



## Installation Manual OEM Vario df Collector



made  
in  
Germany



## OEM Vario df Collector

400 W<sub>p</sub> to 3000 W<sub>p</sub> – Module / Vacuum Tube Collector VRK OEM XXXX-XX df



### General Safety Remarks

To avoid burn injuries and thermal burden of the collector material, please proceed as follows. The installation has to take place at low sun radiation.

**Danger:** Handle the full vacuum tubes with care because they can break. Thus there is a risk of injuries.

When dismantling a system or changing tubes, empty the tubes immediately and do not keep them in the sun. Fluid residues can lead to sudden burst of steam. Thus there is a **risk of injuries**.

Standard tubes: Adjust the coated absorber to the sun. Adjust the absorber to the sun when installing collectors vertically with southern deviation.

If the installation is not handled properly, it can cause damages to the collectors. Use red brass fittings, brass fittings and copper pipe for the installation. Only use hemp in conjunction with pressure and temperature resistance solar sealant. Do not braze in the near of and on the collector. The construction of the collector shall not be modified!

When mounting with press fittings, the O-rings must be temperature resistant. When mounting with compression fittings, all pipe ends must be rectangular and deburred. Put off cap nut and clamping ring on tube and moisten threads with oil. Insert the pipe into the clamping ring until it stops. Tighten cap nut by hand in a first step and after screw with a fork wrench and three-quarter turn. Do not insert annealed copper pipes into the clamping rings.

When installing the pipes, ensure a complete deaeration. The sensor cable shall not get in contact with the hot tubes.

### Occupational Safety Remarks:

It is recommended to wear helmet, ear protection, and goggles! Put on a fall protection! Do only touch the vacuum tubes with gloves!

### Essential Tools:

drilling machine, measuring tape (folding yardstick), bubble level, jaw spanner SW 13, box spanner SW 13, blockbuster



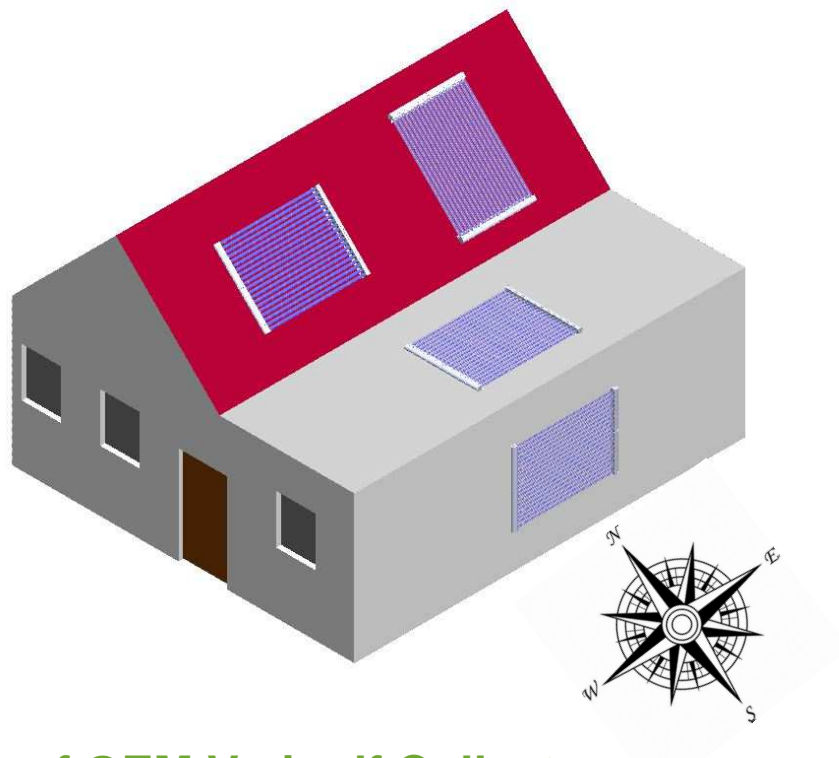
## Mounting Methods:

flat roof, facade, tiled roof (roof tile), trapeze tin roof, pitched roof, tin joint roof

## Remark!



The collectors should be installed so that the manifold is either on top, on the right side or on the left side in position. In case of horizontal installation, the tubes should be protected through an arranged snow guard above. Please note that the tubes have to be adjustable to the sun.



