System Installation, Commissioning and Maintenance Manual

Solar Keymark No. 011-7S495 R

Evacuated tube collectors
CPC **6 INOX**
CPC **12 INOX**
CPC **18 INOX**

With aluminium / stainless steel mounting systems

Contents

Evacuated Tube Collectors
CPC 6 INOX, CPC 12 INOX, CPC 18 INOX

for water heating and backup heating, series connection

Pipe material: stainless steel

Scope of delivery:

fully pre-assembled unit comprising

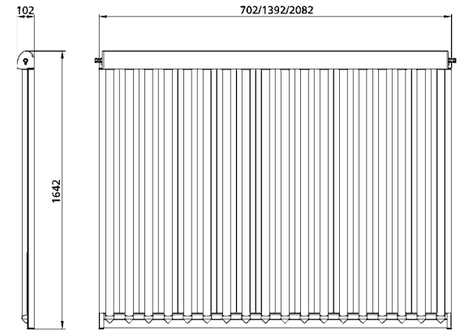
- evacuated tubes based on the thermos flask principle
- manifold with direct flow heat conduction unit and dry tube connection
- CPC reflector

Collectors are packed in individual boxes.
In addition, there is a sun protection sheet over the evacuated tubes.

Installation types:

- on-roof installation
- flat roof / wall installation

Note: The manifold must always be mounted on top. The minimum angle for on-roof and flat roof installation is 15°.



Series		CPC 6 INOX	CPC 12 INOX	CPC 18 INOX
Number of evacuated tubes		6	12	18
η_0 in relation to aperture, EN 12975	%	64.2	64.2	64.2
a_1 with wind, in relation to aperture	W/(m²k)	0.89	0.89	0.89
a_2 with wind, in relation to aperture	W/(m²k²)	0.001	0.001	0.001
Yield forecast (location Würzburg, Germany, reference area 3 m²)	kWh/m²a	651	651	651
Yield forecast (location Würzburg, Germany, reference area 5 m²)	kWh/m²a	589	589	589
Grid dimensions (length x height x depth)	m	0.70 x 1.64 x 0.1	1.39 x 1.64 x 0.1	2.08 x 1.64 x 0.1
Gross surface area	m²	1.15	2.28	3.41
Aperture area	m²	1.0	2.0	3.0
Collector contents	l	0.9	1.8	2.6
Weight	kg	19	35	52
Max. working overpressure	bar	10	10	10
Max. stagnation temperature	°C	272	272	272
Connection diameter, compression fitting	mm	15	15	15
Sensor sleeve	mm	6	6	6
Collector material		Al / stainless steel / glass / silicone / PBT / EPDM / TE		
Glass tube material		borosilicate glass 3.3		
Selective absorber coating material		aluminium nitrite		
Glass tube (Ø ext./Ø int./wall thickn./tube lgth.)	mm	47/37/1.6/1500		
Colour (aluminium frame profiles, powder-coated)		RAL 7015		
Colour (plastic parts)		black		
Thermal shock test / ITW test number		06COL513		
Hailstone test according to DIN EN 12975-2 / TÜV test number		435/142448		
EC type examination		Z-IS-DDK-MUC-07-08-100029919-001		

Solar Keymark approved product / 10 year solar collector warranty / 25 year life expectancy

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1. About this document

1.1 Purpose of this document

This document is to provide you with information regarding the collectors of the INOX
It contains information concerning:
• Safety • Hydraulic interconnection • Connection options • Assembly and installation
• Hydraulic connections • Accessory kits • Lightning protection

1.2 Target group for this document

These installation instructions are intended for installation engineers.

1.3 Symbols used in this document

Danger!
Potential hazard to people.

Caution!
Potential damage to property.

Note!
Information about special features.

1.4 Applicability

These installation instructions apply for the INOX evacuated tube collectors as of 01/01/2008.

2. Safety information

The respective state's specific standards and safety regulations must be adhered to.
Please pay careful attention to this safety information in order to avoid the risk of injury or death and damage to property and equipment. Carefully read through these installation instructions.

2.1 Working on the solar energy system

Installation, initial setup, inspection, maintenance and repairs must be carried out by authorised service personnel (registered heating engineers). Work must comply with the relevant safety standards, e.g. DIN, EN, DVGW and VDE. Before working on the solar energy system it should be isolated from the mains power (e.g. by removing its separate fuse or switching its circuit breaker) and steps taken to prevent it being switched back on.

2.2 Repair work

Repairs to safety-critical components are not permitted. If components are replaced, original Paradigma replacement parts must be used.

2.3 Roof work

The maximum permissible load for the substructure and the required distance from the roof edge are to be observed in accordance with DIN 1055. The accident prevention guidelines stipulated by the trade associations must also be observed.

2.4 Gloves and safety glasses

Wear gloves and safety glasses to avoid cut injuries when installing the collector.

2.5 Fire hazard

Evacuated tube collectors CPC INOX can reach stagnation temperatures in excess of 200°C
during installation and operation. The flow and return connections are a burn hazard due to (among other things) escaping steam.

2.6 Overhead electrical lines

Appropriate safety measures must be taken in the vicinity of overhead electrical lines following consultation with the operator.

2.7 Equipotential bonding / lightning protection for the solar energy system

The pipework of the solar circuit in the lower part of the building must be bonded. The connection of the collector system to an existing or new lightning protection system, as well as the installation of a local equipotential bond, may only be carried out by authorised service personnel after taking all local conditions into consideration.

3. General Information

Carefully read through these installation instructions. Failure to follow these instructions will void any manufacturer's or legal guarantee claims.

3.1 Structure and function of CPC INOX

The CPC INOX evacuated tube collector consists of 3 main components, which are completely pre-assembled in a collector module:
- Evacuated tubes
- CPC reflector
- Manifold with heat transfer units

The incident solar radiation is reflected by the CPC reflector onto the absorber surface of the evacuated tubes where it is converted into heat. The high vacuum in the tubes combined with the highly selective coating on the absorber prevents the heat from escaping into the environment. The heat is transported away from the collector using a suitable heat transfer medium and by means of so-called heat exchangers inside the vacuum tubes and the tube register connected to them.

3.2 Applications and design of CPC INOX

The CPC INOX may be used solely for water heating as well as in partial solar heating applications.

- Aperture surface for domestic water heating = number of persons + 1 [m²]
- Aperture surface for partial solar heating = 2 x number of persons + 1 [m²]. Deviations of ± 25% are permissible.
- Storage tank capacity: approx. 80 l per m² collector area for domestic water heating and/or partial solar heating.

The CPC INOX should only be used in conjunction with suitable solar controllers and only in intrinsically safe and sealed solar heating systems that are fitted with a suitable and sufficiently sized membrane expansion tank.

3.3 Technical data CPC 6/12/18 INOX

Series		CPC 6 INOX	CPC 12 INOX	CPC 18 INOX
Number of evacuated tubes		6	12	18
Module dimensions (length x height x depth)	m	0.70 x 1.64 x 0.1	1.39 x 1.64 x 0.1	2.08 x 1.64 x 0.1
Gross surface	m²	1.14	2,28	3,41
Aperture area	m²	1.0	2,0	3,0
Collector content - INOX	l	0,9	1,8	2,6
Weight - INOX	kg	19	35	52
Max. permitted operating overpressure	bar	10	10	10
Stagnation temperature, max.	°C	295	295	295
Pressure loss at 0.25 l/(m² min), LF at 40°C, approx.	mbar	1	5	11
Pressure loss at 0.66 l/(m² min), HF at 40°C, approx.	mbar	3	13	32
Connection width, flow/return	mm	15	15	15
Collector material - INOX		Al / stainless steel / glass / silicone / PBT / EPDM / TE		
Glass tube material		borosilicate 3.3		
Selective absorber layer material		aluminium nitrite		
Glass tube, (external dim. / internal dim./ wall thickness / tube length)	mm	47/37/1,6/1500		
(aluminium frame profiles, powder coated)		RAL 7015		
Colour (plastic parts)		black		
Heat transfer medium		Tyfocor LS		
Test report EN 12975-2, report no.		06COL513/10EM08		

3.5 Hydraulic interconnection of collectors

The hydraulic interconnection of collectors depends on the available pump head height, and is described in the following for standard systems. In principle, it is advisable to firstly connect as much collector surface as possible in series.

The collectors' maximum aperture surface which can be connected in series is
13 m^2 in low-flow operation (volume flow 0.35 l / (min·m^2)) and
8 m^2 in high-flow operation (volume flow 0.4 l / (min·m^2)).

Maximum permissible number of collectors in series

	Low flow	High flow
CPC 6 INOX	15	9
CPC 12 INOX	7	4
CPC 18 INOX	5	3

It is recommended that the collectors are arranged adjacently. However, stacked arrangements as shown on the following diagrams are also permitted. All these arrangements can also be mirrored in the vertical plane. Clearances between adjacent collectors are to be 5 mm, and at least 150 mm between stacked collectors.

3.6 Connection options for SPA system

Legend

Corrugated hose return (cold)

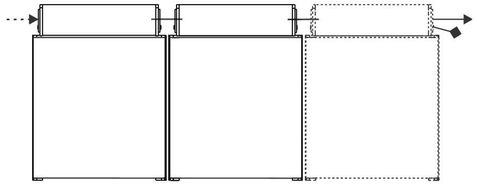
Corrugated hose flow (hot) with collector sensor

3.6.1 Connection options for 1 collector

Caution: Sensor position on the flow side (hot).

3.6.2 Connection options for 2 or more adjacent collectors

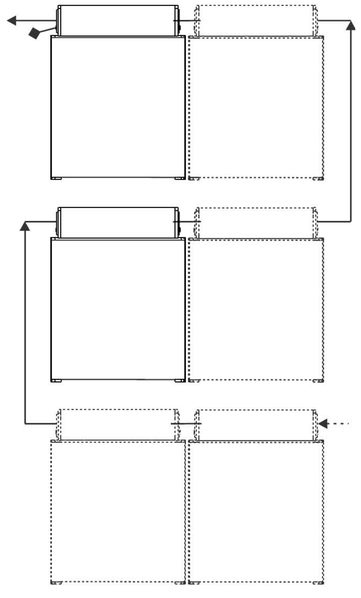
Caution: Sensor position on the flow side (hot).



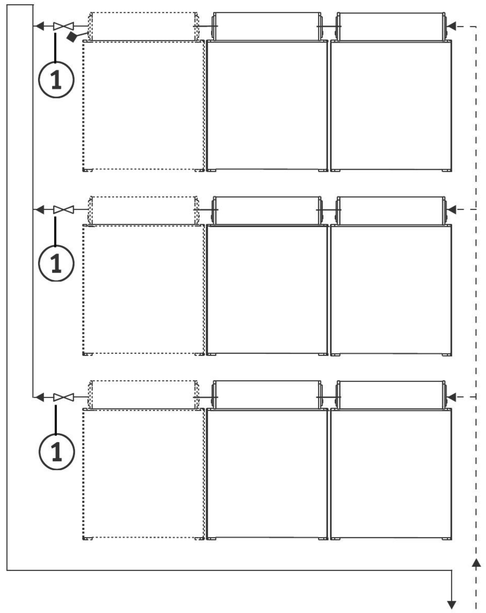
Reverse connection of the flow direction is possible.

3.6.3 Connection options for 2 or more stacked collectors

Caution: Sensor position on the flow side (hot).

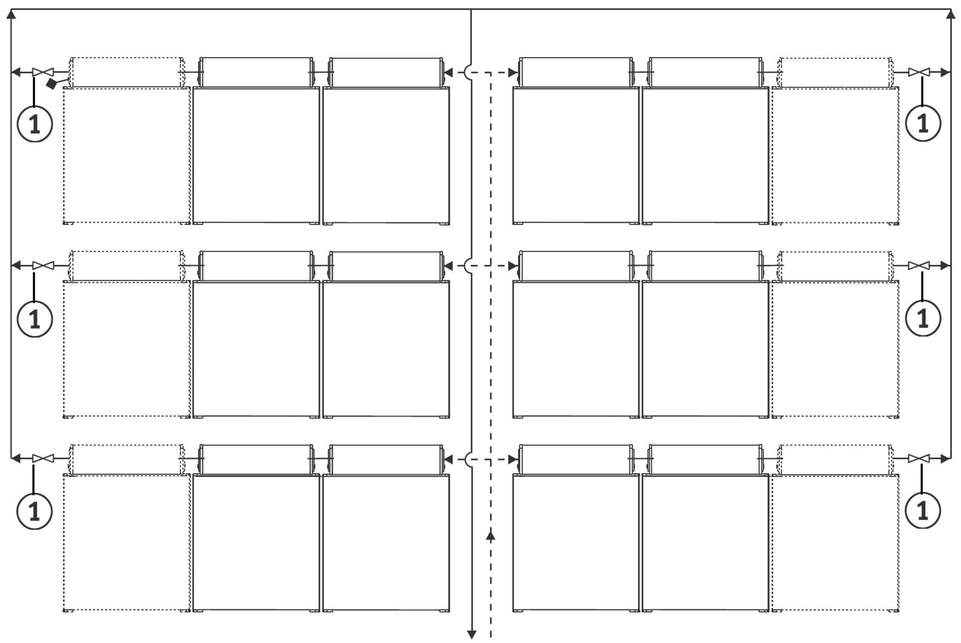


3.6.4 Connection options for 1 or 2 adjacent collectors and 2 or 3 stacked collectors
Caution: Sensor position on the flow side (hot).



Note!
For better bleeding and for equalisation of the collector arrays install a shut-off ball valve in the flow of each exit. (Pos.1)

3.6.5 Connection options for 1 or 2 series connections beside each other
and several series connections above each other
Caution: Sensor position on the flow side (hot).



4. Installing the collectors

Danger!
Please carefully observe the following notes on installation and safety, in order to avoid risk of injury or death and damage to property and equipment.

4.1 General notes on installation

- The accident prevention regulations of accident prevention and insurance associations are to be observed.
- Danger of falling persons, falling objects, breakthrough of surfaces due to insufficient load-bearing capacity, etc., are to be prevented by means of appropriate measures such as the use of scaffolding, protective walls, safety harnesses, leaning ladders, intercepting scaffolds, roof scaffolds, roof ladders, etc.
- The maximum permissible load for the substructure and the required distance from the roof edge are to be observed in accordance with DIN 1055.
- When installing the CPC INOX evacuated tube collector, gloves and safety glasses are to be worn.
- When overhead power lines are nearby, appropriate safety measures (voltage disconnection, covering, safety distances) are to be observed upon consultation with the line operator.
- The collector is to be fastened carefully, so that the stresses which arise in the event of gales, storms, and snow, can be safely accommodated by the fasteners.
- For installations in gardens, safety precautions are to be taken, in order to prevent playing children from becoming injured, or from causing damage.
- The alignment of the collector is to be as southerly as possible. A deviation of ±30° is possible. Shading during the main usage period is to be avoided.
- The manifold of the collector is always to be installed uppermost.
- The predefined minimum slope of the collector is 15° (self-cleaning).
- The sun protection sheet must be left on the collector until the collector has been flushed and filled, however it must not be exposed to the weather for longer than 4 weeks. For longer periods, a suitable sun protection tarpaulin must be applied.
- Plastic piping and press-fitting connections are not permissible in the collector circuit.
- All hydraulic connections are to be realised using olive connections (recommended) or brazed joints.
- When brazing, comprehensive fire protection and sufficient ventilation are to be ensured.
- In accordance with the German Energy Savings Act (EnEV § 12 or Appendix 5), the insulation thickness of the connecting pipework must be at least 20 mm for inner diameters of up to 22 mm and l = 0.035 W/(m·K).
- The insulation of the connecting pipework must be resistant to temperatures of up to 150°C, and UV-resistant.

4.2 CPC INOX evacuated tube collector delivery contents

The complete CPC INOX evacuated tube collector delivery contents comprise:
- 6, 12 or 18 evacuated tubes based on the thermos flask principle with heat exchangers
- Manifold with direct-flow heat conduction units and dry connection of the evacuated tubes, including straight olive connection for flow and return
- CPC reflector
- Installation instructions

4.3 Transporting the collector onto the roof

The collector is transported onto the roof inside the packaging. This prevents damage to the reverse side of the collector. Attention is to be paid to the strength of the wind.
On the reverse side of the collector, strap loops are found above and below, left and right. Hooks or straps can be inserted here. In so doing, it must be ensured that fastenings (knots) are secure.
Transport onto the roof is made easier with a construction crane or mobile crane. If such a device is not available, an inclined hoist can be used. In either case, the collector must, in addition, be guided by ropes, which prevent swinging or lateral tilting. In the absence of motor-powered aids, the collector is hoisted onto the roof with the help of leaning ladders or planks, which serve as slide ramps.

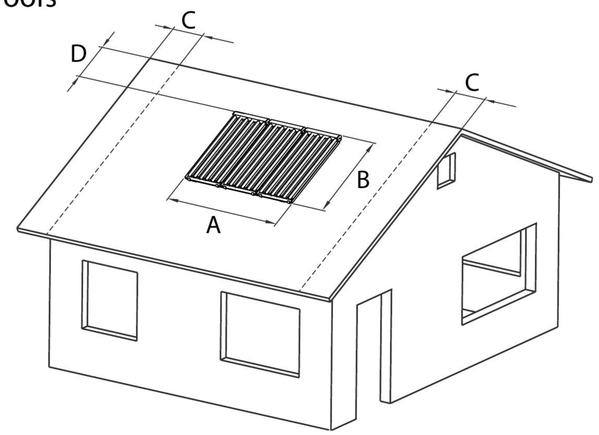
4.4 Installing the collector

Carefully lift the collector (with packaging) over the installed lower mounting hooks. Open the packaging and allow the collector to slide downwards into the lower hooks. If necessary, lift the collector upwards slightly, so that the hooks encompass the lower frame. Insert the upper mounting hook into the groove in the manifold, and screw tight onto the bearing rail using a raised cheese-head screw.

Caution!
The sun protection sheet must be left on the collector until the collector has been flushed and filled, however it must not be exposed to the weather for longer than 4 weeks. For longer periods, a suitable sun protection tarpaulin must be applied.

5. Installation on pitched roofs

5.1 Space requirements



Dim. A Number of adjacent collector s	6 (m)	12 (m)	18 (m)
1	0,70	1,40	2,10
2	1,40	2,80	4,20
3	2,15	4,20	6,30
4	2,85	5,60	8,35
5	3,55	7,00	10,45
6	4,25	8,40	12,55

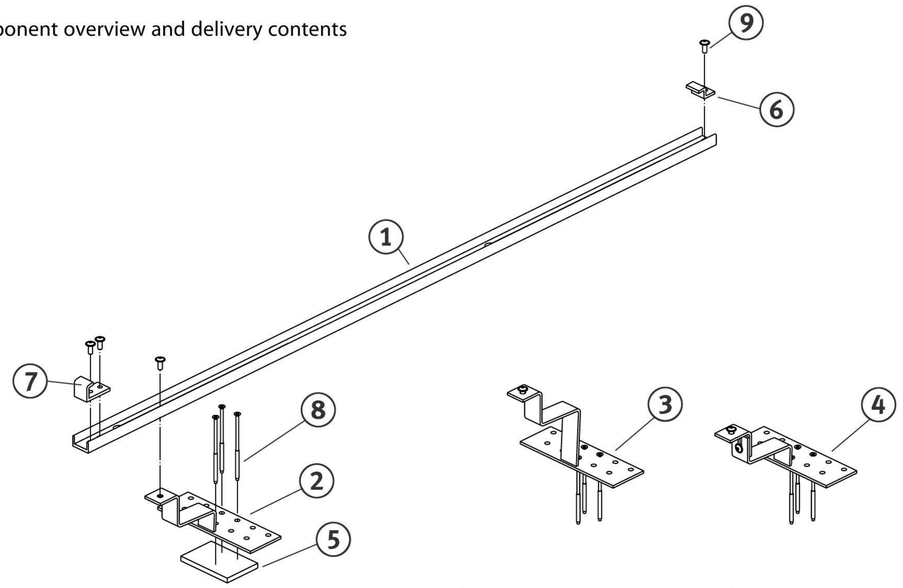
Dim. B Number of stacked collectors	(m)
1	1,64
2	3,43
3	5,22

Dimension C
corresponds to the roof overhang including the thickness of the end wall.
The adjoining 0.30 m distance from the collector is required for hydraulic connection below the roof.

Dimension D
represents a minimum of 3 pan tile rows to the ridge. If this is not observed, there arises a risk of damage to the roof cladding at the ridge, especially on wet-laid pan tiles.

5.2 Pan tiles, plain tile roof cladding, and barrel tiles

5.2.1 Component overview and delivery contents



	List of parts for CPC	12	18	2x6	3x6				
Pos. 1	Bearing rail, pre-assembled, aluminium, L = 1647 mm	2	3	2	2				
Pos. 1	Bearing rail, pre-assembled, aluminium, L = 2064 mm								
Pos. 1	Bearing rail, aluminium, L = 1355 mm		2						
Pos. 1	Bearing rail, pre-assembled, aluminium, L = 2062 mm			2					
Pos. 1	Middle bearing rail, aluminium, L = 1507 mm			1					
Pos. 1	Middle bearing rail, aluminium, L = 1924 mm								
Pos. 2	Retaining clamp for pan tile with raised cheese-head screw	4	6	4	6				
Pos. 3	Retaining clamp for barrel tile with raised cheese-head screw	4	6	4	6				
Pos. 4	Adjustable retaining clamp with raised cheese-head screw	4	6	4	6				
Pos. 5	Spacing board (height adjustment)	12	18	12	1				
Pos. 6	Upper retaining hook	2	3	4	6				
Pos. 7	Lower retaining hook, pre-assembled	2	3	4	6				
Pos. 8	Wood screw 6x140 mm	12	18	12	18				
Pos. 9	Raised cheese-head screw M8x20	2	3	8	12				
Not shown	Slot nut, 20x30x8			4	6				

5.2.2 Necessary accessories

1-2 ventilation tiles depending on number of roof penetrations.

5.2.3 Tool list

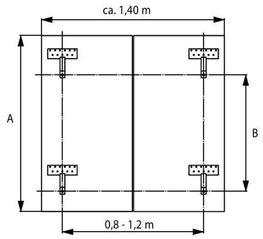
Cordless electric screwdriver or cordless drill, angle grinder with stone disc, 5 mm Allen screwdriver bit, T 30 screwdriver bit, hammer.

5.2.4 Positioning the retaining clamps

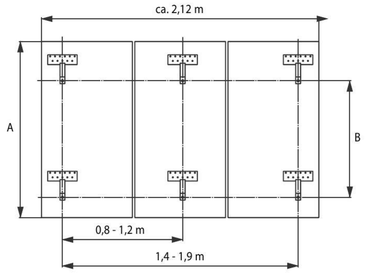
For the installation of either 2 or 3 CPC 6 collectors, either 2 or 3 vertical bearing rails and 2 horizontal bearing rails are provided.
2 bearing rails are used per collector when installing CPC 12/18 collectors.
Install the retaining clamps on the rafters with spacing as shown in the diagram below.

