation guide describes the installation process for the LEICHTmount 2.1 S 10° system on flat roofs. It can also be applied to installation of the LEICHTmount 2.1 S5° and LEICHTmount 2.1 S15° systems.

The LEICHTmount 2.1 S system includes suitable solutions for different load zones.

- *LEICHTmount 2.1 Standard Version S5, S10, S15 for maximum design loads of 2.4 kN/m²*
- *LEICHTmount 2.1 Alpine Version S10, S15 for maximum design loads of 4.4 kN/m²*

This document shows the installation recommendations for:

- *LEICHTmount 2.1 S with framed PV modules mounted transversely*
- *LEICHTmount 2.1 S Alpine with framed PV modules mounted transversely*

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

1.3 Warnings

The warnings used in this installation guide identify safety-relevant information. They consist of:



Severe risk of injury and danger to life if not observed.



Failure to observe may lead to damage to property.

1.4 General information

The manufacturer of the PV system must be consulted before the installation in order to ensure that the existing roofing and roof substructure is designed to support the additional loads. The condition of the roof substructure must be checked via the installer (e.g. the quality and strength of the purlins, if necessary also the rafters and roof battens, the quality of the roofing, adequate attachment of the roof covering to the substructure, and the maximum load-bearing capacity of the roof covering).

Before installing the substructure, ensure that the module manufacturer's specifications regarding the module clamps are observed (e.g. the width and type of the clamp as well as its mounting position on the module). If this is not the case, either the module manufacturer's consent must be obtained by the customer prior to installation, or the frame must be adapted to the module manufacturer's specifications.

The requirements for lightning and surge protection of installation systems for PV modules must be met in accordance with DIN and VDE regulations (e.g. DIN EN 62305-1–4, DIN V VDE V 0100 Part 534, VdS data sheet 2010). The specifications of the respective power supply company must also be complied with.

During installation, fire protection regulations must be satisfied; for example, fire protection walls should not be modified and the corresponding clearances must be observed.

When changing the roofing, the manufacturer's instructions must be followed. During and after installation, the frame parts must not be stood upon or used as a climbing aid. There is a risk of falling and the underlying roofing could be damaged.

Before carrying out work on the roof, check that all accident prevention regulations have been complied with (in their current version), and that sufficient protection against falling objects has been provided.

The installation should only be carried out by adequately trained specialists who work in accordance with the rules of the German roofing trade (ZVDH).

1.5 Installation

This installation guide is designed to assist the installation of the S:FLEX LEICHTmount 2.1 S system on flat roofs. It is intended for use by personnel who have been trained by the operator of the PV system and possess the appropriate qualifications.

Installation of the S:FLEX LEICHTmount 2.1 S system on flat roofs requires extensive specialist expertise. A specialist should be contacted prior to the installation work and the approval of the manufacturer of the roof covering must be obtained.

Particularly in the case of the erection of PV systems on flat roofs, all approvals necessary for the installation must be obtained and, where appropriate, compliance with any additional occupational health and safety provisions regarding the installation of these systems must be ensured before beginning the work.



As a general rule, the installation should only be carried out by adequately trained specialists who work in accordance with the rules of the German roofing trade (ZVDH). System components (roof hooks, system carriers) must not be used as stepladders; the modules must not be stepped upon.



Particularly in the case of the erection of PV systems on flat roofs, all approvals necessary for the installation must be obtained.

1.6 Standards and guidelines



This installation guide is based on state-of-the-art technology as well as our long-standing experience of installing our systems in situ. Since individual project-specific features must be taken into account for each roof, it is always necessary to seek expert advice before starting the installation.

In addition, the manufacturer of the photovoltaic system must be consulted before the installation, in order to ensure that the existing roofing and roof substructure is designed to support the additional loads.

Structural engineers should attend the site for this purpose.

Each photovoltaic system must be installed in accordance with the structural requirements of the site and the installation situation, taking into account the information contained in this installation guide.

Ensure that only current and complete installation guides are used during the installation and that a printout of the installation guide is kept in the immediate vicinity of the system.

Subject to technical modifications.

When installing the PV systems, always observe the installation instructions provided by the module manufacturer, as well as the relevant standards, accident prevention regulations, and any other applicable regulations and provisions.

Before installation, the manufacturer of the photovoltaic system must be consulted in order to ensure that the installation is strictly carried out in accordance with the national and site-specific building regulations, safety and accident prevention regulations, relevant industrial standards and environmental protection regulations.

All individuals who install S:FLEX PV installation systems are obliged to independently inform themselves about all relevant rules and regulations relating to proper planning and installation, and to adhere to them during the installation process. This also includes checking the current state of the various rules and regulations.

The applicable local and national directives regarding occupational health and safety and environmental protection must also be respected.

1.7 Description of the system

The LEICHTmount 2.1 S system includes solutions to suit a range of different requirements.

System properties

Mounting angle:	the LEICHTmount 2.1 S is available with 5°, 10° and 15° mounting angles
Edge spacing:	roof areas F and G can be covered
Module dimensions:	950 – 1050 mm x 1559 – 1993 mm (width x length)
Max. roof pitch:	4°
Building height:	max. 25 m
Wind load:	max. 2.4 kN/m ² (design value as combined load of dead weight and wind pressure)
Snow load:	LEICHTmount 2.1 Standard up to 2.4 kN/m ² LEICHTmount 2.1 Alpine up to 4.4 kN/m ² (design value as combined load of dead weight, wind and snow pressure)
Module approvals:	a list of approved modules is available from S:FLEX GmbH; request individual approvals from the module manufacturers
Materials:	supporting brackets made of aluminium EN AW 6060 T64, module clamps made of aluminium EN AW 6063 T66, stainless steel screws, wind deflectors made of galvanized steel
Requirements:	the structural load-bearing capacity of the roof and the roof insulation must be ensured by the customer; the general business and warranty conditions as well as the user agreement apply

Modules

The system requires that modules with this type of fastening (clamp on the module's short side) can also be used. This approval may exist either generally within the scope of the module certification or may be granted by the module manufacturer on a project-specific basis.



Always observe the module manufacturer's installation instructions.

Flat-roof coverings

The LEICHTmount 2.1 S can be installed on the following flat-roof coverings:
foil, bitumen, gravel, green, concrete.

The compatibility of the roof covering and the protective 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 brackets.



S:FLEX GmbH can provide a measuring device to determine the project-specific friction coefficient.

