

Assembly Guide of the RIPOSOL Series



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1. Introduction

1.1. Short Description

The mounting system for the Riposol series is a robust mounting system for assembly of collectors of the Riposol AK and P series on pitched or flat roofs and can also be used on the ground. It consists of aluminium sectional tracks, roof mounting sets and all the necessary small parts that guarantee safe assembly.

The AK 2300 and AK 2600 collectors as well as P2100 and P3000 are mounted upright. The AK 2300Q and AK 2600Q collectors as well as P2100L and P3000L are mounted crosswise. There is no difference between them regarding mounting on the roof or the hydraulic connection of the collectors.

The flat roof frame (raised mounting) is available in the 20° and 35° variations and can also be used on the ground. For installation on smooth surfaces, a so-called free installation is available with an inclination of 45°.

1.2. About this Guide

Object

The object of this guide is the assembly of the mounting system for the Riposol AK and P series as well as the hydraulic connection of the collectors.

The drawings in this guide show the upright assembly of the collectors. This guide mainly shows drawings of collectors in the AK series. The assembly of the P series is very similar, only the support rail and connector are different (see System Overview and 6.1).

If nothing different is indicated, then mounting on other types of roofs and also crosswise assembly of the collectors is identical.

The technical data of the Riposol series can be found in the appendix.

1.3. Standards and Technical Guidelines

The frame system for the Riposol series fulfils the following standards and guidelines:

- ✓ ÖNORM EN 1991-1-4 EUROCODE1: Effect on supporting structures . Part 1-4: General effects . wind loads
- ✓ ÖNORM EN 03.01.91 EUROCODE1: Effect on supporting structures . Part 1-3: General effects . snow loads

The collectors of the Riposol series fulfil the following standards:

- ✓ EN 12975-1 Thermal solar systems and their components . Solar collectors . Part 1: General Requirements
- ✓ EN 12975-2 Thermal solar systems and their components . Solar collectors . Part 2: Test methods

1.4. Responsibilities of the Operator

The operator of the system has the following safety-related responsibilities:

- ✓ Make sure that the assembly of the mounting is only carried out by persons with trade skills and basic knowledge of mechanics.
- ✓ Make sure that the hired persons can assess the work given to them and recognise possible dangers.
- ✓ Make sure that the hired persons are familiar with the system components.
- ✓ Make sure that the assembly guide is available during the assembly. The assembly guide is part of the product.

- ✓ Make sure that the assembly guide and in particular the warnings and cautions have been read and understood by the personnel before the assembly.
- ✓ Make sure that the permissible operating conditions are complied with. Riposol is not liable for damages resulting from exceeding these conditions.
- ✓ Make sure that the roof structure can withstand the load, especially around the point of transmission of force.
- ✓ Make sure that the stability of the assembled connections and the mounting of the frame are ensured.
- ✓ Make sure that suitable lifting gear is used during the assembly.
- ✓ Make sure that only original parts are used even in the event of a replacement. Otherwise, any guarantee claims will be forfeited.

2. Safety

2.1. Usage in Accordance with Intended Purpose

The frame system for the Riposol series is designed exclusively for holding collectors of the Riposol series. Any other use is considered to be improper.

Use in accordance with the intended purpose also includes compliance with the specifications in this assembly guide. Riposol is not liable for damages resulting from non-observance of the assembly guide, especially the safety instructions, as well as abusive use of the product.

2.2 Basic Safety Instructions

The following general safety instructions and warnings are an important part of this guide and are of fundamental importance for handling the product.

- ✓ In addition, observe the following basic safety instructions:
- ✓ Regardless of the testable statics in advance of each assembly and installation, make sure that the product complies with the local static requirements.
- ✓ Do not remove safeguards or render them inoperable.
- ✓ Wear work clothing in accordance with the regulations of the government safety organisation.
- ✓ Comply with the applicable safety-at-work regulations.
- ✓ For the entire duration of the assembly, the presence of a second person is mandatory, who can provide help in the event of an accident.
- ✓ If there is a danger of freezing, then under no circumstances fill with water, rather exclusively with Riposol heat transfer liquid. Damage may occur even at air temperatures of 5°C.
- ✓ Keep a copy of this installation guide close to the system.

2.3 Instructions for Working on the Roof

When working on the roof, observe the following instructions:

- ✓ Observe the accident prevention regulations for working on roofs. If necessary, make barricades to protect against falling parts.

- ✓ For work on a roof, use a safety harness or safety scaffolding according to the accident protection regulations.
- ✓ Before walking on the roof, test and ensure the load-bearing capacity of all loaded parts.
- ✓ Use a safety harness.
- ✓ Even when working for just a short time, use protective equipment against falling.
- ✓ Don't carry material to the roof using a ladder, rather use suitable lifting gear.

3. Important Assembly Instructions

3.1. Operating Conditions

The frame system for the Riposol series can withstand a load test according to ÖNORM EN 12975 Part 1 and 2. It has been designed for the following maximum loads.

Snow Load

The maximum snow load is dependent on the collectors being used as well as the type of roof mounting.

Collector	Max. snow load with roof hooks	Maximum snow load with hanger bolts
AK2300 and AK2300Q	Max 2 kN/m ²	Max. 1.5 kN/m ²
AK2600 and AK2600Q	Max 2 kN/m ²	Max. 1.5 kN/m ²
P2100 and P2100L	Max 2 kN/m ²	Max. 1.5 kN/m ²
P3000 and P3000L	Max 2 kN/m ²	Max. 1.5 kN/m ²

Spacing of the Roof Mounts

The spacing of the roof mounts for the sectional tracks is dependent on the type and number of collectors used. The supplied roof mounts are mounted evenly along the sectional tracks.

Other Operating Conditions

Terrain category	III, IV
Roof area	Field area (no edge and corner area)
Wind load	Gust dynamic pressure max. 0.8 kN/m ²

3.2 Assembly Preparations

The manufacturer recommends informing yourself of the local conditions before ordering the frame system for the Riposol series. In particular, familiarise yourself with

- ✓ the roof condition (e.g. insulation), strength of the roof battens,
- ✓ quality of the roof battens,
- ✓ roof covering (e.g. flat wave troughs).

