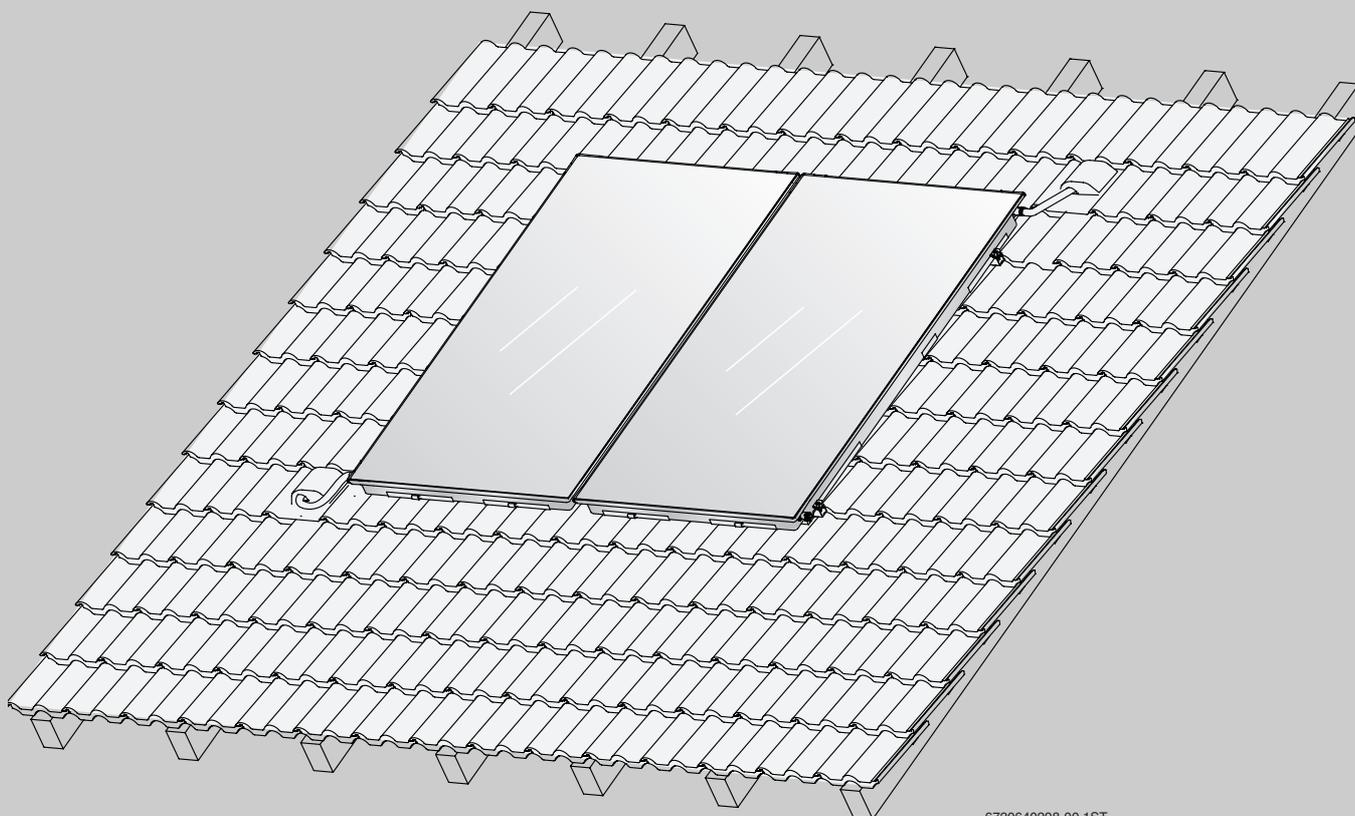


Installation and maintenance instructions

Flat-plate collector



6720640298-00.1ST

Logasol SKN 4.0

Rooftop installation

For contractors

Read carefully prior
to installation and
maintenance

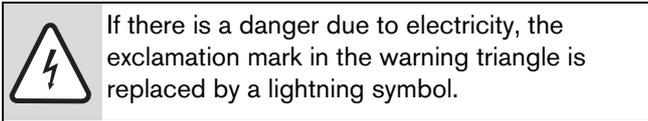
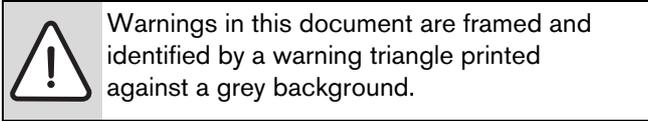
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1 Key to symbols and safety instructions

1.1 Explanation of symbols

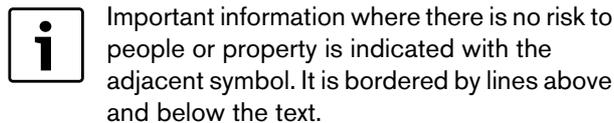
Warnings



Keywords at the start of a warning indicate the type and seriousness of the ensuing risk if measures to prevent the risk are not taken.

- **NOTICE** indicates that material losses may occur.
- **CAUTION** indicates that minor to medium injury may occur.
- **WARNING** indicates that severe injury may occur.
- **DANGER** indicates a risk to life.

Important information



Additional symbols

Symbol	Explanation
▶	Action step
1. , 2.	Numbered action steps
→	Cross-reference to other parts of this document or to other documents
•	List/list entry
–	List/list entry (second level)

Tab. 1

1.2 General safety instructions

Storage

- ▶ Only store flat-plate collectors in dry conditions (in the open only with a rain cover).

Risk of burns from the flat-plate collectors

Some parts may cause burns if the flat-plate collectors and installation materials are exposed to solar radiation for prolonged periods of time.

- ▶ Protect yourself with personal protective equipment.
- ▶ Protect the flat-plate collector and installation materials from solar radiation (e.g. with a tarpaulin).

Danger of falling when working on the roof

- ▶ If there are no general safety devices to prevent a fall, wear personal protective equipment or safety equipment.
- ▶ For all work on the roof, take appropriate measures to prevent accidents.
- ▶ Observe accident prevention regulations.

Installation

Installation and maintenance must only be carried out by an authorised contractor.

- ▶ Please read these instructions carefully.
- ▶ Never modify components.
- ▶ Fit the installation set only on roofs with sufficient load-bearing capacity. If necessary, consult a structural engineer and/or roofer.

Function check

The operator is responsible for the safety and environmental compatibility of the system.

- ▶ Users are recommended to arrange a maintenance and inspection contract with an approved contractor.
- ▶ Replace faulty parts immediately. Use only original spare parts.

Instructing the user

- ▶ Instruct users as to how the appliance functions, as well as how to operate the system as a whole.
- ▶ Inform users that they must never carry out any modifications or repairs.
- ▶ Hand these installation and maintenance instructions to the user. Point out that these instructions must be kept and passed on to the next owner/user.

2 Product information

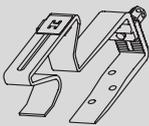
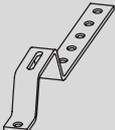
In these instructions, the Logasol SKN 4.0 flat-plate collector is simply referred to as the collector.

Pantiles, Roman tiles, stone tiles etc. will all be referred to as roof tiles.

2.1 Roof connection

The graphics in these instructions use the example of a roof covered with pantiles and the roof connection for this

type of roof. If the installation varies for other types of roofs, this is indicated in the text.

Type of roof	Pan tiles, plain tile	Sheets, corrugated sheets	Slate/shingle
Roof connection			

Tab. 2

2.2 Structure of the collector

The graphics in these instructions show vertical collectors [10]. If the installation of horizontal collectors [9] varies from that described, this is indicated in the text.

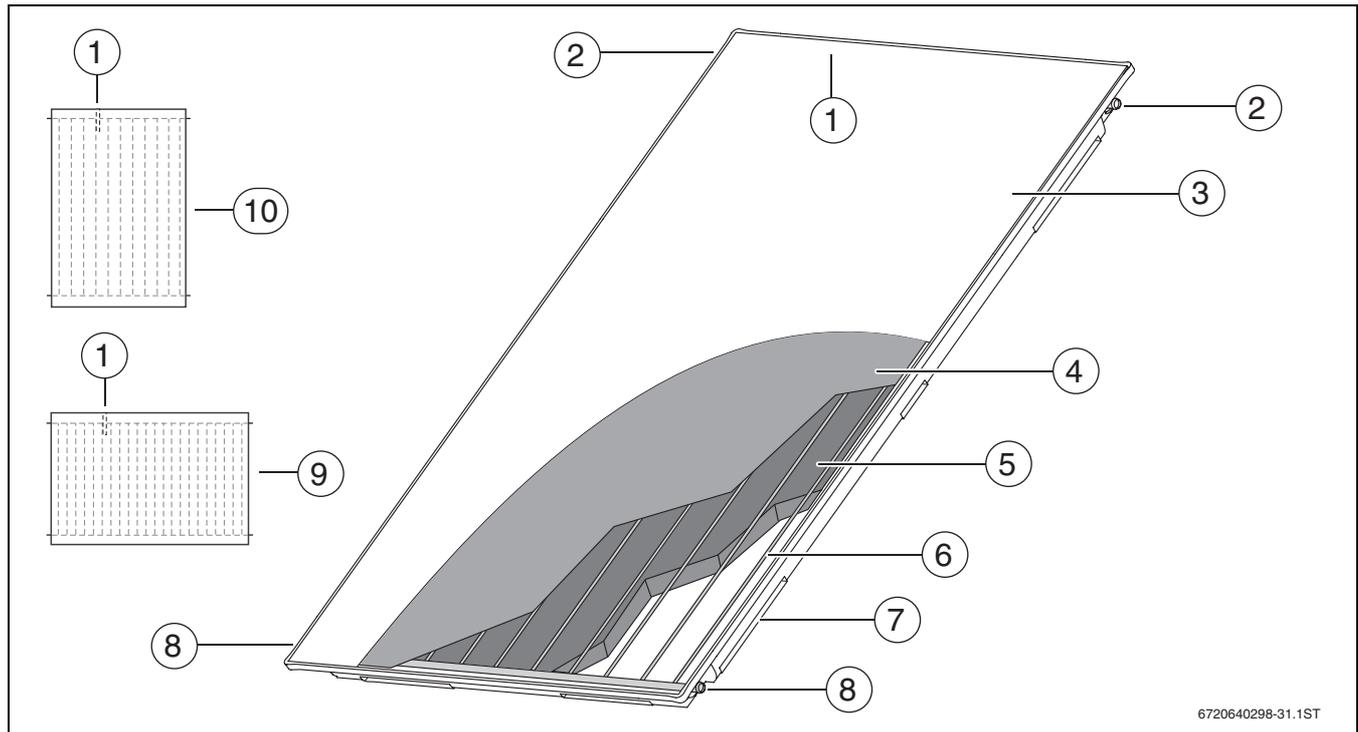


Fig. 1 Cross-section of vertical collector version

- 1 Sensor pocket for collector sensor
- 2 Collector connection, flow
- 3 Glass cover
- 4 Absorber
- 5 Insulation
- 6 Harp-shaped tube
- 7 Installation pocket inside the casing
- 8 Collector connection, return
- 9 Schematic illustration of horizontal collector version
- 10 Schematic illustration of vertical collector version

2.3 Correct use

The collectors are designed to produce heat in solar thermal systems.

The installation set is exclusively designed for the safe mounting of collectors.

- ▶ Only operate collectors in conjunction with suitable solar controllers and in fail-safe sealed unvented solar thermal systems.

Permissible heat transfer medium

- ▶ To protect the collectors against damage through frost and corrosion, operate them with Tyfocor L solar heat transfer fluid.

Permissible types of roof

These instructions describe the collector installation on pitched roofs with roof tiles, plain tiles, slate/shingle, sheet metal and corrugated sheets.

- ▶ Only use the installation set on such roofs.

Maximum thickness of roof tiles and battens

The roof hook can open up to 70 mm (→ fig. 17, page 16). This means that in order to be able to hook the roof hook in place, the combined thickness of roof tile and batten must not exceed 70 mm.

- ▶ If the roof hook opening is too tight, use the roof hook as a rafter anchor (→ fig. 20, page 17).

Permissible batten clearances

- ▶ Install landscape collectors on roofs with a batten clearance of up to 420 mm.

Permissible roof inclinations

- ▶ Fit the installation set on roofs with an inclination between 25° and 65°. On roofs with corrugated sheets or sheet steel cover, inclinations between 5° and 65° are permissible.
- ▶ On all installations, have a roofer ensure that the roof is watertight.

Permissible loads

- ▶ Only install collectors in locations with lower values than those shown in tab. 3. If necessary, consult a structural engineer.

The installation set is suitable for the following maximum loads:

Maximum snow load	Maximum wind speed	Additional accessories required ¹⁾
Portrait collector version:		
2.0 kN/m ²	151 km/h ²⁾	--
3.1 kN/m ²	151 km/h ²⁾	2 x roof connection 2 x snow load profile 1 x profile rail ³⁾
Landscape collector version:		
2.0 kN/m ²	151 km/h ²⁾	--

Tab. 3

- 1) Per collector (installation: chapter 7)
- 2) Equivalent to a dynamic pressure of 1.1 kN/m²
- 3) Including additional collector clamp

- ▶ To determine the maximum wind speed, take into account the following factors:
 - Location of the solar thermal system
 - Geographical height of the terrain
 - Topography (terrain/buildings)
 - Height and structure of building

The maximum snow load is calculated using regional zones (snow load zones) and the ground level elevation.

- ▶ Enquire about the locally applicable snow loads.

Prevent an accumulation of snow above the collector:

- ▶ Install a snow guard above the collector (maintain a clearance of no more than 1 m between the collector and the snow guard).

-or-

- ▶ Regularly clear snow build-up.

2.4 Components and technical documentation

A solar thermal system is designed to heat domestic hot water (DHW) and can also provide central heating backup where required. It comprises various components.

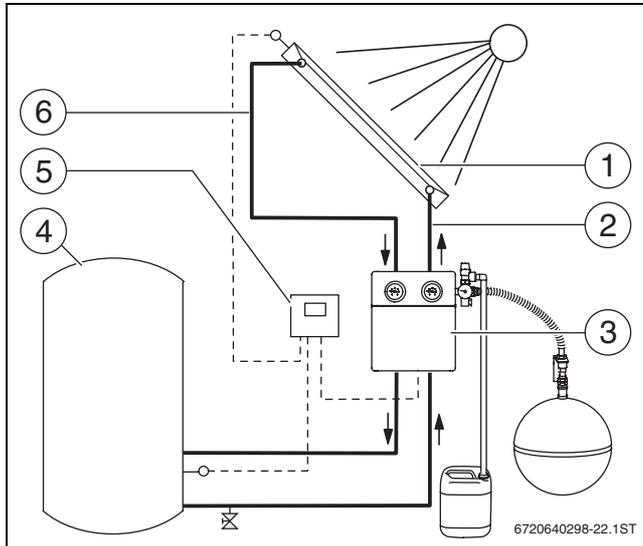


Fig. 2 Solar thermal system components

- 1 Collector with collector sensor at the top
- 2 Pipework (return)
- 3 Solar pump station with expansion vessel, temperature and safety equipment
- 4 Solar cylinder
- 5 Solar controller
- 6 Pipework (flow)

The following subjects are described in the component instructions:

Collector

- Installing the roof connection
- Fixing the collector
- Hydraulic collector connection
- Collector maintenance

Solar pump station

- Installation of the solar pump station
- Installing the pipework
- Commissioning the system as a whole
- Maintenance of the solar pump station and the whole system
- Information on system faults

Solar controller

- Installation and electrical connection of the controller
- Operation of the controller and the system as a whole
- Controller maintenance
- Information on controller faults

Further instructions may be found with the accessories.

2.5 Accessories

In the following, please find a list of accessories that may be combined with the collector and the installation set.

- Accessories for higher loads (→ chap. 7.2, page 21)
- Air vent set (→ chap. 10.2, page 29)
- Connection set for 2 rows (→ chap. 10.3, page 31)

2.6 EU Declaration of Conformity

This product conforms in design and operation to the European Directives and the supplementary national requirements. Its conformity is demonstrated by the CE designation. The Declaration of Conformity can be requested from the manufacturer (see the back cover for the address).