Row spacings

The LEICHTmount 2.1 S is available in the following versions:

LEICHTmount 2.1 S 15 (18°): 790 mm (31.1 inch)

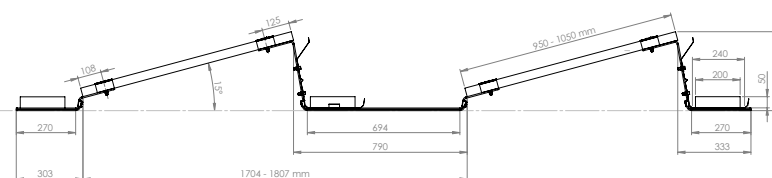
LEICHTmount 2.1 S 15 (25°): 571 mm (22.5 inch)

LEICHTmount 2.1 S 10 (18°): 527 mm (20.8 inch)

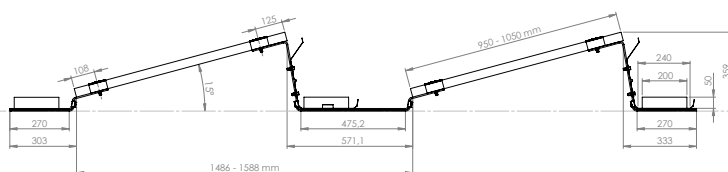
LEICHTmount 2.1 S 10 (25°): 380 mm (15 inch)

LEICHTmount 2.1 S 5 (18°): 335 mm (13.2 inch)

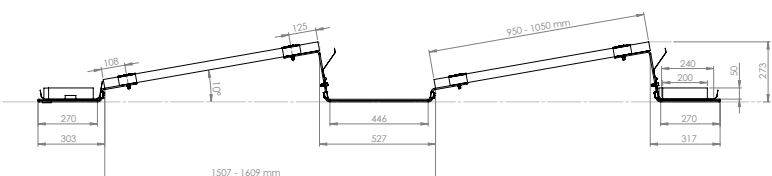
S15 18° irradiation angle



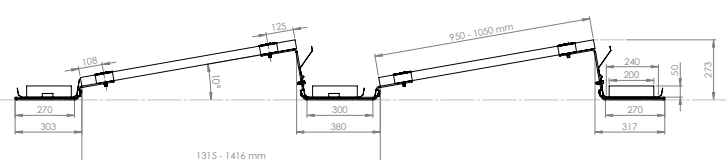
S15 25° irradiation angle



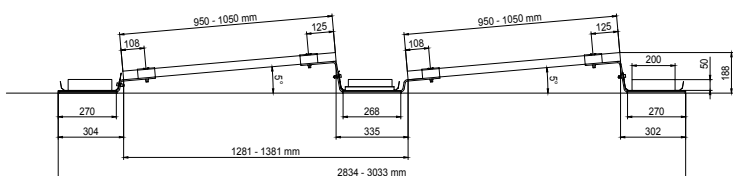
S10 18° irradiation angle



S10 25° irradiation angle



S5 18° irradiation angle

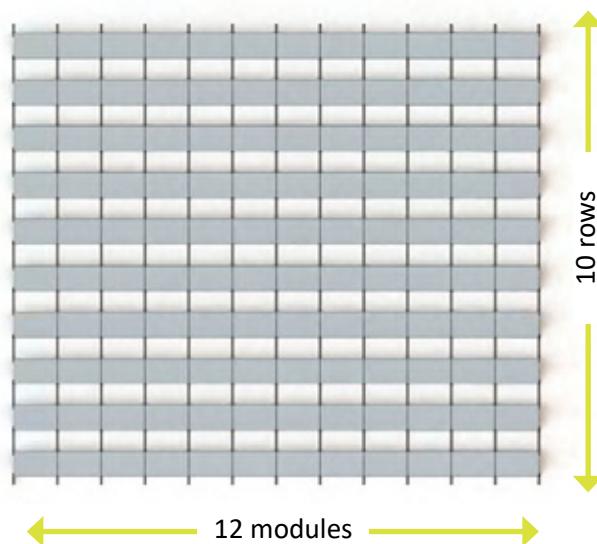


Basic conditions for the module field size

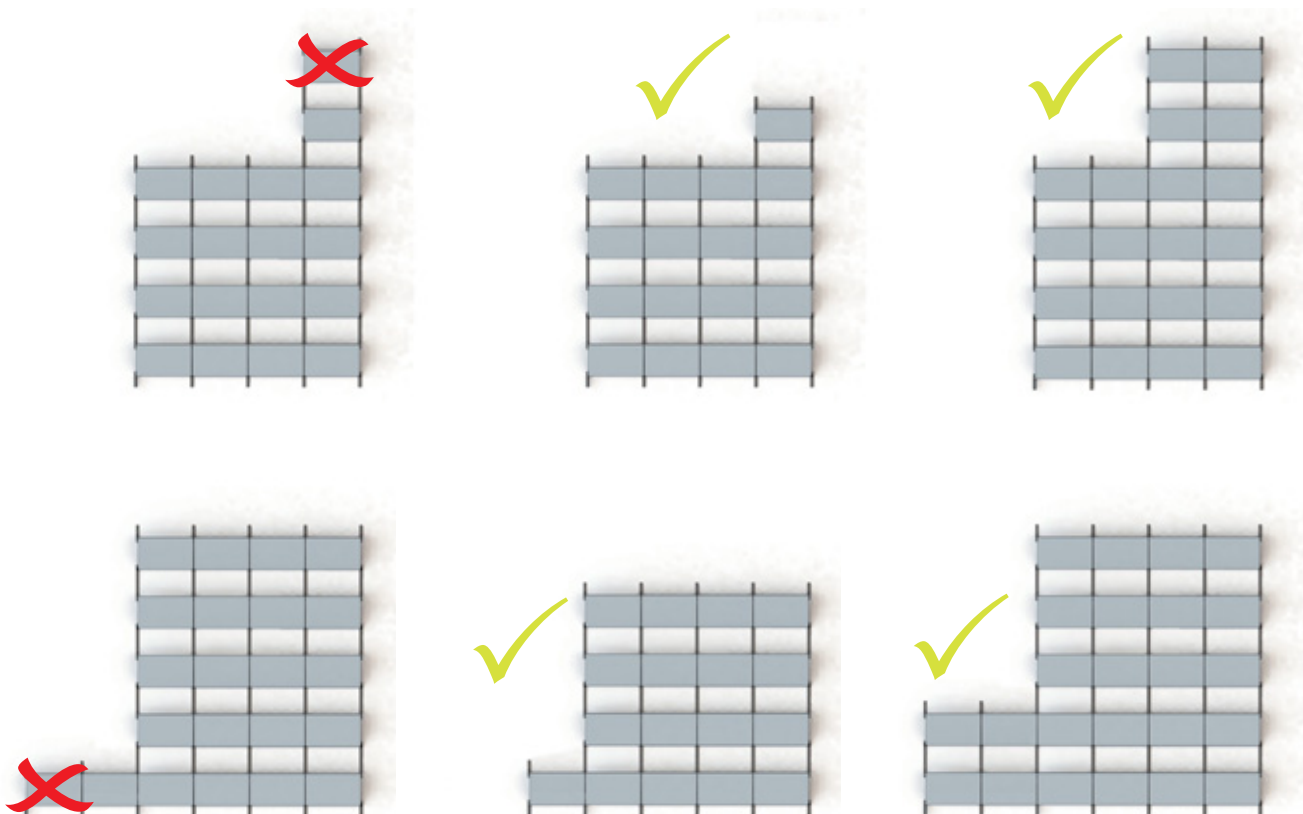
The minimum size of the module field for the LEICHTmount 2.1 S is:
2 rows with 3 modules, or 3 rows with 2 modules



