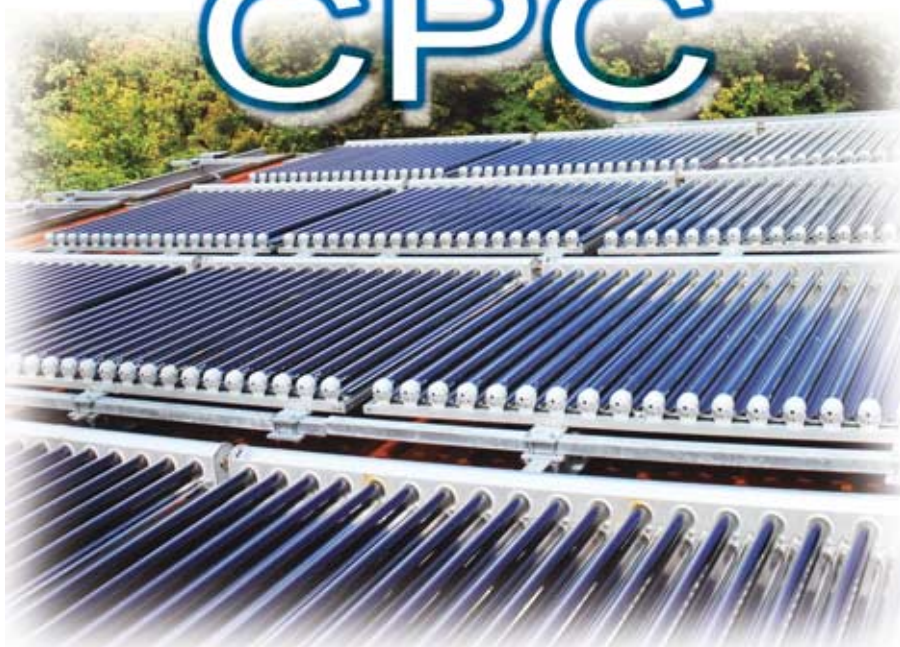




Professional solar systems!

Röhrenkollektor CPC

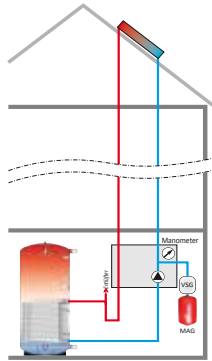
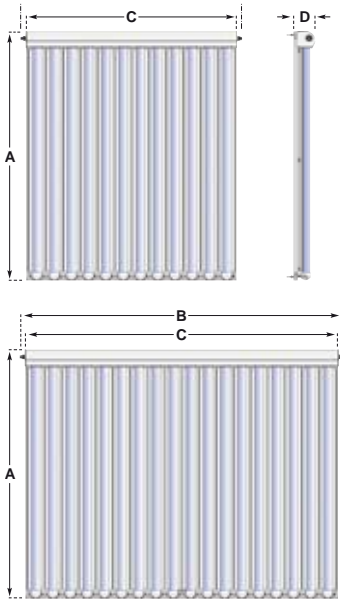


Mounting instruction

– Please read carefully before installation –

Technical specifications

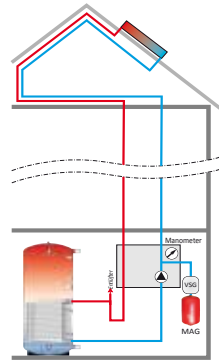
		CPC 12	CPC 18
type of mounting		on roof (pitched/flat roof)	
gross surface area m ²		2,16	3,21
aperture surface area m ²		1,89	2,84
number of tubes		12	18
height mm	A	1603	1603
width mm	B	1423	2083
depth mm	C	1358	2018
interval flow and return line mm	D	140	140
weight unfilled kg		43	65
collector capacity Liter		1,74	2,60
max. operating pressure bar		6	6
stationary temperature °C		249	249
peak output per module $W_{peak} (G^*=1000W/m^2, \eta_0)$		1357	2039
conversion factor η_0		0,718	
thermal conductivity $a_1 W/(m^2K)$		0,974	
thermal conductivity $a_2 W/(m^2K^2)$		0,005	
incident angle modifier IAM50		0,87	
collector glazing		safety glass	
connections		CU 18 x 1,0	
absorber with evacuation tube		U-shaped tube CU	
absorber coating		selective AL-N/AL	
CPC-reflector		highly polished	
casing		aluminum	
thermal insulation collector		compressed rock wool	
norm		DIN EN 12975	
hydraulic interconnection		max. 6 collectors in a row	
distance between collectors		approx. 50 mm	
permissible collector tilt		15°-65° (stand-kit available)	
recommend storage tank dimension		50 liter per m ² collector surface	



Right

Self-draining possible.

The solar medium will be ejected almost completely when the system is in stagnation.



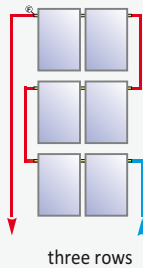
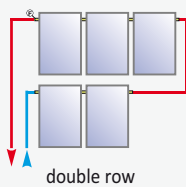
Wrong

Self-draining not possible.

Solar medium is left in the collector. Heavy steam formation in, high thermal stress of the system components.

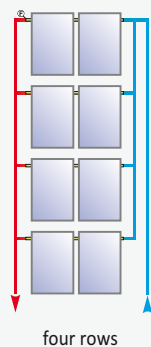
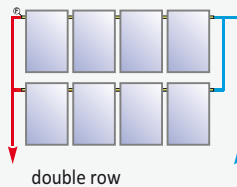
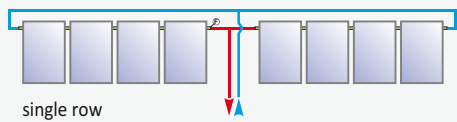
Connection example

up to a maximum of 6 collectors



Connection example (Tichelmann)

for larger collector arrays



These schemes are only an installation example and do not replace technical planning!