	CPC 6/12/18 INOX		
Dim. A	1.64 m		
Dim. B	Approx 1m		

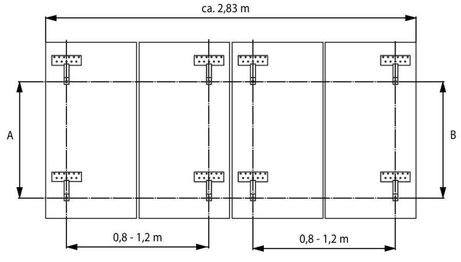
Positioning the retaining clamps for 2 adjacent CPC 6 _____ collectors



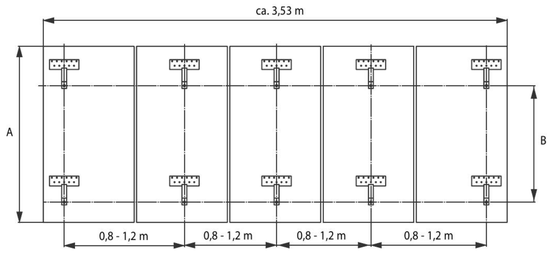
Positioning the retaining clamps for 3 CPC 6_____ or 1 CPC 6__ and 1 CPC 12__ arranged adjacently



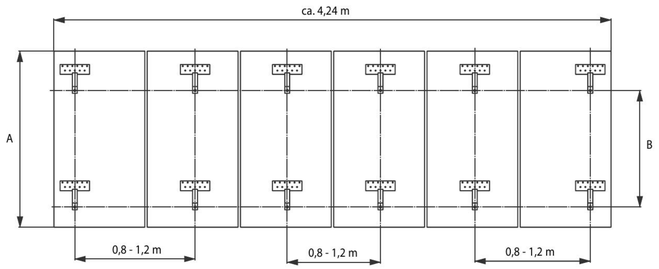
Positioning the retaining clamps for 4 adjacent CPC 6 _____ collectors



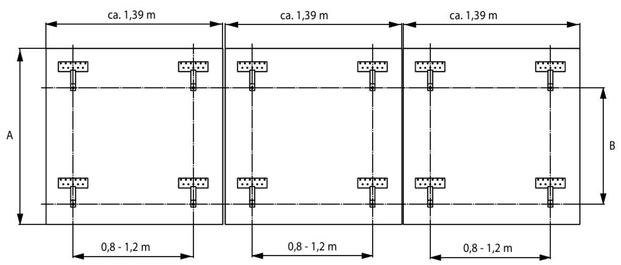
Positioning the retaining clamps for 5 CPC 6_____ or 1 CPC 6 __ and 2 CPC __12 arranged adjacently



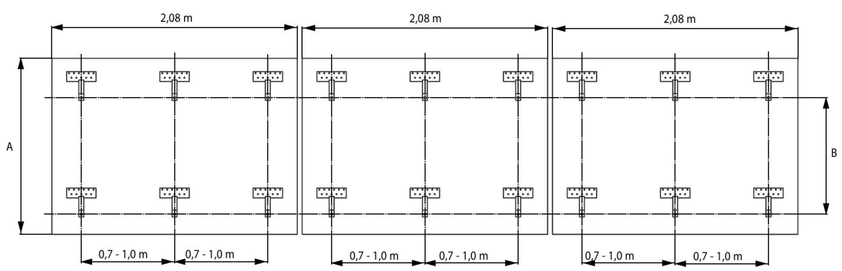
Positioning the retaining clamps for 6 adjacent CPC 6 _____ collectors



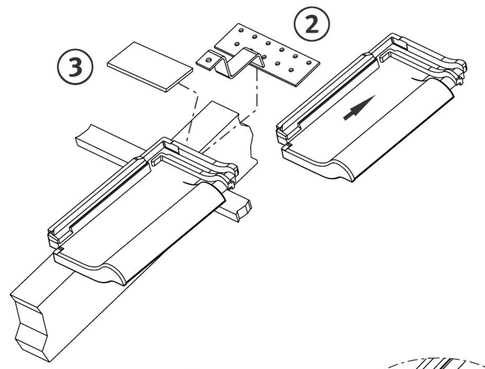
Positioning the retaining clamps for 1 or more adjacent CPC 12 _____ collectors

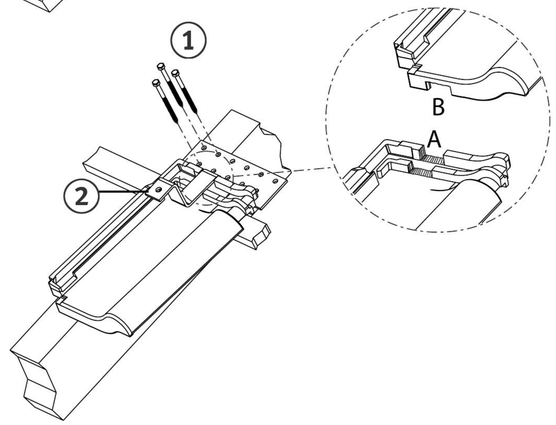


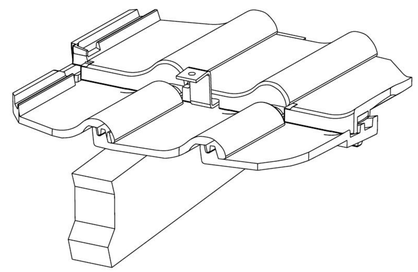
Positioning the retaining clamps for 1 or more adjacent CPC 18 _____ collectors

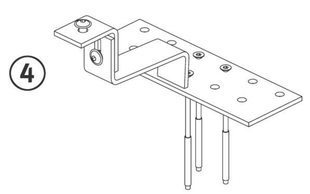


5.2.5 Installing the retaining clamps or the height-adjustable retaining clamps for pan tiles









1. Locate the position of the rafters, and remove 2 - 3 pan tiles from one row for installation of the retaining clamps.

Note!
The retaining clamp must be positioned in the pan tile's trough.

2. If necessary, insert the spacing boards underneath (pos.3) to fix the height of the retaining clamp (pos.2) so that it protrudes on the level of the pan tile beneath, and runs just above the pan tile in the trough, without resting on the pan tile.

Note!
In the area of the retaining clamps, the protruding tile edges (pos.B) and profiles (pos.A) must be removed from the pan tiles.

3. Position the retaining clamp and spacing board and screw tightly onto the rafter using the 6x140 mm wood screws (pos. 1).

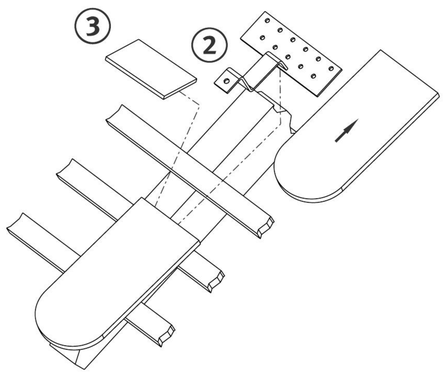
4. Ensure that they are securely in place.

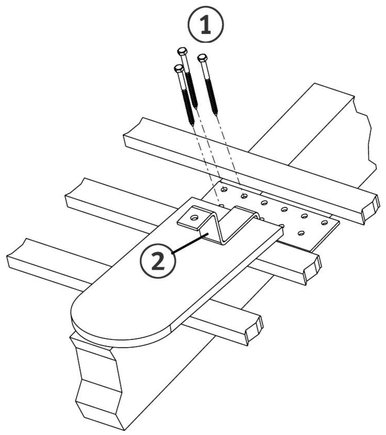
5. Re-install the pan tiles.

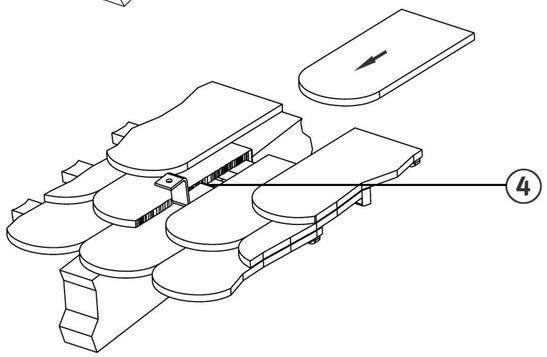
Additional installation step when height-adjustable retaining clamps are used:

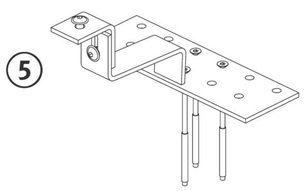
Loosen the raised cheese-head screw on the height-adjustable retaining clamp (pos.4). Adjust the level to that of the other retaining clamps by means of a taut line guide. This is achieved by moving the bracket up or down. Afterwards, fasten the raised cheese-head screw once more.

5.2.6 Installing the retaining clamps or the height-adjustable retaining clamps for plain tiles









1. Locate the position of the rafters, and remove 2 - 3 tiles from one row for installation of the retaining clamps. The retaining clamp (pos.2) must be positioned with one side (left or right) in the middle of the tile which lies beneath.

2. If necessary, insert the spacing boards underneath (pos.3) to fix the height of the retaining clamp (pos.2) so that it protrudes on the level of the tile beneath, and runs just above the tile, without resting on it.

3. In order to provide space for the retaining clamp, it may be necessary to shorten the upper edge of the tile lying beneath the clamp and/or to cut a suitable recess into the batten above.

4. Screw the retaining clamp (pos.2) onto the rafter with 6 x 140 mm wood screws (pos.1), including the spacing board if necessary.

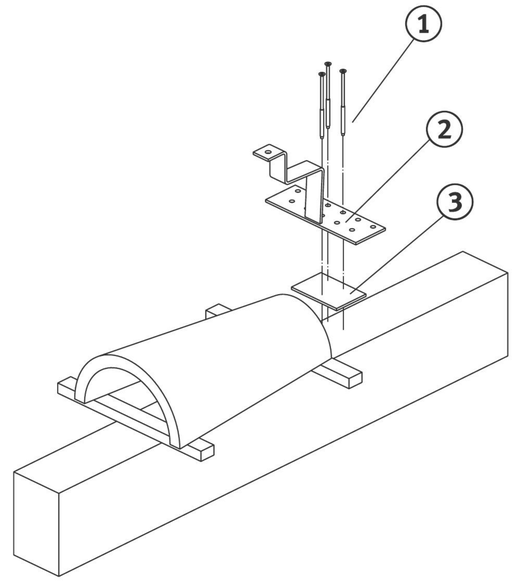
5. Ensure that they are securely in place.

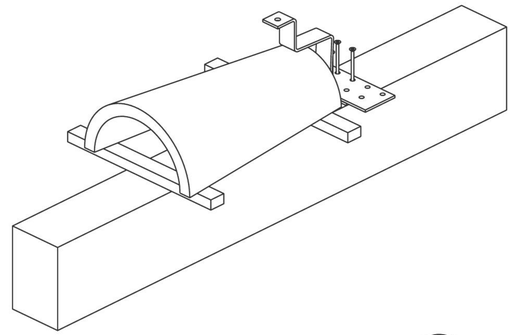
6. Re-install the tiles. To this end, cut the tile beside the retaining clamp with an angle grinder, to remove a section as wide as the retaining clamp (pos.4).

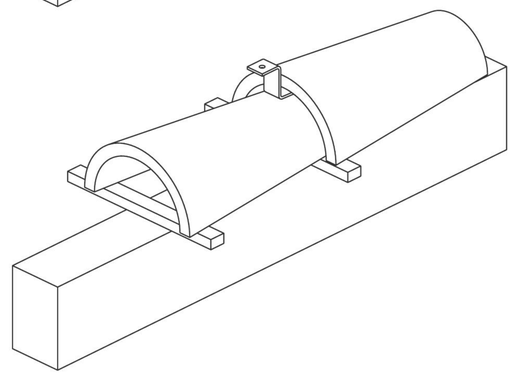
Additional installation step when height-adjustable retaining clamps are used:

Loosen the raised cheese-head screw on the height-adjustable retaining clamp (pos.5). Adjust the level to that of the other retaining clamps by means of a taut line guide. This is achieved by moving the bracket up or down. Afterwards, fasten the raised cheese-head screw once more.

5.2.7 Installing the retaining clamps for barrel tiles







1. Locate the position of the rafters, and remove 2 - 3 pan tiles from one row for installation of the retaining clamps.

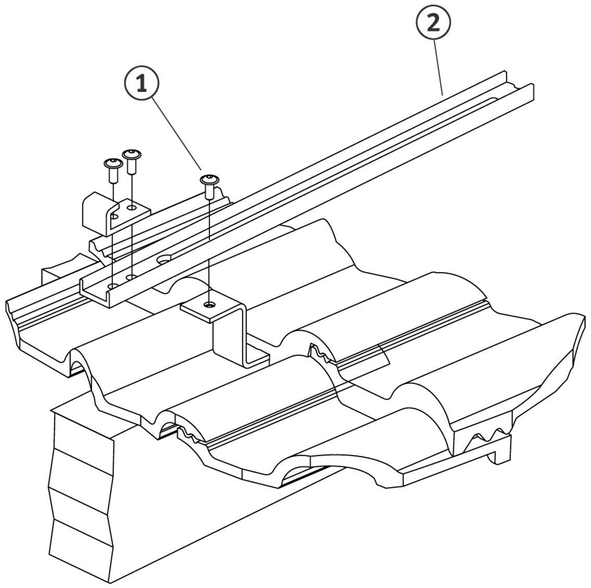
2. If necessary, insert the spacing boards underneath (pos.3) to fix the height of the retaining clamp (pos.2) so that it protrudes on the level of the tile beneath, and runs just above the tile, without resting on it.

3. Position the retaining clamp and spacing board and screw tightly onto the rafter using the 6x140 mm wood screws (pos. 1).

4. Ensure that they are securely in place.

5. Re-install the tiles.

5.2.8 Installing the bearing rails and retaining hooks for the CPC 6 model



1. Feed the raised cheese-head screws (pos.1) for the retaining clamps through the elongated holes in the bearing rails (pos.2) and tighten slightly.

2. In so doing, align the bearing rails so that the overhangs at each end are approximately equal. Assess the alignment of the bearing rails with the use of a line guide.

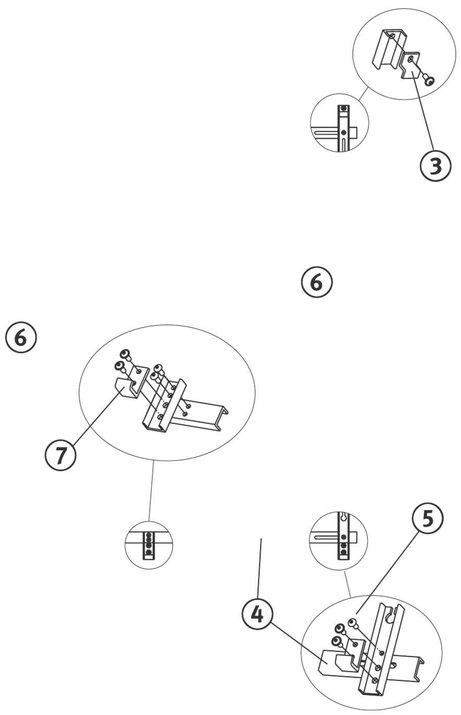
3. Tighten all raised cheese-head screws and check that they are securely fastened.

4. Screw the horizontal bearing rails (pos.4) onto the vertical bearing rails (pos.6) with the raised cheese-head screws (pos.5) and fasten tightly.

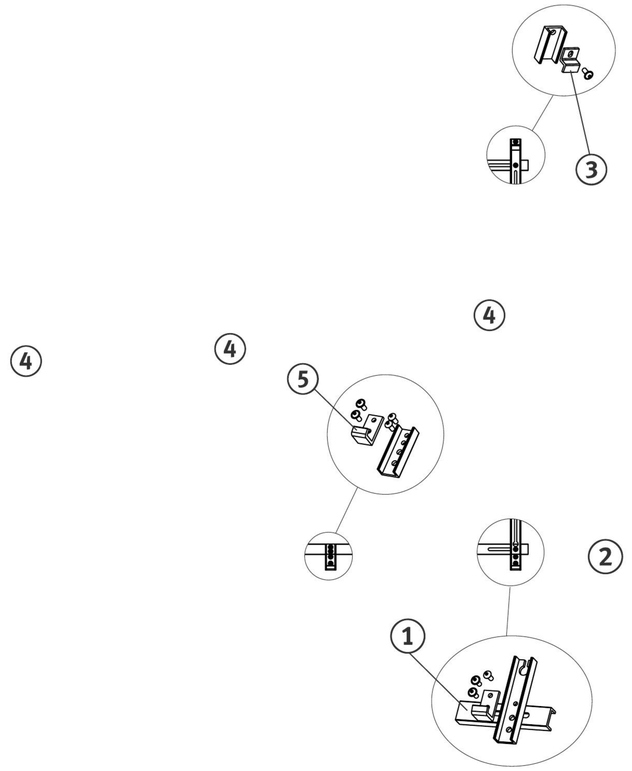
5. The lower retaining hooks (pos.7) are already pre-assembled.

6. Attach the upper retaining hooks (pos.3) to the bearing rails once the collector has been installed, and not beforehand, using one raised cheese-head screw per hook.

7. Ensure that they are securely in place.



Installation kit for 2 CPC 6 collectors



1. Screw the horizontal bearing rails (pos.1) onto the vertical bearing rails (pos.4) with the raised cheese-head screws (pos.2) and fasten tightly.

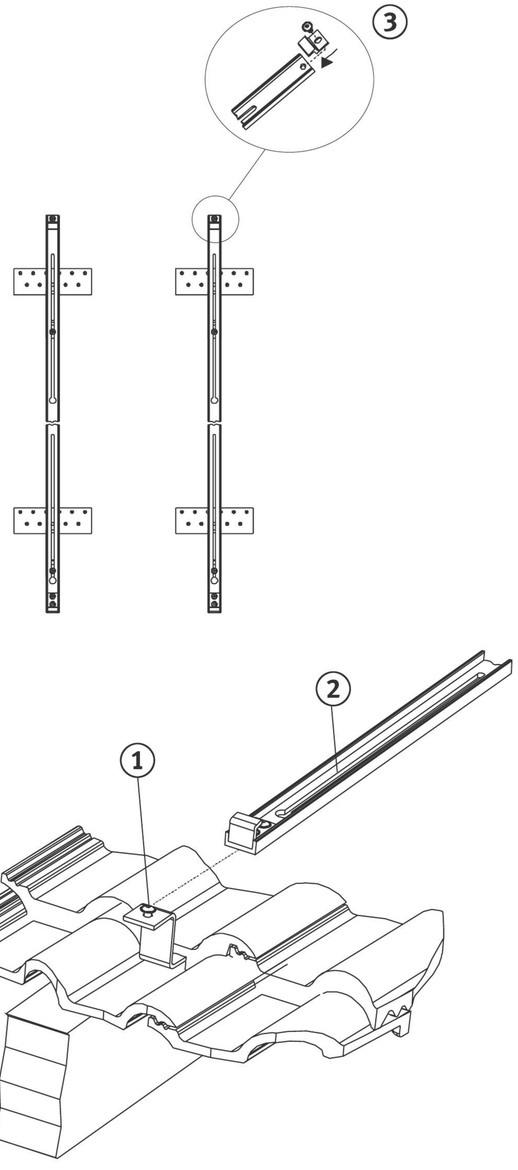
2. The lower retaining hooks (pos.5) are already pre-assembled.

3. Attach the upper retaining hooks (pos.3) to the bearing rails once the collector has been installed, and not beforehand, using one raised cheese-head screw per hook.

4. Ensure that they are securely in place.

Installation kit for 3 CPC 6 collectors

5.2.9 Installing the bearing rails and retaining hooks for the CPC 18 model



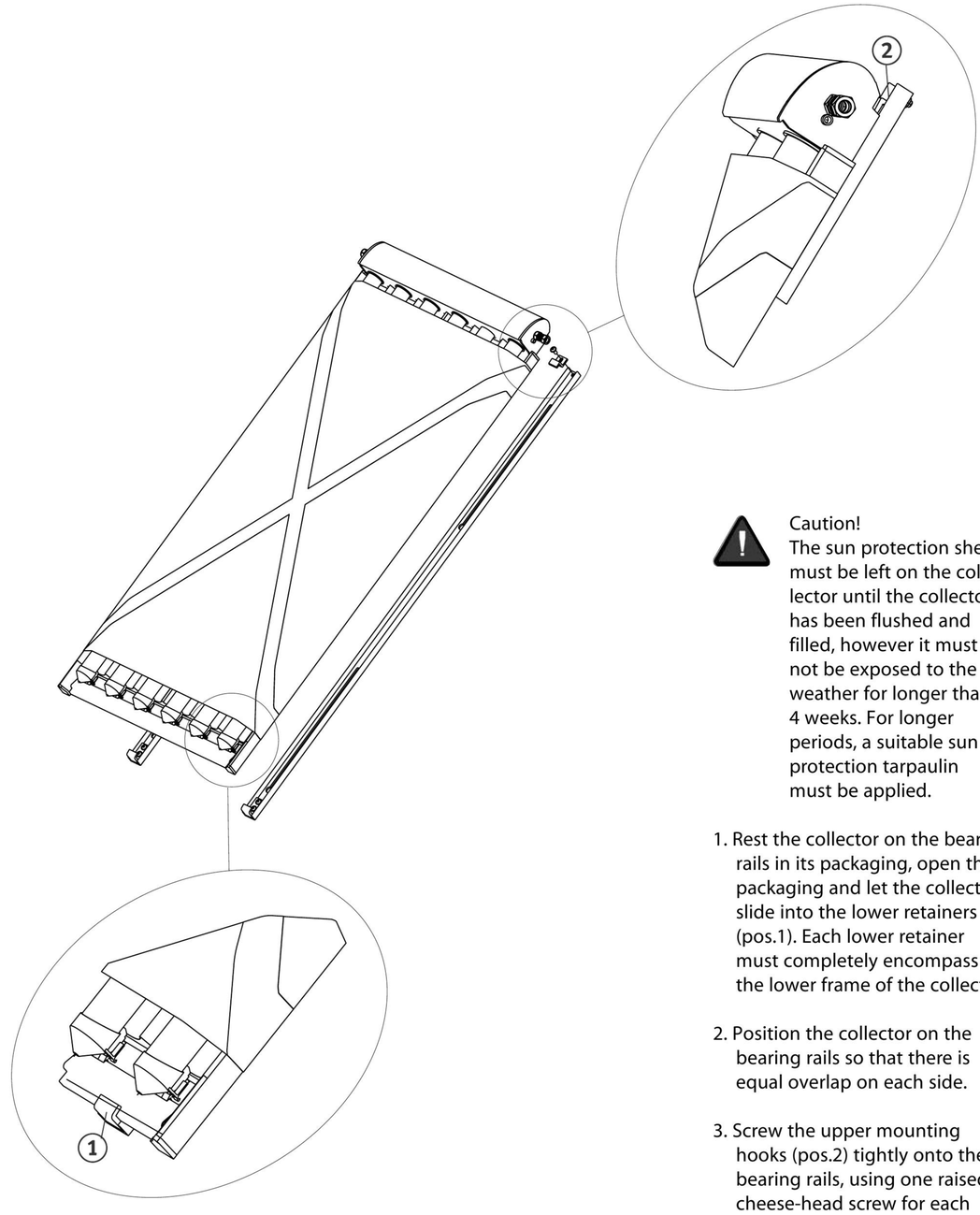
1. Feed the raised cheese-head screws (pos.1) for the retaining clamps through the elongated holes in the bearing rails (pos.2) and tighten slightly.

2. In so doing, align the bearing rails so that the overhangs at each end are approximately equal. Assess the alignment of the bearing rails with the use of a line guide.

3. Tighten all raised cheese-head screws and check that they are securely fastened.

4. Do not attach the upper retaining hooks (pos.3) until after the collectors have been installed.

5.2.10 Installing the collector



Caution!
The sun protection sheet must be left on the collector until the collector has been flushed and filled, however it must not be exposed to the weather for longer than 4 weeks. For longer periods, a suitable sun protection tarpaulin must be applied.

1. Rest the collector on the bearing rails in its packaging, open the packaging and let the collector slide into the lower retainers (pos.1). Each lower retainer must completely encompass the lower frame of the collector.