The maximum size of the module field for the LEICHTmount 2.1 S is:
10 rows with 12 modules (120 modules).



Example boundary conditions for module fields with the LEICHTmount 2.1 S.



System design

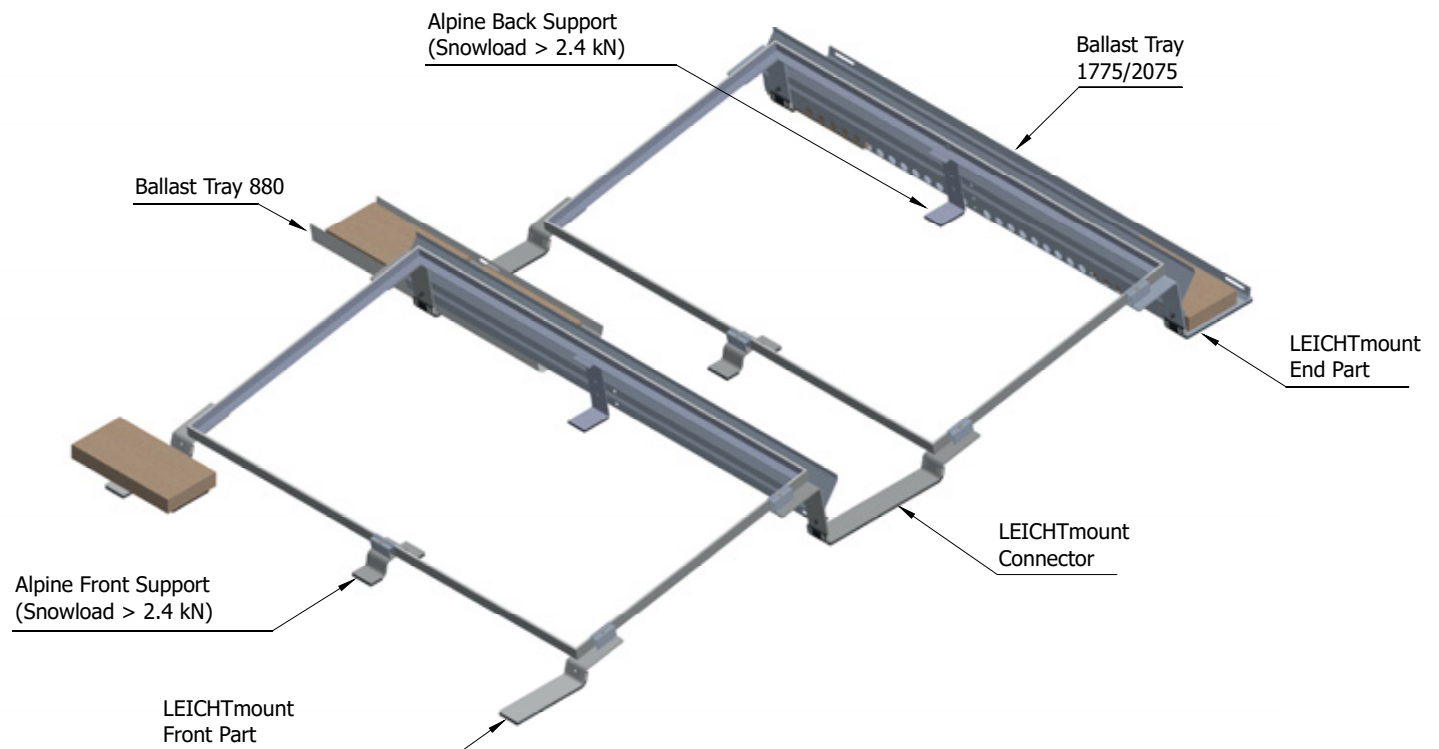
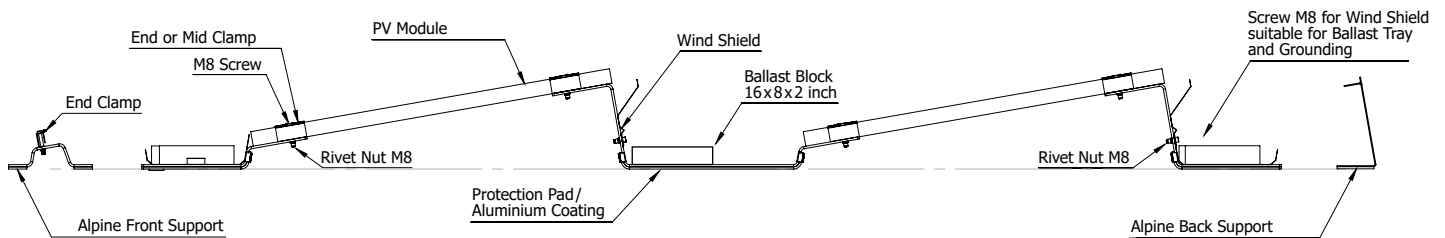
LEICHTmount 2.1 S Standard up to 2.4 kN/m^2

LEICHTmount 2.1 S Alpine up to 4.4 kN/m^2

The standard system is designed for wind and snow loads up to max. 2.4 kN/m^2 , the Alpine system for up to max. 4.4 kN/m^2 . All values are design values as a combined load of dead weight, wind and snow pressure.