Safety regulations

Carefully read the safety instructions before commencing the installation. It's for your own safety.

Please follow the structural instructions if the installation location of the solar system is above 600m sea level or possibly exposed to large amounts of snow (higher than zone 4). The installation needs to be carried out on a roof that is capable of bearing that load. The static bearing capacity needs to be checked on site before the installation.

The collectors can either be transported vertically or horizontally. Attention: Breakage of glass. Store the collectors in a dry and shadowy place. The protections of the manifolds have to be removed before the solar collectors are exposed to the sun and heat themselves.

Working on the roof

Appropriate safety measures have to be arranged. Familiarize yourself with the general regulations of accident prevention for construction work of your professional association or let yourself be instructed by an appropriate person. The following aspects have to be respected to achieve a secure installation of the solar system:

- always use fall protection while working on a roof
- respect safety regulations when using a ladder
- while working on roof coverings with corrugated sheets the risk of breaking through exists
- secure workplaces on steep roofs
- safety clearances have to be met if an aerial pipeline leads across the roof
up to 1.000 V >1m, more than 1.000 V to 11.000 V >3m, with unknown voltage >5m.
- always wear safety goggles and gloves while working with an angle grinder
- Flat plate collectors can achieve a stationary temperature of over 200°C due to incident light. The risk of burns exists at the connections of flow and return. Always cover the collectors on sunny days during the installation
- Even regular daylight might cause the fluid in the collector to vaporize. This vapor leaks from the collector connections. Possible risk of scalding

Attention: glass

- Don't exert mechanical pressure on the glass covering. Glass splinters might evoke cuts
- Wear safety goggles and gloves while installing the solar system to avoid injuries due to possible damages

Electric connections

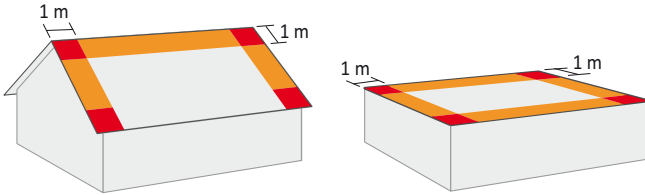
Electric installations have to be accomplished by a licensed tradesman subject to the German regulations VDE 0100 and to those of the local power company.



Caution frost damage:

The installation needs solely to be filled with solar fluid not with water only. This is also necessary in summer. Due to the special high selective coating temperature drops into the sub-zero area could occur during night time which can lead to the destruction of your solar system!

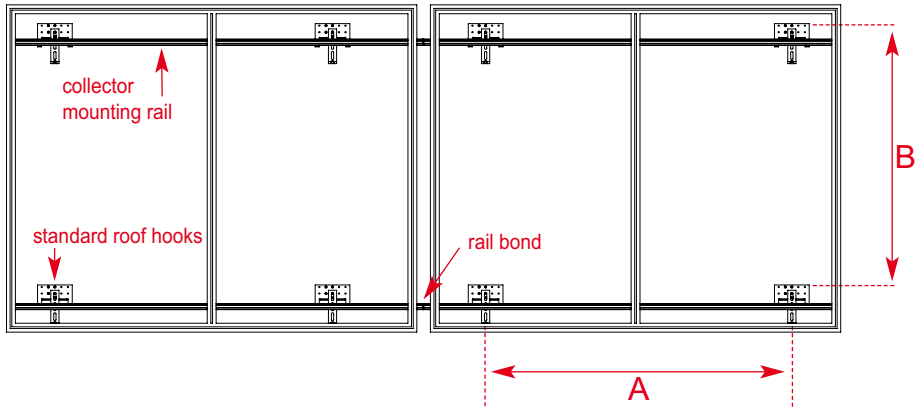
Mounting dimensions



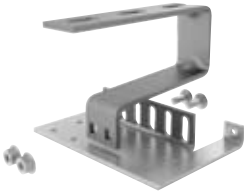
Minimum distance from roof edge:

Minimum distance of collector array from roof edge: 1 meter (except: eaves with pitched roofs)

With existing lightning protection system: minimum distance from this device: 1 meter



Distance between roof hooks (standard hooks and slate tile roof hooks)		CPC 12	CPC 18
collector height	(mm)	1603	1603
collector width	(mm)	1358	2018
A = distance (min. – max.)	(mm)	approx. 800-1300	approx. 1500-2000
B = distance (min. – max.)	(mm)	1200-1500	1200-1500

Installation material for standard roof tiles**Roof hooks**

coach bolts (M 8),
hexagon nuts with flange

**torx screws (5x60 mm) with patented drill-bit
and type approval**

for fixing the standard hooks on the rafter

**coach bolts M10**

for fixing the collector bearing rails on the roof hooks and the
collector mounting rails

aluminum collector mounting rail (upper and lower rail are identical)

for fixing the collectors

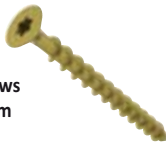


Installing the roof hooks on standard tiles

Diese Teile werden benötigt:



roof hooks



torx screws
5 x 60 mm



The pictures illustrate the mounting on the roof battens. You probably need longer wood screws, depending on the constructional circumstances of your roof, to guarantee a stable connection between rafter and hook.

