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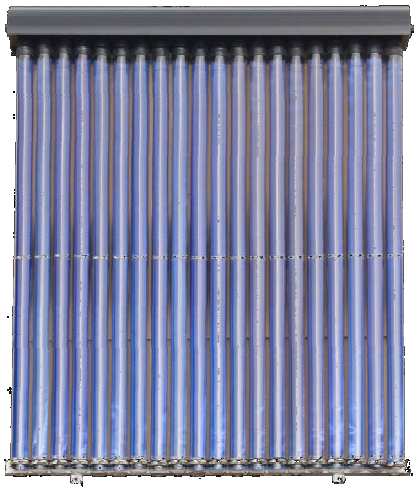
Installation manual On roof mounting

Vacuum tube collectors

Wikosun HP 65-30/20

roof angles from 25° to 87°



Installation and commissioning should be undertaken by a specialist.

General terms and conditions of warranty state that all installations must be performed by a suitably trained and qualified plumber by taking into account local norms and regulations.

Factory warranty will only be covered if the installation instructions are followed.

Warranty does not cover any damages, caused by non-observance of this manual.

The correct functioning is only guaranteed if the installation instructions are followed.

The system is to be checked annually by a specialized company. Independently, occurring defects must be repaired immediately.

This document should be handed over to the client on completion of works.

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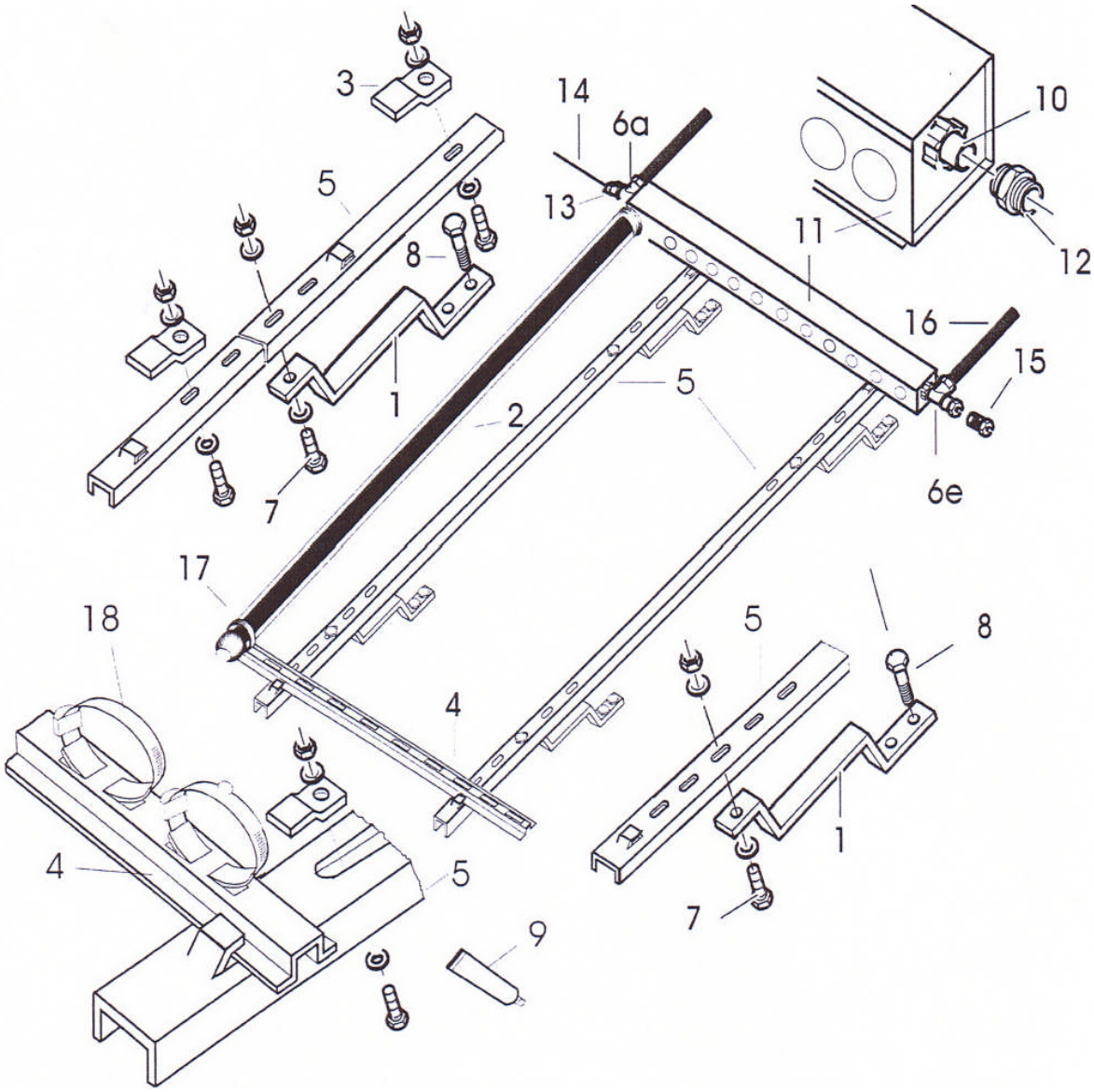
Index