2.7 Type plate

The collector type plate is located on the collector casing and includes information in the form of symbols.

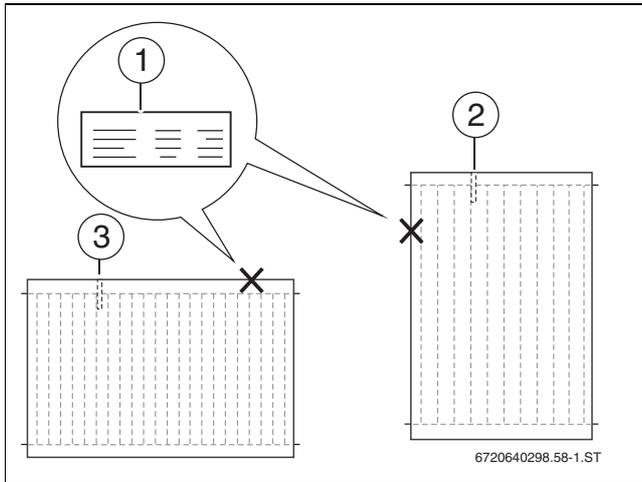


Fig. 3 Type plate position

- 1 Type plate on the collector casing
- 2 Sensor well, collector sensor, portrait collector version
- 3 Sensor well, collector sensor, landscape collector version

Symbol	Explanation	Explanation
t_{stg}	temperature _{stagnation}	Max. stagnation temperature
p_{max}	pressure _{maximum}	Max. operating pressure
m	mass	Weight
A_G	area _{gross}	External surface area
A_a	area _{aperture}	Aperture area (translucent area)
A_A	area _{absorber}	Absorber area
V_f	volume _{fluid}	Collector capacity

Tab. 4 Type plate information

2.8 Specification

Logasol SKN 4.0	
Certificates	CE 
Length	2017 mm
Width	1175 mm
Height	87 mm
Clearance between collectors	25 mm
Collector connection (connection set is required)	23 mm
Absorber capacity, portrait (V_f)	0.94 l
Absorber capacity, landscape (V_f)	1.35 l
External surface area (gross area, A_G)	2.37 m ²
Absorber surface area (net area, A_A)	2.18 m ²
Aperture area (translucent area, A_a)	2.25 m ²
Net weight, portrait version	40 kg
Net weight, landscape version	41 kg
Permissible operating pressure collector (p_{max})	6 bar
Max. stagnation temperature	199 °C

Tab. 5

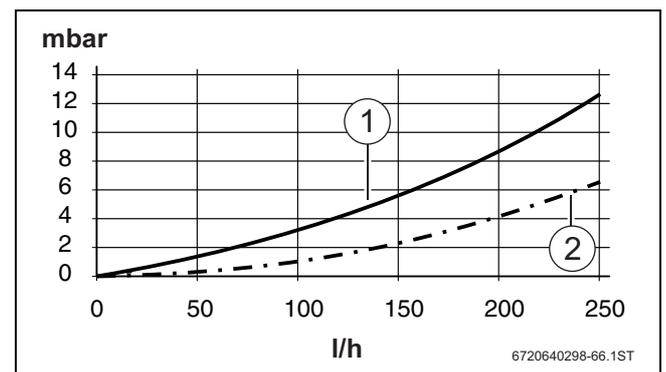


Fig. 4 Collector pressure drop

- 1 Pressure drop curve for vertical version
- 2 Pressure drop curve for horizontal version

2.9 Standard delivery

- ▶ Check that the delivered material is complete and undamaged.

2.9.1 Collector installation set

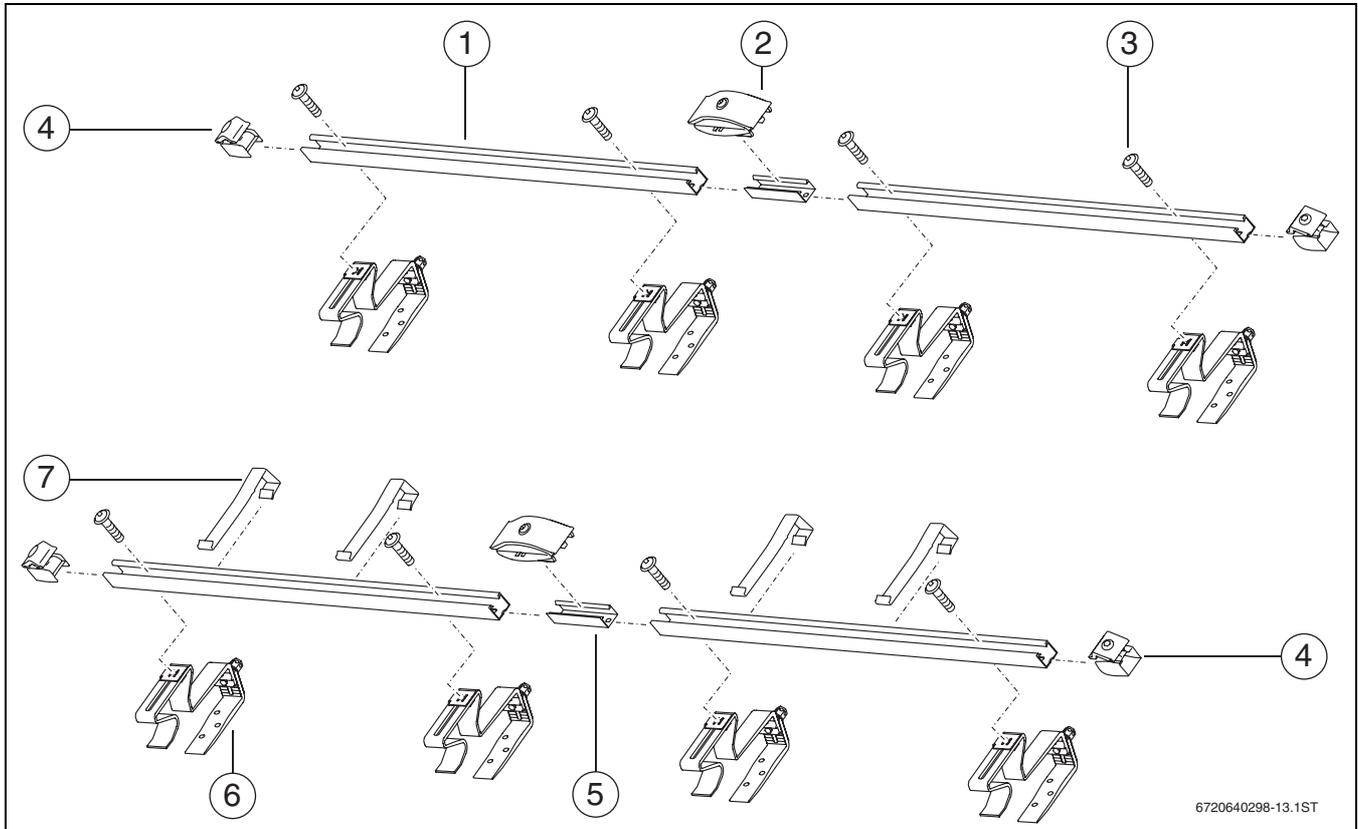


Fig. 5 Installation set for 2 collectors: 1 basic installation set, 1 extension installation set and 2 installation sets for roof tiles

Standard installation set, per collector row and for the first collector:

Pos. 1	Profile rail	2 x
Pos. 4	One-sided collector clamp	4 x
Pos. 7	Anti-slip protector	2 x
Pos. 3	Screw M 8	4 x

Tab. 6

Extension installation set, for each additional collector:

Pos. 1	Profile rail	2 x
Pos. 2	Double-sided collector clamp	2 x
Pos. 7	Anti-slip protector	2 x
Pos. 5	Connector	2 x
Pos. 3	Screw M 8	4 x

Tab. 7

Installation set for roof tiles¹⁾ per collector:

Pos. 6	Roof hook, adjustable	4 x
--------	-----------------------	-----

Tab. 8

1) Installation sets for other types of roof are described in chapter 6.

2.9.2 Connection set

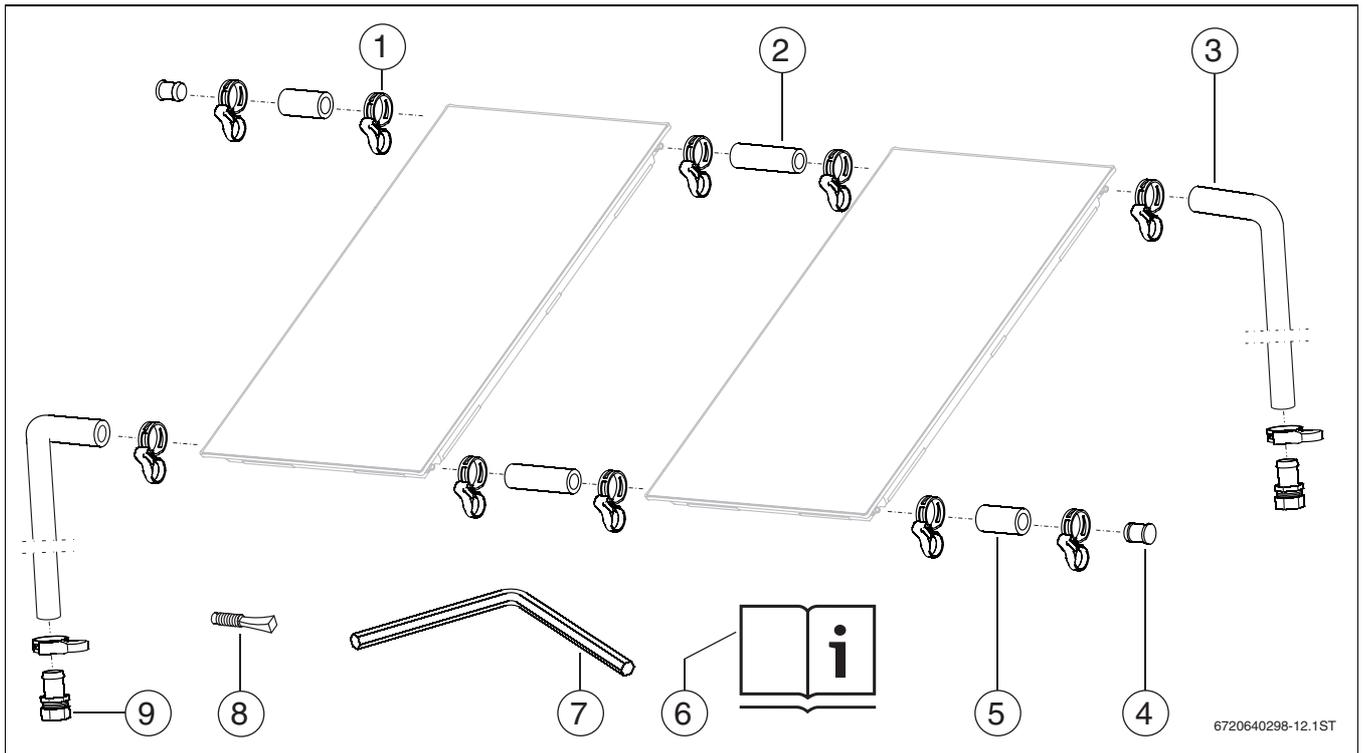


Fig. 6 1 rooftop connection set and 2 interconnection sets

Connection set for one collector array:

Pos. 1	Hose clip (1 x as spare)	5 x
Pos. 3	Solar hose, 1000 mm long	2 x
Pos. 4	Dummy plug	2 x
Pos. 5	Solar hose, 55 mm with plug	2 x
Pos. 6	Installation and maintenance instructions	1 x
Pos. 7	Allen key SW5	1 x
Pos. 8	Sensor well plug (collector sensor)	1 x
Pos. 9	Hose ferrule R 3/4 with 15mm locking ring fitting	2 x

Tab. 9

2.9.3 Collector with 2 interconnection sets

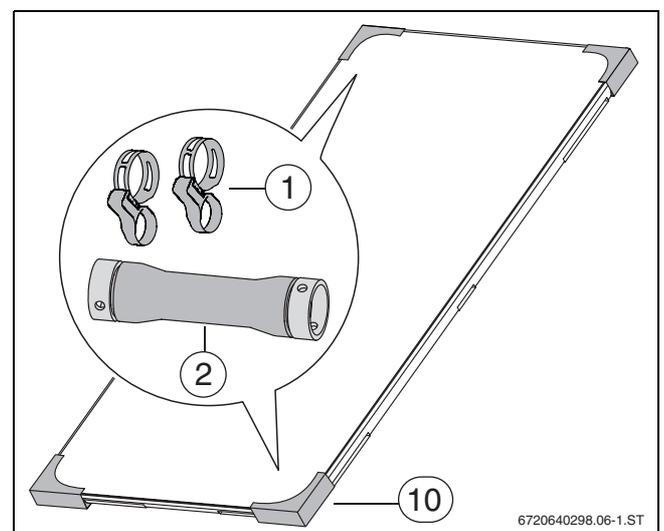


Fig. 7 2 protective corners cover 1 interconnection set each (1 interconnection set includes 2 hose clips and 1 solar hose)

Pos. 1	Hose clip	4 x
Pos. 2	Solar hose 145 mm with plug	2 x
Pos. 10	Protective corner with interconnection set	2 x

Tab. 10

3 Regulations

3.1 Validity of regulations

- ▶ Observe updated regulations or supplements. These regulations also apply at the time of installation.

- BS 8000-15: 1990: Workmanship on building sites. Code of practice for hot and cold water services (domestic scale)

3.2 Standards, regulations, directives

- ▶ Observe all standards and guidelines applicable to the installation and operation of the system in your country and region.
- The Health and Safety at Work Act 1974.
- Control of substances hazardous to health regulations (COSHH) 1994
- The pressure equipment regulations 1999
- Construction (Design and Management) Regulation (CDM) 2007
- The Work at Height Regulations 2005
- Manual Handling Operations Regulations 1992
- The Lifting Operations and Lifting Equipment Regulations (LOLER) 1999
- Reporting of injuries, diseases or dangerous occurrences regulations (RIDDOR) 1995
- Confined spaces regulations 1997
- Personal protective equipment at work regulations 1992
- Electricity at work regulations 1989
- Provision and uses of work equipment regulations (PUWER) 1998
- BS 6795:1986 Code of practice for solar heating systems for swimming pools for swimming pool.
- BS5918: A code of practice for the installation of DSHW 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: 2006 Specification for design, installation, testing and maintenance, of servicing supplying water for domestic use within buildings and their curtilages.
- EN 12976: Thermal solar heating system and their components (prefabricated systems).
- ENV 12977: Thermal solar heating system and their components (bespoke systems).
- BS 6920: Suitability of non-metallic products for use in contact with water intended for human consumption with regards to their effect on the quality of water
- BSEN 12831:2003: Heating systems in buildings. Methods for calculation of the design heat load

4 Handling



DANGER: Risk of death by falling from roof!

- ▶ Never use a ladder to move components to the roof because the installation material and collectors are heavy and difficult to handle.
- ▶ Whilst working on the roof, take all necessary precautions against a possible fall.
- ▶ If there are no general safety devices to prevent a fall, wear personal protective equipment.



WARNING: Risk of injury through falling parts.

- ▶ During transport, secure the collectors and installation materials to prevent them falling.



NOTICE: Leaks through damage to the sealing face at the collector connections.

- ▶ Remove the protective caps only immediately prior to installation on the roof.



Two of the four protective corners of the collector contain important parts (→ Fig. 7, page 9).



All packaging materials are environmentally compatible and can be recycled.

- ▶ Dispose of shipping packaging by environmentally responsible means.



NOTICE: Damage to the collector connections through incorrect use.

- ▶ Never use the collector connections as lifting points.
- ▶ To carry the collector, hold it with your hands by the recessed grips or by the collector edge.