3.3 Transport and Handling of the Collectors

When handling the collectors, the following instructions must be followed:

- ✓ take into account the weight of a collector
- ✓ take into account the dimensions of the collectors
- ✓ **don't** lift the collectors by the connectors
- ✓ avoid blows and other mechanical influences on the collector glass and the collector itself
- ✓ take into account the suitability of the collectors for inclinations of 20° to 80°
- ✓ when temporarily storing the collectors before starting the assembly, keep them dry and protected against exposure to sunlight

4. System Overview

The system overview shows all frame parts of the frame system for the Riposol series that may be included in the scope of delivery. The exact scope of delivery is dependent on the following:

- ✓ type of roof
- ✓ type of collectors
- ✓ number of collectors



1	Collector	9	Strut
2	Roof hooks	10a	Eternit® panel, double cover
3	Supporting rail AK	10b	Eternit® panel, rhombus template
4	Hanger bolt	10c	Eternit® panel, rhombus template
5	Fastening bracket	11	Sheet metal seam clamp
6	Connector AK	12	T-slide
7	Sectional track	13	Connector
8	Inclination track	14	Supporting rail P
		15	Connector P

5. Assembly of the Roof Mounting

DANGER

Danger to life from falling and falling parts!

- ✓ Protect yourself against falling.
- ✓ Don't stand in the danger zone.
- ✓ Wear a hardhat.
- ✓ After completion of the assembly, check to make sure the frame system and collectors are seated securely.

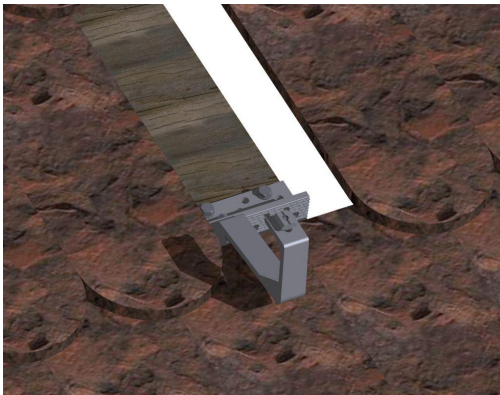
CAUTION

Material damage by stepping on roof hooks!

Don't use the mounted roof hooks as stepladders. The underlying material can be damaged.

Depending on the type of roof, there are different roof mounts.

5.1. Tiled Roof (installing the roof hooks)



1. Remove the roof tile from the designated location, or alternatively slide it up.

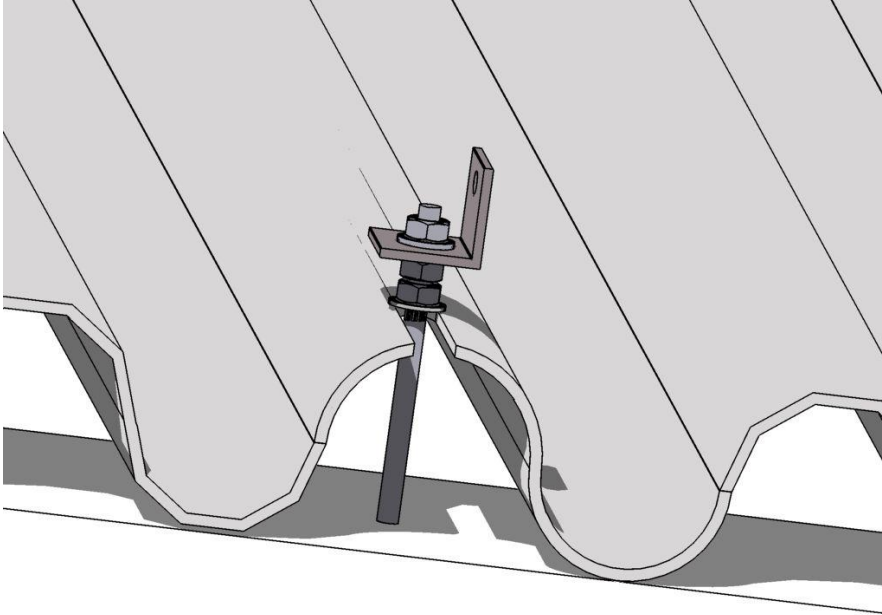
CAUTION

Material damage from incorrect installation!

The roof hooks must not be pressed against the roof tiles, because the roof tiles will be damaged.

2. If necessary, line the roof hooks with wood so that they don't lie on the roof tile.
3. If necessary, cut out the roof tile at the location of the installation.
4. Screw the roof hooks to the rafters.
5. If necessary, shift the roof hooks. The option of shifting the roof hooks can be used to even out height differences in the roof.
6. Completely cover the roof again.

5.2. Corrugated roof (mounting the hanger bolts)



For corrugated roofs, slate roofs, and trapezoidal sheet metal roofs, hanger bolts are used instead of roof hooks.

CAUTION
Building damage through leakage!

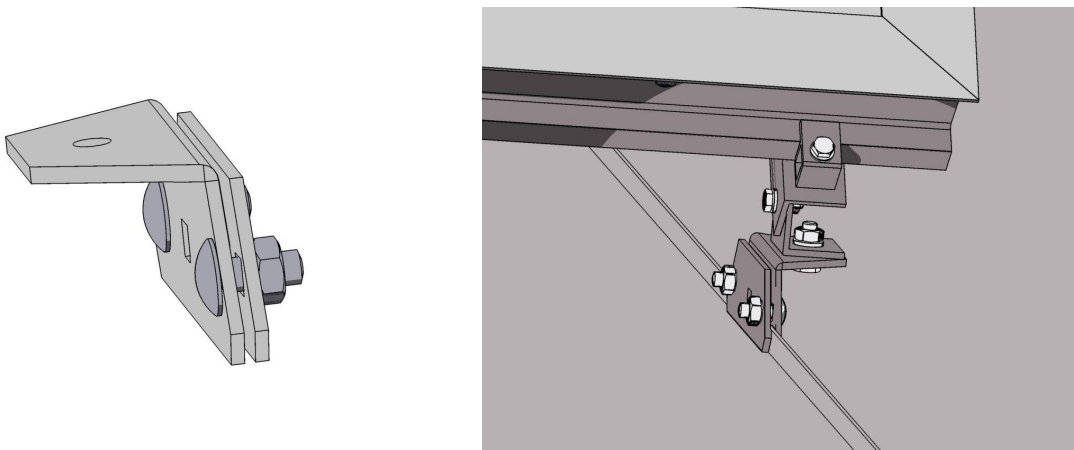
Never drill into a wave trough.

1. Drill through the covering at the designated location.
2. Screw the hanger bolt into the rafter.

Adequately tighten the stationary seal ring with the help of the nut without damaging the covering. The amount the nut can be tightened is determined by the physical characteristics of the roof.