Pos. No.	Description
1	Roof hook
2	Collector pipe
3	Brackets
4	Base support
5	Side rails
6	T- or cross piece (6a, 6b)
7	Screws M8 x 25
8	Wooden screw
9	Heat conductive paste
10	Manifold
11	Manifold case
12	Fitting for additional collectors
13	Sensor pocket
14	Temperature sensor
15	De-aeration valve
16	Flexible metal tube
17	Rubber belt
18	Clamp

Chart 1: Part list

1 Mounting accessories

1.1 Mounting kits

Collector mounting kits for a vertical installation are available as follows:

Mounting kit	Content	Amount
Basic mounting kit for one module Part No. 03301000101 (tile) Part No. 03302000101 (slate) Part No.03303000101 (steel plate roof) Part No. 03304000101 (corrugated sheet iron roof)	Rafter bracket	4
	Hex head screw (8 x 80mm)	4
	Washer M8 x 16mm	16
	Machine screw 8 x 25 mm	12
	Hex nut 8 mm	12
	Plug for the fixation of base support	4
	Base support	1
	Side rail	2
	Bolt connection d=22mm	1
	T-piece 22/22/1/2“	1
	Sensor pocket ½“ x 100 mm	1
	Rubber belts according to number of tubes	
	Clamps according to number of tubes	
Extension kit for one module Part No. 03401000101 (tile) Part No. 03402000101 (slate) Part No. 03403000101 (steel plate roof) Part No. 03404000101 (corrugated sheet iron roof)	Rafter bracket	4
	Hex head screw (8 x 80mm)	4
	Washer M8 x 16mm	16
	Machine screw 8 x 25 mm	12
	Hex nut 8 mm	12
	Plug for the fixation of base support	4
	Base support	1
	Side rail	2
	Bolt connection d=22mm	1
	Rubber belt according to number of tubes	
	Clamps according to number of tubes	

Chart 1: Mounting accessories

Prior to installation:

- Check the content of the delivery with the delivery note!
- Read the installation instructions carefully and pay attention to the different steps!
- Respect the safety instructions!

Necessary tools	Application
Socket key or ratch with extension SW 13	Installation of rafter brackets and kiln furniture
Combination spanner SW 13	
Open-ended spanner SW 21	Sensor pocket
Open-ended spanner SW 32	Parallel compression fitting
Pipe tongs	
Drill d=5,5mm	Pre-drilling of rafter brackets
Angle grinder (hammer and chisel)	Removal of drainage area

Chart 2: Tool list

1.2 Transport and storage of collectors

Collectors should be transported in their packaging horizontally (glass facing upward) or vertically. It must be ensured that collectors can at any time be safely put down (e.g. tilting danger by wind, endangering of other people). Collectors should never be put down over the edge! Please take special precaution while transporting the collectors on the roof. If collectors can not be put down at any time and/or if a risk of slipping exists, auxiliary material like safety ropes should be used.
Store collectors in closed and sun-protected areas either horizontally with the glass facing upward or in an upright position. Do not stack collectors on their connectors.

2 Installation

2.1 Evaluation of the mounting place

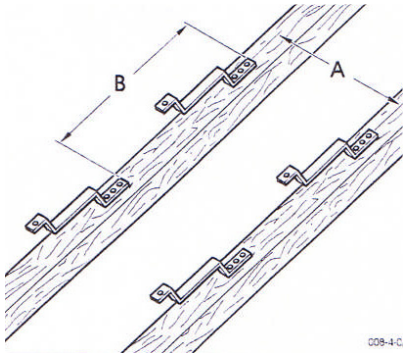


Fig. 2: Positioning of collectors

The roof covering and static should be observed while choosing the adequate sockets. Establish the position of the equipment, possible shadow sources (trees, higher roofs etc.).

Mark the corner positions of the collector field, as well as the position of the sockets, i.e. fastening spots according to the following measure default:

Wikosun HP 65-20			
	A	600 mm	800 mm
	B	1600 mm	2000 mm
Wikosun HP 65-30			
	A	1200 mm	1680 mm
	B	1600 mm	2000 mm

To assemble several modules in a line, the following external dimensions are valid:

Module	HP 65/20		HP 65/30	
	Tubes	Ext. dimensions	Tubes	Ext. dimensions
1	20	1450 mm	30	2150 mm
2	40	2960 mm	60	4360 mm
3	60	4470 mm	90	6570 mm
4	80	5980 mm	120	8720 mm

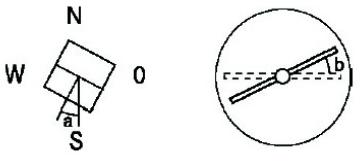
- Install roof outlets above the collector.
- Mounting of max. 60 tubes in series, for more tubes additional lines are required or „low flow“ design must be applied.
- If collectors are installed parallel, size of collector areas must be equal and pipe work should be installed with control valves or according to Tichelmann to secure even flow through all collectors.

