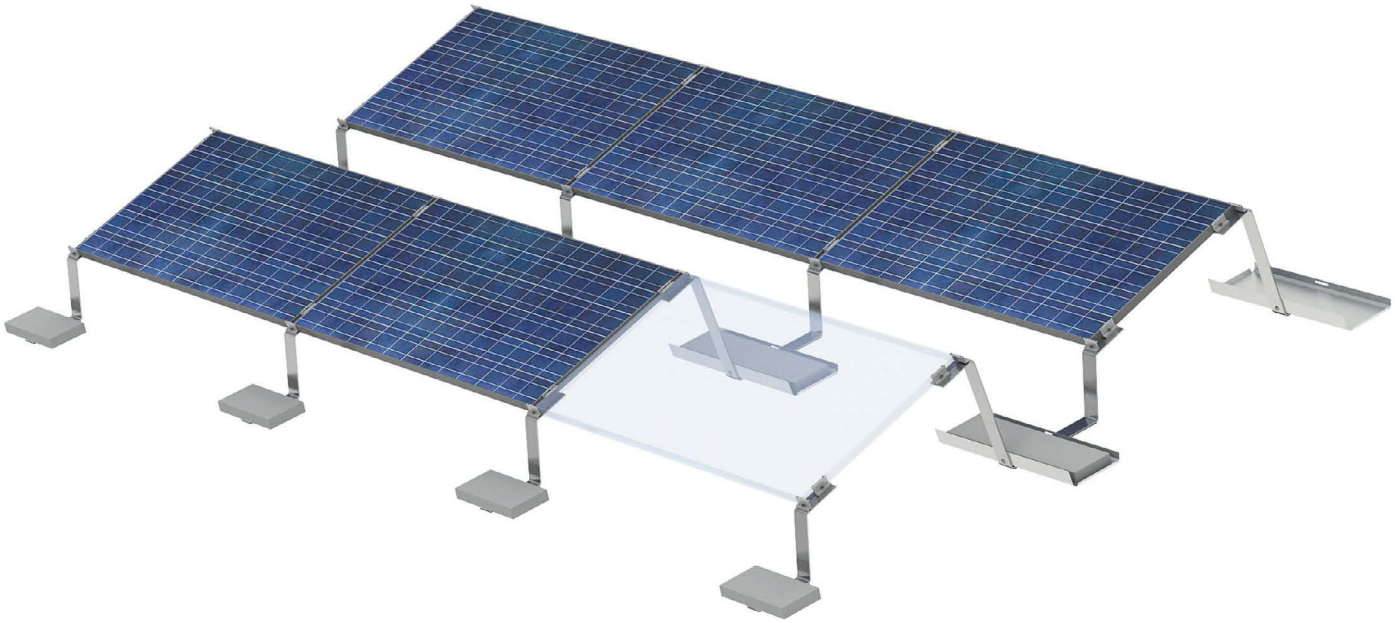
Installation instructions

S:FLEX LEICHTMOUNT G S

Aerodynamic free-standing system for east-west orientation



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

1.1 Intended use

The S:FLEX LEICHTmount G S is a robust frame system for mounting PV modules outdoors. It consists of aluminium mounting brackets with prepared screw connections, module clamps, ground screws, ballast trays and all the necessary small parts to ensure safe installation. This mounting system allows for open-air mounting with large-area coverage with or without ballasting. The innovative system utilises the entire frame structure and aerodynamic effects to secure the stand.
The S:FLEX LEICHTmount G S is designed for south-facing systems with a module tilt angle of 15° or 20° and can be used for most framed PV modules from leading manufacturers with the following dimensions:
module width 950 – 1,150 mm; module length 1,500 – 2,250 mm.

The system is designed for wind and snow loads of up to 2.4 kN/m2. The specified values are design values as a combination of wind and snow load.
The aerodynamics of the system were determined on the basis of wind tunnel tests. The load-bearing capacity was assessed by TÜV Rheinland as part of the certification process in accordance with the relevant standards. UL2703 was analysed.
The S:FLEX LEICHTmount G S can be used on the following surfaces:
- Arable land, grassland
- Sand, gravel and crushed stone surfaces
- Sealed surfaces (asphalt, concrete)

Any other use in this regard is considered misuse of the product. 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 recommendation describes how to install the S:FLEX LEICHTmount G S system outdoors.

