

# Assembly and operating instructions

**Ergo-Pro Twinline Solar Station  
Complete with DeltaSol C Plus Controller.**



## Safety instructions

Before using your equipment, please read the following instructions for assembly and start-up. This will help you avoid any damage to your equipment that may arise from incorrect handling. Use of the equipment in a manner that is contrary to its intended purpose, together with changes during assembly or to the construction that are not permitted will invalidate any claims for liability. Alongside country-specific guidelines, the following technical regulations must be given particular consideration:

**DIN 4751**  
Central heating boilers  
**DIN 4757**  
Solar heating and solar thermal systems  
**DIN 18380**  
central heating systems and hot water supply systems  
**DIN 18382**  
Electrical cable and wiring systems in buildings  
**EN 12975**  
Thermal solar systems and components

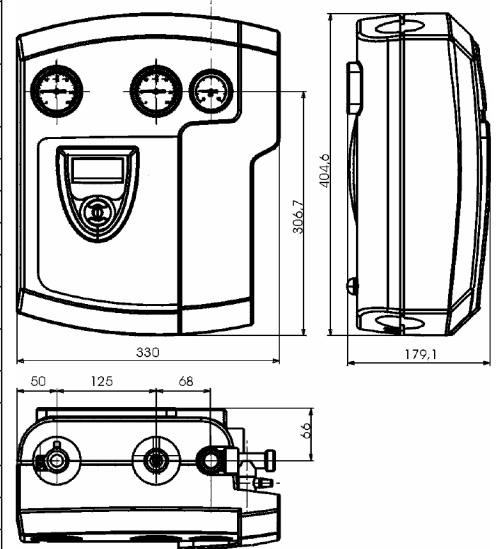
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## Technical data

Operating pressure:	max. 6 bar
Operating temperature of feed line:	max. 140 °C
Operating temperature of return line:	max. 120 °C
Medium	Water with max. 50 % propylene glycol
Nominal size:	DN 15
Screw connections:	flatsealing union nut 1 inch
Collector connections	Internal thread 3/4 inch
Tank connections	Internal thread 3/4 inch
Materials:	
Seals	EPDM/AFM 34
Housing	CW 617 (2.0402)
Connecting components	CW 614 (2.0401)
Insulation	EPP foam
Heat conductivity:	0.038 W/mK
Weight:	approx. 7 kg.
Operating voltage	230V/ 50Hz
Pump capacity ST 20/6 3	min. 34 W (stage 1) max. 82 W (stage 3)