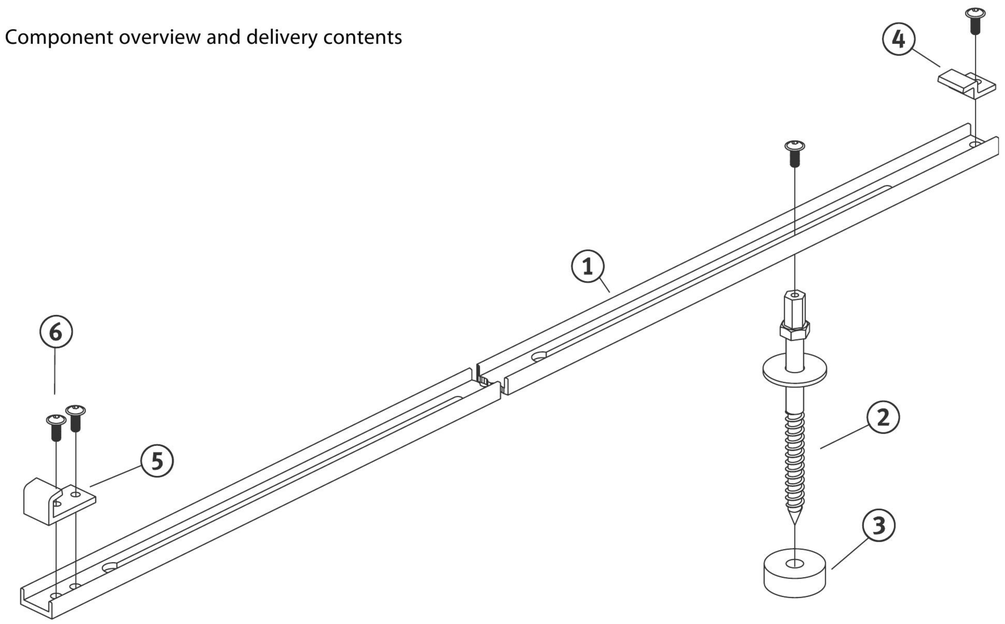
2. Position the collector on the bearing rails so that there is equal overlap on each side.

3. Screw the upper mounting hooks (pos.2) tightly onto the bearing rails, using one raised cheese-head screw for each hook.

4. Check that all screw fittings are securely fastened.

5.3 Corrugated roof cladding

5.3.1 Component overview and delivery contents



		INOX							
	List of parts for CPC	12	18	2x6	3x6				
Pos. 1	Bearing rail, pre-assembled, aluminium, L = 1647 mm	2	3	2	2				
Pos. 1	Bearing rail, pre-assembled, aluminium, L = 2064 mm								
Pos. 1	Bearing rail, aluminium, L = 1355 mm			2					
Pos. 1	Bearing rail, pre-assembled, aluminium, L = 2062 mm				2				
Pos. 1	Middle bearing rail, aluminium, L = 1507 mm				1				
Pos. 1	Middle bearing rail, aluminium, L = 1924 mm								
Pos. 2	Hanger bolt with raised cheese-head screw	4	6	4	6				
os. 3	Seal washe	4	6	4	6				
Pos. 4	Upper retaining hook	2	3	4	6				
Pos. 5	Lower retaining hook, pre-assembled	2	3	4	6				
Pos. 6	Raised cheese-head screw M8x20	2	3	8	12				
shown	Slot nut, 20x30x8			4	6				

5.3.2 Necessary accessories

1-2 ventilation plates depending on number of roof penetrations.

5.3.3 Tool list

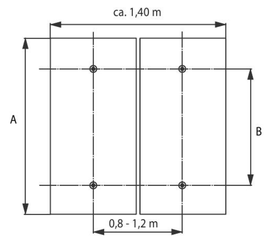
Dust mask, cordless electrical screwdriver or cordless drill, 16 mm bit for fibre cement, 17 mm spanner set, SWS Allen screwdriver bit.

5.3.4 Positioning the hanger bolts

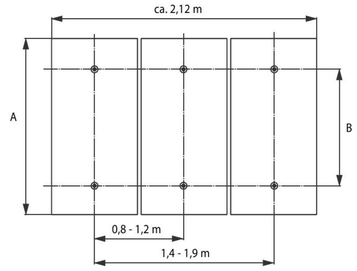
For the installation of either 2 or 3 CPC 6 collectors, either 2 or 3 vertical bearing rails and 2 horizontal bearing rails are provided.
2 bearing rails are used per collector when installing CPC 12/18 collectors.
Install the hanger bolts on the rafters with spacing as shown in the diagram below.

	CPC 6/12/18		
Dim. A	1.64 m		
Dim. B	Approx 1m		

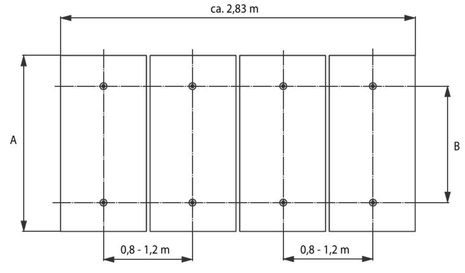
Positioning the hanger bolts for 2 adjacent CPC 6 _____ collectors



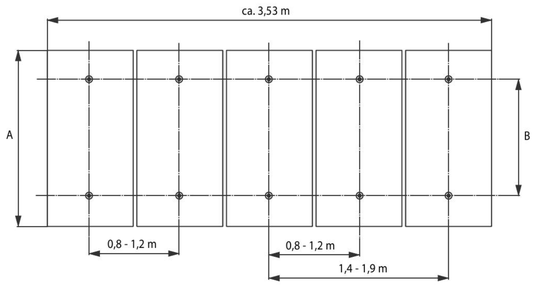
Positioning the hanger bolts for 3 CPC 6_____ or
1 CPC 6 __ and 1 CPC 12 __ arranged adjacently



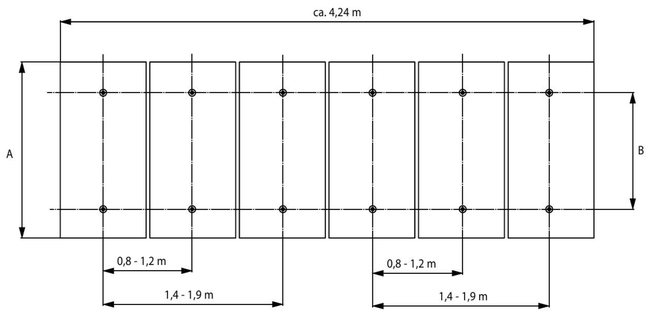
Positioning the hanger bolts for 4 adjacent CPC 6 _____ collectors



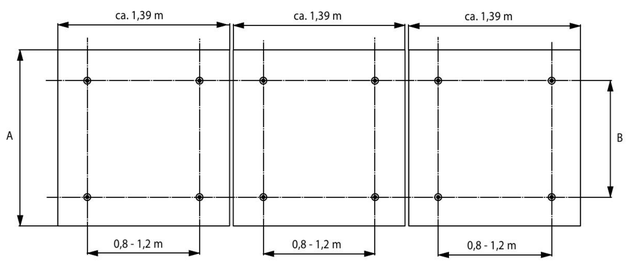
Positioning the hanger bolts for 5 CPC 6_____ or
1 CPC 6 __ and 2 CPC 12 __ arranged adjacently



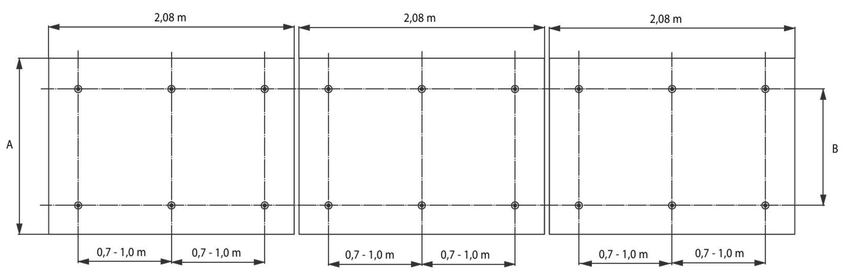
Positioning the hanger bolts for 6 adjacent CPC 6 _____ collectors



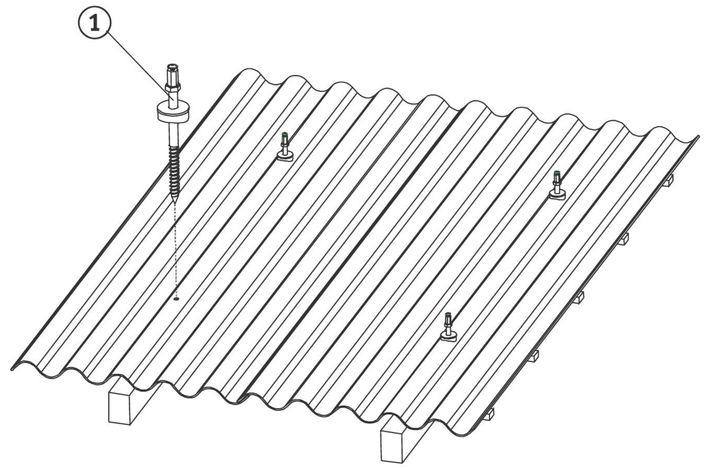
Positioning the retaining clamps for 1 or more adjacent CPC 12 _____ collectors

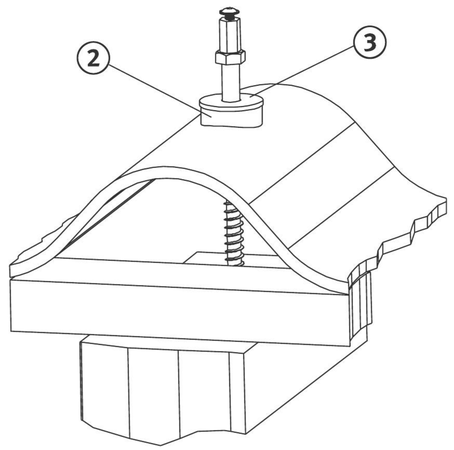


Positioning the retaining clamps for 1 or more adjacent CPC 18 _____ collectors



5.3.5 Installing the hanger bolts





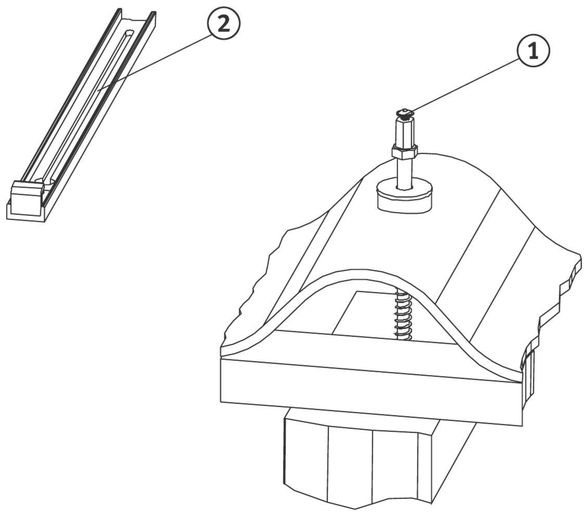
1. Locate the position of the rafters. If the rafter width is less than 60 mm, an auxiliary rafter must be added.

Danger!
When drilling into asbestos cement or fibre cement, it is imperative to wear a dust mask!

2. Drill through the corrugated sheet with a 16 mm drill bit, and through the rafter with a 13 mm drill bit.

3. Screw the hanger bolt (pos. 1) at least 80 mm deep into the rafter, but far enough so that the black EPDM rubber seal ring (pos.2) lies flat and compressed between the ridge of the corrugated sheet, and the welded washer on the hanger bolt (pos.3). The drilled holes in the corrugated sheet must be completely sealed.

5.3.6 Installing the bearing rails and retaining hooks for the CPC 6 model



1. Feed the raised cheese-head screws (pos.1) for the hanger bolts through the elongated holes in the bearing rails (pos.2) and tighten slightly.

2. In so doing, align the bearing rails so that the overhangs at each end are approximately equal. Assess the alignment of the bearing rails with the use of a line guide.

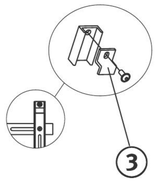
3. Tighten all raised cheese-head screws and check that they are securely fastened.

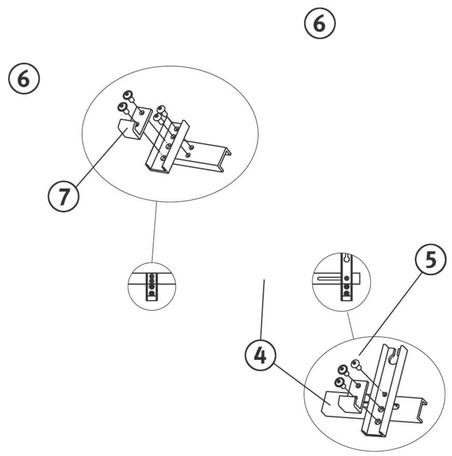
4. Screw the horizontal bearing rails (pos.4) onto the vertical bearing rails (pos.6) with the raised cheese-head screws (pos.5) and fasten tightly.

5. The lower retaining hooks (pos.7) are already pre-assembled.

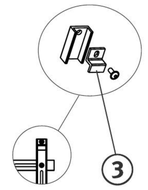
6. Attach the upper retaining hooks (pos.3) to the bearing rails once the collector has been installed, and not beforehand, using one raised cheese-head screw per hook.

7. Ensure that they are securely in place.





Installation kit for 2 CPC 6 collectors

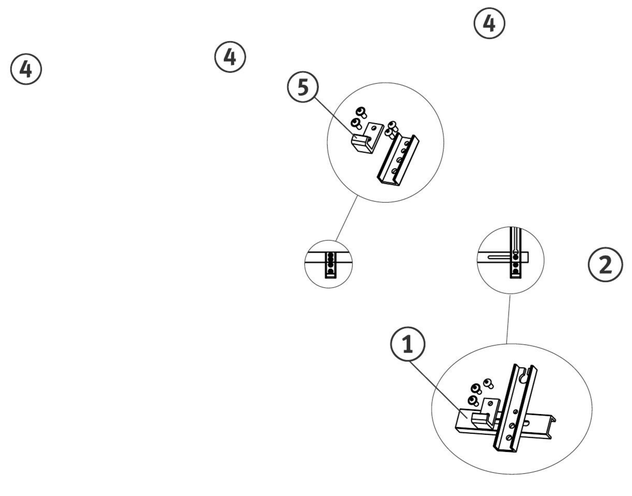


1. Screw the horizontal bearing rails (pos.1) onto the vertical bearing rails (pos.4) with the raised cheese-head screws (pos.2) and fasten tightly.

2. The lower retaining hooks (pos.5) are already pre-assembled.

3. Attach the upper retaining hooks (pos.3) to the bearing rails once the collector has been installed, and not beforehand, using one raised cheese-head screw per hook.

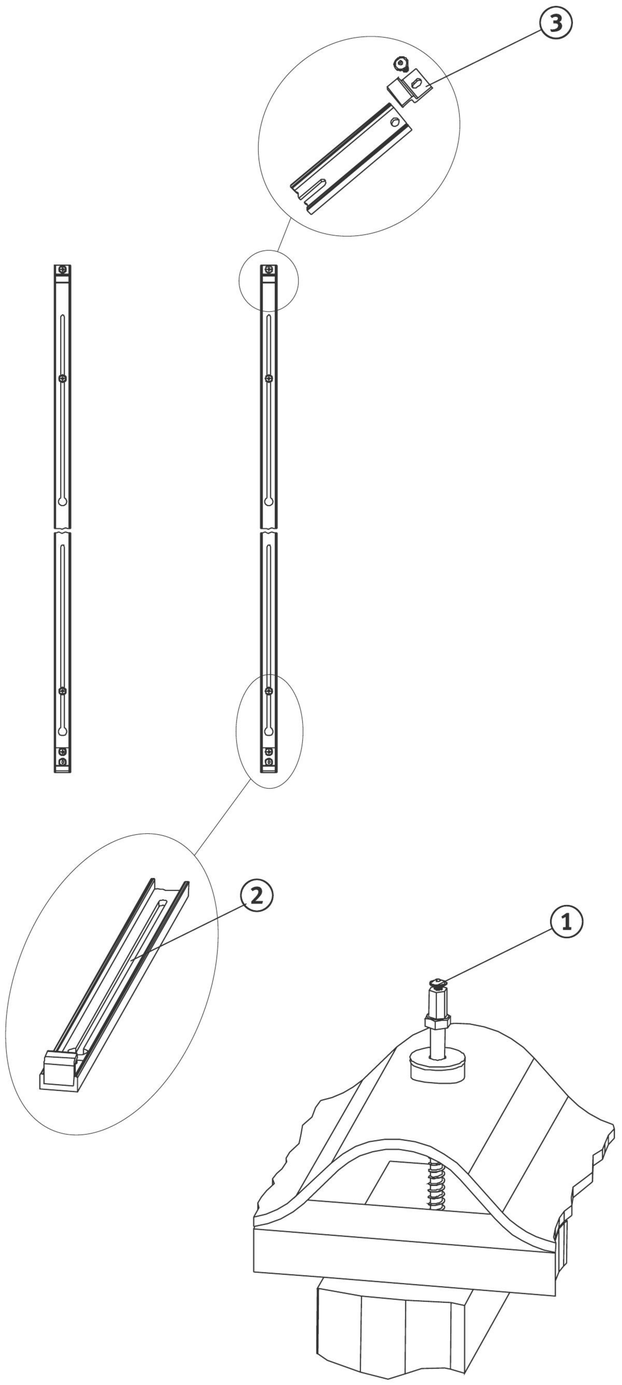
4. Ensure that they are securely in place.



Installation kit for 3 CPC 6 collectors

Installation kit for 3 CPC 6 collectors

5.3.7 Installing the bearing rails and retaining hooks for the CPC 12 _____ and CPC 18 model



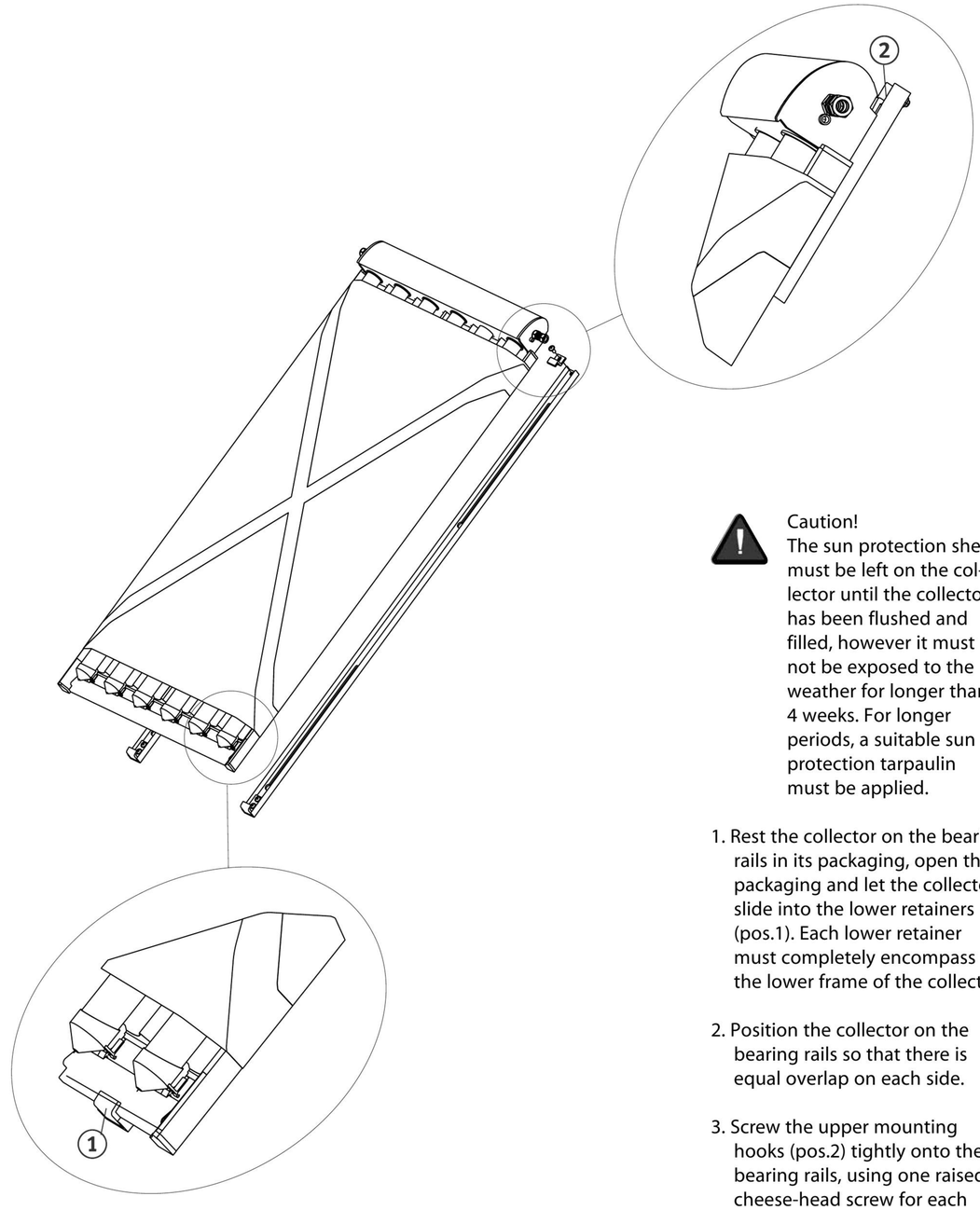
1. Feed the raised cheese-head screws (pos.1) for the hanger bolts through the elongated holes in the bearing rails (pos.2) and tighten slightly.

2. In so doing, align the bearing rails so that the overhangs at each end are approximately equal. Assess the alignment of the bearing rails with the use of a line guide.

3. Tighten all raised cheese-head screws and check that they are securely fastened.

4. Do not attach the upper retaining hooks until after the collectors have been installed.

5.3.8 Installing the collector



Caution!
The sun protection sheet must be left on the collector until the collector has been flushed and filled, however it must not be exposed to the weather for longer than 4 weeks. For longer periods, a suitable sun protection tarpaulin must be applied.

1. Rest the collector on the bearing rails in its packaging, open the packaging and let the collector slide into the lower retainers (pos.1). Each lower retainer must completely encompass the lower frame of the collector.

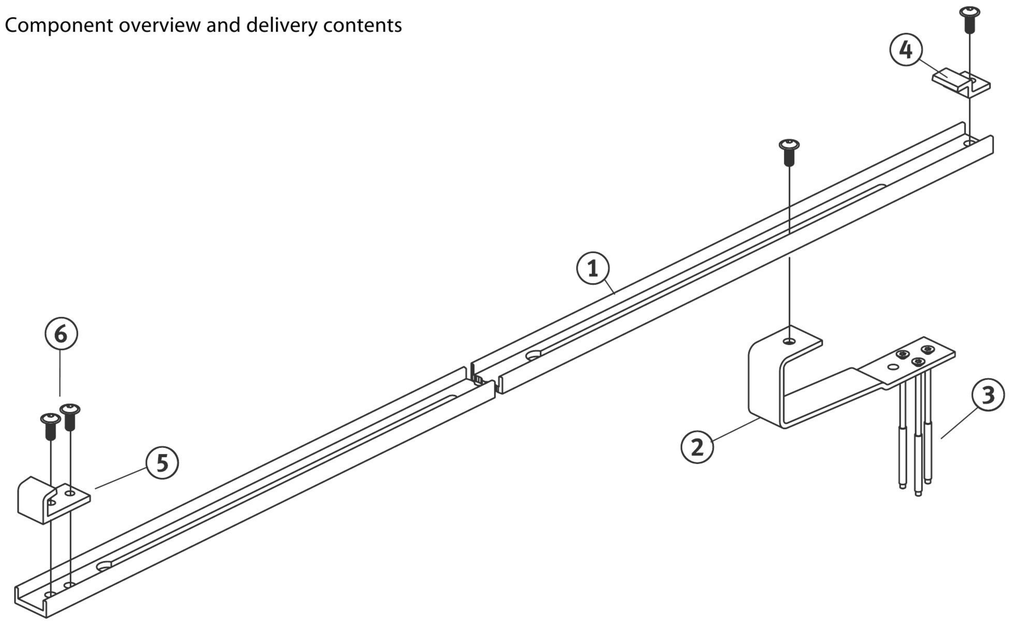
2. Position the collector on the bearing rails so that there is equal overlap on each side.