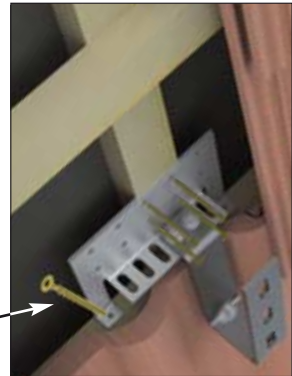
With possible higher snow loads (grade el. over 600 m sea level, > 2,3 kN/m²) the tiles underneath the hook should be replaced by metal tiles!

1

Pre-mount the roof hook and the base plate, do not yet fasten the bolts.

Unroof the rafters and mount the base plate with the torx screws **onto the rafter**. Always make sure that the roof hook is seated in the tile's bulge.

The base plate should additionally be fixed with the roof batten when the bearing surface seems to be problematic.



2

Make sure that the roof hook has approx. 2-3 mm too much play to the tile.

There happen to be tiles that ask for a log of wood as distance piece.

Now screw the roof hook solidly onto the base plate with a 13mm flat wrench or ring wrench.

3

Grind off as much material from the tile as needed, with the help of an angle grinder, so that the roof hook perfectly fits underneath the tile. Afterwards retile the roof.



No grind works on the roof (risk of falling)

Next step: „Installing the collector bearing rails“

Special solution: Installing the plain tile hooks

**Diese Teile
werden benötigt:**



**roof hook for plain tiles
(special equipment)**



**torx screws
5 x 60 mm**



The pictures illustrate the mounting on the roof battens. You probably need longer wood screws, depending on the constructional circumstances of your roof, to guarantee a stable connection between rafter and hook.

With possible higher snow loads (grade el. over 600 m sea level, > 2,3 kN/m²) the tiles underneath the hook should be replaced by metal tiles!

Expose the rafters and screw the plain tile roof hook onto the rafter with the torx screws.

This kit can generally be used for most types of tiles that are plainly seated.



Next step: „Installing the collector bearing rails“

Special solution: installing the hanger bolts

Diese Teile werden benötigt:



self-locking nut M12

mounting
rail
supporter

self-locking nut M12



self-locking nut M12



sealing



hanger bolt

Stockschrauben
(Sonderzubehör)

1

Define the intervals of the drill holes according to the dimensions of the collector. Drill them in a straight row using a plumb-line.

Drill only on stable substructure

Pre-drill with 10mm afterwards use 16mm for the tiles (roof covering).

Screw the hanger bolt through the tiles onto the pre-drilled rafter. Fix the sealing together with the hexagon nut with flange. Adjust the interval for the mounting rail supporter by means of the nuts.

The hanger bolt has a hexagon head (wrench size 8 mm), it can be screwed in by means of a drill chuck. By this a safe installation of the hanger bolt can be guaranteed.



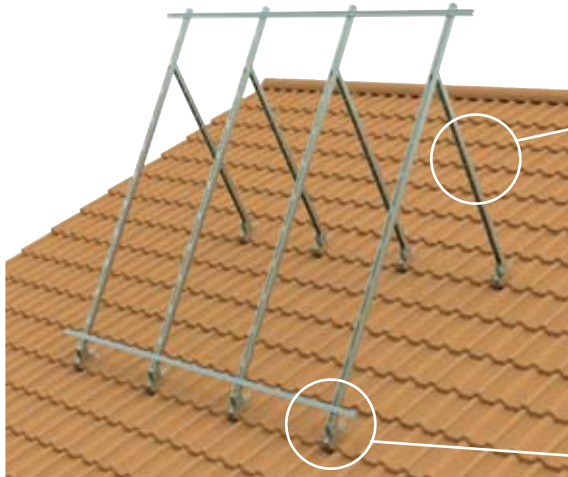
Position of the hanger bolt always on the wave crest not in the wave trough.

Next step: „Installing the collector bearing rails“

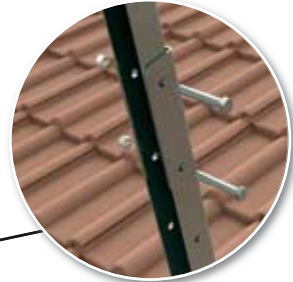
Special solution: Installation with stand-kit

recommended tilt angle (guide value for Germany):

- supplementary heating 60°
- heating up DHW (all year) 45°
- heating up DHW (summer) 25°



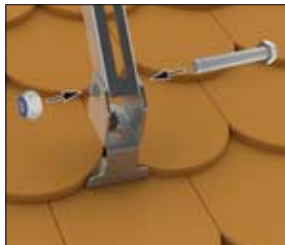
Stand-kit for the installation on standard roof hooks for tiled roofs



Telescopic U-profile to adjust the collector inclination. The U-profiles can be telescoped if the collector should be inclined in a weaker way. Two stainless steel screws (M8x50) and self-locking nuts are used as locking device.



The figure shows the ready installed base frames on **standard roof hooks** (with collector bearing rails). Each basic hoop is fixed with a screw M8x55 and a self-locking nut.



Special solution: plain tile hooks

Installing the basic hoop on plain tile hooks



Special solution: hanger bolts

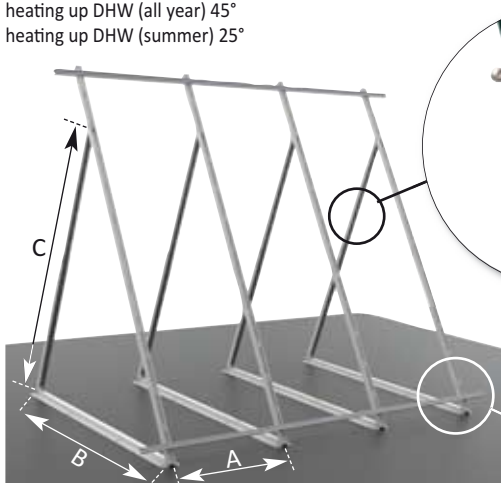
Installing the basic hoop on hanger bolts

Next step:
„Installing the collector mounting rails“

Special solution: Installation with a flat roof stand-kit

recommended tilt angle (guide value for Germany):

- supplementary heating 60°
- heating up DHW (all year) 45°
- heating up DHW (summer) 25°



Telescopic U-profile to adjust the collector. Two stainless steel screws (M8x50) and self-locking nuts are used as locking device.

