



# **Assembly Instructions**

## **Solar collector FINO**



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Observe the warnings indicated by this sign.  
They warn of dangers or possibly erroneous actions, which may result to lapse of the warranty.

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The STI GmbH is obliged to take back with the environmental label RAL-UZ-73 for solar collectors („Blauer Engel“) labeled products, and to consign it to recycling.



# Safety regulations, instructions and guidelines

## Engineer standards and guidelines

- VBG 4 Unfallverhütungsvorschriften Elektrische Anlagen und Betriebsmittel
- VBG 37 Unfallverhütungsvorschrift Bauarbeiten
- VBG 74 Leitern und Tritte
- ZVDH, Regelwerk (Stand Juni 2001)
- LBO's Landesbauordnungen der Bundesländer
- DIN 18299 Allgemeine Regelung für Bauarbeiten jeder Art
- DIN 18334 Zimmer- und Holzbauarbeiten
- DIN 18338 Dachdeckungs- und Dachabdichtungsarbeiten
- DIN 18339 Klempnerarbeiten
- DIN 18351 Fassadenarbeiten
- DIN 18360 Metallbauarbeiten, Schlosserarbeiten
- DIN 18381 Gas-, Wasser- und Abwasserinstallationsanlagen
- DIN 18451 Gerüstarbeiten
- DIN 1055 Lastenannahme für Bauten Teil 1-5
- DIN 1988 Teil 1-8 Technische Regeln für die Trinkwasserinstallation
- DIN 4708 Teil 3 Zentrale Brauchwassererwärmungsanlagen
- DIN 4102 Brandverhalten von Baustoffen und Bauteilen
- DIN 4109 Schallschutz im Hochbau
- HeizAnlVO Heizungsanlagenverordnung
- ZVH - Richtlinie 11.01 Einbindung solartechnischer Anlagen in die Hauswärmerversorgung
- TRD 802 Dampfkessel der Gruppe III
- TRD 402 Ausrüstung von Dampfkesselanlagen mit Heißwassererzeugern der Gruppe IV
- ENV 1991-2-3-4 Grundlagen der Tragwerksplanung und Einwirkung auf Tragwerke – Schneelasten und Windlasten
- DIN EN 516 Einrichtungen zum Betreten des Daches
- EN 517 Sicherheitsdachhaken
- DIN 4751 Teil 1: Wasserheizungsanlagen: Offene und geschlossene physikalisch abgesicherte Wärmeerzeugungsanlagen bis 120 C° - Sicherheitstechnische Ausrüstung  
Teil 2: Wasserheizungsanlagen: Geschlossene, thermostatisch abgesicherte Wärmeerzeugungsanlagen mit Vorlauftemperaturen bis 120 C° - Sicherheitstechnische Ausrüstung  
Teil 3: Wasserheizungsanlagen: Geschlossene, thermostatisch abgesicherte Wärmeerzeugungsanlagen mit 50 kW Nennwärmeleistung mit Zwangumlauf-Wärmeerzeugern und Vorlauftemperaturen bis 95 C°; Sicherheitstechnische Ausrüstung
- DIN 4753 Teil 1 Wassererwärmer und Wassererwärmungsanlagen für Trink- und Betriebswasser; Anforderungen, Kennzeichnung, Ausrüstung und Prüfung
- DIN 4757 Teil 1: Sonnenheizungsanlagen mit Wasser und Wassergemischen als Wärmeträger; Anforderungen an die Sicherheitstechnische Ausrüstung



- Teil 2: Sonnenheizungsanlagen mit organischen Wärmeträgern;  
Anforderungen an die sicherheitstechnische Ausrüstung
- DIN VDE 0100-510 Errichten von Starkstromanlagen mit Nennspannungen bis 1000 V; Allgemeine Bestimmungen
  - DIN VDE 0100-725 Errichten von Starkstromanlagen mit Nennspannungen bis 1000 V; Hilfsstromkreise
  - DIN VDE 0100-737 Errichten von Niederspannungsanlagen - Feuchte und nasse Bereiche und Räume und Anlagen im Freien
  - DIN VDE 0105-100 Betrieb von elektrischen Anlagen
  - DIN VDE 0185-1, DIN 57185-1 Blitzschutzanlage, Allgemeines für das Errichten
  - DIN VDE 0190 Einbeziehung von Gas- und Wasserleitungen in den Hauptpotentialausgleich
  - VDE 0855-1, DIN 57855-1 Errichtung und Betrieb (Erdung) von Antennenanlagen