3. Tighten the nut.

5.3. Sheet Metal Seam Roof (mounting the sheet metal seam clamps)



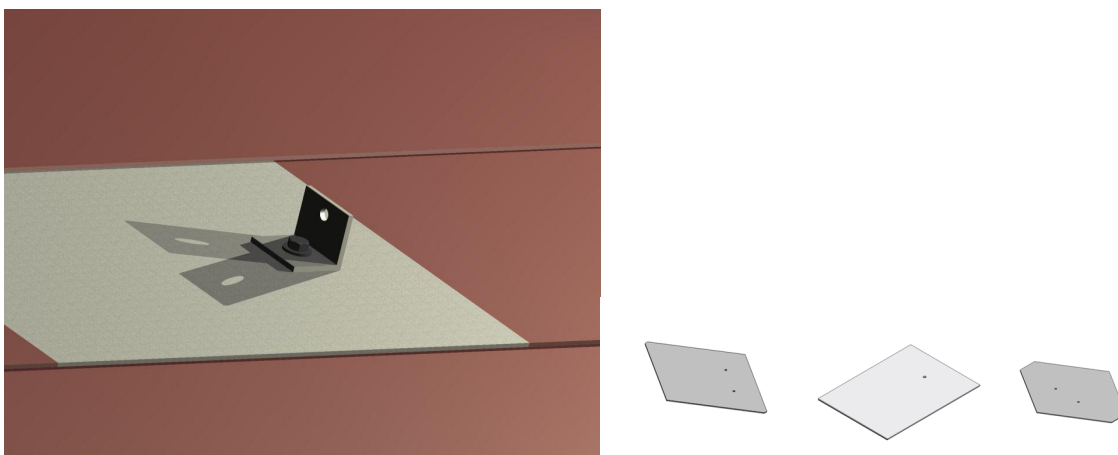
DANGER

Insufficient load bearing capacity!

If the roof structure and the number of sheet metal seam clamps don't have adequate load bearing capacity, the frame with the collectors may fall from the roof.

- ✓ Have the roof structure tested.
 - ✓ Have the load bearing capacity of the roof tested for suction.
 - ✓ If the load bearing capacity is inadequate, change over to an installation with hanger bolts. Contact Riposol service for the spacing.
1. Place the sheet metal seam clamp at the designated location on the seam.
 2. Screw the sheet metal seam clamp onto the seam and firmly clamp to the seam without causing any damage.
 3. Check to make sure the sheet metal seam clamp is seated securely!!!

5.4. Eternit® Roof (mounting the covering elements)



Depending on the covering of the Eternit® roof, there are different mounting plates. Mounting on an Eternit® double cover is shown. The installation of the mounting plates is identical for other Eternit® roofs.

1. Remove the Eternit® plate at the designated location.
2. Insert the mounting plate in place of the removed Eternit® plate.
3. Screw the mounting plate and bracket to the roof batten with the accompanying wood screw.

6. Assemble Frame Components

6.1. Pitched Roof – Tiled Roof

DANGER

Danger to life from falling and falling parts!

- ✓ Protect yourself against falling.
- ✓ Don't stand in the danger zone.
- ✓ Wear a hardhat.
- ✓ After completion of the assembly, check to make sure the frame system and collectors are seated securely.

CAUTION

Material damage by stepping on roof hooks!

Don't use the mounted roof hooks as stepladders. The underlying material can be damaged.



1. Place the sectional tracks on the installed roof hooks and fasten to the roof hooks with the help of the T-slide and the hexagonal bolt.
2. Position the AK supporting rail on the sectional track and fasten with connectors and hexagonal bolts.

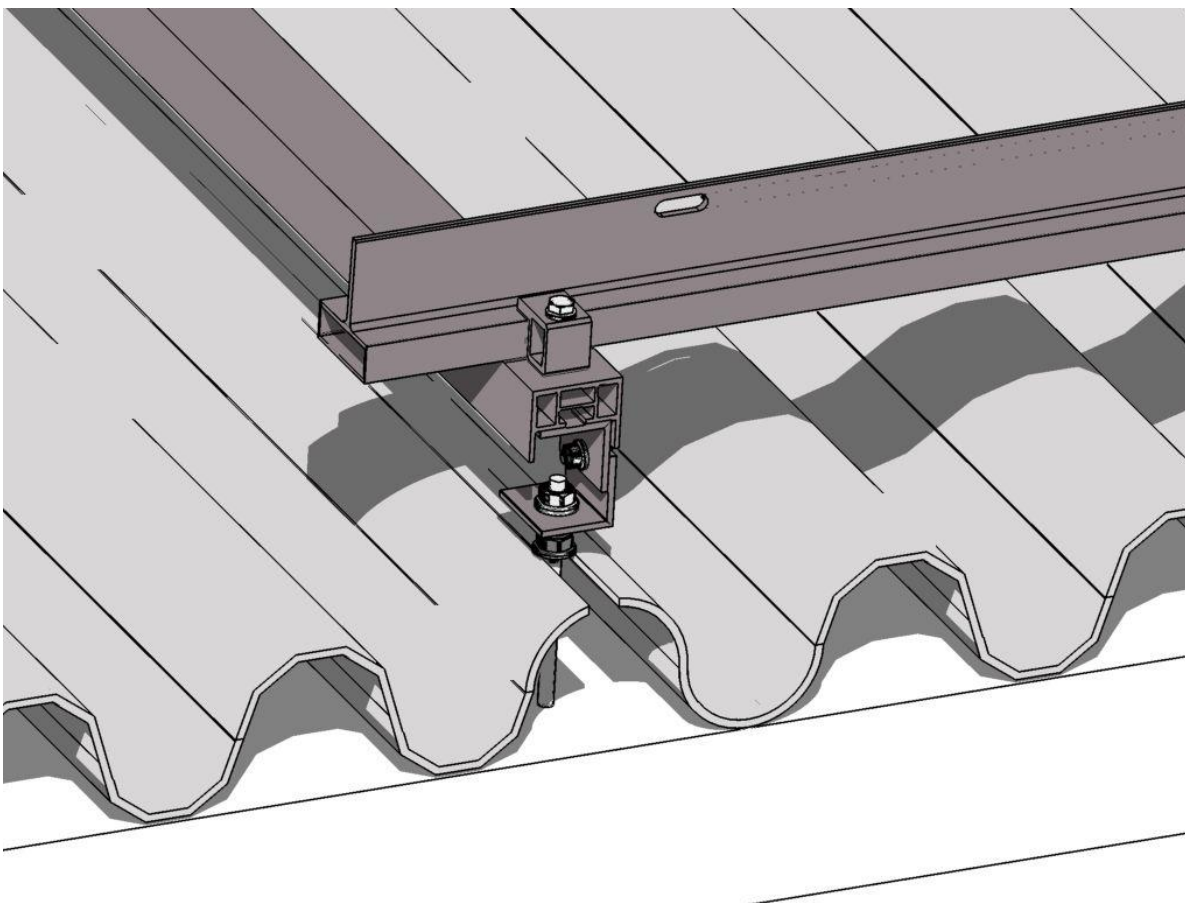
IMPORTANT!!!! The shorter side (x) of the support rail must point to the outside and be fastened with a connector.

