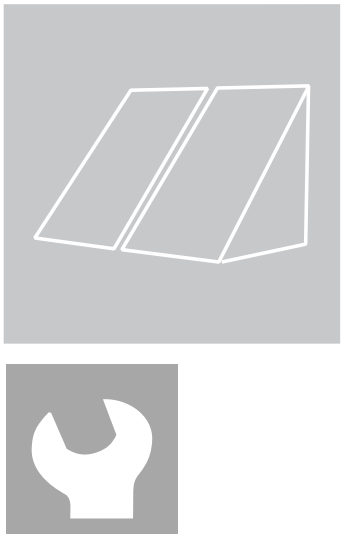
Solar products

Schüco mounting system MSE 210 flat roof



SCHÜCO

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Installation instructions: MSE 210 flat roof • Art. No. 259 591 • 11.2009 - 03

General

Dear Customer,

Thank you for choosing Schüco solar products and placing your trust in our company. Prior to first installation, we recommend you attend a training course at our training centre or, if this is not possible, that you arrange for on-site training from one of our service engineers.
Before installation, please read carefully the general information and safety guidelines contained in these instructions.

Proper use

The mounting system developed by Schüco is only to be used for fixing framed PV modules to flat roofs.

The MSE 210 flat-roof system can only be installed up to a max. roof pitch of 20°.
If the flat-roof system is to be secured in place by means of ballasting, a roof pitch of 10° must not be exceeded.

Please note that the load tables on pages 23-25 are only designed for a roof pitch of 5°.
For steeper roof pitches, the ballasting must be increased (see page 22).

The following module dimensions must not be exceeded:

- Portrait module installation; **module length = 1.70 m**
  dscape module installation; **module width = 1.02 m**

An alternative use or a use beyond this remit is not in accordance with its purpose. Incorrect use can result in the death or serious injury of the user or a third party, and may damage the appliance, the installation or other material assets. The manufacturer/supplier shall not be liable for any resulting damage. The user alone shall bear the risk.

Correct usage also includes adhering to the installation and operating instructions.
Please note the following information about relevant laws, legislation and technical regulations.
When setting up solar energy systems, the laws and regulations at local, state, European and international level that apply to the country in question must be observed.
Accepted practice as usually codified in standards, guidelines, specifications, general and technical regulations laid down by local and national bodies, power supply companies, trade organisations and technical committees in the relevant sector must be followed.

The installation of solar units may make increased demands in terms of watertightness with regard to roof, wall and sealing and this must be taken into account accordingly.
To meet regulations aimed at preventing accidents, it may be necessary to use safety equipment (straps, scaffolding, harnesses, etc). Such safety equipment is not supplied and must be ordered separately.
Installation may only be carried out by technically qualified and authorised personnel with a recognised qualification (verified by a state or national body) in the relevant technical field.
Any electrical work must be carried out by a qualified electrician and must conform to the relevant DIN standards, VDE guidelines, accident prevention regulations and the requirements of the local energy provider.

All the components, particularly the PV modules, become very hot when exposed to solar radiation. There is a danger of burning. Suitable protective measures must be taken, e.g. wearing protective gloves, not working with direct solar radiation or protecting the PV modules from sunlight.

The following standards must be adhered to:

DIN 18299;
General rules for all kinds of building works

DIN 18338;
Roofing and roof sealing work

DIN 18360;
Metal construction works

DIN VDE 0100−540;
Selection and setting up - earthing, earth conductor and potential equalisation

DIN 57185 VDE 0185;
Erecting a lightning conductor

DIN 4102;
Fire behaviour of building materials and building components

The accesories listed are not part of the flat-roof mounting brackets.

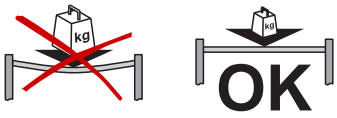
Solar technical hotline

Technical support for specialist craftsmen
Tel.: (+49) 1805 / 783-999

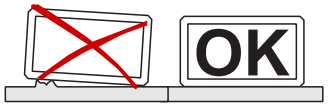
0.14 €/min (including VAT) from a German landline. Call costs from a mobile phone network may vary according to the mobile phone provider and tariff.

Fax.: (+49) 521 / 783-7242
E-mail: Technische-Hotline-Solar@schueco.com

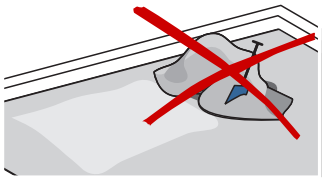
Safety instructions for MSE 210 flat-roof installation



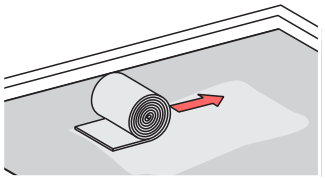
Do not exceed the maximum roof load.



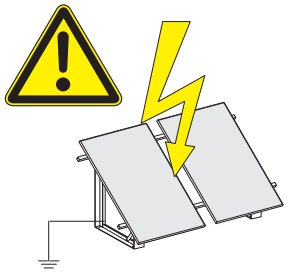
The supporting surface for the flat-roof mounting system must be flat and load-bearing.



Avoid accumulation of loose material.



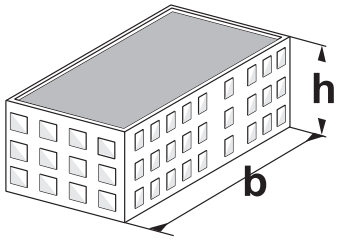
If necessary, lay a protective building mat beneath the flat-roof mounting system to prevent any possible damage to the roof covering.



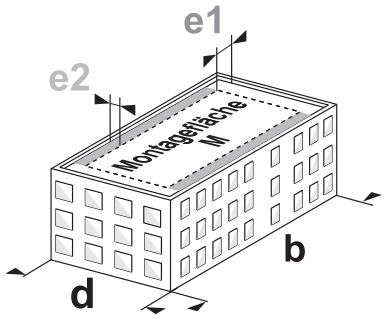
Module fields must be incorporated into the existing building's lightning conductor.

The edge areas are calculated in accordance with DIN 1055.
Ensure that the height (h) of the building is not greater than the narrow building width (w).
(Building height ≤ building width).

Maximum building height h = 20 metres.



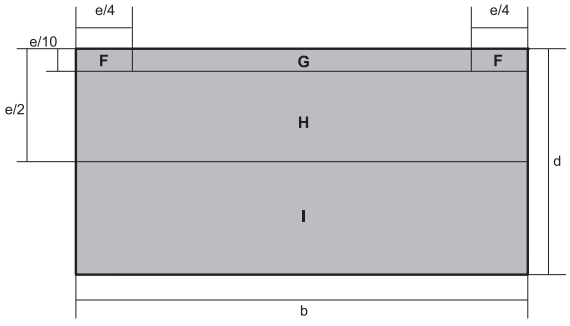
Calculating the smallest edge area (e1 and e2):
The smaller value is definitive.
e1 = Min (h x 0.2; w x 0.1)
e2 = Min (h x 0.2; d x 0.1)



The MSE 210 flat-roof mounting system has been structurally verified for the following parameters:

- Max. module size: 1020 mm x 1700 mm ~ 1.7 m²
- Roof area: H and I
- Snow load: s_k ≤ 0.9 kN/m²
  (~ SLZ 2, up to 300 m above sea level)
- Wind load, q ≤ 1.1 kN/m²
  (WLZ 3, inland, H ≤ 25 m)
- Dead load: g ≤ 0.2 kN/m²

View of roof / roof areas in accordance with DIN 1055-4



e = b or 2 h, whichever is lower.
b: Dimension at right angles to the wind.

Explanation of pictograms used

Danger! Risk of death or injury

Warning! Risk of damage to health, environment and product

Important! Risk of damage to the environment and product

Danger! Risk of death or injury from electric shock. Before working with electrical devices, first disconnect the device from the mains (all connections).

Danger! Risk of scalding.

Important note

Materials to be provided by others

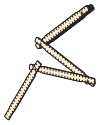
See page ...

Weight (kg)

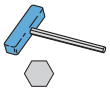
Option

Tools required

Pencil / chalk



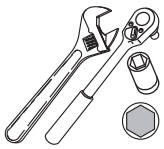
Folding rule / tape measure



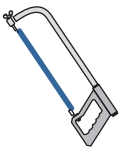
Socket wrench 6 mm

Cordless screwdriver / drill

Insert for hexagon-head screwdriver SW10

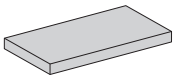


Ratchet/open-ended spanner

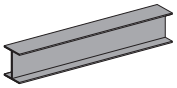


Metal saw

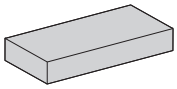
Also required



Edging stones



Steel supports



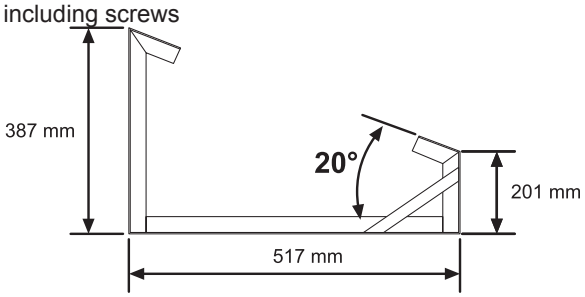
Concrete base

Suitable wood screws

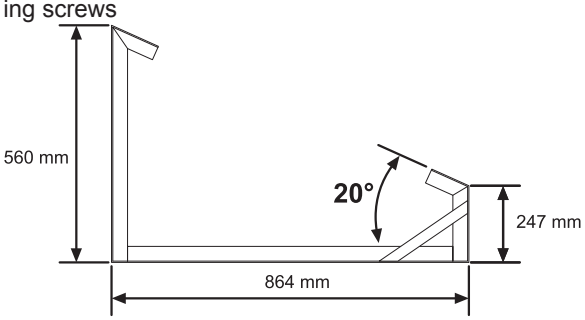
Suitable steel screws

Overview of range of MSE 210 articles

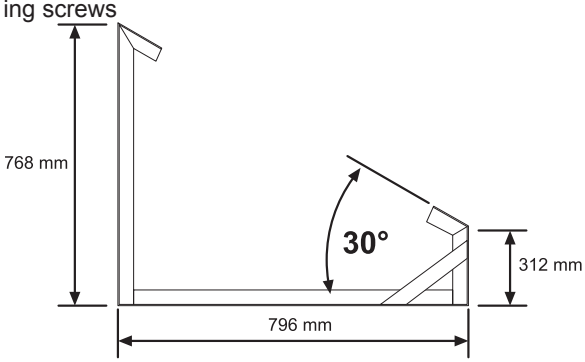
MSE 210 flat-roof brackets for 20° module angle Landscape module installation (259 586 / 20 PU), including screws