## Connection of solar thermal systems

- EN 12976: Thermische Solaranlagen und ihre Bauteile (vorgefertigte Anlagen)
- ENV 12977: Thermische Solaranlagen und ihre Bauteile (kundenspezifisch gefertigte Anlagen)
- DIN 1988: Technische Regeln für Trinkwasser-Installation (TRWI)

## Notes before starting assembly



The installation and initial operation must be carried out by an expert who is responsible for the correct installation and operation.

Before installing and putting the collectors into service, please inform yourself about the local engineer standards and regulations.

For mounting the collector you should use the available mounting hook. The mounting hooks can be fixed at the planned installation site with any suitable mounting system for solar thermal or photovoltaic modules. (in dependence of roof shape and roofing)  
Please contact your supplier of fixing material.

Throughout the installation of a solar collector you directly intervene into an existing roof cladding. Different roof coverings such as tile, shingles or slate require additional measures (eg sarkings) as security against the ingress of moisture due to rain or snow - especially in case of extended and occupied top floors or in case of too less roof pitch (concerning the covering).

# Safety regulations, instructions and guidelines

The selected substructure and the connections to the building are to be interpreted by others according to local circumstances.

Recommended heat transfer medium is Tyfocor LS or equivalent. The collectors may never be operated or tested under pressure with water.

Part of the collector can reach temperatures above 200°C and can cause burns.

The collectors are not to be mounted or filled in direct sunlight.

Disregard of the instructions can lead to the extinction of the warranty.

## Lightning protection

Note country-specific legislation!  
Through the installation of metal fastening, a check is needed by an authorized qualified electrician.

The metallic pipes of the solar circle are connected via a copper pipe of at least 16 mm<sup>2</sup> with the earth circuit connector.

Please ensure sufficient ventilation for each assembly method. Do not close ventilation openings. The collector has to be ventilated behind.

Pay attention to the regulations of the ZVDH (Germany), SVDW (Switzerland) as well as different local regulations concerning the ventilation. If necessary, consult an expert.

## Responsibility

The constructor of the installation is responsible for the integration according to regulations and for compliance with the safety regulations.

The operator of the installation is responsible for an operation of the installation according to regulations and for consultation of experts in case of problems.

This instruction is not subjected to be control of service of modifications. It does not absolve the manufacturer and operator of the installation of his responsibilities to install and operate all parts of the installation according to utmost professional knowledge. The manufacturer of the installation is responsible to observe and keep all appropriate regulations and instructions.

## Statics

 Before beginning the assembly it is vital to test the roof or substructure on site to sufficient load-carrying capacity.

Pay increased attention to the possible durability of the screw fittings to fasten the collectors as well as to the quality of the substructure.

According to DIN 1055 part 4 and 5 or rather according to the local engineer standards it is necessary to check on site the whole collector installation, especially in snowy regions (note: 1 m<sup>2</sup> powder snow ~ 60 kg / 1 m<sup>2</sup> wet snow ~ 200 kg) as well as in regions with high wind speed. Before starting the assembly all aspects that may lead to incorrect load of the whole construction have to be considered.

Install the collectors the way that backlog of snow (e.g. due to snow guards or other obstacles) is not possible.

The collectors have to be mounted in an angle of at least 20° to 70°.

In case of correct assembly snow loads up to 2 kN/m<sup>2</sup> and wind loads up to 1,1 kN/m<sup>2</sup> on the collector are permissible.

There must be a minimum distance of 1 m to ridge of the roof, dormer and eave.