For the connections and connecting tubes, an additional lateral distance of 30 cm should be taken into consideration.

In case of several lines one after another, we recommend a distance of min. 50 cm to ensure an easy access.

2.2 Positioning of collectors

If the roof is not exactly South oriented, but presents a deviation angle **a,** the collector pipes should be horizontally turned to the angle **b,** direction of the sun at noon.



Roof inclination 45 °				
Deviation from South	**a**	10°	20°	45°
Pipes rotation	**b**	7°	14°	30°
Roof inclination 30 °				
Deviation from South	**a**	10°	20°	45°
Pipes rotation	**b**	5°	10°	26°

The pipe connections should be loosened.
.

2.3 Mounting of roof hooks

2.3.1 Mounting of roof hooks on tile roof

Note: Select the rafters that the collector juts out with ca. 30 cm at the right and left side. It is therefore recommended to measure first the distance of the rafters before fitting in the collector.

Start with roof hook (1) above left. Take out tile from rafter and screw roof hook to rafter with 2 screws (8). Then, replace tile to roof.

Note: If required use the attached perforated plates (P) to achieve above mentioned measures.

Adjusting of tiles:
Mark the position of the tile on the roof and cut the section out of tile with grinder. Replace the tile on the roof. In case of „Beaver Tail“ tiles cut a strip out of the tile.

Mounting of additional roof hooks:
Mount the other 3 roof hooks of the module in the same manner and according to the measures.
The hooks must be mounted horizontally and vertically in alignment. If necessary, mount further hooks for additional modules.

Mounting of side rails:
Screw the side rails (5) at the roof hooks (1).

Please note that one basic mounting kit is required per collector.

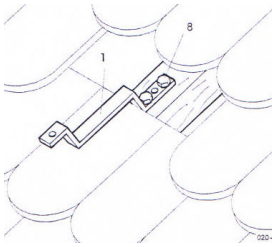


Fig. 3: Fixation of hooks

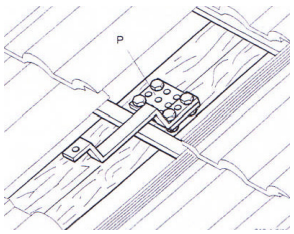


Fig. 4: Perforated plates

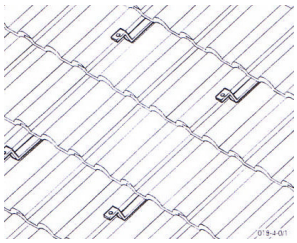


Fig. 5: Additional hooks

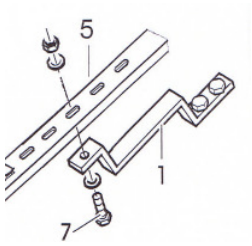


Fig 6: Installation of side rails

2.3.2 Mounting of roof hooks on steel plate roof

Install provided mounting elements on the vertical fold. The splits are fixed on the fold by screwing, drilling is not necessary. Please use an additional spacer for the lower eaves.

Install vertical perforated rails so that they jut out equally on the top and on the bottom, mount on the slot above to avoid slipping, first of all fix loosely.

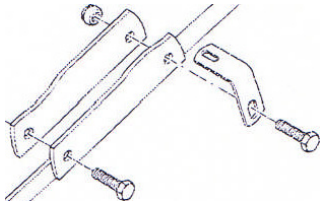


Fig. 7: Mounting parts

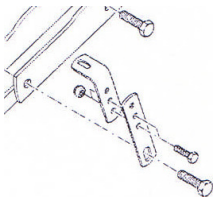


Fig. 8: Spacer

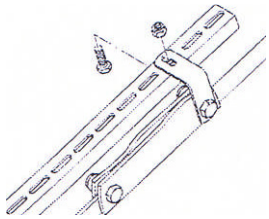


Fig. 9: Vertical perforated rail

2.3.3 Mounting of roof hooks for corrugated sheet iron roof

Install threaded bolt on the brackets. Install vertical perforated rails so that they jut out equally on the top and on the bottom, mount on the slot above to avoid slipping, first of all fix loosely.

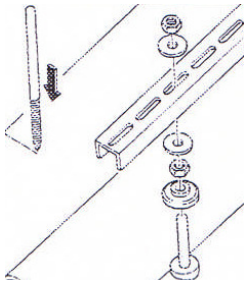


Fig. 10: Installation of threaded bolt

2.4 Installation of manifold case

2.4.1 Fixation of manifold case

Remove plastic foil.
Slide manifold case (11) with the profile rail (19) into the hook (3A) of the side rail (5). Screw the bracket (3) on the side bar.
Adjust the casing that it juts out on both sides with the same distance from the side bars.
Tighten the screw of the bracket.
If the side rails provide no hook, use the extra brackets for mounting.