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

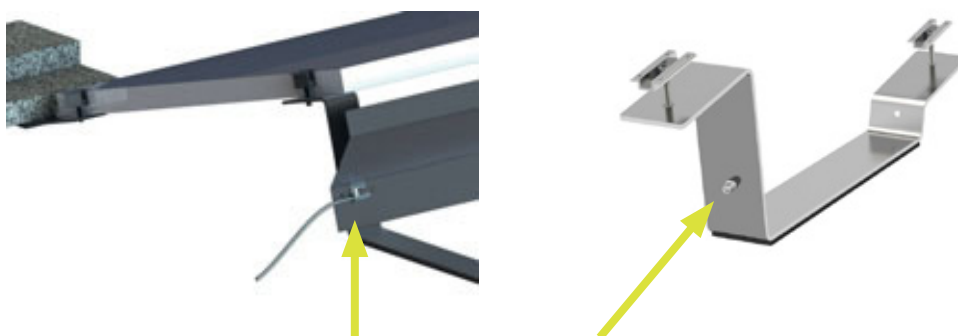
Potential equalisation between the individual system components must be ensured in accordance with the respective country-specific regulations and standards.



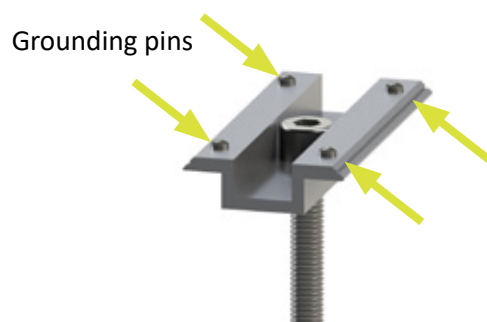
Always observe the module manufacturer's installation instructions.

Once the installation is complete, the entire system can be grounded and integrated into the in-house lightning protection system. One grounding terminal per module field is recommended (max. 40 modules).

The LEICHTmount 2.1 S system must be grounded in accordance with the applicable regulations of the country in which the installation is carried out.



The grounding cable is attached using a screw on the wind deflector.



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



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. In accordance with VDE 0185-305-3 Supplement 5, the separation distance between the PV system and lightning protection system must be observed.

S:FLEX GmbH assumes no liability whatsoever for damage caused by lightning strikes or grounding problems.

Optional elements

Side deflectors

As a visually appealing solution, the module rows can be fitted with a special side deflectors. These are also installed in areas in which the installation system must be fire-tested in accordance with UL1703.



Clamp the side deflectors between the end clamps and substructure (Front Part, End Part and Connector) on the end of each array.



A successfully completed fire test is only valid if the side cover plates are installed. The side covers are not supplied as standard and must be ordered separately.

2.1 System components

Front part



End part



Connector



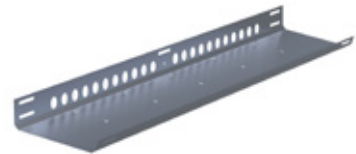
Wind shield



Ballast tray 880



Ballast tray 1775/2075



Module End clamp 33–50mm



Module end clamp



Module mid clamp



Cable clips



Hexagon socket screw M8



Flat Washer M8x30



Allen nut M8x16



Flathead screw



Blind rivet nut VZ M8



Wind deflector clip



Alpine back support



Alpine front support



Building screen mat (PES)



Ballast block (not included in delivery)



2.2 Installation — Racking and modules

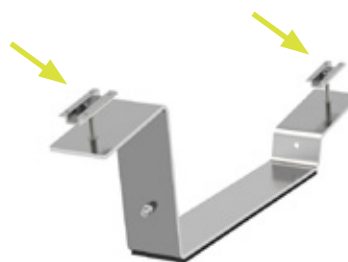


The design and planning of the LEICHTmount system must be carried out using the S:FLEX planning software (Solar.Pro.Tool). Please make sure that the position of the modules on the roof and the ballast distribution are exactly as described in the project report. If the module distribution on the roof changes due to local conditions, such as unforeseen interfering surfaces, the structural calculation must be repeated using the S:FLEX planning software (Solar.Pro.Tool).



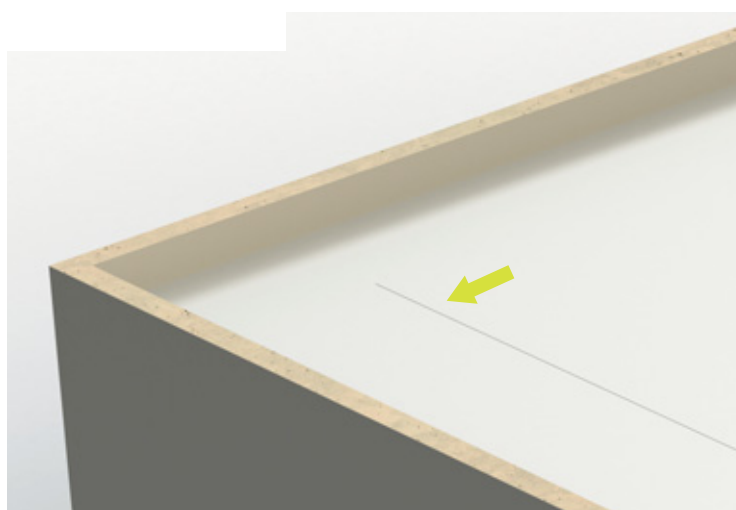
Do not leave the installation site until the wind deflector and ballast for each module have been installed in accordance with the ballast chart. Without the wind deflectors and ballast, the stability of the module field is not guaranteed. The correct position of the ballast blocks and the building protection 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.

Place the end clamps and mid clamps on the LEICHTmount 2.1 S Front Parts, End Parts and Connectors.



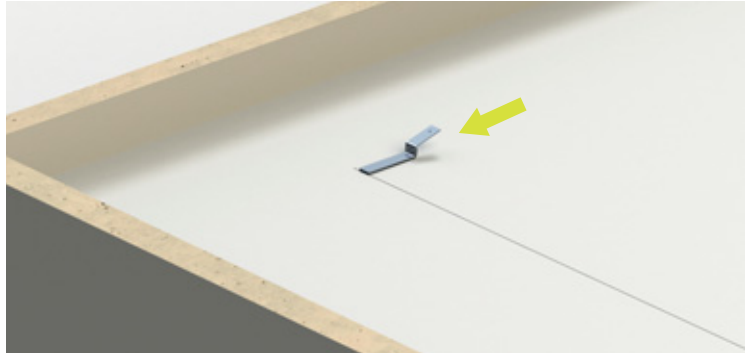
Measure the roof surface.

Mark the initial point with a chalk line.