## For transport and stocking

- Never abandon the delivered collectors unprotected at the building site.
- Never lay down the collectors onto a rough surface with overhanging pieces like stones, timbers, etc.
- Stock the collectors always upright leaning against a solid surface.
- The rigidity of the collectors is limited. During transport to the building site always ensure a torsion-free transport type.
- In case of an elevated intermediate storage make sure that the collectors are protected against sliding down.

# Product descriptions

## Solar thermal collector „FINO“

The solar collector uses the radiant energy of the sun for heating a heat transfer fluid.

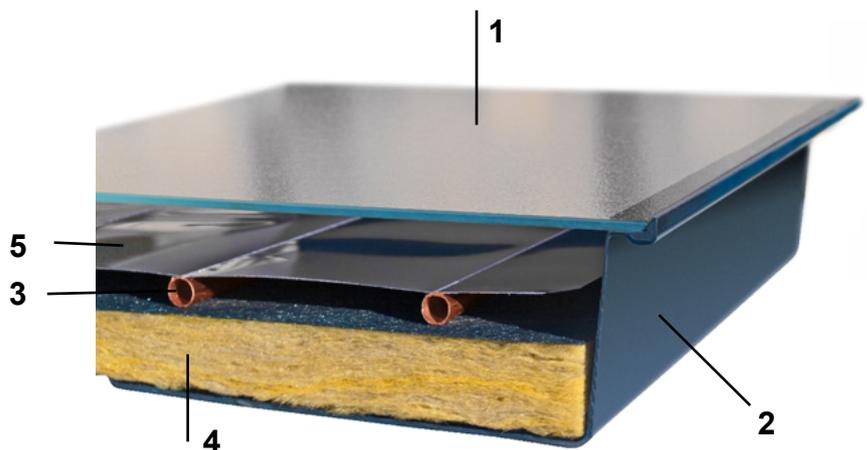
This glycol-water mixture indicates the stored heat through a heat exchanger to a storage tank.

The energy can be used for hot water installation.



## sectional model

- 1 solar safety glass
- 2 plastic tray
- 3 absorber pipe
- 4 insulation
- 5 highly selective coated absorber



# Product description



## Clamp

To mount the collector on substructure - four clamps made of aluminum are required. (see figure)

These are available as a kit from your supplier.

The collector can be mounted onto slanted roofs or console constructions (flat roofs, base or barrier).

## Specifications

Model FINO	
cross area	0,96 m <sup>2</sup>
length	1.200 mm
width	800 mm
height	70 mm
case	plastic tray
glass	solar glass ESG
insulation	mineral wool
absorber	vacuum coating, highly selective
weight	13,5 kg

## Capabilities

Use for solar thermal systems for hot water generation

Example for dimensioning

Number of FINO's	People	Hot water consumption per day	Capacity of hot water storage tank	Heat exchanger	Normal flow rate
2	2-3	100 l	100 l	0,50 m <sup>2</sup>	50 l/h
3	4-5	150 l	150 l	0,75 m <sup>2</sup>	75 l/h
4	4-6	200 l	200 l	1,00 m <sup>2</sup>	100 l/h

# Product description

## Hydraulic connections

The hydraulic connection between the collectors requires standard clamping ring joints (10 mm).

Example: Supplier: Simplex VSH SUPER

Please note the assembly instructions of your supplier.

The maximum allowable operating pressure is 6 bar.

Pressure drop per collector at design conditions  
 (T<sub>m</sub> = 20°C und dV/dt = 50 l/h)  
 Δp = 2930 Pa

Table of measurements (Pa) (T<sub>m</sub> = 20 °C)

flow rate [l/h]	pressure drop [Pa]
100	6660
150	11190
200	16520
250	22650
300	29580

angle 90°



T-piece



straight connection



copper tube 10 mm



# Collector hydraulic

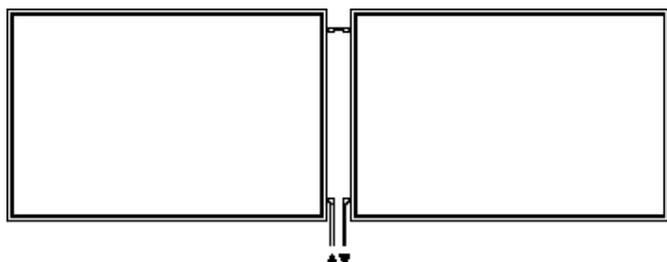
## Arrangement options

Each collector has unilaterally a flow and return connection (tube 10 mm.) up to four collectors can be connected in series.