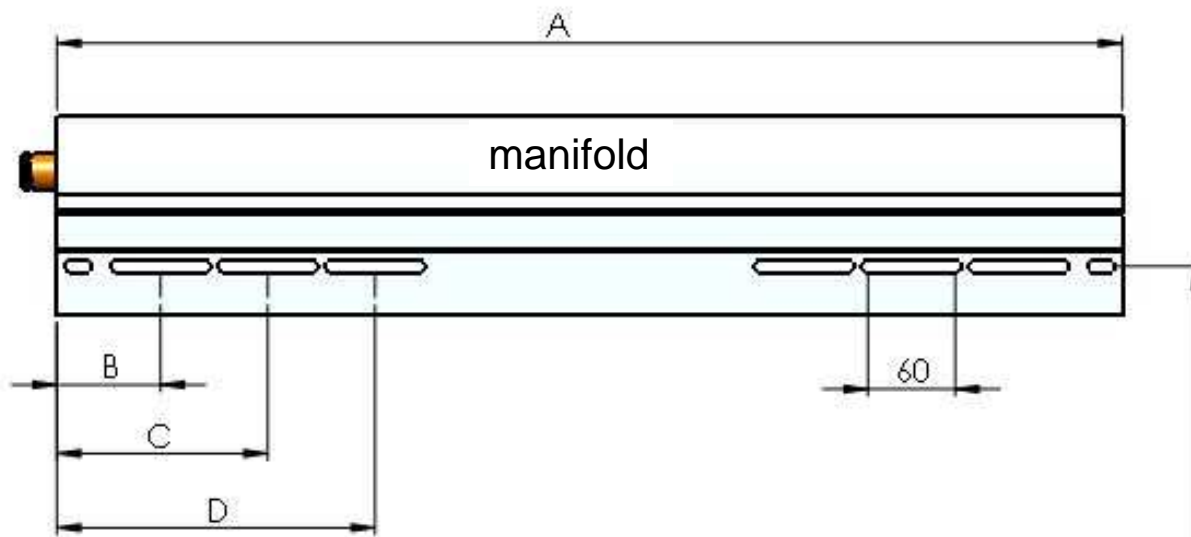
## Dimensions of OEM Vario df Collectors

Collector	length (mm)	width (mm)	weight (kg)	gross area (m <sup>2</sup> )	power range (W <sub>p</sub> )*
5 df tubes	2170	375	11	0,82	406 – 540
10 df tubes	2170	750	22,5	1,63	789 – 1104
20 df tubes	2170	1500	45	3,26	1578 – 2208
30 df tubes	2170	2250	67,5	4,88	2368 – 3238

\*depends on absorber coating (coated on one or both sides), irradiation and reflected radiation



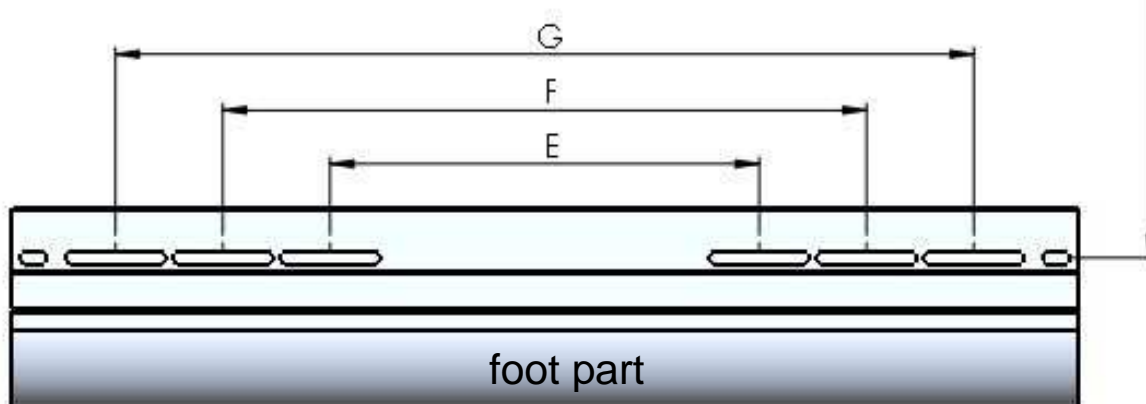
## Mounting Dimensions of df Collectors



Collector	A	B	C	D	E	F	G	H
5 tubes	375	75	/	/	195	/	/	1945
10 tubes	750	75	150	220	300	450	600	1945
20 tubes	1500	300	370	450	600	750	900	1945
30 tubes	2250	450	520	600	1050	1200	1350	1945

The oblong holes enable a difference of + / - 30 mm.