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

1.3 Warnings

The warning texts provided in these installation instructions relay safety-related information.
These consist of the following:

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

Failure to observe this may lead to property damage.

1.4 General information – standards and guidelines

An important part in addition to these assembly instructions is the supplied project report in which the static calculation was carried out in relation to the location. Please ensure that the position of the modules in the field and the ballast distribution are carried out exactly as specified in the project report. If the module distribution changes due to local conditions such as unforeseen interfering surfaces, the structural analysis must be recalculated. The S:FLEX LEICHTmount G S must be planned using the software.

The technical documentation is an integral part of the product. S:FLEX is not liable for damage resulting from non-compliance with the installation instructions, in particular the safety instructions, or from misuse of the products. The current general terms and conditions and warranty conditions also apply.

S:FLEX GmbH is not responsible for the examination and documentation of the subsurface, in particular the load-bearing capacity for the system and ballast as well as the determination of the pull-out forces of any ground screws to be used, or for the professional installation.

Ground-mounted photovoltaic systems are not maintenance-free. Maintenance, in particular the correct position of the ballast stones and the tight fit of ground screws, should be carried out annually. After exceptionally strong wind events, we recommend maintenance immediately after the storm event.

S:FLEX GmbH accepts no liability for faults and damage and/or a restricted or limited operational capability of the system which has resulted from incorrect installation and/or installation which was not undertaken in accordance with the installation instructions and/or the project report (Solar.Pro.Tool). In the case of incorrect installation, the buyer's right to assert claims for material defects shall expire. The system warranty is only valid if all system components were 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 sides). 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.

The optional fleece mat included in the scope of delivery inhibits the growth of plants on the surface, which makes maintenance easier. Complete suppression of plant growth, even over a limited period of time, cannot be guaranteed. For maximum effectiveness, make sure that the strips of fleece mats are laid with a generous overlap and that no soil material is on or accumulates on the mats. The latter can be caused by the installation and maintenance work, but also by the blowing or washing up of soil material.

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.

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 S:FLEX LEICHTmount G S system includes solutions to suit a range of different requirements:

System properties

Mounting angle:	15° and 20°	
Row spacing:	LEICHTmount G S 15°:	556 mm or 798 mm
	LEICHTmount G S 20°:	734 mm or 1054 mm
Module dimensions:	950 – 1150 mm x 1500 – 2250 mm (width x length)	
Slope of the terrain:	10°	
Wind load/snow load:	up to 2.4 kN/m² design load	
Modules:	The system requires that the modules can also be used with this type of mounting (clamping on the short side of the module). This approval may exist either generally within the scope of the module certification or, under certain circumstances, may be determined on a project-specific basis by the Module manufacturer take place.	
Materials:	supporting brackets made of aluminium EN AW 6060 T64, module clamps made of aluminium EN AW 6063 T66, stainless steel screws, ballast trays made of strip galvanised steel, Ground screws made of die-cast aluminium	
Packing volume:	approx. 40 kW per pallet, approx. 1 MW per lorry	

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

Substrates

The S:FLEX LEICHTmount G S can be used on the following substrates:

- Arable land, grassland
- Sand, gravel and crushed stone surfaces
- Sealed surfaces (asphalt, concrete)

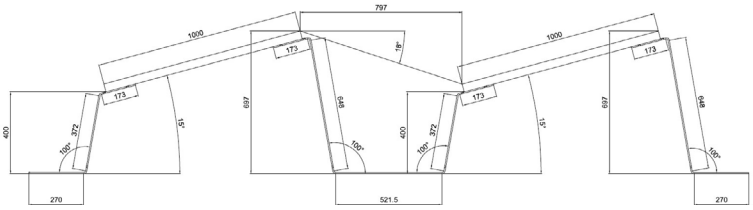
S:FLEX GmbH may provide a measuring device in order to determine the project-specific friction co-efficient.