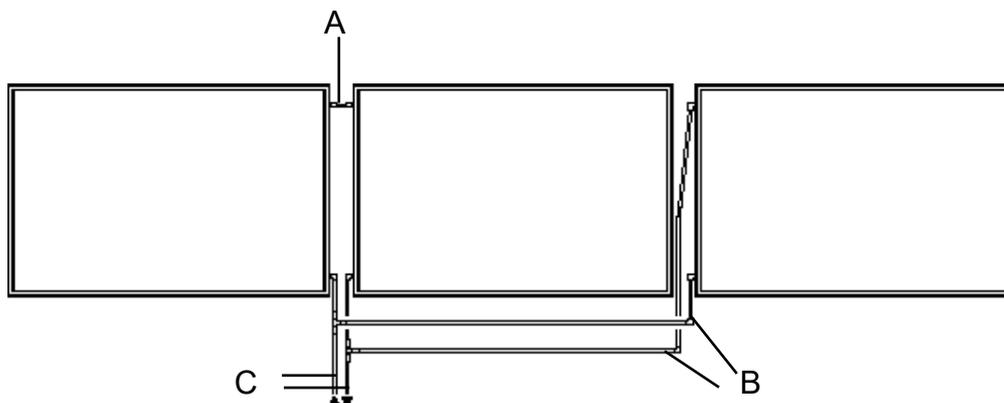
In parallel interconnecting any number of such fields can be combined, taking into account the pressure losses. The dimension of the connecting pipe is always 10x1 mm (A) between two collectors. The collection pipe 12x1 mm (B). The dimensions of the flow and the return pipe are to be seen in the table at page 14. (C).