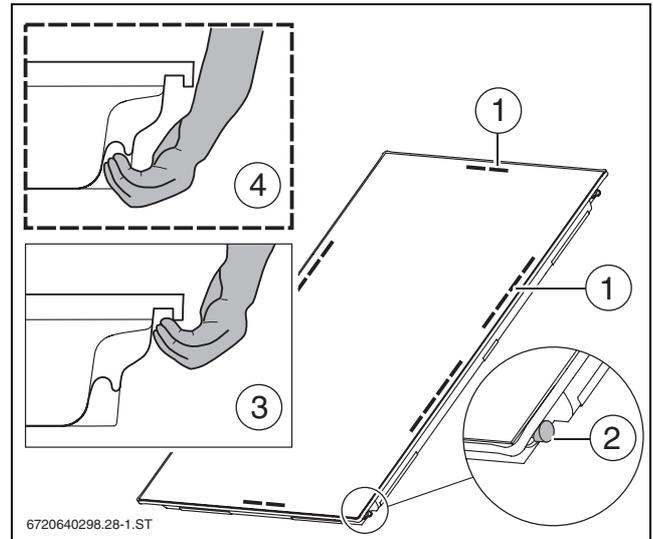


Fig. 8

- 1 Location of recessed grip
- 2 Remove the protective caps only on the roof
- 3 Carrying the collector: all-round collector edge
- 4 Carrying the collector: recessed grip

- ▶ To make it easier to transport the collectors and the installation materials, the following aids, which have sufficient load-bearing capacity, can be used:

- Lifting sling
- 3-point suction lift
- Roofing ladder or equipment for sweeping chimneys
- Lean-to lift
- Scaffolding



The solar hoses [1] inside the protective corners are supplied with greased plugs [2]. These plugs expand the solar hose and make it easier to fit it to the solar connection.

- ▶ Remove plug [2] only immediately prior to fitting the solar hose (→ chapter 9.1.2, page 24) for removal instructions.

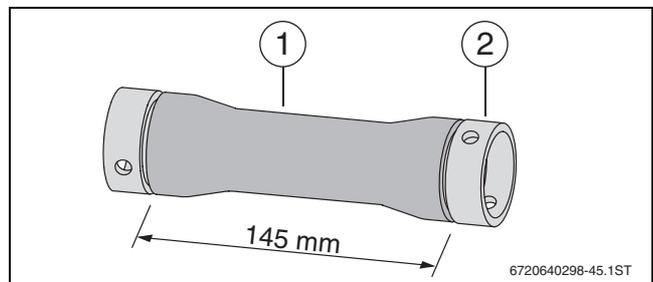


Fig. 9

5 Before installation

5.1 General information



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

- ▶ Protect yourself with personal protective equipment.
- ▶ Protect the collector and installation materials from solar radiation.



We recommend that you engage the services of a roofing contractor, as they are experienced in working on roofs and will be aware of the risk of falling.

- ▶ Obtain information about on-site conditions and local regulations.
- ▶ Arrange collectors in the optimal position on the roof. For this, pay particular attention to the following:
 - Align the collector array facing as close to south as possible (→ Fig. 10).
 - Align the collector array so that it is in line with windows, doors etc. (→ Fig. 10).
 - Avoid shading (→ Fig. 11).
 - Observe the hydraulic connection to the pipework (→ chapter 5.2).
 - Take the space required on the roof into account (→ chapter 5.3).

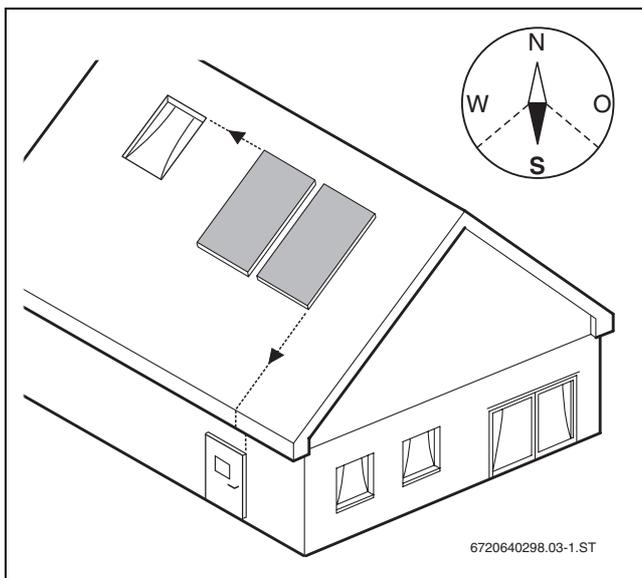


Fig. 10

- ▶ Prevent shading of the collector array through adjacent buildings, trees etc.

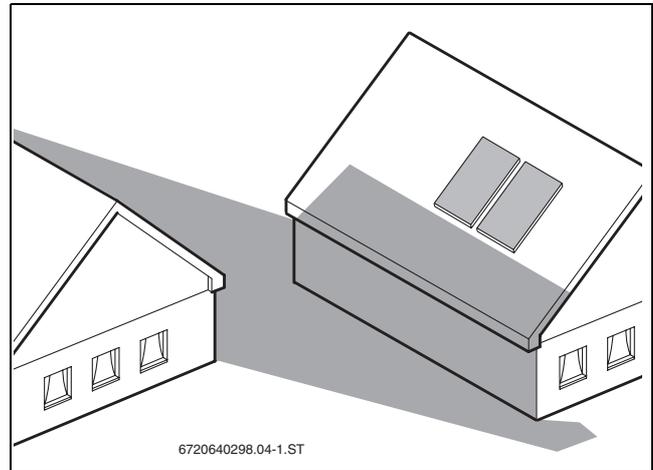


Fig. 11

Solar pump station not underneath the collector array

In some cases, the solar pump station [1] cannot be sited underneath the collector array (e.g. in the case of loft installations).

Form a "pipe trough" with the flow in order to prevent overheating in such systems:

- ▶ Firstly, route the flow to the height of collector return connection [2]. Then route it to the solar pump station.

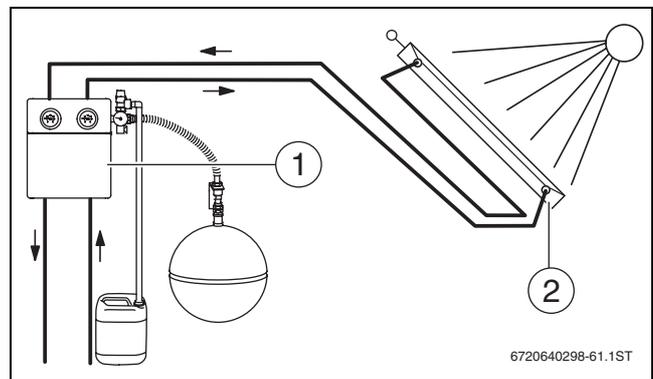


Fig. 12

5.2 Arrangement of collectors

The flow may be located on the right hand or the left hand side of the collector array.

- ▶ Connect the collector array alternately (→ Fig. 13).



Refer to the solar technical guide for detailed information on designing the system hydraulics and components.

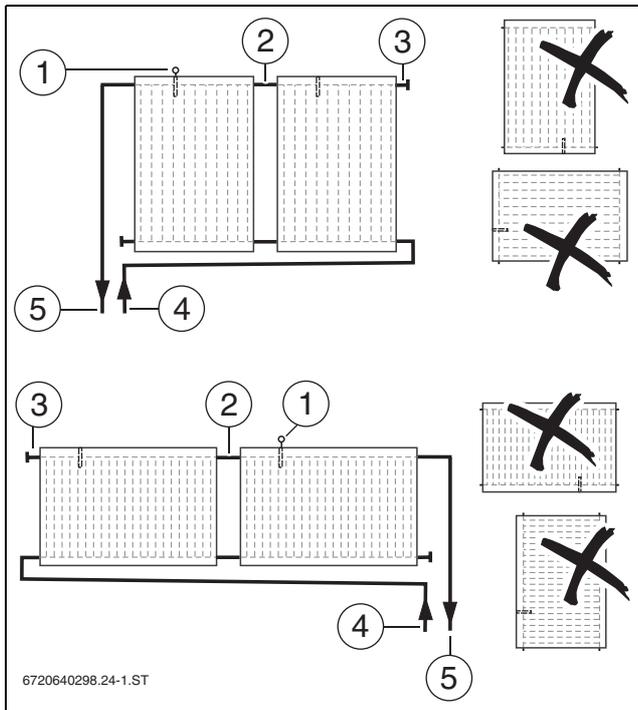


Fig. 13 Layout of portrait (top) and landscape (bottom) collectors

- 1 Collector sensor inside sensor well (always at the top of the collector where the flow is connected)
- 2 Solar hose 145 mm
- 3 Solar hose, 55 mm and dummy plug
- 4 Return (from the cylinder)
- 5 Flow (to the cylinder)

Permissible layout and orientation

- ▶ When installing collectors, ensure that the sensor well for the collector sensor is located at the top (→ Fig. 13 [1]).
- ▶ Plan the routing of the collector sensor lead so that the collector sensor (→ Fig. 13 [1]) can be fitted to the collector to which the flow [5] has been attached.

Maximum number of collectors and collector arrays with several rows

- ▶ Allow for no more than 10 collectors per row.
- ▶ Connect collector arrays comprising several rows in reverse return so that the total of all pressure drop values (e.g. pipe lengths with the same cross-section) between the first and last branches are identical.

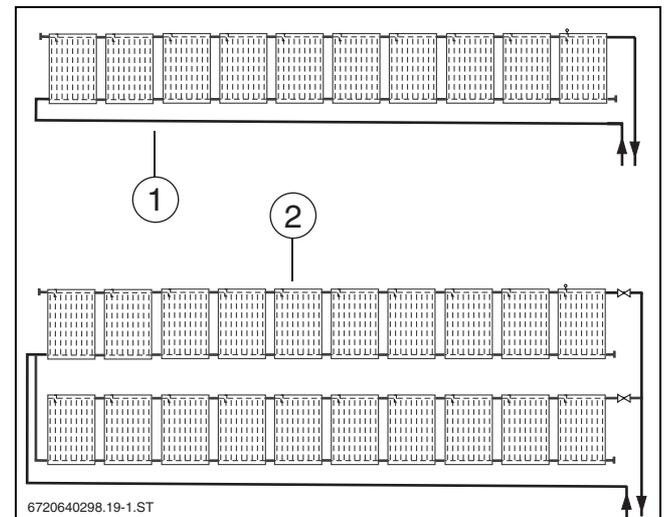


Fig. 14

- 1 Connection of a single row
- 2 Connection of more than 10 collectors; (two rows connected in parallel and reverse return)

5.3 Space required on roof



DANGER: Risk to life through collectors that cannot withstand high winds.

- ▶ Maintain the minimum clearance to the edge of the roof (dim. a).

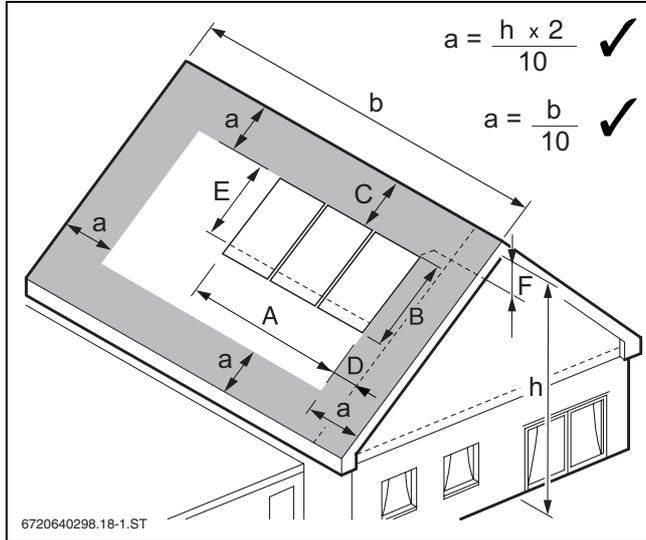


Fig. 15

- **Dim. a:** Either formula can be used. The lower value can be applied.
- **Dim. A and B:** → Tab. 11
- **Dim. C:** At least two rows of tiles to ridge or chimney.
- **Dim. D:** At least 0.5 m for the flow on the right or left of the collector array.
- **Dim. E:** Equals 1.8 m (landscape version: 1.0 m) and is the minimum clearance from the upper edge of the collector to the lower profile rail, which is installed first.
- **Dim. F:** If an air vent valve is required on the roof, at least 0.4 m for the flow.

Number of collectors	Portrait		Landscape	
	Dimension A	Dimension B	Dimension A	Dimension B
1	1.18 m	2.02 m	2.02 m	1.18 m
2	2.38 m	2.02 m	4.06 m	1.18 m
3	3.58 m	2.02 m	6.11 m	1.18 m
4	4.78 m	2.02 m	8.15 m	1.18 m
5	5.98 m	2.02 m	10.19 m	1.18 m
6	7.18 m	2.02 m	12.23 m	1.18 m
7	8.38 m	2.02 m	14.27 m	1.18 m
8	9.58 m	2.02 m	16.32 m	1.18 m
9	10.78 m	2.02 m	18.36 m	1.18 m
10	11.98 m	2.02 m	20.40 m	1.18 m

Tab. 11 Space required for portrait and landscape versions

5.4 Lightning protection

- ▶ Check regional regulations as to whether a lightning protection system is required.

Lightning protection is frequently required for buildings higher than 20 m, for example.

- ▶ Have a qualified electrician install the lightning protection.
- ▶ If a lightning protection system is installed, check whether the solar thermal system is included in this system.

5.5 Required tools and materials

- SW27 and 30 spanners (SW = width across flats) for making the pipe connection
- SW24 and 37 spanners for the interconnection set (2 rows, accessory)
- SW15 and 19 spanners for double ended screws
- Ø 6 mm wood drill bit and Ø 13 mm metal drill bit for stock screws
- Angle grinder for plain tiled roofs
- Spirit level
- Plumb line
- Air vent tile or aerial outlets
- Material for pipe insulation



Fitting the installation set and the connection set only requires the SW5 Allen key from the connection set.

5.6 Installation order

1. Determine the clearances for roof connections.
2. Fit the roof connections.
3. Fit the profile rails and the anti-slip protector.
4. Fit the collectors and collector sensors.
5. Connect the pipework to the collectors.

6 Installing the roof connection



DANGER: Risk of death by falling from roof!

- ▶ Whilst working on the roof, take all necessary precautions against a possible fall.
- ▶ Always wear personal protective equipment.

Subject to the type of roof, the roof connection is made with different roof hooks or with stock screws.

- ▶ Remove and replace broken roof tiles, shingles, roofing sheets etc.

6.1 Determining distances

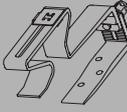


The actual distance between the roof hooks/stock screws is determined by the tile valleys on pan tile roofs and corrugation peaks on corrugated sheet roofs.



Landscape installation is only possible if roof battens are no more than 420 mm apart.

- ▶ Determine the roof hook positions and transfer them onto the roof.