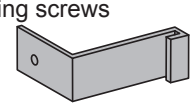
MSE 210 flat-roof brackets for 20° module angle Portrait module installation (259,587 / 20 PU), including screws



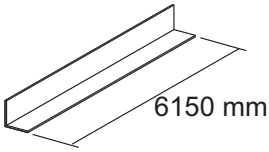
MSE 210 flat-roof brackets for 30° module angle Portrait module installation (259 588 / 20 PU), including screws



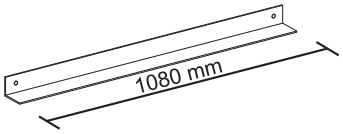
Flat-roof clamps (259 589 / 20 PU) for fixing the flat-roof brackets to the L-shaped coupling profiles, including self-drilling screws



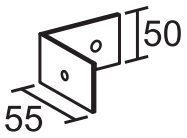
L-shaped coupling profile [50x50x3 mm] (259 596 / 20 PU)
L-shaped coupling profile [55x55x4 mm] (259 597 / 20 PU)



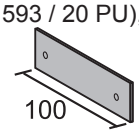
Flat-roof connectors (259 595 / 20 PU), including screws



Elbow fitting (259 594 / 20 PU), including screws

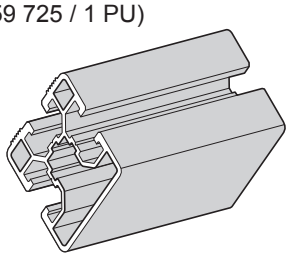


Flat connector (259 593 / 20 PU), including screws

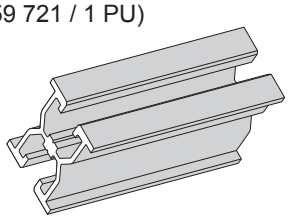


Also required

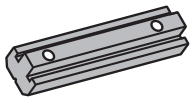
BP 160 S (259 725 / 1 PU)



BP 085 S (259 721 / 1 PU)



Connector kit (257 106 / 50 PU)

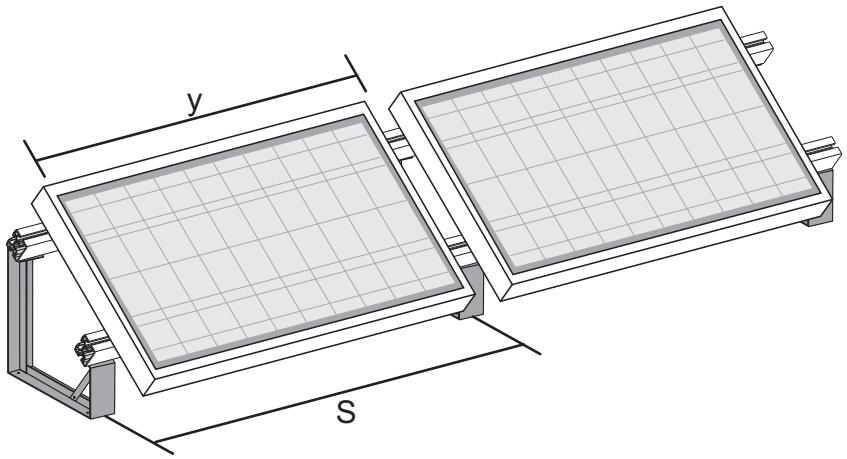


Schüco standard PV module / module-dependent retaining clamps

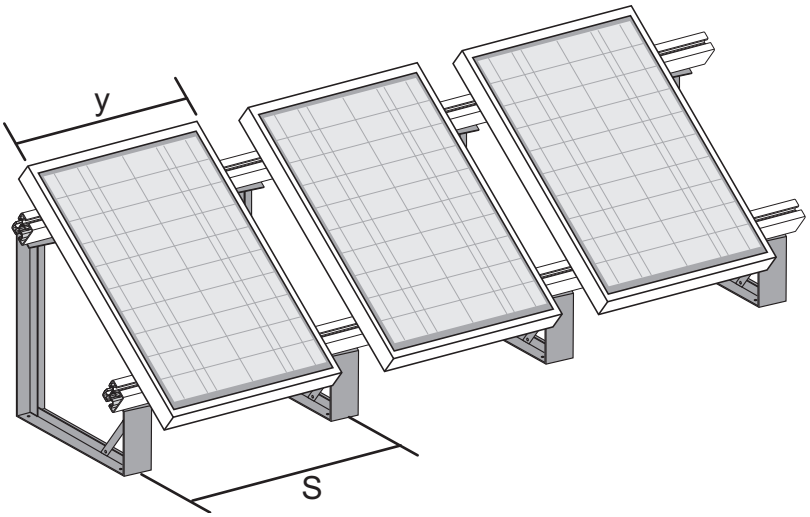
Selection of mounting rails to be used ...

a) ... if the distance between the supports is 1020 mm
If the distance of the supports between the flat-roof brackets is 1020 mm, BP 160 S must be used.

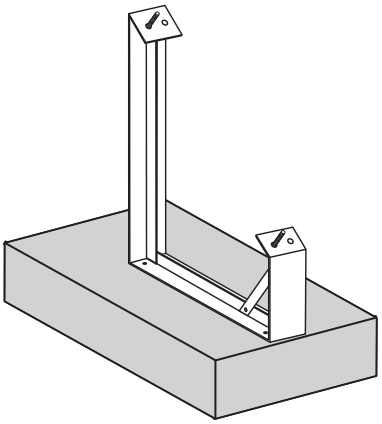
b) ... if the distance between the supports is equal to the module width
If the flat-roof brackets are positioned between each PV module, BP 085 S can be used (the load on the mounting rail for this installation type is less than in example a)).



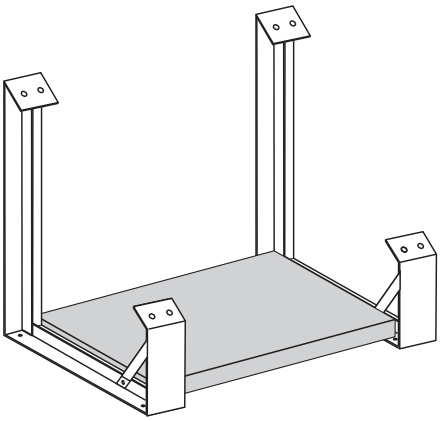
y = Module width, length
S = Distance between supports
S = y + 42 mm



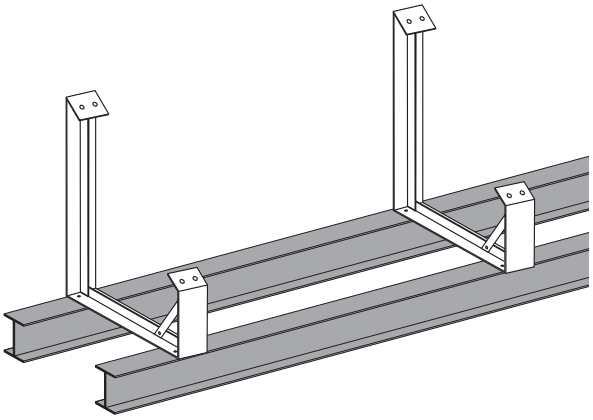
Ballasting options for MSE 210 flat-roof brackets



Ballasting with a concrete base

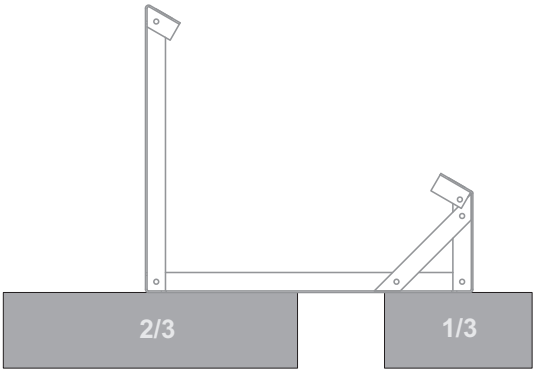


Ballasting with edging stones

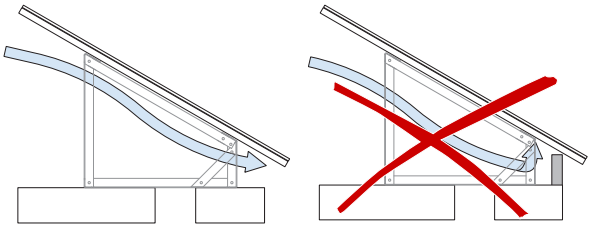


Fixing to the existing mounting frame

Position of ballasting



If you ballast your flat-roof brackets with edging stones or a concrete base, ensure that the ballasting is split into 2/3 on the back support and 1/3 on the front support.
Where 2 or more rows are connected together, the ballasting does not need to be distributed.