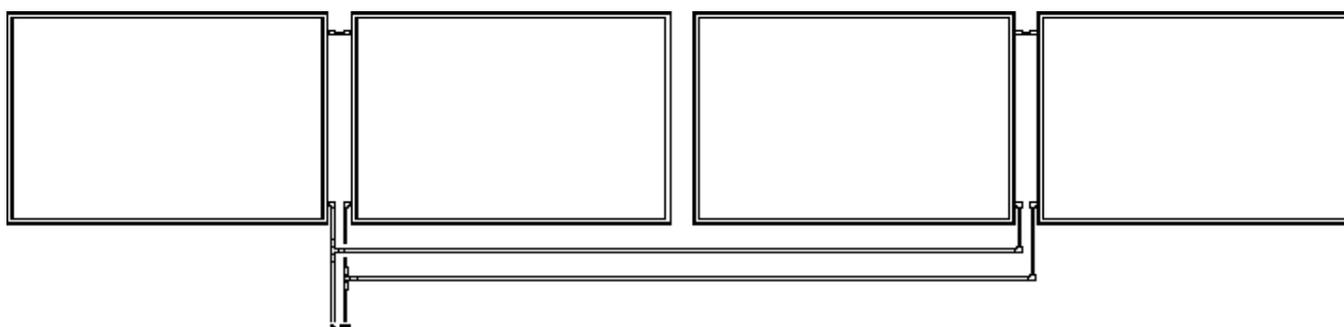
single-row with two collectors



single-row with three collectors

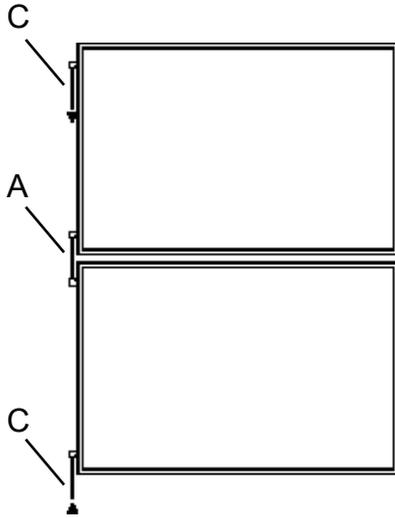


single-rows with four collectors

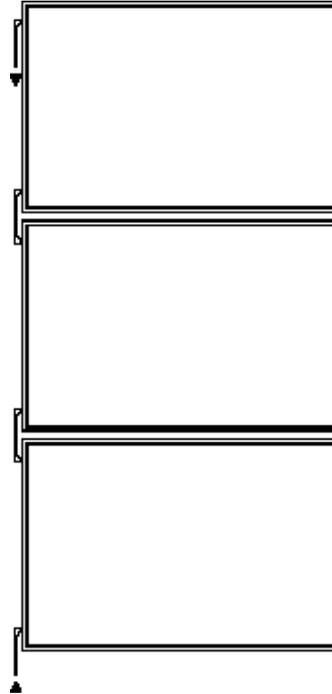


# Collector hydraulic

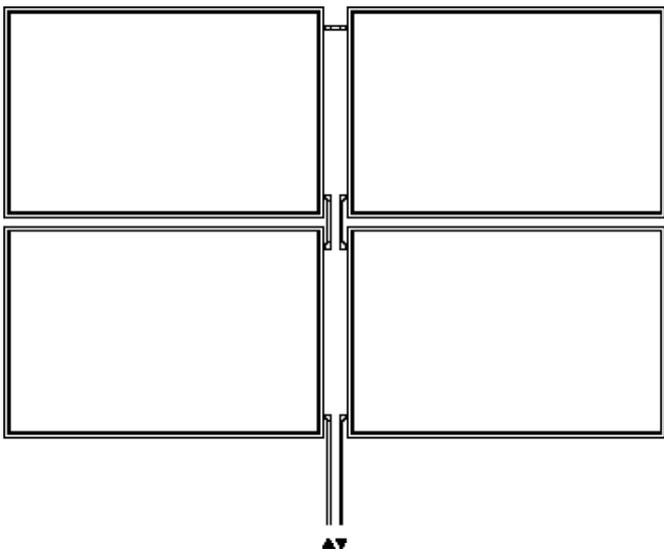
in two rows with two collectors



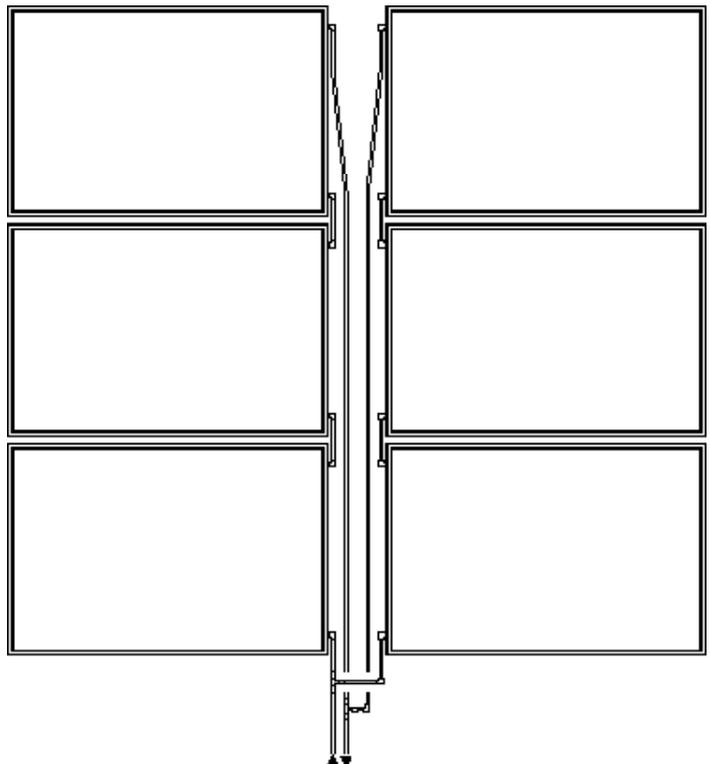