Collector version	Dimension W		
			
Portrait	1360-1745	1455-1645	1455-1645
Landscape	590-900	685-805	685-805

Tab. 12

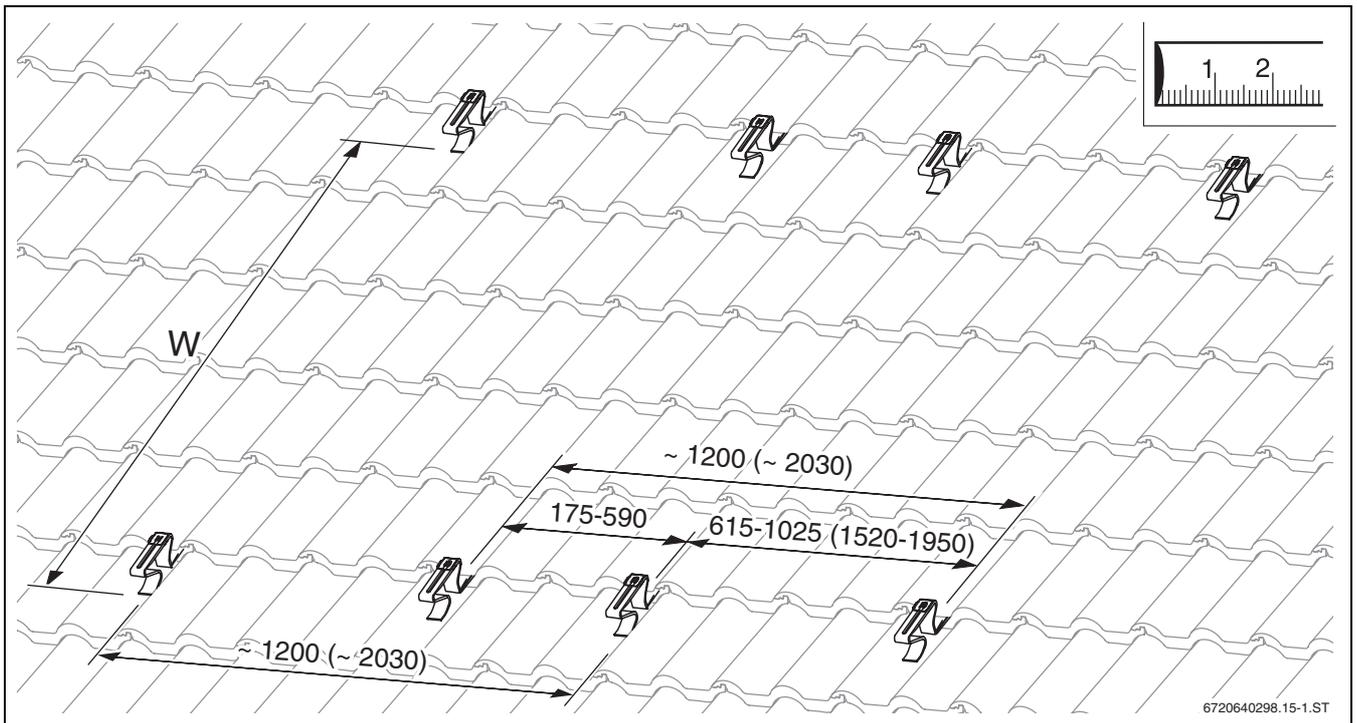


Fig. 16 Roof hooks for two collectors (dimension in brackets refer to landscape collectors; dim. in mm)

6.2 Fitting the roof hooks with pan tiles



WARNING: System damage through subsequent loosening of the long nuts on the roof hooks.

When the nut is tightened, adhesive is activated which bonds the joint securely after one hour.

- ▶ If the long nut is undone after this time, secure it on site (e.g. suitable adhesive).

- ▶ Undo nut with the SW5 Allen key to turn or move the bottom part of the roof hook [1].

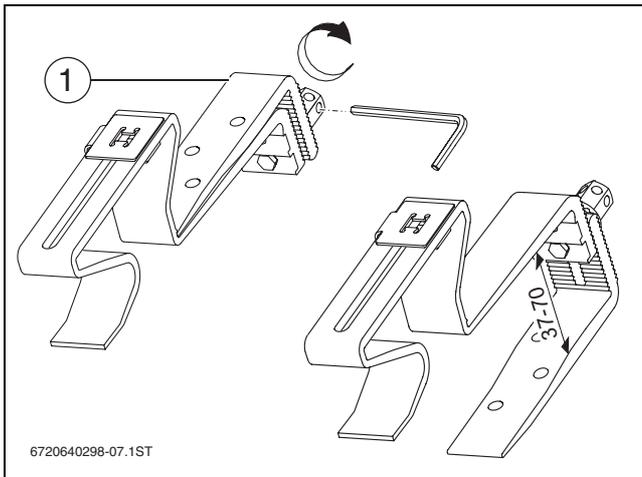


Fig. 17 Turning the lower part of the roof hook

Hooking the roof hooks into the roof batten

- ▶ Slide the roof tiles up around the roof hook positions.

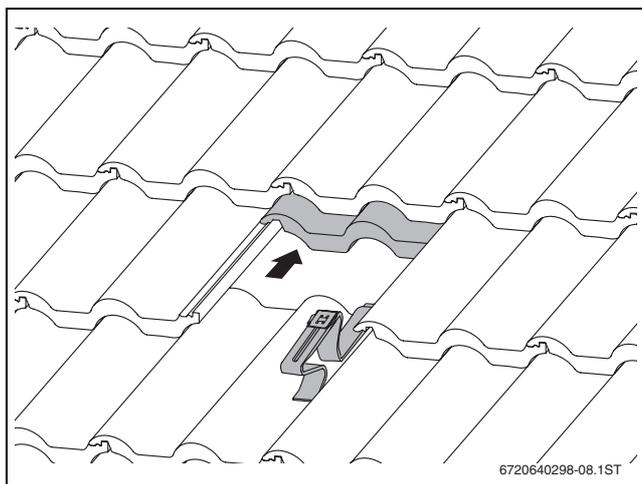


Fig. 18 Roof hook hooked in

- ▶ Place the roof hooks into the valley of the corrugation and hook under the batten.
- ▶ Push the bottom part of the roof hook [1] up to the batten.
- ▶ Tighten nut [2] when the serrated washer [3] grips the teeth of the bottom part of the roof hook.

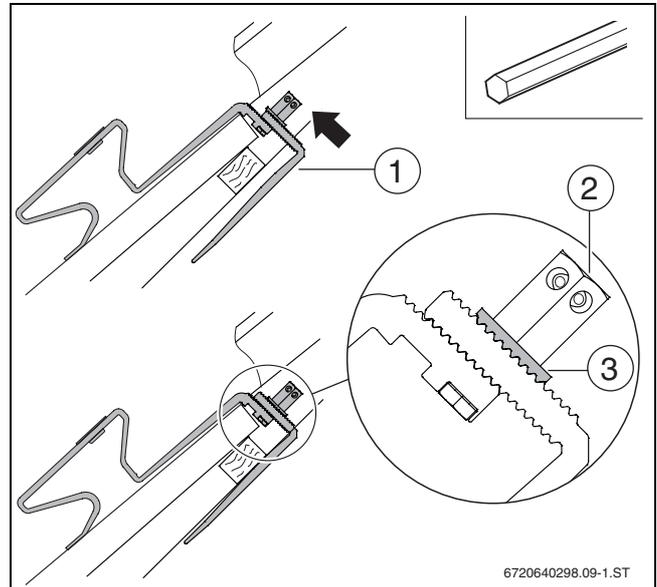


Fig. 19



NOTICE: A roof may leak through drifting snow that can enter between the roof tiles.

- ▶ Carefully remove the roof tile contact points if the roof tile does not lie flat on the roof hook.

Fitting roof hooks as rafter anchors



WARNING: System damage through breaking roof hooks.

- ▶ Relocate the bottom part of the roof hook to the top hole.

- ▶ Relocate the bottom part of roof hook [1] to the top hole [2]. Do not yet tighten the nut.

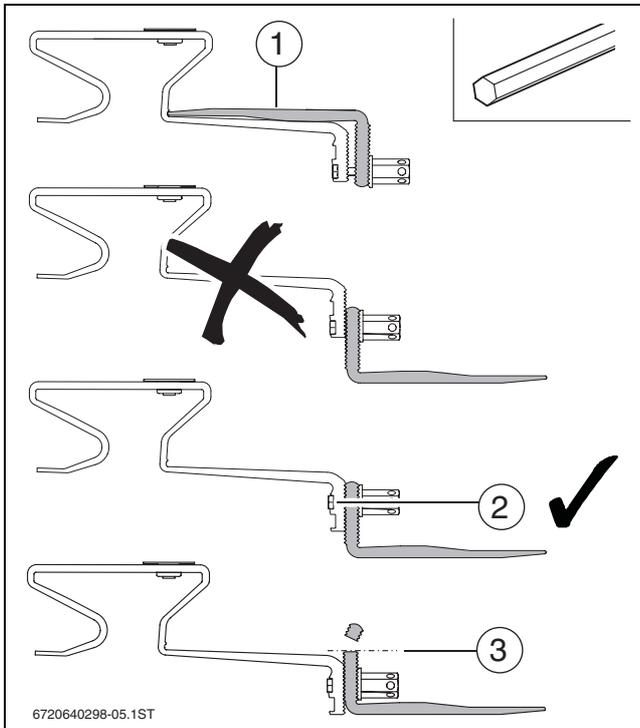


Fig. 20

- 1 Bottom part of roof hook
- 2 Use the top hole
- 3 Trim if required

- ▶ Where required, secure boards/planks with adequate load-bearing capacity to the rafters (→ Fig. 21 [1]). Where required, remove counter battens from this area.
- ▶ Lay the front support (→ Fig. 21 [2]) on the roof tile so that it lies in a tile valley when subjected to loads.

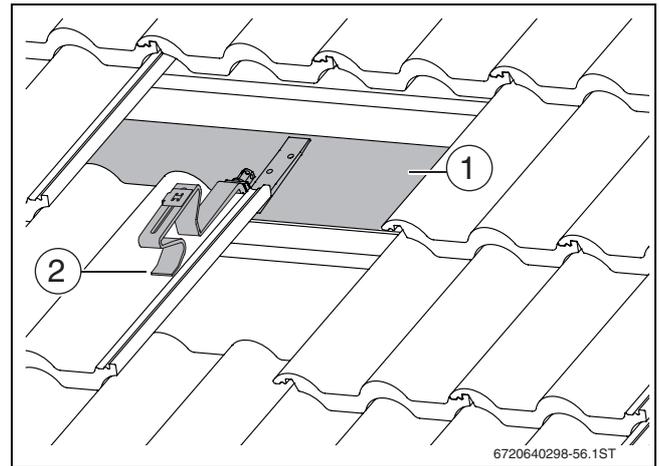


Fig. 21 Securing rafter anchors on the board/plank

At the top edge of the roof tile, the roof hook needs a little play (→ Fig. 22 [1]).

- ▶ If required, trim the top of the roof tile.

The roof hook must be supported by the front of the roof tile (→ Fig. 22 [4]).

- ▶ It may be necessary to underlay the lower part of the roof hook with boards/planks so that the roof hook lies on top of the tile.
- ▶ Tighten nut when the serrated washer [2] grips the teeth of the bottom part of the roof hook.
- ▶ Secure the bottom part to the rafter (boards/planks) with three suitable on-site screws [3].

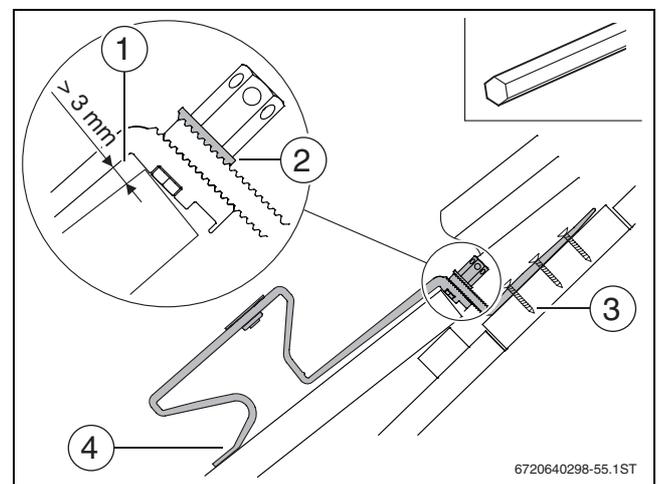


Fig. 22



NOTICE: Roof leaks through drifting snow that can enter between the roof tiles.

- ▶ Carefully remove the roof tile contact points if the roof tile does not lie flat on the roof hook.

6.3 Fitting roof hooks with plain tiles



NOTICE: Unprofessional work may lead to the roof leaking.

- ▶ Consult a roofer for advice and assistance.



WARNING: System damage through subsequent loosening of the roof hook nut. When the nut is tightened, adhesive is activated which bonds the joint securely after one hour.

- ▶ If the nut is undone after this time, secure it on site (e.g. suitable adhesive).



WARNING: System damage through breaking roof hooks.

- ▶ Relocate the bottom part of the roof hook to the top hole.

- ▶ Relocate the bottom part of roof hook [1] to the top hole [2] of the roof hook. Do not yet tighten the nut.

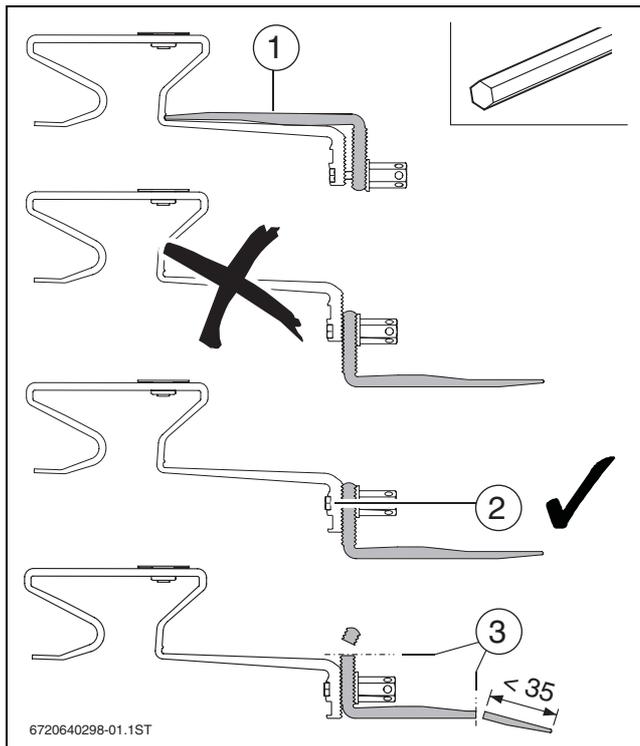


Fig. 23

- 1 Bottom part of roof hook
- 2 Use the top hole
- 3 Trim if required

- ▶ Where required, secure boards/planks with adequate load-bearing capacity on the rafters (→ Fig. 24 [3]). Where required, remove counter battens from this area.



NOTICE: Roof leaks through incorrectly positioned roof hooks.

- ▶ Position the roof hook centrally on the roof tile. The bottom part then lies on the rafter (boards/planks).

- ▶ Tighten nut [1] when the serrated washer [2] grips the teeth of the bottom part of the roof hook.
- ▶ Secure the lower part of the roof hook with three suitable screws (Not supplied).

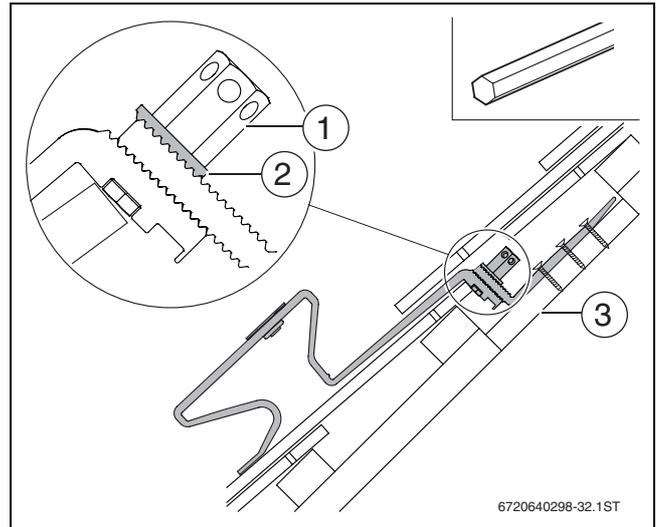


Fig. 24

- ▶ Trim adjacent plain tiles (dotted line [1]).