Row spacings

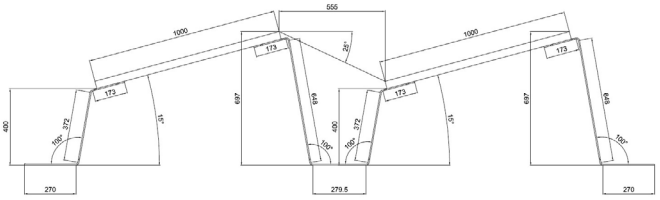
The S:FLEX LEICHTmount G S is available in the following versions:

LEICHTmount G S 15 (18°): 798 mm module spacing
LEICHTmount G S 20 (18°): 1054 mm module spacing
LEICHTmount G S 15 (25°): 556 mm module spacing
LEICHTmount G S 20 (25°): 734 mm module spacing

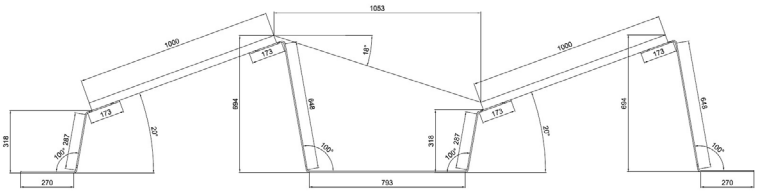
S15 18° irradiation angle



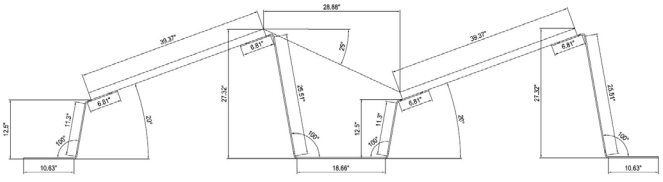
S15 25° irradiation angle



S20 18° irradiation angle