H  
**1945 mm**





## Wall and Facade Mounting

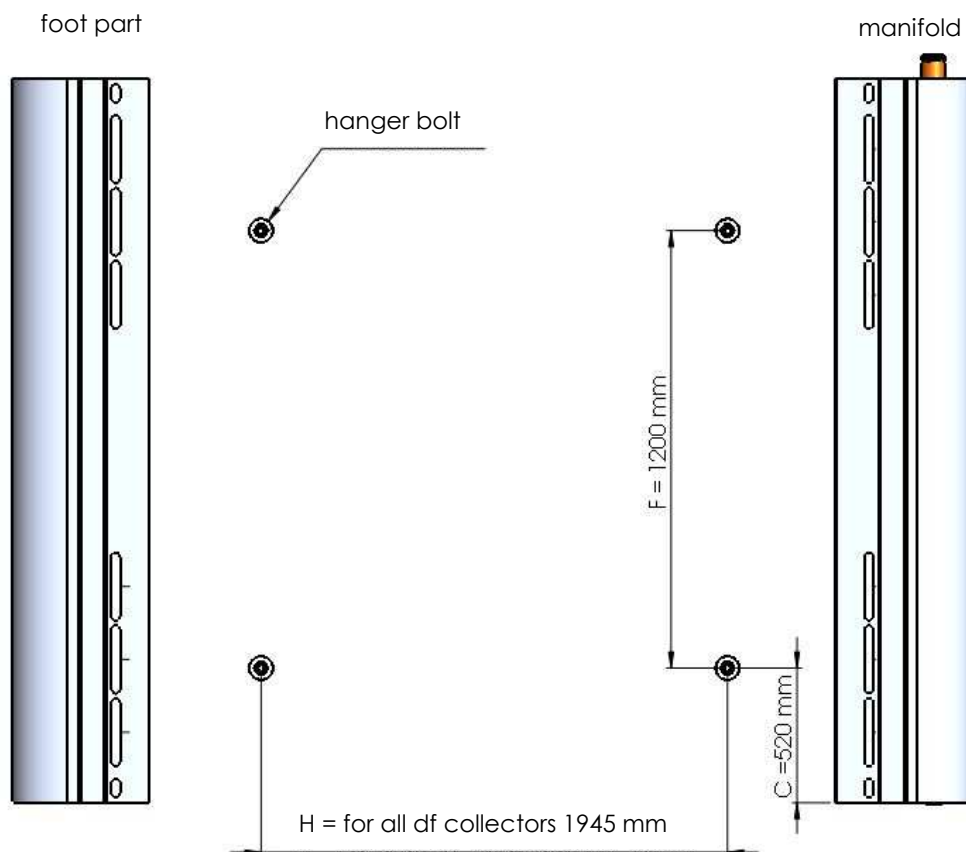
Mounting of OEM Vario 3000-30 df with hanger bolts

Example

Determining of mounting dimensions of hanger bolts with OEM Vario 3000-30 df (middle oblong hole from hanger bolt to hanger bolt).

The dimensions can be found in the table of the previous page. To do this, simply follow the steps given below.

First column: collector with 30 tubes, hanger bolt 1 dimension  $C = 520$  mm, hanger bolt 2 dimension  $F = 1200$  mm, the distance of screw to manifold and foot part amounts 1495 mm for all collectors.

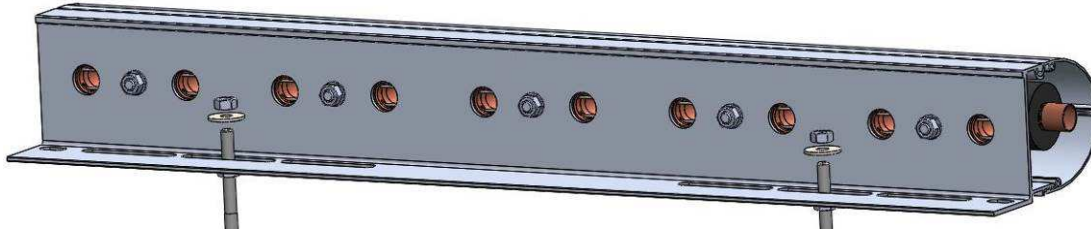


Ensure when marking the drill holes that the hanger bolts align horizontally and vertically. Use a bubble level.