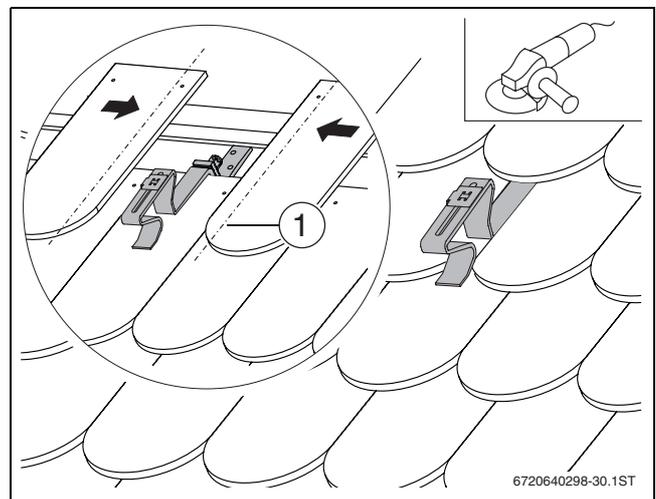


Fig. 25

6.4 Fitting special roof hooks for slate/shingles

NOTICE: Unprofessional work may lead to the roof leaking.

- ▶ Have a qualified roofer carry out the installation on slate/shingle roofs.

- ▶ To ensure a watertight installation, insert a plate on site [3] underneath the special roof hook.
- ▶ Fit the special roof hook at the front with gaskets [2] and screw [1].
- ▶ Adequately secure the special roof hook at the back on the roof substrate.

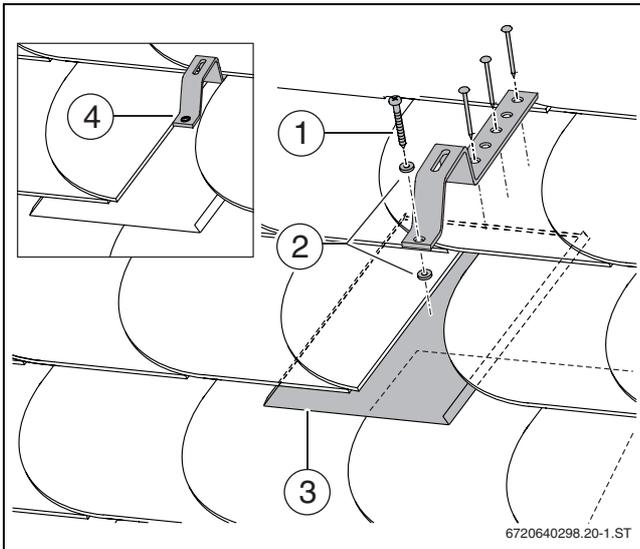


Fig. 26 Example sealing technique

- 1 Screw (Not supplied)
- 2 Gaskets (Not supplied)
- 3 Plate (Not supplied)
- 4 Fitted special roof hook

6.5 Fitting double ended screws on sheet metal roofs

Double ended screws are used instead of roof hooks to secure the profile rails.

NOTICE: Unprofessional work may lead to the roof leaking.

- ▶ Have a qualified roofer carry out the installation on sheet metal roofs.

- ▶ When installing solder sleeves (not supplied) to the sheet metal roofing material. This ensures that the roof is watertight.

i The stock screws are fitted in a similar way to the installation described for corrugated roofs (→ chapter 6.6, page 20).

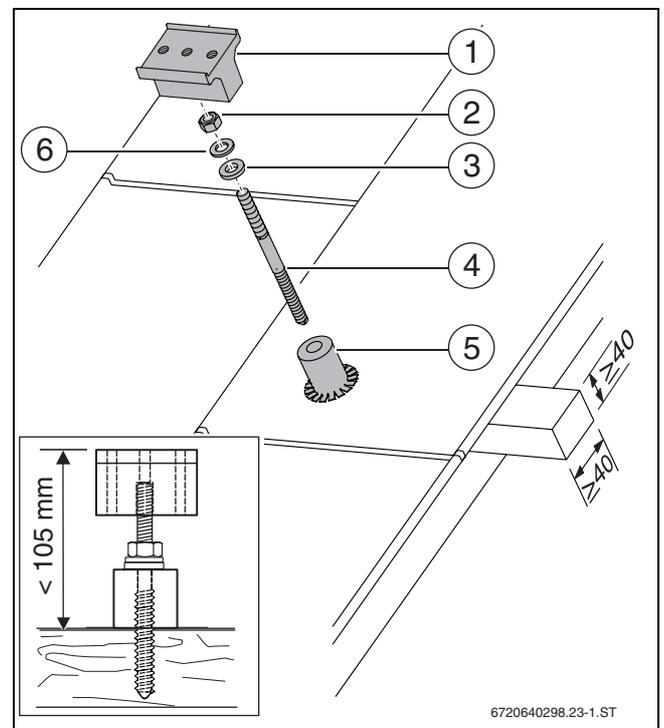


Fig. 27

- 1 Retaining block
- 2 M12 nut
- 3 Sealing washer
- 4 M12 double ended screw
- 5 Sleeve (Not supplied)
- 6 Washer

6.6 Fitting double ended screws on corrugated roofs

DANGER: Risk to life through breathing in fibres containing asbestos!

- ▶ Observe local regulations on handling of asbestos.
- ▶ Wear personal protective equipment (e.g. breathing apparatus).

NOTICE: System damage through a substructure with inadequate load bearing capacity.

- ▶ The double ended screws require support timbers of at least 40 × 40 mm.

i We recommend making a drilling template to ensure accurate vertical drilling (→ Fig. 28 [1]).

1. With a Ø 13 mm metal drill bit, drill through the peaks of the corrugations. However, do not drill into the timber below.
2. With a Ø 6 mm wood bit, drill absolutely vertically through the drilling template [1] and substructure.

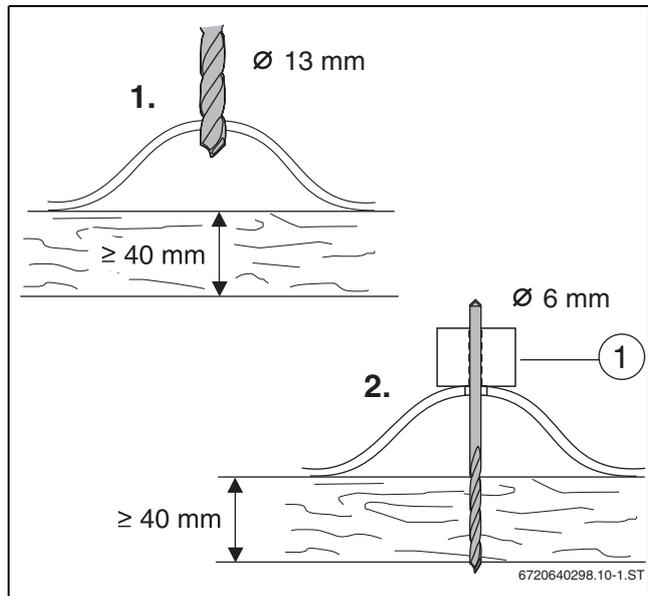


Fig. 28

- ▶ Turn the pre-assembled double ended screw with an SW19 spanner until dimension Z (→ Tab. 13) is reached (→ Fig. 29).
- ▶ Tighten nut (→ Fig. 29 [2]) until the sealing washer makes full contact with the corrugated sheet.

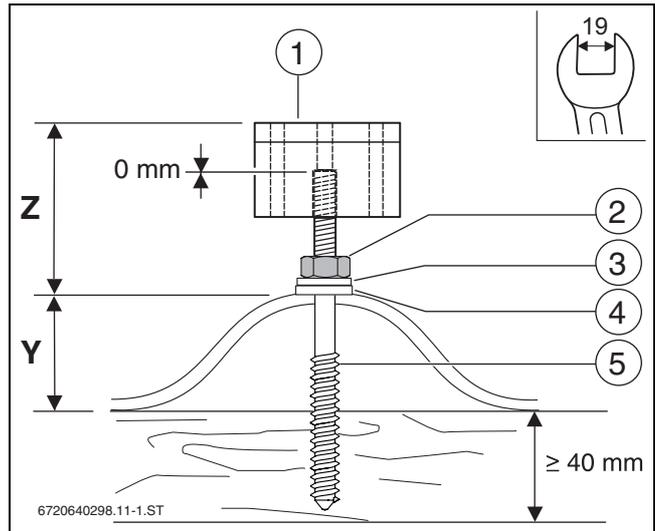


Fig. 29 Fitted double ended screw with retaining block

- 1 Retaining block
- 2 M12 nut
- 3 Washer
- 4 Sealing washer
- 5 M12 double ended screw

Corrugation height, dimension Y	Dimension Z
35 mm	70 mm
40 mm	65 mm
45 mm	60 mm
50 mm	55 mm
55 mm	50 mm
60 mm	45 mm

Tab. 13

The profile rails must not sag.

- ▶ If required, underlay the profile rails at the retaining block.
- ▶ Secure each profile rail with two screws.

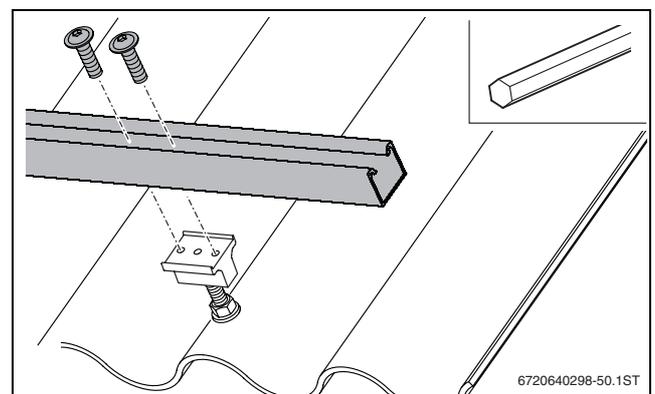


Fig. 30

Continue with "Aligning profile rails" (→ page 22).

7 Installation of accessories for higher loads

The installation of additional roof hooks and rails enables the installation system for vertical collectors to withstand higher loads (→ chapter 2.3, page 5).

The installation on a tiled roof is shown by way of example.

Standard snow load profile delivery for each collector:

Roof hook	2 x
Snow load profile	2 x
Profile rail	1 x

Tab. 14

In addition, the set includes collector clamps (single and double-sided) for the additional profile rail.

7.1 Fitting additional roof hooks

- ▶ Fit additional roof hooks [1] as centrally as possible between the upper and lower roof hooks already fitted.

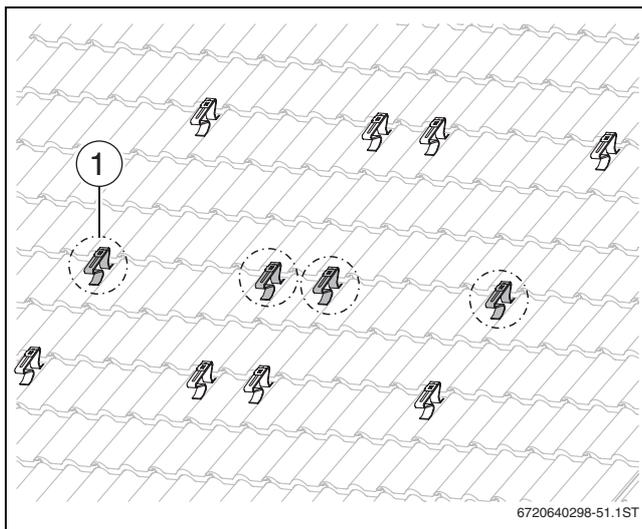


Fig. 31 Additional roof hooks for two collectors side by side

7.2 Fitting the snow load profile

- ▶ Place snow load profile [1] on the roof hooks and secure by hand with screw M8.
- ▶ Make sure snow load profiles are level and flush (use string line). Then tighten the screws.

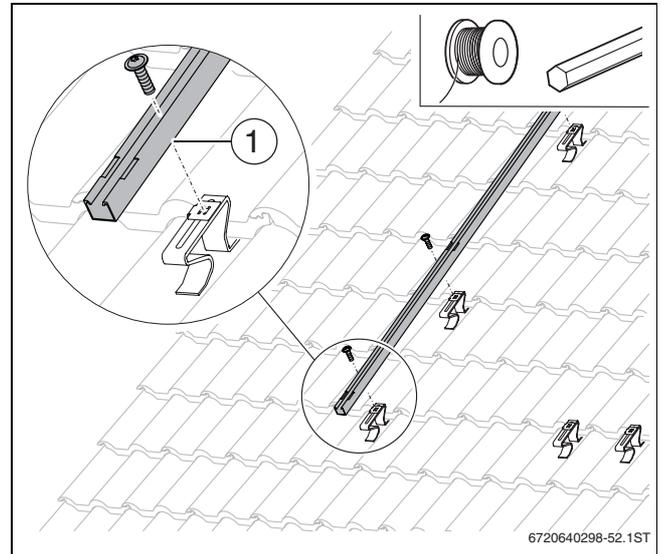


Fig. 32

7.3 Installing the profile rails

- ▶ Connect the profile rails (→ chapter 8.1, page 22).
- ▶ Insert profile rails [1] into the cut-outs of the snow load profiles and secure by hand with aluminium nut [2].

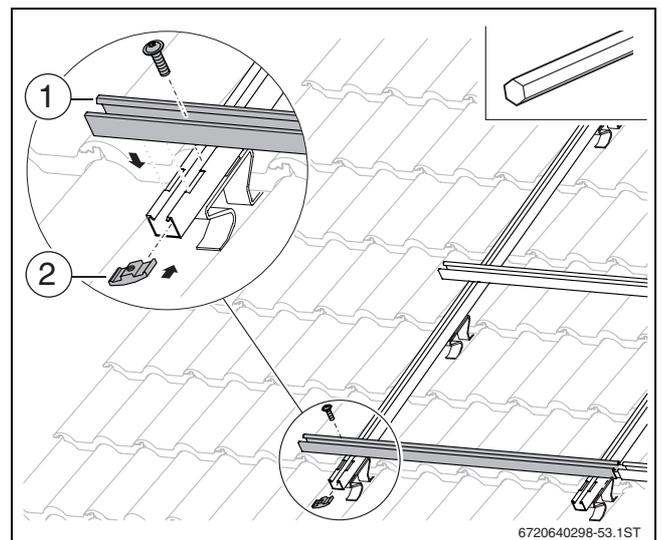


Fig. 33

Continue with "Aligning profile rails" (→ page 22).

8 Fitting the profile rails

8.1 Connecting profile rails

- ▶ Push profile rails onto joiner [1] until they click into place.

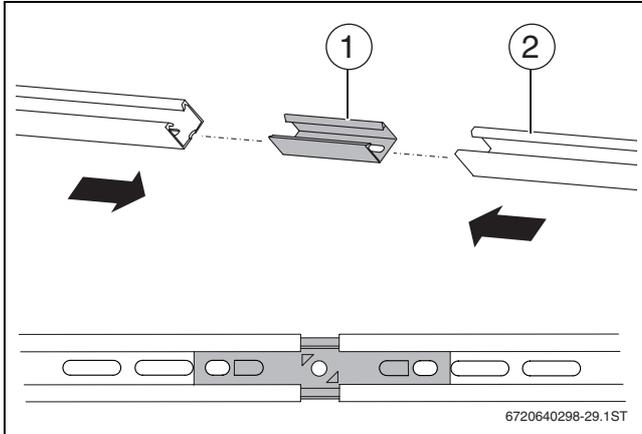


Fig. 34

8.2 Installing the profile rails

- ▶ Connect the profile rail as far up as possible in the roof hook slot using screw M8. Tighten the screw after aligning the profile rail.

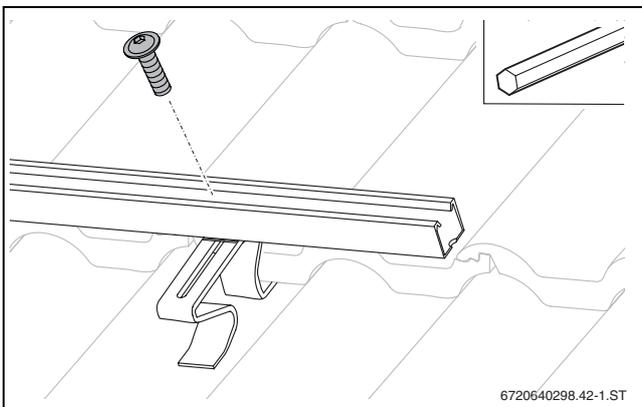


Fig. 35

8.3 Aligning the profile rails



It is important for the subsequent collector installation that the profile rails are accurately aligned.