3. Screw the upper mounting hooks (pos.2) tightly onto the bearing rails, using one raised cheese-head screw for each hook.

4. Check that all screw fittings are securely fastened.

5.4 Slate roof cladding

5.4.1 Component overview and delivery contents



		INOX							
	List of parts for CPC	12	18	2x6	3x6				
Pos. 1	Bearing rail, pre-assembled, aluminium, L = 1647 mm	2	3	2	2				
Pos. 1	Bearing rail, pre-assembled, aluminium, L = 2064 mm								
Pos. 1	Bearing rail, aluminium, L = 1355 mm			2					
Pos. 1	Bearing rail, pre-assembled, aluminium, L = 2062 mm				2				
Pos. 1	Middle bearing rail, aluminium, L = 1507 mm				1				
Pos. 1	Middle bearing rail, aluminium, L = 1924 mm								
Pos. 2	Slate roof retaining clamp	4	6	4	6				
Pos. 3	6x140 wood screw	12	18	12	18				
Pos. 4	Upper retaining hook	2	3	4	6				
Pos. 5	Lower retaining hook, pre-assembled	2	3	4	6				
Pos. 6	Raised cheese-head screw M8x20	2	3	8	12				
Not shown	Slot nut, 20x30x8			4	6				

5.4.2 Necessary accessories

Make roof penetrations on site (e.g. using metal ventilation elements).

5.4.3 Tool list

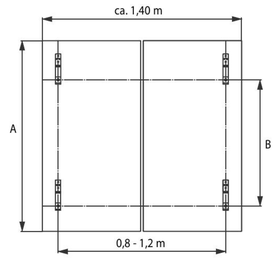
Cordless electric screwdriver or cordless drill, 5 mm Allen screwdriver bit, T 30 screwdriver bit, hammer.

5.4.4 Positioning the retaining clamps

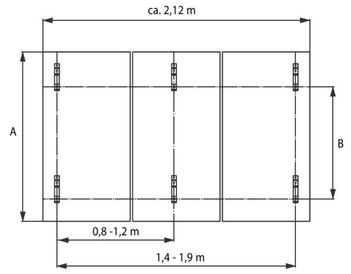
For the installation of either 2 or 3 CPC 6 collectors, either 2 or 3 vertical bearing rails and 2 horizontal bearing rails are provided.
2 bearing rails are used per collector when installing CPC 12/18 INOX collectors.
Install the retaining clamps on the rafters with spacing as shown in the diagram below.

	CPC 6/12/18 INOX		
Dim. A	1.64 m		
Dim. B	Approx 1m		

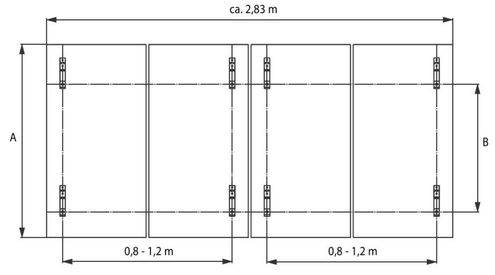
Positioning the retaining clamps for 2 adjacent CPC 6 _____ collectors



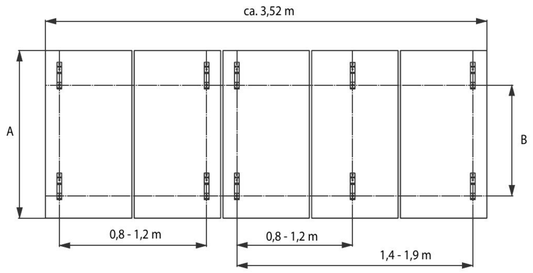
Positioning the retaining clamps for 3 CPC 6_____ or 1 CPC 6__ and 1 CPC 12__ arranged adjacently



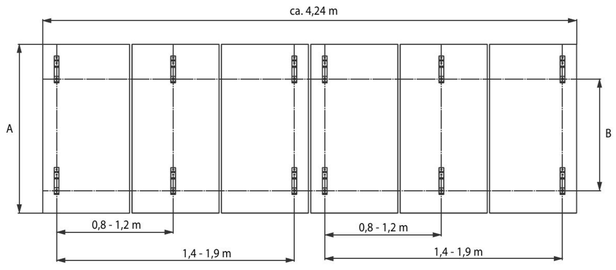
Positioning the retaining clamps for 4 adjacent CPC 6 _____ collectors



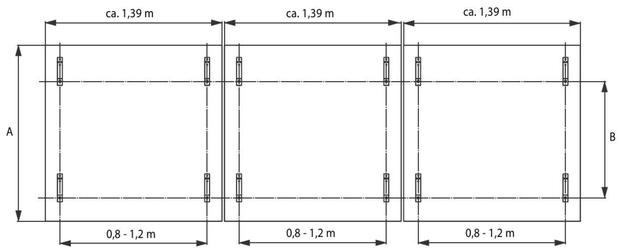
Positioning the retaining clamps for 5 CPC 6_____ or 1 CPC 6 __ and 2 CPC 12 __ arranged adjacently



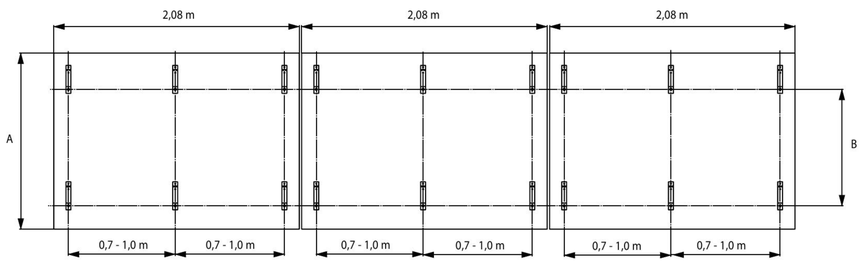
Positioning the retaining clamps for 6 adjacent CPC 6 _____ collectors



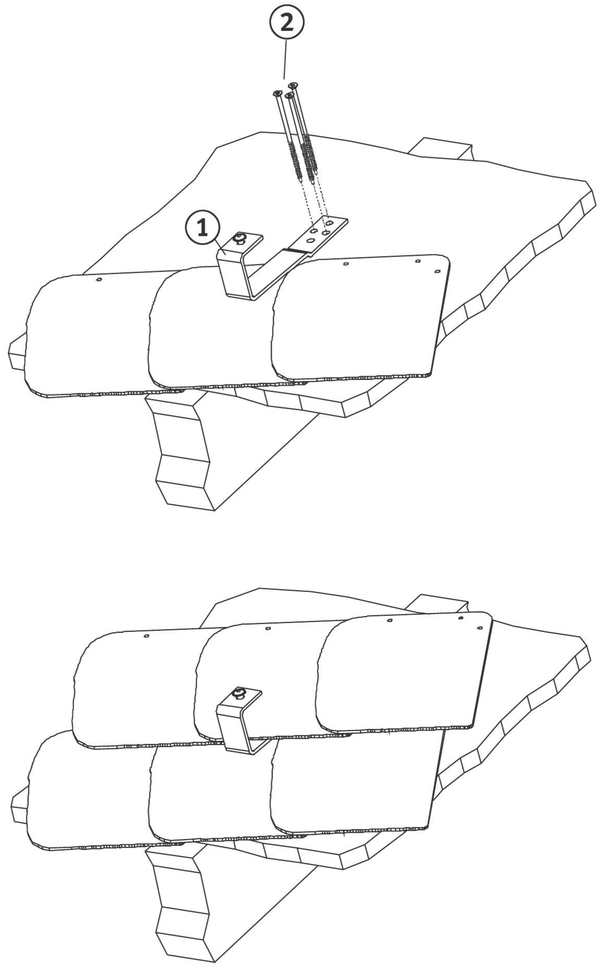
Positioning the retaining clamps for 1 or more adjacent CPC 12 _____ collectors



Positioning the retaining clamps for 1 or more adjacent CPC 18 _____ collectors



5.4.5 Installing the retaining clamps

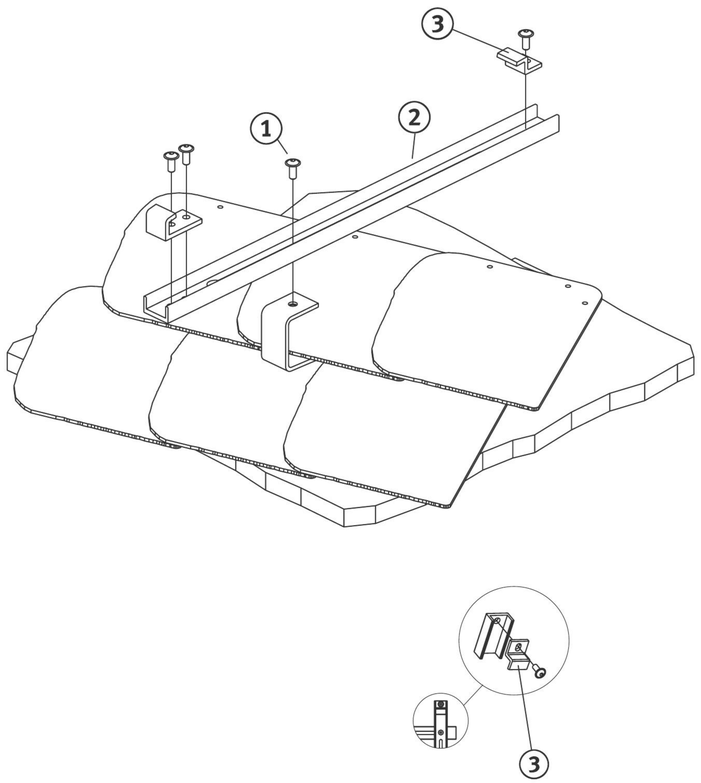


1. Locate the position of the rafters. Remove slates from the area where the retaining clamps are to be installed. Ensure that each respective position is directly over a rafter.

2. By screwing the wood screws (pos.2) through the boarding, screw each retaining clamp (pos.1) onto the rafter which lies beneath. If necessary, use a metal underlay (not provided).

3. Replace the removed slates, ensuring that they overlap sufficiently. To this end, it may be necessary to use a slate repair kit (not provided).

5.4.6 Installing the bearing rails and retaining hooks for the CPC 6 model



1. Feed the raised cheese-head screws (pos.1) for the retaining clamps through the elongated holes in the bearing rails (pos.2) and tighten slightly.

   In so doing, align the bearing rails so that the overhangs at each end are approximately equal.

2. Assess the alignment of the bearing rails with the use of a line guide.

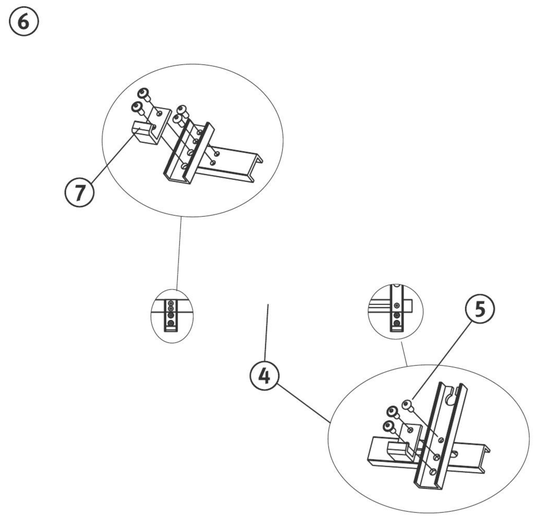
3. Tighten all raised cheese-head screws and check that they are securely fastened.

4. Screw the horizontal bearing rails (pos.4) onto the vertical bearing rails (pos.6) with the raised cheese-head screws (pos.5) and fasten tightly.

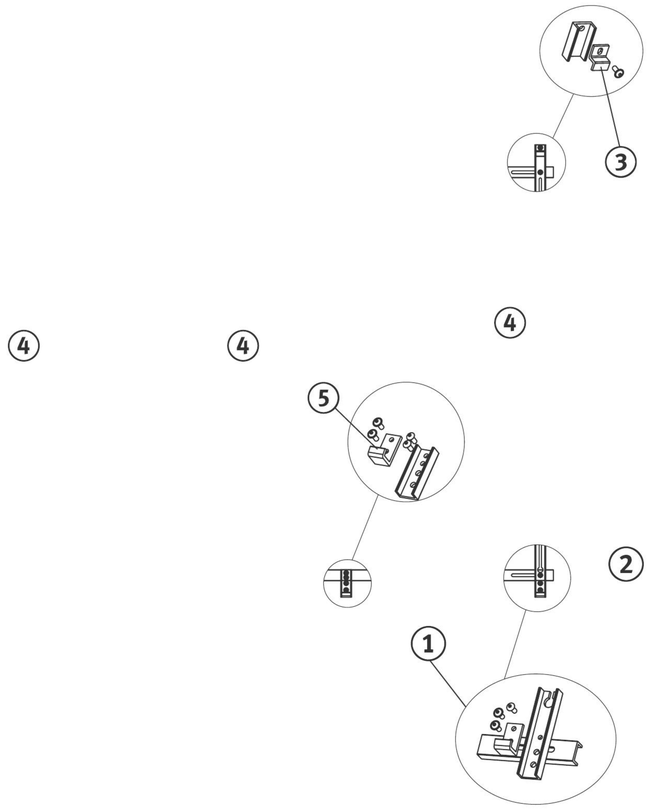
5. The lower retaining hooks (pos.7) are already pre-assembled.

6. Attach the upper retaining hooks (pos.3) to the bearing rails once the collector has been installed, and not beforehand, using one raised cheese-head screw per hook.

7. Ensure that they are securely in place.



Installation kit for 2 CPC 6 collectors



Installation kit for 3 CPC 6 collectors

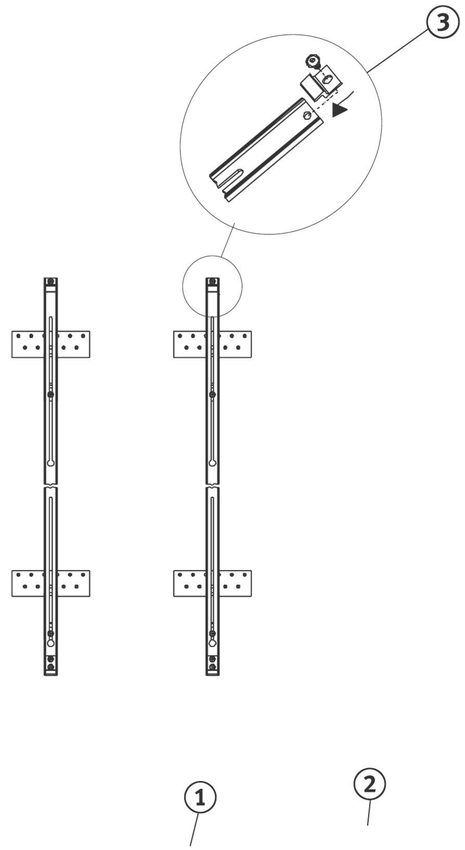
1. Screw the horizontal bearing rails (pos.1) onto the vertical bearing rails (pos.4) with the raised cheese-head screws (pos.2) and fasten tightly.

2. The lower retaining hooks (pos.5) are already pre-assembled.

3. Attach the upper retaining hooks (pos.3) to the bearing rails once the collector has been installed, and not beforehand, using one raised cheese-head screw per hook.

4. Ensure that they are securely in place.

5.4.7 Installing the bearing rails and retaining hooks for the CPC 12 _____ and CPC 18 model



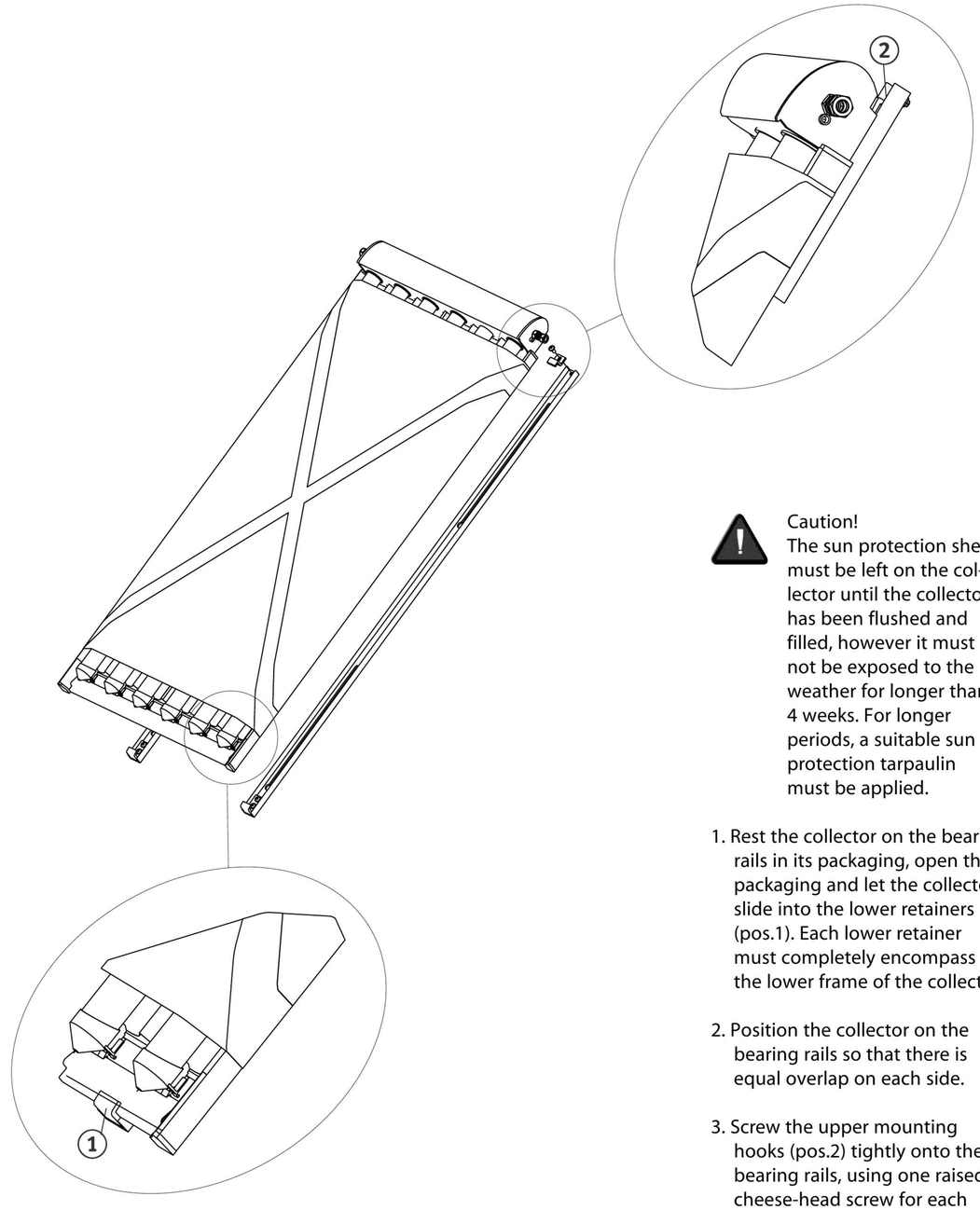
1. Feed the raised cheese-head screws (pos.1) for the retaining clamps through the elongated holes in the bearing rails (pos.2) and tighten slightly.

2. In so doing, align the bearing rails so that the overhangs at each end are approximately equal. Assess the alignment of the bearing rails with the use of a line guide.

3. Tighten all raised cheese-head screws and check that they are securely fastened.

4. Do not attach the upper retaining hooks (pos.3) until after the collectors have been installed.

5.4.8 Installing the collector



Caution!
The sun protection sheet must be left on the collector until the collector has been flushed and filled, however it must not be exposed to the weather for longer than 4 weeks. For longer periods, a suitable sun protection tarpaulin must be applied.

1. Rest the collector on the bearing rails in its packaging, open the packaging and let the collector slide into the lower retainers (pos.1). Each lower retainer must completely encompass the lower frame of the collector.

2. Position the collector on the bearing rails so that there is equal overlap on each side.

3. Screw the upper mounting hooks (pos.2) tightly onto the bearing rails, using one raised cheese-head screw for each hook.

4. Check that all screw fittings are securely fastened.

5.5 Over rafter insulation

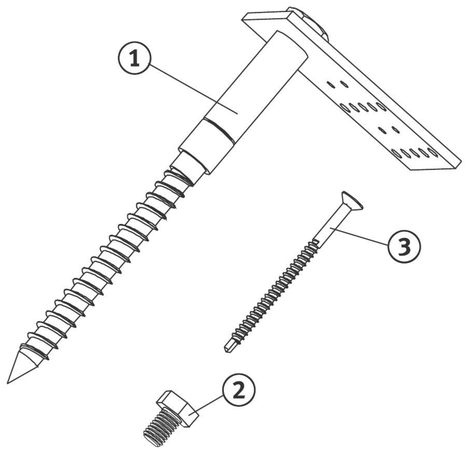
5.5.1 Application

So-called over rafter insulation is becoming ever more widespread in new buildings, as well as in old buildings with refurbished thermal infrastructures. In such cases, an over rafter insulation (100 mm, 200 mm) accessory kit is used to supplement the on-roof installation kit. This is mounted on the counter battens, and tightly fixed to the rafters through the heat insulation. The retaining clamps are then attached on top by means of hex bolts.

5.5.2 Range of applications

Over rafter insulation is suitable for the following retaining clamps:
Pan tile, plain tile, height-adjustable and barrel tile.

