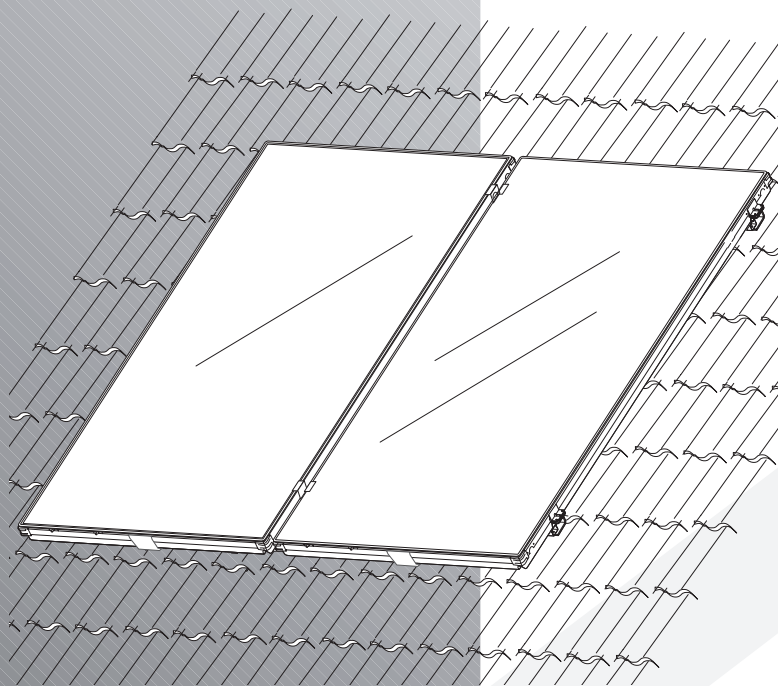


FK240 FLAT SOLAR COLLECTORS

ROOF-TOP INSTALLATION FOR WORCESTER SOLAR SYSTEMS



GB

INSTALLATION INSTRUCTIONS

About this manual

This installation manual contains important information for the safe and appropriate installation of the roof mounted solar panels.

Notes are included with important information for situations in which there is no danger for persons or equipment.

These technical documents should be retained in a safe place. These may also be inspected at the manufacturer's premises.

The activities described in the installation manual assume expertise based on completed vocational training in gas or water-related installation. Only carry out these installation steps, if you possess these skills.

- ▶ Hand these installation instructions to the customer.
- ▶ Explain to the customer the function and operation of the related devices.



RECYCLING

At the end of their service life, collectors may be returned to the manufacturer. Materials will be recycled in an environmentally appropriate manner.

Contents

1	General information	4
2	Specifications	5
3	Safety	6
3.1	Correct use	6
3.2	Notes structure	6
3.3	Please observe these safety instructions	7
4	Before the installation	9
4.1	General notes	9
4.2	Component description	10
4.3	Taking measurements	14
5	Preamsembling profile rails	16
5.1	Connecting profile rails	16
5.2	Installation of the collector holder bridge	17
5.3	Installation of the lateral collector holder	18
5.4	Installation of antislip protection	18
6	Installation of profile rails and roof hooks	19
6.1	Setting clearances	20
6.2	Pantile or brick tile ridge	21
6.3	Crown tile ridges	24
6.4	Slate/shingle ridges	26
7	Collector installation	27
7.1	Placing and connecting collectors in the collector holders	28
7.2	Securing collectors	30
8	Header connection	32
8.1	Water connection acc. to the Tichelmann principle	32
8.2	Always ensure the system is properly vented	33
8.3	Connection flow and return lines	34
8.4	Connection of air trap and venting valve (accessory)	36
8.5	Dummy plug installation	37
9	Collector sensor connection	38
10	Insulating the connection and header pipes	39

1 General information

This chapter details which technical rules and regulations apply to this installation.



USER NOTE

Observe all standards and guidelines applicable to the installation and operation of this system in your country.

UK		
Installation work on roofs	Connection of thermal solar heating systems	Installation and equipment of DHW cylinders
The Health and Safety at Work etc Act 1974 The Management of Health and Safety at Work Regulations 1999 The Construction (Health Safety and Welfare) Regulations 1996 The Construction (Design and Management) Regulations 1994 The Lifting Operations and Lifting Equipment Regulations 1998	EN 12976: Thermal solar heating system and their components (pre-fabricated systems). ENV 12977: Thermal solar heating system and their components (bespoke systems). BS 5918: Latest version: Solar heating systems for domestic hot water.	BS5546: 2000 Specification for installation of hot water supplies for domestic purposes, using gas-fired appliances of rated input not exceeding 70 kW. BS6700:1997 Specification for design, installation, testing and maintenance, of servicing supplying water for domestic use within buildings and their curtilages.

Tab. 1 Technical rules for the installation of thermal solar heating systems (selection) in UK

- 1 VOB: Contract procedures for construction work, part C: General technical conditions of contract for construction services (ATV).
- 2 Terms of invitations to tender for construction services giving special consideration to the construction of living accommodation.



USER NOTE

The installation of the Worcester Solar System must be carried out in accordance with the relevant requirements for safety, current IEE wiring regulations, local building regulations, building standards (Scotland) (Consolidation) regulations and by-laws of the local water company and health and safety document No 635 (Electricity at Work Regulations 1989).
BS 5918: Latest version

2 Specifications

FK240	
Length	2115 mm
Width	1135 mm
Height	112 mm
Clearance between collectors	40 mm
Absorber liquid content	1.15 l
Gross absorber surface area	2.4 m ²
Net absorber surface area	2.1 m ²
Net weight	approx. 43 kg
Permissible collector operating pressure	3 bar
Type approval code	08-228-762

Tab. 2 FK240 Specifications

3 Safety

This chapter details the safety instructions in general and the meaning of user notes.

You will find the safety and user notes, which specifically refer to the installation, in this chapter and in the installation manual, i.e. immediately following the individual installation steps.

Carefully read the safety instructions before commencing the installation on the roof.

Severe injury as well as material losses and environmental damage, may follow if you ignore safety instructions.

3.1 Correct use

This installation set holds the thermal solar collectors, which are installed on sloping roofs with a slope of 25° to 60°.

Operating conditions

Only erect the installation set on roofs whose construction can support the weight. If necessary, consult a structural engineer or a roofer.

The installation set is suitable for a standard snow load of 2.24 kN/m². If the installation set is installed in a roof with a slope of $\geq 45^\circ$, the approved snow load is 3.1 kN/m².

The mounting kit must not be used for fixing any other objects to the roof. The kit is intended exclusively for the safe fixing of solar collectors.

3.2 Notes structure

Two levels are identified by signal terms:



WARNING!

RISK TO LIFE

Identifies possible dangers which might lead to serious injury or death if appropriate care is not taken.

**CAUTION!****RISK OF INJURY/SYSTEM DAMAGE**

Identifies potentially dangerous situations, which might lead to mild or slight injuries or to material losses.

Further symbols identifying dangers and user notes:

**WARNING!****RISK TO LIFE**

from electric shock.

**USER NOTE**

Tip for the optimum utilisation and setting of the products plus other useful information.

3.3 Please observe these safety instructions

**WARNING!****RISK TO LIFE**

through a fall or falling parts.

- ▶ Ensure you have the correct safety equipment for working on roofs.
- ▶ Take appropriate action to prevent accidents when working on roofs.
- ▶ Whilst working on the roof, take all necessary precautions against a possible fall.
- ▶ Always wear your personal protective clothing and safety equipment.
- ▶ After completing the installation, always check the secure positioning of the installed set and that of the collectors.

**CAUTION!****RISK OF INJURY**

Injury and operating faults can result from making changes to the system construction.

- ▶ Never change the system construction.



CAUTION!

RISK OF INJURY

Some parts may cause burns, if the collector and installation materials are exposed to solar radiation for longer periods of time.

- ▶ Always wear your personal protective clothing and safety equipment.
- ▶ Cover the collector (e.g. with a sheet) and the installation material during the installation as protection against high temperatures resulting from solar irradiation.

4 Before the installation

4.1 General notes

Make yourself familiar with the on-site conditions and local regulations before commencing the installation.



CAUTION!

RISK OF INJURY

Some parts may cause burns, if the collector and installation materials are exposed to solar radiation for longer periods of time.

- ▶ Always wear your personal protective clothing and safety equipment.
- ▶ Cover the collector (e.g. with a sheet) and the installation material during the installation as protection against high temperatures resulting from solar irradiation.

Check

- ▶ the delivery for completeness and perfect condition.
- ▶ the optimum arrangement of the solar collectors. Take account of the direction of the sunlight (angle of inclination, southerly direction). Avoid the shade of high trees or structures and locate the collectors according to the shape of the building (e.g. aligned with windows, doors, etc.).



USER NOTE

Only use OEM components and replace any damaged or faulty parts immediately.



USER NOTE

Remove broken roof tiles, shingles or plates in the area of the collectors and have them replaced.

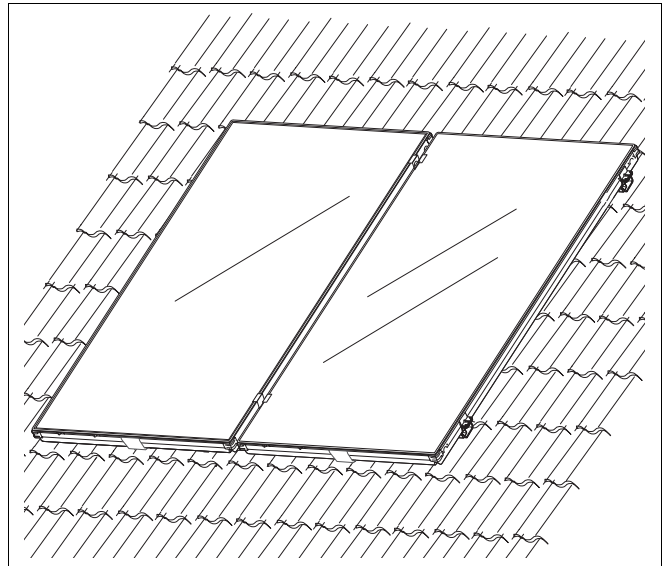


Fig. 1 General overview of collector pair – roof mounting

4.2 Component description



USER NOTE

You will need an extension set for the second and every subsequent collector and a basic pipework set for every collector array.