in three rows with three collectors



in two rows with four collectors

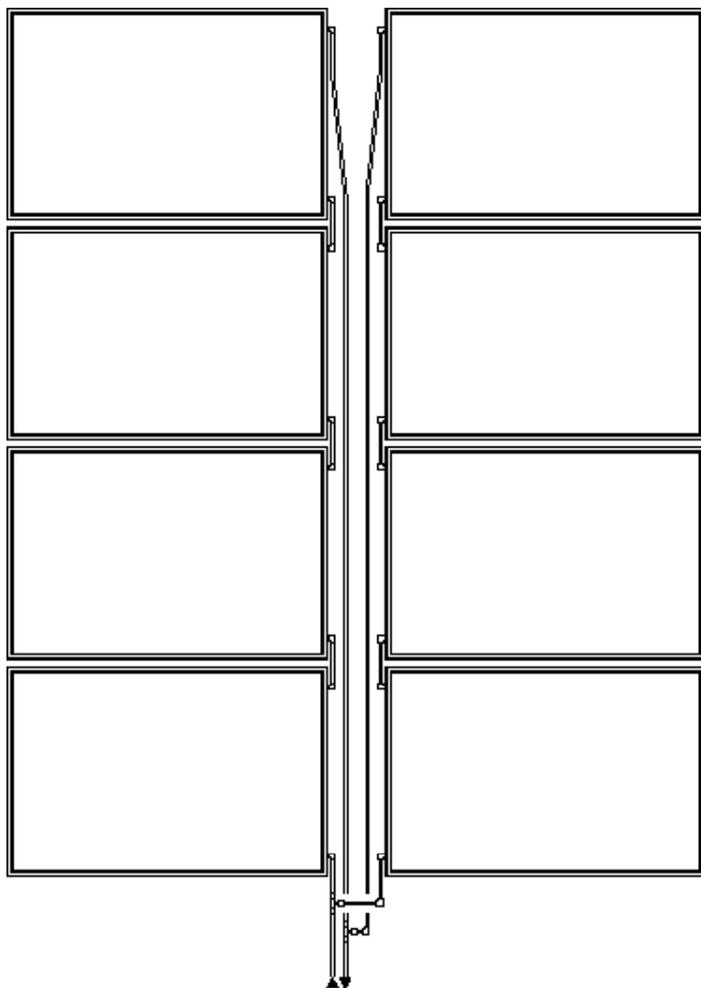


in three rows with six collectors



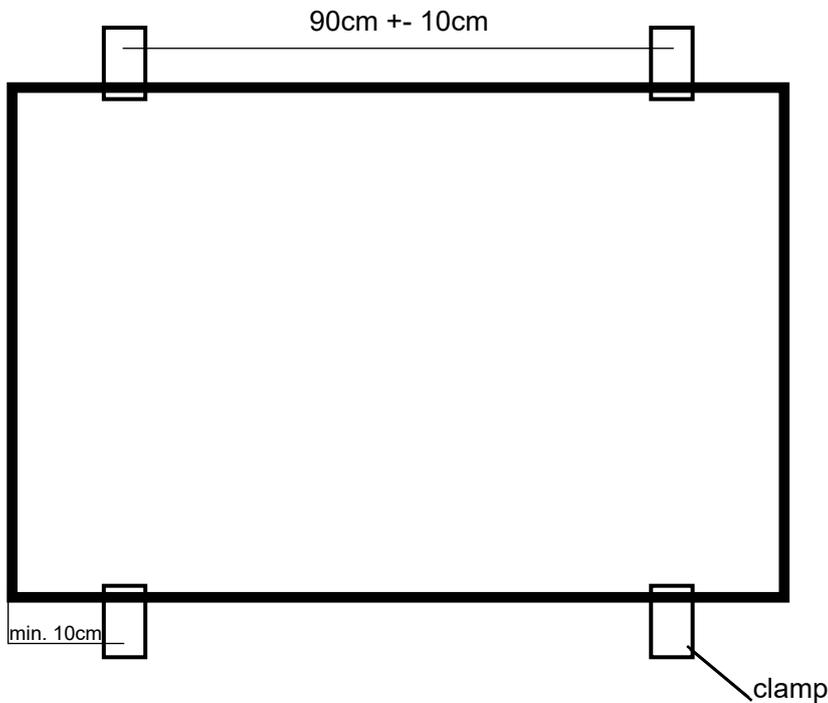
# Collector hydraulic

in four rows with eight collectors



# Assembly

## Distance dimension



The measurements indicate the hole spacing of the clamps.