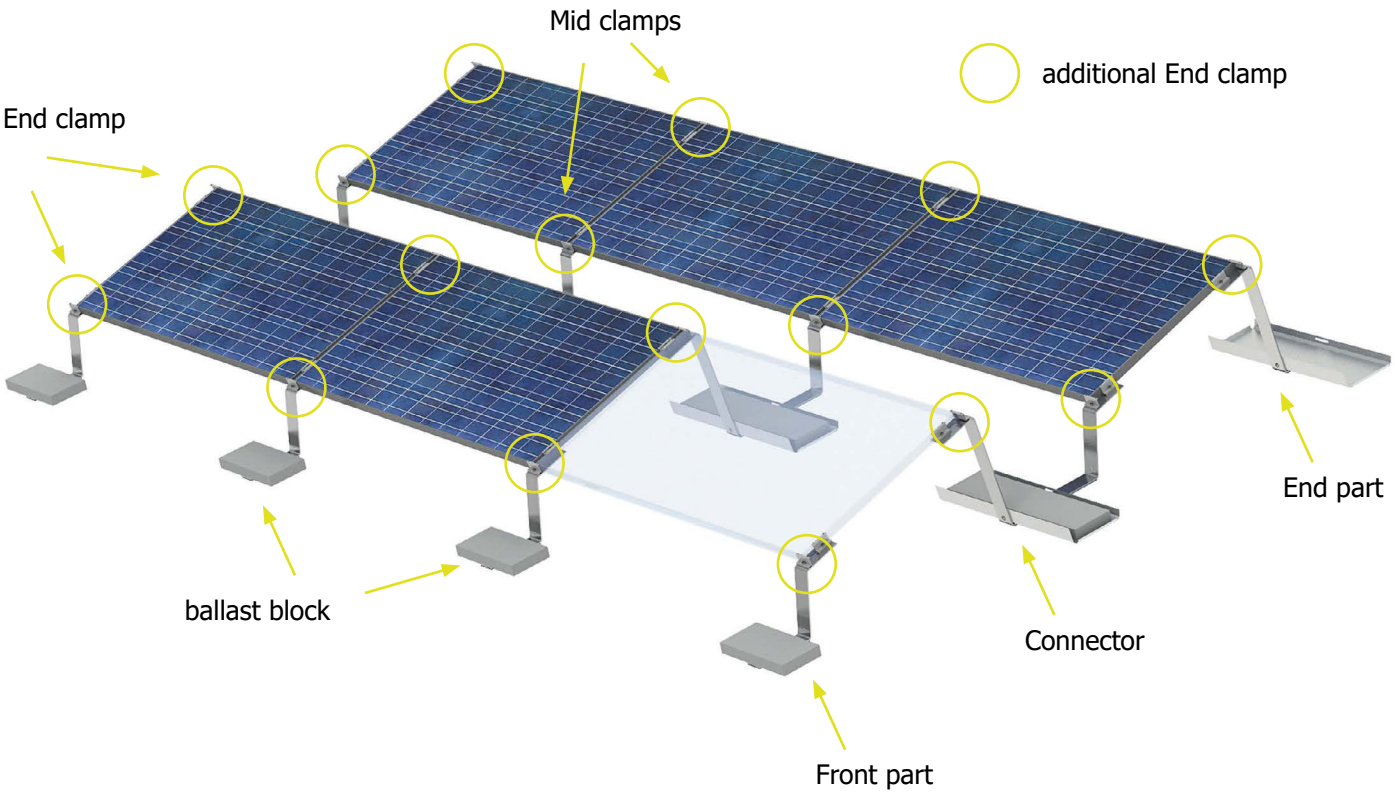
S20 25° irradiation angle

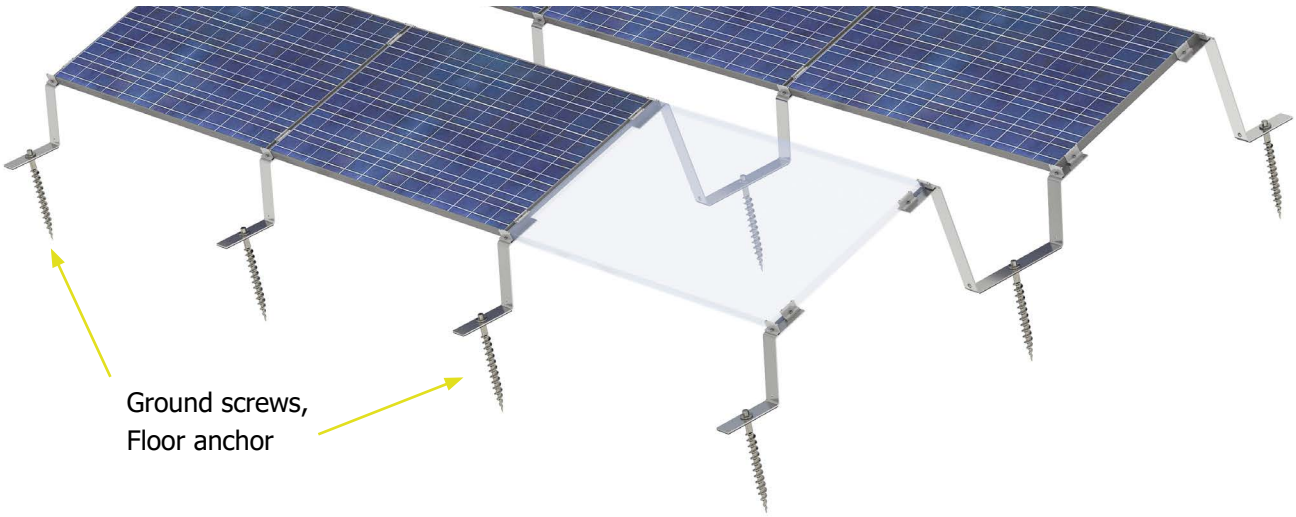


System design

S:FLEX LEICHTmount G S

The S:FLEX LEICHTmount G S system is designed for normal 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.





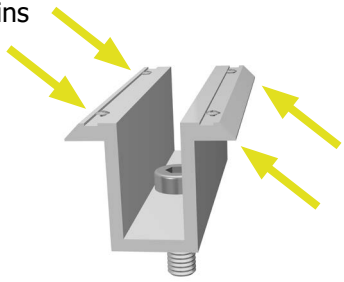
Earthing

Equipotential bonding between the individual system components must be ensured in accordance with 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.