4.2.1 Basic set (per collector array for the first collector) – Fig. 2

Item 1:	Profile rails	2 ×
Item 2:	Antislip device	1 ×
Item 3:	Standard collector clips, incl. spacers	4 ×
Item 4:	Collector holders	4 ×
Others:	Various small components	

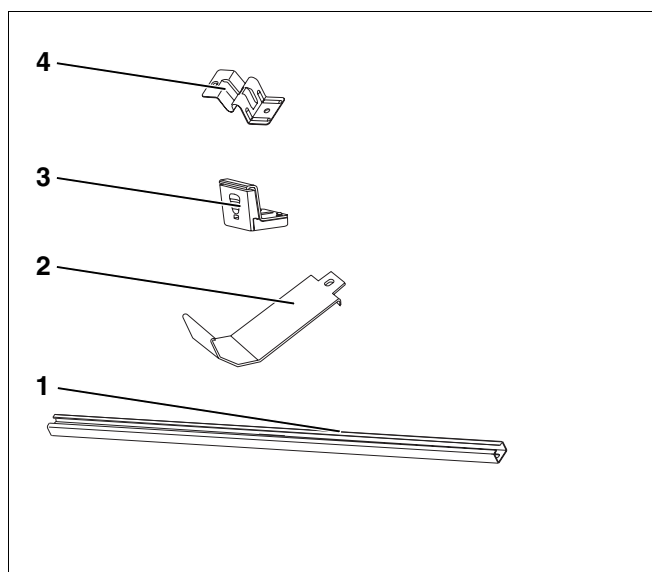


Fig. 2 Basic set

4.2.2 Extension kit (for each additional collector) – Fig. 3

Item 1:	Rail connector	2 ×
Item 2:	Profile rails	2 ×
Item 3:	Collector holder link, incl. spacers	2 ×
Item 4:	Double clips, including protective caps	2 ×
Item 5:	Antislip device	1 ×
Others:	Various small components	

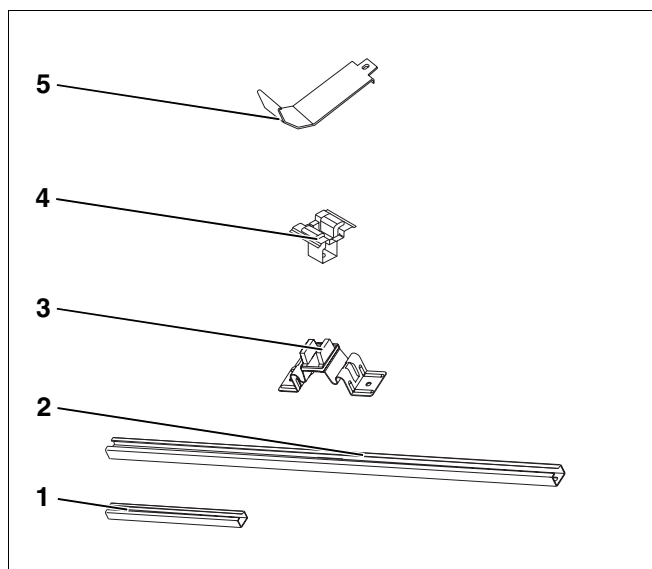


Fig. 3 Extension set

4.2.3 Basic pipe set (per collector array) – Fig. 4

Item 1:	Cable clamp for collector sensor	1 ×
Item 2:	SW 5 Allen key	1 ×
Item 3:	solar hoses, length 1000 mm	2 ×
Item 4:	solar hoses, length 60 mm (spare)	2 ×
Item 5:	Hose couplings	2 ×
Item 6:	Hose clips (including 1 x spare)	7 ×
Item 7:	Dummy plug	2 ×
Others:	Various small components	

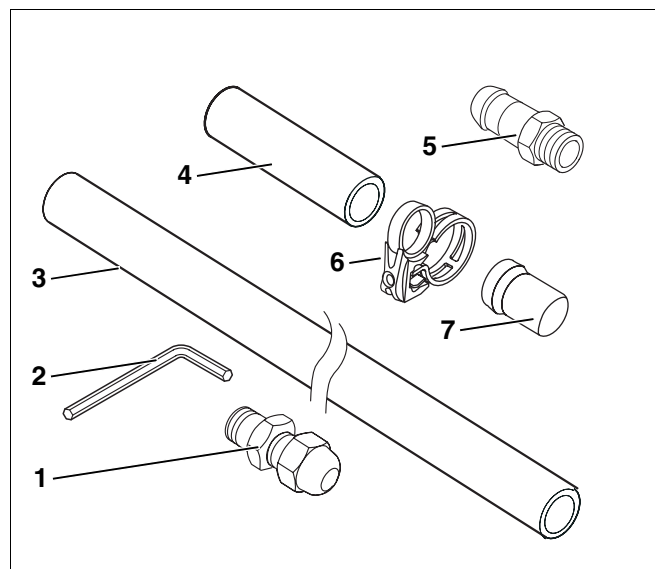


Fig. 4 Basic pipework set

4.2.4 Roof hook installation set (for pantile and brick ridges) – Fig. 5

Item 1:	Roof hook	4 ×
	Various small components	

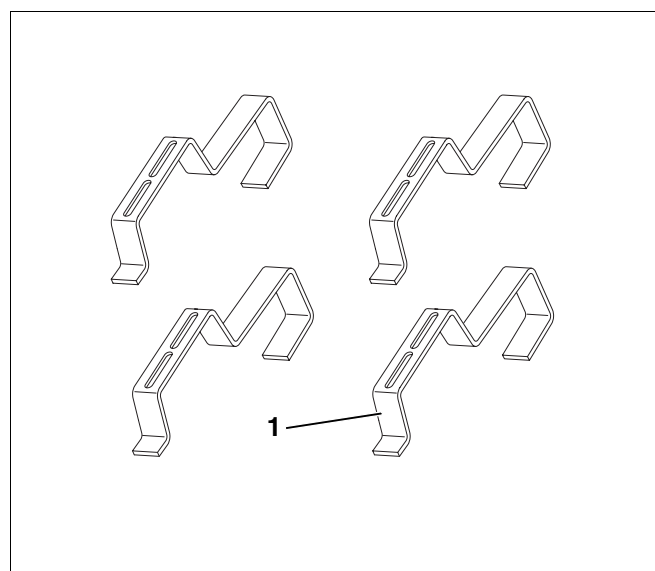


Fig. 5 Roof hook installation set

4.2.5 Roof hook additional installation set (for pantile and brick ridges; accessories, per collector) – Fig. 6

Item 1: Additional roof hooks 4 ×

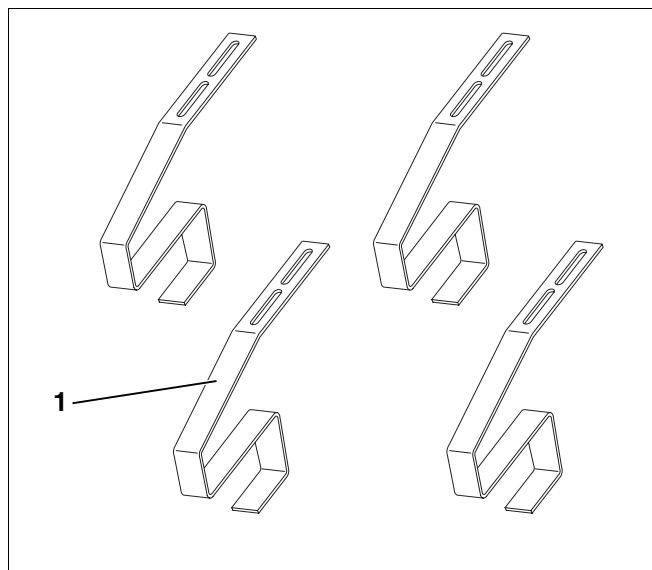


Fig. 6 Roof hook additional installation set – accessories

4.2.6 Special roof hook installation set (for slate, shingle and crown tile ridges; accessories; per collector) – Fig. 7

Item 1: Special roof hooks 4 ×
Others: Various small components

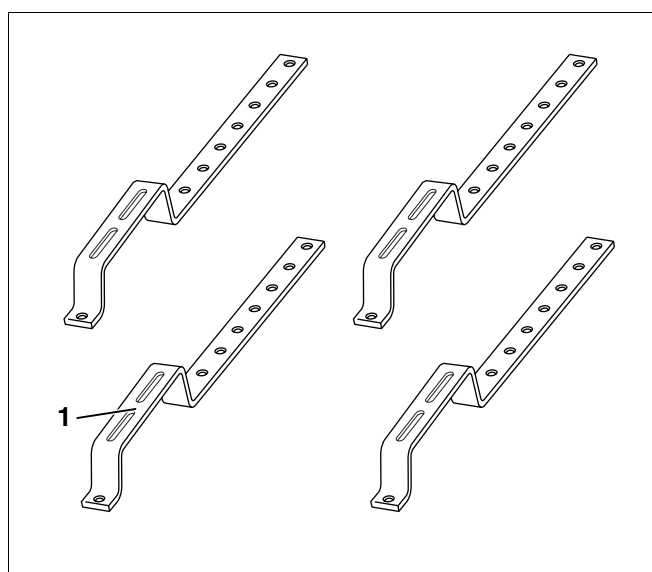


Fig. 7 Special roof hook installation set – accessories

4.2.7 Special roof hook installation set (for crown tile ridges; accessories, per collector) – Fig. 8

Item 1:	Special roof hook accessories	4 ×
Others:	Various small components	

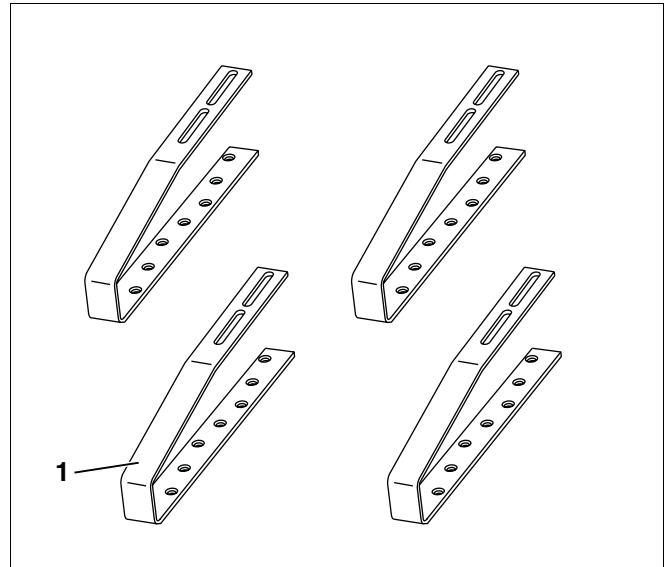


Fig. 8 Special roof hook installation set – accessories

4.2.8 Other required tools and equipment

- SW 13, 27 spanners
- Spirit level
- Suction pump (recommended but not required)
- Vest harness with safety rope
- Pipe insulation
- Scaffolding (where required by law)
- Roofing ladder

4.3 Taking measurements



USER NOTE

Carefully select the location of the collector array on the roof, and note the correct collector orientation.

4.3.1 Estimate your space requirements

Plan sufficient roof area for vertical installation.

These dimensions relate to the roof surface area, which must be available.

The dimensions stated relating to space requirements are simply the width of the collector array. In addition, allow at least 0.5 m on either side of the collector array for pipework (Fig. 9).



USER NOTE

If you install a vent, sufficient space around the flow exit must be planned during installation.

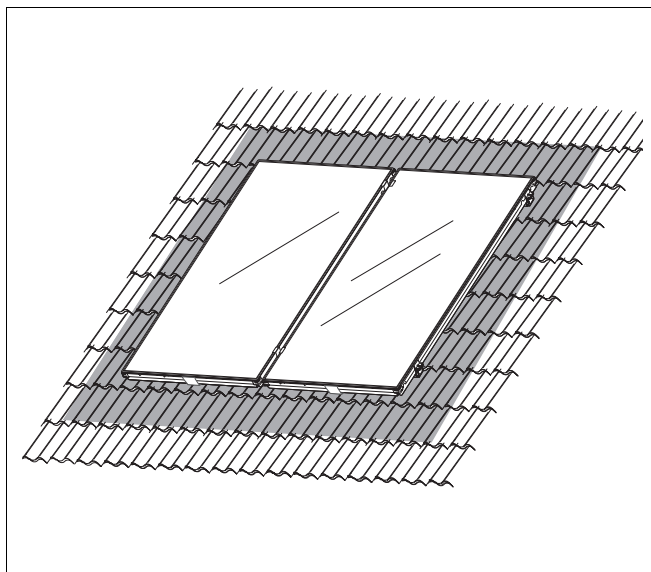


Fig. 9 Space required for collector array

4.3.2 Please observe these dimensions

Dimension A and B

Dimension A and B (Fig. 10) correspond to the area required for the selected number and layout of the collectors.