- ▶ Level the profile rails horizontally and with the stated clearance. Use a spirit level.
- ▶ Align sides of the upper and lower profile rails with each other.
- ▶ Check that they are at right angles. Measure the diagonals or place a roof batten [1], for example, at the ends of the profile rails.
- ▶ Tighten screws M8.

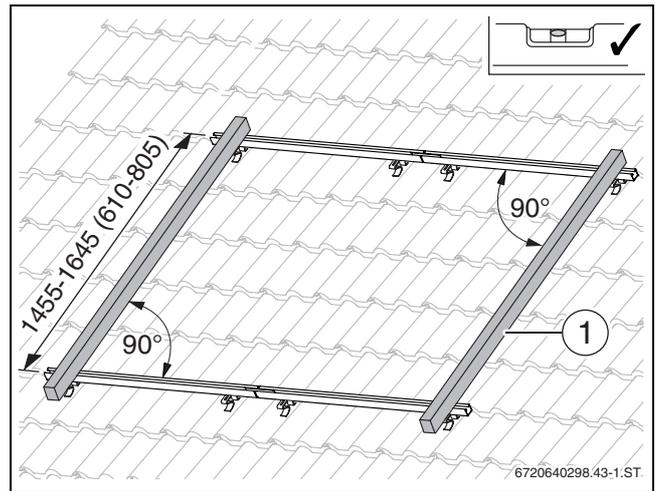


Fig. 36 The value in brackets applies to landscape collectors

8.4 Fitting the anti-slip protectors

Use both internal slots [1] to fit the two anti-slip protectors.

- ▶ Push the anti-slip protector over the profile rail and let it click into slot [2].

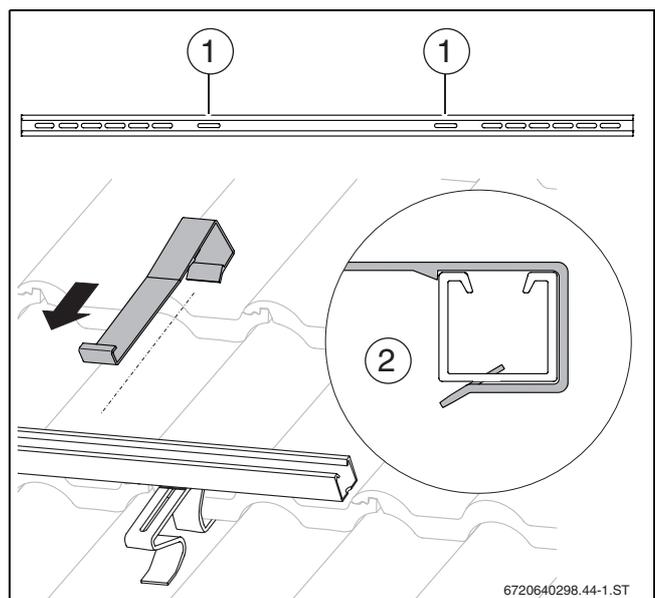


Fig. 37

9 Installing the collectors



DANGER: Risk of death by falling from roof!

- ▶ Whilst working on the roof, take all necessary precautions against a possible fall.
- ▶ Always wear personal protective equipment and use a safety device to prevent a fall.
- ▶ The installation on the roof must be performed by at least 2 people.



NOTICE: Collector damage through leaks at the collector connection.

- ▶ Only remove protective caps from the collector connections immediately prior to making the hydraulic connection.



NOTICE: Collector damage through damaged connections.

- ▶ Never use collector connections to lift the collector.
- ▶ To carry the collector, hold it with your hands by the recessed grips or by the collector edge.

- ▶ For lifting the collector to the roof, use at least one of the following:
 - Hydraulic Lift
 - 3-point suction handles with adequate lifting capacity
 - Lifting sling



WARNING: Risk of injury through falling collectors.

- ▶ Secure the collectors against falling during handling and installation.
- ▶ After completing installation, check that the installation set and collectors are securely positioned.

Important information on handling solar hoses and hose clips



CAUTION: Risk of injury through tightened locking ring prior to installation.

- ▶ Tighten the locking ring only after the hose clip has been placed over the solar hose.



NOTICE: Leaks at the collector connections. Subsequent loosening of the hose clip can impair its tensioning capacity.

- ▶ Push the hose clip immediately in front of the bead of the collector connection. Only then should the locking ring be tightened.



Prior to the installation, we recommend placing the solar hoses without plugs in hot water. This makes the installation easier, especially in cold weather.

Plugs are set into the solar hoses to facilitate the interconnection of collectors.

1. Only remove plugs immediately prior to fitting the solar hose.
2. Push the solar hose with its hose clip onto the collector connection.
3. Tighten the locking ring when the hose clip is located directly in front of the bead.

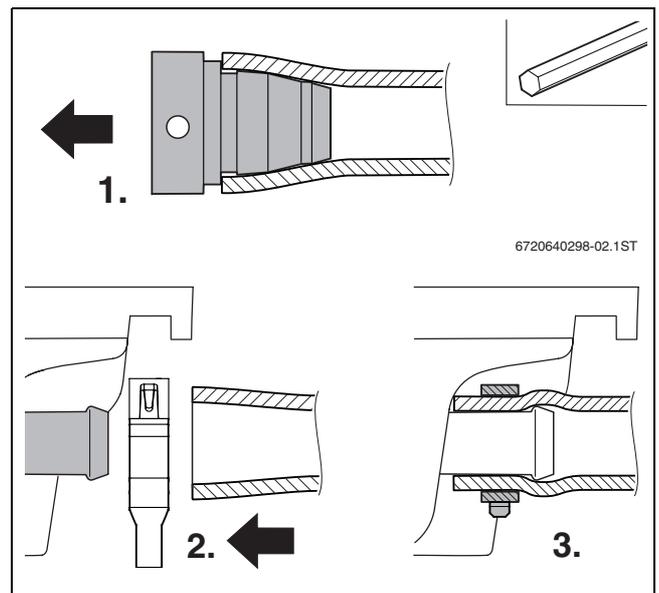


Fig. 38 Installation of the solar hose

9.1 Preparing the collector installation on the ground

- Observe the information in chapter 5.2, page 13, concerning the collector layout.

The process for the right hand side of the collector array is shown in the following by way of example, with the first collector being installed on the right hand side.



The interconnection set (accessory) for two collector rows can be preassembled on the ground (→ chapter 10.3, page 31).

9.1.1 Fitting the dummy plug

- Push solar hose [2] with prefitted dummy plug onto the available collector connections.
- Tighten the locking ring when hose clip [1] is located directly in front of the bead.

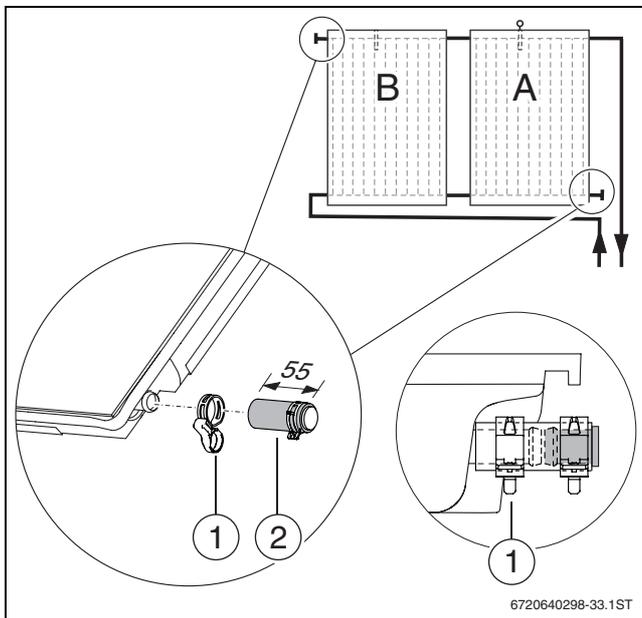


Fig. 39

9.1.2 Fitting the interconnection set

- Remove the interconnection set from the protective corners.
1. Only remove one plug with an SW5 Allen key.
 2. Push solar hose [2] with a hose clip onto the collector connection.
 3. Tighten the locking ring when hose clip [1] is located directly in front of the bead.

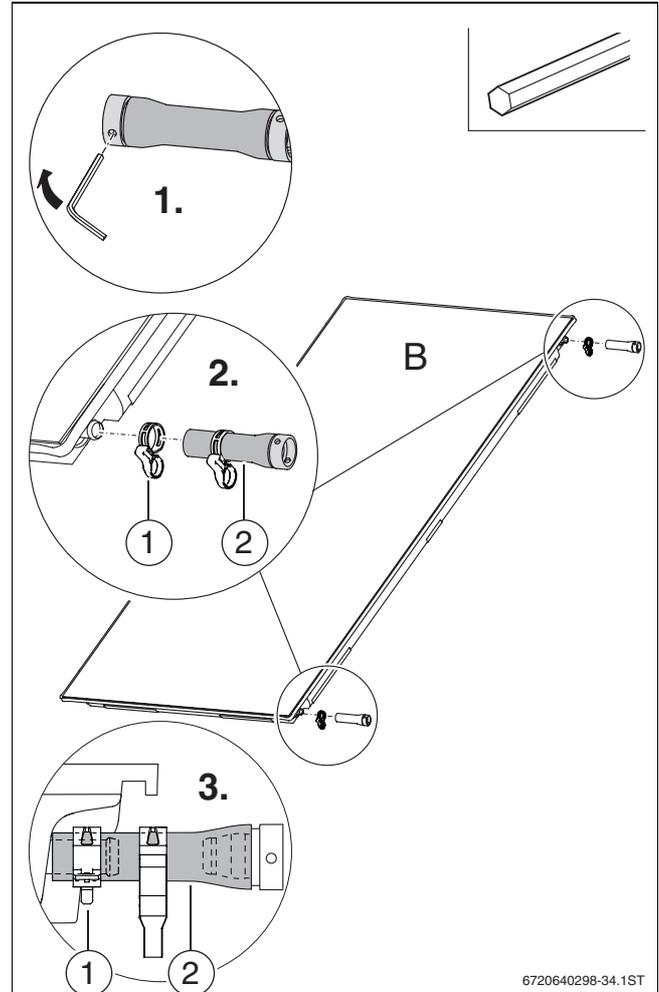


Fig. 40 Interconnection set on the second and all further collectors

9.2 Securing the collectors



WARNING: Risk of injury through collectors falling from the roof.

- ▶ Ensure that the installation pockets in the casing are undamaged and freely accessible.



The plastic parts on the collector clamps do not have any support function. They are simply intended to make installation easier.

9.2.1 Fitting single sided collector clamps on the right hand side



Fit the single sided collector clamp on the left hand side only after the final collector has been installed.

- ▶ Push the collector clamp into the profile rail and let it click into the slot.

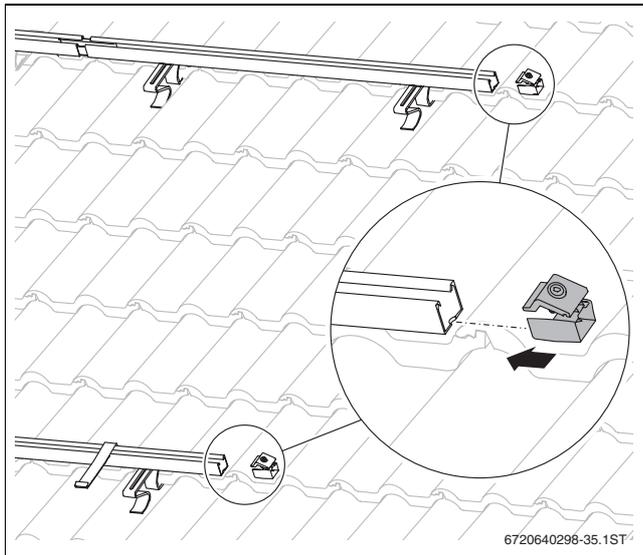


Fig. 41

9.2.2 Placing the first collector on the profile rails

- ▶ Turn the collector so that the sensor well for the collector sensor is located at the **top** of the collector.



WARNING: Risk of injury through falling collectors.

- ▶ Ensure that the anti-slip protectors grip into the installation pockets.

- ▶ Place the collector on the right hand side of the profile rails and let installation pockets [2] slide into anti-slip protectors [1].

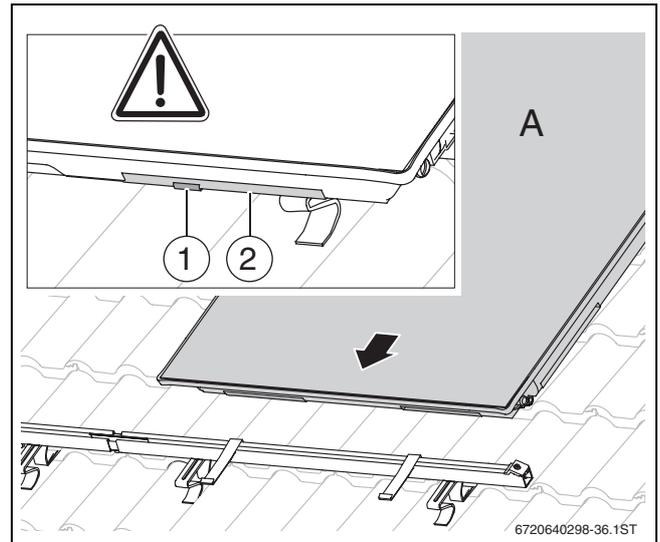


Fig. 42

- ▶ Carefully push the collector up against the collector clamp and level horizontally.

The hold-down retainer (→ Fig. 43, [1]) on the collector clamp must not be allowed to twist. If required, counterhold at the hold-down retainer.

- ▶ Tighten the screw of the collector clamp with an SW5 Allen key.

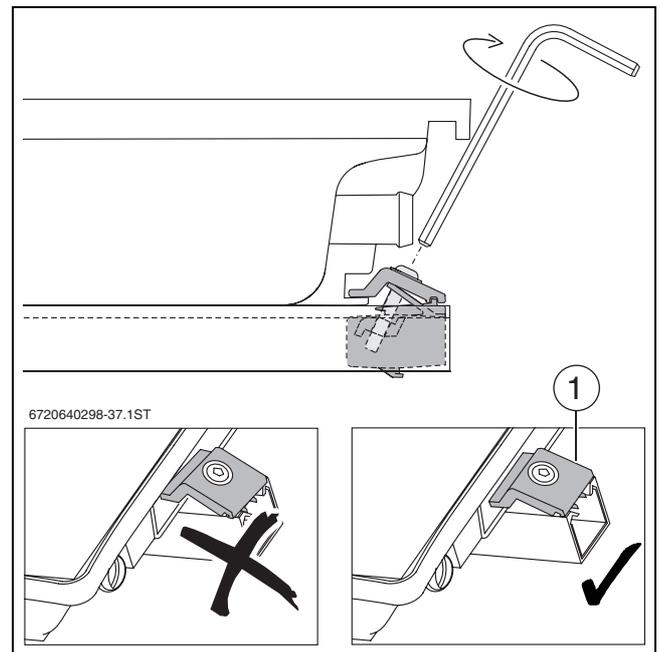


Fig. 43

9.2.3 Inserting a double sided collector clamp

- ▶ Place the double sided collector clamp on the profile rail and push up to the collector.