During the installation of collectors of the Riposol P series, simply a different support rail (System Overview No. 14) and a different connector (No. 15) are used.

With the P series, the collectors must only be positioned between the support rails and they are to be fastened with the help of the connectors and the respective screws. The collector itself no longer has to be screwed onto the support rails.



6.2. Pitched Roof – Other Roof Mountings



When installing pitched roof mountings (except for tiled roofs 6.1), according to the illustration, inclination tracks that have already been drilled are used, which can also be found in the raised mounting variation. These inclination tracks must be screwed to the respective roof mounting with the help of the fastening bracket.

6.3. Flat Roof - Raised Mounting

In order to simplify the work on the roof, the manufacturer recommends mounting individual frame components to the sectional tracks on the ground. Some frame components can be pre-installed. In that case, skip over the respective chapters.

Supporting Rails

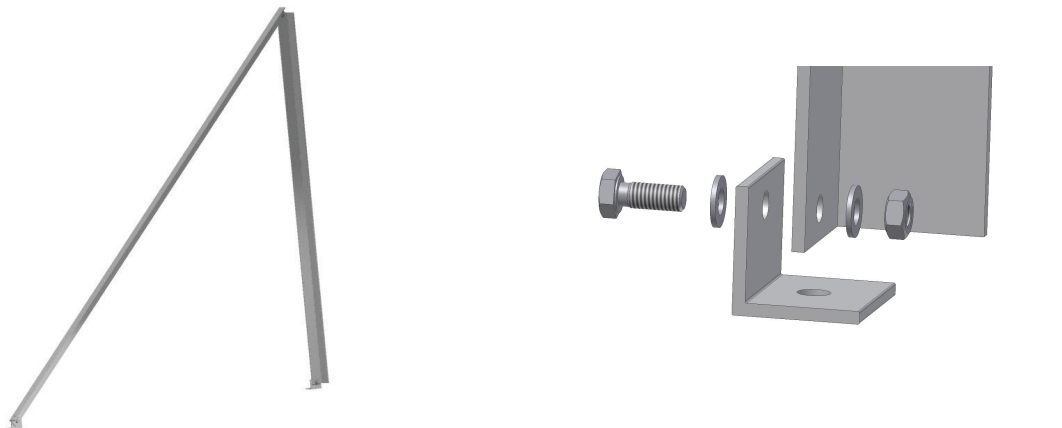
The supporting rails are single or multipart depending on the number of collectors (see Attachment 7.2).

Standoff Triangle

The standoff triangle is available for a standoff of 20° and 35°.

The triangle consists of an inclination track and a support. Two fastening brackets connect the inclination track and support to the roof mounting.

For so-called free installations, an angle of 45° is used and can also be mounted on concrete bases if necessary. The procedure for the assembly is the same.



Mount the bracket to the support

1. Mount bottom of the support to the bracket with a hex head screw, washers and nut.
2. Screw tight and check to make sure it is firm.

Mount the support to the inclination track

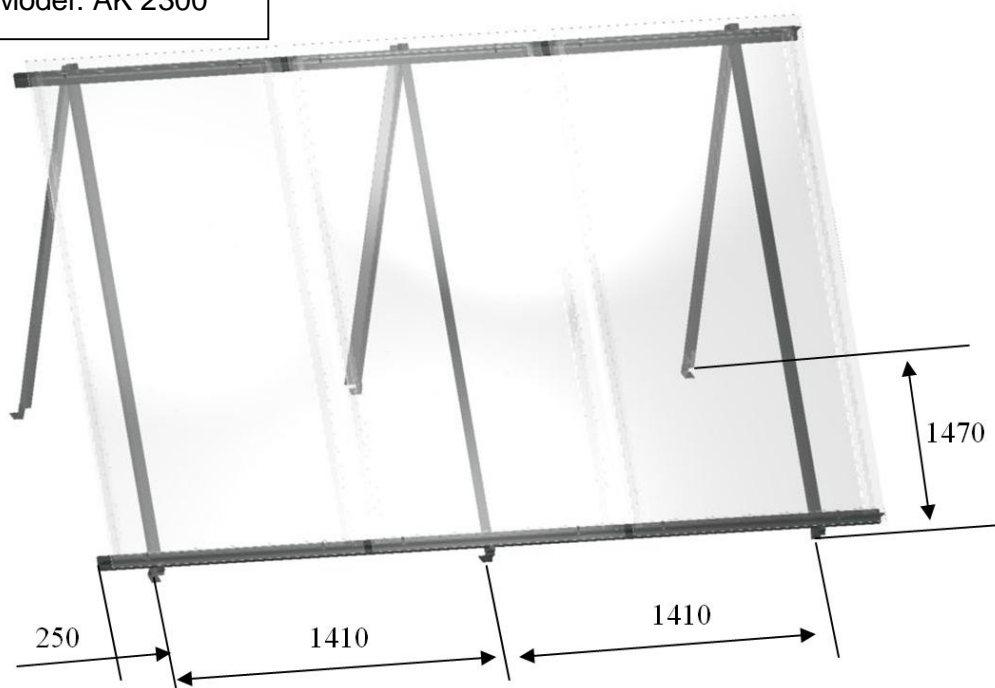
1. Mount top of the support to the inclination track with a hex head screw, washers and nut.
2. Screw tight and check to make sure it is firm.

After assembling the standoff triangle, the support rail must be fastened the same way as for fastening to pitched roofs.