Dimension C

Dimension C represents at least two tiles to the ridge. There is a risk of damaging the tiles at the roof ridge, particularly if the tiles are laid in mortar.

Dimension D

Dimension D corresponds to the roof height including the gable wall. The adjacent 50 cm clearance to the collector array is required under the roof on the right or left depending on the type of connection.

Dimension E

Dimension E corresponds to at least 30 cm, which is required in the attic for installation of the connection pipes.

Dimension F

Dimension F corresponds to at least 40 cm, which is required in the attic for installation of the connection pipes.

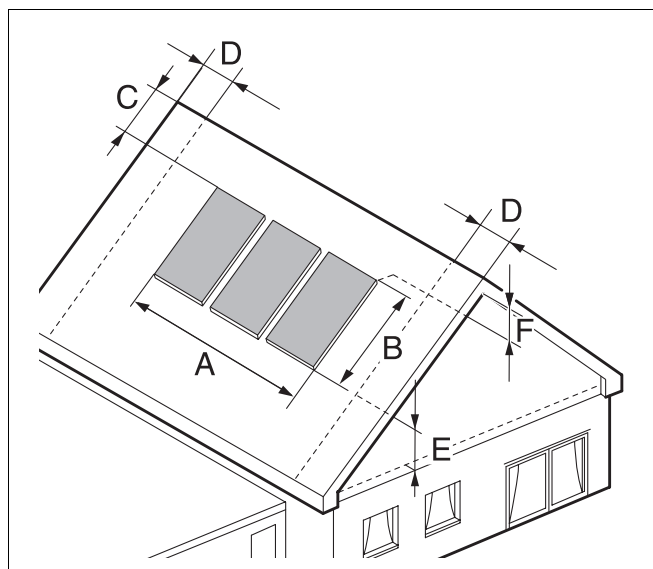


Fig. 10 Space required for collector array

Space requirement

Number of collectors	Dimension A	Dim. B
2	2,34 m	2,20 m
3	3,51 m	2,20 m
4	4,68 m	2,20 m
5	5,85 m	2,20 m
6	7,02 m	2,20 m
7	8,19 m	2,20 m
8	9,36 m	2,20 m
9	10,53 m	2,20 m

Tab. 3 Space requirement for vertically installed collectors

5 Preassembling profile rails

Before starting the installation on the roof, the profile rails for a maximum of three collectors can be preassembled on the ground.

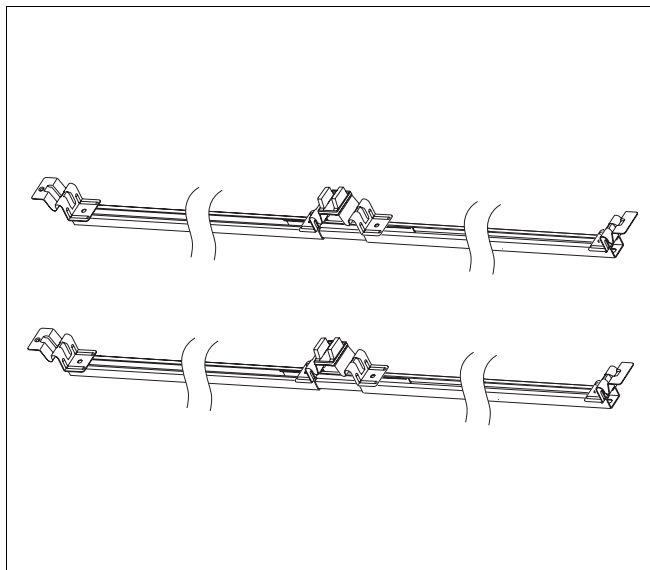


Fig. 11 Preassembled profile rails for two adjacent collectors

5.1 Connecting profile rails

If you wish to preassemble multiple collectors (at least two), the individual profile rails (top and bottom) must be connected with rail connectors (Fig. 12, **Item 1** and **2**).

- Slide the rail connectors (Fig. 12, **Item 1**) until they lock (Fig. 12, **Item 3**) in the profile rails.

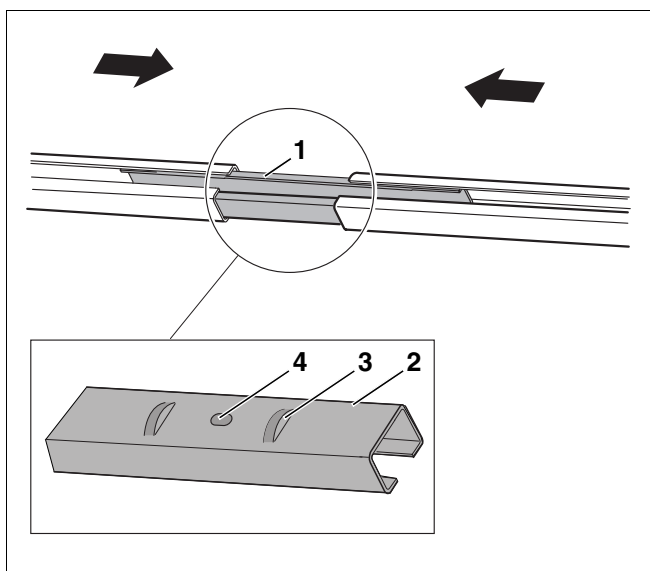


Fig. 12 Plugging profile rails together

Item 1: Plug connector

Item 2: Rail connector (back)

Item 3: Lock

Item 4: Drilled hole

5.2 Installation of the collector holder bridge



USER NOTE

The threaded plates (Fig. 13, **Item 1**) are preassembled at the factory with the pan-head screws (Fig. 13, **Item 2**) to the collector holder link (Fig. 13, **Item 4**).

The threaded plates have a self-locking, tight thread.

- Position the two collector holder links centrally Fig. 13 on the two profile rails (above the rail connector).



USER NOTE

A drilled hole (Fig. 12, **Item 4**, page 16) is present in the rail connector to check that the collector holder link is centrally positioned.

Make sure that the spacer block (Fig. 13, **Item 3** and Fig. 14, **Item 1**) is at right angles to the profile rails on the frame.

- Now fasten the collector holder link to the underlying profile rails and rail connectors with the preassembled threaded plates and pan-head screws.
- Pay particular attention to the orientation of the threaded plates in Fig. 13.

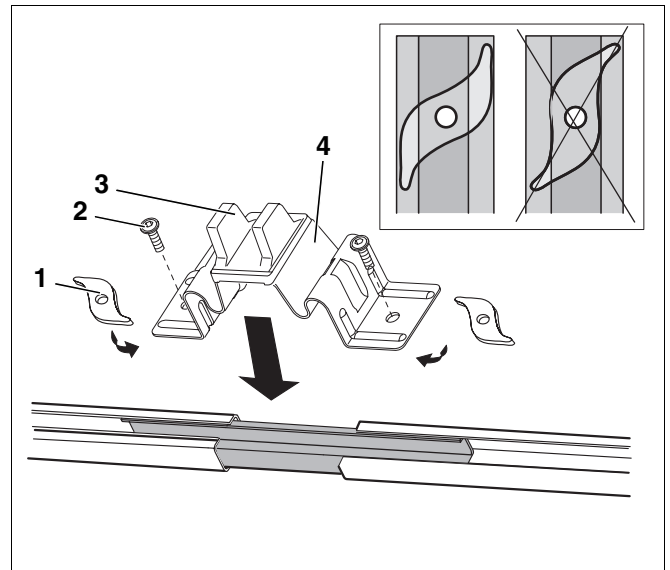


Fig. 13 Installation of the collector holder bridge

Item 1: Threaded plate (preassembled)

Item 2: Pan-head screw (preassembled)

Item 3: Spacer block

Item 4: Collector holder link (preassembled)

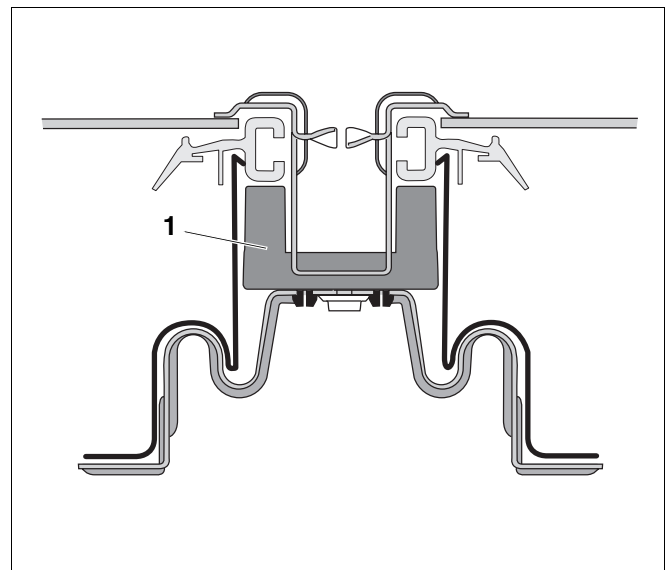


Fig. 14 View of the exact position of the spacer block

5.3 Installation of the lateral collector holder

The lateral collector holders act as lateral ends or limits of the collector array.

- Install the collector holder Fig. 15 so the edge of the threaded plate is flush with the end of the profile rail. The threaded plate must not protrude under any circumstances.
- Attach the collector holders with the preassembled threaded plates (self-locking, tight thread; Fig. 15, **Item 2**) and pan-head screws (Fig. 15, **Item 1**).

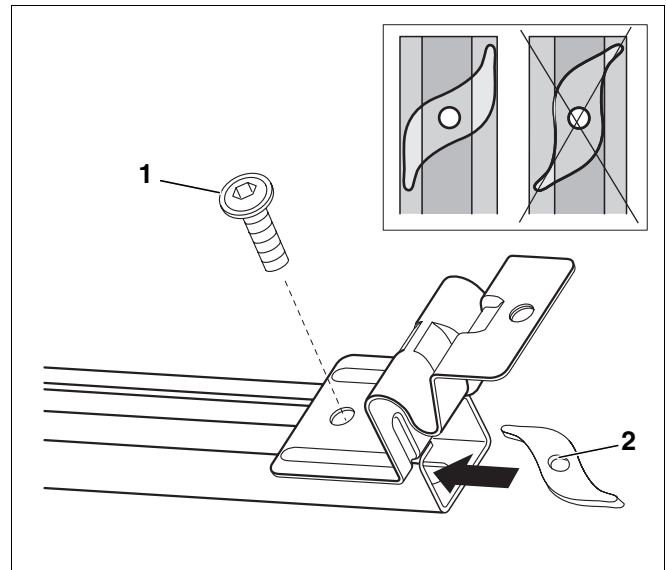


Fig. 15 Securing the collector holder flush with the profile rail

Item 1: Pan-head screw (M8 x 16, preassembled)

Item 2: Threaded plate (preassembled)

5.4 Installation of antislip protection

To be able to install the collectors safely, the antislip device (Fig. 16, **Item 1**) must be attached and secured to the bottom profile rails.