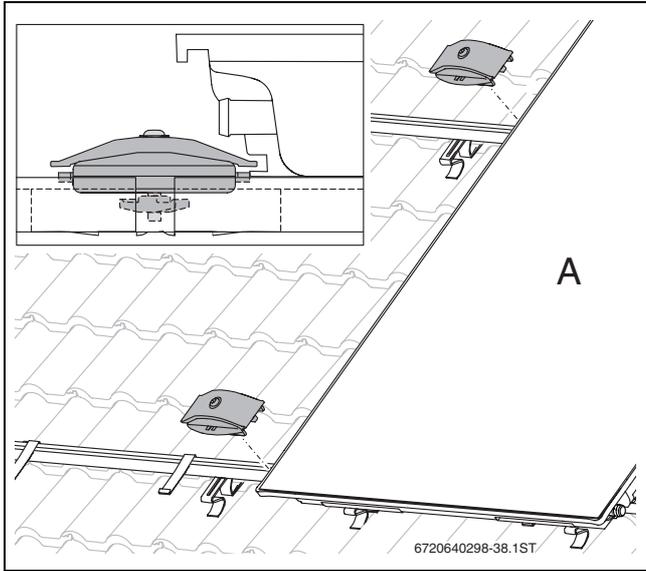


Fig. 44

9.2.4 Placing the second collector on the profile rails

- ▶ Place second collector [1] along with the pre-assembled solar hoses onto the profile rails and let it slide into the anti-slip protectors.
- ▶ Pull the plugs from the solar hoses.
- ▶ Push second hose clip [2] onto the solar hoses.

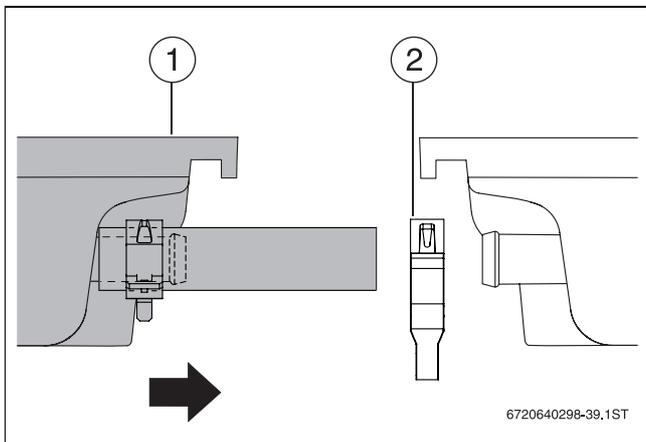


Fig. 45

- ▶ Push the collector up to the first collector so that the solar hoses are pushed onto the collector connections.

The collectors are adequately pushed together when the four apertures on the double sided collector clamp show only green [2].

- ▶ Tighten the screw of the double sided collector clamp with an SW5 Allen key.

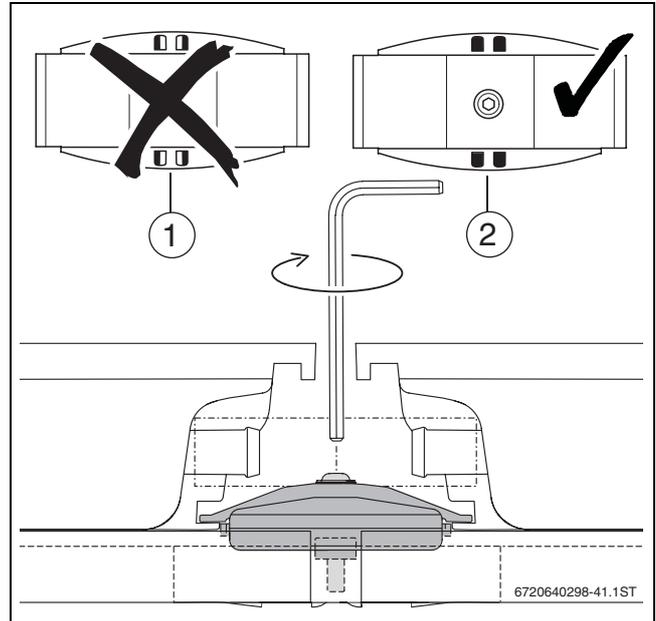


Fig. 46 Fitted double sided collector clamp

- 1 Collector not pushed far enough against the collector clamps
- 2 Collectors fitted correctly; screw can now be tightened

CAUTION: Risk of injury and leaks through escaping solar heat transfer medium as a result of unsecured solar hoses.

- ▶ Secure every solar hose to the collector connection using a hose clip.

- ▶ Tighten the locking ring when the hose clip is located directly in front of the bead.

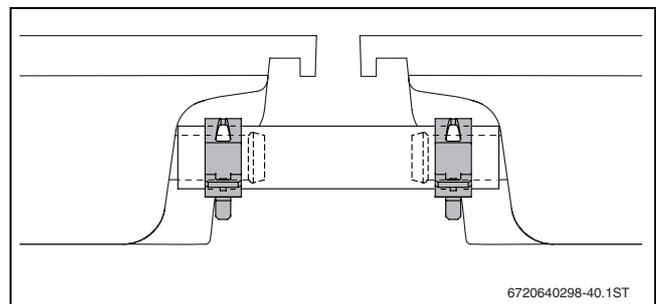


Fig. 47

- ▶ Fit all other collectors in the same way.

9.2.5 Fitting the single sided collector clamp on the left hand side

- ▶ Push collector clamp [1] into the profile rail and let it click into the slot.

Hold-down retainer [2] on the collector clamp. It must not be allowed to twist. If required, counterhold at the hold-down retainer.

- ▶ Tighten the screw of the collector clamp with an SW5 Allen key.

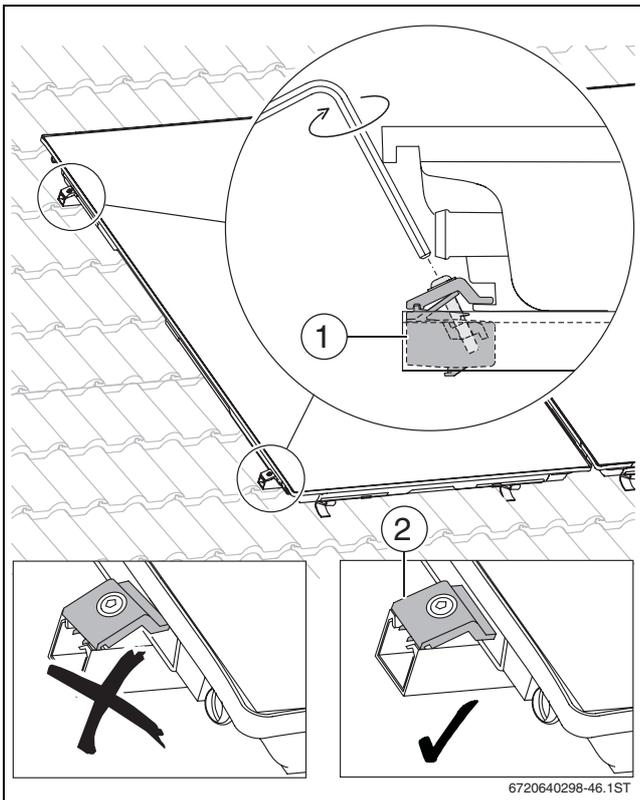


Fig. 48

9.3 Installing the collector sensor

The collector sensor is included with the solar controller.

NOTICE: System failure through faulty sensor lead.

- ▶ Protect the sensor lead against possible damage, e.g. from rodents.

- ▶ Fit the collector sensor next to the connected flow into the collector (→ Fig. 49).

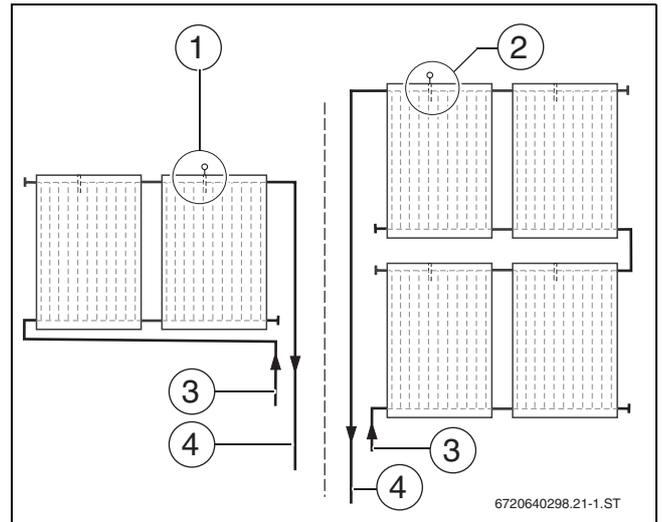


Fig. 49 Position of the collector sensor

- 1 Collector sensor position for single row arrays
- 2 Collector sensor position for double row arrays
- 3 Return
- 4 Flow

- ▶ With a screwdriver, for example, puncture the sealing membrane of the sensor well and insert the collector sensor as far as it will go (equal to 165 mm).

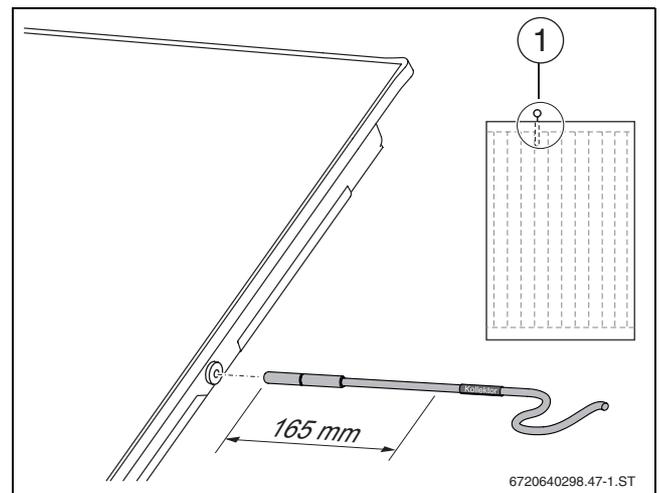


Fig. 50

- 1 Position of the sensor well for the collector sensor



If the sensor well of a collector is incorrectly punctured, seal that sensor well with a plug from the connection set.

10 Hydraulic connection

The solar pump station instructions include information on the routing of pipework to the collector.

NOTICE: Collector damage through leaks. The direct connection of rigid pipework to the collector is not permissible.

- ▶ Make the hydraulic connection of the collector to the pipework with flexible solar hoses.

NOTICE: Leaks at the collector connections. Subsequent loosening of the hose clip can impair its tensioning capacity.

- ▶ Push the hose clip immediately in front of the bead of the collector connection. Only then should the locking ring be tightened.

i We recommend the use of standard air vent tiles [2] or aerial outlets for routing the solar hoses below the roof. Consult your local building merchants for advice on air vent tiles.

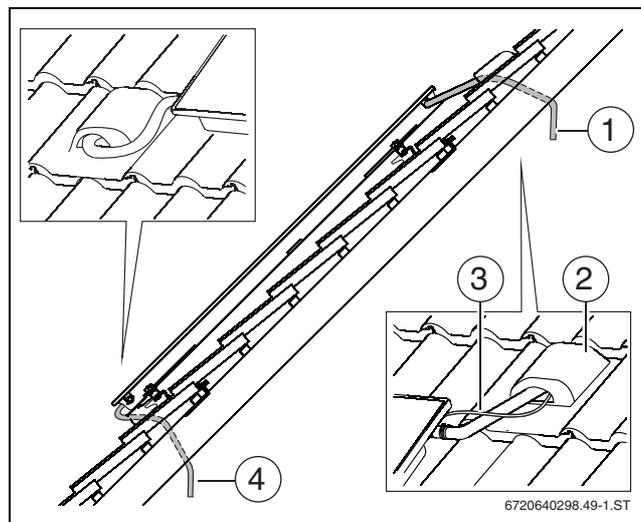


Fig. 51 Routing the solar hose through the roof

- 1 Solar hose (flow)
- 2 Standard air vent tile
- 3 Sensor lead
- 4 Solar hose (return)

10.1 Connecting the solar hose without air vent valve on the roof

- ▶ Push solar hose [1] with a hose clip onto the collector connection.
- ▶ Tighten the locking ring when the hose clip is located directly in front of the bead.
- ▶ At the opposite end of the solar hose, push solar ferrule [3] together with hose clip [2] as far as possible into the solar hose.
- ▶ Tighten the locking ring when the hose clip is located directly in front of the bead.
- ▶ Route the fitted solar hose together with the sensor lead through the roof.
- ▶ Push pipe [4] into the 15 mm locking ring fitting and tighten the fitting.
- ▶ Fit the solar hose for the return in the same way.

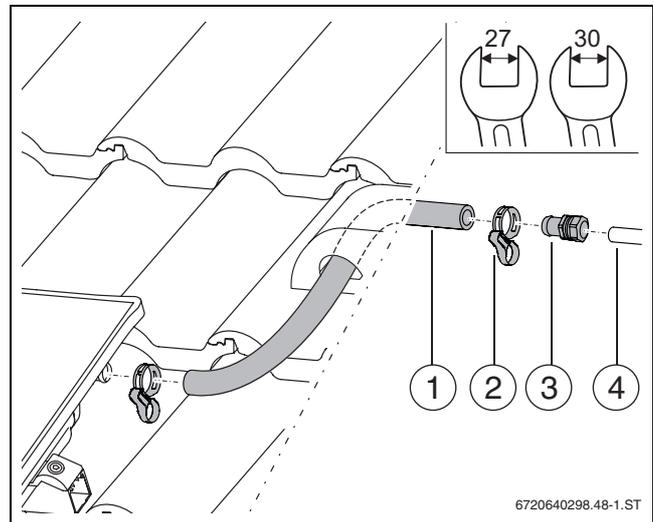


Fig. 52 Routing the solar hose (flow) through the roof

- 1 Solar hose (flow)
- 2 Hose clip
- 3 Hose ferrule R³/₄ (flow) with 15 mm locking ring
- 4 Pipework

10.2 Connecting the solar hose with air vent valve (accessory) on the roof

To ensure the perfect function of automatic air vent valve [1], take the following into account:

- ▶ Route flow [2] with an incline towards the air vent valve at the highest point of the system.
- ▶ Route the return with an incline to the collector array.
- ▶ For every change of direction downwards and renewed incline, fit an additional air vent valve.
- ▶ Install a manual air vent valve with adequate temperature resistance if there is insufficient space below the roof.

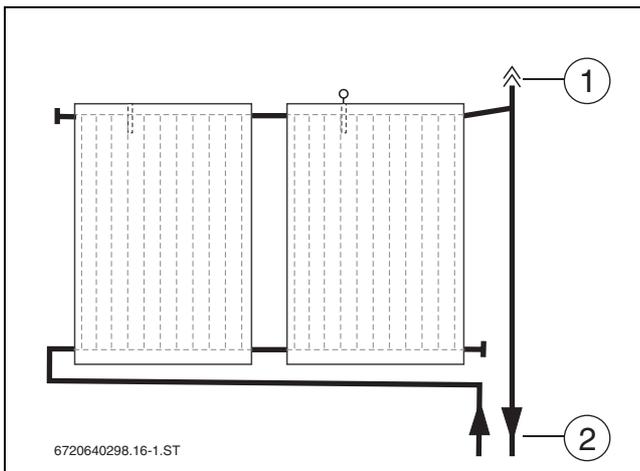


Fig. 53

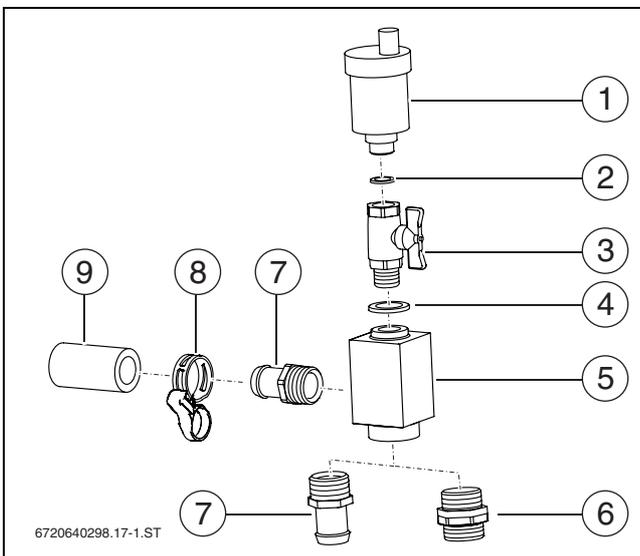


Fig. 54 Standard delivery, air vent valve set

- 1 Automatic air vent valve with locking screw (1x)
- 2 Gasket 9 x 15 mm (1x)
- 3 Ball valve (1x)
- 4 Gasket 17 x 24 mm (1x)
- 5 Air separator (1x)
- 6 Twin nipple G $\frac{3}{4}$ with O-ring (1x)
- 7 Hose ferrule (2x)
- 8 Hose clip (2x)
- 9 Solar hose 55 mm (1x)

10.2.1 Fitting the air vent valve under the roof

- ▶ Push solar hose [1] with a hose clip onto the collector connection.
- ▶ Route the solar hose and sensor lead through the roof.
- ▶ Fit the solar hose for the return in the same way.
- ▶ Insert the hose ferrule R $\frac{3}{4}$ with O-ring [2] and twin nipple [3] into the air separator.
- ▶ Push hose ferrule R $\frac{3}{4}$ [2] as far as it will go onto the solar hose and secure with a hose clip.
- ▶ Push pipe [4] into the 15 mm locking ring fitting and tighten the fitting.