Remark
Please make sure that the bracket (3) is correctly inserted into the profile rail (19) and fix.

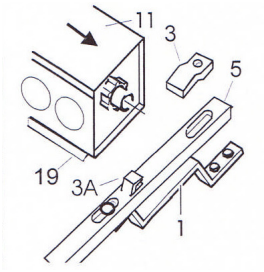


Fig. 11: Fixation of manifold case

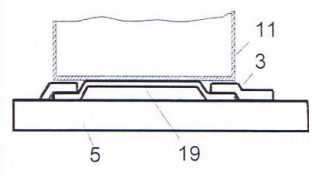


Fig 12: Mounting of bracket

2.4.2 Mounting of base support

Slide base support (4) into the hook (3B) of the side rail. Screw the bracket (3) on the side bar. Adjust the base support that it juts out with the same distance from the left and right side bar (5). Align the clamps with the perforations of the manifold case and ascertain a right angle between the manifold case and the longitudinal axis of the bues which will be installed.
Tighten screw of the bracket. If the side rails provide no hook, use the extra brackets for mounting.

Attention:
Before assembling, the collector pipes can become very hot at the top end from diffuse sun radiation (>200 °C). Therefore, the pipes should be covered before assembly and also to be protected against impact.
Allowed operating pressure: 6 bar.

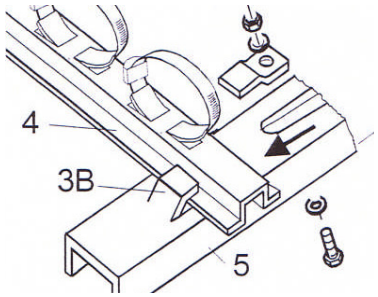


Fig. 13: Mounting of base support

2.4.3 Mounting of locking ring connection (fitting)

1. Slide nut and locking ring on the tube
2. Lubricate thread slightly. Tighten nut first manually and then with wrench.

2.4.4 Connection of the manifold case of additional modules (extension)

Slide the fitting (12) onto the installed manifold aces and tighten nuts. Add the second nut and the fitting on the following manifold case. Slide the manifold as far as it will go onto the installed manifold and align it.
Tighten the nuts of the fitting. Tighten the screw of the second manifold.

Note: It is important that the copper connection of the collector tube is slided in completely into the screw connection before tightening. Do not tighten screw more than necessary to avoid crushing of the copper connection.

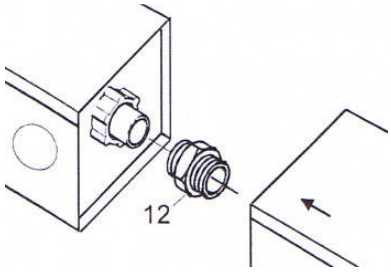


Fig. 14: Connection

2.5 Mounting of pipe works

2.5.1 Mounting of T-piece

Mount T-pieces at outlet and inlet of collector (6a. 6b).
Screw in sensor pocket (13) for temperature sensor (14) at collector outlet (hot side).
Depending on sensor type provided, it can also be directly inserted without sensor pocket.

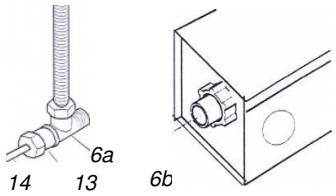


Fig. 15: T-piece

2.5.2 Roof opening for pipe works

Provide openings in the roof tiles fort he piping just above the collectors (directly left and right of collectors).
Use ventilation tiles which have been modified to allow for space of pipes.

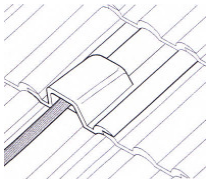


Fig. 16: Roof opening for pipe works

2.5.3 Connection of pipe work

Connect collector inlet T-piece and collector outlet T-piece (6a; 6e) with the flexible metal tubes (16). Install a deaeration valve at the highest place possible above the collector.
The flexible metal tubes will be lead through the ventilation of tiles prepared as described above.

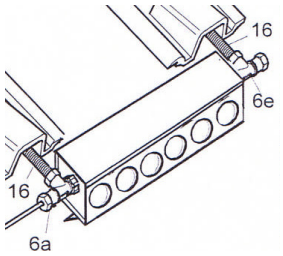


Fig. 17: Connection of pipe work

2.6 Pressure test

The system can be checked before installation of the tubes.
Fill the system with water. Keep the deaeration valve open until the water level in the system has reached the valve. Wait a moment to let as much as possible air stream out, then close it. Start the pump and pressurize the system with 3 bar. Check the pipe work and all connections.

2.7 Mounting of collector tubes

2.7.1 Preparation of tubes

Paste the condenser of the heat pipe carefully with heat transmission paste to provide an optimal thermal connection.

Fig. 18: Paste with heat transmission paste

2.7.2 Mounting of collector tubes

Please respect safety instructions!!!
Slide condenser completely into cartridge while turning the collector tube gently back and forth. Prevent from edging. Upper rubber gasket must rest on collector case with slight pressure.