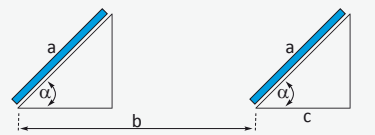


Dimensions of the flat-roof stand-kit

	CPC 12	CPC 18
distance A	approx. 800 - 1300 mm	approx. 1500 - 2000 mm
depth B	1600 mm	1600 mm
telescope height C	extendable to approx. 65°	extendable to approx. 65°

Calculating the clouding for flat roof installation (example: vertical angle of the sun 17° on 21.12. (Germany))

		collector inclination (α)		
		min. 25°	45°	min. 65°
CPC 12	distance (b)	3,65	4,85	5,40
CPC 18	distance (b)	3,65	4,85	5,40



Instruction for the installation/fastening of the stand-kits:

- the best solution is to screw the stand-kit onto the subsurface
- it would be possible to use ballast in order to protect the panels against wind load

Due to the different local conditions it is impossible for Solarbayer to make a general statement on the connection of the stand-kit to the subsurface (advice on demand)

Next step:
„Installing the collector mounting rails“

Installing the collector mounting rails

**These parts
are necessary:**



collector mounting rail



coach bolt M10
with self-locking nut

1

Insert the coach bolts into the slot of the collector mounting rails



2

Insert the collector mounting rail together with the coach bolts into the long slot of the standard roof hooks.



3

Adjust the collector mounting rail and fix it with the self-locking nut.



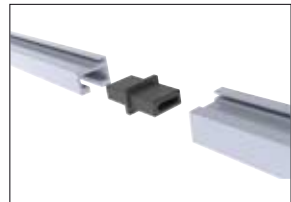
4

This picture shows the special installation type with hanger bolts



5

The collector mounting rails are extended with the enclosed rail bonds.



Next step: „Installation of the connecting hooks“

Installation of the connecting hooks

**These parts
are necessary:**



hook with nib for the upper
mounting of the collector



hook without nib for the lower
mounting of the collector

**This nib has to be pre-mounted
and adjusted correctly.**

1

Insert the coach bolt into the upper
and lower groove of the collector.



2

Adjust the lower hook (without nib)
together with the nut to the lower
part of the collector, bring it to
dimension and tighten the screws.

This dimension has to be
adjusted exactly because it
cannot be changed after the
installation. This applies to all
collectors.



3

Shift the upper hook (with nib) to
the uppermost part of the collector
and tighten it hand-tight.

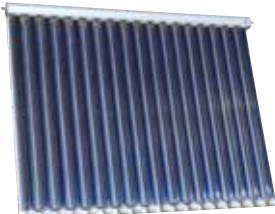
After the collector is hooked up
and after its connection to the
other collectors, slide the hook
downwards into the aluminium
profile.



Next step: „Installing and connecting the collectors“

Montage und Anschluss der Kollektoren

These parts are necessary:



collectors

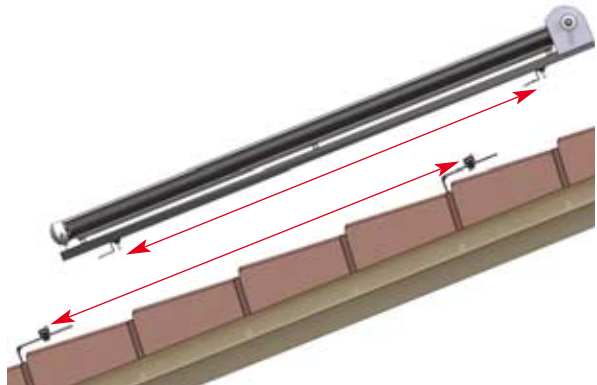


CPC installation kit



Grease the compression fitting before the installation (e.g. with fermit)

Check the proper and safe installation of the collectors and the correct installation of the collector connections



- 1 You have to check the dimensions of the intervals again before fitting the collectors into the rails. If necessary adjust them again according to the mounting dimensions of the rails. Now fit in the collectors into the lower rail.

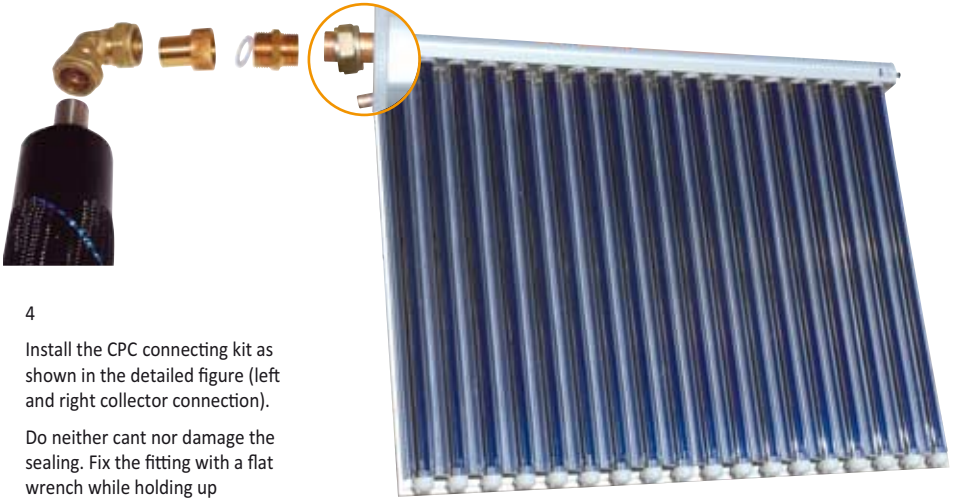


- 2 Push the collectors with greased fittings together and fix them with a flat wrench while holding up