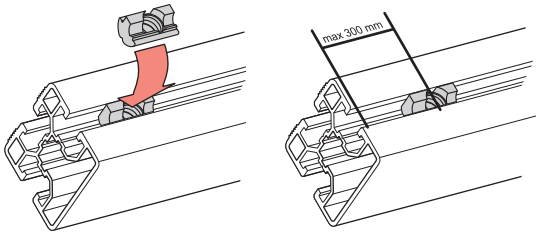


Ensure that the air (wind) is able to flow unhindered under the PV module.

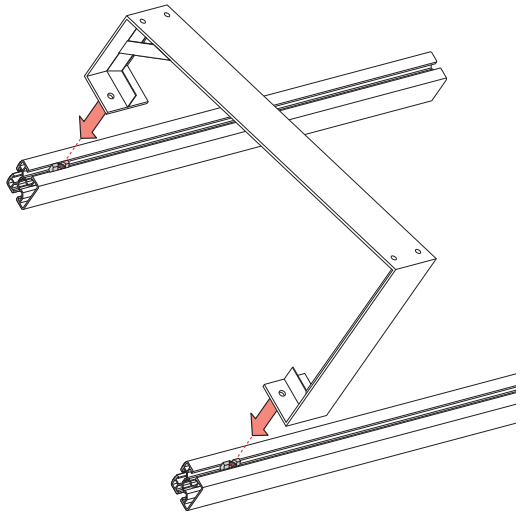
For ballasting as described on this page, ensure that the roof covering is not damaged. We recommend using a protective building mat.

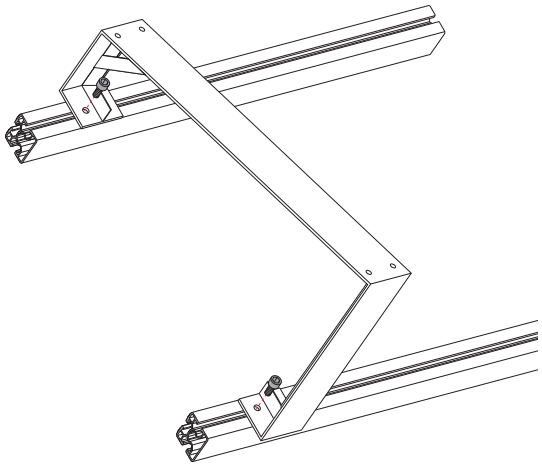
Mounting the MSE 210 flat-roof brackets

Step 1
Insert the anchor blocks at the correct position in the mounting rails.



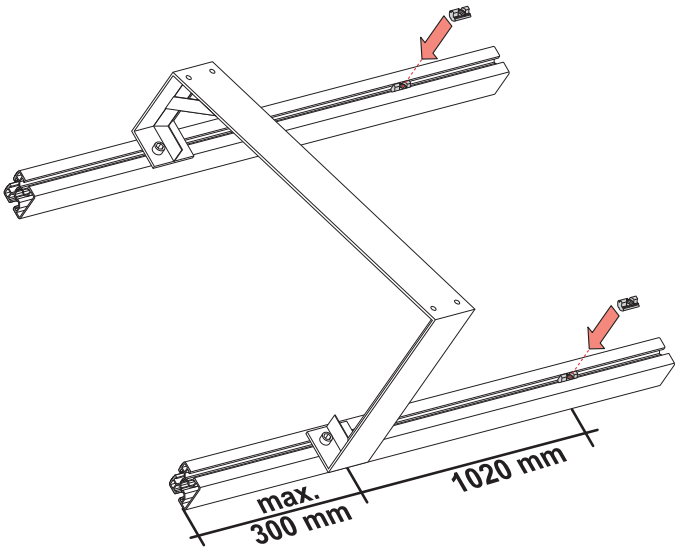
Step 2
Position the flat-roof brackets on the anchor blocks rotated by 180° and fix to the mounting rails using a serrated lock washer and socket head bolt.

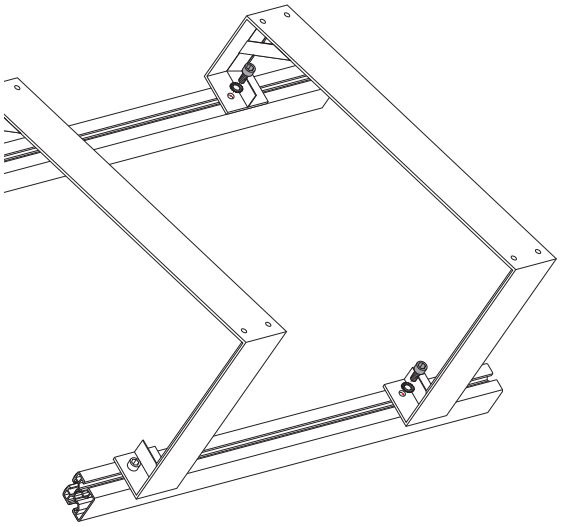




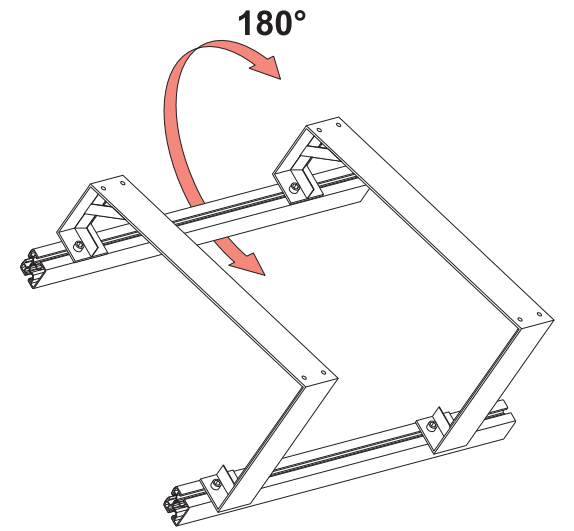
Step 3
Fix all remaining flat-roof brackets to the mounting rails in the same way as the first one.

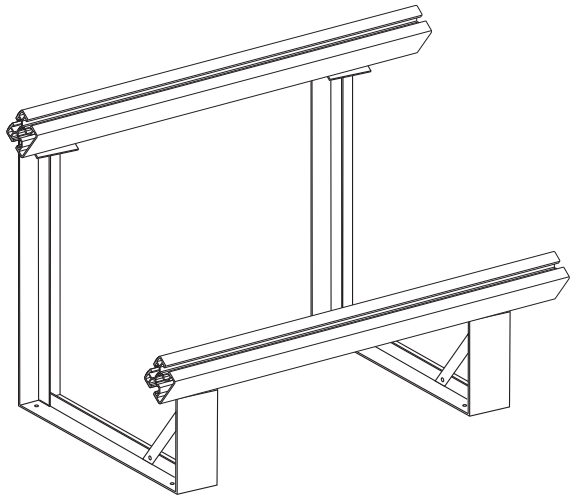
Ensure the correct distance of the supports between the brackets of 1020 mm.





Step 4
After you have mounted the required number of flat-roof brackets, rotate the frame by 180° so that the mounting rails are at the top.