Slide the rubber belt (17) on the lower end of the tube under the clamp (18) of the base support (4) and tighten it carefully with the screw driver. .
Proceed with the other tubes in the same manner.

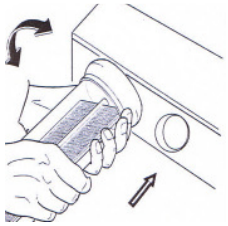


Fig 19: Mounting of tubes

2.7.3 Exchange of tubes

In case of repairs, separate pipes can be exchanged without the disassembly of the whole collector. Please proceed according to 2.7.2 but reverse order.

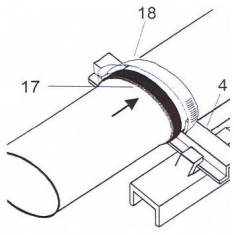


Fig. 20: Mounting of tubes

2.9 Installation of collector temperature sensor

The collector temperature sensor is part of the controller. It is to be installed at the flow of the system (hot water side). Put the sensor into the sensor pocket as far as it will go. Apply a heat-conductive paste onto the sensor to improve the heat transfer. Screw carefully the cable sheet on the sensor pocket.
The 1 m cable is laid with the pipe work through the roofing. The cable can be extended in the interior (2 x 0,75²). For the connection of the temperature sensor cable with the controller the use of an over voltage protection (protection against over voltage damages) is recommended.

2.10 Installation of pipe work

Install the pipe work

- on shortest way to minimize losses.
- with a complete high temperature insulation (100% according to EnEv).
- rising to the collector to prevent air cushions.

2.11 Start up

The air test of the system shall be done if possible under a 5 bar pressure to prove a leak tightness.

The system should be filled up with a heat carrier liquid and washed with an electric pump or with an adequate hand pump, so that all possible air bubbles are eliminated.

Fill the system at 3 bar pressure and pay attention to the specific layout requirements of the system (change pressure if necessary).

Bring the system control in operation according to the manufacturer instructions; enter the flow rate on the control display depending on the absorber surface. Please pay attention to the units!

2.12 Regulation of flow rate (Taco-Setter)

The set-up of the flow rate according to our instructions is important for an efficient functioning of the system (see chart page 7).

When setting-up the flow rate, please pay attention to the scale of the taco-setter used (see sample fig. 21).

Scale WIKORA Solar stations:
WIK-PG 20/12 - floater bottom edge
WIK-PG 25/14 - floater upper edge
WIK-PG 25/30 - floater upper edge
WIK-PS 25/14 - floater upper edge
WIK PS 25/30 - floater upper edge

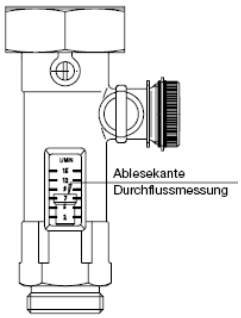


Fig 21: Scale

3 Planning and layout data for collectors

Recommendation:

System pressure	3,0 bar
Primary pressure of expansion vessel	2,5 bar
Flow rate	100 l/(h x collector)
Switch-on temperature difference of controller	7 to 15 K *
Switch-off temperature difference of controller	3 to 8 K * (*internal to the plant)

Please note that for the layout of the collector circuit, the solar tube circuit and the heat exchanger circuit, the corresponding pressure losses and the total pressure loss in combination with the desired flow rate must be considered.
Furthermore, please note that the calculation of the piping cross-sections must be carried out under the aspect of the necessary flow velocity for solar installations from min. 0.4 m/s up to max. 1,5 m/s with the required flow rate liter/h.
Moreover, it must be considered that the hydraulic faulty wiring results in a system specific and demand specific flow rate which involves a loss of pressure. This again has an influence on the layout of piping cross-sections, solar medium capacities, pump pressures, flow-meter set-ups and flow-meter configurations as well as on their number.

The values indicated in chart 4 apply only for pipe works up to an overall length of 40 m and heat exchangers with a capacity of 16 l.

Number of collectors	**2**	**3**	**4**
External diameter of the connection pipe in mm	15	15	18
Flow rate in l/min	3	5	6
Flow rate in l/h	200	300	400
Expansion vessel in l	18	18	25

Chart 4: Reference values for pipe work size, flow rates and diaphragm type expansion vessels

Each solar system needs an adequate and competent planning and execution. Please note that only a specialized company is responsible for the layout of piping cross-sections, the layout of diaphragm type expansion vessel, the determination of the solar pump group as well as the necessary flow-meter. Our data do not relieve of a special planning.