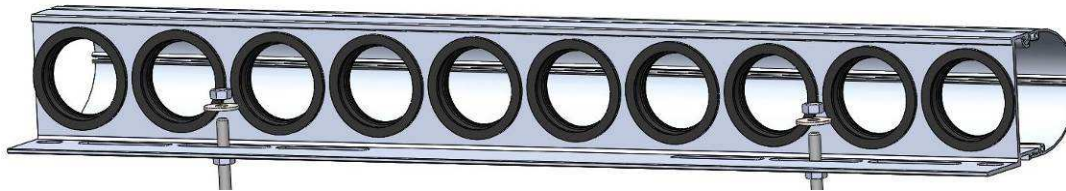
## For All Mounting Methods

### Mounting of manifold



Fix, adjust and tighten the manifold with screw and nut.

### Mounting of foot part

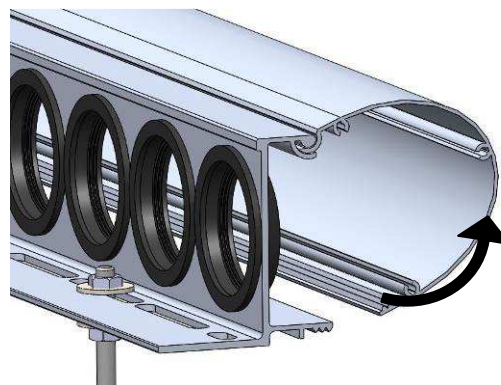


Fix, adjust and tighten the foot part with screw and nut.

Please note, that manifold and foot part have to be aligned. Use a bubble level.

### Dismounting of manifold and foot part

Push the cover on side of the interlocking down and turn it upwards.  
Put the cover aside.

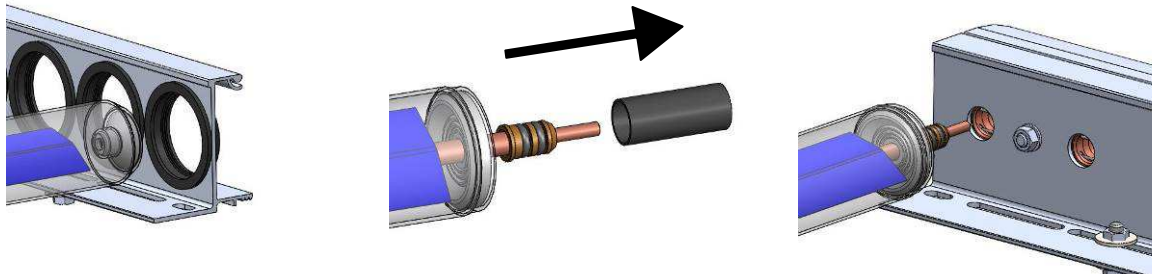






## Mounting of tubes

Wear cotton gloves for mounting the tubes. To make the mounting easier, spray the lower tube part and the tube feedthrough with detergent-water-mixture. Now put the tube into the foot part with slightly rotating movements.

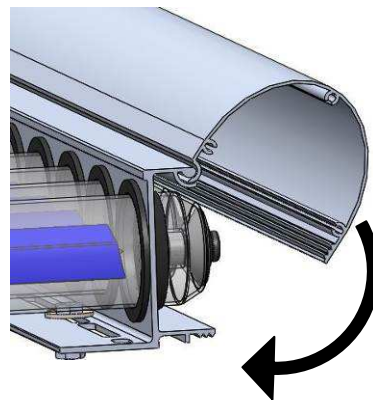


The O-rings in the upper part are pre-greased and protected through a protective cap. This protective cap should be removed before mounting in the manifold.

Insert the tube with pressure until it stops and both O-rings are behind the spring clip and locked behind the brass component. Check by pulling the firm fit of the tube. All tubes have to be in alignment in manifold after mounting. Grease accidentally degreased O-rings sparsely.