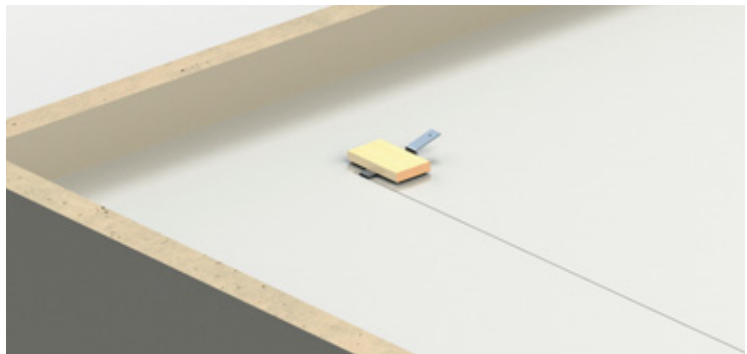
Level in accordance with the project report.

Position the Front Part.

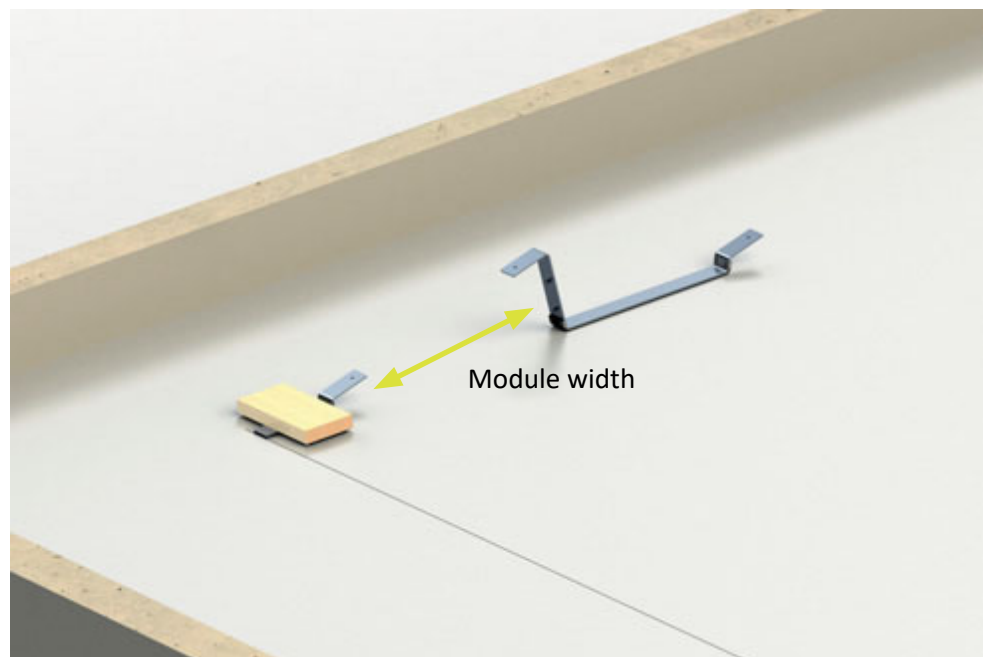


Secure the Front Part with a ballast block.

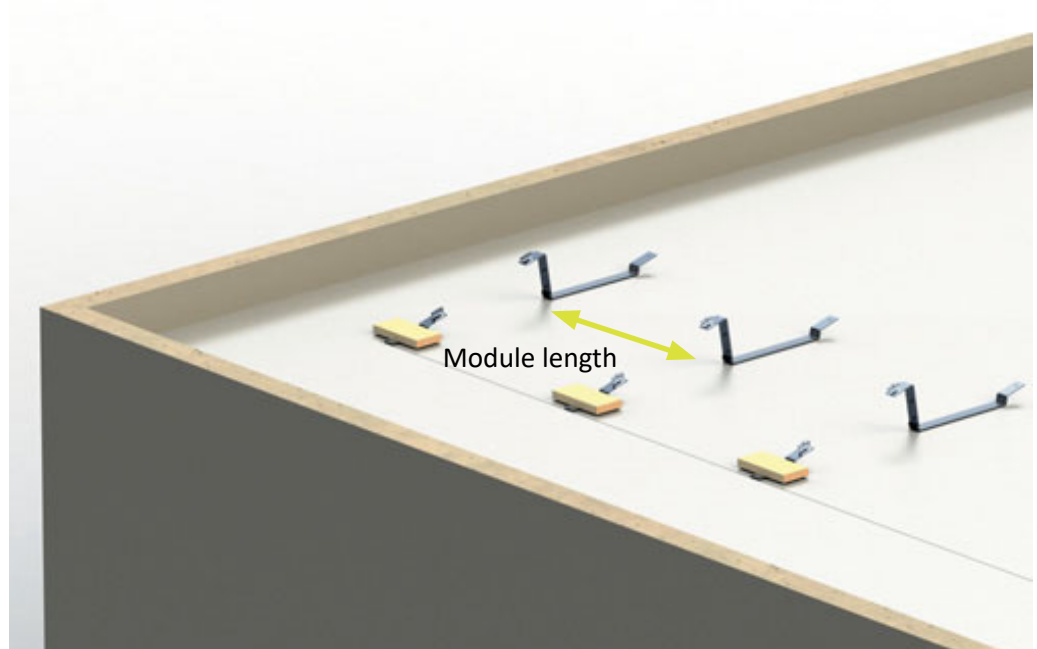
Place the Building screen mat (PES) next to the Front Part under the ballast.



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

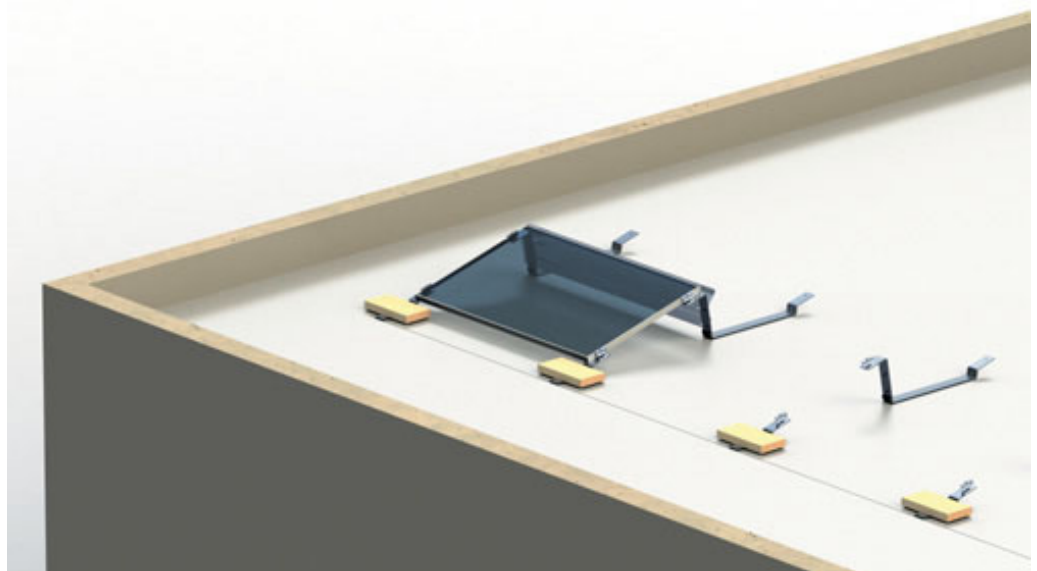


Place the Front Part and Connector at approximately the required horizontal distance (module length).
The exact distance is adjusted during installation of the module.