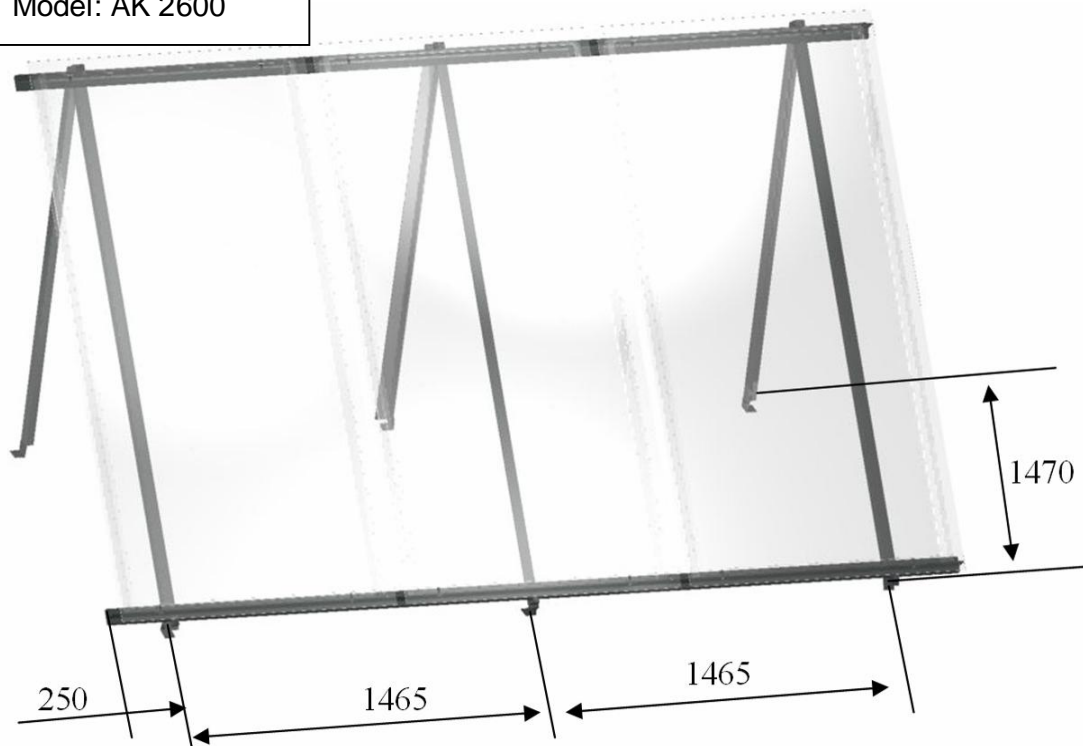
6.4. Setup Spacing for Free Installation (45°)

To guarantee fast assembly and possibly also to be able to perform the work required to assemble the collector (setup foundation etc.), the following illustrations show the spacing of the fastening elements relative to each other. In each of these illustrations there are 3 collectors. If there are more than 3 collectors beside each other, then the remaining standoff triangles contained in the sets are distributed uniformly across the entire setup surface area.