- Attach the preassembled antislip device centrally between the collector holders Fig. 16 with the threaded plates (self-locking, tight thread; Fig. 16, **Item 3**) and pan-head screws (Fig. 16, **Item 2**).
- Tighten the screws.

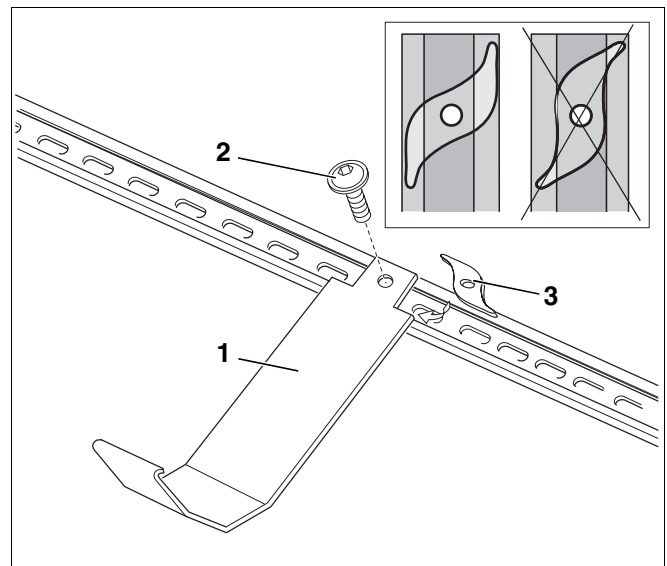


Fig. 16 Attaching antislip device

Item 1: Antislip device

Item 2: Pan-head screw (preassembled)

Item 3: Threaded plate (preassembled)

6 Installation of profile rails and roof hooks



WARNING!

RISK TO LIFE

Whilst working on the roof, take all necessary precautions against a possible fall.



CAUTION!

RISK OF INJURY

When working on a roof falling parts may cause serious injury.

- ▶ Take appropriate action to prevent accidents when working on roofs.
- ▶ Always wear your personal protective clothing and safety equipment.



USER NOTE

For better access to the roof use a scaffold tower.

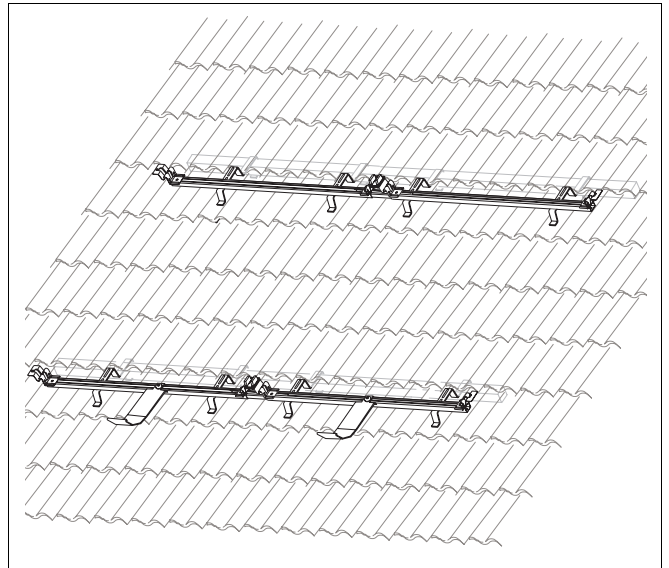


Fig. 17 Profile rails with roof hooks installed on a tile roof – for two adjacent collectors

6.1 Setting clearances

The dimensions given are guide values that should be approximately maintained.



USER NOTE

On pantile and brick tile roofs the tile troughs determine the true distance between the roof hooks.

Distances of roof hooks

Every profile rail is fastened with two roof hooks (and if required additional roof hooks) (Fig. 18). See the table for the approximate distance between the roof hooks.

Distance w	Distance x	Distance z
approx. 1170 mm	approx. 700 mm	approx. 470 mm

Tab. 4 Distance of the roof hooks from one another



USER NOTE

Distances x and z should always be approximately equal to distance w.

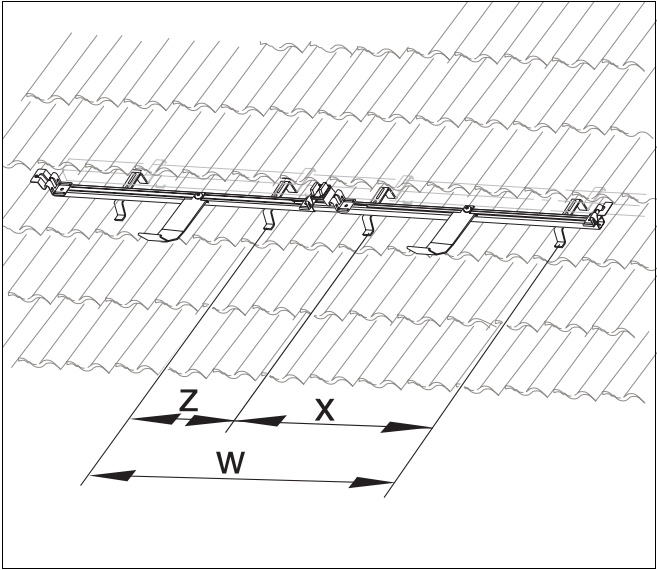


Fig. 18 Distance of the roof hooks from one another

Distances of profile rails

Set the distance (Fig. 19) between the top and bottom profile rails. Use the table values.

Distance y	
from	to
1 650 mm	1 690 mm

Tab. 5 Distance (centre-centre) between bottom and top profile rail



USER NOTE

The top profile rail must be between the sensor pocket and the collector connection.

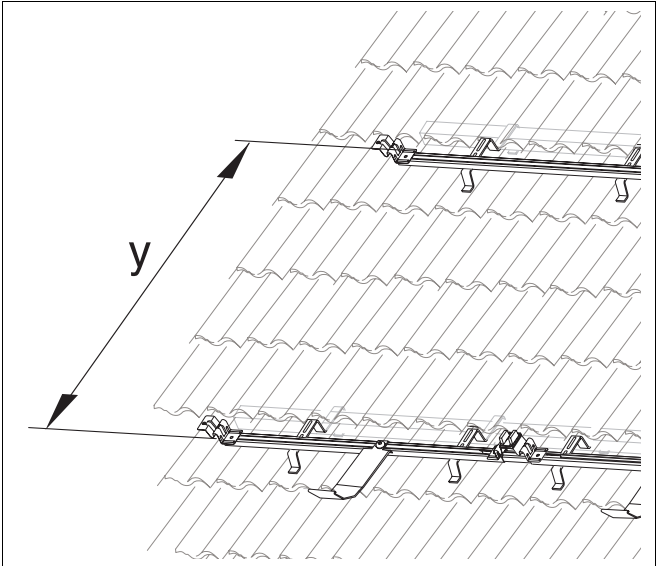


Fig. 19 Distance of the profile rails from one another

6.2 Pantile or brick tile ridge

Always install all roof hooks (and additional roof hooks if required) following the reference values specified in the tables on page 20.



USER NOTE

Do not modify the roof construction and avoid damaging the roof covering. In the case of ridge tiles laid in mortar, lift the tiles starting with the 3rd row under the ridge.

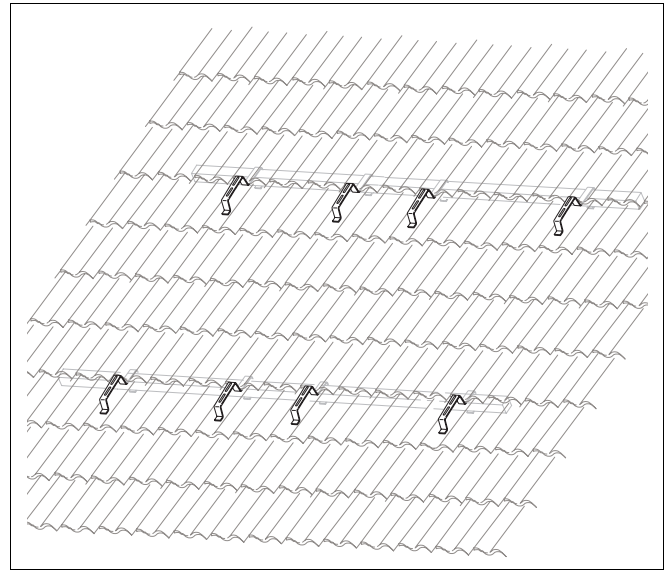


Fig. 20 View of attached roof hooks and additional roof hooks

6.2.1 Attaching roof hooks

- ▶ Lift the corresponding pantile or brick tile (Fig. 21).
- ▶ Attach the roof hook to the roof battens and position it with the bottom in a tile trough.



USER NOTE

If necessary, knock off the base of the tile so it will lie correctly back on top of the roof hook.



USER NOTE

Mark the distance of the profile rails on the roof hook.



USER NOTE

If the tiles overlap more than 95 mm, they must be notched in the area of the roof hook.

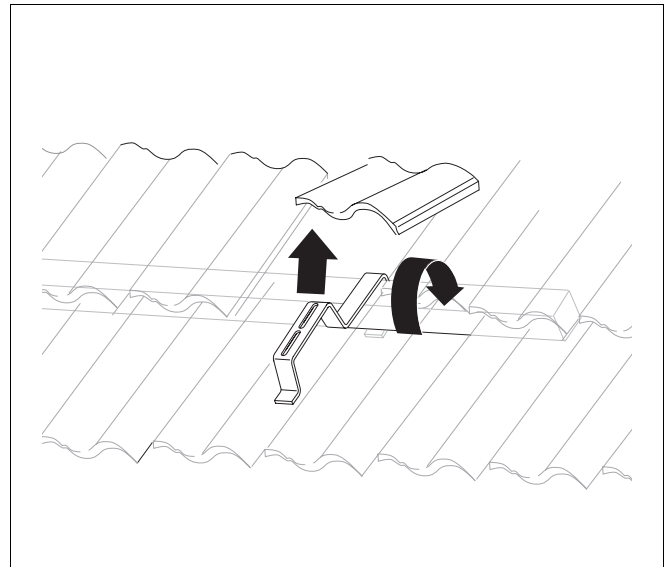


Fig. 21 Attaching roof hooks

6.2.2 Attaching additional roof hooks (accessories)

Additional roof hooks are required as well as the roof hook if:

- the roof slope is less than 30°.
- the distance to the edge of the roof or ridge is greater than three pantiles or brick tiles.
- wind forces are expected.
- ▶ Lift the corresponding pantile or brick tile (Fig. 22).
- ▶ Take the additional roof hook and guide it diagonally under the pantile or brick tile. The additional roof hook must be attached to the roof batten and be in contact with the roof hook above.