## Dimensions



## Structure / scope of supply

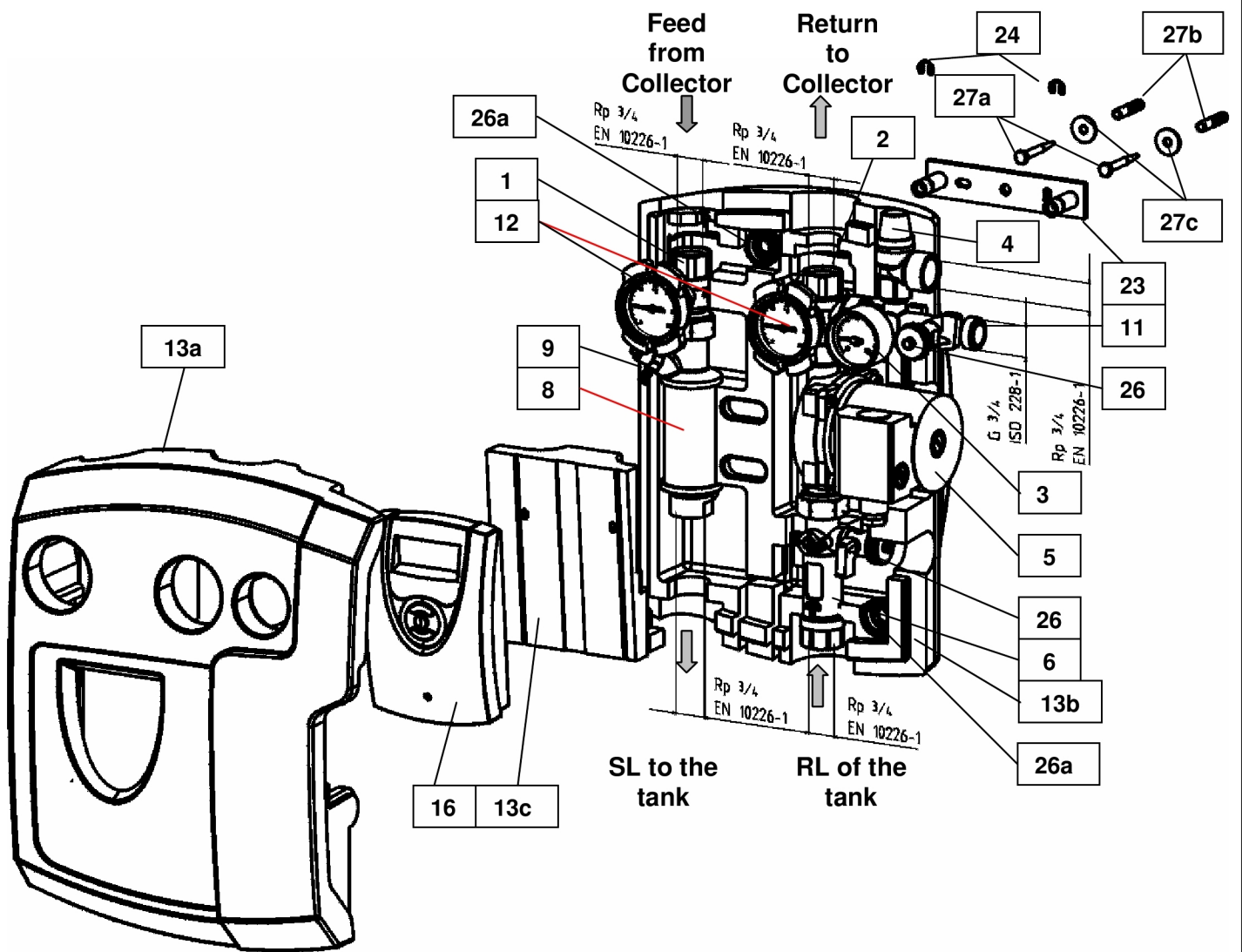


Fig. 1: General layout drawing

Item	Designation	PGS DN15
1	Feed line ball valve with integrated gravity brake (20 mbar)	1
2	Return line ball valve with integrated gravity brake (20 mbar)	1
3	Manometer	1
4	Solar relief valve, 6 bar, TÜV tested	1
5	Circulation pump ST 20/6 3	1
6	Flow meter 1 - 10 l/min. with rinsing / shut-off function, union nut G1 x IG Rp <sup>3</sup> / <sub>4</sub>	1
8	Air jet, union nut G1 x IG Rp <sup>3</sup> / <sub>4</sub> with	1
9	Manual bleeding nipple	1
11	Connection to membrane expansion vessel	1
12	Dial thermometer	2
13	Insulation (insulating half jacket front (13a), back (13b), control console (13c))	1
23	Mounting plate	1
16	Controller	1
24	Spring	2
26	BFE cocks	2
26a	Grommets for BFE cocks	2
27	Wall assembly set (wood screws (27a), dowel (27b), washers (27c), 2 of each)	1