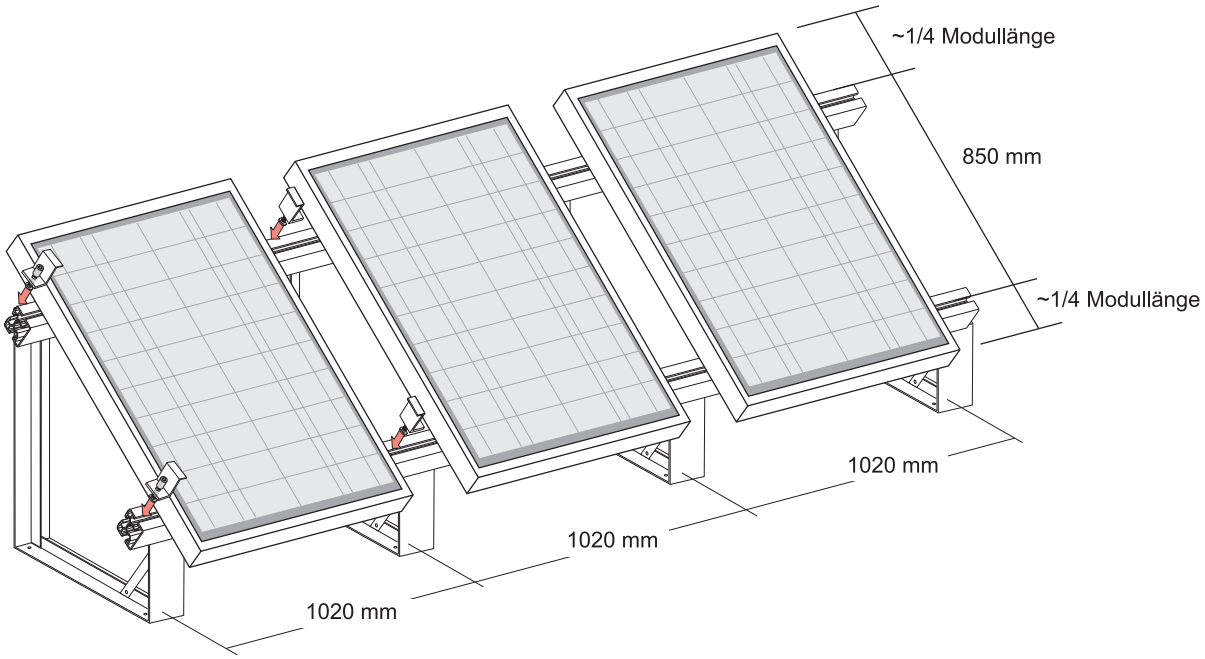




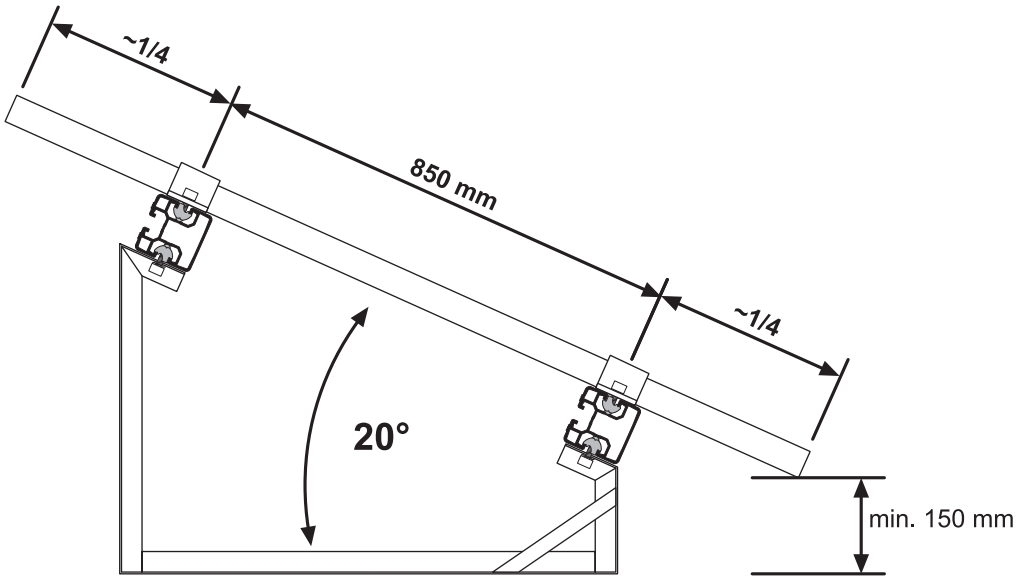
Portrait module installation

System overview

Adhere to the distances shown in the pictures.



The retaining clamps, which will depend on the module type, are not supplied with the flat-roof brackets.



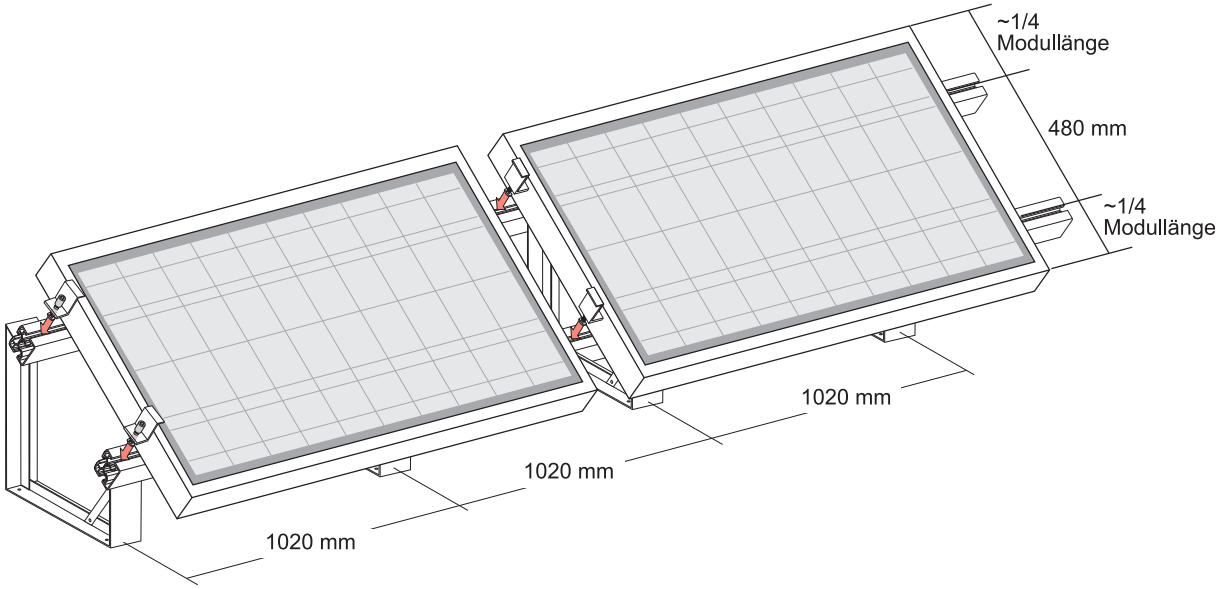
Flat-roof brackets (20° portrait / 259 587) with assembled mounting rails 1.2 and retaining clamps positioned at a quarter of the module length.

Ensure the module edges are always a sufficient distance from the ground (min. 150 mm) to ensure that there is sufficient ventilation behind the modules

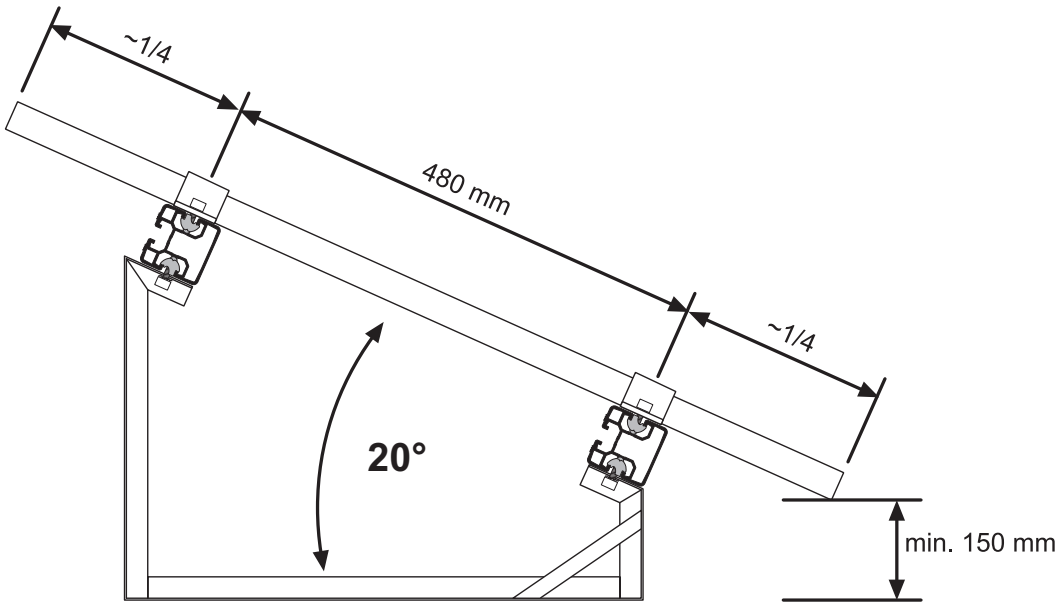
Landscape module installation

System overview

Adhere to the distances shown in the pictures.



The retaining clamps, which will depend on the module type, are not supplied with the flat-roof brackets.

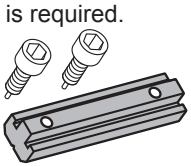


Flat-roof brackets (20° landscape / 259 586) with assembled mounting rails 1.2 and retaining clamps positioned at a quarter of the module width.

Ensure the module edges are always a sufficient distance from the ground (min. 150 mm) to ensure that there is sufficient ventilation behind the modules

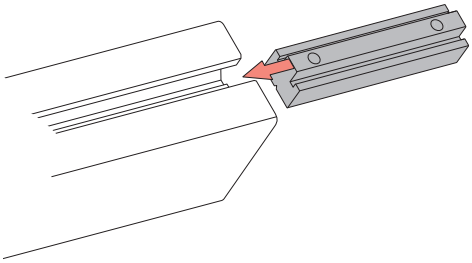
Connecting the mounting rails together

To connect mounting rails together, the connector kit (257 106 / 50 PU) is required.

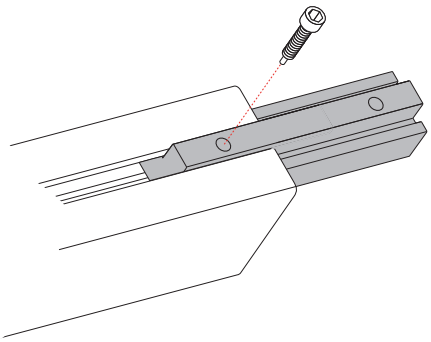


A maximum of 2 mounting rails each 6.18 m in length can be connected in this way.

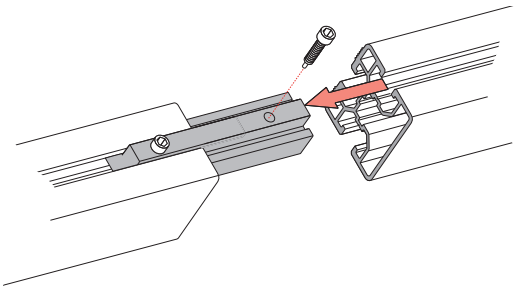
Step 1
Slide the connector half way into the end of the mounting rail.

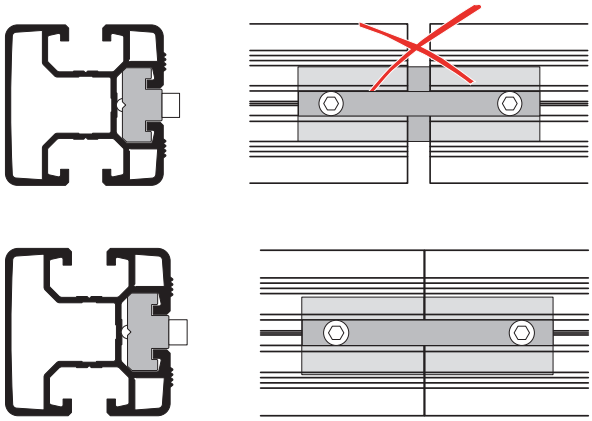


Step 2
Screw the connector into the mounting rail using the punching screw to prevent removal.



Step 3
Slide the second mounting rail onto the connector and fix using the punching screw to prevent removal.





The mounting rails must be butt-jointed.

The mounting rails can be joined in two different ways:

1. The join for the mounting rails is between two flat-roof brackets (see figure 1)

This joint is not structural. No modules can be mounted above the mounting rail joint.