4 Technical data

Description	**WIKOSUN HP 65-30**	**WKOSUN HP 65-20**
System	Vacuum tube collector	Vacuum tube collector
Collector gross surface	4,26 m^2	2,97 m^2
Absorber surface	2,97 m^2	1,98 m^2
Frame	Aluminum extruded profile	Aluminum extruded profile
Dimensions:		
Length x width x height	1980 x 2150 x 142 mm	1980 x 1450 x 142 mm
Weight	86 kg	58 kg
Cover	Boron silicate hard glass d=100 mm x 2,7 mm	Boron silicate hard glass d=100 mm x 2,7 mm
Connections Cu-tube	d=22mm	d=22mm
Insulation manifold casing	Mineral wool compressed and laminated	Mineral wool compressed and laminated
Absorber:		
Material	Cu-fin	Cu-fin
Absorber coating	Tinox	Tinox
Flow rate per collector:		
Minimum	80	80
Maximum	160	140
Pressure loss:		
80,l/h	110	75
100,l/h	100	100
120,l/h	160	140
Efficiency	η = 82,6	η = 79,4
Peak power	2455 Watt per collector	1575 Watt per collector
Capacity	1,4 Liter	1,0 Liter
Max. working pressure	6/10 bar	6/10 bar
Stagnation temperature	252°C	252°C
Installation	On roof, flat roof angle of 25-87°	On roof, flat roof angle of 25-87°

Return:
Collectors can be returned to Wikora after use. All collector material will be recycled accordingly by Wikora.

5 General operation and maintenance instruction

Present operation and maintenance instruction and the compliance with it in combination with the installation and maintenance record is part of the guarantee and warranty!

Operation

- Your Wikora solar heating system is preset according to the present installation and maintenance record. In general, there is no need of changing the preset parameters.
- Please do not change the preset parameters by yourself. You will lose any warranty and guarantee claim.
- If you do not conform to the preset parameters, please let them change and document by a specialist.
- The various system parameters can be accessed according to enclosed instruction manual of the controller.
- It is recommended to vent the solar heating system approx. 4 weeks after the initial operation. This should be undertaken by a specialist. If you wish to vent the system by yourself, you can do it one-time at the central vent of the solar pump group.

Venting procedure

- Please switch off your solar heating system in the evening.
- Open the air valve at the central vent by using a radiator vent key. Once liquid pours out, close this air valve. The procedure is terminated.
- Switch on again your solar heating system.
- Please never vent at sunshine or running pump!
- Please do not undertake an additional venting process. If the system's working pressure drops later on or if the system does not give any heat, please call a specialist.

Maintenance of solar heating system

- Your Wikora solar heating system is a closed heating system. It corresponds to the safety regulations of DIN 4751, DIN 702 and DIN 721.
- Such systems have to be built and maintained exclusively by qualified and specialized companies.
- Please do not refill water in case of pressure loss but call a specialist for assistance.
- Only a solar concentrate released by Wikora may be refilled.
- The valid system working pressure is shown in the installation and maintenance record and corresponds to 3.0 bar, in general.
- Please do never remove the drain bottle under the exhaust line of the safety valve which is to collect the blast solar liquid in case of over pressure.
- The solar heating system and the condition of the solar concentrate are to be checked and documented annually by a specialist. Otherwise, any guarantee and warranty claim expires.

Setting-up operation

Date: ……..

Company: ……

Name: ……

5.1 Evidence of maintenance

	Date	Name / Company	Executed activity	Kg refilled sole	Color medium
1					□ uncolored □ brown □ black □ cloudy
2					□ uncolored □ brown □ black □ cloudy
3					□ uncolored □ brown □ black □ cloudy
4					□ uncolored □ brown □ black □ cloudy
5					□ uncolored □ brown □ black □ cloudy
6					□ uncolored □ brown □ black □ cloudy
7					□ uncolored □ brown □ black □ cloudy
8					□ uncolored □ brown □ black □ cloudy
9					□ uncolored □ brown □ black □ cloudy
10					□ uncolored □ brown □ black □ cloudy

Chart 6: Evidence of maintenance

6 Safety instructions

The installation of collector and solar components must comply with the local regulations and conditions. Technical standards and rules have to be respected.

7 Antifreeze

7.1 Product information solar liquid L concentrate (WIK PE-10)

Long-term antifreeze concentrate with corrosion inhibitors for cooling and heating systems with systems of solar and heat pump.

Product properties:
SOLARLIQUID L concentrate is a odorless liquid based on monopropylenglykol.
It can be used in the sector of food and DHW as cooling brine or heat transfer liquid.

The special corrosion inhibitors protect the metal and plastic materials which are commonly used in construction against corrosion, aging and incrusting in order to maintain the efficiency of the system over a long time period and up to 250°.

SOLARLIQUID L concentrate is entirely mixable with water and other antifreeze on basis of propylene glycol. It is delivered unblended and ensures an antifreeze protection until –50°C.
The product is slightly harmful to water (self classification according VwVwS of May 17, 1999, appendix 4).
It is not hazardous material in the sense of transport regulations.