The edge distance must be at least 10 cm.

The distances between the collectors can be chosen depending on the arrangement of the collectors.



The solar collector FINO provides air inlets at the right and left site which are covered with a grommet. It is mandatory that the opening of the grommet is adjusted parallel to the floor. If not it may lead to ingress of splash.



# Assembly



## Installation of substructure



It is recommended to mount the FINO on an outside sub construction (aluminium profile, console, etc.), which is not scope of delivery.

Before starting to mount the collector it is mandatory, to check the roof and the onsite sub construction regarding load capacity and taking into account wind and snowloads.



## Installation of the clamps



Insert the four clamps from the side in the horizontal grooves on the collector at the top and bottom in accordance with distance dimensions at page 15.

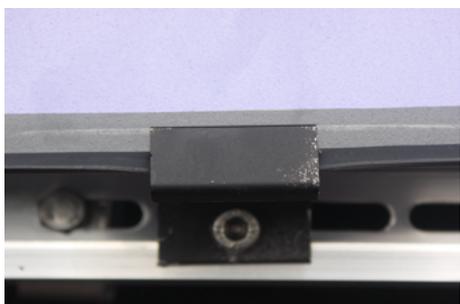
Watch out for uniform load distribution, i.e. the clamp must hook the entire surface of the tub edge.



## Assembly of the collector

Fix the clamp on the substructure.

Unilateral loads damage the seal of the collector.  
For non-observance expires the manufacturer's warranty



# Pipe dimension

## Recommended pipe dimension for connections

length of pipe FL+RE number of collectors	up to 5 m	from 5 m up to 10 m	from 10 m up to 15 m	from 15 m up to 20 m	from 20 m up to 25 m	from 25 m up to 30 m
2 pcs (flow=50l/h)	12 x 1	12 x 1	12 x 1	12 x 1	12 x 1	12 x 1
3 pcs (flow=75l/h)	12 x 1	12 x 1	12 x 1	12 x 1	12 x 1	12 x 1
4 pcs (flow=100l/h)	12 x 1	12 x 1	12 x 1	12 x 1	12 x 1	12 x 1
5 pcs (flow=125l/h)	12 x 1	12 x 1	12 x 1	15 x 1	15 x 1	15 x 1
6 pcs (flow=150l/h)	12 x 1	12 x 1	15 x 1	15 x 1	15 x 1	18 x 1
7 pcs (flow=175l/h)	12 x 1	15 x 1	15 x 1	15 x 1	18 x 1	18 x 1
8 pcs (flow=200l/h)	12 x 1	15 x 1	15 x 1	18 x 1	18 x 1	18 x 1

length of pipe FL+RE number of collectors	from 30 m up to 35 m	from 35 m up to 40 m	from 40 m up to 45 m	from 45 m up to 50 m	from 50 m up to 55 m	from 55 m up to 60 m
2 pcs (flow =50l/h)	12 x 1					
3 pcs (flow=75l/h)	12 x 1	15 x 1				
4 pcs (flow=100l/h)	15 x 1					
5 pcs (flow=125l/h)	15 x 1	15 x 1	18 x 1	18 x 1	18 x 1	18 x 1
6 pcs (flow=150l/h)	18 x 1	18 x 1	18 x 1	18 x 1	22 x 1	22 x 1
7 pcs (flow=175l/h)	18 x 1	18 x 1	22 x 1	22 x 1	22 x 1	22 x 1
8 pcs (flow=200l/h)	22 x 1					

FL- flow  
RE- return

# Initiation

## Initial operation

After installing the other components such as flow pipe, return pipe, insulation, pump group, expansion tank and controller the installation can be put into service. Perform a leak test and complete the commissioning log. Protect the collectors from direct sunlight if the filling of the installation is not carried out within five days after completion of the assembly.