5.5.3 Component overview and delivery contents



		Per retaining clamp or hanger bolt
Pos.1	Over rafter insulation fastening assembly	1
Pos.2	M8x12 hex bolt	4
Pos.3	4.5x70 wood screw	4

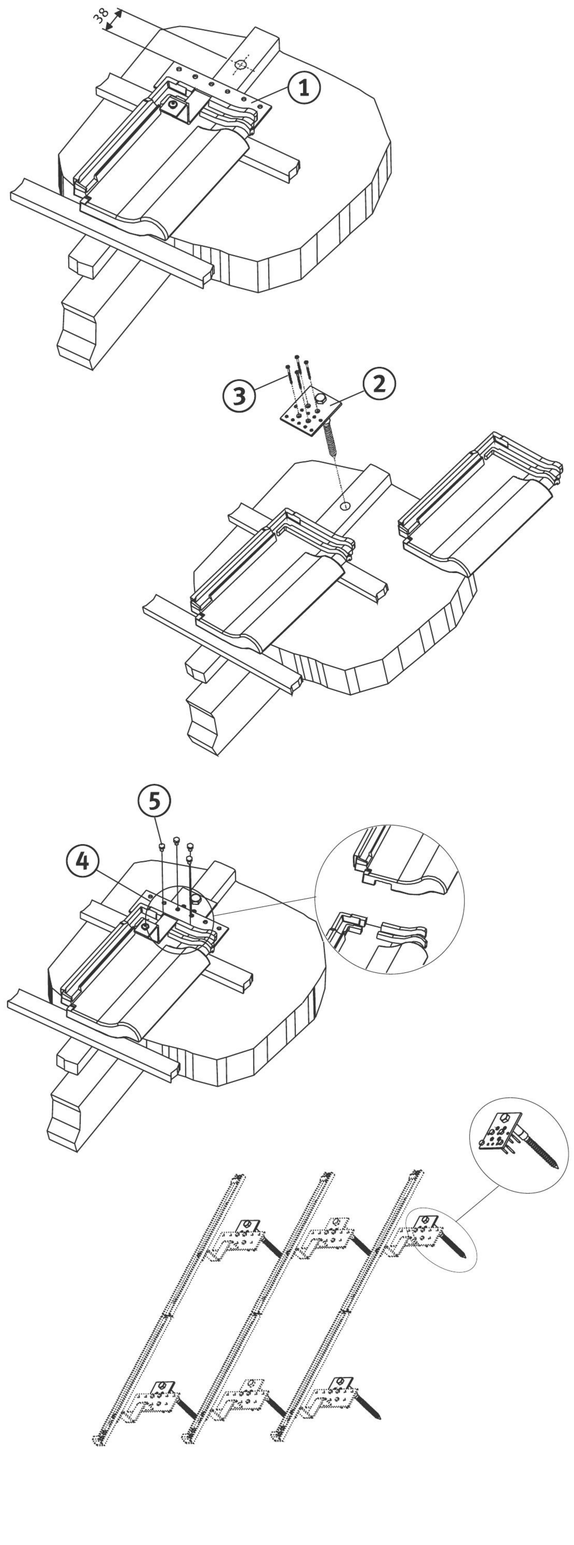
5.5.4 Necessary accessories

1-2 ventilation tiles depending on number of roof penetrations.

5.5.5 Tool list

Cordless electrical screwdriver or cordless drill, 22 and 13 mm wood drill bit (length 250 or 350 mm),
TX 25 screwdriver bit, 13 and 24 mm spanner set.

5.5.6 Installing the over rafter insulation accessory kit



1. Determine the position for the fastening assembly. To this end, place the retaining clamp (pos.1) in the desired position above the tile, and mark the centre of the counter batten 38 mm above the upper edge of the retaining clamp for a Ø 13 mm drilled hole.

2. Drill a 13 mm hole through the counter batten, thermal insulation, and rafter.

3. Enlarge the hole in the counter batten to 22 mm.

4. Screw the fastening assembly (pos.2) tightly onto the rafter using a 24 mm spanner.

5. With wood screws (pos.3), secure the fastening assembly to the counter batten to prevent it from turning.

6. Secure the retaining clamp (pos.4) to the fastening assembly with hex bolts (pos.5).

7. Repeat this procedure for the remaining fastening assemblies.

8. Ensure that they are securely in place.

5.6 Pitch angle correction

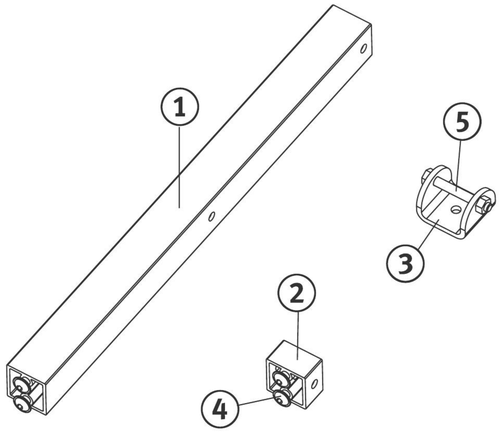
5.6.1 Application

On slightly slanting roofs, it may be advisable to raise the collector inclination angle by 10° to 20°. In such cases, a pitch angle correction accessory kit is used to supplement the on-roof installation kit. It is installed between the attached retaining clamps and the bearing rails.

5.6.2 Range of applications

Pitch angle correction is suitable for the following retaining clamps:
Pan tile, plain tile, height-adjustable, corrugated roof, barrel tile and slate roofs.

5.6.3 Component overview and delivery contents

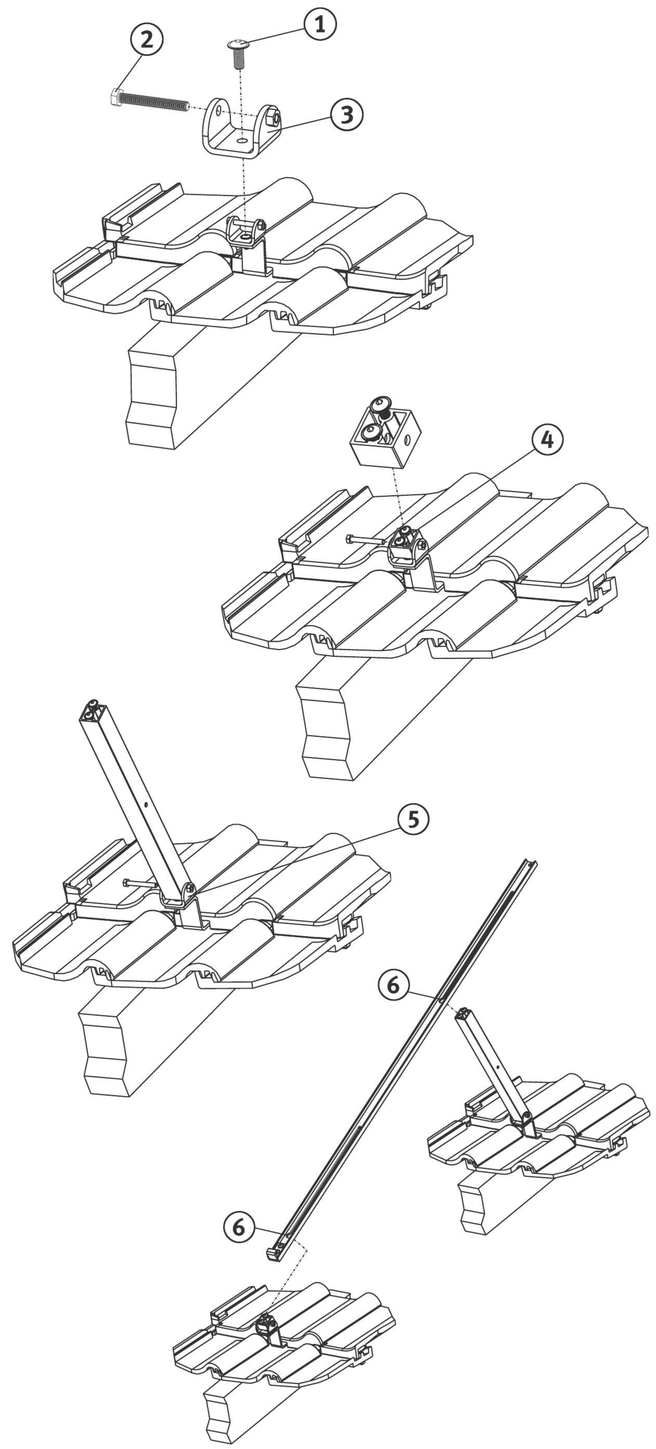


		Per bearing rail
Pos.1	Long spacer pipe	1
Pos.2	Short spacer pipe	1
Pos.3	Hinge support	2
Pos.4	Raised cheese-head screw	4
Pos.5	Hex bolt	2

5.6.4 Tool list

Cordless electric screwdriver, TX 30 screwdriver bit, 13 mm spanner set.

5.6.5 Installing the pitch angle correction



1. Remove the raised cheese-head screws (pos.1) from the installed retaining clamps or hanger bolts and the hex bolt (pos.2) from the hinge support (pos.3).

2. Attach the hinge support via the raised cheese-head screw to the retaining clamp or hanger bolt (pos.4).

3. If necessary, shorten the long spacer pipes to the required length. Drill additional holes if needed.

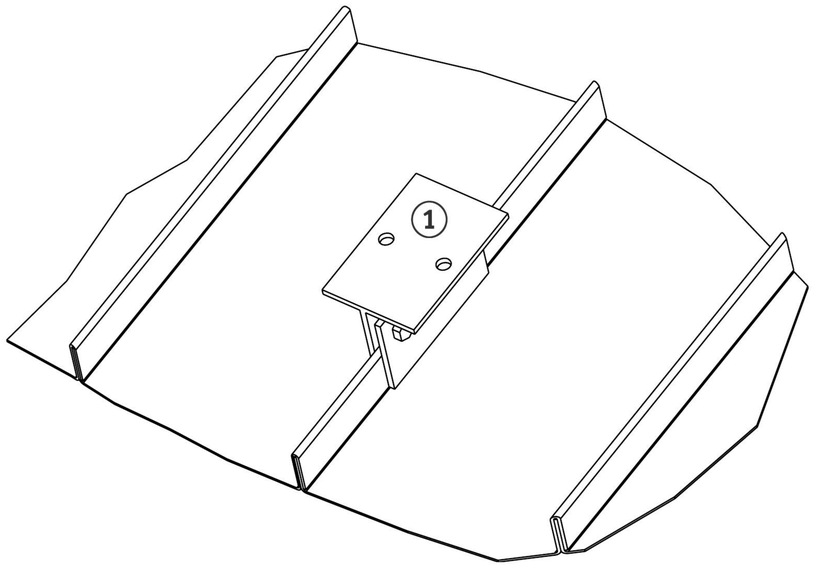
4. Connect each spacer pipe to a hinge support using a hex bolt (pos.5). Attach the long spacer pipe to the upper retaining clamp or hanger bolt, and the short spacer pipe to the lower one.

5. Connect the bearing rails to the spacer pipes using raised cheese-head screws (pos.6).

6. Ensure that they are securely in place.

5.7 Tin roof

A suitable substructure (retainer, pos.1) must be provided on-site to hold the bearing rails.
Ensure that it is securely in place after installation.

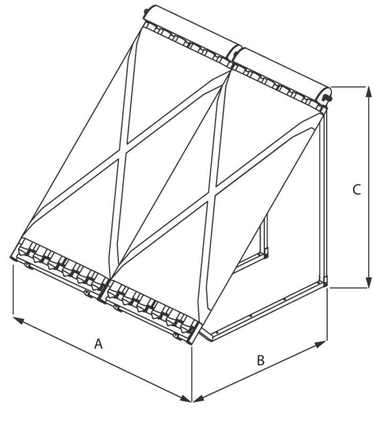


6. Installation on flat roofs / angle frames 30° or 45°

The CPC INOX evacuated tube collector can be installed on flat roofs, on slightly sloping roofs (up to 20°) or in gardens. The spacing between the angle frames must also be adhered to on sloping roofs. It may be necessary to add auxiliary rafters. If applicable, a stress analysis is to be carried out on the substructure.

6.1 Space requirements

Space requirements for a single-row collector array.



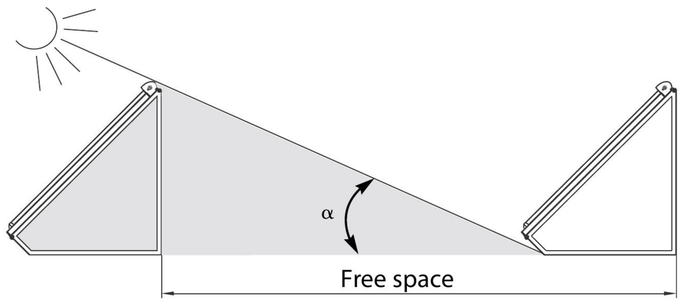
Dimension A according to number of collectors

	CPC INOX					
	6	12	18			
Number of collectors	(m)	(m)	(m)			
1	0,70	1,40	2,10			
2	1,40	2,80	4,20			
3	2,15	4,20	6,30			
4	2,85	5,60	8,35			
5	3,55	7,00	10,45			
6	4,25	8,40	12,55			

Dim. B and C according to installation angle

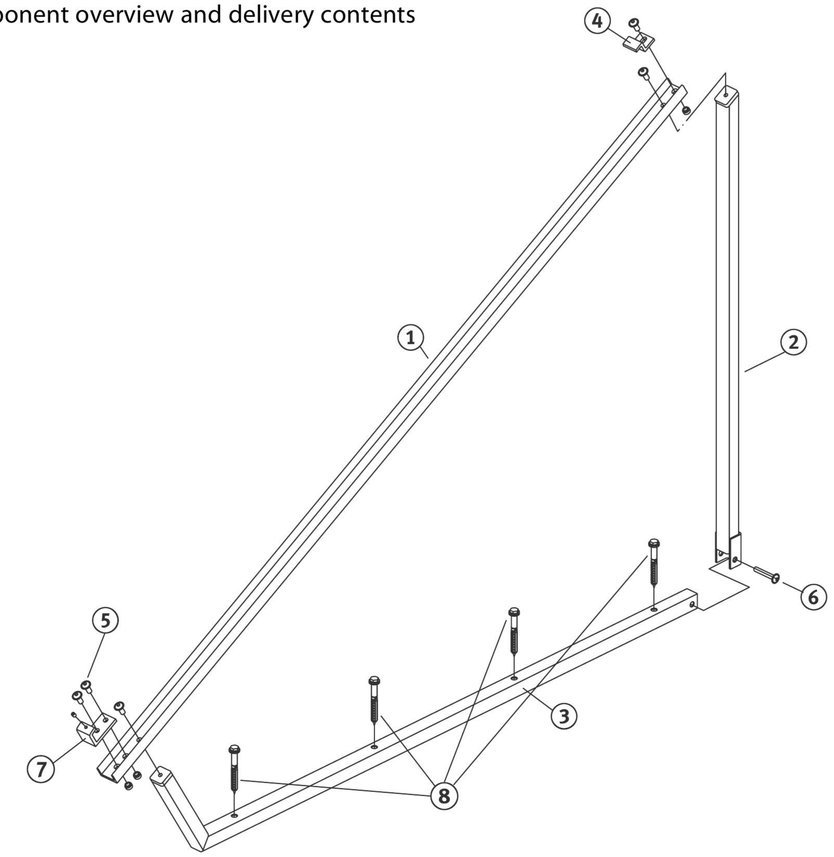
	CPC 6/12/18		
Installation angle	(m)		(m)
Dim. B 30°	1,44		1,82
Dim. B 45°	1,20		1,50
Dim. C 30°	1,04		1,24
Dim. C 45°	1,35		1,63

Free space between the collectors, for double-r ow or multi-r ow collector arrays.



		Free space, α = 30° (m)		Free space, α = 45° (m)	
Type of use	Main usage period	CPC 6/12/18		CPC 6/12/18	
Domestic water	May to August	2,6		Impractical	
Domestic water	April to September	Impractical		3,1	
Domestic water and heating	March to October	Impractical		4,0	
Domestic water and heating	all year	Impractical		5,0	

6.2 Component overview and delivery contents



		INOX				
	List of parts for CPC	6	12	18		
Pos. 1	Bearing rail, pre-assembled, aluminium, L = 1647 mm	2	2	2		
Pos. 1	Bearing rail, pre-assembled, aluminium, L = 2064 mm			2		
Pos. 2	Square tube, straight	2	2	2		
Pos. 3	Square tube, angled	2	2	2		
Pos. 4	Upper retaining hook	2	2	2		
Pos. 5	Raised cheese-head screw M8x20	10	10	10		
Pos. 6	Raised cheese-head screw M8x50	2	2	2		
Pos. 7	Lower retaining hook, pre-assembled	2	2	2		
Pos. 8	Hex bolt with wall plug	8	8	8		

6.3 Necessary accessories per angle frame

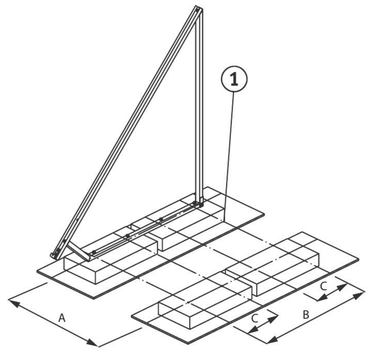
- 2 concrete slabs, minimum weight per slab: 75 kg (if installing on concrete slabs)
- 1 building protection mat (if installing on concrete slabs)
- 4 wood screws (if installing on wood substructure)

6.4 Tool list

Drill, cordless electric screwdriver, TX 30 screwdriver bit, masonry drill bit for wall plug or threaded bolt, 13 mm hex screwdriver bit or 13 mm spanner.

6.5 Weight and positioning of the concrete slabs

When installing CPC INOX collectors, 2 angle frames with 30° or 45° gradients are used for each collector. Each angle frame must be weighted with 2 concrete slabs. The required weights on roofs up to a maximum of 20 m in height can be ascertained from the table below. Install the angle frames on the concrete slabs with spacing as shown in the diagram below. This spacing must also be adhered to on sloping roofs. It may be necessary to add auxiliary rafters.



Note!
Flat roofs covered with gravel: Clear gravel from the area where the concrete slabs are to be placed.
Flat roofs with plastic roof sheeting: lay concrete slabs on protective padding (building protection mats - pos.1).

Arrange the concrete slabs as shown in the figure to the left.

	CPC INOX					
	6	12	18			
Dim. A (m)	0,55	1,10	1,40			
Dim. B 30° (m)	1,05	1,05	1,05			
Dim. B 45° (m)	0,81	0,81	0,81			
Dim. C 30° (m)	0,35	0,35	0,35			
Dim. C 45° (m)	0,27	0,27	0,27			

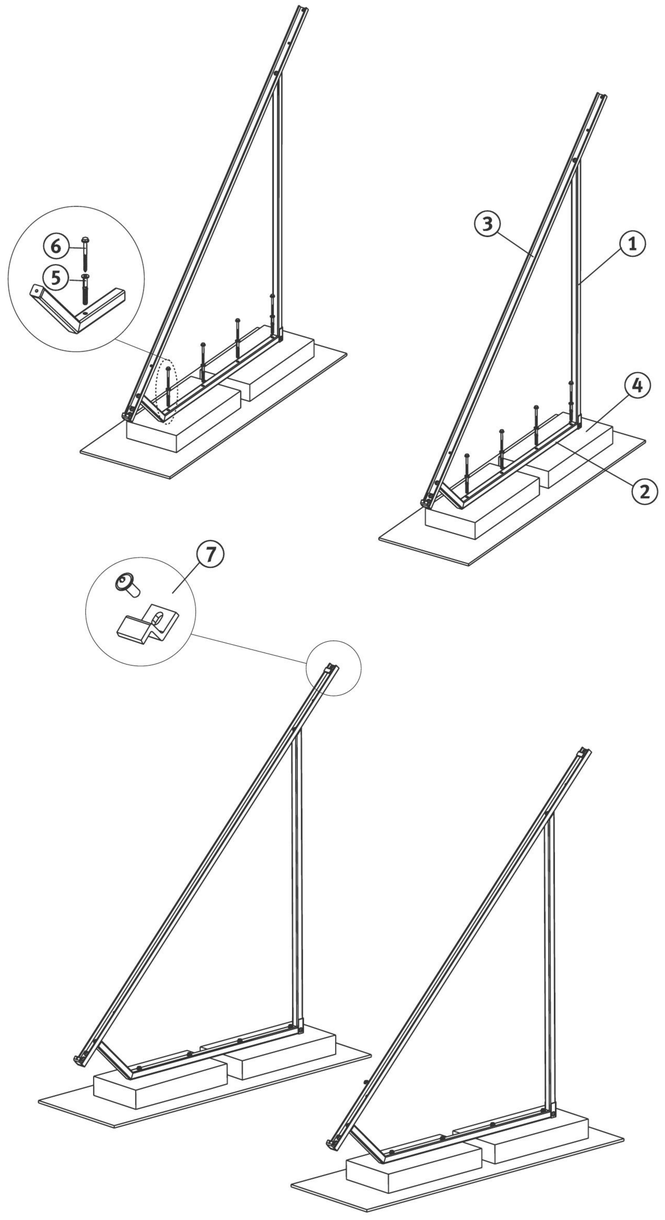
Building height of up to 8 m

Collector type	Quantity of the angle frames	Angle of the frame	Required weight of the front concrete slab	Required weight of the rear concrete slab
CPC 6/12/18	2	30	75kg	75kg
CPC 6/12/18	2	45	75kg	75kg

Building height of up to 20 m

Collector type	Quantity of the angle frames	Angle of the frame	Required weight of the front concrete slab	Required weight of the rear concrete slab
CPC 6/12/18	2	30	112kg	112kg
CPC 6/12/18	2	30	112kg	112kg

6.6 Installing the angle frames and retaining hooks



1. Connect the straight square tube (pos.1) and the angled square tube (pos.2) using long raised cheese-head screws.

2. Connect the bearing rail (pos.3) to the square tubes (pos.1 and 2) using short raised cheese-head screws. Use the lowest drilled hole of each bearing rail.

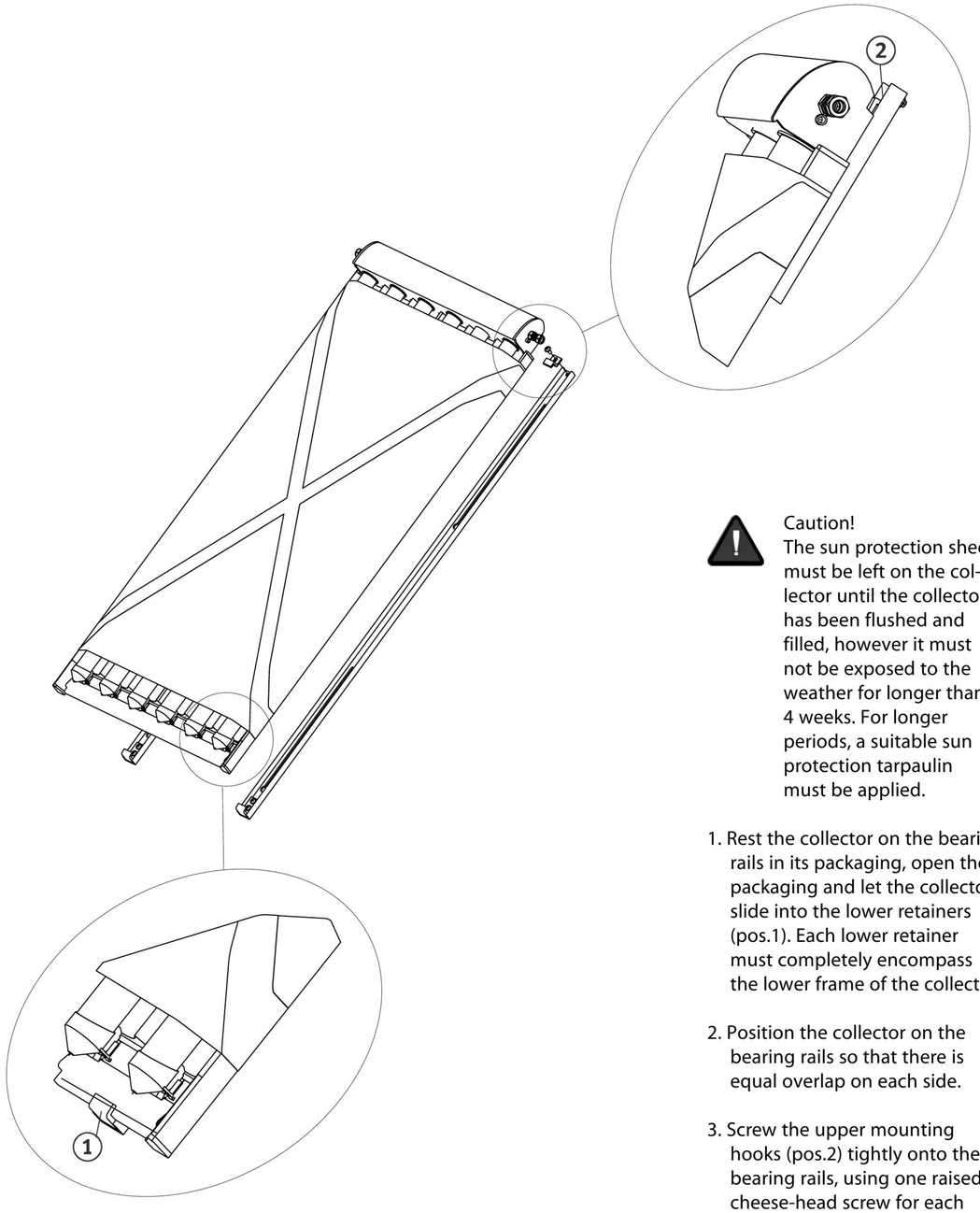
3. Lay the building protection mat between the concrete slabs (pos.4) and the flat roof seal. Align and, if necessary, underlay the concrete slabs.