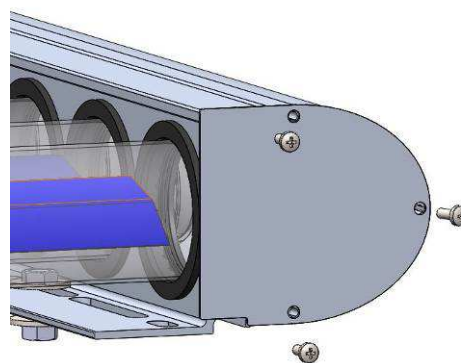
## Mounting of foot part

Afterwards mount the cover of the foot part. Place the cover and turn it down until you hear a "click".



## Mounting of side cover foot part

Mount the side cover left side and right side with the attached screws.





## Connection Mounting (Flexible Hose or Rigid Piping)

Mount the flexible hose or rigid piping with slightly rotating movements onto the entry side (picture1).

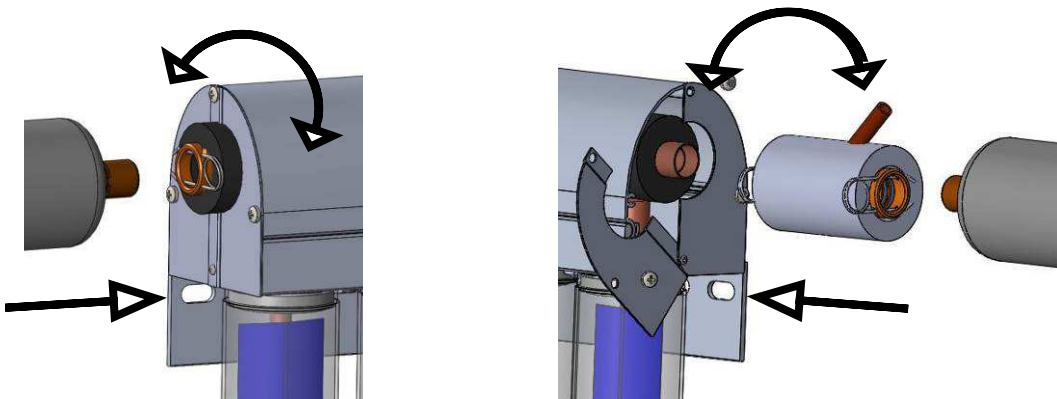
**Important:** Check the right position of the clips and the locking device by pulling slightly.

Afterwards mount the divided side cover.

Insert with slightly rotating movements the collector connector and mount it (picture2).

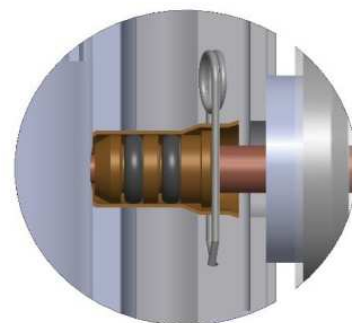
**Important:** Check the right position of the clips and the locking device by pulling slightly. Afterwards mount the flexible hose or rigid piping with slightly rotating movements.

**Important:** Check the right position of the clips and the locking device by pulling slightly. Finally mount the divided side cover.



**Sensor pocket mounting:** Insert the sensor pocket into the thermometer pocket and connect it with the shrink hose. Shrink the shrink hose with a heating source or paste it up with the added protective sheet.

**Warning:** Regard that the checkpoint of the plumbing has to be determined so, that the collector collecting pipe is flexible enough. The rigid piping must not be shortened. The further connections have to be retained to a length of max. 15 cm.



### Mounting of the vacuum tube:

Insert the tube with pressure until it stops and both O-rings are behind the spring clip and locked behind the brass component.

Check by pulling the firm fit of the tube.

