

# SOLSTAR

Version 1.0-1 EN

Solar station  
with universal control



Operation



TECHNISCHE  
ALTERNATIVE



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# Safety instructions



To avoid accidents and damage due to incorrect operation, carefully read through these operating instructions before you start working with the solar station. If you carry out any alterations to the construction of the solar station or the safety devices, you may invalidate your right to make guarantee claims. Always observe the local regulations.

## Operating conditions

The operating conditions, which are listed in the technical data, may not be exceeded under any circumstances. Safe operation is only guaranteed if these operating conditions are adhered to.

## Electrical connection

Any electrical connections must be made by qualified electricians. Connection cables must be routed in the recesses provided in the insulated base in such a way that direct contact with the pump casing and the pipes is prevented.

Check before switching on, whether the supply voltage matches that stated on the power rating plates of the pump and the controller. All connections must correspond to the local regulations.

## Safety standards during installation, commissioning and maintenance

Installation, commissioning and maintenance may only be carried out by qualified persons who are familiar with these operating instructions. Ensure that when working on the system, all components are switched off and have cooled down.

Ensure that the system is switched off before working on it. When replacing the pump, turn the ball valve (no. 4, fig. 1) and the valve of the flow controller (no. 6, fig. 1) to the locked position.



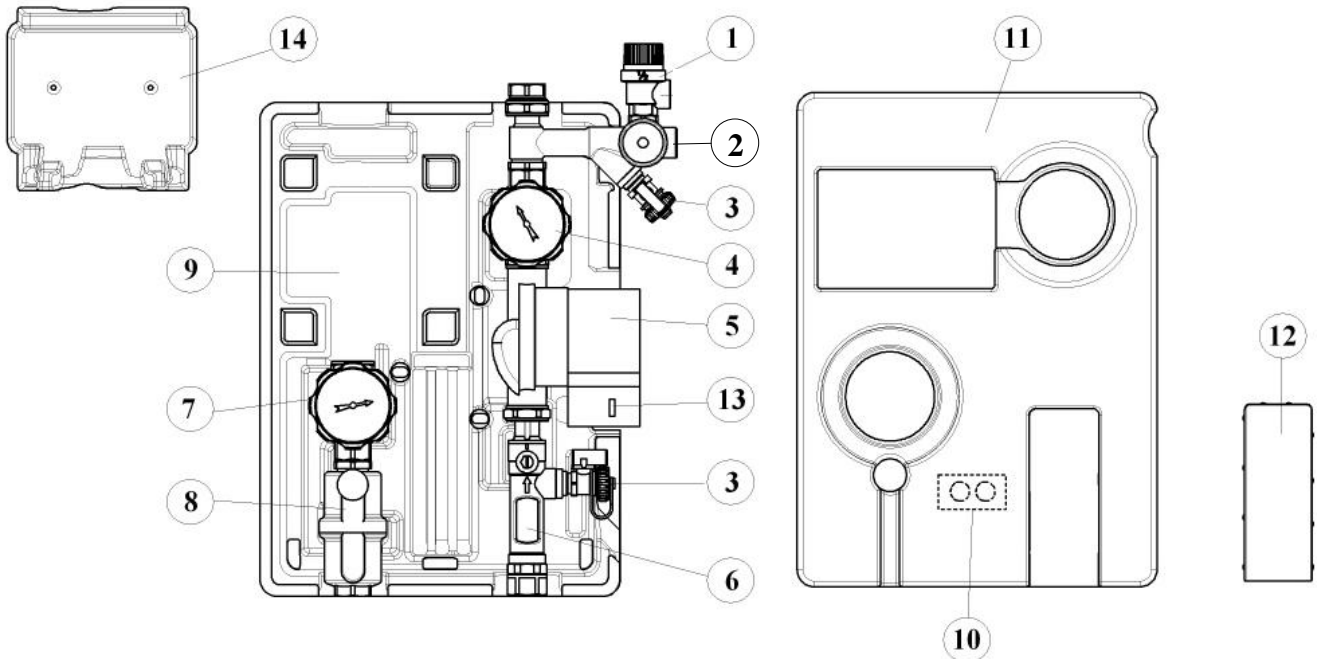
**WARNING!** Dependent on the pump and system operating conditions, the surface temperatures can be very high. Direct contact with the pump may result in burns!

## Function mode

The SOLSTAR solar station is connected to the primary circuit of a solar thermal system and contains all the components which are necessary for optimum operation of the solar thermal system. It is equipped with a speed-controlled pump which increases the system yield and reduces power consumption. Thermometers in the flow and return indicate whether the solar thermal system is operating free from faults. The station is equipped with the necessary safety technology (pressure gauge and safety valve). There is an integrated solar controller for control of the solar thermal system.