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

Connector

Ballast tray 880

Ballast tray 1775/2130

End clamp

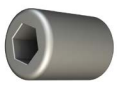
Mid clamps

Hexagon socket screw / cylinder head screw M8x30 DIN 912

Flat washer M8x30

Cable clips

Hexagon socket nut M8x16



Flathead screw

Blind rivet nut VZ M8

Ground screw, ground anchor

2.2 Installation — frame and modules

The design and planning of the S:FLEX LEICHTmount G S system must be carried out using the S:FLEX planning software. Please make sure that the position of the modules on the substrate and the ballast distribution correspond exactly to the specifications in the project report. If the module distribution on the substrate 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 ballast for each module has been installed in accordance with the ballast chart. Without ballasting, the stability of the module array cannot be guaranteed and the correct position of the ballast blocks must be checked during the annual maintenance. It is the responsibility of the installing company to check the specification and weight of the required ballast blocks.

Mark the southern edge
of each module field on the floor according to the plan.

Level in accordance with the project report.

Place the module end clamps and module mid clamps on theS:FLEX LEICHTmount G S supports.

SW corner (2 connection terminals)

Southern edge (1 end clamp)

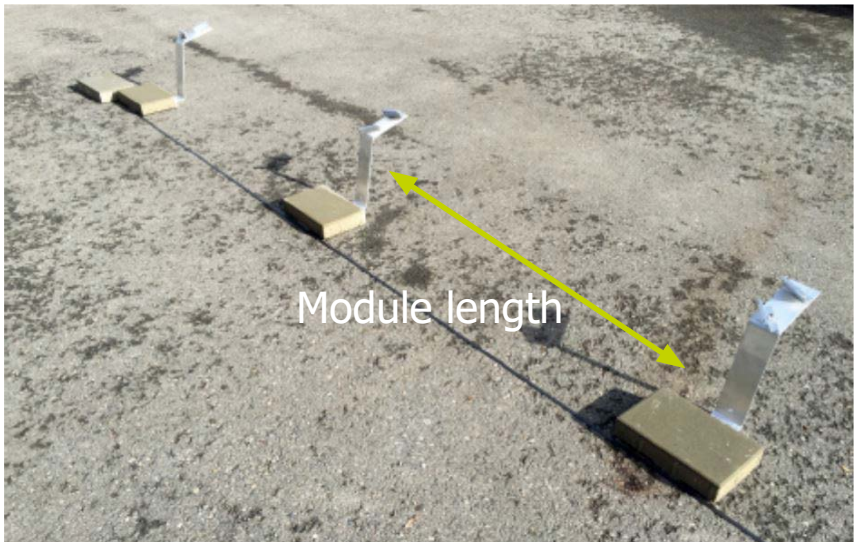
SO corner (2 terminal blocks)

Set up the initial support along the marked southern edge of a module field.

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

Secure the front part with a ballast block.

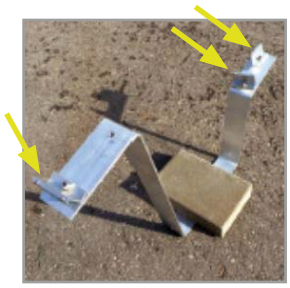
Place the ballast block on the initial support for stable support.



Place the end clamps on the double supports so that the modules can be inserted.
(on the low side as with the starting support, on the high side as with the end support)

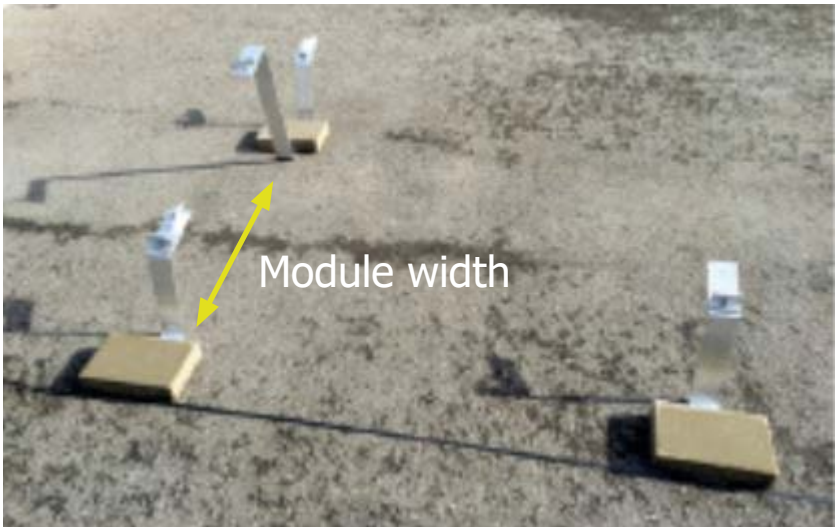
3 clamps on the western edge (one at the top and 2 at the bottom)