- 3 Push the upper (hand-tightened hooks) downwards until the nib of the hooks clicks into the groove of the rail. Now fix the hook with a 13mm hex key.

Thus the supporting structure is solidly fixed.



4

Install the CPC connecting kit as shown in the detailed figure (left and right collector connection).

Do neither cant nor damage the sealing. Fix the fitting with a flat wrench while holding up

5

Insert the sensor into the collector's sensor socket (1. collector, flow line).

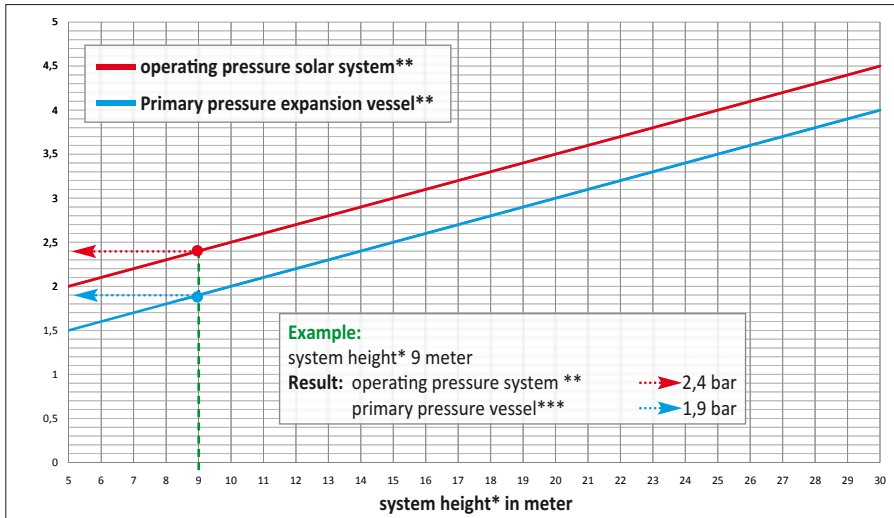
Afterwards pull the shrink hose over the sensor protective tube and sensor socket and shrink it on.



Initial operation

Determine the system's operating pressure and primary pressure of the expansion vessel

The professional adjustment of the solar expansion vessel's primary pressure and the operating pressure is the premise for a trouble-free operation of the solar system as well as for a long operating life of the solar fluid.



* The system height is the measured height from the manometer of the solar station to the highest position in the collector array

** The system's operating pressure has to be created with a filling unit - after professional de-airing of the system - and can be checked on the manometer of the solar station

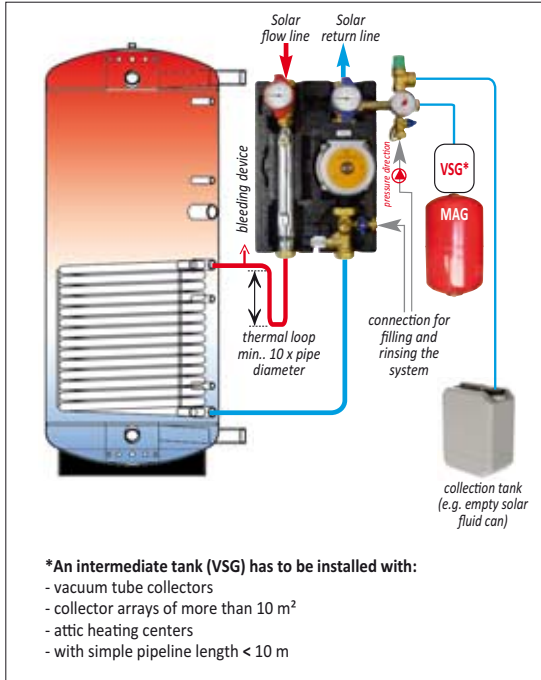
*** The primary pressure of the expansion vessel is pre-set to 2,5 bar (caution: der Ethe set pressure is to be adjusted according to the determined value of the chart)

Solar fluid LS

Only use our solar fluid LS. The ready to use special heat transfer fluid with high thermal load capacity guarantees antifreeze protection up to -28 °C.



CAUTION: The collectors have to be operated with antifreeze fluid even when the outside temperature is above freezing.



Remains of liquid might stay in the system depending on hydraulic connection resp. system. Hence, it is necessary to rinse the collectors with solar fluid because steam jets or freezing might lead to damages. Our flat-plate collectors are only to be used with solar fluid L.

Pay attention to possible separate guidelines of the manufacturer of the solar pump concerning the rinsing process.