## Inspections within the first two weeks of operation

- bleeding the solar circle.
- control system pressure

## Instructions for the operation of the installation

Carry out changes to the scheme and other system components only after consultation and with inputs from your specialized partner.

Ensure that an appropriate safety valve is mounted, whose opening pressure is not exceeding the maximal operating pressure of the collectors. Furthermore, do not install shut-off valves that may affect or prevent the function of the safety valve.

Carry out maintenance and inspection with appropriate caution. Certain components may reach temperatures up to 200° C. There is a risk of burns.

It is absolutely necessary to make sure that the back flow temperature never falls below the ambient temperature. If necessary, take appropriate measures (e.g. increase of back flow temperature to at least 30° C.)

## Important to observe!

Any guarantee and warranty for collectors as well as for resulting damages on the system or building expires due to unauthorized changes on the collectors and the accessories.

There is no guarantee or warranty due to optical or technical reduction or defects on the collector resulting from external influences, forasmuch as these influences are not part of the supplier's sphere of influence and they are not explicitly known before execution.

## Regular inspections

Solar systems should be reviewed at intervals to be determined in addition to the function control by the operator.

The maintenance intervals of the system will be defined during commissioning.

An annual review is recommended. The following components must be checked for proper function (if installed):

- solar collectors
- solar circle
- heat transfer fluid
- solar storage
- solar regulator incl. circulation pump
- supplementary heating system

## Unscheduled maintenance

Depending on the location of the installation, environmental influences may cause soiling on the collector glass (dust, pollen etc.). Clean the glass, if necessary, exclusively with clear water to ensure optimal light transmission.

If it is necessary to free the system from snow or ice, use only non-metal cleaning equipment, such as brooms, with due care. Walk on roof areas only in compliance with all safety aspects.

Heavy condensation may occur on the interior side of the glass when defrosting while the collectors are covered with snow. It is absolutely necessary to free the collectors from snow to avoid damages due to humidity.

# Appendix

Commissioning report									
System operator					Installer				
Street					Street				
Postcode/City					Postcode/City				
Material	Product (description)	Type (Serial N°)	Special feature	Material	Date of assembly				
tick accordingly			Hot surface						
Flat plate collector					Date of commissioning				
Piping									
Heat exchanger					Type of installation				
Storage 1			Content lit.		Roof-integrated				
Storage 2			Content lit.		Roof-mounted				
Solar regulation					Control				
Expansion tank			Content lit.	Safety valve	bar				
Drain/water			Content lit.						
Collector adjustment: south 0°, west +90°, east -90°				Setting angle of collectors					
Height				Meter					
Setting value (Control value=°)	Type / Programme			Maximum temperature	Temperature difference		Hygiene		
Consumer 1° = e.g. water for domestic use				°C	K		K		
Consumer 2° = e.g. 1. buffer store				°C	K		K		
Consumer 3° = e.g. 2. buffer store				°C	K		K		
Consumer 4° = e.g. swimming pool				°C	K		K		
Maximum temperature of collector	°C			Solar protective function from	°C		Yes No		
Operating pressure at	bar			System pressure expansion tank	bar		Debit: Actual value:		
Heat transfer medium									
Visual check	normal/pink		brown		black		rusty		
Type			Minimum value	Actual value		System		rinsed filtered bleached	
Liquid capacity	pH-value								
Ratio	Frost protection								
General system checkpoints									
Collector clean			ok	Pumps tested on functionality				ok	
Stable collector fastening			ok	Temperature sensor shows realistic values				ok	
Collector not steam'd up (interior)			ok	Grounding of the system				ok	
Non-return valve (not for Drain/W.)			ok	Water - water for domestic use				ok	
Operating hours	Pump 1		h	Pump 2		h	Colormeter		100%
Remarks:									



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