4. Drill holes in the concrete slabs (pos.4). Bolt the angle frames onto the concrete slabs using the wall plugs (pos. 5) and the hex bolts provided (pos. 6).

5. Only after the collector has been installed, are the upper retaining hooks (pos.7) attached to the bearing rails, using 1 raised cheese-head screw per hook.

6. Ensure that they are securely in place.

6.7 Installing the collector



Caution!
The sun protection sheet must be left on the collector until the collector has been flushed and filled, however it must not be exposed to the weather for longer than 4 weeks. For longer periods, a suitable sun protection tarpaulin must be applied.

1. Rest the collector on the bearing rails in its packaging, open the packaging and let the collector slide into the lower retainers (pos.1). Each lower retainer must completely encompass the lower frame of the collector.

2. Position the collector on the bearing rails so that there is equal overlap on each side.

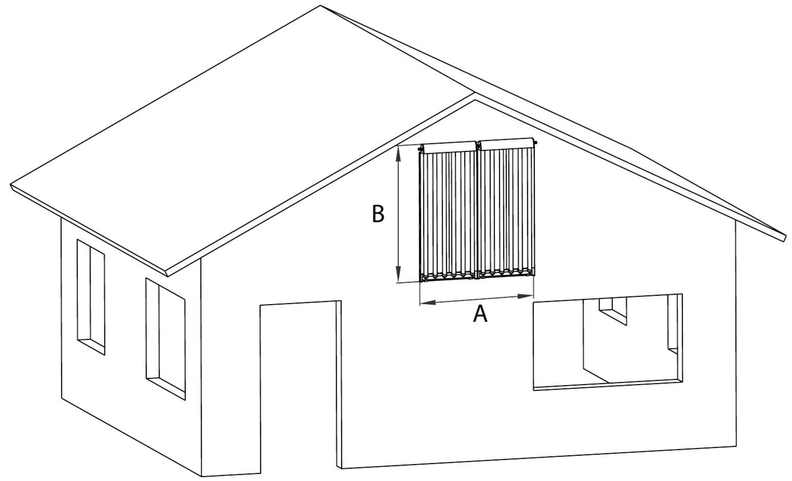
3. Screw the upper mounting hooks (pos.2) tightly onto the bearing rails, using one raised cheese-head screw for each hook.

4. Check that all screw fittings are securely fastened.

7. Facade installation / vertical

The CPC INOX can also be installed vertically on a wall by means of the retaining clamps for pan tiles.
A specific clearance of the pipe length must be maintained beneath the array.

7.1 Space requirements



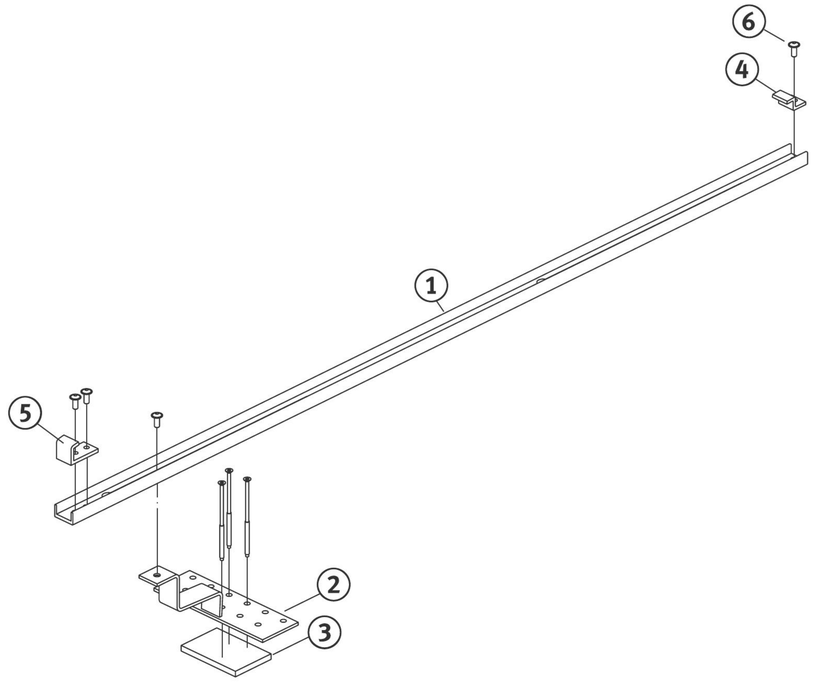
Dim. A

Number of adjacent collectors	CPC INOX 6 (m)	CPC INOX 12 (m)	CPC INOX 18 (m)
1	0,70	1,40	2,10
2	1,40	2,80	4,20
3	2,15	4,20	6,30
4	2,85	5,60	8,35
5	3,55	7,00	10,45
6	4,25	8,40	12,55

Dim. B

Number of stacked collectors	CPC 6/12/18 INOX (m)
1	1,64
2	3,35
3	5,06

7.2 Component overview and delivery contents



	List of parts for CPC	INOX 12	18	2x6	3x6				
Pos. 1	Bearing rail, pre-assembled, aluminium, L = 1647 mm	2	3	2	2				
Pos. 1	Bearing rail, pre-assembled, aluminium, L = 2064 mm								
Pos. 1	Bearing rail, aluminium, L = 1355 mm		2						
Pos. 1	Bearing rail, pre-assembled, aluminium, L = 2062 mm			2					
Pos. 1	Middle bearing rail, aluminium, L = 1507 mm			1					
Pos. 1	Middle bearing rail, aluminium, L = 1924 mm								
Pos. 2	Retaining clamp with raised cheese-head screw	4	6	4	6				
Pos. 3	Spacing board (height adjustment)	12	18	12	1				
Pos. 4	Upper retaining hook	2	3	4	6				
Pos. 5	Lower retaining hook, pre-assembled	2	3	4	6				
Pos. 7	Raised cheese-head screw M8x20	2	3	8	12				
Not shown	Slot nut, 20x30x8			4	6				

7.3 Necessary accessories

Suitable bolts or screws and wall plugs for fastening onto the wall.

7.4 Tool list

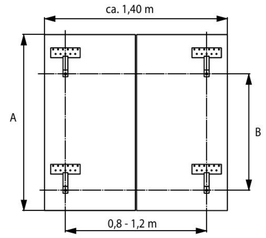
Cordless electric screwdriver or cordless drill, TX 30 screwdriver bit, hammer.

7.5 Positioning the retaining clamps

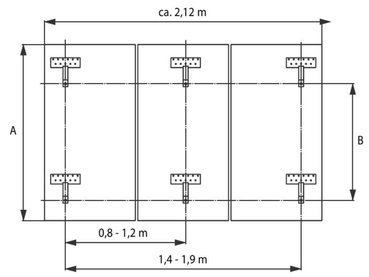
For the installation of either 2 or 3 CPC 6 collectors, either 2 or 3 vertical bearing rails and 2 horizontal bearing rails are provided.
2 bearing rails are used per collector when installing CPC 12/18 collectors.
Install the retaining clamps on the wall with spacing as shown in the diagram below.

	CPC 6/12/18 INOX		
Dim. A	1.64 m		
Dim. B	Approx 1m		

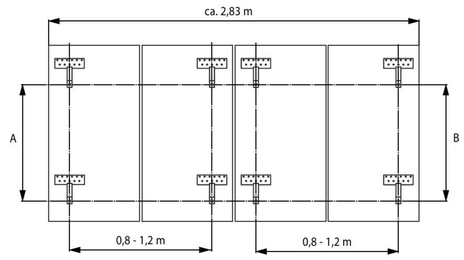
Positioning the retaining clamps for 2 adjacent CPC 6 _____ collectors



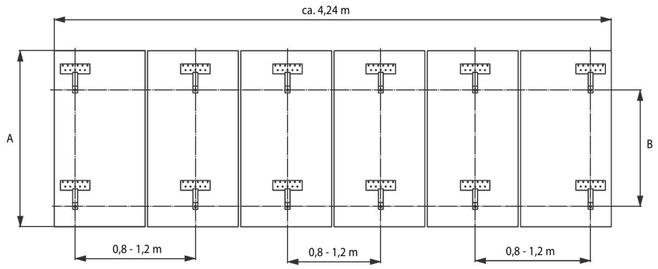
Positioning the retaining clamps for 3 CPC 6_____ or 1 CPC 6__ and 1 CPC 12__ arranged adjacently



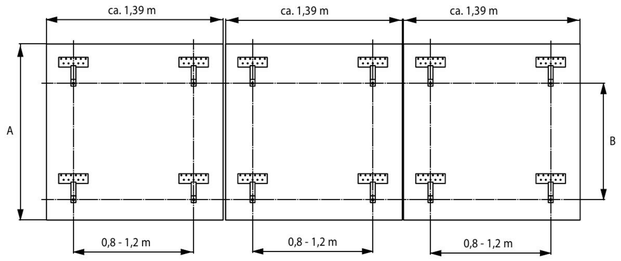
Positioning the retaining clamps for 4 adjacent CPC 6 _____ collectors



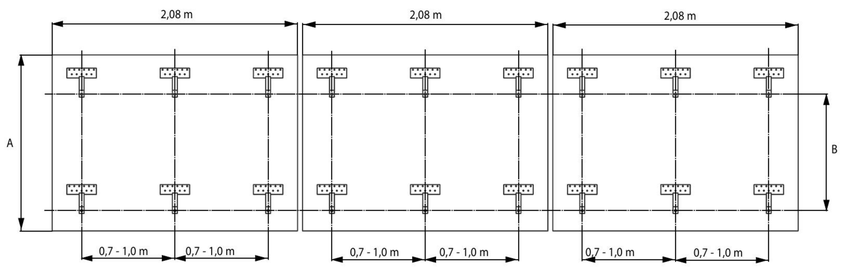
Positioning the retaining clamps for 6 adjacent CPC 6 _____ collectors



Positioning the retaining clamps for 1 or more adjacent CPC 12 _____ collectors

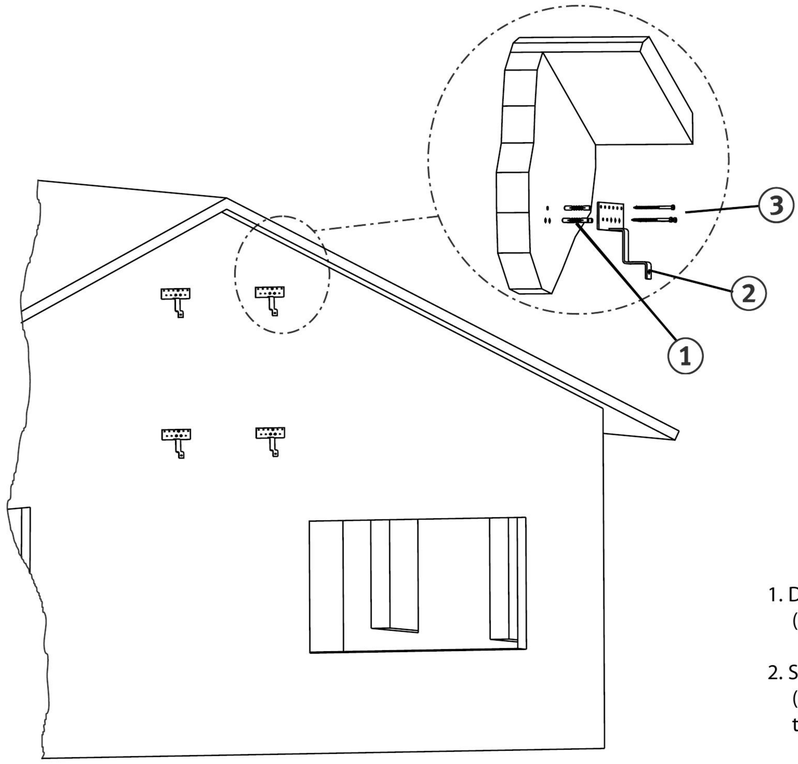


Positioning the retaining clamps for 1 or more adjacent CPC 18 _____ collectors



7.6 Installing the retaining clamps

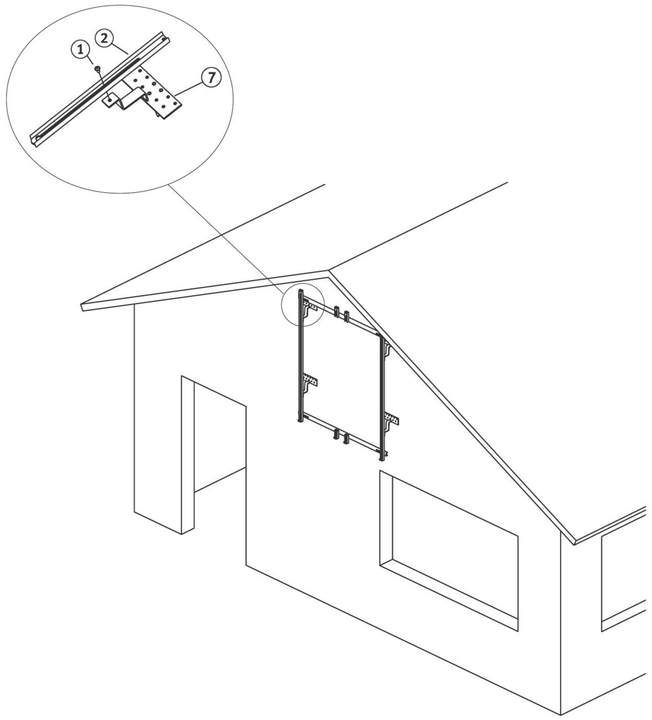
Note
When installing on a facade, use the correct screws or bolts and wall plugs.



1. Drill holes and insert wall plugs (pos.1).

2. Secure the retaining clamps (pos.2) to the facade using the screws (pos.3).

7.7 Installing the bearing rails and retaining hooks for the CPC 6 _____ model



1. Feed the raised cheese-head screws (pos.1) for the retaining clamps (pos.7) through the elongated holes in the bearing rails (pos.2) and tighten slightly.

2. In so doing, align the bearing rails so that the overhangs at each end are approximately equal. Assess the alignment of the bearing rails with the use of a line guide.

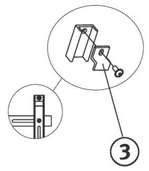
3. Tighten all raised cheese-head screws and check that they are securely fastened.

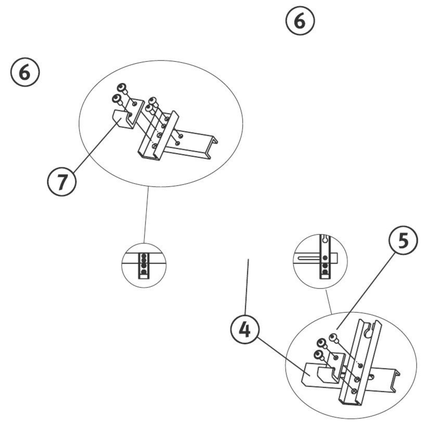
4. Screw the horizontal bearing rails (pos.4) onto the vertical bearing rails (pos.6) with the raised cheese-head screws (pos.5) and fasten tightly.

5. The lower retaining hooks (pos.7) are already pre-assembled.

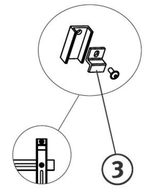
6. Attach the upper retaining hooks (pos.3) to the bearing rails once the collector has been installed, and not beforehand, using one raised cheese-head screw per hook.

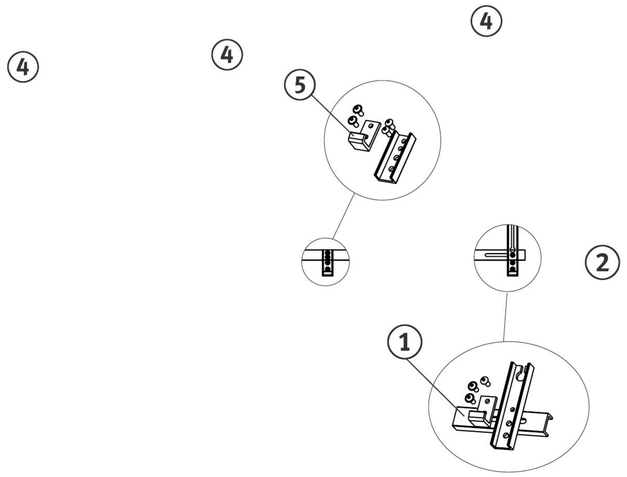
7. Ensure that they are securely in place.





Installation kit for 2 CPC 6 collectors





1. Screw the horizontal bearing rails (pos.1) onto the vertical bearing rails (pos.4) with the raised cheese-head screws (pos.2) and fasten tightly.

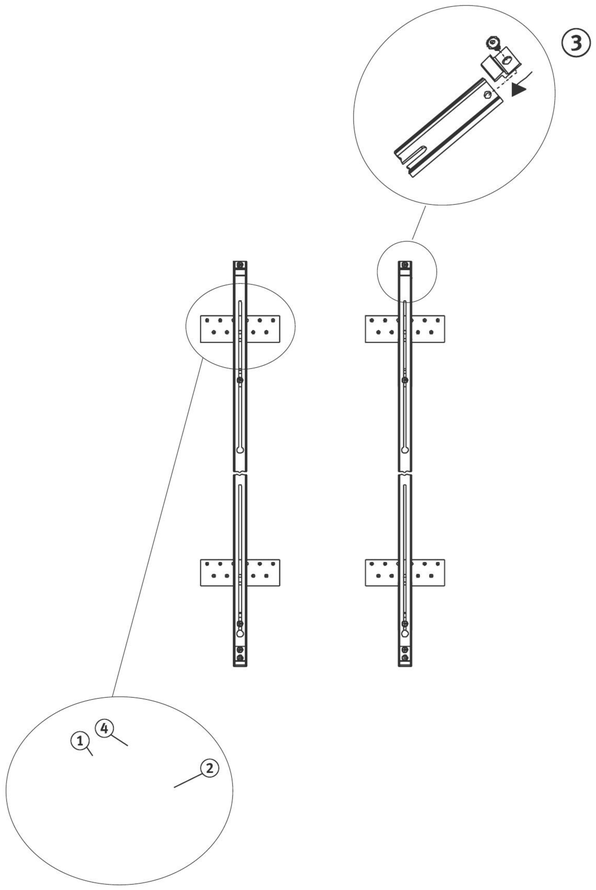
2. The lower retaining hooks (pos.5) are already pre-assembled.

3. Attach the upper retaining hooks (pos.3) to the bearing rails once the collector has been installed, and not beforehand, using one raised cheese-head screw per hook.

4. Ensure that they are securely in place.

Installation kit for 3 CPC 6 collectors

7.8 Installing the bearing rails and retaining hooks for the CPC 12 _____ and CPC 18 model



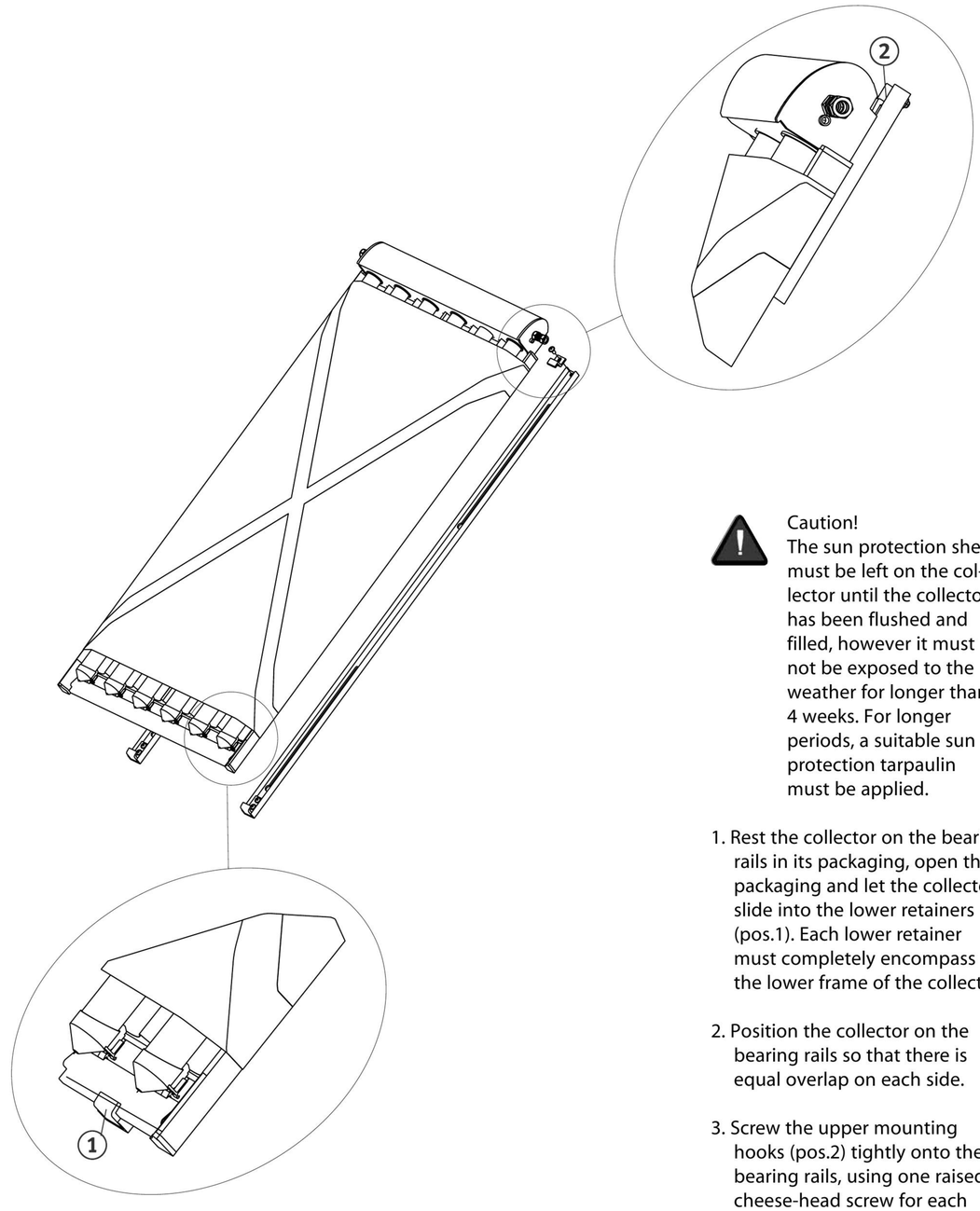
1. Feed the raised cheese-head screws (pos.1) for the retaining clamps (pos.2) through the elongated holes in the bearing rails (pos.4) and tighten slightly.

2. In so doing, align the bearing rails so that the overhangs at each end are approximately equal. Assess the alignment of the bearing rails with the use of a line guide.