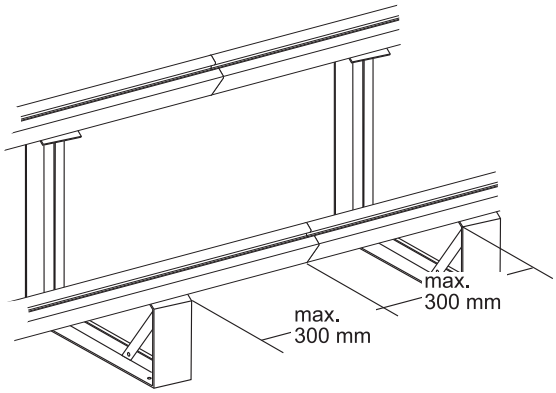


Fig. 1

2. The join for the mounting rails is in the centre of a flat-roof bracket.
(See figure 2)

This joint is structural. Modules can be mounted above the mounting rail joint.

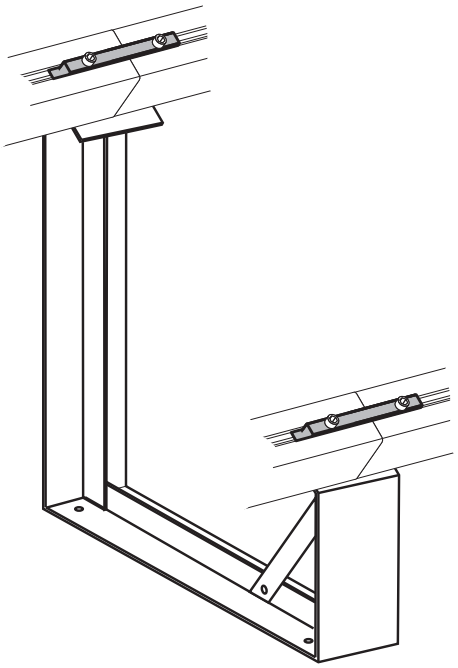
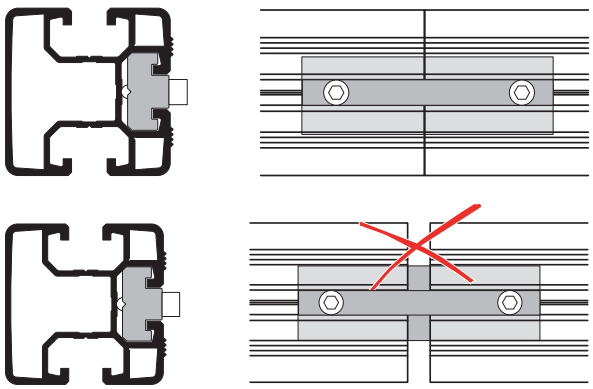


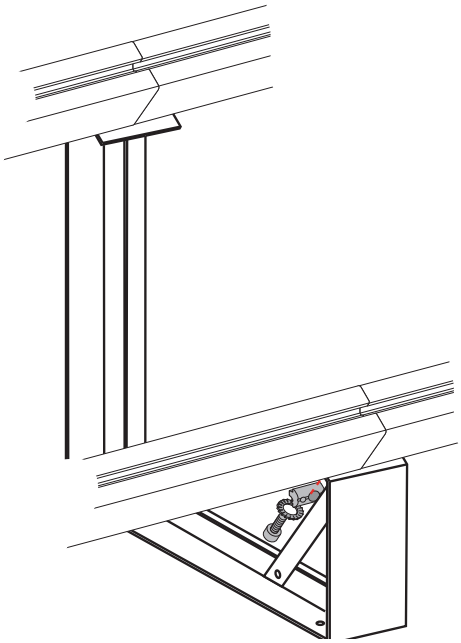
Fig. 2

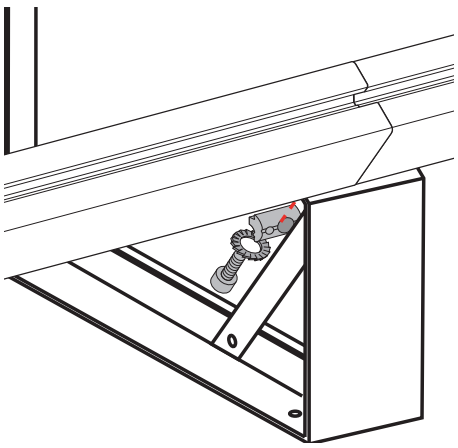
For the mounting rails to be coupled in this way, the connector must be inserted in the side of the mounting rails.

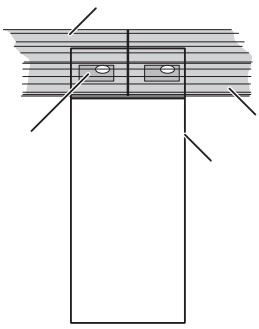


Ensure the mounting rails fit flush together.

Connect each mounting rail to the flat-roof bracket using a socket head bolt, a serrated lock washer and an anchor block.







Series coupling:
Selecting the coupling profile

Refer to DIN 1055-4 for the velocity pressure that predominates in your construction area.

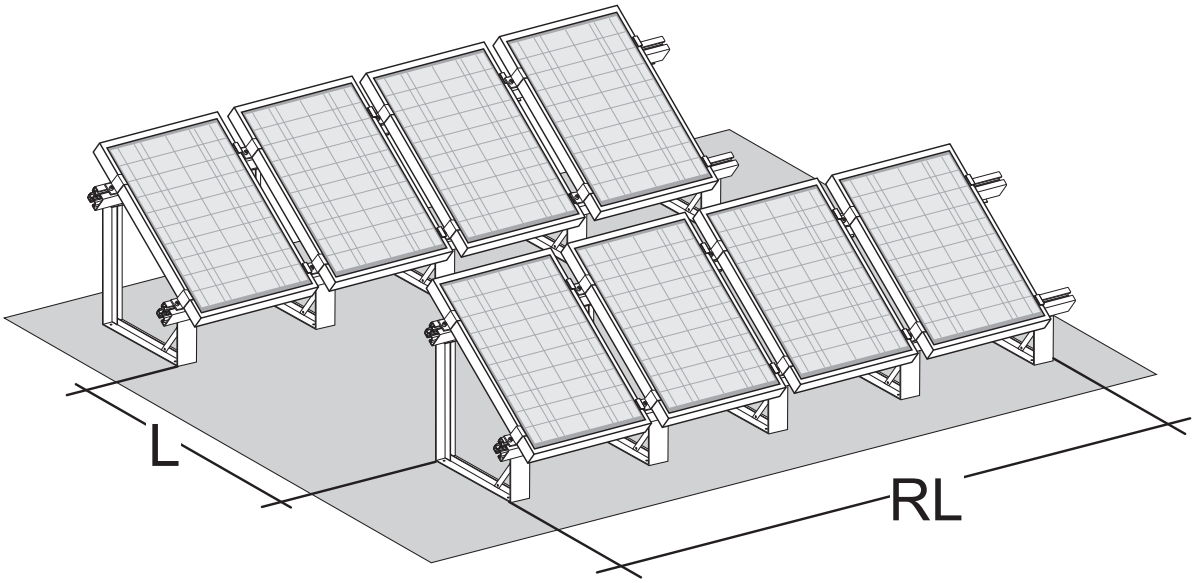
If the distance between the module rows is greater than those listed here, your system planner must calculate the correct values.

You must install at least 2 L-shaped coupling profiles up to a module row length (RL) of 6 metres.
For longer module rows, a correspondingly greater number of L-shaped coupling profiles must be used.

Some guidance values are provided below. This list does not claim to be complete:

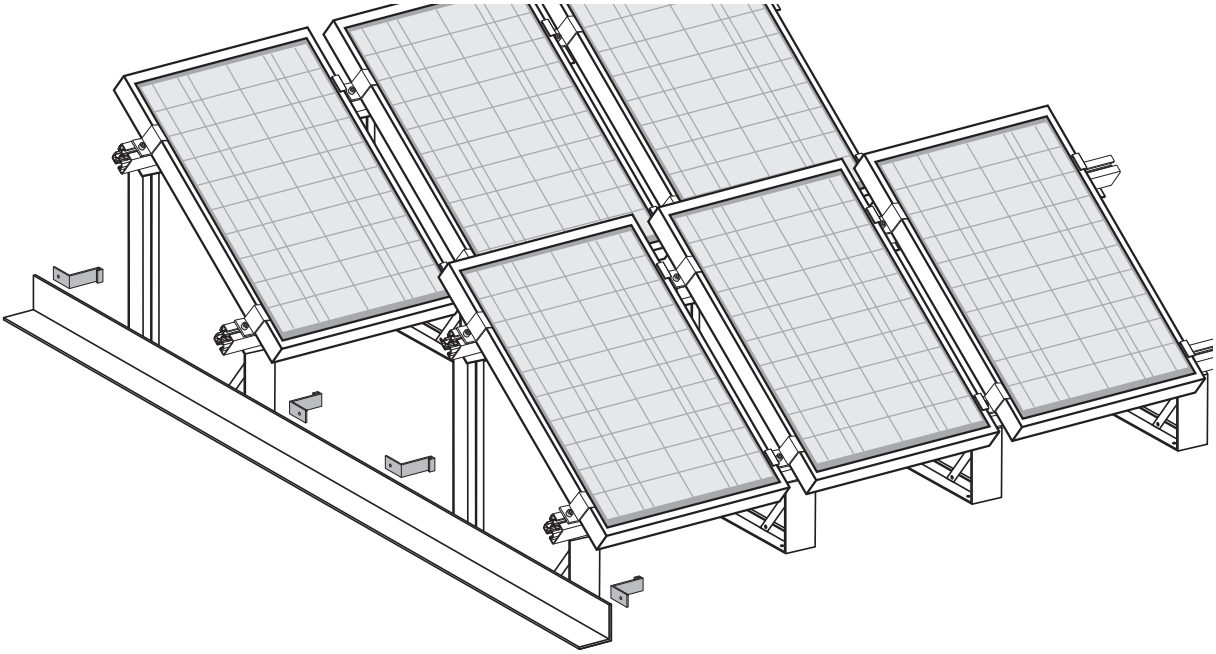
L-shaped coupling profile 50x50x3 (259 596)				
		Module orientation	Velocity pressure	Distance of the module rows (L) in metres
Module angle	30°	Portrait	≤ 0.6 kN/m²	~ 3.6 m
	20°	Portrait	≤ 0.9 kN/m²	~ 2.7 m
	20°	Landscape	≤ 1.3 kN/m²	~ 1.6 m
L-shaped coupling profile 55x55x4 (259 597)				
Module angle	30°	Portrait	≤ 1.0 kN/m²	~ 3.6 m
	20°	Portrait	≤ 1.3 kN/m²	~ 2.7 m
	20°	Landscape	≤ 1.6 kN/m²	~ 1.6 m