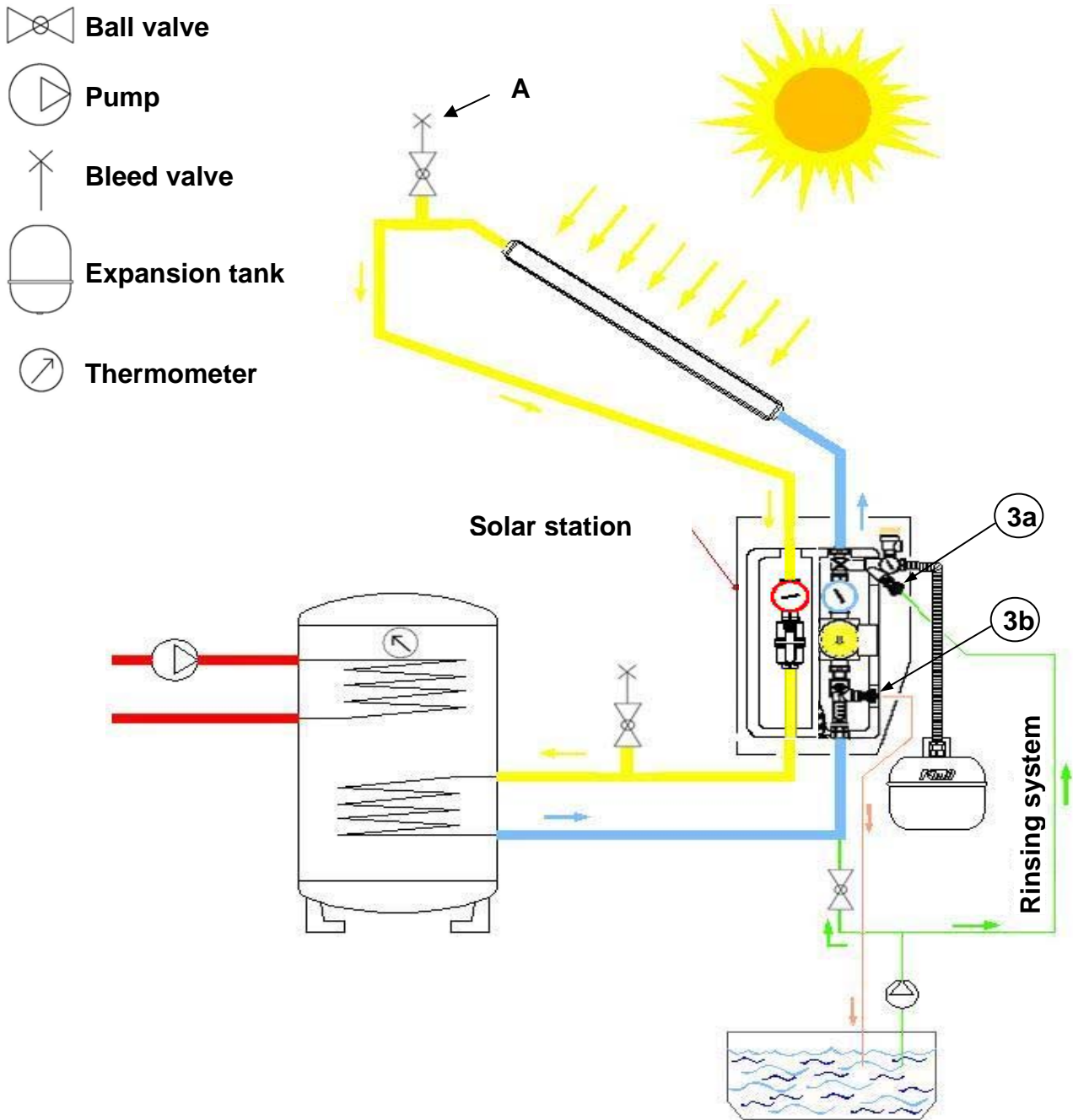
## Components

**Figure 1**



1. Safety valve for solar thermal systems
2. Connection with pressure gauge for expansion tank
3. Filling, drainage and rinsing cocks (3a = top, 3b = bottom)
4. Ball valve with integral thermometer in the return line complete with anti-gravity non-return flap
5. Circulation pump, Wilo Solar ST 20/6
6. Flow controller and flow meter in the return (adjustment range 1 ÷ 13 l/min)
7. Ball valve with integral thermometer in the flow
8. Bleed device
9. Pre-shaped insulating base
10. Hose connections
11. Pre-shaped insulating upper part
12. Cover for control opening (flow meter)
13. Pump plug, Molex system
14. Mounting for the solar controller