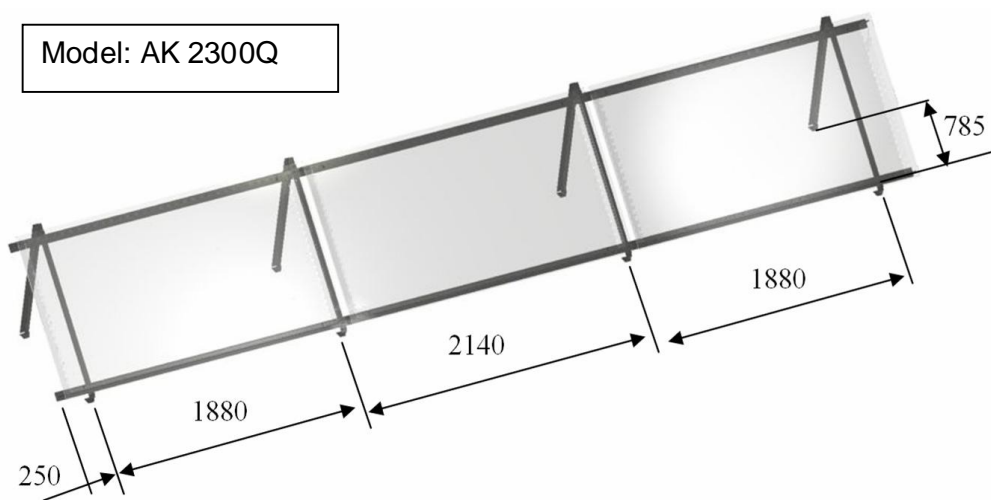
Model: AK 2300



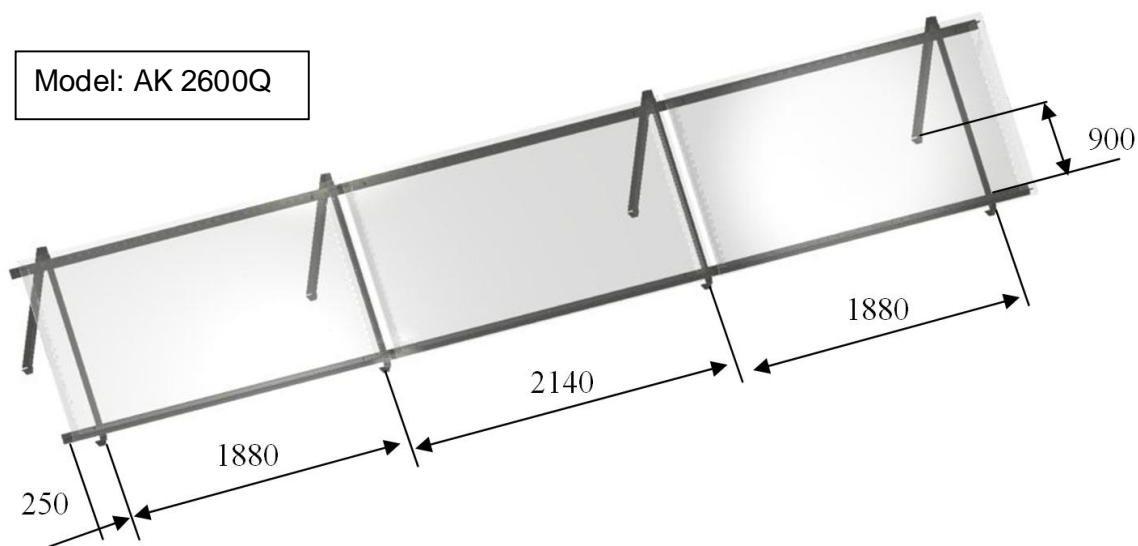
Model: AK 2600



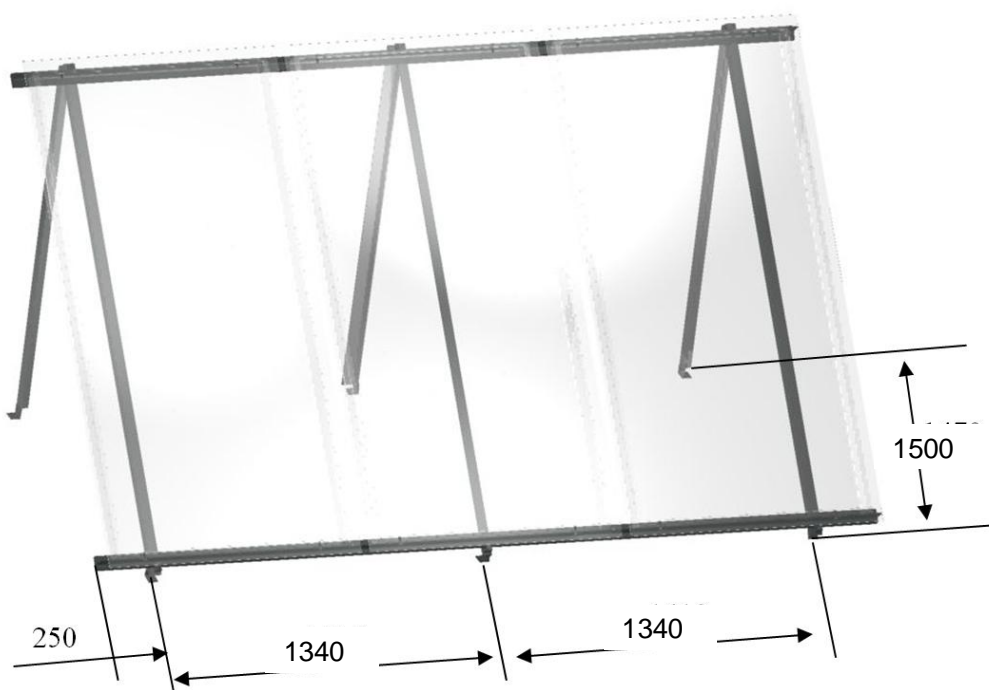
Model: AK 2300Q



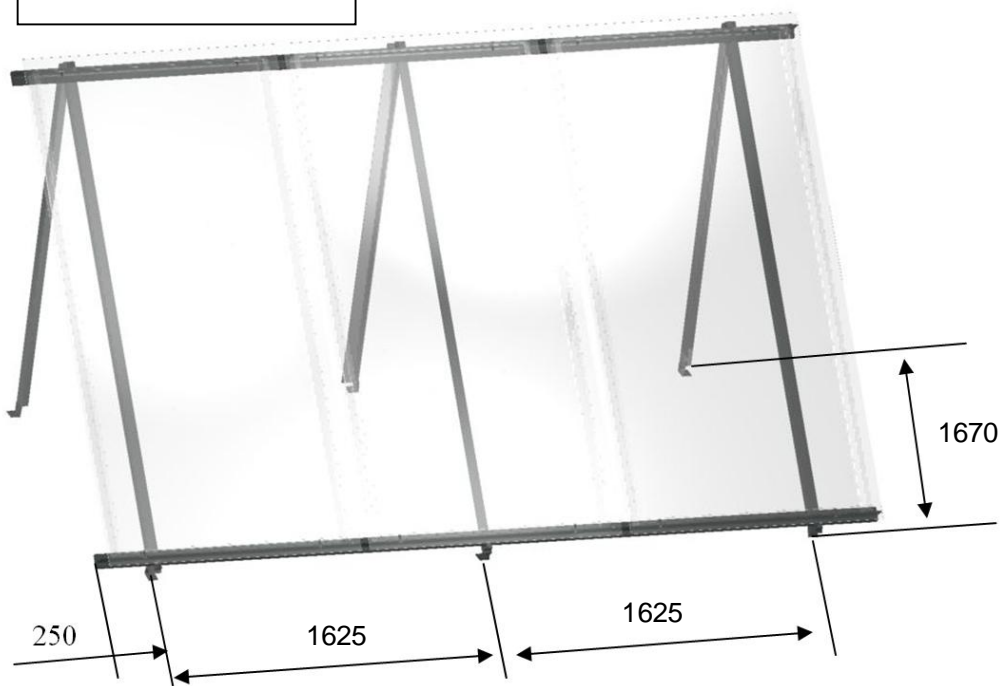
Model: AK 2600Q



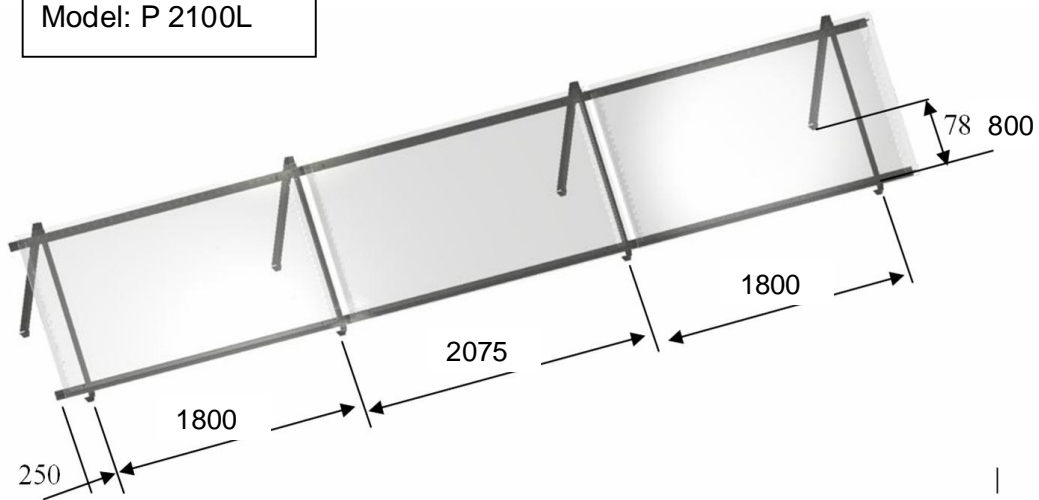
Model: P 2100



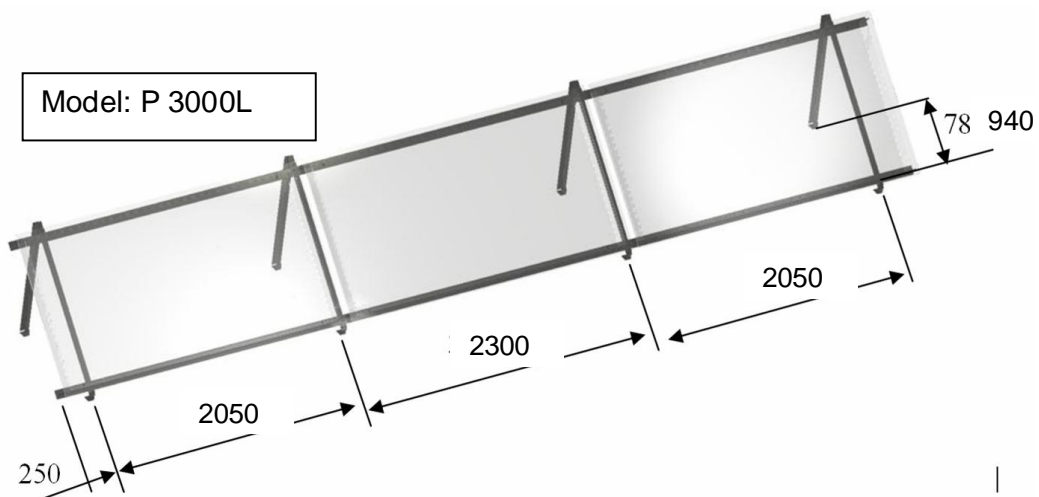
Model: P 3000



Model: P 2100L



Model: P 3000L



7. Installing the Collectors

DANGER

Danger to life from falling and falling parts!

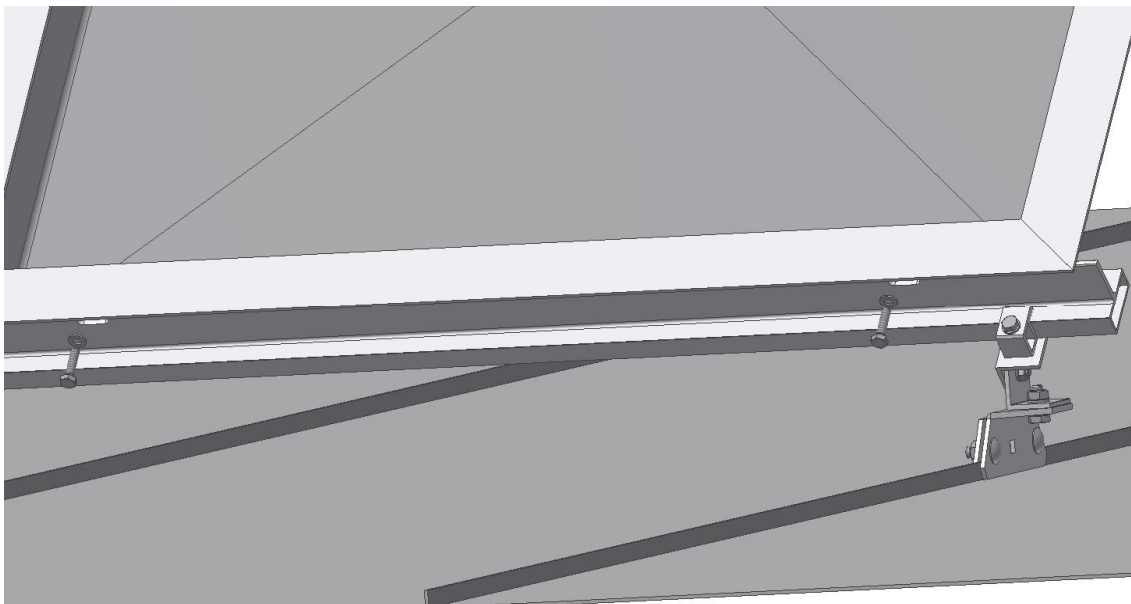
- ✓ Protect yourself against falling.
- ✓ Don't stand in the danger zone.
- ✓ Wear a hardhat.
- ✓ After completion of the assembly, check to make sure the frame system and collectors are seated securely.

The collectors are installed on the supporting rails beside each other. The manufacturer recommends installing the collectors by starting from one side.

All collectors must always be installed such that the sensor tube is positioned on the side in the upper section of the collector (directly below one of the upper connectors).

Collectors AK2300 and AK2600 as well as P2100 and P3000 are mounted upright. Collectors AK2300Q and AK2600Q as well as P2100 and P3000 are mounted crosswise. There is no difference between them regarding mounting on the roof or the hydraulic connection of the collectors.

7.1. Fastening the Collector to the Supporting Rail (only for AK series)

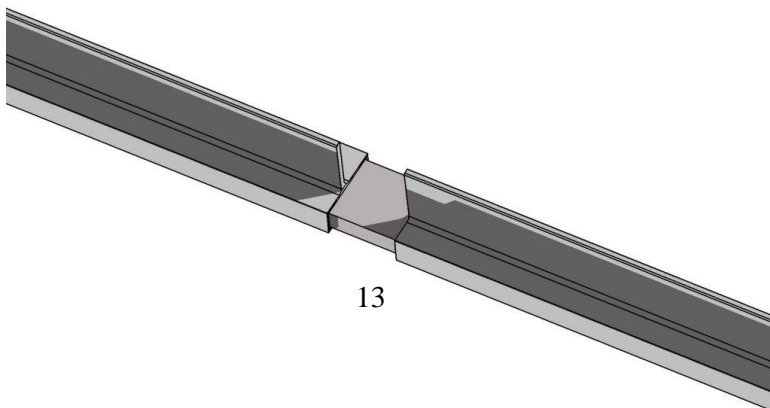


Don't slide the collectors onto the rails, rather lift them.

1. Place the collector between the supporting rails.
2. Fasten the collector to the supporting rails with the hex head screw and washers.

7.2. Extending the Supporting Rails