## Assembling the Ergo Pro Solar Station on the wall

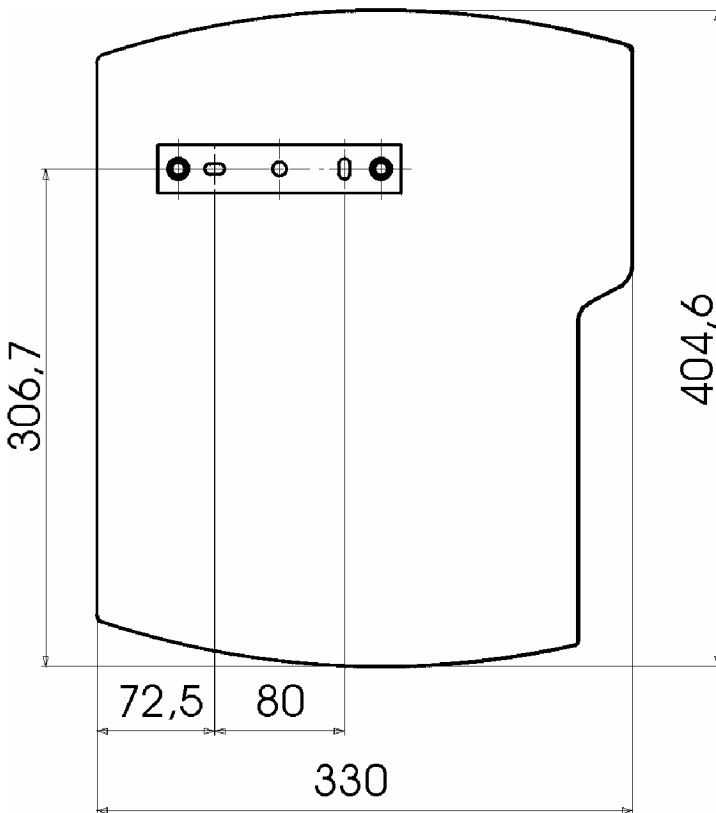


Fig. 3a: Drilling dimensions

- Pull feed line **(A)** and return line **(B)** out of the mounting plate **(23)**.
- Mark drilling points for the mounting plate **(23)** on the wall and drill two 8mm holes **(Fig. 3a)**

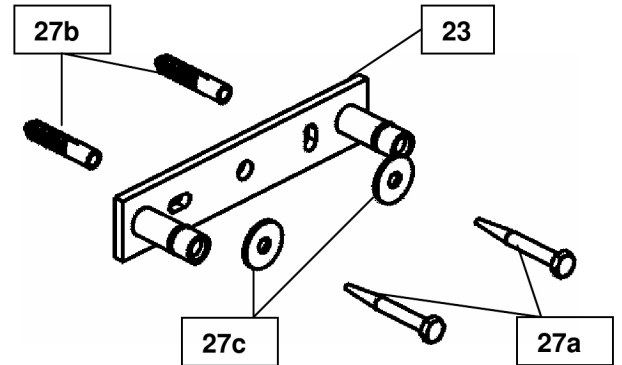


Fig.3b: Attaching the mounting plate

- Insert dowels **(27b)** into the holes and bolt on the mounting plate using the screws **(27a)** and washers **(27c)**. Adjust the mounting plate with a spirit level.

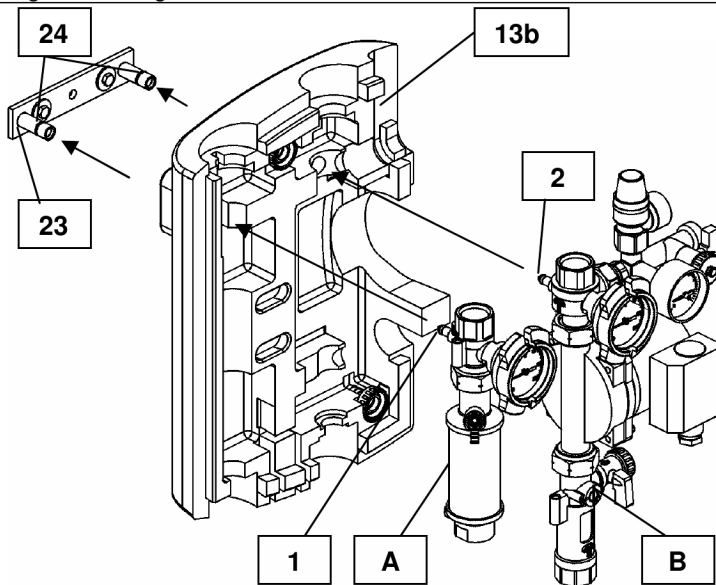


Fig.3c: Wall assembly

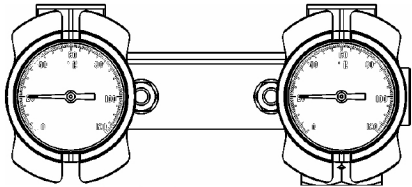
- Check that the springs **(24)** sit in the slots of the mounting plate intake sockets **(23)** correctly.
- Push the rear insulation jacket **(13b)** over the intake sockets, press the flow pipe **(A)** with the taps on the supply ball valve **(1)** and the return flow pipe **(B)** with the taps on the return ball valve **(2)** into the intake sockets, until they engage.