**Figure 2**



## Filling the system

1. Open the valve, which is connected to the bleed valve A (as shown in fig. 2) at the highest point of the system (top at the collector)
2. Open the ball valves with thermometers (nos. 4 and 7, fig. 1), by turning the thermometers to 45° (= flow possible in both directions).
3. Fill the system using a pump by connecting the filling hose to the lower filling cock (no. 3b, fig. 2) until no more air comes out of bleed valve A
4. Close the valve at the bleed valve A
5. Close the filling cock.

## Rinsing the system

1. Open the ball valves with the thermometers (nos. 4 and 7, fig. 1), by turning the thermometers to 45° (= flow possible in both directions).
2. Close the flow controller valve (no. 6, fig. 1)
3. Connect an external pump via a hose to the filling cock of the safety unit (3a, fig. 2). Let solar liquid flow through the solar collectors and the heat exchanger until it flows out of the lower drainage cock (no. 3b, fig. 2) at the flow controller
4. Briefly open the flow controller valve (no. 6, fig. 1) in order to remove all the air from the system.
5. To ensure that the system has been thoroughly rinsed, let the external pump run into the system for a few minutes, until clear solar liquid comes out of the drainage cock (taking care to adhere to the instructions for the external rinsing pump).

## Commissioning

1. Close the lower drainage cock at the flow controller (no. 3b, fig. 2) and increase the system pressure up to the maximum permitted value. Close the filling valve (no. 3a, fig. 2), once this value is reached.
2. Fully open the ball valve (nos. 4 and 7, fig. 1) and switch on the pump (no. 5, fig.).
3. Let the pump run for a while and check the system for leaks.
4. Open the valve, which is connected to the bleed valve A (as shown in fig. 2) at the highest point of the system (top at the collector) and briefly switch on the pump to remove the remainder of the air from the system.
5. Set the desired system pressure.
6. You can adjust the flow rate in the system using the flow controller (no. 6, fig. 1) by adjusting the valve above the flow indicator (see chapter "Flow controller"). When adjusting the set flow value, the pump must be set to the highest power setting (stage 3). Adjust the flow value according to the manual of the collector manufacturer.
7. After a few hours operation, bleed the air from the system with the top bleed valve at the collectors and the bleed device in the module (no. 8, fig. 1). After bleeding, you must check the plant pressure again and, if necessary, create the desired pressure (point 1).

## Draining the system

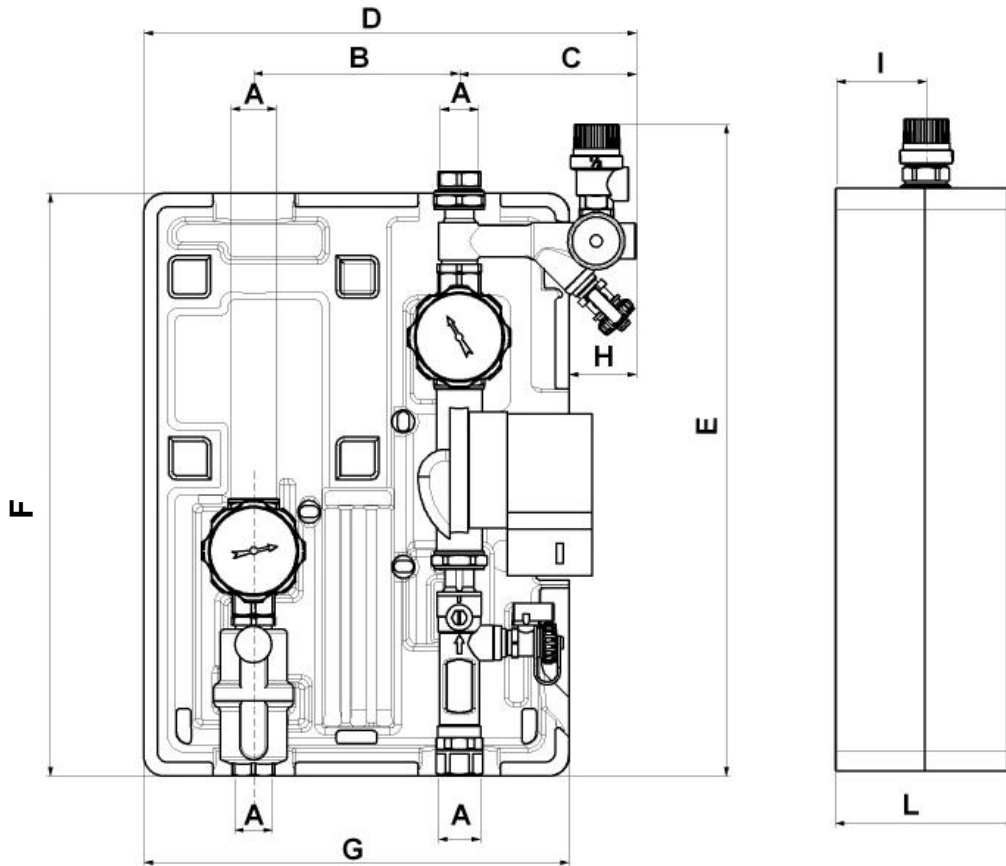
1. Open the ball valves with thermometers (nos. 4 and 7 in fig. 1), by turning the thermometers to 45° (= flow possible in both directions).
2. Open the valve, which is connected to the bleed valve A (as shown in fig. 2) at the highest point of the system (collector top)
3. Connect the heat-resistant hose to the lower drainage cock (no. 3, fig. 1) at the flow controller and open the cock.
4. Dispose of the solar liquid in accordance with local regulations.