In order to be able to extend the collectors in the row in any way, moulded connecting tubes (13) are included as shown in the illustration. They slide into the supporting rails and ensure a stable connection.



13

7.3. Hydraulically Connecting Collectors

1. Slide the second collector up to the first collector.
2. Align the collectors so that the hydraulic connectors are together.
3. Use a union nut to screw together the connector of the collector to the second collector and seal by hand.
4. Tighten the union nut with the corresponding open end spanner.

8. Start-up and Maintenance

8.1. Start-up

The system is started up using the following steps:

1. Hydraulic start-up:
For detailed information, see the operator's guide of the pump assembly.
2. Electrical start-up:
For detailed information, see the operator's guide of the solar controller. Connect the collectors together so that they are electrically conductive. The solar pipe work (supply and return) must be directly connected by the shortest path to the building potential equalisation. Connect large metallic parts to the building's lightning protection.

8.2. Operating Instructions

- ✓ Through collector overheating (e.g. due to a stoppage), solar liquid may lead out of the safety valve, depending on the system. Don't direct it to the sewer system. Instead, trap it for refilling and return it to the system.
- ✓ Fill the system with Riposol heat transfer liquid (see the operator's guide of the pump assembly for filling the system). The heat transfer liquid is non-poisonous and food safe and may be fed into the sewer system if necessary.
- ✓ Use the filling and rinsing pump to fill the system. It is connected to the filling and emptying valve with the hose connection nozzles (see operator's guide of the pump assembly).