Align the initial and double brackets 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.



Tighten the end clamps with 15 – 20 Nm.

The end clamps or the mid clamps for the previous module can then be tightened and another module installed. At the end of the row, attach an end clamp and screw it tightly into position after aligning the last module. The clamps must be tightened with a torque of at least 15 Nm, up to a maximum of 20 Nm.



Click cable clips onto the module frame.



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



Secure the mid or end clamp with 15 – 20 Nm.

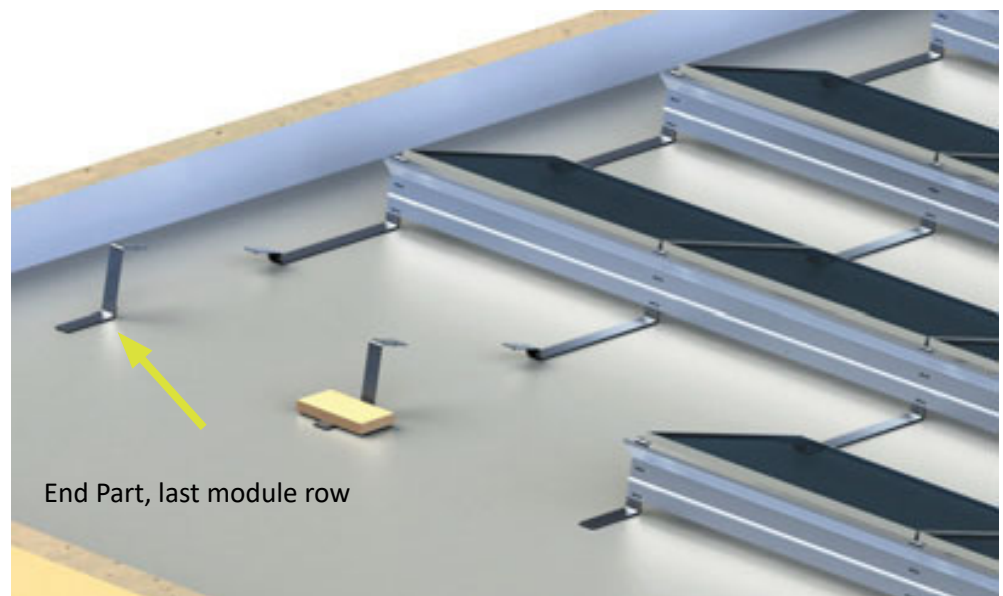


In order to minimise the installation time, the wind shield is installed at the same time as the ballast trays. The installation guide for the wind shields and ballast trays can be found on page 20.

Proceed as described for the following rows.

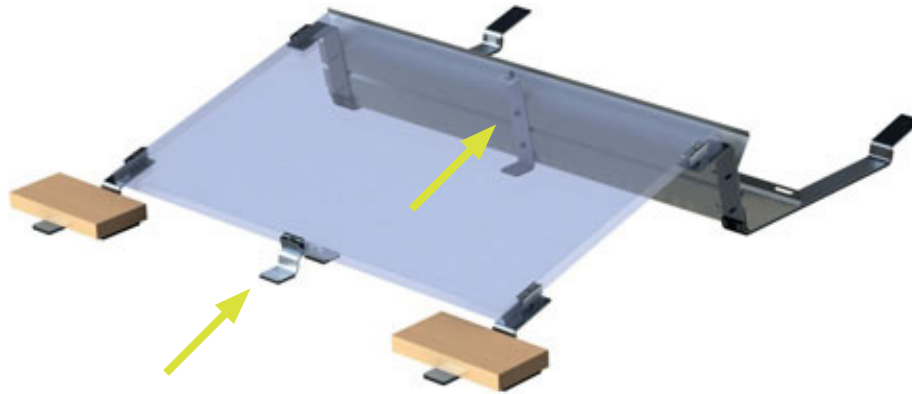
When installing the last row, the End Part is used instead of the Connector.

The modules and wind shield are installed in the same way.



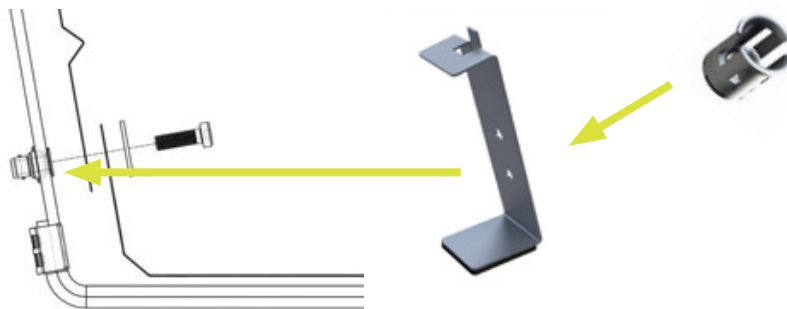
2.3 Installation — alpine supports

Place the Front Support on the lower module end centered in the middle and tighten with 15 – 20 Nm.



Press the 2 rivet nuts into the designated holes in the Back Support.