# Installation and wall mounting

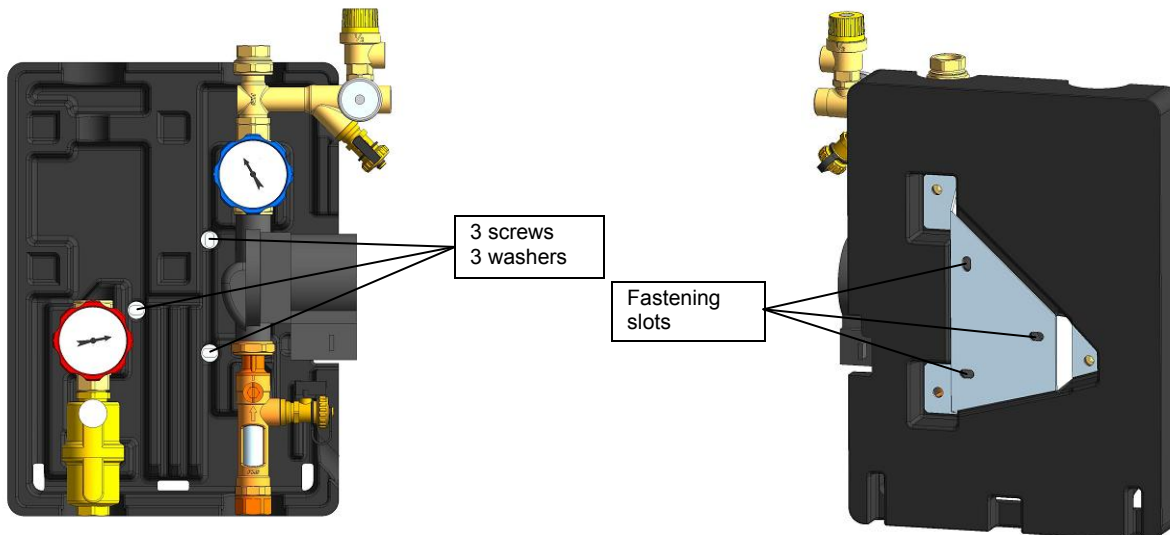
The solar station is fixed to the wall using a mounting plate on the rear side of the insulating base and 3 screws. The solar station must always be fitted vertically with flow and return at the top or bottom.

Dimensions:

**Figure 3**



A	B	C	D	E	F	G	H	I	L	Weight (kg)
G ¾" F	155	130	360	500	425	310	50	70	140	6.0



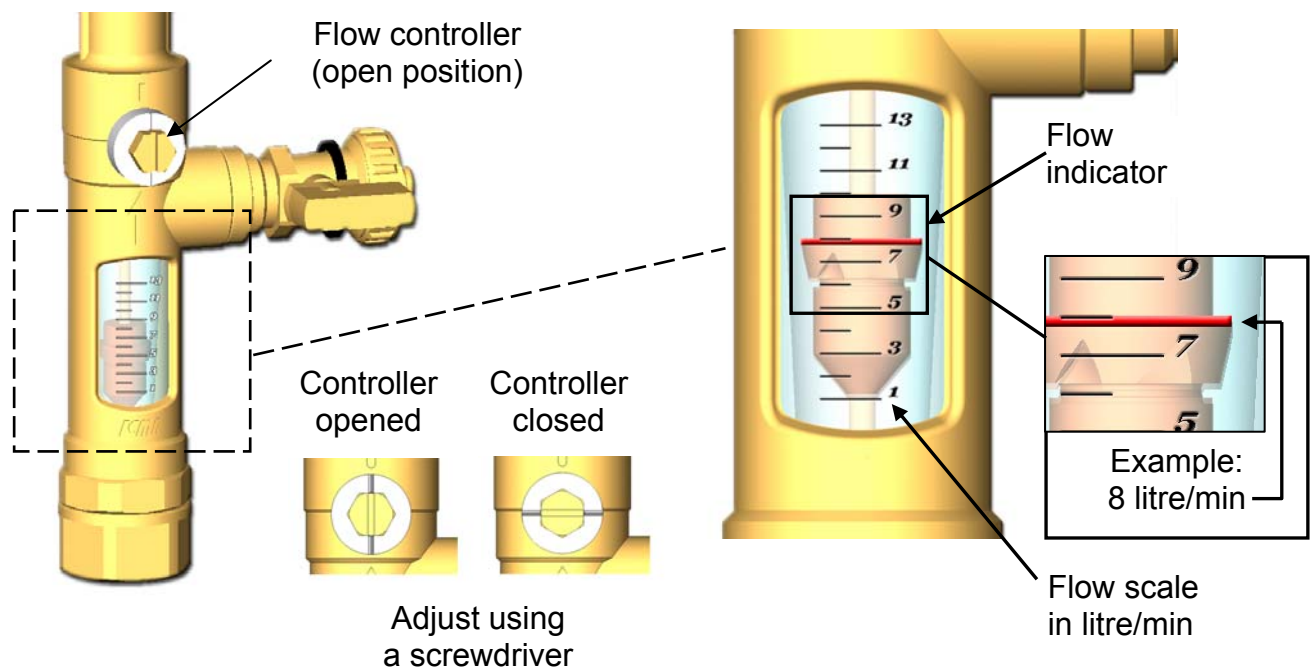
## Procedure:

1. Fit the pipes for the entire system, while observing the clearances shown in fig. 3.
2. Determine the locations of the rawlplugs and insert them.
3. Secure the solar station to the wall using the enclosed screws and washers.
4. Connect the solar station using the pipes.
5. The solar station must be connected by a qualified electrician according to the local regulations
6. Check all connections for strength.

## Flow meter

The flow meter (no. 6, fig. 1) measures the system flow rate in litres per minute. Above the flow meter is the flow controller, which limits the flow rate. The flow controller is adjusted using a screw-driver. The current flow rate can be read off at the gauge glass of the flow meter (see fig. 4). The flow range can be set from 1 ÷ 13 litre/minute. The flow meter must always be installed in a vertical position, as must the entire solar station.