L = Distance of module rows behind one another



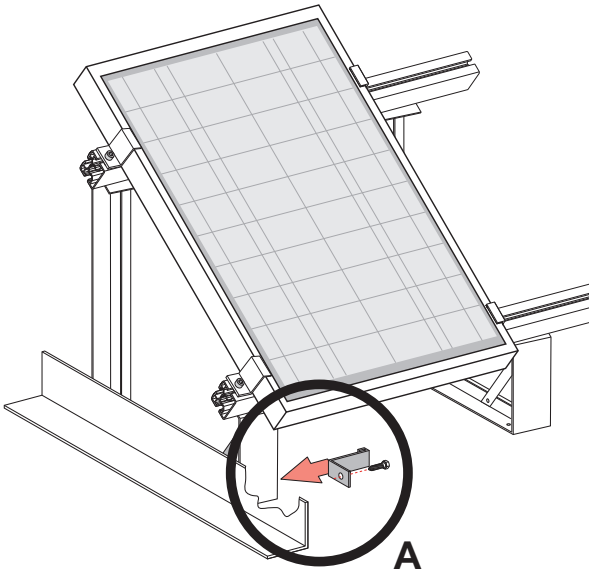
Series coupling, type 1

System overview
This series coupling option is preferable if the flat-roof brackets can be positioned directly behind one another.

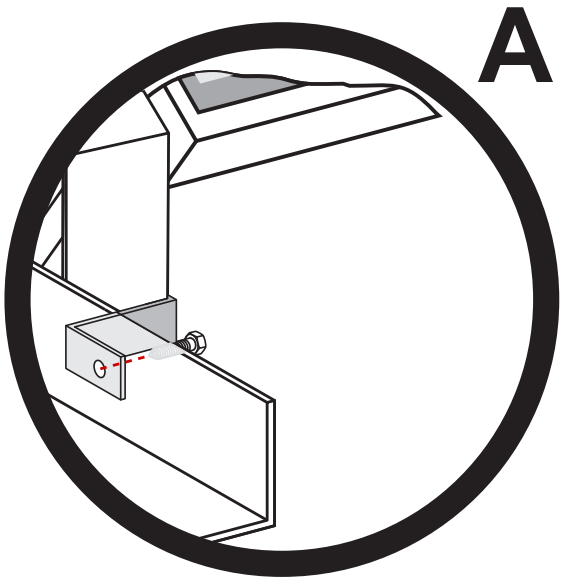


Step 1
Position the L-shaped coupling profile (259 596 / 259 597) parallel to the rows of modules to be connected.

Step 2
Slide the flat-roof clamp (259 589) backwards and forwards on the flat-roof bracket.

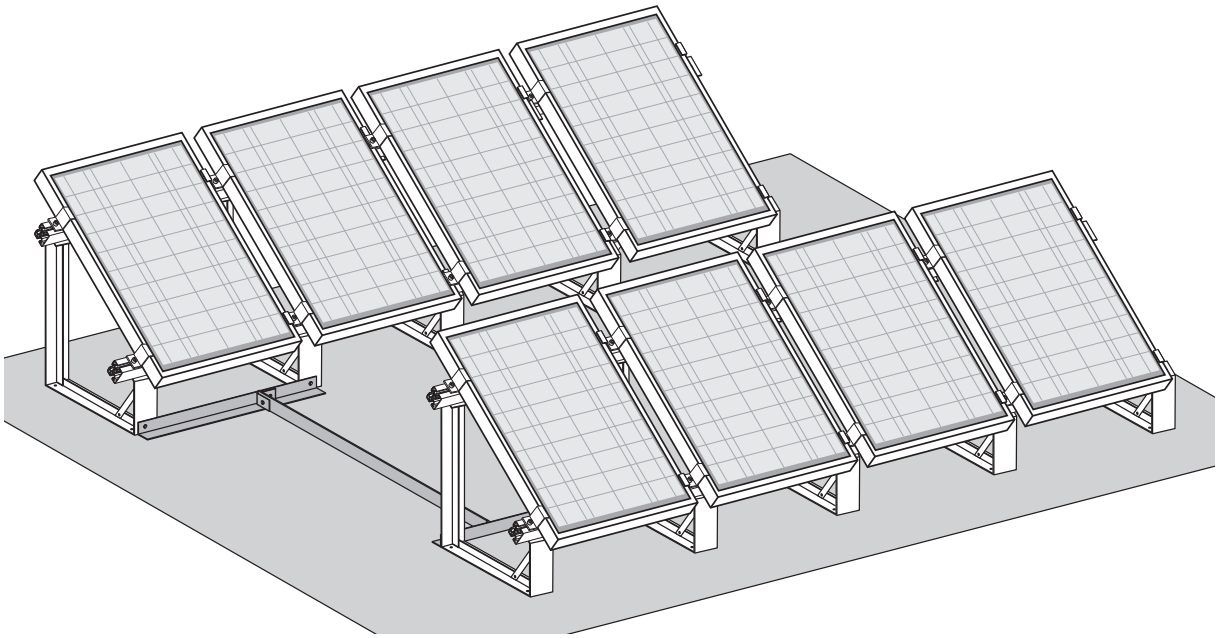


Step 3
Fix the flat-roof clamp to the coupling profile using the self-drilling screw.

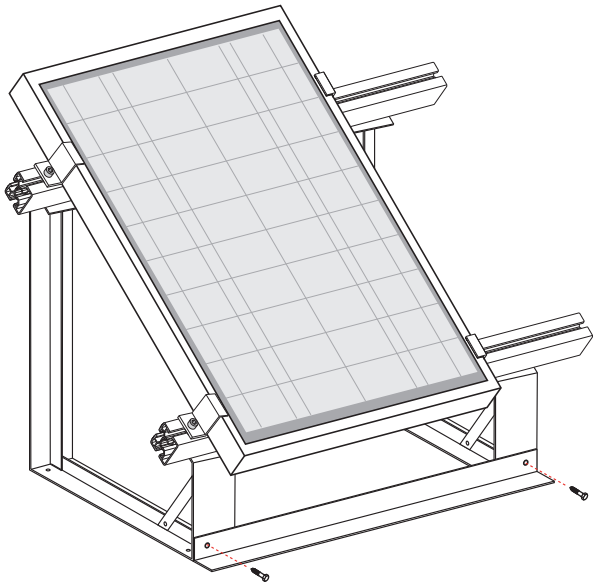


Series coupling, type 2

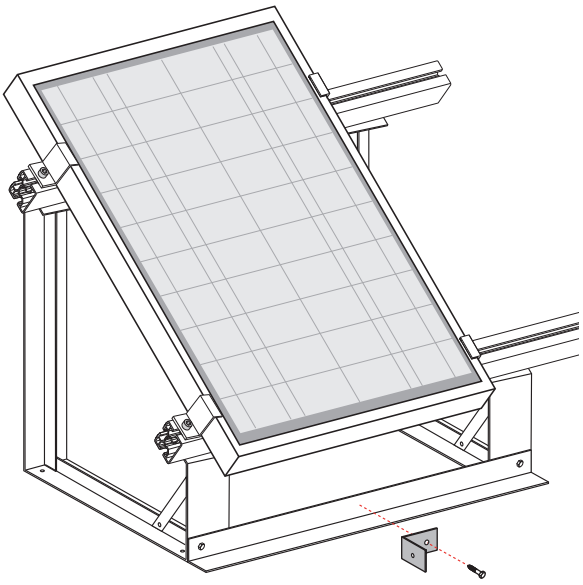
System overview



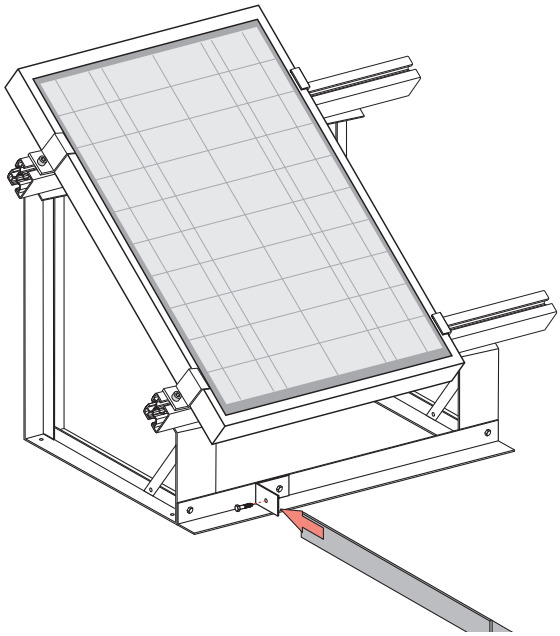
Step 1
Screw the flat-roof connector (259 595) to two adjacent flat-roof brackets using self-drilling screws.