- One rivet nut for LEICHTmount S5°
- One rivet nut for LEICHTmount S10°
- Two rivet nuts for LEICHTmount S15°



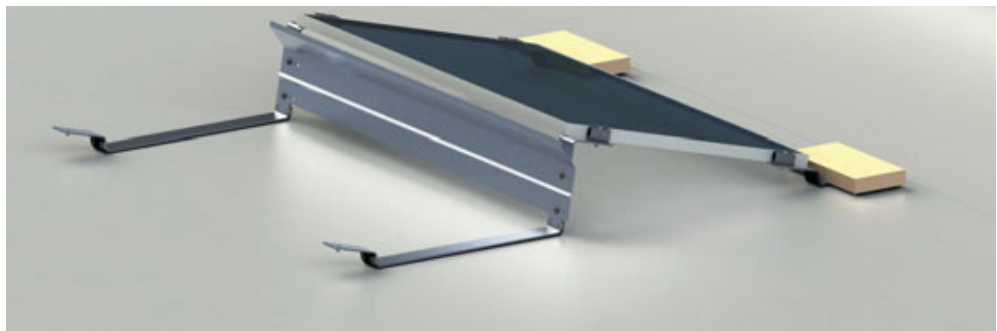
**Tighten the Allen screw
with 15 – 20 Nm.**

2.4 Installation — wind deflector

The wind deflector is installed with an overlap on the double and end brackets and secured with the supplied Allen screws and washers. The Allen screws are screwed to the respective row with 15 Nm after the modules have been installed.



- 1 Allen nut M8x30 per double or end bracket for the LEICHTmount S5°
- 1 Allen nut M8x30 per double or end bracket for the LEICHTmount S10°
- 2 Allen nuts M8x30 per double or end bracket for the LEICHTmount S15°



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

Type	Module width	x	Module length
Wind deflector 1775	950 – 1050 mm	x	1559 – 1690 mm
Wind deflector 2075	950 – 1050 mm	x	1855 – 1993 mm



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

2.5 Installation — ballast trays

The ballast trays must be used as soon as the specified ballast weight per bracket is exceeded. In this case, a distinction is made between the standard ballast tray (880) and the long ballast tray (1775/2075), depending on the ballast weight per bracket.

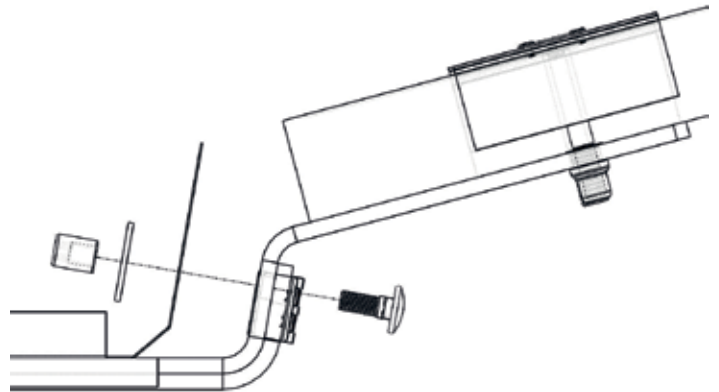
The ballast trays are also used if the point load is too high for the roof skin. This ensures that the weight is spread over a larger supporting surface.

Ballast tray 880

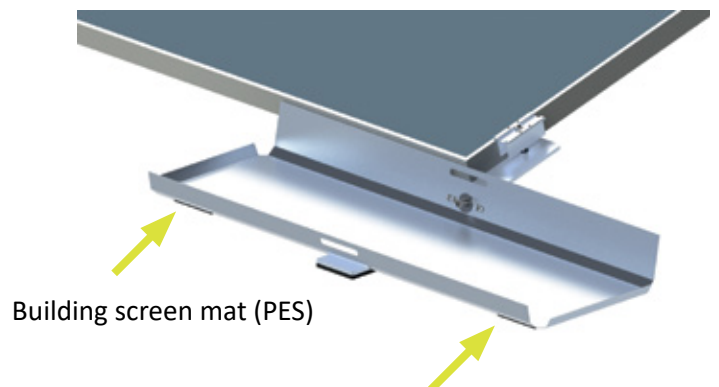
The ballast tray for the initial bracket is attached using a flathead screw inserted from the rear through the square hole, and a hex nut. For shading reasons, a maximum of 5 blocks can be installed in the front ballast tray.



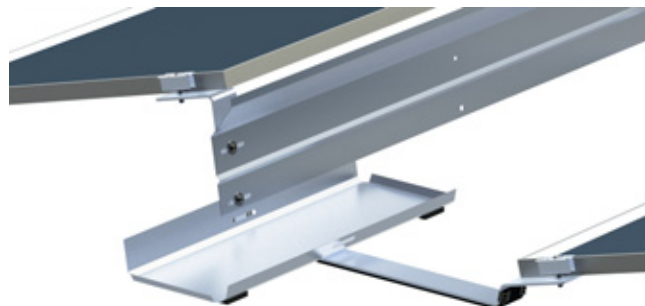
**Tighten Allen nut
with 15 – 20 Nm.**



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



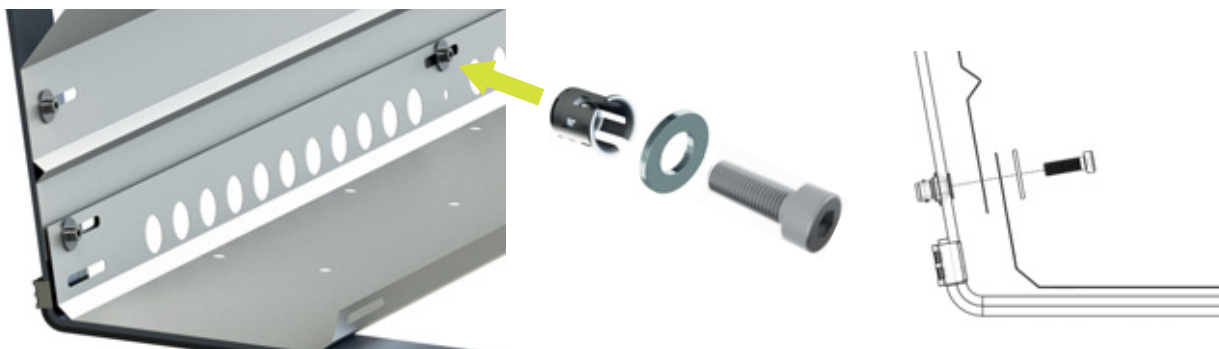
The ballast tray on the Connector and End Part are installed over the screw of the wind shield. The tray is bolted between the Connector or End Part and the wind shield. A maximum of 7 blocks per tray can be installed.