Gaseous state	liquid
Color	Purple-blue
Odor	odorless
Boiling point	151°C
Density	1,041 g/cm³
pH-value	8
Viscosity	70mm²/s
Water solubility	any proportion
Specific humidity	<4; hygroscopic liquid
Responsiveness	reacts with strong oxidizers
Flashpoint	develops flammable vapors
Explosion risk	none

Fig. 7: Product data of solar concentrate at regular state (20°C; 1 bar)

The concentration must only be diluted with potable water or demineralized water (chloride concentration < 100mg/l). Prepared mixtures are also available.

Share SOLARLIQUID L in volumes %	Density in g/cm³	Freezing point in °C
25	1,020	-10
30	1,025	-14
35	1,029	-17
40	1,032	-21
45	1,037	-26
50	1.040	-32
55	1,043	-40

Fig. 8: Antifreeze protection with different mixing ratios

The concentrate and the prepared mixtures can be stored up to 5 years. According to the direction of hazardous materials, no specific labeling is required (see safety data sheet).
The indications mentioned in the product information and the safety data sheet are based on our technical experience. The data does not represent any mandatory statement concerning specific properties. The suitability of the product fro a specific application requires prior consultation.

This product information does not relieve of a delivery control according to HGB 377/378.

7.2 Safety Data Sheet

According to 2001/58/EG – extract
Printing date: 3.06.2008 revised on: 21.04.2008

Product information

Commercial name	Solar liquid L Concentrate
Article code	391100
Application	Antifreeze / Solar liquid of solar heating systems
Decomposition products:	Carbon monoxide and carbon dioxide
Supplier	Staub & Co. Chemiehandelsgesellschaft mbH Ostendstraße 124 90428 Nürnberg Tel.: 0911/5482- 0

Emergency: Giftnotruf Universität Mainz - Tel.: 06131/19240

General safety and hygienic measures

The usual precautionary measures while handling chemicals are to be considered

- Soiled and soaked clothes should be taken off immediately.
- Wash your hands before breaks and after end of work.
- Don't eat, drink and smoke during work.
- Don't inhale gases, vapors and ensure sufficient ventilation.
- Wary protection equipment; unprotected persons should be kept away.
- Eye protection: wear safety glasses during the filling procedure.
- Respiratory protection: wear respiratory protection during aerosol or fog formation.
- Hand protection: Use protection gloves of butyl rubber, nitril rubber/nitrillatex

The product doesn't require any specific labeling according to the last version of the ,,Allgemeinen Einstufungsrichtlinie für Zubereitungen der EG".

Keep the liquid out of the reachability of canalizations or waters. It the product enters the soil, waters or canalization, please inform the local authority in charge.
Cleaning: clean with liquid binding material (sand, kieselguhr, acid binder or universal binder). Recycle contaminated material separately.
Keep the concentrate in a cool and dry environment. Protect against humidity and water. Provide sufficient ventilation during work.

First aid

If the product gets in contact with the eye, a slight irritation can occur.

- After inhalation: take fresh air and consult a doctor in case of medical condition.
- After skin contact: wash immediately with water and soap.
- After eye contact: wash the open eye for several minutes. Consult a doctor in case of medical condition.
- After swallowing: rinse the mouth and drink plenty of water. Consult a doctor in case of medical condition.
- After contact with cloths: remove soiled clothes immediately.

Fire fighting

- Suitable fire extinguishing agents: CO2, solid extinguishing agent or water. Fight larger fire with water jet or alcohol-steady foam. Cool tanks at risk with water jet. Collect contaminated fire water separately. It must not reach canalization.
- Combustion products: carbon monoxide (CO); carbon dioxide (CO2).
- Special protection equipment: carry protective respirator that is not depending on the ambient air.

Recycling

Recycling must be carried out according to local regulations. The waste code number (according to AVV) is to be determined separately.

The product is only designated for commercial processing / use. The data is based on our today's knowledge but does not represent any confirmation of product properties and does not constitute a legal position.

All data according to manufacturer data of Fa. Staub & CO Chemiehandelsgesellschaft mbH

8 Warranties

Warranty conditions for Wikora vacuum tube collectors. All deliveries and services are carried out according to our general terms and conditions.

1. The warranty period for the collector function amounts to **5 years.** Within that period, all parts proven to be useless or considerably reduced in their usability due to production or material defects are repaired or replaced ex works. At expiration of the legal warranty period, we have the choice between rectification or replacement.

2. The warranty begins with the delivery of the collectors to the end user and under condition that the system has been installed and setup by a specialized company according to our installation and operating instructions as well as the locally valid norms and regulations. Further, the warranty is dependent on a carefully completed installation and maintenance record which must be filled out by the installer and kept by the system owner.

3. The guaranteeing implies that
- the collectors are transported, installed, operated and maintained according to our installation and operating instructions,
- all system components originate from WIKORA GmbH,
- the collector system is exclusively operated with our solar liquid.

4. The guaranteeing does not refer to damages due to
- wear and tear, excessive wear, inappropriate operation or inappropriate use,
- use of a unsuitable solar fluid or results of corrosion provoked by a solar fluid,
- chemical or electro-chemical influences,
- incorrect system layout.