3. Tighten all raised cheese-head screws and check that they are securely fastened.

4. Do not attach the upper retaining hooks (pos.3) until after the collectors have been installed.

7.9 Installing the collector



Caution!
The sun protection sheet must be left on the collector until the collector has been flushed and filled, however it must not be exposed to the weather for longer than 4 weeks. For longer periods, a suitable sun protection tarpaulin must be applied.

1. Rest the collector on the bearing rails in its packaging, open the packaging and let the collector slide into the lower retainers (pos.1). Each lower retainer must completely encompass the lower frame of the collector.

2. Position the collector on the bearing rails so that there is equal overlap on each side.

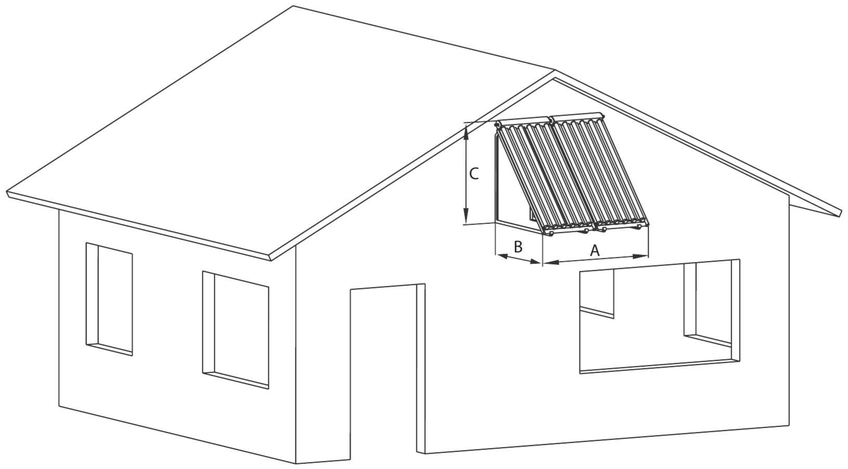
3. Screw the upper mounting hooks (pos.2) tightly onto the bearing rails, using one raised cheese-head screw for each hook.

4. Check that all screw fittings are securely fastened.

8. Facade installation / angle frame 45° or 60°

The CPC INOX can be installed on a wall by means of the angle frames for 45° or 60° slopes. For a 60°slope, 0.9 m space must be kept free beneath the collector.

8.1 Space requirements



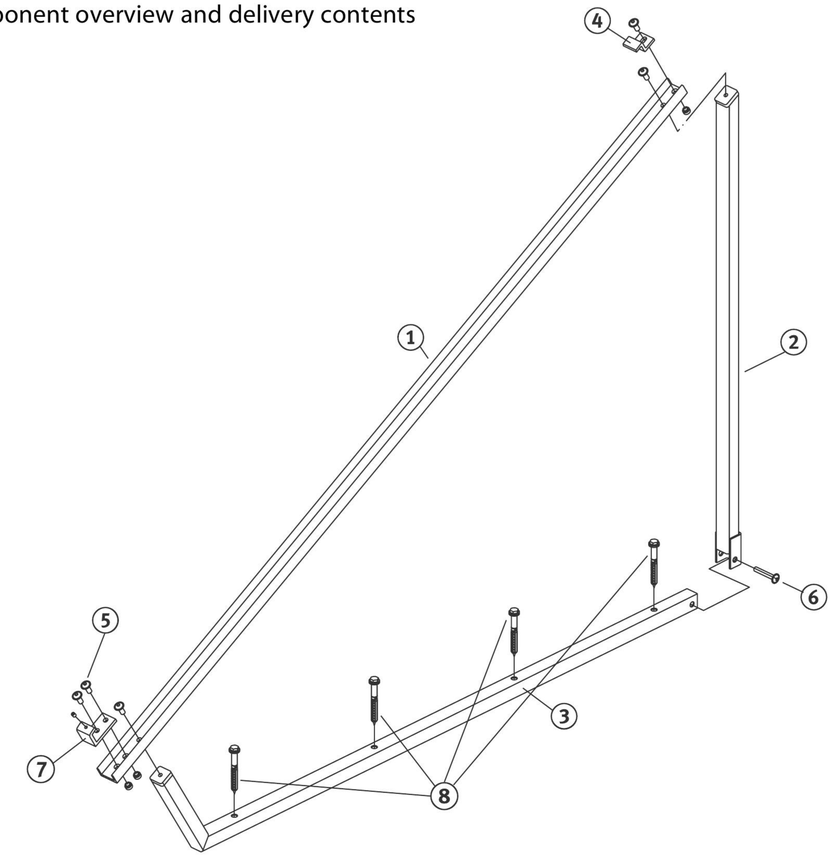
Dimension A according to number of collectors

	CPC INOX		
	6	12	18
Number of collectors	(m)	(m)	(m)
1	0,70	1,40	2,10
2	1,40	2,80	4,20
3	2,15	4,20	6,30
4	2,85	5,60	8,35
5	3,55	7,00	10,45
6	4,25	8,40	12,55

Dim. B and C according to installation angle

	CPC 6/12/18 INOX
Installation angle	(m)
Dim. B 45°	1,35
Dim. B 60°	1,01
Dim. C 45°	1,20
Dim. C 60°	1,48

8.2 Component overview and delivery contents



		INOX				
	List of parts for CPC	6	12	18		
Pos. 1	Bearing rail, pre-assembled, aluminium, L = 1647 mm	2	2	2		
Pos. 1	Bearing rail, pre-assembled, aluminium, L = 2064 mm			2		
Pos. 2	Square tube, straight	2	2	2		
Pos. 3	Square tube, angled	2	2	2		
Pos. 4	Upper retaining hook	2	2	2		
Pos. 5	Raised cheese-head screw M8x20	10	10	10		
Pos. 6	Raised cheese-head screw M8x50	2	2	2		
Pos. 7	Lower retaining hook, pre-assembled	2	2	2		
Pos. 8	Hex bolt with wall plug	8	8	8		

8.3 Necessary accessories per angle frame

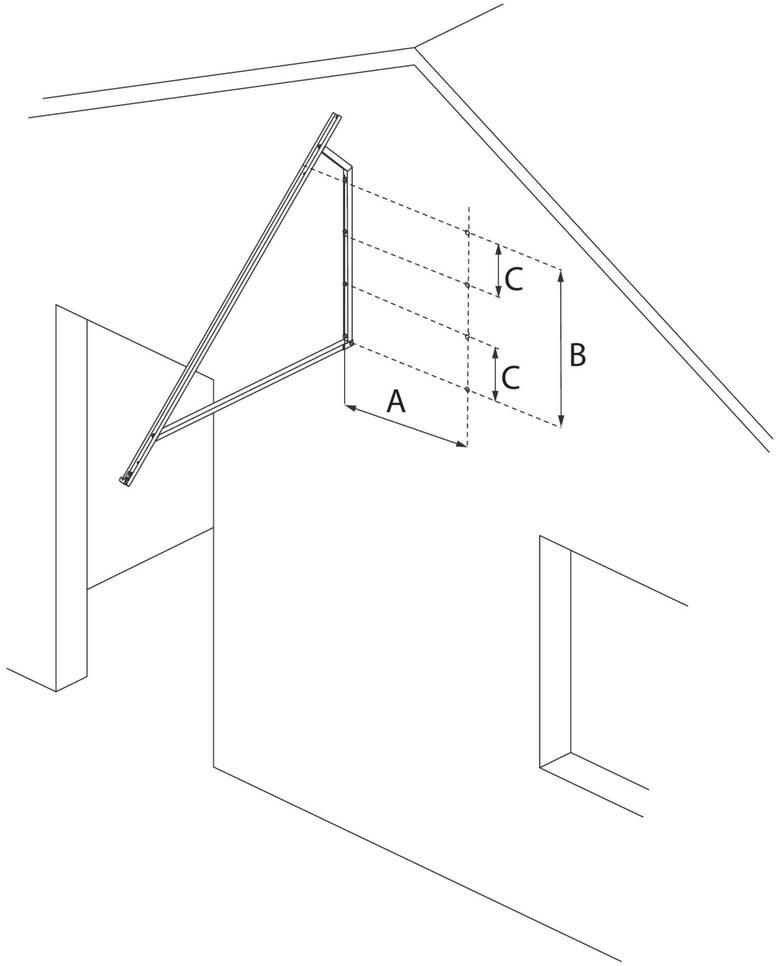
Use suitable screws and wall plugs, or threaded bolts and bolting material for the respective surface.

8.4 Tool list

Drill, cordless electric screwdriver, TX 30 screwdriver bit, masonry drill bit for wall plug or threaded bolt, 13 mm hex screwdriver bit or 13 mm spanner.

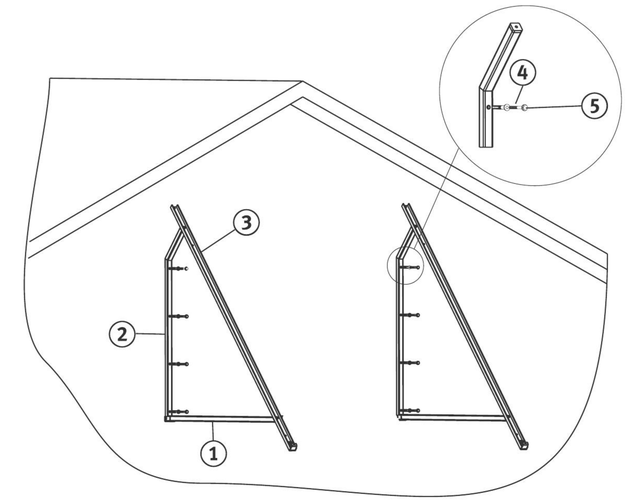
8.5 Positioning the angle frames

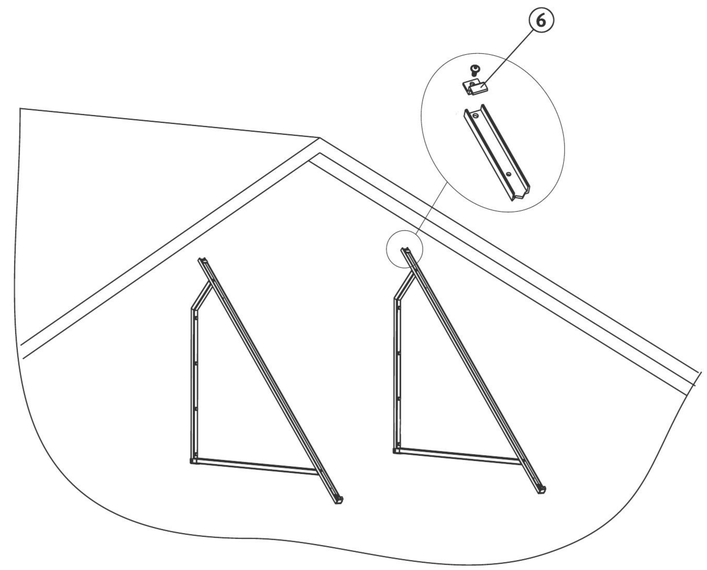
The CPC INOX can be installed on a wall by means of the angle frames for 45° or 60° slopes. For a 60°slope, 0.9 m space must be kept free beneath the collector.



	CPC INOX					
	6	12	18			
Dim. A (m)	0,55	1,10	1,40			
Dim. B 30° (m)	1,05	1,05	1,05			
Dim. B 45° (m)	0,81	0,81	0,81			
Dim. C 30° (m)	0,35	0,35	0,35			
Dim. C 45° (m)	0,27	0,27	0,27			

8.6 Installing the angle frames and retaining hooks





For wall installations, 4 suitable bolts or screws of sufficient length and thickness are to be used for each angle frame. Here, the combined weight of the collector and angle frames, as well as stress from snow and wind must be taken into account. The offset corner of each angle frame is to point upwards.
On cavity wall masonry, the wall plugs are to be inserted in the load-bearing wall, or threaded bolts are to be used.
If the angle frame is mounted on a facing skin which is not very stable, it should be underlaid with suitable slabs, which transfer the exerted forces onto the masonry in such a manner that they are distributed over a large area.

1. Connect the square tubes, straight (pos.1) and angled (pos.2), using M8x50 raised cheese-head screws.

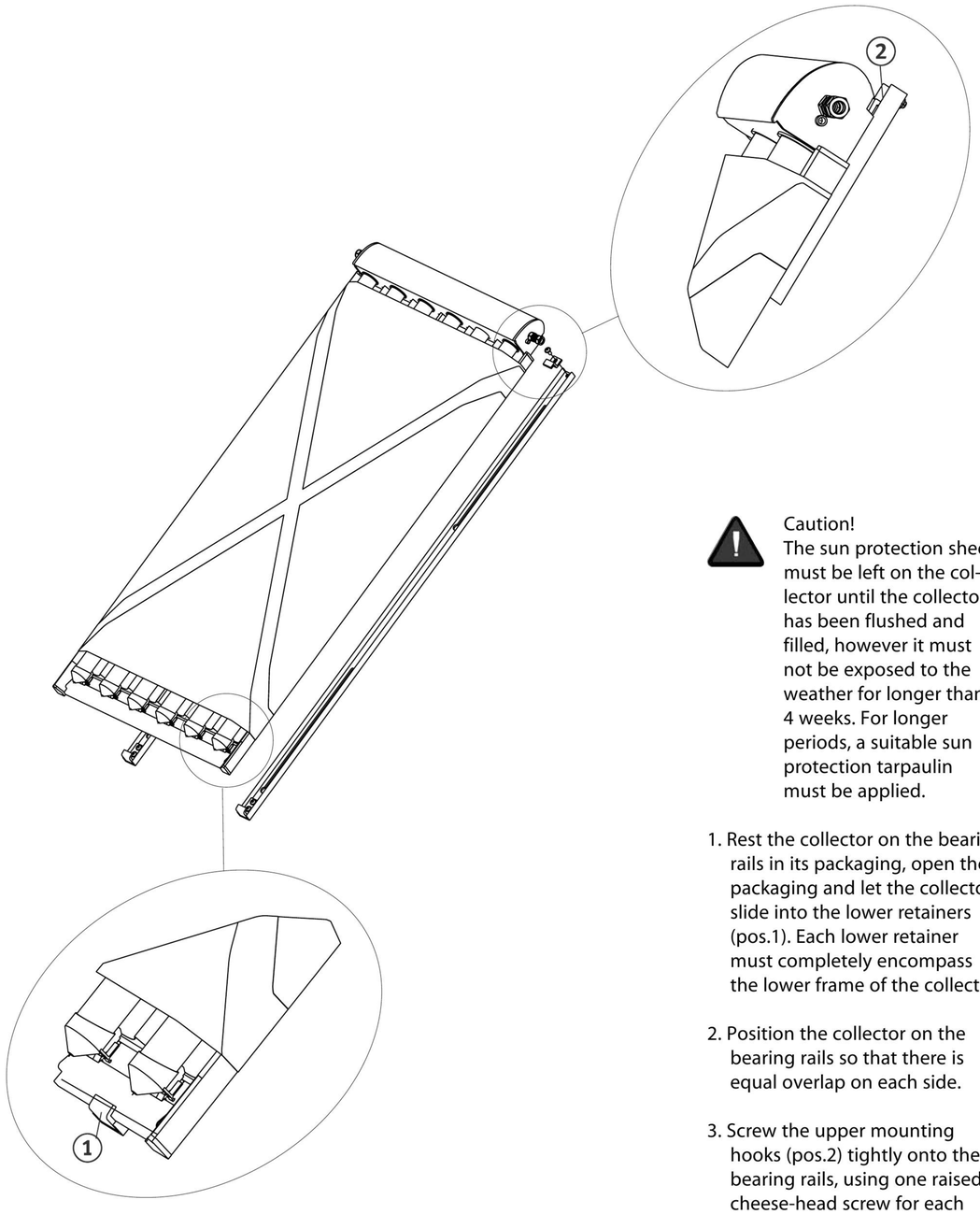
2. Connect the bearing rail (pos.3) to the square tubes (pos.1 and 2) using M8x20 raised cheese-head screws. Use the upper drilled hole on each bearing rail.

3. Drill holes into the facade. Attach the wall plugs (pos.4) and angle frames (pos.2) to the facade using the provided hex bolts (pos.5) or other suitable bolts or screws. The alignment of the angle frames is to be assessed with the use of a line guide on the lower edges of the frames.

4. Only after the collector has been installed, are the upper retaining hooks (pos.6) attached to the bearing rails, using 1 raised cheese-head screw per hook.

5. Ensure that they are securely in place.

8.7 Installing the collector



Caution!
The sun protection sheet must be left on the collector until the collector has been flushed and filled, however it must not be exposed to the weather for longer than 4 weeks. For longer periods, a suitable sun protection tarpaulin must be applied.

1. Rest the collector on the bearing rails in its packaging, open the packaging and let the collector slide into the lower retainers (pos.1). Each lower retainer must completely encompass the lower frame of the collector.

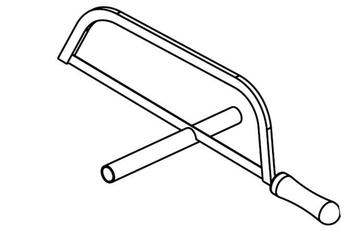
2. Position the collector on the bearing rails so that there is equal overlap on each side.

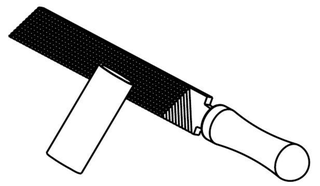
3. Screw the upper mounting hooks (pos.2) tightly onto the bearing rails, using one raised cheese-head screw for each hook.

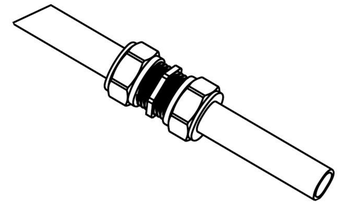
4. Check that all screw fittings are securely fastened.

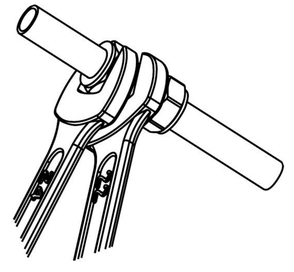
9. Hydraulic connections

9.1 Connections with olive rings









It is preferable to use olive connections in the collector circuit, due to their ease of installation, and their temperature resistance. When tightening or loosening the fittings, always grip the body of the fitting with a spanner to counter the force.

1. Cut the pipe to the required length (pos.1). Olive connections size 12 mm have an insertion depth of 18.5 mm.

2. Remove burrs (pos.2) and check the pipe ends for scratches, soiling and deformations.

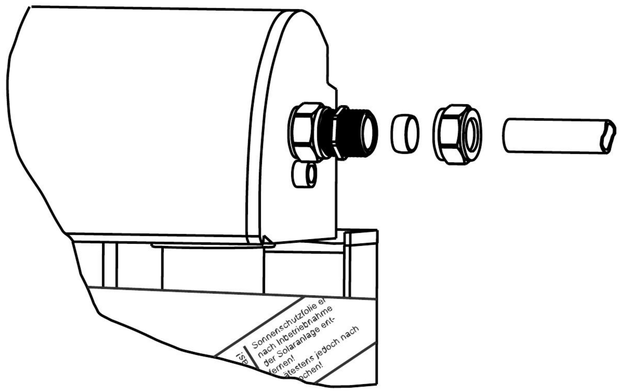
3. Check that the olive ring is correctly positioned at the fitting. Through the olive ring, push the pipe into the fitting, up to the stop (pos.3).

4. Tighten the union nut by hand. Then, upon first installation, screw tight with one revolution (360°). Use an open-ended spanner to counter the force (pos.4).

5. Check that the connection is leak-tight. If the connection is not leak-tight, loosen it and check the pipe for damage.

6. Each time the fitting has been loosened, it must be hand-tightened during reassembly, then further tightened using an open-ended spanner, turning only 1/8 to 1/4 of a rotation (45° to 90°).

9.2 Connecting the flow and return lines to the collector



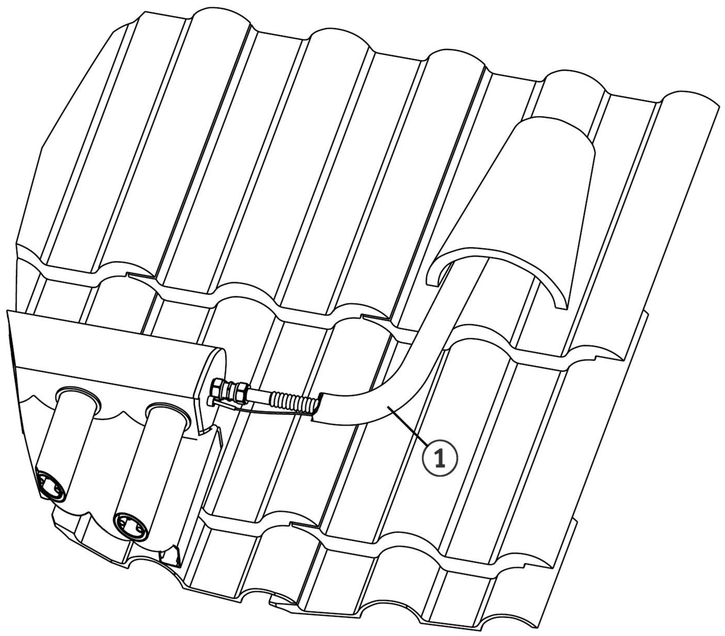
Note!
The flow or return pipe can be connected to the collector on the left or on the right, as selected.

1. Attach the connecting pipes with an olive connection as shown in the figure to the left.

Note!
When tightening or loosening the fittings, always grip the body of the fitting to counter the force.

2. For reductions to 12 mm connecting pipes reduced support sleeves are available in the accessories connection kits.

3. Check that the connection is leak-tight.

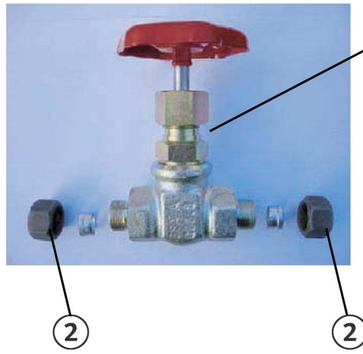


Note!
If, during commissioning, a motor-driven flushing pump is used for flushing, bleeding and filling the solar energy system (for the prerequisites please refer to the service instructions, section “Commissioning”), bleeding at the highest point of the system is unnecessary.

4. For flexible connection of the collector to the pipes, flexible metal connection hoses are available as an accessory kit (pos.1).

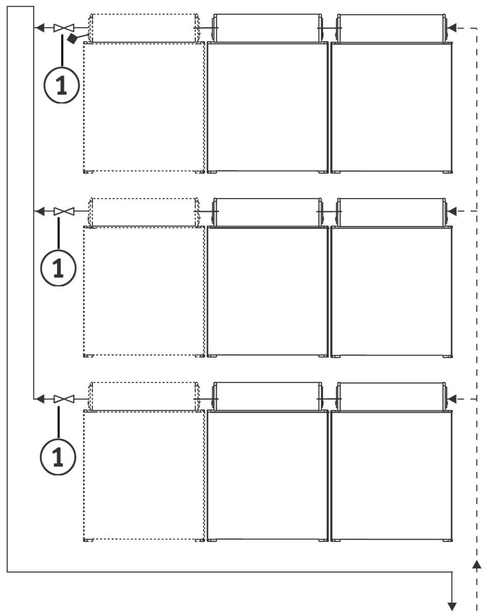
9.4 Shut-off valve

9.4.1 Component overview and delivery contents



Pos.1: Shut-off valve, temperature-resistant up to 400°C.
Pos.2: 2 cutting rings 15 mm with union nuts.

9.4.2 Applications of the shut-off valve



Used in solar energy systems with several collector strings connected in parallel to shut off individual strings. Each parallel collector string must be fitted with a shut-off valve on the supply side .