Rinse

The solar system has to be rinsed with the ready mixed heat transfer fluid

Course of action:

- check if all screwed connections are tightened
- check the primary pressure of the solar expansion vessel at zero pressure, if necessary adjust to 2,5 bar
- switch the solar station's ball valves of flow and return to 45° - that will open the gravity brakes
- close hex key of flow regulator
- connect the hoses of the filling station with the corresponding valves
- open any other valve (if existing)
- adjust the inversion valve (if existing) to "manual"; convert the exits one after the other during the rinsing (if possible control them electrically with the control unit)
- the solar system can now be flushed in both directions; keep an eye on the manometer
- **don't** rinse/fill the solar system when it is under direct exposure to light or when the storage tank temperature is > 60°C
- the rinsing has been successful when the fluid returns clean and without air bubbles into the container
- operating pressure has to be at least 3 bar
- close the filling and draining valves and completely open the flow regulator
- open the ball valves and put the switching valves (if existing)
- the solar system is now ready for operation

Adjusting the flow rate

Solar pump RPM controlled:	Solar pump without RPM control:
<p>e.g. when using the solarbayer multi-loop controller SR 0502 or SR 0603 MC</p> <p>Turn the hex key at the regulation valve as far as possible to the left, it is now completely open.</p> <p>The flow rate is controlled yield-optimized by the control unit.</p> <p>Activate RPM control („ON“)</p> <p>Please read carefully the controller manual.</p>	<p>Adjust pump function to manual on the controller.</p> <p>Turn the hex key at the regulation valve as far as possible to the left, it is now completely open.</p> <p>Adjust pump to power stage II and meter the flow rate at the flow meter. If necessary boost the power stage until the calculated flow rate is achieved (cf. adjusting flow rate).</p> <p>Hint: always reduce the power stage before throttling the flow rate for electricity saving reasons! The regulator valve stays completely open.</p> <p>Recommended minimum flow rate Solarbayer flat plate collectors: 25 l/m²h</p> <p>Example: $6\text{m}^2 \times 25\text{l/m}^2\text{h} = 150\text{l} : 60\text{ min.} = 2,5\text{ l/min.}$</p> <p>Adjust the calculated flow rate at the screw-in bolt of the regulation valve (display shows l/min.) while pump is running (turning the screw right reduces flow).</p>

Pay attention to the guidelines of the pump manufacturer concerning the flow rate adjustment.

Piping

Flow and return lines

Guiding value:

collector surface in m ²	copper pipe mm	Solarpipe
up to 14	15-18	DN 16
up to 28	22	DN 20
from 28 on	28	DN 25

Attention:

determine bigger dimensions if the pipelines are longer than 10m.

Pipeline connections:

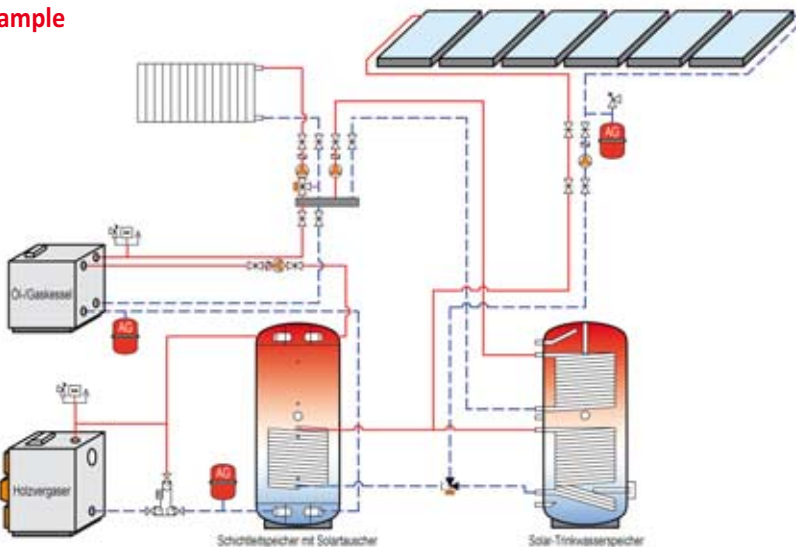
- hard soldering (flux free hard solder according to DIN 8513)
- pressing (only with fittings that are authorized for permanent temperatures >150°C and an operation with propylene glycole by the manufacturer)

Thermal insulation of the pipelines

the pipeline insulations have the following characteristics:

- short time temperature resistance > 150°C (e.g. fiberglass, rubber)
- outdoor parts must be UV-resistant and weatherproof (e.g. sheet metal jacket)
- insulation thickness = pipeline diameter (Minimum) (based on a K-value of 0,04 W/mk)

Example



Backup heating with solar (DHW tank with buffer storage tank):
 Optional: retrofitting a Solarbayer wood log boiler system with solar to an existing heating system

This scheme is only an installation example and does not replace technical planning!

Maintenance

In order to keep your high quality Solarbayer solar system in constant and perfect operating state we recommend an annual maintenance and check of the complete system by a specialist.

Minimum requirement for a professional check/maintenance:

- check the solar fluid with a refractometer (can be bought at our company)
- check pH value of heat transfer medium. Note: when the pH-Wert is < 7 the fluid needs to be changed
- leakage test as well as rinse and clean the system by the aid of the Solarbayer professional filling unit
- check the tightness of all connections and mounting elements
- sight check all collectors for probable defects
- pressure check of the expansion vessel, as well as a check of all safety devices
- check all moveable and electrical components
- check the tanks according to their reliability and security
- local conditions (e.g. hydraulic systems, electronics, etc.) might necessitate further checks

Professional filling unit Vario 1200

This compact filling and flushing has especially been developed to suit the requirements of HVAC installers and convinces with its versatile application possibilities.

Suitable for larger collector arrays.

Brief description

For the initiation and maintenance of closed systems such as solar systems, floor and wall heating. For cost saving rinsing, pre-bleeding and filling in one go.