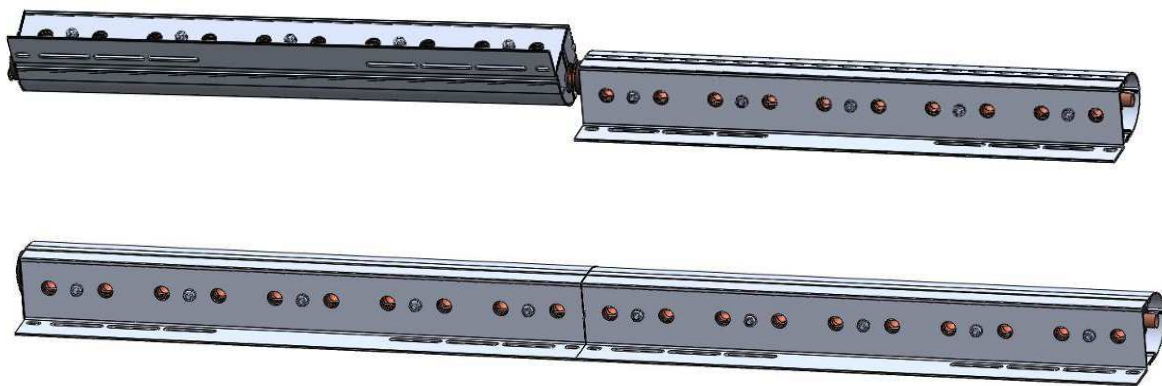




## Connection of Collectors, Connection of Manifolds

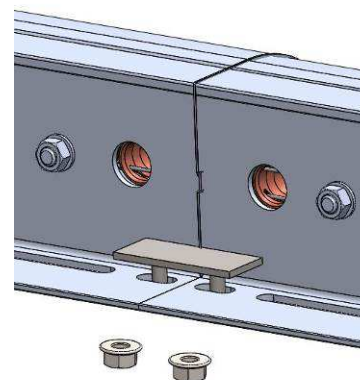
At first, adjust and mount the manifold and tighten the fixing screws. Afterwards set the subsequent manifold, with the collector connector, on the mounted manifold and couple them with slightly turning movements. Check the right position of the clips and the locking device by pulling slightly. It may be necessary to couple the subsequent manifold turned 90° upwards and to swing it in position.

**Important!** The collectors have to be mounted aligned, otherwise it can result leaks.



### Mounting of the Housing Connectors

Mount the housing connector with the self-locking-nut and fix it.



#### Attention

If the collectors are not filled immediately with fluid, this can cause damages to the collector. Therefore the collectors must be protected from direct sun light. Large fields can be commissioned field by field. Suitable barriers must be provided.





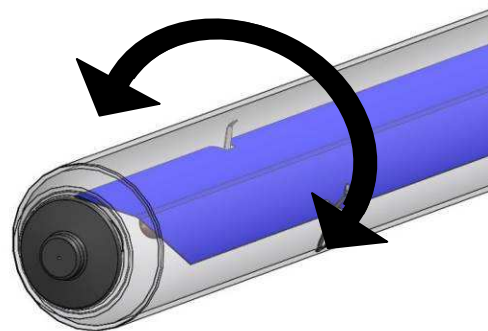
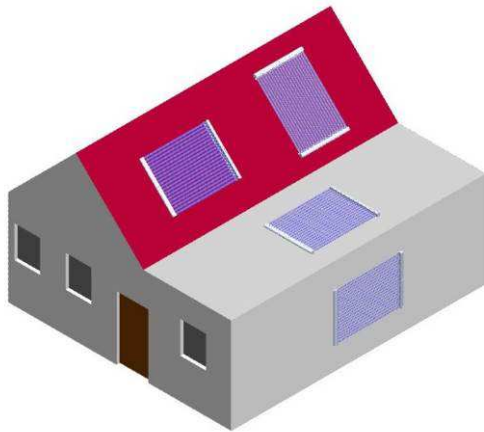
## Flat Roof Mounting

See installation manual: VarioPro Flat Roof System  
See installation manual: Set for Elevation

## Tiled Roof Mounting

See installation manual: Collector Mounting Set

## Note the angularity of the tubes!



For a domestic water heating system, we recommend to adjust the absorber 45° to the sun. For a combination of domestic water heating and heating support, we recommend an angle of 60° to the sun.

## Note the working pressure!

The working pressure (minimal working pressure) of the system  $P_0$  must be set in cold condition (20 °C) so, that on level of the collector (manifold), the pressure amounts 1,5 bar.