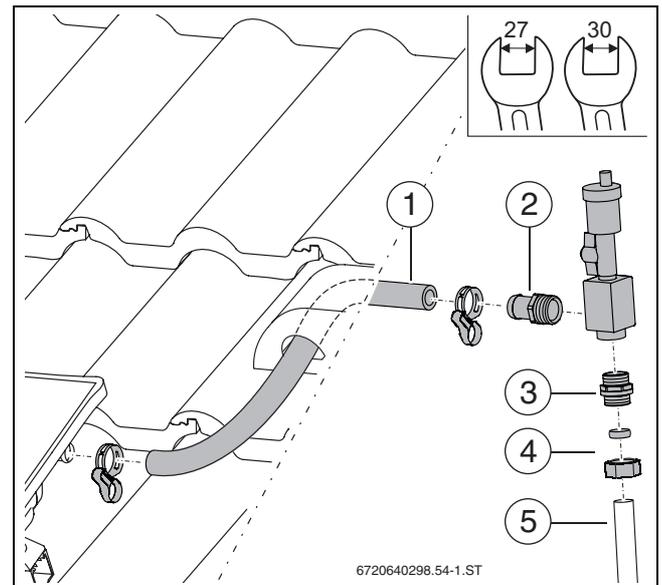


Fig. 55

- 1 Solar hose
- 2 Hose ferrule
- 3 Twin nipple
- 4 Take the locking ring and union nut from the connection set
- 5 Pipework

10.2.2 Fitting the air vent valve above the roof

- ▶ Push solar hose [1] with a hose clip onto the collector connection.
- ▶ Insert hose ferrules R³/₄ with O-ring [2, 3] into the air separator.
- ▶ Secure the long solar hose to the hose ferrule and route it, together with the sensor lead, through the roof.
- ▶ Insert the hose ferrule with locking ring fitting [4] into the solar hose and secure with a hose clip.
- ▶ Push pipe [5] into the 15 mm locking ring fitting and tighten the fitting.

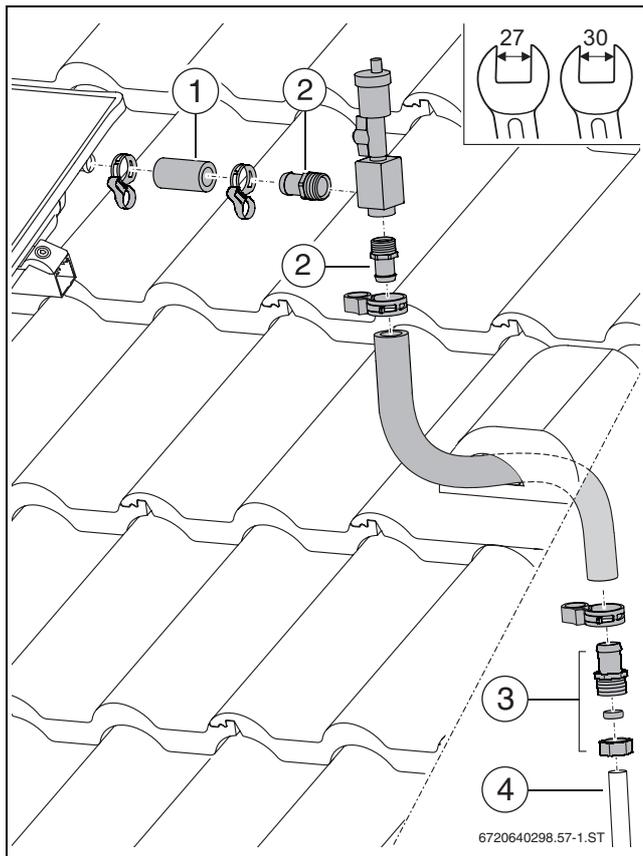


Fig. 56

- 1 Solar hose 55 mm
- 2 Hose ferrule
- 3 Hose ferrule
- 4 Hose ferrule with compression fitting 15 mm
- 5 Pipework

10.3 Fitting the interconnection set for 2 rows (accessory)

The interconnection set enables the hydraulic connection of the upper collector row with the lower row.

10.3.1 Standard delivery

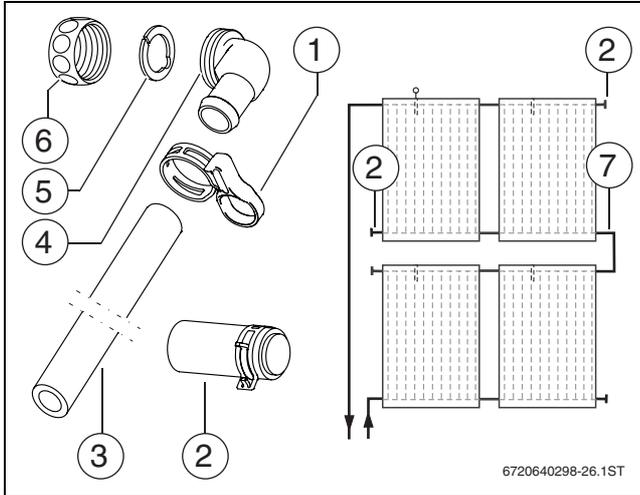


Fig. 57

- 1 Hose clip (2x)
- 2 Solar hose, 55 mm, and dummy plug (2x)
- 3 Solar hose, 1000 mm (1x)
- 4 Elbow ferrule (2x)
- 5 Lockwasher (2x)
- 6 Union nut G1 (2x)
- 7 Connection set

10.3.2 Fitting additional dummy plugs

- ▶ Push solar hose with prefitted dummy plug [2] onto the available collector connections.
- ▶ Tighten the locking ring when hose clip [1] is located directly in front of the bead.

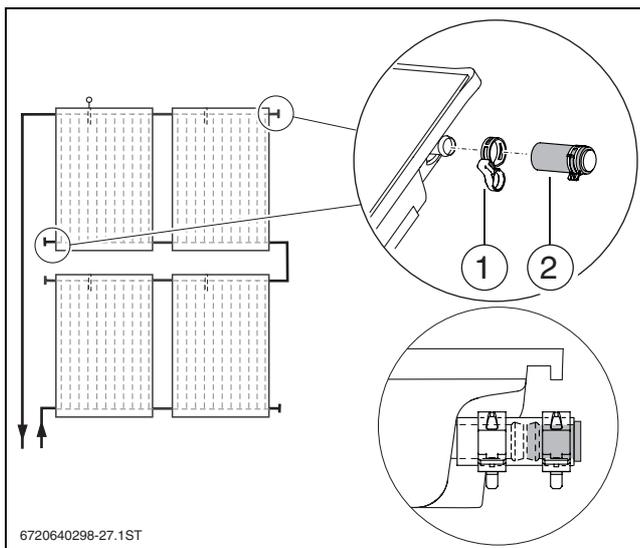


Fig. 58

10.3.3 Fitting the interconnection set

- ▶ Slide union nut [6] over the collector connections.
- ▶ Place lockwasher [5] behind the bead on the collector connection and press together.

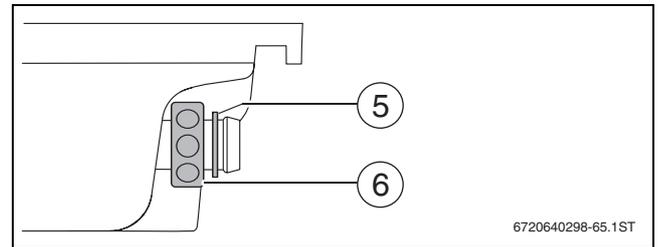


Fig. 59



NOTICE: Collector damage through twisted pipes.

- ▶ When tightening the fittings at elbow ferrule [4], counterhold with an SW24 spanner.

- ▶ Push elbow ferrule [4] with O-ring against the collector connection, align and secure with union nut [6].
- ▶ Check the clearance between the elbow ferrules (dimension X) and trim the solar hose to fit.
- ▶ Attach solar hose [3] with hose clips [1] to the elbow ferrules.
- ▶ Tighten the locking ring when the hose clip is located directly in front of the bead.

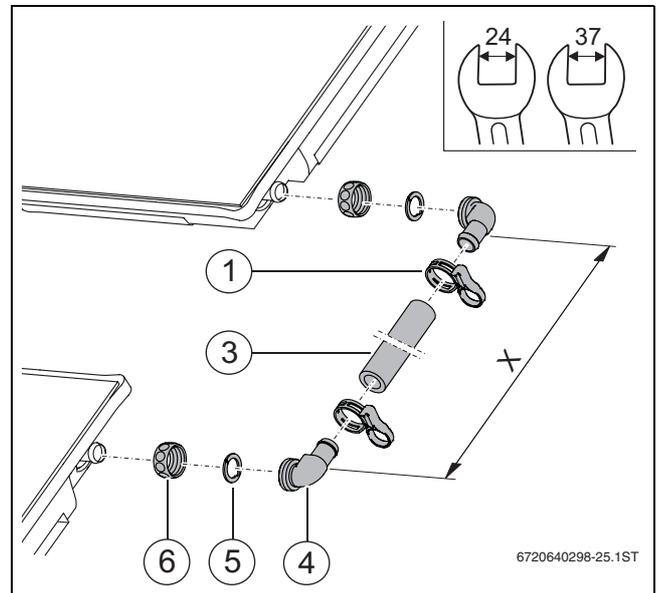


Fig. 60

11 Final steps

11.1 Checking the installation



NOTICE: System damage through corrosion.
Corrosion may result if residual water remains for prolonged periods in the solar thermal system following flushing or pressure testing.

- ▶ Immediately following a pressure test, commission the solar thermal system (→ solar pump station instructions) with solar heat transfer medium.



After completing the checks, carry out thermal insulation to complete the work.

Checks:

1.	Profile rails connected to roof hooks and screws tightened?	<input type="radio"/>
2.	Anti-slip protectors fitted?	<input type="radio"/>
3.	Collector clamps fitted and screws tightened?	<input type="radio"/>
4.	Solar hoses secured with hose clips (locking ring tightened)?	<input type="radio"/>
5.	Collector sensor inserted up to the end-stop?	<input type="radio"/>
6.	Pressure test carried out and all connections checked for leaks (see solar pump station instructions)?	<input type="radio"/>

Tab. 15



If you are venting the solar thermal system with an automatic air vent valve (accessory) on the roof, close the ball valve after of the venting process (→ see solar pump station instructions).



Commission the solar thermal system in accordance with the details in the solar pump station installation and maintenance instructions.

11.2 Insulating the connection lines and pipework

- ▶ Thermally insulate the pipework in the entire solar circuit in accordance with regulations.
- ▶ Thermally insulate the external pipework using material which is resistant to UV rays, weather influences and high temperatures (150 °C).
- ▶ Insulate internal pipework with high temperature-resistant (150 °C) material.
- ▶ Protect the insulation against damage from birds if required.

12 Cleaning the collectors



DANGER: Risk to life through falling!

- ▶ Whilst working on the roof, take all necessary precautions against a possible fall.
- ▶ Always wear personal protective equipment and use a safety device to prevent a fall.

Cleaning glass panes

At a roof slope of 15° and steeper, glass panes are generally self-cleaning.

- ▶ In the case of more stubborn contamination, clean with a glass cleaner. Never use acetone.

Cleaning the vent

Moisture created during the night (condensation) can escape from the collector through the vents [1] located at each collector corner.

Environmental influences can cause these vents to become blocked.

- ▶ Should the collector still be misty in spite of 4 hours intensive solar radiation, clean the vents [1] with a thin nail, for example.

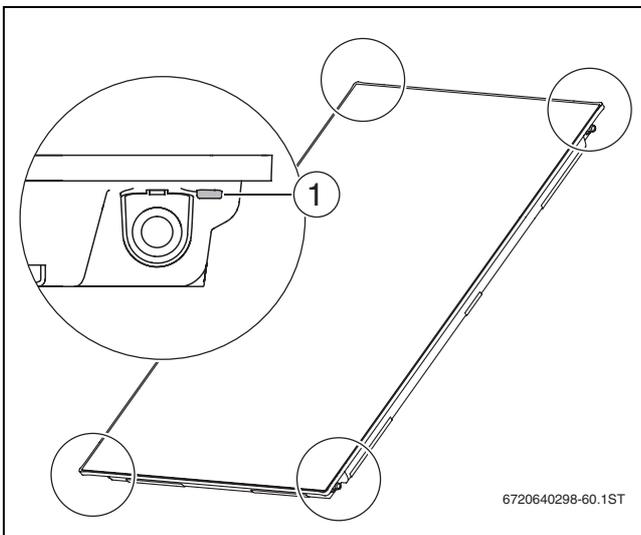


Fig. 61

13 Environmental protection and disposal

Environmental protection is one of our principal policies.

Quality of products, efficiency and environmental protection are equally important objectives for us. Statutory and other regulations concerning environmental protection are strictly applied. To protect the environment, we use the best possible technology and materials whilst taking into account economical aspects.

Removing collectors



DANGER: Risk to life through falling!

- ▶ Whilst working on the roof, take all necessary precautions against a possible fall.
- ▶ Always wear personal protective equipment and use a safety device to prevent a fall.

- ▶ Drain the pipework.
- ▶ Undo the collector clamps on the side and in between collectors.
- ▶ Remove solar hoses.
- ▶ Use lifting gear for handling the collectors (→ chapter 4, page 11).

Disposing of collectors

At the end of their service life, collectors should be disposed of in accordance with local regulations. Materials should be (where possible) recycled using the most environmentally responsible processes.

14 Maintenance/inspection



- DANGER:** Risk to life through falling!
- ▶ Whilst working on the roof, take all necessary precautions against a possible fall.
 - ▶ Always wear personal protective equipment and use a safety device to prevent a fall.



The installation and maintenance instructions of the solar pump station include details regarding the maintenance of the entire solar thermal system. Observe these details.

We recommend conducting the first service/inspection after about 500 hours run, and then every 1-2 years.

Use the table as a copy template so that you will have documentation available even after the third maintenance.

- ▶ Check the collector array regularly (inspection). Immediately remedy all faults (maintenance).
- ▶ Fill out the report and tick off the tasks performed.

Owner:	Site location:
--------	----------------

Maintenance and inspection tasks		Page	Maintenance/inspection		
Date					
1.	Visual inspection of collectors carried out (safe seating, optical impression)?		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2.	Collector sensor positioned correctly and inserted into the sensor well as far as it will go?	27	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.	Visual inspection of the installation system carried out?		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4.	Visual inspection for leaks carried out at the joints between the installation and the roof?		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.	Visual inspection of pipe insulation carried out?	32	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6.	Visual inspection of glass panes. Cleaning in the case of severe contamination.	33			
Notes					
	The collector array has been serviced as specified by these instructions.		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
			Date, stamp, signature	Date, stamp, signature	Date, stamp, signature

Tab. 16

Notes

Èire

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In the UK and IE, Buderus is a brand name
of Bosch Thermotechnology Ltd.

Buderus