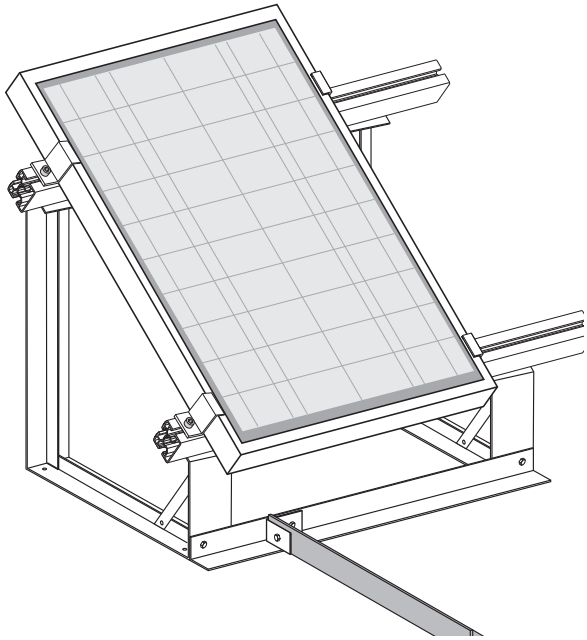


Step 2
Screw the elbow fitting (259 594) to the flat-roof connector using the self-drilling screw



Step 3
Fix the coupling profile (259 597 /
259 596) to the elbow fitting (259 594).
Check that all the self-drilling screws have been tightened.





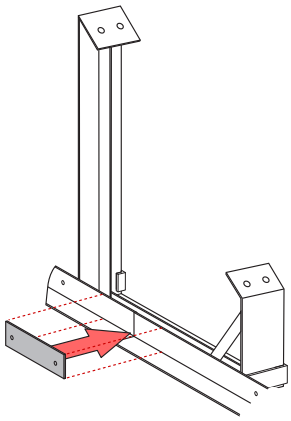
Joining the coupling profiles

A maximum of 2 coupling profiles (every 6.15 m) can be joined together.

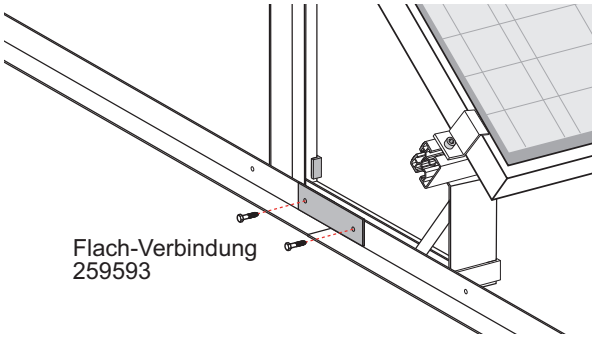
Articles required:
Flat connector 259 593, including two self-drilling screws.

Step 1
Butt the coupling profiles up against one another.

Step 2
Position the flat connecter centrally over the joint between the two coupling profiles.



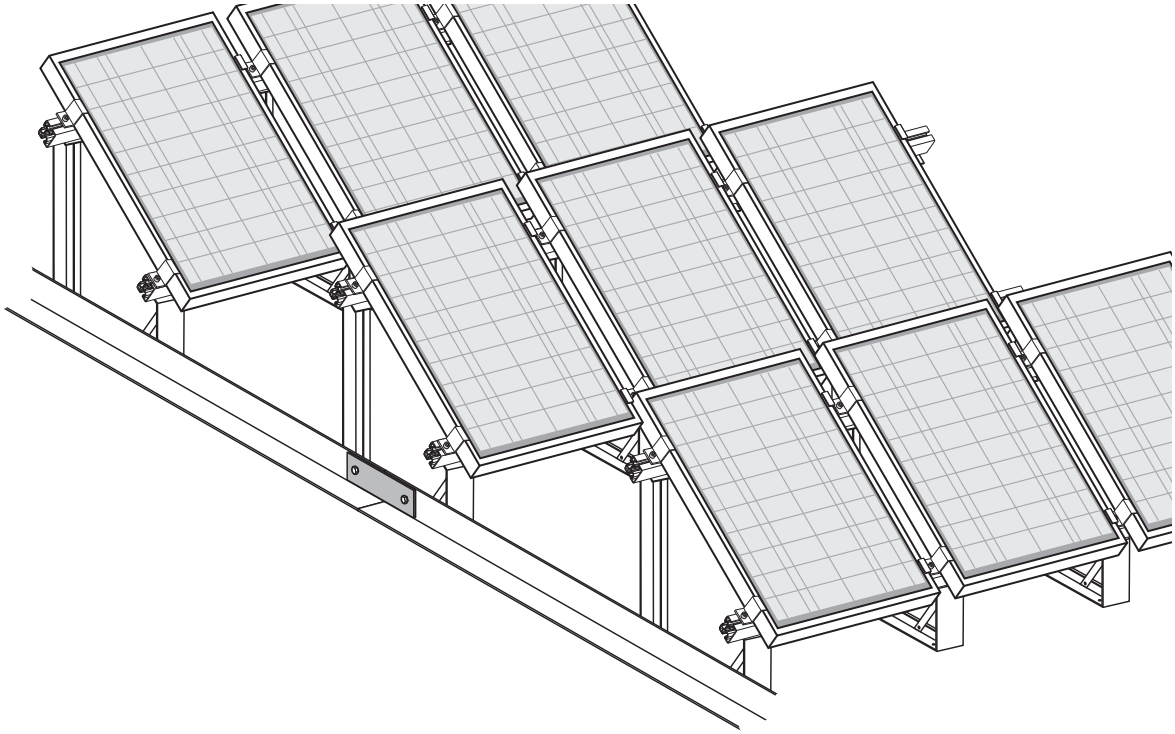
Step 3
Tighten the two self-drilling screws.



The flat connector must always be affixed within a flat-roof bracket.

The join must never be between two flat-roof brackets.

Overview of series coupling



Load tables

Securing the flat-roof system with ballasting is only possible on a roof pitch of 0°-10°.
The load tables below are only designed for a max. roof pitch of 5°.

In order to use the load tables, the following conditions must be fulfilled:

Min. number of connected rows	Min. length of rows m	Module arrangement
No coupling required	> 6	Portrait or landscape
2	> 3	Landscape
3	> 3	Portrait
3	< 3	Landscape

When coupling at least 2 rows 6.00 m in length, the loads in the tables below can also be reduced by 10%.

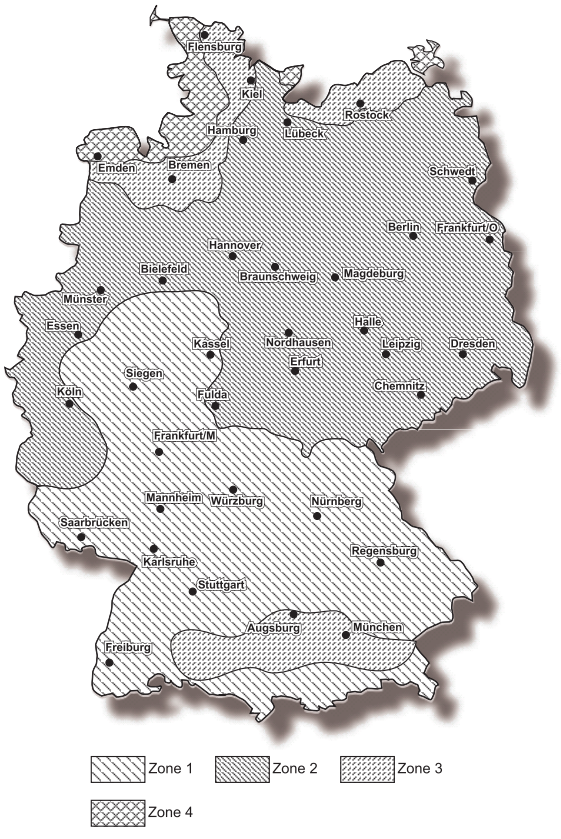
For smaller module arrays, the table values must be multiplied by 3.

Each flat-roof mounting system must be secured against wind to secure it against lifting up and slipping. This can also be assured e.g. with a weight.
The following points are also significant.

1. The wind zone in the area.
2. The quality of the terrain on which the flat-roof construction stands.
3. If the flat-roof construction is to be mounted on a building, the height of the building is also significant.

The wind zone map specifies the generally prevalent wind speed.
The terrain categories specify the wind-breaking effect of obstructions.
The height of the building improves the assessment of the wind speeds.

Wind zone map of Germany in accordance with DIN 1055-4, Appendix A.



Windzonenkarte

Terrain categories according to DIN 1055-4, Appendix B.

Terrain category I
Open sea; lakes with at least 5 km of open expanse downwind; flat terrain without any obstacles

Terrain category II
Terrain with hedges, individual farms, houses or trees, e.g. agricultural region

Terrain category III
Suburbs, industrial or commercial areas; forests

Terrain category IV
Urban areas where at least 15% of the area is covered with buildings, the average height of which exceeds 15 m

Combination of profiles, coast
Transition area between terrain category I and II

Combination of profiles, inland
Transition area between terrain category II and III

The German Institute of Civil Engineering (DIBT) provides a guideline to determining the wind load zones for regions and places in Germany at:

www.dibt.de/de/Data/Windzonen_nach_Verwaltungsgrenzen.xls

For roof pitches >5°, installation can be carried out with increased ballasting.

Roof pitch	6°	7°	8°	9°	10°
Increase in total weight	106%	112%	119%	127%	135%

Total weight = dead load + ballasting

Example:
Dead load = 15 kg/m²
Ballasting for 0-5° roof pitch = 40 kg/m²
Total weight = 55 kg/m²

Question:
How much more ballast is required if the system is to be mounted on a flat roof with a 10° roof pitch?

Answer:
Calculate the increase in total weight = 55 kg/m² * 1.35 = 74.25 kg/m²

How much ballasting is required now:
74.25 kg/m² - 15 kg/m² (dead load)
= 59.25 kg/m²

This is equivalent to an increase in ballasting of ~ 148%.