**The ballast trays must also be
installed in areas in which
the installation system must be fire
tested in accordance with UL1703.**

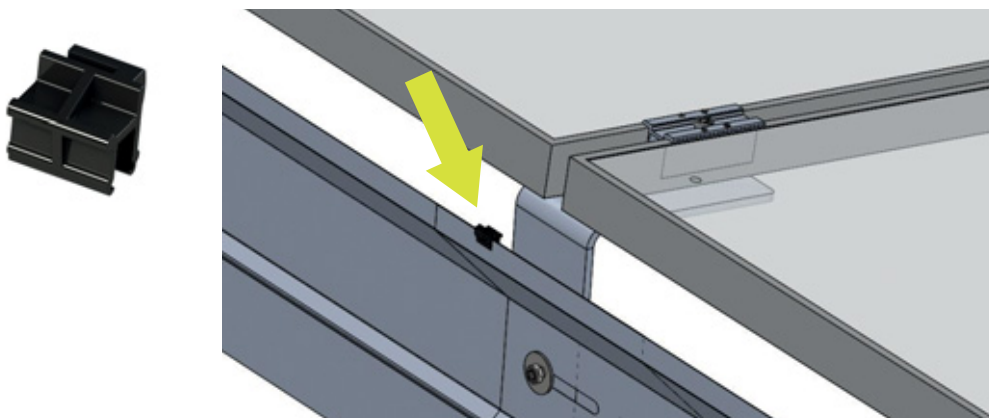
Ballast tray 1775/2075

As soon as more than 7 blocks per Connector or End Part are required the long Ballast Tray 1775/2075 needs to be installed. The tray is installed in front of the wind shield and tightened with the same hexagon socket screw. The tray is bolted additionally in the center of the wind shield over the rivet nut, hexagon socket screw and washer.



**Tighten the Allen screw
with 15 – 20 Nm.**

Install the wind shield clip at the overlapping point of the shields.

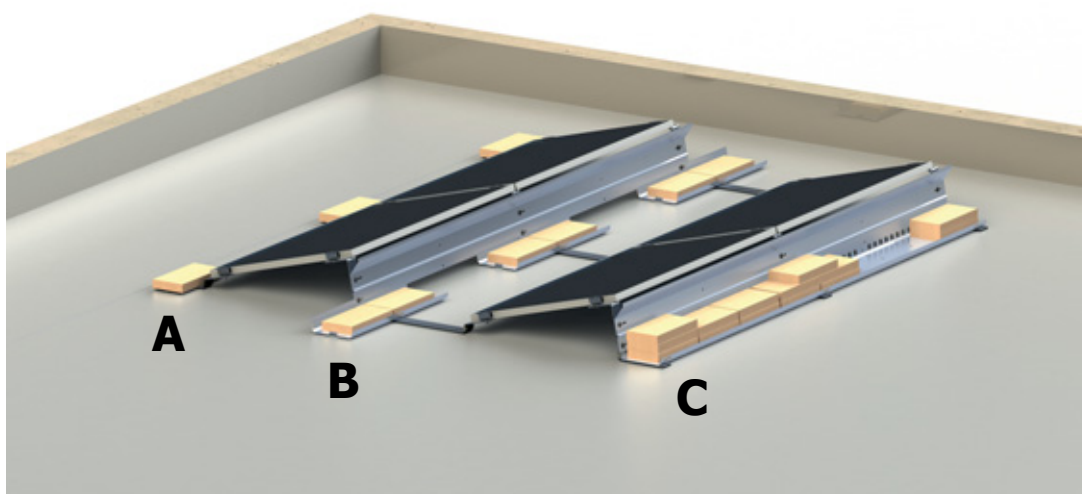


**The ballast trays must also be
installed in areas in which
the installation system must be fire
tested in accordance with UL1703.**

2.6 Installation — ballast

Place all required ballast blocks on the Front Part, Connector and End Part in accordance with the structural calculation in the project report. Always attach building screen mat (PES) on the left and right side underneath the ballast blocks and trays. We recommend using two building screen mat (PES) per ballast block or ballast tray. Four building screen mat (PES) should be used for the long ballast tray.

The optimum size of a ballast block for the system is 400x200x50 mm. The blocks used must be able to withstand the local weather conditions and have a compressive strength of at least 21 N/mm².



Variant A: Standard ballast without tray, ballast is placed directly on the Front/End Part or Connector.

Variant B: Ballast tray 880 with up to max. 7 blocks (7-kg ballast blocks).

Variant C: Ballast tray 1775/2075 with up to max. 16 blocks (7-kg ballast blocks).



Do not leave the installation site until the ballast for each module has been installed in accordance with the ballast chart. Without the ballast, the stability of the module field is not guaranteed. The correct position of the ballast blocks and the Building screen mat (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 LEICHTmount System User Agreement

We wish to point out that the installation system is sold under a purchase agreement. Its installation, processing or purchase by third parties does not take place on behalf of S:FLEX GmbH. Installation/processing of the system must be carried out in strict accordance with the installation instructions.

The design and planning of the system must be carried out using the S:FLEX planning software (Solar.Pro.Tool). S:FLEX GmbH is not responsible for the project-related structural analysis of the roof structure, for obtaining and documenting the roof manufacturer's approval for the attachment of the corresponding fasteners on the respective roof (in terms of warranty ramifications), or for correct installation of the system.

Faults and damage or impaired/inadequate functioning of the system that are the result of faulty installation and/or failure to observe the installation instructions and/or the project report (Solar.Pro.Tool) shall not constitute a defect for which S:FLEX GmbH is responsible. In the case of faulty workmanship by the purchaser or third parties, the rights of the purchaser to assert claims due to a defect in the goods shall expire.

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

The system requires that the modules may 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.

4.1 Warranty / Product Liability (Exclusion)

The dimensioning information provided in this manual consists merely of advice based on practical experience. Binding structural load analyses can be created using the S:FLEX planning software (Solar.Pro.Tool).

As the installation company, you are responsible for the correct execution of the installation. The company S:FLEX GmbH is not liable for the dimensioning information contained in commercial offerings.

As the installation company, you are responsible for the mechanical durability of the installed interface connections on the building envelope, in particular also for their watertightness. The components supplied by the company S:FLEX GmbH are designed in accordance with the expected loads and the technological state of the art.

For this purpose, within the context of your enquiry/order, you must specify in writing all general technical conditions (data on the load-bearing structure, snow load zone, building heights, wind loads, etc.) using the project data sheet and submit this to the company S:FLEX GmbH.

The company S:FLEX GmbH shall not be liable for incorrect handling of the installed components. S:FLEX GmbH must be consulted directly regarding use of the system near the sea due to the increased corrosion risk. With proper handling, dimensioning in accordance with the structural conditions and normal environmental and ambient conditions, the company S:FLEX GmbH guarantees that the metallic components of the frames will remain free of defects in terms of their material and workmanship for a period of 10 years from the transfer of risk to the warranty holder. This warranty does not apply to wearing parts. For further information, please refer to the separate warranty conditions.

This warranty applies under the generally prevailing weather and environmental conditions.