- ✓ robust, high-performance pump with water proof on-off switch
- ✓ stainless steel pump casing
- ✓ transparent, pressure proof flow and return hoses for visual control
- ✓ ball valve at the tank's bottom for complete draining
- ✓ solid wheels
- ✓ ready-to-use
- ✓ unique cost-performance ratio



Professional filling unit Vario 1200

motor 230 V / 1200 Watt
 max. perm. fluid temp.: +90°C
 max. pumping head: 80 m

Order number: 4300303

Mitgeltende Vorschriften für solarthermische Anlagen

The general and special quality and test regulations are only applicable in combination with the applicable laws, regulations and norms and their sections that refer to the scope of application of quality regulations for solar systems. The most recent version is to be kept as basis for the quality regulations:

BGI 656 Personal protective equipment against falls – correct use,
BGR 203 - Working on roofs,
BGV A1 *Accident-Prevention Regulation - Principles of Prevention*,
BGV A2, A3 Electrical Installations and Equipment,
BGV C22 Construction work,
Chemicals Act (ChemG),
DIN 1055 Actions on structures,
DIN EN 1057 Copper and copper alloys - Seamless, round copper tubes for water and gas in sanitary and heating applications,
Technical rules of DVGW,
DIN EN 12449 Copper and copper alloys - Seamless, round tubes for general purposes,
DIN EN 1652 Copper and copper alloys - Plate, sheet, strip and circles for general purposes
DIN EN 12735-1 Copper and copper alloys - Seamless, round copper tubes for air conditioning and refrigeration - Part 1: Tubes for piping systems,
DIN 1988 Codes of practice for drinking water installations (TRWI); general information,
DIN 1988-4 Codes of practice for drinking water installations (TRWI); drinking water protection and drinking water quality control,
DIN EN 806 - 1-3 Specification for installations inside buildings conveying water for human consumption,
DIN EN 1717 Protection against pollution of potable water installations and general requirements of devices to prevent pollution by backflow,
DIN 4753 – 1 Water heaters, water heating installations and storage water heaters for drinking water,
DIN 4753 – 11 Water heaters and hot water systems for drinking and service water; indirect heat exchangers; requirements, testing and marking,
DIN EN 1991 Teil 1-3 Eurocode 1,
DIN EN 1991 Teil 1-4 Eurocode 1,
DIN 1946 Ventilation systems (VDI ventilation code),
DIN 4102 Fire behaviour of building materials and building components,
DIN 4807 Expansion vessels,
DIN 53384 Testing of plastics; artificial weathering or exposure in laboratory apparatus; exposure to UV-radiation,
pr DIN EN 12897 Water supply - Specification for indirectly heated unvented (closed) storage water heaters,
DIN EN 12975-1 Thermal solar systems and components - Solar collectors - Part 1: General requirements,
DIN EN 12975-2 Thermal solar systems and components - Solar collectors - Part 2: Test methods (including corrigendum AC:2002),
DIN EN 12976-1 Thermal solar systems and components - Factory made systems - Part 1: General requirements,
DIN EN 12976-2 Thermal solar systems and components - Factory made systems - Part 2: Test methods,
DIN V ENV 12977-1 Thermal solar systems and components - Custom built systems - Part 1: General requirements for solar water heaters and combisystems,
DIN V ENV 12977-2 Thermal solar systems and components - Custom built systems - Part 2: Test methods,
BDH Information sheet n° 34: Operational safety of solar thermal systems,
DIN V ENV 12977-3 Thermal solar systems and components - Custom built systems - Part 3: Performance test methods for solar water heater stores,
DVGW – worksheet GW2 Connecting copper pipes for gas and water installations
KfW – recommendation 1-6,
DVGW – worksheet W 270 Reproduction of microorganisms on materias for drinking water – Test methods and rating,
DVGW – worksheet W 551 „Potable water heating systems; technical measures for the decrease of legionella growth; planning, formation, operation and restoration of potable water systems”,

EU Pressure equipment directive PED 97/23/EC,
EEC directive 89/336/EEC Electromagnetic compatibility,
EEC directive 73/23/EEC Low voltage,
EEC directive 89/292/EEC Machinery,
EU directive 67/548/EEC classification, packaging and labelling of dangerous substances,
EU directive 91/155/EEC safety documents,
Ordinance on Hazardous Substances (GefStoffV),
RAL-GZ 429, Roof construction,
RAL-RG 641/1, Copper pipe,
RAL-RG 641/2, brazing solder and brazing flux and solder paste for copper,
RAL-RG 641/3, soft solder, solder flux and solder paste for copper,
RAL-RG 641/4, Capillary soldered fittings made of copper pipes,
RAL-GZ 655, Pipe supports,
Regulation guideline of the ZVDH (German Central Association of the Roofing Trade),
Technical Rule for Hazardous Substances (TRGS 519),
Energy Saving regulation EnEV on energy saving thermal insulation and on energy efficiency in buildings,
VDI 2067 Economic efficiency of building installations,
VDI 6002 Solar heating for potable water,
VDI 2035-1 Prevention of damage in water heating installations - Scale formation in domestic hot water supply installations and water heating installations,
VDI 2035-2 Prevention of damage in water heating installations - Water-side corrosion,
Regulation on the classification on substances hazardous to water (VwVwS),
Drinking water Ordinance (TrinkwV).

Instructions for lightning protection

The general principles for protection against lightning are stated in DIN EN 62305 part 3 / VDE 0185-305-3 (protection against lightning, physical damage to structures and life hazard) and in supplementary sheet 2 (Photovoltaic and solar thermal systems).