### Example:

The collector was installed at a height of 10 m over the expansion vessel.

$$P_0 = (h \times 0,1) + 1,5 \text{ bar}$$

$$P_0 = (10 \times 0,1) + 1,5 \text{ bar}$$

$$P_0 = 2,5 \text{ bar}$$

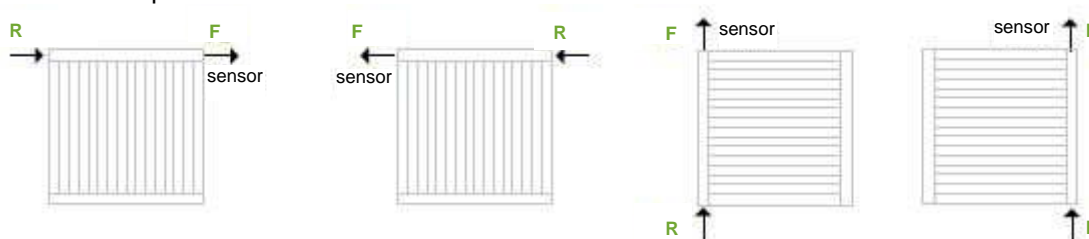
The pre-pressure of the expansion vessel should be set onto 0,3 – 0,5 under the system pressure  $P_0$ .



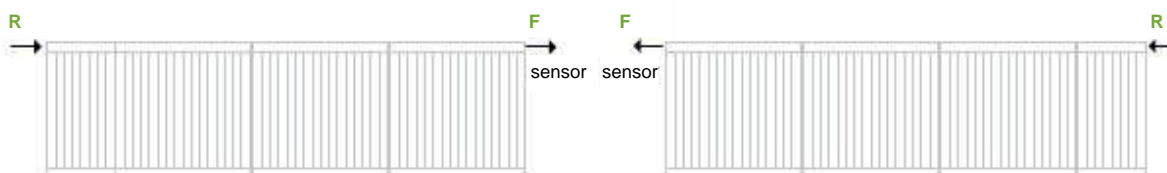
## Collector Wiring: Attention!

Install the sensor at the flow side always.

Connection options for one collector:

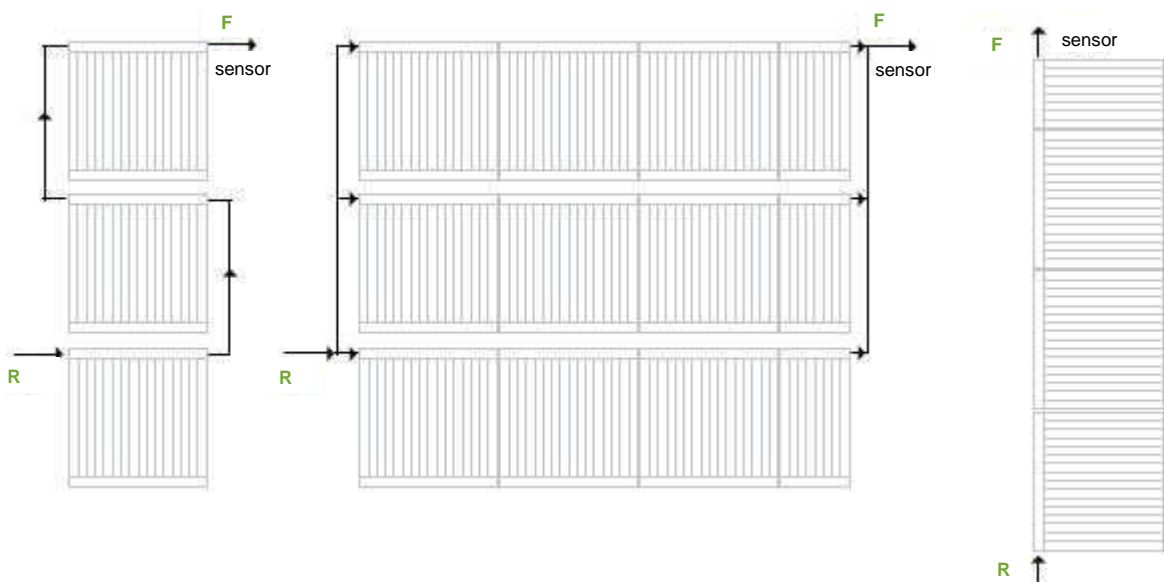


Connection options for several horizontal collectors in series (max. 70 tubes):



Connection options for several horizontal collectors in series (max. 70 tubes):

When collectors run parallel to one-another, equal subfields (number of vacuum tubes) and the right interconnection must be considered according to the Tichelmann principal.