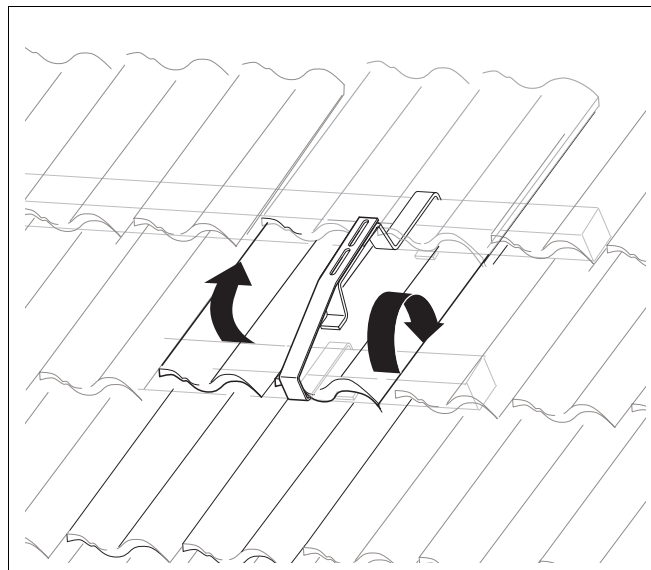


Fig. 22 Attaching additional roof hooks

6.2.3 Installing profile rails

- ▶ Always start with the bottom profile rail.
- ▶ Place the profile rails that were preassembled on the installed roof hooks (Fig. 23).
- ▶ As specified in Table 5, page 20 the profile rail should be positioned as far down the hook as possible (the collector later covers the additional roof hook as far as possible). We recommend a batten gauge to maintain the correct distance of the profile rails.
- ▶ Align the profile rails horizontally.
- ▶ Connect the profile rails and roof hooks with nuts, shims and pan-head screws.

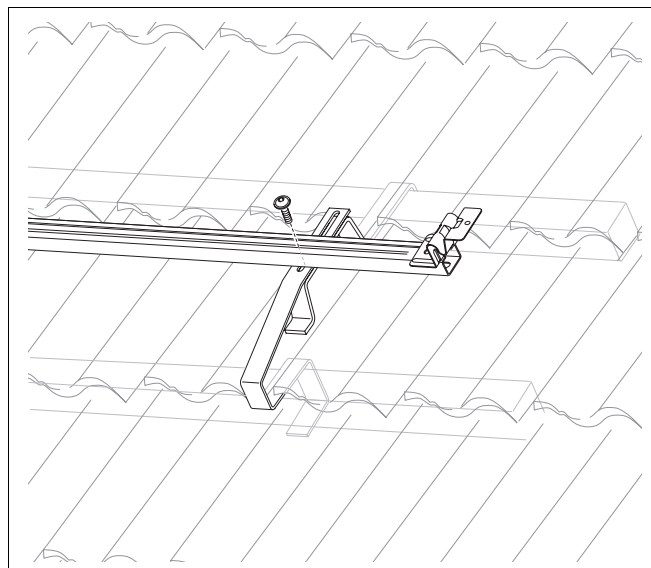


Fig. 23 Screw preassembled profile rail to roof hook and additional roof hook

6.2.4 Aligning profile rails

- Align the top profile rails to the side flush with the bottom profile rails (Fig. 24).



USER NOTE

Measure the diagonals or place a roof batten on the collector holders of the profile rails. The angle between roof batten and profile rail must be 90° .

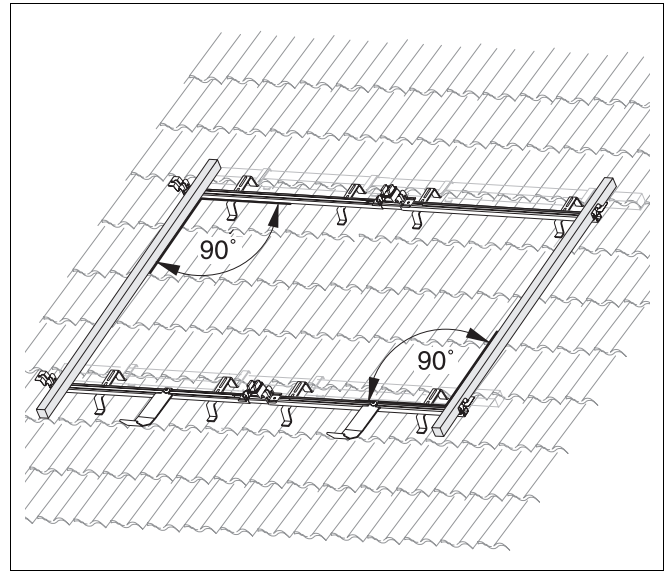


Fig. 24 Aligning profile rails

6.3 Crown tile ridges



USER NOTE

Consult a roofer when installing on a roof with crown tiles.

- During installation maintain the required distances (w, x and y) between the special roof hooks and additional roof hooks (Table 4 and 5, page 20).



BUILDING DAMAGE

caused by leaks.

CAUTION!

- Install every special roof hook and additional roof hook on the centre of a crown tile.
- Install the special additional roof hooks (accessories: conditions of use see Chapter 6.2.2 "Attaching additional roof hooks (accessories)", page 22) centrally on the crown tiles with the included screws (Fig. 25).
- Cut the adjacent crown tile (Fig. 25, dashed line).
- Attach the crown tile to the roof batten (Fig. 26).
- Fasten the special additional roof hooks to the roof batten – if necessary, additional roof hooks must be installed or the roof battens cut out so the crown tiles lie flat again.

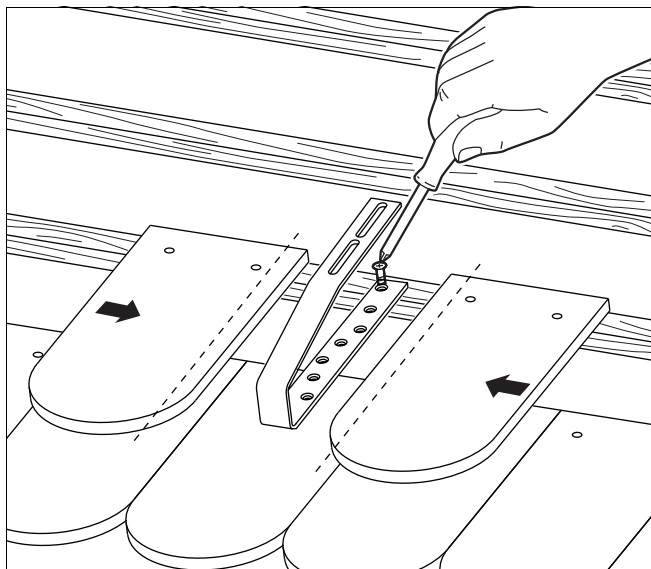


Fig. 25 Cut crown tile and install special additional roof hooks (accessories)

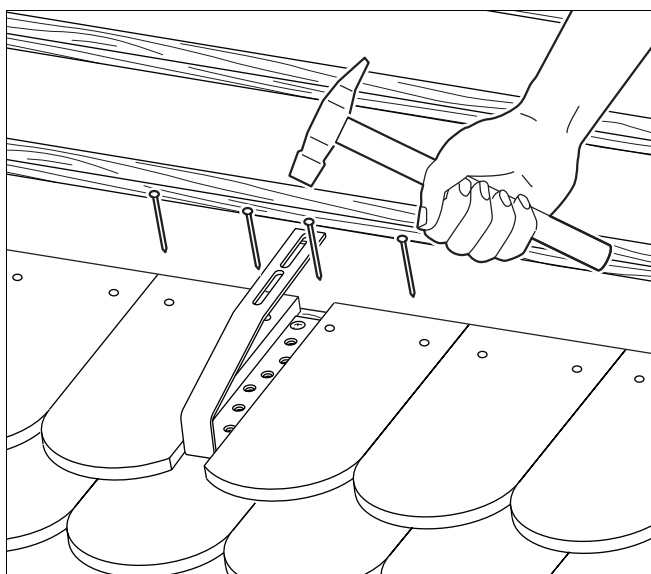


Fig. 26 Fastening crown tiles

- Place the second row of crown tiles (Fig. 27) and fasten them in place.

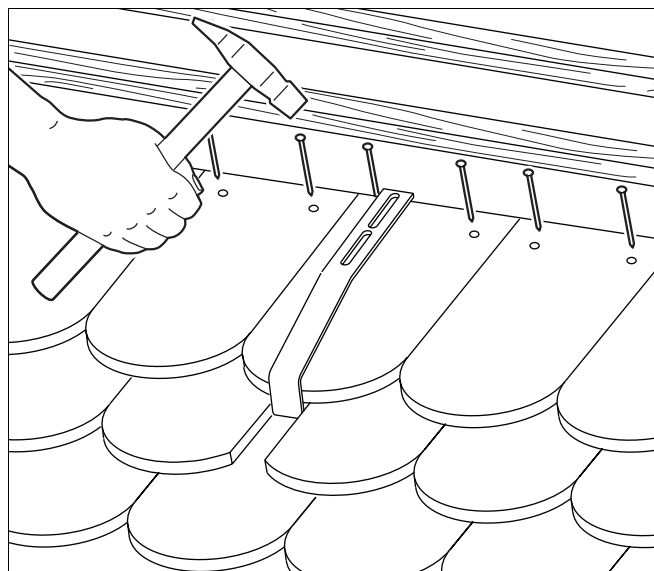


Fig. 27 Installing second row of crown tiles

- Install the special roof hooks (Fig. 28) with the included screws.

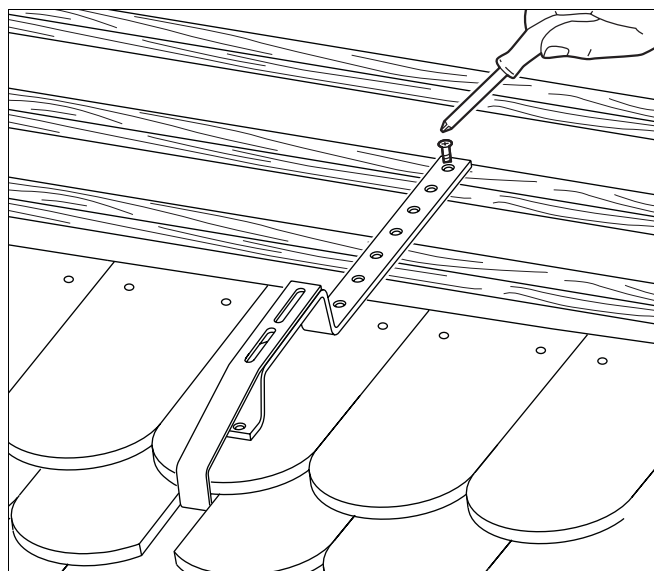


Fig. 28 Installing special roof hooks

- Cut the adjacent crown tiles (Fig. 29) and fasten them to the building.
- Finish the roof.
- Install the profile rails (see Chapter 6.2.3 "Installing profile rails", page 22).