**Figure 4**



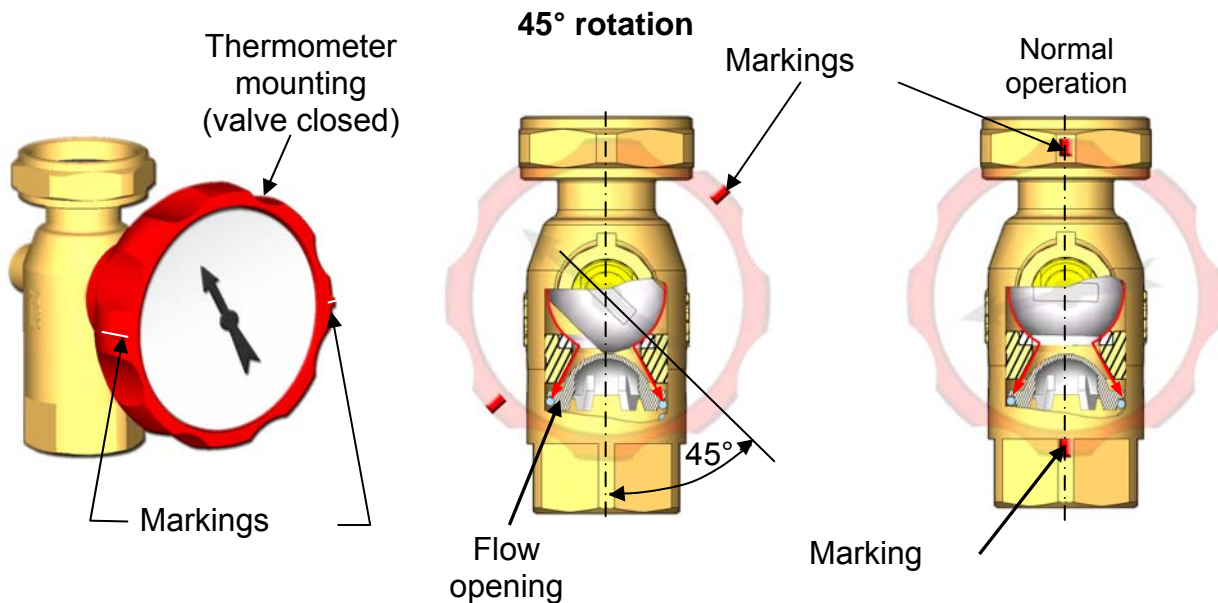
## Ball valves

The solar station has ball valves with thermometers, which are integrated in the turning wheels.

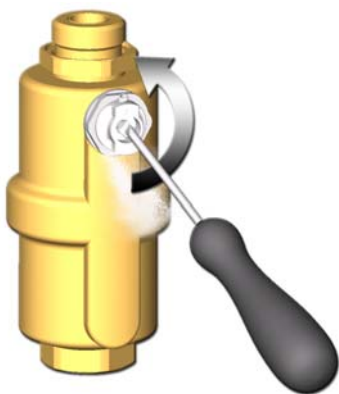
The flow and return lines can be disconnected using the ball valves so that pump replacement is possible even when the system is full.

To enable flow in both directions during filling, emptying or rinsing, the turning wheels on the ball valves must be rotated to 45°. During normal operation (flow in one direction, "gravity brake" active) the wheels must be turned to the end (vertical) position.

**Figure 5**



## Bleed device



The solar station bleed device is fitted in the flow line. Gases from the system liquid are separated out and stored in the top part of the device.

During commissioning, the gases must be regularly vented during the day by switching off the pump and opening the device bleed valve using a suitable screwdriver or a bleed key, without removing the insulation covering. Immediately after commissioning, this measure must be repeated regularly at weekly to monthly intervals, dependent on how many gases are contained in the system liquid.

During further operation, venting must take place every 6 months in order to achieve disruption-free and efficient system operation.