Only 1 clamp (bottom) in the system



3 clamps on the eastern edge (one above and 2 below)

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



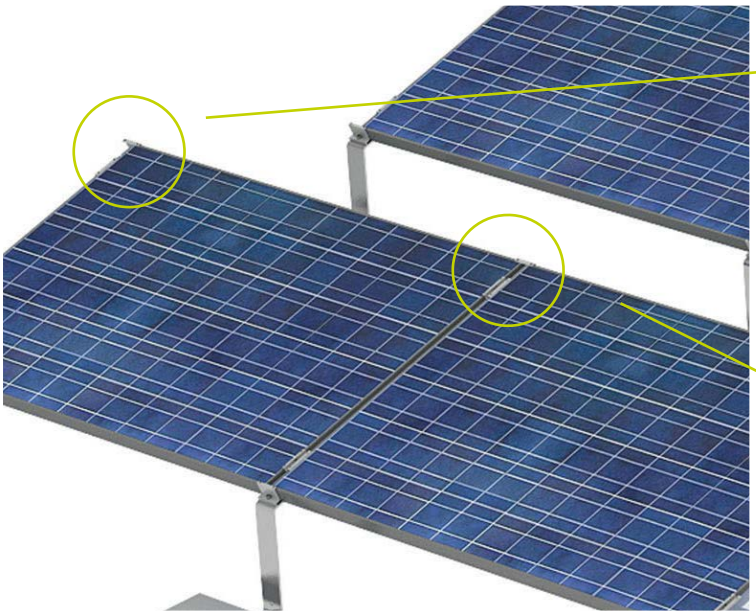
Align the front part and connector using a guideline.

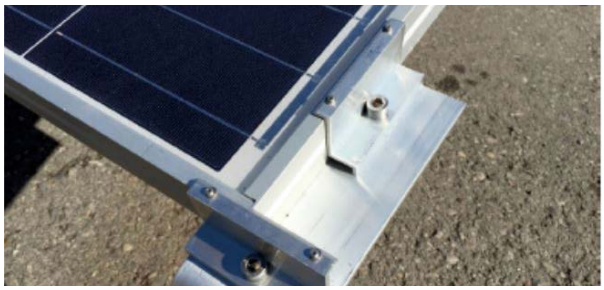
Install the module on the front parts in the horizontal orientation and align the top so that it sits flush with the LEICHTmount connector or end part. Then fit the ballast tray (if necessary). The installation of the ballast tray is described in section 2.3.

Tighten the end clamps with 15 – 20 Nm.

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

Now slide the next module under the module mid clamps and align it with the additional module end clamps. Then the module mid clamps and the additional module end clamps can be tightened and another module mounted. (Tightening torque 15 – 20 Nm).





Mount the module mid clamps and additional module end clamps with 15 – 20 Nm.

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 at least 15 Nm torque, but with a maximum of 20 Nm.

Click cable clips onto the module frame.

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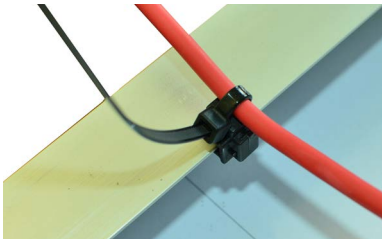


For easier alignment, align the bottom edge of the module with the markings.

Tighten the end clamps with 15 – 20 Nm.

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

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.

Proceed as described for the following rows.

The end part is used at the end of the last module row. Mount the modules as described for the connectors. Then fit the ballast plate (if required).

Complete 2x2 module field, before installation of ballast/fixing and accessories.