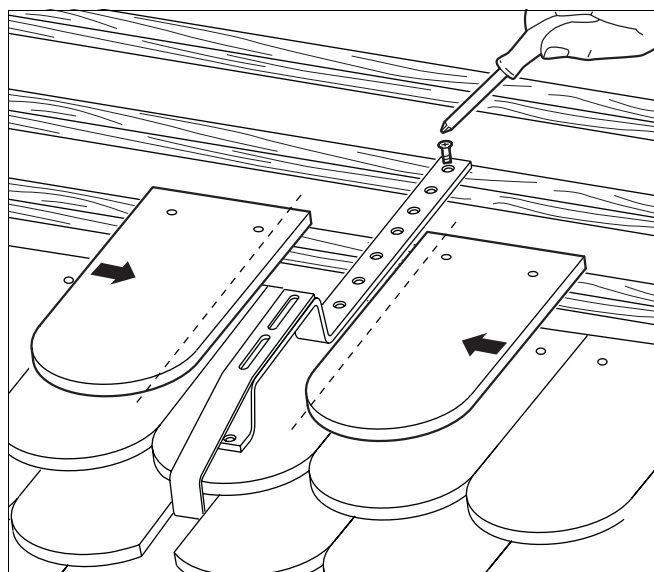


Fig. 29 Cutting and installing crown tiles

6.4 Slate/shingle ridges



USER NOTE

A roofer should carry out the installation with slates or shingles.

Here is an example of the installation of the special roof hooks and the watertight seal with on-site flashing (Fig. 31, **Item 4** and **6**) with a slate/shingle ridge.

- ▶ Fit the slate/shingle ridge according to the conditions on site.
- ▶ During installation maintain the required distances (w, x and y) between the special roof hooks and additional roof hooks (Table 4 and 5, page 20).
- ▶ Install the special roof hook (Fig. 31, **Item 5**) and the seal (Fig. 31, **Item 2** and **7**) on the slate/shingle ridge with the included screw (Fig. 31, **Item 3**).
- ▶ To ensure that the installation is watertight, flashing must be installed or positioned on the building above and below the special roof hooks (Fig. 31, **Item 4** and **6**).



USER NOTE

The special roof hooks must be positioned on the front of a multiple ridge (Fig. 31, **Item 1**).

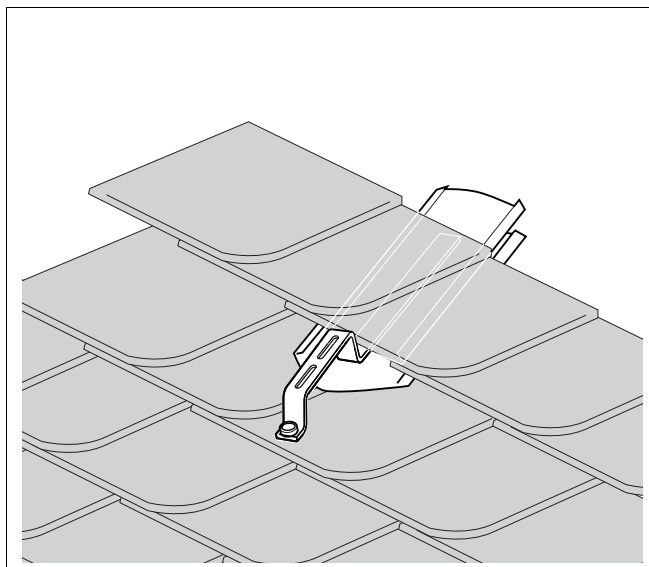


Fig. 30 Special roof hook fully installed

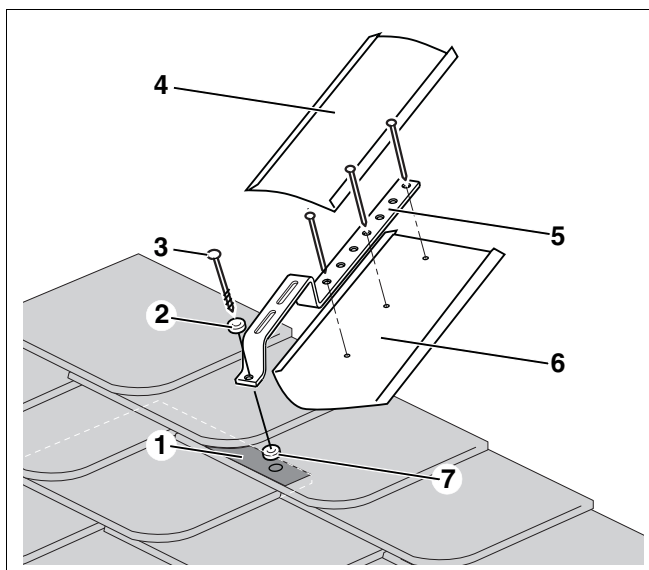


Fig. 31 Installing special roof hooks on a multiple ridge

Item 1: View of the multiple ridge

Item 2: Seal (on building)

Item 3: Screw

Item 4: Flashing (on building)

Item 5: Special roof hooks

Item 6: Flashing (on building)

Item 7: Seal (on building)

7 Collector installation

Observe the following safety and user instructions when commencing the collector installation.



RISK TO LIFE

through a fall or falling parts.

WARNING!

- ▶ Take appropriate action to prevent accidents when working on roofs.
- ▶ Whilst working on the roof, take all necessary precautions against a possible fall.
- ▶ Always wear your personal protective clothing and safety equipment.
- ▶ After completing the installation, always check the secure positioning of the installed set and that of the collectors.
- ▶ Ensure that the correct equipment is used for working on roofs.



USER NOTE

Use lifting equipment as used by roofing contractors or sufficient suction handles for the installation (for easier lifting).



CAUTION!

SYSTEM DAMAGE

Unsecured collectors may fall during handling and installation.

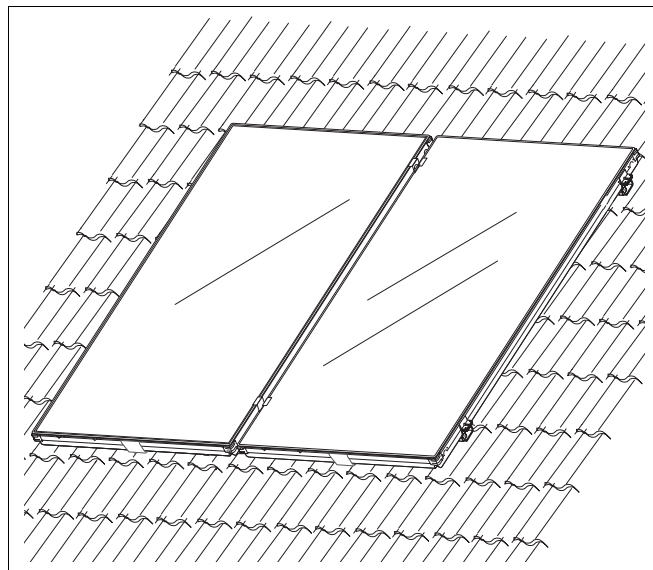


Fig. 32 View of installation on roof

7.1 Placing and connecting collectors in the collector holders



RISK OF INJURY

Install collectors with at least one assistant.

CAUTION!

- ▶ Always commence with the right hand collector.
- ▶ Position the first collector centrally into the trough of the preassembled collector holders.
- ▶ Slide the collector (Fig. 33, **Item 1 und 2**) down in front of the antislip device (Fig. 33, **Item 4**). Slide the antislip device up until the edge of the antislip device locks into the groove (Fig. 33, **Item 3**) in the collector frame.

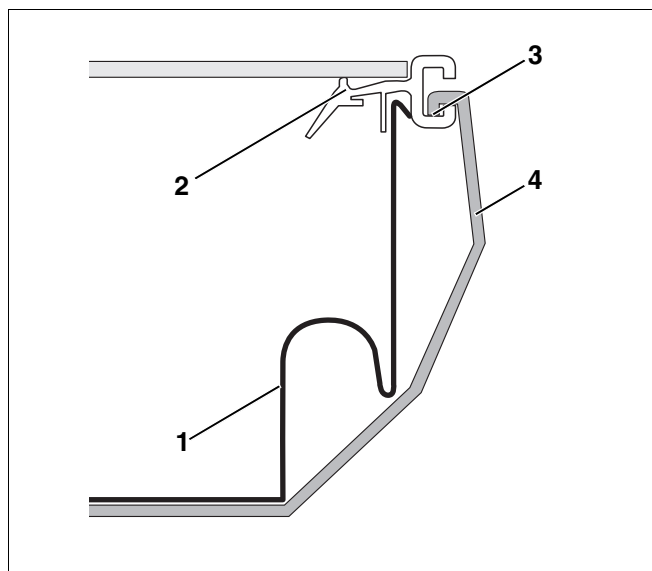


Fig. 33 Inserting the first collector

Item 1: Collector trough

Item 2: Collector frame

Item 3: Groove on collector frame

Item 4: Antislip device

As standard, the hose clip is fitted to (Fig. 34, **Item 2**) the solar hose (Fig. 34, **Item 1**).

- ▶ Before inserting the next collectors, push the hose clips (Fig. 34, **Item 2**) over the pre-assembled solar hoses (Fig. 34, **Item 1**).



USER NOTE

Ensure that the second hose clip (Fig. 34, **Item 2**) is located on the solar hose.

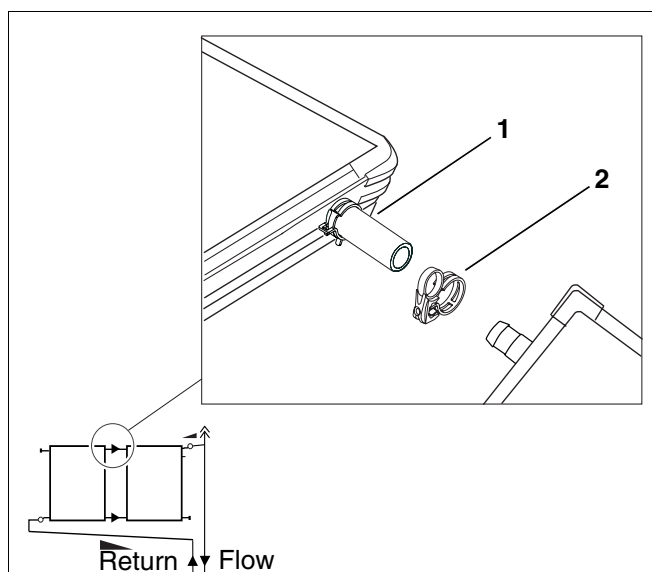


Fig. 34 Pull the hose clip over the solar hose.

Item 1: Pre-assembled solar hose

Item 2: Hose clip

- ▶ Whilst inserting the next collector, push the pre-assembled solar hoses onto the connections of the previously installed collector (Fig. 35).
- ▶ Then place the collector into the collector holders.

**CAUTION!****SYSTEM DAMAGE**

It is only possible to adjust the location of the hose clip with the blue clamping ring still in place and the clip in the open state. The clip should not be slackened with pliers, to avoid damage to the corrosion resistant coating on the hose clip.

**CAUTION!****RISK OF INJURY**

Only pull the blue ring from the clip when the solar hose is in the correctly installed position.

The blue clamping ring must be removed from the hose clip to close or secure the solar hose.