5. Moreover, the warranty does not apply for
- damages as a result of an inappropriate storage of the collectors prior to installation and
- damages that are ascribed to force majeure,
- The warranty regarding the safety glass refers to its condition, and here only to manufacturing and material defects.

6. The warranty expires
- if arising and obvious defects are not notified in writing within 10 days after receipt or hidden defects immediately after emerging. In case of hidden defects it is only valid for the warranty exceeding the legal warranty period,
- if the collectors are changed or maintained by non-specialized persons or companies or undertaken without our prior agreement,
- if the possibility to peer the entire system is not granted or if the collectors are removed without our agreement,
- if original Wikora components are exchanged by other components or if inappropriate installation material and system components as well as no authorized solar fluid are used,
- if the annual inspection is not realized within the time limit. The proper execution is to be documented by the specialized company in charge.

7. Transport damages are to be notified immediately, stipulated on the delivery note and signed by the sub-contractor. §447b BGB remains untouched.

8. After the expiration of the legal warranty period, the warrantee must provide the necessary aide in case of reparation work and is obliged to assume the necessary services like transport, installation etc. In the event of warranty, we recompense max. 200.00 € + VAT fort he first collector and max. 80.00 € for each additional collector, incl. all consumables.

9. This warranty does not justify claims exceeding the legal liability for physical or personal injuries that have been caused by the defects of the purchased object. Redhibitory actions and abatements exceeding legal regulations are not justified either.

10. Other legal claims for warranty and damages in respect of BGB and ProdHaftG remain untouched by this warranty.

11. The exchange or rectification of the collectors or other parts of the solar system must be carried out by the installer and only after having consulted Wikora. Otherwise an entitlement to compensation does not exist.

12. Notifications of claim are to be announced in writing to WIKORA GmbH and by presenting the installation and maintenance record as well as the respective proofs immediately after the damage is occurred.

13. Solar accessories are subject to the legal warranty.

9 Installation and maintenance record

Please complete carefully.
The installation and maintenance record is part of the warranty and will be requested in case of complaints with the corresponding invoice.

□ **Installation** □ **Maintenance**

Contact Data	**Final customer**	**Installer**
Name		
Company		
Street No		
ZIP / Town		
Phone		
Mobile		
E-mail		
	First installation	**Last maintenance**
Date		
Installer		

Material overview	Brand (designation)	Type (serial no.)	Characteristics (dimensions)	Material	For stainless steel tank(s): Additional corrosion protection needed? (please consider indications of the local water supplier)	
Collector						
Pipeline (single)			Ø , m			
Insulation			Thickness mm			
Heat exchanger					Yes No	Anode type
Tank 1			Vol. l	m^2	□ □	
Tank 2			Vol. l	m^2	□ □	
Controller						
Solar pump			Level	I II III		
Expansion vessel			Vol. l			

System - settings (Controller setting = *)		Type		Max. temperature	Difference in temperature	Hystere = Delta t off
Consumer 1* = e.g. DHW				°C	K	K
Consumer 2* = e.g. buffer tank 1				°C	K	K
Consumer 3* = e.g. buffer tank 2				°C	K	K
Consumer 4* = e.g. swimming pool				°C	K	K
Max. collector temperature*		°C	Cooling function * from			°C
Backup heat target temperature*		°C	Flow rate		Target : l/min	Actual: l/min
System working pressure at	°C	bar	Primary pressure exp. vessel		Target : bar	Actual : bar

Solar liquid						
Visual control		□ colour unchanged □ brown □ black □ cloudy				
Brand / type			Minimum value	Actual value	**System**	□ rinsed
Filling capacity		Liter ph-value	7			□ filtered
Mixing ratio		% antifreeze upto	-25°C			□ purged

DHW system	yes / no	Number of collectors	
Space heating	yes / no	Mounting type	OR / IR / FR / horizontal / vertical
DHW-mixing valve	yes / no	Hydr. connection	single row / double row / parallel / series
		Orientation/Pitch	S / SE / SW / E / W ca. Grad
How is the solar ventilation system designed?			
□ with AIR-Stop in the solar circuit		In case of quick vent valve, please add drawing.	
□ wiht quick vent valve at collectors			

General checklist			
Collector is clean	□ ok	Operation of pumps checked	□ ok
Collector fastening is stable	□ ok	Temperature sensores indicate realistic values	□ ok
Collector interior is not fogged	□ ok	System is grounded	□ ok
Return valves	□ ok	Solar liquid for re-filling is available	□ ok
DHW-mixing valve	□ ok	Anode(s) checked	□ ok

Meter reading	Pump 1	h	Pump 2	h	Heat quantity meter	kWh

User has been instructed	□ yes	□ no	
Maintenance contract	□ yes	□ no	
Inspection interval	□ annually	□ every 2 years, no later than	

Drawing of collector array

Date, signature and stamp of solar company

Datum, signature of customer

Remark : Please add proof of invoice.