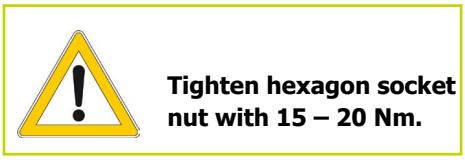
The ballast distribution must correspond to the plan in the project report. The quantity and distribution of the ballast depend on parameters such as location, environment and the nature of the subsoil.

2.3 Installation — ballast trays

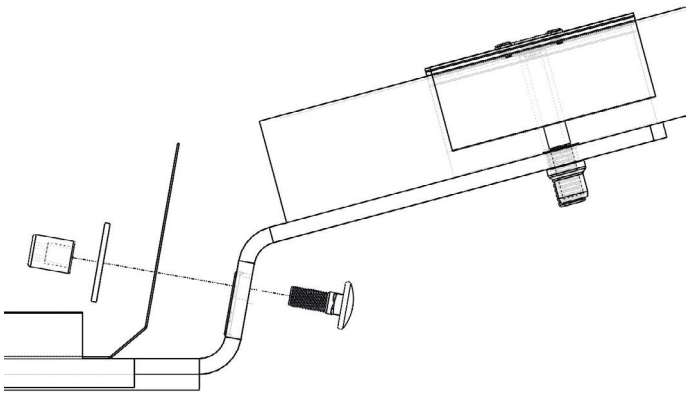
The ballast trays must be used as soon as the specified ballast weight per support is exceeded.
In this case, a distinction is made between the standard ballast tray (880) and the long ballast tray (1775/2130), depending on the system and ballast stone used.

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

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.



Tighten hexagon socket nut with 15 – 20 Nm.



2.4 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.

Ballast on supports must be stacked in such a way that it cannot slide off the bracket. On hard ground, the ballast stones must be underlaid with building protection mats (or another material of sufficient strength and durability). On very soft ground, ballast trays must be used to prevent the ballast stacks from tipping over.

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/mm².

Variant A

Variant B

Variant C

Variant A: **Standard ballast without tray; ballast lies directly on the initial, end and double brackets.**

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

Variant C: **Ballast tray 1775/ 2130 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 may compromise the positional stability of the entire system and represents a major risk. Deviations from the planning must always be agreed with S:FLEX GmbH and may only be carried out after written approval.
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 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.

2.5 Installation - floor anchor

Ground screws / ground anchors supplement or replace ballast, e.g. at locations with high wind loads or limited transport options. The load-bearing capacity of ground screws varies greatly depending on the soil properties. The data sheet provides reference points, but only on-site measurements provide reliable values.
All S:FLEX LEICHTmount G S system supports have a hole in the base through which the ground screw is screwed directly through the support into the ground. If a fleece mat has been laid under the system to suppress plant growth, the ground screw can be screwed through it.

The positioning of the ground anchors must always be carried out strictly in accordance with the planning documents. A different distribution or omission of ground anchors may compromise the positional stability of the entire system and represents a major risk. Deviations from the planning must always be agreed with S:FLEX GmbH and may only be carried out after written approval.
Do not leave the construction site until every ground anchor has been installed according to the project report!
The tight fit of the ground anchors should be checked during annual maintenance and after severe weather events.

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.

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.

3.2 Disposal

The S:FLEX mounting system is made from 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 S:FLEX LEICHTmount G S

We expressly point out that the assembly system is sold under a purchase agreement.
Its installation/processing or acquisition by a third party is not carried out in the name of, or on behalf of, S:FLEX GmbH. Installation/processing of the system must be carried out by appropriately qualified personnel and strictly in accordance with the installation instructions.

The design and planning of the system must be carried out using the S:FLEX planning software.

S:FLEX GmbH accepts no liability for faults and damage and/or a restricted or limited operational capability of the system which has resulted from incorrect installation and/or installation which was not carried out in accordance with the installation instructions and/or the project report. In the case of incorrect installation, the buyer's right to assert claims for material defects shall expire.

The system warranty is only valid if all system components were 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 sides). 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 is merely suggested values based on prior experience. Binding structural analyses for installation frames 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 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 for the expected loads and in accordance with the currently available technology.
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, 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 the generally prevalent weather and environmental conditions.