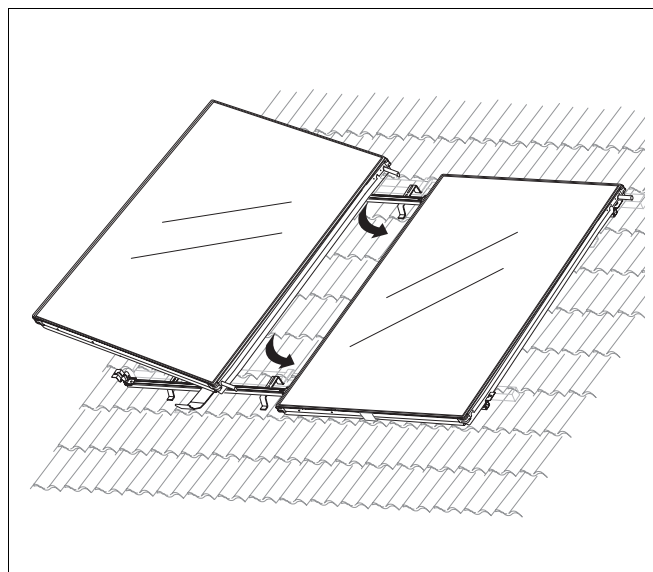


Fig. 35 Inserting the second collector and tightening the hose clip

7.2 Securing collectors

Secure the collectors with the collector clamps supplied.

- Position the edge of the double clamp onto the glass panes of the collectors (Fig. 36).



USER NOTE

Hold the collector clamps tightly when securing the clamps to ensure that they sit in proper alignment.

Ensure that the protective caps (Fig. 36, **Item 1**) of the double clamps are present.

- Secure the double clamps on the collector holders using the pan-head screws supplied.



USER NOTE

Use the Allen key SW5 to secure the collector clamps.

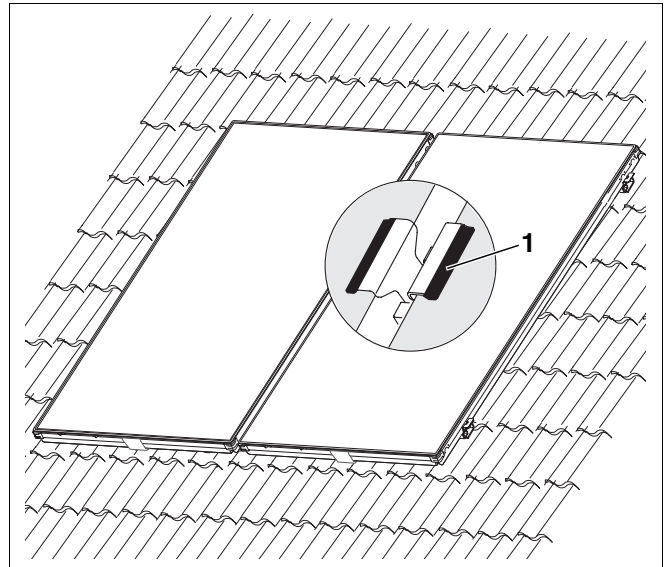


Fig. 36 Securing collectors centrally



USER NOTE

Make sure that the plastic top parts (Fig. 38, **Item 4**) of the two-part spacer blocks are located on the plastic bottom parts (Fig. 38, **Item 5**).

The plastic top parts support the collector frame.

- ▶ Tip the collector clips slightly forward and insert them into the groove in the collector frame.
- ▶ Secure the collector clips on the side collector holders using the pan-head screws supplied.

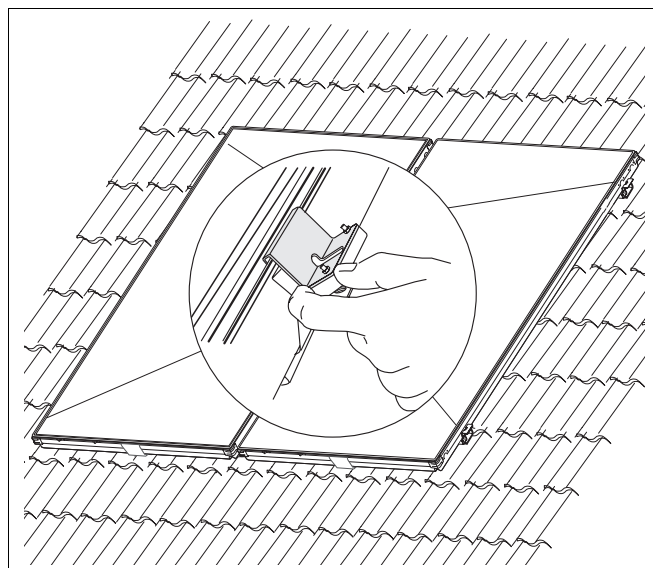


Fig. 37 Securing collectors to the side

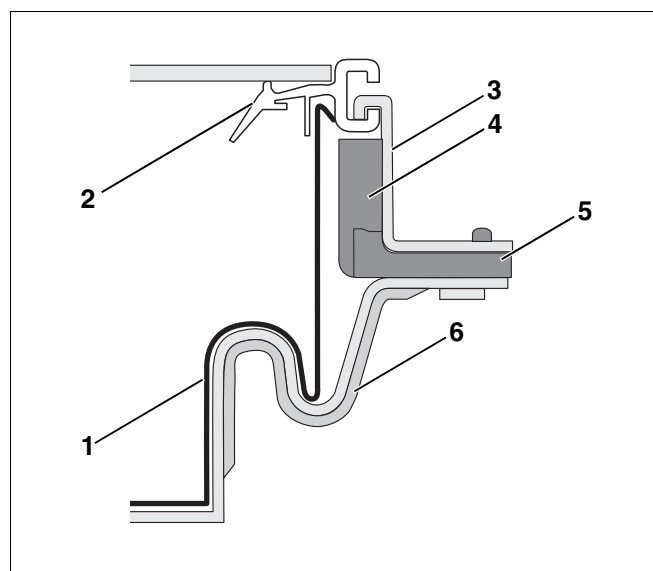


Fig. 38 Diagram of inserted collector clips

Item 1: Collector trough

Item 2: Collector frame

Item 3: Collector clips

Item 4: Top spacer plastic

Item 5: Bottom spacer plastic

Item 6: Collector holder

8 Header connection

8.1 Water connection acc. to the Tichelmann principle

Always connect the collectors according to the Tichelmann principle (Fig. 39). Install the pipework so that the same volume flow is channelled to each collector.

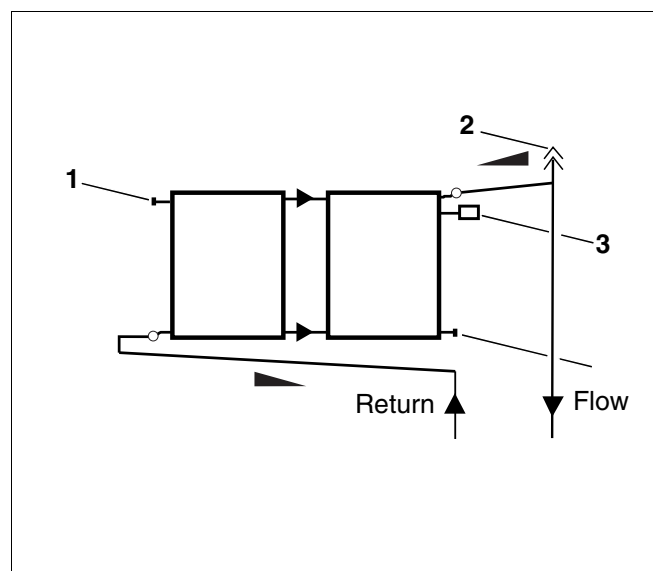


Fig. 39 Water connection acc. to the Tichelmann principle

Item 1: Dummy plug

Item 2: Automatic air-vent valve (accessory)

Item 3: Temperature sensor

8.2 Always ensure the system is properly vented

If you intend venting a solar heating system with automatic air-vent valves at the highest point of the system, run your pipework rising to the air-vent valve.

Avoid frequent changes in direction.



USER NOTE

For each change of direction downwards and each new rise, install an additional air trap with air vent.

If you cannot provide an automatic air-vent valve due to space restrictions, install a manual air-vent valve.



USER NOTE

For solar heating systems always use all-metal air vents. Automatic vents with plastic floats will be destroyed as the liquid and steam temperatures can be in excess of 110 °C. Plastic pipes (e.g. those made from polyethylene) are also unsuitable for solar heating systems.

Function of the grub screw and the weather protection cap

The solar heating system is vented through the opened grub screw (Fig. 40, **Item 1**). The weather protection cap must always be positioned over the grub screw to prevent moisture entering through the opened shut-off screw into the solar heating system (Fig. 40, **Item 2**).

- Open the air-vent valve by unscrewing the grub screw one full revolution.

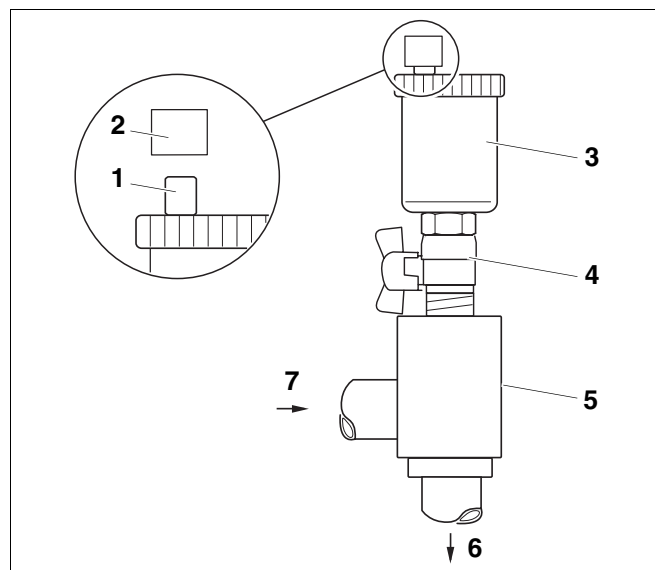


Fig. 40 View – air trap with vent valve for flow connection (accessory)

Item 1: Grub screw

Item 2: Weather protection cap

Item 3: Automatic air-vent valve (accessory)

Item 4: Ball valve, 3/8", 1/A with winged handle (accessory)

Item 5: Air trap (accessory)

Item 6: Solar heating station header

Item 7: Header from the solar collectors

8.3 Connection flow and return lines

The manifold terminates as pipeline under the roof. The connection with the collector array is achieved via $\frac{3}{4}$ inch solar hoses (part of the basic pipework set).

8.3.1 Connect flow line

- ▶ Remove the preassembled short solar hose (if the flow pipe is on the r.h. side) and replace it with the long solar hose (Fig. 41, **Item 4**) at the top connection of the collector that is the last hydraulically.
- ▶ Fasten the long solar hose to the collector with a new hose clip (Fig. 41, **Item 5**).
- ▶ Slide the second hose clip (Fig. 41, **Item 3**) over the long solar hose.



USER NOTE

Do not install the air vent (accessory) and the bleeder (accessory) yet.

You will need a conversion kit to install the bleeder above the roof. It must be ordered separately.

- ▶ On pantile or brick tile roofs feed the flow line and the sensor cable (Fig. 42, **Item 1 and 2**) into the attic through an air pantile (Fig. 42, **Item 3**) or an antenna barrel.



USER NOTE

Use a roofing company for a sheet steel roof.

Use a specially shaped insert on corrugated roofs.

- ▶ Connect the air vent with bleeder (accessories) (Fig. 41, **Item 1**) to the hose coupling (Fig. 41, **Item 2**) on the long solar hose in the attic if possible. The hose coupling is included with the basic piping set.