Caution!
No shut-off device must be positioned between the collector and the expansion tank or safety valve. Installation of the shut-off valve (pos.1) is therefore only permitted in the flow of each collector string. Installation in the return is not permitted.

9.4.3 Installing the shut-off valve

Install the shut-off valve in the flow of each individual collector using the cutting ring connection.

Note!
For correct flushing and bleeding of collector strings connected in parallel, the procedure needs to be performed separately for each individual collector string. For this purpose, open only one shut-off valve at a time while the others remain closed. After flushing and bleeding one string, repeat the procedure for the next string. After flushing and bleeding all the strings, open all the shut-off valves.
After installation, check that all the cutting ring connections are leak-tight.

10. Connection kit between 2 collectors connected in series

10.1 Component overview and delivery contents

1. EPDM insulation
   (width 45 mm, thickness 19 mm) with self-adhesive fastener.

2. Cover plate (width 70 mm, aluminium).

3. Square-end retainer (aluminium, 8 x 10 x 80 mm) with screw (stainless steel, 4.2 x 19 mm).

4. 2 plastic connection plugs left and right, with metal pin.

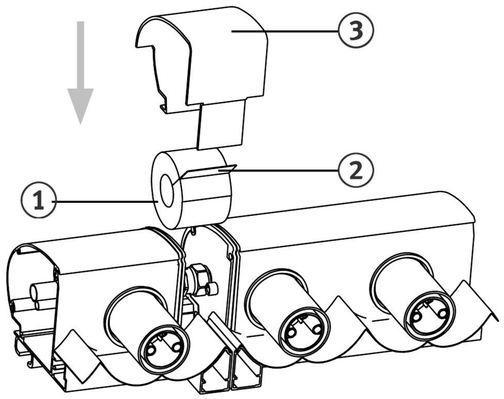
10.2 Applications of the connection kit

Used in solar energy systems with two or more CPC evacuated tube collectors connected in series.
Provides an aesthetic connection between two collector modules.

10.3 Tool list

Hammer, cross-head screwdriver.

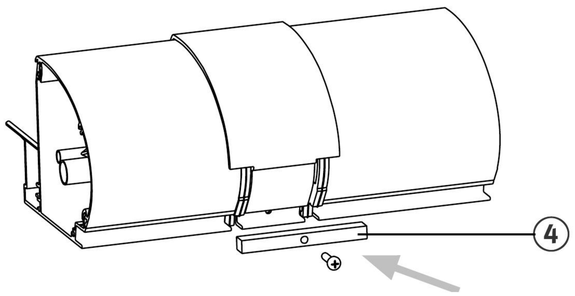
10.4 Installation



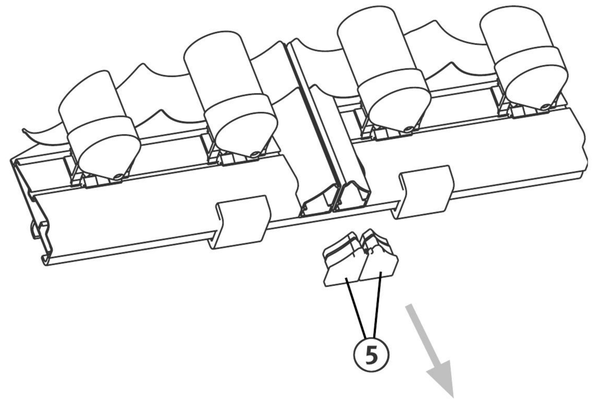
After precisely aligning the CPC collector modules, install the connection kit in the following order:

1. Slide the EPDM insulation (pos.1) over the screw fittings (bottom to top) and seal using the adhesive strap (pos.2).

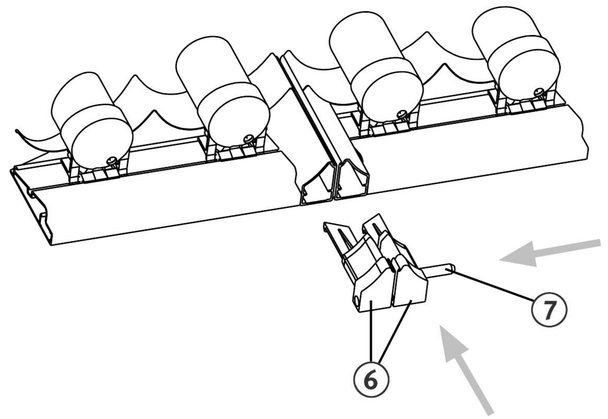
2. Slide on the cover plate (pos.3).



3. Insert square-end retainer (pos.4) in the mounting rails of the right and left collectors and fasten to the cover plate using the fastening screw.

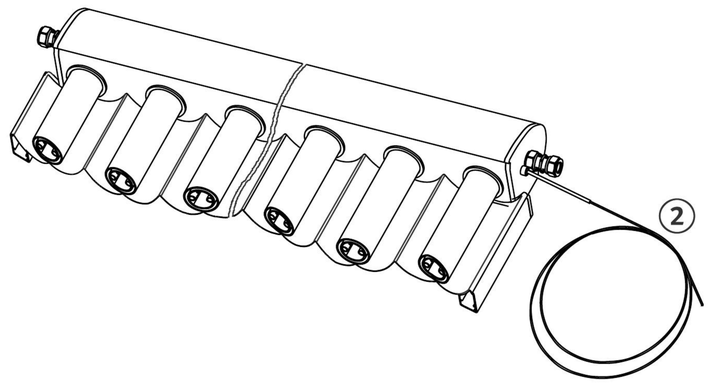


4. Remove the original plugs from the right and left collector frame profiles (pos.5).



5. Insert the connection plugs right and left (pos.6) into the collector frame profiles.
   Use a hammer to force the metal pins (pos.7) into the side of the connection plugs.

11. Sensor connection



Caution!
Always install the sensor (pos.2) on the hot flow side.

1. Both on the left and on the right side there is an immersion sleeve integrated in the collector side piece.

2. Push the sensor all the way into the immersion sleeve.

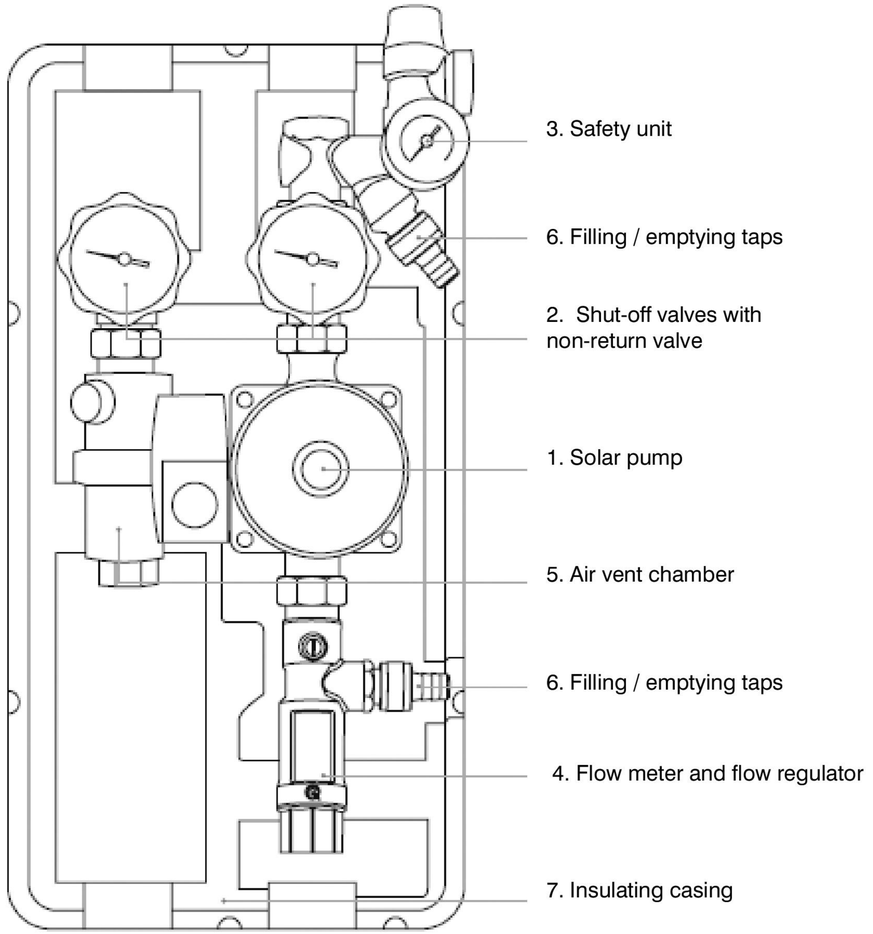
12. Lightning protection, equipotential bonding and overvoltage protection

The collector system must be integrated into any existing lightning protection installation on the building. To connect the collector system to the lightning protection system, a conductive connection must be established between the assembly frames and the piping by means of a copper cable (cross sectional surface of at least 10 mm ²). The pipes must have a conductive connection to the main equipotential bonding conductor by means of a cable with a cross section of at least 10 mm ².
The local lightning protection regulations must be observed.
Each installation must be provided with a lightning protection equipotential bond as specified in VDE 0185.
The PT 1000 collector sensor and the solar controller both include integrated overvoltage protection. It is not necessary to install an additional lightning protection socket between the collector sensor and the controller.

Installing the Pumping Station

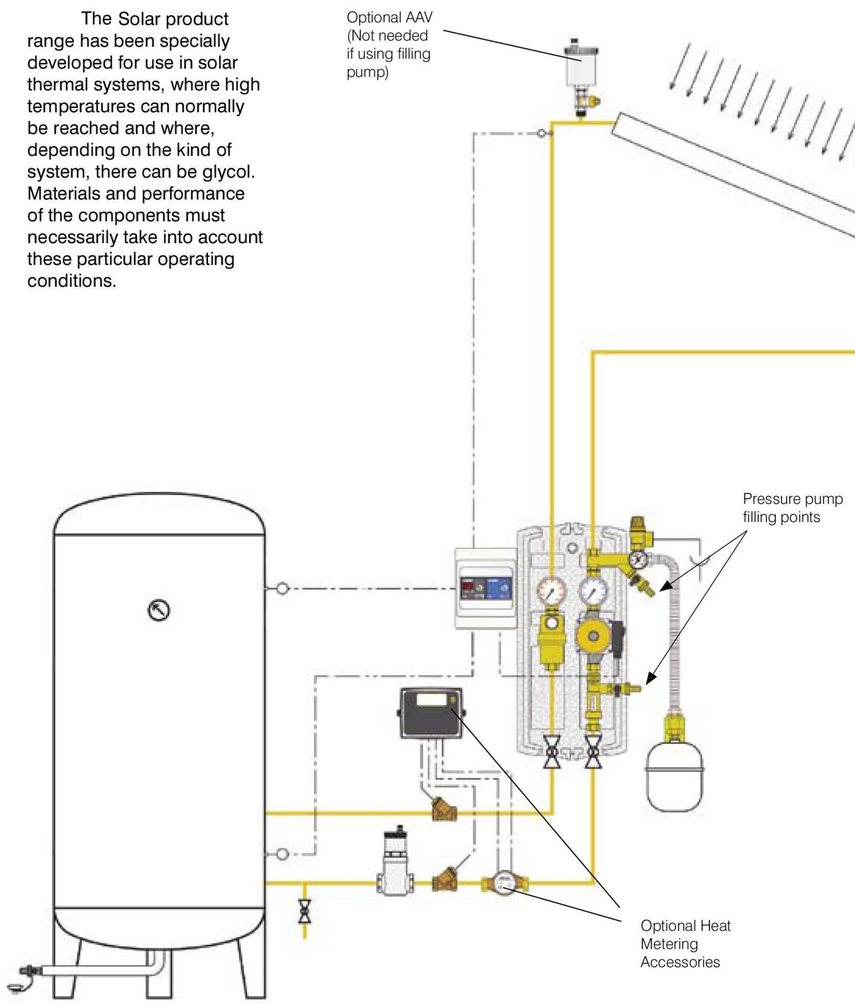
The pumping station should be mounted vertically on a flat surface capable of supporting its weight. It can be installed in the roof space if necessary, but note that access will be required for commissioning and also any possible maintenance in the future.

The pressure relief valve on the pump station can be discharged into the solar HTF container situated next to the pump station. If discharging into a container then it is necessary that there is a small amount of fluid in the container to cool any hot fluid which could potentially discharge from the system.

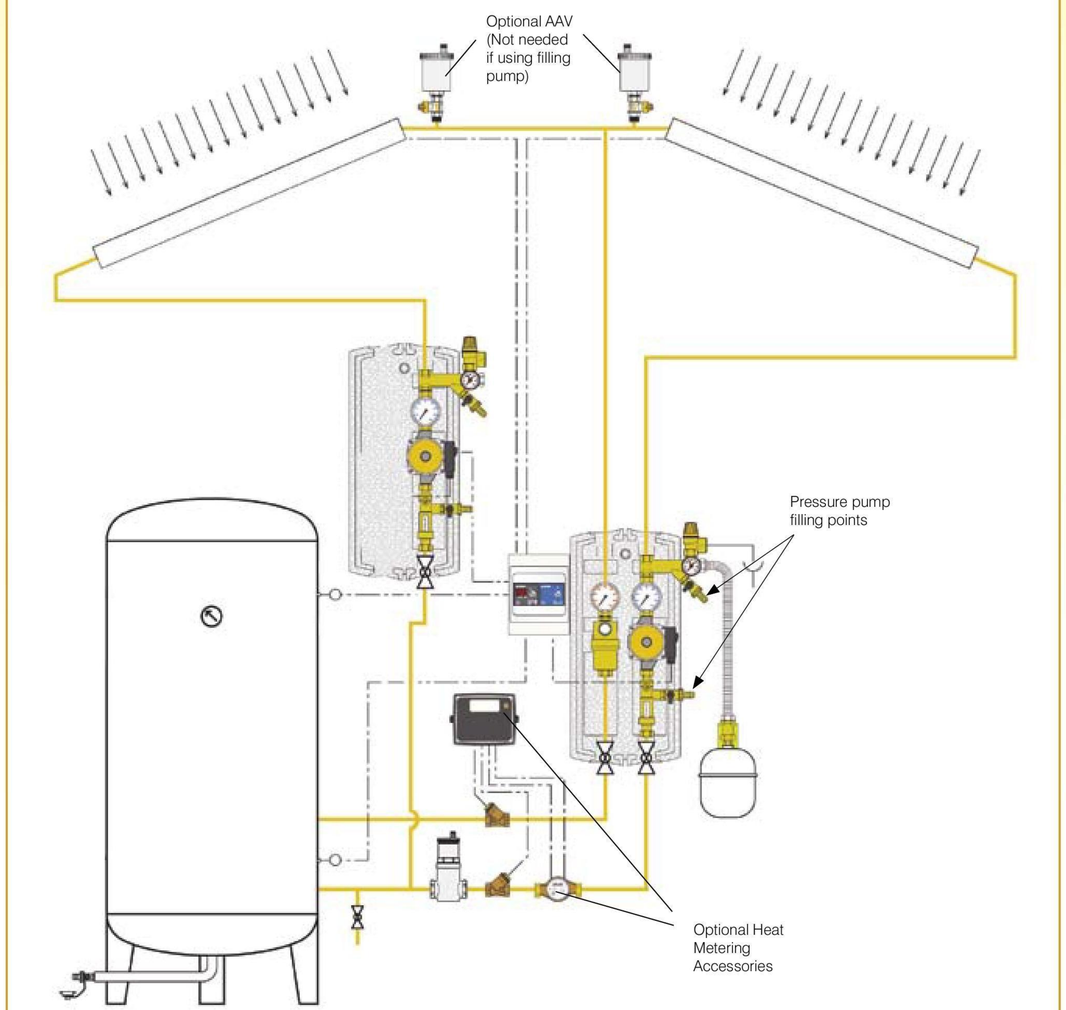


System with one collector field

The Solar product range has been specially developed for use in solar thermal systems, where high temperatures can normally be reached and where, depending on the kind of system, there can be glycol. Materials and performance of the components must necessarily take into account these particular operating conditions.



System with two collector fields / East - West System



Installing the stainless steel solar pipe

Cutting

1. Split the pipes and cut the insulation using a sharp knife. Be careful not to damage the wire.
2. Push the insulation back along the pipe to allow access for cutting the pipes.
3. Cut the pipes in the valley of the corrugation using an adjustable pipe cutter. Do not clamp the cutter on the pipe with great force or the pipe will flatten.
4. Allow 1 additional valley on each cut of the pipe to produce the sealing joint.

(An optional extra flanging tool is available which will create a perfect flange finish on both DN 16 and DN 20 stainless steel pipework.

Final Connection

1. Insert the washer into the nut.
2. Screw nut onto the relative connection.
3. Tighten nut using a spanner.

The pipe should be supported every one meter using the correct brackets.

Flushing and filling the system

Before filling and pressurising, the system must be flushed, using a solar filling machine, to remove any contaminants. It is recommended that the solar heat transfer fluid is used as some parts of the system may not be able to be drained down.

Connect the pipe from the bottom of the solar filling machine to the fill and drain valve below the pressure relief valve on the pump station and connect the pipe from the top of the machine to the fill and drain valve below the flow setter on the pump station.

Open the fill and drain valves.

Ensure the flow setter is fully open.

Turn the right hand isolating valve (with integrated thermometer) on the pump station a quarter turn clockwise to close the non-return valve.

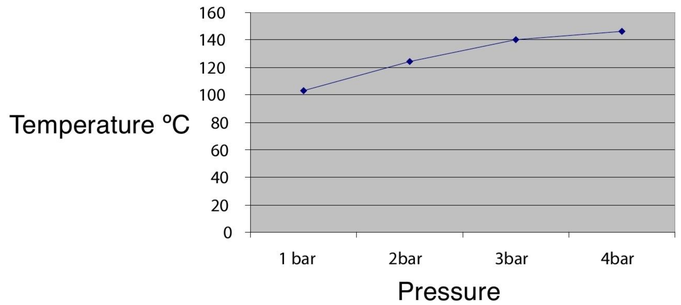
Ensure the left hand isolating valve on the pump station is turned to the anti-clockwise position to allow this non-return valve to be open.

Pour solar heat transfer fluid into the filling machine, ensure the isolation valve is open on the bottom of the machine then switch it on to allow the fluid to circulate through the system for 30 minutes to flush out the air and any possible debris.

To clear any air or debris from the flow setter and pump, turn the right hand isolation valve anti-clockwise for 5-10 seconds then turn back clockwise.

To pressurise the system, close the fill and drain valve below the flow setter and watch the pressure gauge on the pump station rise to 3 bar, close the fill and drain valve below the pressure relief valve and then turn off the machine.

It is vital that the system is pressurised to 3 bar as this raises the temperature boiling point of the heat transfer fluid.



Disconnect the machine and screw blanking caps on to the fill and drain valves on the pump station. Next, make sure both isolating valves on the pump station are turned to the anti-clockwise position.

Commissioning the pump station

To ensure the primary solar system is free from air you must manually switch on the circulation pump on the pump station via the solar differential temperature controller. To see you have circulation through the system the flow setter should give a reading of around 7 to 10 litres per minute.
The maximum flow of fluid through the system needs to be adjusted to give optimum performance. This will depend on the number of collectors used in the installation.

Commissioning the solar controller

Commissioning the solar controller
The recommended settings for the solar controller are:

- Switch on temperature difference 7°C
- Switch off temperature difference 3°C
- Minimum pump speed 40%
- Store max temperature 65°C
- For thermal stores or if the outlet temperature is controlled with a suitable TMV then store max may be set to 85°C

For pipe runs which are greater than 10m from the store to the panel it is recommended to increase the switch on temperature difference to accommodate for any possible heat loss.

To change any of the settings above please refer to the controller installation manual supplied with the controller.
Other functions on the controller are optional but are not necessary for most systems. The descriptions of these functions are in the controller manual.

System maintenance and warranty

System maintenance

The solar heat transfer fluid must be checked once every year to investigate its antifreeze and pH value. These checks can be made using a refractometer.

- Antifreeze concentration of 40 - 45%. If the reading is below 30% then the fluid will need to be replaced.
- pH Value of 8.5 - 9.5.
- Refractive index: I.374

The collector/collectors should be visually inspected once a year for any sign of leakage, damage or any sign of corrosion. Checks should also be made on the mounting brackets/bolts for any corrosion or damage.

Warranty

The collectors are guaranteed for 10 years and have a life expectancy of 25 years. The warranty will be invalid in the following cases:

- Collectors that are installed damaged or damaged during installation
- Failure of the collector due to frost, lightning strikes, transient voltages or any act of misuse or any act of vandalism.
- The guarantee does not cover the effects of scale in the system.
- Modifications or tampering will invalidate the warranty.
- The collectors must be installed in an appropriate location and there use is restricted to potable water only and back up heating.
- Any installation that has taken place and has not followed the installation and commissioning procedures.

Solar Collector Details

Manufacturers Name ..... Model .....

Evacuated Tube Yes ☐ No ☐ Flat Panel Yes ☐ No ☐

Direct Flow ☐ Heat Pipe ☐ On roof ☐ Roof Integrated ☐

Gross collector area .....M² Absorber Area.....M²

Collector Serial number (s) ..... (located on the collector)

Panel Orientation S ☐ SW ☐ SE ☐ E/W ☐

Panel Angle .....°

Stagnation Temperature ..... °C

Cylinder Details

Manufacturers Name ..... Model .....

Vented Cylinders only

Capacity of cylinder.....Litres

Is the vent pipe correctly installed? Yes ☐ No ☐

What is the static head in meters? .....

What is the cylinder thermostat setting? .....°C

Unvented Cylinders only

Capacity of cylinder.....Litres

What is the incoming water pressure.....BAR

Has strainer been cleaned of installation debris ? Yes ☐ No ☐

Has a water treatment device been fitted? Yes ☐ No ☐

If Yes to above what type.....

Are T & P and expansion valves fitted and discharged tested? Yes ☐ No ☐

Is Primary & solar energy cut out 2 port valves operational Yes ☐ No ☐

Pressure reducing valve setting.....BAR

Has expansion Vessel or internal air gap been checked? Yes ☐ No ☐

What is the cylinder thermostat setting? .....°C

Has G3 requirements been fully achieved? Yes ☐ No ☐

Solar System Details

Controller type.....

Pipe work used Copper pipe work ☐ Flexible Stainless steel ☐

Insulation type High temperature ☐ Pre-insulated ☐

Length of pipe work in meters.....

Expansion Vessel type : Solar rated Yes ☐ No ☐

Size of expansion vessel.....Litre

Pre-charge pressure of vessel.....Bar

Pump speed modulation set with controller Yes ☐ No ☐

***If Not** Flowsetter reading.....Litres / min*

Antifreeze protection method used

Concentrated Yes ☐ No ☐

Please state glycol / water mix used in percentage Water..... % Gylcol..... %

Has system been flushed / filled and de-aireated

with correct filling pump? Yes ☐ No ☐

What pressure has the primary solar

circuit been set to.....Bar

Has the system been explained to the householder Yes ☐ No ☐

Has the systems literature been left with the customer Yes ☐ No ☐

Installation Date ..... / ..... / .....

Installation Engineers Details

Company Details

Address ……

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Installation engineer……

Contact telephone number……

BPEC or LOGIC certification number……

G3 Unvented certification number……

Engineers signature……

Customers signature……

Please see web site for warranty details and manufactures instructions for system annual maintenance check.

SOLAR KEYMARK COLLECTORS
COME WITH A TEN YEAR MANUFACTURES WARRANTY.

Please contact us directly in writing within 7 days of any warranty issues.

Installation Date ..... / ..... / .....

Maintenance Record

Date	Engineer	Company Details	Findings

Notes

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