If a lightning protection system is installed on a structure as external lightning protection the collectors and its installation rails have to be connected to the protection system. A specialist for lightning protection has to check if either the solar system is within the range of a lightning protection system or what arrangements have to be met. Attention: It is not allowed to draw a conductive connection between the collector and the existing lightning protection system (danger of launching the lightning into the house!) A safety clearance of approx. 0,5 m from the collector array to the conductive parts of the lightning protection system has to be maintained to all sides. The exact calculation of the safety clearance is stated in DIN EN 62305 part 3. If it is impossible to keep up the safety clearance a specialist for lightning protection has to realize the necessary regulations.

Furthermore it has to be considered: If the lightning protection is outdated and no longer in accordance with the norm, the right of continuance expires due to the mounting of the collectors. In this case the lightning protection system has to be revised.

Source: information sheet no. 34, march 2009, Operating Reliability of Solar Thermal Systems. For further information see: www.BDH-Koeln.de

Overload protection: In order to protect the collector sensor and the control unit against overload you can install an overload arrester. Nearby lightning might induce voltage peaks which can destroy the sensor or the control unit. Protective diodes limit the damage caused by overload to a minimum. Solarbayer control units are regularly equipped with an overload protection.

Potential equalization: The solar system is to be connected to the structure's existing potential equalization by a specialist.

When planning and mounting, it is always the most recent version of this guidelines and regulations that has to be paid attention to!

Possible problems and trouble shooting

Problem	Cause	Solution
Pump is not working although the collector temperature is at least 10K warmer than that of the tank. No sounds from the pump can be heard	No power	Check all pipelines and fuses
	Either temperature difference is adjusted too big or the controller does not switch	- check controller - check temperature sensor - diminish temperature difference
	Maximum temperature is achieved.	Check settings
	Pump shaft is blocked by deposits in the bearings	Either switch to maximum rotation speed for a short time or unblock rotor. Put screwdriver into slot and turn manually
	Pump is broken	Exchange pump.
Pump is operating, but flow and return have the same temperature. Pump is very hot	There is air in the system. Valves are closed	- check system's pressure - flush complete solar system with Solarbayer filling station - open valves
The tank cools down during the night; flow and return have different temperatures after the pump has been turned off.; during the night collector temperature is higher than outside temperature	gravity brakes do not close 100% (particles of dirt)	Check the position of the red and blue handle. Probably, jammed cuttings or particles of dirt on the sealing surface. Uninstall and clean
The solar gain is unusually low	The pipe insulation is too thin, high heat loss; circulation is neither temperature nor time controlled. The system may have been designed incorrectly	Check the layout of the system (collector size, shading, pipe length, clock timer, hot water consumption)

Warranty certification

Based on the following terms of guarantee the company Solarbayer GmbH issues a 5 year guarantee for the **high capacity vacuum tube collector CPC**.

1. A **system warranty for the complete system of the hivacuum tube collector CPC** issued. The system consists of collectors, mounting kits, connection lines (Solarpipe), solar stations, expansion vessels, safety devices, heat transfer fluid, boiler and tanks by the company Solarbayer.
2. The time of guarantee is 5 years and starts with the time of delivery of the goods to the customer. The decisive date is the one noted on the packing list.
3. For a call upon guarantee it is required that the system is installed in accordance with the mounting instruction of the Solarbayer GmbH as well as in accordance with the corresponding regulations. Furthermore, the maintenance by a specialized company has to be arranged in regular intervals. The maintenance work is to be documented and proof of evidence is to be given in case of a warranty claim. The costs for the maintenance work are paid by the customer. Moreover, it is understood that the whole system corresponds to the mounting instructions.
4. The guarantee does not cover:
 - normal wear and tear parts
 - heavy strain and improper usage
 - use of inappropriate heat transfer medium
 - damages arisen by reason of chemical and electrochemical influences
 - damages arisen by faulty storage of the system by the ultimate consumer
 - corrosion damages caused by accumulation of humidity in between the collectors
 - breakage of glass
 - glass, except the defect is based on a manufacturing defect or a material defect
 - larceny, natural catastrophes, etc.
 - application of accessories and fluids that are not authorized by the manufacturer
 - electrical and moveable components (pumps, control units, valves/fittings, expansion vessels ...)
 - damages in transit
5. The packing list in combination with the original, paid, invoice is regarded as guarantee certificate.
6. In case of a defect, the customer is bound to give notice of existing defects immediately to the company Solarbayer (maximum time to give notice is a fortnight after the delivery).
7. Within guarantee time accorded to the company Solarbayer, the company only provides material replacement in the following way:
 - 2. - 3. year: ex works
 - 3. - 4. year: 50 % of the value of raw material
 - 4. - 5. year: 25 % of the value of raw material
8. Further requirements of any kind, especially indemnity requirements, rectification of defects, redhibition and cancellation of the contract are excluded from the existing guarantee certification.
The legal warranty claims are not affected by this guarantee bond.
9. The guarantee expires
 - if defects are not reported immediately
 - if changes are carried out that are not in accordance with the mounting instruction
 - if original parts are exchanged without having conferred to the company Solarbayer
 - if the required services are not accomplished
10. The customer is bound to switch off the system as long as further defects are avoided by this shut off. If the system is not switched off and further defects occur the claim under guarantee does not apply.
11. Deliveries and services are executed according to our General Terms and Conditions
12. If any regulations of this agreement may no longer be effective in law or invalid in any way the validity of the remaining regulations shall not be affected. The parties may replace the ineffective clause by a legally valid regulation that is as close as possible to the invalid one.

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- Storage systems
- Fresh water systems
- Wood log boiler
- Solar systems
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www.solarbayer.de

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