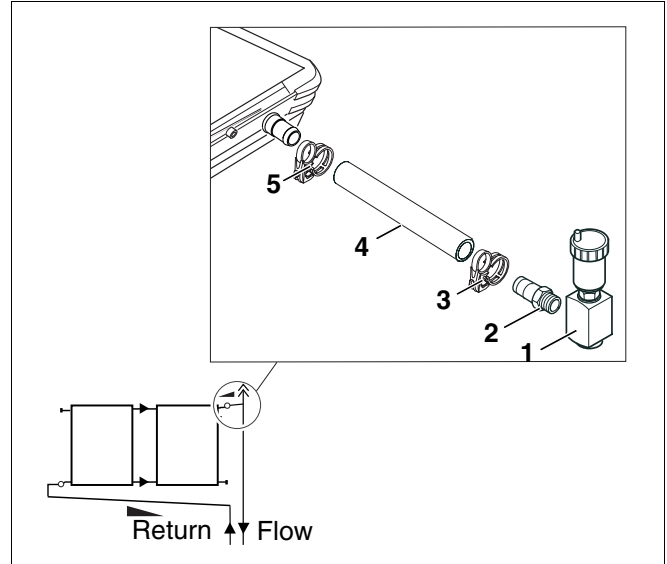


Fig. 41 Connecting flow line and air vent with bleeder

Item 1: Air trap and venting valve (accessory)

Item 2: Hose coupling

Item 3: Hose clip

Item 4: long solar hose

Item 5: Hose clip

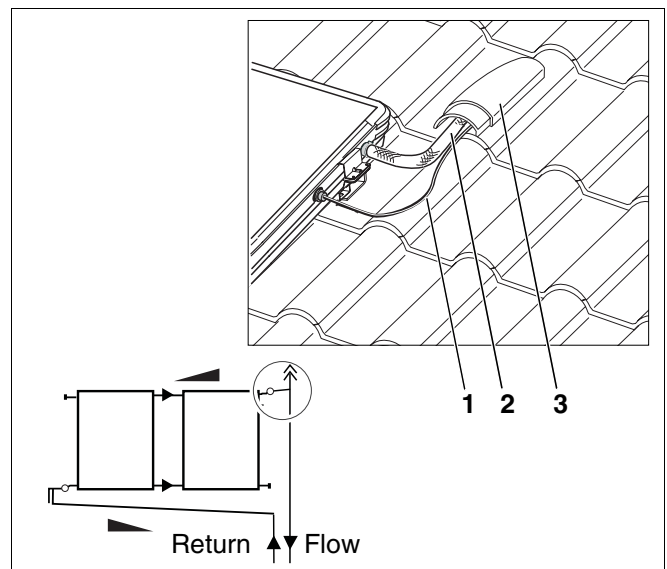


Fig. 42 Laying out flow pipe and sensor cable

Item 1: Sensor cable

Item 2: Flow line

Item 3: Air pantile

8.3.2 Connection of the return pipe



USER NOTE

During the installation ensure that the return pipe is run below the collector array rising to the array (Fig. 43).

- ▶ Fasten the long solar hose (Fig. 43, **Item 2**) to the collector with the hose clip.
- ▶ Slide the second hose clip over the long solar hose.
- ▶ Guide the return line into the attic through a suitable roof opening (e.g. soil vent cover) (Fig. 43, **Item 1**).
- ▶ Slide the supplied hose coupling onto the pipe.

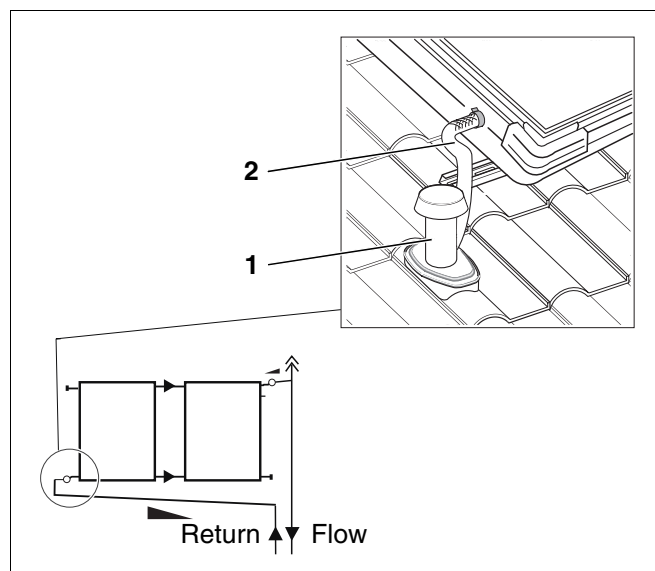


Fig. 43 Connecting return line

Item 1: soil vent cover

Item 2: long solar hose

8.4 Connection of air trap and venting valve (accessory)

- ▶ Connect the system to the air vent (Fig. 44, **Item 4**) in the flow (Fig. 44, **Item 3**) at the highest point of the system with the supplied hose coupling.
- ▶ Slide the hose clip up to the air vent.



CAUTION!

SYSTEM DAMAGE

It is only possible to adjust the location of the hose clip with the blue clamping ring still in place and the clip in the open state. The clip should not be slackened with pliers, to avoid damage to the corrosion resistant coating on the hose clip.



CAUTION!

RISK OF INJURY

Only pull the blue ring from the clip when the solar hose is in the correctly installed position.

The blue clamping ring must be removed from the hose clip to close or secure the solar hose.

- ▶ Pull the serrated washers of the hose clips.

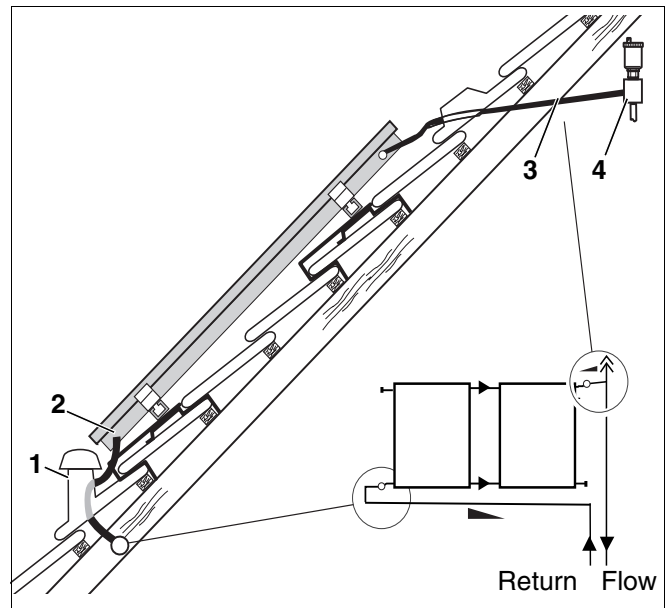


Fig. 44 Position of air vent with bleeder

Item 1: soil vent cover

Item 2: Return line

Item 3: Flow line

Item 4: Air trap and venting valve (accessory)

8.5 Dummy plug installation

Seal the collector connections, which are not required, using the dummy plugs supplied with the basic pipeline kit.

- ▶ To do this, insert the dummy plug (Fig. 45, **Item 1**) head first into the short solar hose.
- ▶ Push the hose clip (Fig. 45, **Item 2**) up to the head of the dummy plug (Fig. 45, **Item 1**).

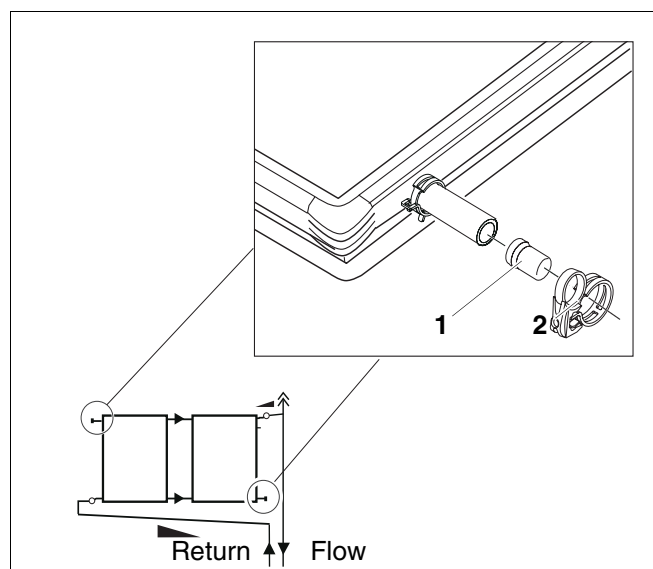


Fig. 45 Dummy plug installation

Item 1: Dummy plug

Item 2: Hose clip

9 Collector sensor connection



USER NOTE

Observe the installation location for single or dual row collector systems.

Location

- Insertion point (Fig. 46, **Item A**) for single row collector systems.
- Insertion point (Fig. 46, **Item B**) for dual row collector systems.

Collector sensor connection



USER NOTE

The collector sensor is part of the control unit package.

- ▶ Insert the collector sensor (Fig. 46, **Item 1**) through the compression fitting (Fig. 46, **Item 2** and **3**) and push the collector sensor approx. 170 mm until it reaches the end of the sensor pocket (Fig. 46, **Item 4**).
- ▶ Thread the bottom part of the compression fitting (Fig. 46, **Item 3**) into the sensor pocket thread (Fig. 46, **Item 4**).
- ▶ Tighten the compression fitting (Fig. 46, **Item 2** and **3**).

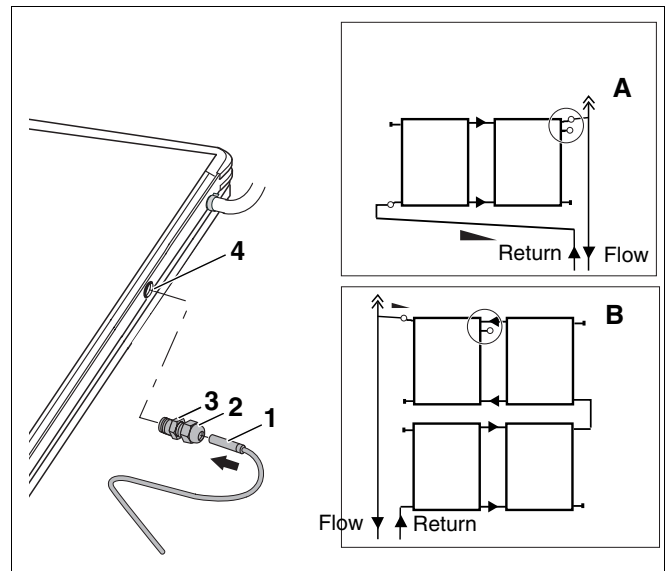


Fig. 46 Collector sensor connection

Item 1: Collector sensor

Item 2: Upper part - compression fitting

Item 3: Lower part – compression fitting

Item 4: Sensor pocket for collector sensor

10 Insulating the connection and header pipes



USER NOTE

Carry out the following insulating work only after completion of the pressure test and when all connections are tight.

- Finally, check the secure positioning of the installed set and that of the collectors.

Insulation of internal and external manifolds

- For the insulation of external pipework, use only UV and high temperature resistant insulating materials.
- For the insulation of internal pipework, use only high temperature resistant insulating materials, e.g. Armaflex HT for solar installations.



USER NOTE

Also insulate the connections between the collectors.

INSTALLATION INSTRUCTIONS

EXCELLENCE COMES AS STANDARD

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