## Checklist:

Attention should be paid to these important points in that overview:

### 1. Insert the vacuum tube with rotating movements into the manifold.

- Remove the protective cap of the vacuum tube.
- Spray the tube with detergent-water-mixture to facilitate the tube mounting.
- Check the right position of the clips and the locking device by pulling slightly.
- Wear cotton gloves!

### 2. Attention! Do not use an automatic bleeder for a solar system!

- This is a frequently occurring error, because it is usual for standard heating systems.
- Automatic bleeder can be destroyed by high temperatures.
- Heat transfer medium escapes, anti-freeze protection not ensured.
- Functionality of the system not ensured. Use air pots with a manual venting screw.

### 3. Filling the System

- The heat transfer medium must be filled in with an electrical circulating pump/solar system filling unit. Definitely consider the minimum time period of 30 minutes to avoid entrapped air in the heat transfer medium. The fill quantity depends on the number of installed collectors and piping length. Fill quantity, see on point 4.

### 4. Adjustment of the Solar Station

- The solar station must be set concerning volumetric flow of the heat transfer medium! The regulated volumetric flow must be set in the DeltaSol SLL control unit (l/h).

Number of tubes	20	30	40	50	60	80	100	120	140
Heat transfer medium Volumetric flow*	1,0- 1,5 l/min.	2,0- 2,5 l/min.	2,5- 3,0 l/min.	3,0- 4,0 l/min.	4,0- 4,5 l/min.	5,5- 6,0 l/min.	7,0- 7,5 l/min.	8,0- 9,0 l/min.	9,5- 10,5 l/min.
Heat transfer medium VT51(ca.)	15 kg	20 kg	30 kg	35 kg	40 kg	45 kg	50 kg	60 kg	65 kg

\*volumetric flow 36 – 45 l/m<sup>2</sup>/h (aperture area)



## Attention!

We would like to expressly point out to only use our heat transfer fluid VT51 or a fluid that was tested by us to ensure a safe operation in long-term and continuous use.



### 5. Estimation expansion vessel dimensioning

Because of different expansion vessel for direct flow or heat pipe collectors, we suggest to calculate it separately for each system.

To determine the correct expansion- and auxiliary vessel for your system, please request our easy-Anlagenplaner: <http://akotec.eu/produkte/easy-anlagenplaner/>

With tool it is easy to calculate the complete solar system and you get information about the needed expansion vessel.

### 6. Tank volume

- The tank should be dimensioned between 50l/m<sup>2</sup> and 70l/m<sup>2</sup> gross collector area. If heat pipe 100°C collector is selected the volume of the tank can dimensioned less, because the shutdown function of the collector is with 100°C. Damaging of the solar fluid because of overheating is not possible with 100°C heat pipe tubes!
- For calculation of the optimal tank volume is a simulation software available. As needed please let the tank volume calculate from one of our technical experts.

### 7. Control Unit

- If you do not use an AkoTec control unit, note that the alternatively chosen controller has a vacuum tube collector function.

### 8. Insulation

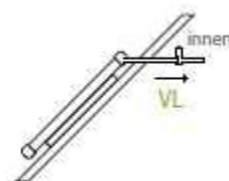
- Note a sufficient and entire insulation.

### 9. Thunderbolt

- The collector field must be grounded concerning local guidelines.

### 10. Air Pot

- The Air Pot must be mounted on the highest point and on forward side.





## Maintenance Instructions:

- The anti-freeze content must be checked annually.
- The safety devices (safety venting and expansion vessel) must be checked annually.

Regular check of the functionality of control unit and electric components necessary!

## Remarks for Power Collectors

For actively using the coated backside of the collectors OEM Vario 3000-30, - 2000-20, - 1000-10 and - 500-5 is a reflector provided by the customer necessary. The reflector has limited benefit without an additional absorbing surface. All reflecting materials e.g. a zinc plate or a white wall are suitable as reflector.

**Important:** Please pay attention to all planning, installation and commissioning manuals. These documents are available at all times on <http://akotec.eu/downloads/>.