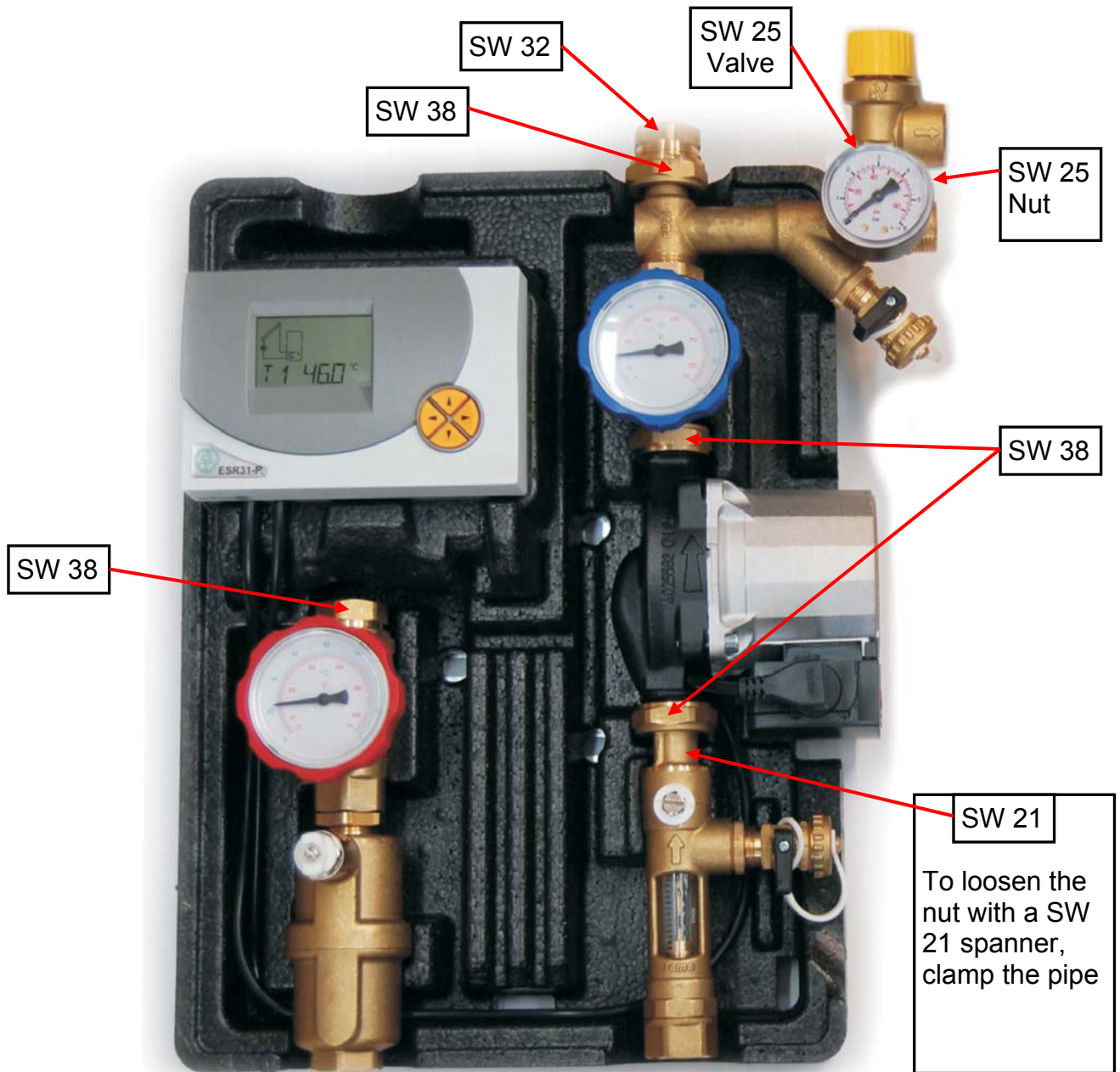


**WARNING!** When bleeding the system, superheated liquid or steam may splash or escape, dependent on how high the system temperature and pressure are.

Therefore, follow the following procedure to prevent accidents:

- Use only a correctly fitting screwdriver and open the valve carefully
- Protect yourself and any electrical components against water
- After bleeding, switch the pump back on

# Spanner sizes (SW - mm)



Seal all threaded connections with flat seals.  
Check for the tight seating of all nuts before the system pressure exceeds 3 bar.

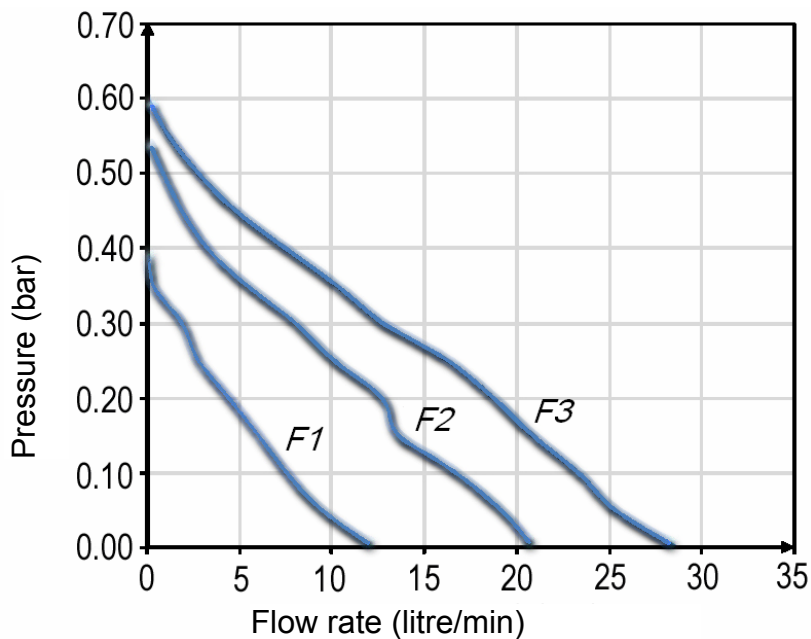
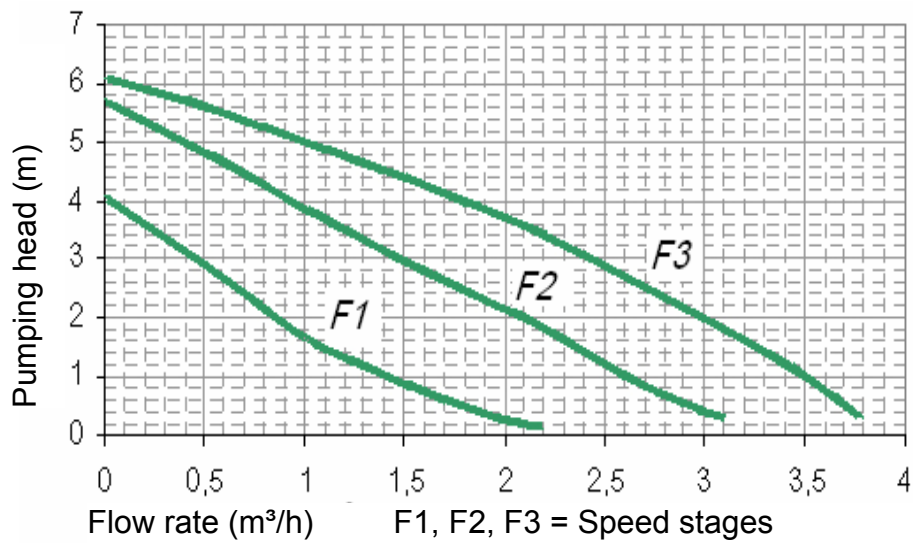
## Technical data