- ✓ Don't fill the system if the collector is hot.
- ✓ If the solar system is not put into operation immediately, then cover the collectors. That way, the heat transfer liquid that has been already put in will be protected against overheating.
- ✓ Over-dimensioning and system stoppages at a time when there is a high level of sunlight exposure can lead to overheating and the formation of vapour in the system.

8.3. Maintenance

The system requires maintenance every 2 years. During the maintenance, the following work, routine checks, and visual checks must be performed.

Frost protection: Resistance to freezing should be in the range of $-25^{\circ}\text{C} \pm 3^{\circ}\text{C}$.

Corrosion protection: Use a pH measuring strip to check whether the liquid is in the neutral range (7 ± 0.5). A pH value outside this range indicates deterioration of the heat transfer liquid. Replace the heat transfer liquid to protect the seals and pipes against corrosion.

Check the safety valves and expansion tank using the respective manufacturer's specifications.

9. Troubleshooting

Malfunction	Possible Cause	Reason	Fault Repair
The system doesn't produce heat	Incorrect controller setting		Check the settings of the controller
	Controller doesn't work	Lightning strike/malfunction	Contact service centre
	Air in the system	The bleeding that was performed wasn't sufficient	Rinse and bleed the system. Set the manual fan.
	No flow through the system	Pump not connected Controller defective Pump has seized up	In manual mode, switch the output of the solar controller on/off. Open the pump and physically move it.
System doesn't produce enough heat.	Volumetric flow rate of the solar system is too high or too low		Set the correct volumetric flow rate for the pump assembly
	Heat transfer liquid is damaged	Long stoppage times of the system	Check the heat transfer liquid and replace if necessary
	Solar system only runs for short periods of time	Storage sensor set too high. Storage sensor set in T-connector.	Position the sensor as far down into the tank as possible. Place it directly on the tank if possible.
	Long running times of circulation losses	Vigorous, constant mixing and circulation losses	Reduce the running time to a minimum with a timer or button, for example.
	Supply and return are reversed		Check the collector connectors
	Collector mounted with collector sensor down		Always position the collector sensor up
	Heat can't be transferred	Heat exchanger calcified	Tank maintenance
	Too little sunlight exposure		There is no fault.
System switches on and off frequently	Collector sensor positioned incorrectly		Reposition collector sensor
Solar line heats up during stoppages	Gravity circulation	Gravity circulation	Check the setting of the gravity brakes. Check all outgoing pipe lines for gravity circulation

The tank has cooled down by the morning	Poor insulation of the outgoing lines	Gravity circulation	Check the insulation of the outgoing lines and gravity brakes
	Unexpected heat loss (e.g. boiler)	Gravity circulation/pump running constantly	Check all outgoing lines for gravity circulation
	Tank insulation damaged		Check tank insulation
Tap temperature of the water is very hot	There is no domestic water mixer		Install a domestic water mixer
Screw joints are leaky	Screw joints tightened when hot		Retighten screw joints when cold
Tank corroded after only a short time	No anode maintenance		Replace anode
	Very aggressive water		Install a suitable anode
Collector looks clouded	Temporary clouding	Dew formation due to very high air humidity	No measures necessary as long as the clouding disappears again after exposure to sunlight
	Constant clouding	Moisture accumulation	Contact service centre
System became leaky in the winter	Frost damage	Frost protection no longer adequate	Check heat transfer liquid, pressure test the collector/system
		Heat transfer liquid was diluted with water	Check heat transfer liquid, pressure test the collector/system
Pressure when cold below minimum pressure	System was filled when exposed to sunlight. System has lost liquid		Refill system when cold or with the collectors covered
	No primary pressure in the expansion tank		Replace expansion tank
Bleeding of the system	Expansion tank faulty		Replace expansion tank
	Expansion tank doesn't work		Check expansion tank
	Expansion tank over-dimensioned		Replace expansion tank accordingly
	Too much heat transfer liquid in the system	When the system is heated to the maximum temperature, excess liquid is forced out	This is a one-time occurrence. Don't do anything.

10. Appendix

Technical Data

Flat Collector AK2600 (upright format)

Gross collector surface area:	2.62 m ²
Aperture surface area:	
Max. operating pressure:	10 bar
Dimensions (W x H x D):	1240 x 2110 x 92
Weight:	41 kg
Supply/return connectors:	brass screw joints 1+

Flat Collector AK2600Q (crosswise format)

Gross collector surface area:	2.62 m ²
Aperture surface area:	
Max. operating pressure:	10 bar
Dimensions (W x H x D):	2110 x 1240 x 92
Weight:	41 kg
Supply/return connectors:	brass screw joints 1+

Flat Collector AK2300 (upright format)

Gross collector surface area:	2.27 m ²
Aperture surface area:	
Max. operating pressure:	10 bar
Dimensions (W x H x D):	1075 x 2110 x 92
Weight:	36 kg
Supply/return connectors:	brass screw joints 1+

Flat Collector AK2300Q (crosswise format)

Gross collector surface area:	2.27 m ²
Aperture surface area:	
Max. operating pressure:	10 bar
Dimensions (W x H x D):	1075 x 2110 x 92
Weight:	36 kg
Supply/return connectors:	brass screw joints 1+

Flat Collector P 3000 (upright format)

Gross collector surface area:	2.8 m ²
Aperture surface area:	2.57 m ²
Max. operating pressure:	6 bar
Dimensions (W x H x D):	1229x2279x102 mm
Weight:	54.8 kg
Supply/return connectors:	brass screw joints 1+

Flat Collector P 3000L (crosswise format)

Gross collector surface area:	2.8 m ²
Aperture surface area:	2.57 m ²
Max. operating pressure:	6 bar
Dimensions (W x H x D):	2279x1229x102 mm
Weight:	54.8 kg
Supply/return connectors:	brass screw joints 1+

Flat Collector P 2100 (upright format)

Gross collector surface area:	2.12 m ²
Aperture surface area:	1.91 m ²
Max. operating pressure:	6 bar
Dimensions (W x H x D):	1039x2038x102 mm
Weight:	40.8 kg
Supply/return connectors:	brass screw joints 1+

Flat Collector P 2100L (crosswise format)

Gross collector surface area:	2.12 m ²
Aperture surface area:	1.91 m ²
Max. operating pressure:	6 bar
Dimensions (W x H x D):	2038x1039x102 mm
Weight:	40.8 kg
Supply/return connectors:	brass screw joints 1+