1. Load tables in accordance with DIN 1055
a) Protection against sliding and lifting up

The values in the tables below indicate what additional ballasting must be added to the mounting system. This ensures the mounting system is secured against lifting up and slipping.
Depending on the module surface area, the module angle and the height of the installation surface, different amounts of ballasting will be required.

To calculate the load on the roof resulting from the mounting system, the dead load of the mounting system (modules + mounting frame ~ 15 kg/m²) must be added in addition to the load.

Data in kg/m² of module surface area for standard areas, max. roof pitch 5°. See the validity notes on loading.
Data based on wind tunnel tests and DIN 1055-4:2005-03.

Wind zone 1	Terrain category I		Terrain category II		Terrain category III		Terrain category IV	
Height/PV inclination	20°	30°	20°	30°	20°	30°	20°	30°
5 m	50.5	71.4	35.9	50.1	25.8	35.3	21.1	28.4
10 m	58.7	83.4	43.6	61.3	27.9	38.4	21.1	28.4
20 m	68.5	97.6	53.2	75.3	36.1	50.3	23.3	31.8
Wind zone 2	Terrain category I		Terrain category II		Terrain category III		Terrain category IV	
Height/PV inclination	20°	30°	20°	30°	20°	30°	20°	30°
5 m	61.2	87.0	43.2	60.7	30.6	42.4	24.8	33.9
10 m	71.4	101.8	52.7	74.5	33.3	46.2	24.8	33.9
20 m	83.4	119.3	64.5	91.5	43.4	60.9	27.7	38.1
Wind zone 3	Terrain category I		Terrain category II		Terrain category III		Terrain category IV	
Height/PV inclination	20°	30°	20°	30°	20°	30°	20°	30°
5 m	73.0	104.2	51.2	72.4	36.0	50.2	29.0	40.0
10 m	85.3	122.2	62.7	89.1	39.2	54.9	29.0	40.0
20 m	99.8	143.4	77.0	110.0	51.4	72.7	32.4	45.0
Wind zone 4	Terrain category I		Terrain category II		Terrain category III		Terrain category IV	
Height/PV inclination	20°	30°	20°	30°	20°	30°	20°	30°
5 m	85.9	123.1	60.0	85.2	41.9	58.8	33.5	46.6
10 m	100.5	144.4	73.6	105.1	45.7	64.4	33.5	46.6
20 m	117.9	169.7	90.7	130.0	60.2	85.5	37.6	52.6

Validity notes
The data is based on the wind records calculated according to DIN 1055.4:2005-03. Refer to the official tables for the assignment of wind zones. Refer to the definitions in DIN 1055-4 for the assignment of terrain categories. Regulations for different roughnesses are also listed there.
Without certification, terrain category II must be assumed in inland areas, terrain category I must be assumed on the coast, near riverbanks and up to 5 km from large lakes.

Conversion for special areas
Table values apply for central areas, as well as east and west roof edges. All values are in [kg/m²] based on a module area of 1 m². The table values must be multiplied by 3 for roof edge zones to the north, south, north-east, north-west, south-east and south-west (zone G in accordance with DIN 1055-4:2005-03). The table values must be multiplied by 5 for roof corner zones, where applicable (zone F in accordance with DIN 1055-4:2005-03). The width of the corner and roof edge areas is the smaller value of 0.2 h or 0.1 w of the building (dimensions in accordance with DIN 1055-4:2005-03)

1. Load tables in accordance with DIN 1055
b) Protection against lifting up

The values in the tables below indicate what additional ballasting must be added to the mounting system. This ensures the mounting system is secured against lifting up.
Depending on the module surface area, the module angle and the height of the installation surface, different amounts of ballasting will be required.

To calculate the load on the roof resulting from the mounting system, the dead load of the mounting system (modules + mounting frame ~ 15 kg/m²) must be added in addition to the load.

Important!

This table must only be used if the anti-slip kit is secured on the roof.

Data in kg/m² of module surface area for standard areas, max. roof pitch 5°. See the validity notes on loading.
Data based on wind tunnel tests and DIN 1055-4:2005-03.
The dead load of the system of 15 kg/m² of module surface area must be added to the table values.

Wind zone 1	Terrain category I		Terrain category II		Terrain category III		Terrain category IV	
Height/PV inclination	20°	30°	20°	30°	20°	30	20°	30
5 m	26.1	29.4	19.3	21.6	14.6	16.1	12.4	13.6
10 m	29.9	33.9	22.9	25.7	15.6	17.3	12.4	13.6
20 m	34.4	39.1	27.3	30.9	19.4	21.7	13.5	14.9
Wind zone 2	Terrain category I		Terrain category II		Terrain category III		Terrain category IV	
Height/PV inclination	20°	30°	20°	30°	20°	30°	20°	30°
5 m	31.0	35.2	22.7	25.5	16.9	18.8	14.2	15.6
10 m	35.7	40.6	27.1	30.6	18.1	20.2	14.2	15.6
20 m	41.3	47.1	32.6	37.0	22.8	25.6	15.5	17.2
Wind zone 3	Terrain category I		Terrain category II		Terrain category III		Terrain category IV	
Height/PV inclination	20°	30°	20°	30°	20°	30°	20°	30°
5 m	36.5	41.5	26.4	29.8	19.4	21.6	16.1	17.9
10 m	42.2	48.1	31.7	36.0	20.8	23.4	16.1	17.9
20 m	48.9	55.9	38.3	43.7	26.5	29.9	17.7	19.7
Wind zone 4	Terrain category I		Terrain category II		Terrain category III		Terrain category IV	
Height/PV inclination	20°	30°	20°	30°	20°	30°	20°	30°
5 m	42.5	48.5	30.5	34.5	22.1	24.8	18.2	20.3
10 m	49.3	56.3	36.8	41.9	23.8	26.9	18.2	20.3
20 m	57.3	65.6	44.7	51.0	30.6	34.6	20.1	22.5

Validity notes
The data is based on the wind records calculated according to DIN 1055.4:2005-03. Refer to the official tables for the assignment of wind zones. Refer to the definitions in DIN 1055-4 for the assignment of terrain categories. Regulations for different roughnesses are also listed there.
Without certification, terrain category II must be assumed in inland areas, terrain category I must be assumed on the coast, near riverbanks and up to 5 km from large lakes.

Conversion for special areas
Table values apply for central areas, as well as east and west roof edges. All values are in [kg/m²] based on a module area of 1 m².
The table values must be multiplied by 3 for roof edge zones to the north, south, north-east, north-west, south-east and south-west (zone G in accordance with DIN 1055-4:2005-03).
The table values must be multiplied by 5 for roof corner zones, where applicable (zone F in accordance with DIN 1055-4:2005-03).
The width of the corner and roof edge areas is the smaller value of 0.2 h or 0.1 w of the building (dimensions in accordance with DIN 1055-4:2005-03)

2. Load table in accordance with Eurocode

Data in kg/m² of module surface area for standard areas (=area H,I in accordance with EN 1991-1-4), max. roof pitch 5°. See the validity notes on loading.
All data is based on wind tunnel tests.
The dead load of the system of 15 kg/m² of module surface area must be added to the table values.

The values for protection against lifting up must only be used once the anti-slip kit has been secured on the roof.

The values in the tables below indicate what additional ballasting must be added to the mounting system. This ensures the mounting system is secured against lifting up and slipping.
Depending on the module surface area, the module angle and the height of the installation surface, different amounts of ballasting will be required. To calculate the load on the roof resulting from the mounting system, the dead load of the mounting system (modules + mounting frame ~ 15 kg/m²) must be added in addition to the load.

Velocity pressure [kN/m²]	"Protection against sliding and lifting by the ballast"		"Protection only against lifting by the ballast"	
PV inclination ->	20°	30	20°	30°
0.4	21.2	32.6	8.5	10.8
0.45	25.8	38.6	11.4	14.0
0.5	30.3	44.5	14.3	17.2
0.55	34.8	50.5	17.3	20.5
0.6	39.4	56.5	20.2	23.7
0.65	43.9	62.4	23.1	26.9
0.7	48.4	68.4	26.1	30.1
0.75	52.9	74.3	29.0	33.4
0.8	57.5	80.3	32.0	36.6
0.85	62.0	86.2	34.9	39.8
0.9	66.5	92.2	37.8	43.0
0.95	71.1	98.1	40.8	46.3
1	75.6	104.1	43.7	49.5
1.05	80.1	110.1	46.6	52.7
1.1	84.6	116.0	49.6	55.9
1.15	89.2	122.0	52.5	59.2
1.2	93.7	127.9	55.4	62.4
1.25	98.2	133.9	58.4	65.6
1.3	102.8	139.8	61.3	68.8
1.35	107.3	145.8	64.2	72.1
1.4	111.8	151.7	67.2	75.3
1.45	116.4	157.7	70.1	78.5
1.5	120.9	163.6	73.0	81.7
1.55	125.4	169.6	76.0	85.0

Validity notes
To use the loading table, first calculate the velocity pressure according to height, wind zone and terrain category for the roof height in the respective country. The velocity pressure is the gusting dynamic load for a 50-year storm, e.g. in accordance with EN 1991-1-4. Please refer to the definitions from EN 1991-1-4 for the assignment of terrain categories. Regulations for different roughnesses are also listed there.

Conversion for special areas:
Table values apply for central areas, as well as east and west roof edges. All values are in [kg/m²] based on a module area of 1 m².
The table values must be multiplied by 3 for roof edge zones to the north, south, north-east, north-west, south-east and south-west (zone G in accordance with EN 1991-1-14).
The table values must be multiplied by 5 for roof corner zones, where applicable (zone F in accordance with EN 1991-1-4).
The width of the corner and roof edge areas is the smaller value of 0.2 h or 0.1 w of the building (dimensions in accordance with EN 1991-1-4).

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