Suitable liquid	Water, water with glycol-based antifreeze (25 ÷ 50% maximum)
Connections	G 3/4"
Temperature range	-10°C ÷ +160°C
Max. ambient temperature	+40°C
Max. operating pressure	10 bar
Material of the fittings	Brass EN 12165 CW614N
Thermometer material	Steel/aluminium
Valve seals	PTFE
O-rings	EPDM-Perox
Flat seals	Betaflex
Insulation casing	PPE, K-factor $\lambda$ : 0.041 W/mK
Pressure gauge range	0 ÷ 6 bar
Thermometer range	0 ÷ 160°C
Pipe connection for connection to the expansion tank	3/4"
Safety valve temperature range	-30 ÷ +160°C
Safety valve setting	6 bar
Minimum pressure of the gravity brakes in the ball valves	$\Delta p = 2 \text{ kpa}$ (200mm WS)
Filling and emptying connections with hose connection	Ø 13mm

## Pump Wilo Solar ST20/6

Installation length between the connections	130mm
Supply voltage	230V 50Hz
Operating temperature	approx. -10°C ÷ +110°C
Maximum temperature	+140°C for 2 hours
Maximum working pressure	10 bar
Protective category	IP44
Mains connection plug	Molex type adapter

### Characteristic curves:







## **Guarantee conditions**

**Note:** The following guarantee conditions do not in any way limit the legal right to a guarantee, rather expand your rights as a consumer.

1. The company Technische Alternative elektronische Steuerungsgerätegesellschaft m. b. H. provides a two-year guarantee from the date of purchase by the end consumer for all the devices and parts which it sells. Defects must be reported immediately upon detection and within the guarantee period. Technical support knows the correct solution for nearly all problems. In this respect, contacting us immediately will help to avoid unnecessary expense or effort in troubleshooting.
2. The guarantee includes the free of charge repair (but not the cost of on site fault-finding, removal, refitting and shipping) of operational and material defects which impair operation. In the event that a repair is not, for reasons of cost, worthwhile according to the assessment of Technische Alternative, the goods will be replaced.
3. Not included is damage resulting from the effects of overvoltage or abnormal ambient conditions. Likewise, no guarantee liability can be accepted if the device defect is due to: transport damage for which we are not responsible, incorrect installation and assembly, incorrect use, non-observance of operating and installation instructions or incorrect maintenance.
4. The guarantee claim will expire if repairs or actions are carried out by persons who are not authorised to do so or have not been so authorised by us or if our devices are operated with spare, supplementary or accessory parts which are not considered to be original parts.
5. The defective parts must be sent to our factory with an enclosed copy of the proof of purchase and a precise description of the defect. A filled in "service advice note", which can be downloaded from our homepage [www.ta.co.at](http://www.ta.co.at), will accelerate processing. A prior clarification of the defect with our technical support is necessary.
6. Services provided under guarantee result neither in an extension of the guarantee period nor in a resetting of the guarantee period. The guarantee period for fitted parts ends with the guarantee period of the whole device.
7. Extended or other claims, especially those for compensation for damage other than to the device itself are, insofar as a liability is not legally required, excluded.

**TECHNISCHE ALTERNATIVE**



elektronische Steuerungsgerätegesellschaft m. b. H.

A-3872 Amaliendorf Langestraße 124

Tel ++43 (0)2862 53635

Fax ++43 (0)2862 53635 7

E-Mail: [mail@ta.co.at](mailto:mail@ta.co.at)

--- [www.ta.co.at](http://www.ta.co.at) ---

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