## Gravity brake function

Gravity brake opening pressure

in each case 20 mbar

The gravity brakes are built into the feed and return ball valve. They are operated by turning the ball valve handle.



Gravity brakes closed,  
Ball valves opened

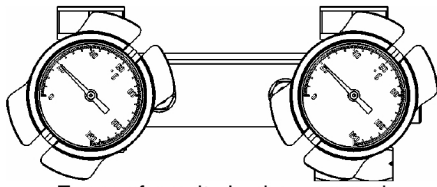
Fig.4a

### Operating position

The valve discs should not be opened, to prevent circulation under the force of gravity

The slots in the handles are vertical (fig. 4a)

The force of gravity brakes are in the operating position (closed). The ball valves are opened



Force of gravity brakes opened

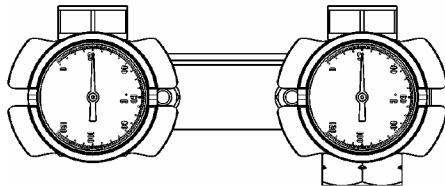
Fig.4b

### Emptying / filling

To fill and completely empty the solar plant, open the gravity brakes by turning the handles to the right.

The slots in the handles are located at an angle of 45 ° to the vertical (fig. 4b).

The gravity brakes are opened.



Ball valves closed

Fig.4c

### Position "Closed"

Turn the handles 90° to the right .

The ball valves are closed. The slots in the handles are now horizontal (fig. 4c).

## Flow meter / rinsing and filling armature

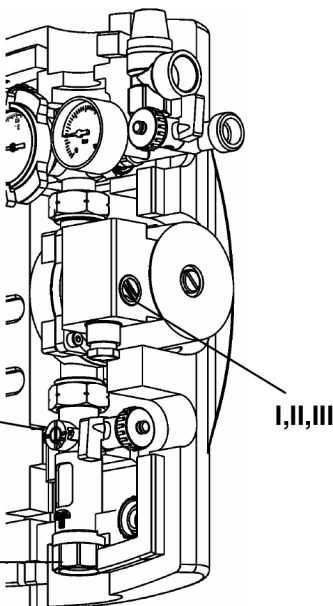
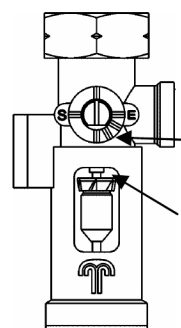


Fig. 5

Adjusting the flow rate of the heat transfer fluid is achieved by selecting the r.p.m. setting (I, II, III) on the circulating pump and with the throttle (C) on the flow meter (7).

The flow meter displays the flow rate. The normal range is between 1 and 10 l/min.



Flow rate adjustment range

Read off the flow rate from the upper edge of the float

Fig. 6

**Fill / rinse / empty (fig.7)**

For filling, rinsing and emptying the solar plant, use the BFE cocks (26) on the membrane expansion vessel connection (11) and on the flow meter (7) (see Fig. 7). Unscrew the caps from the closed boiler filling and boiler emptying cocks (BFE cocks) and attach the input pipes from the rinsing and filling mechanism

**Filling and emptying:**

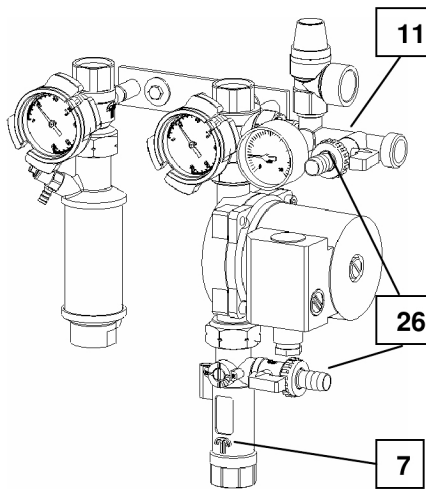
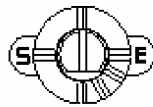


Fig. 7

To fill and empty the solar plant, the supply and return ball valve must be opened in the "Gravity brake" position (45 °).



Turn the spindle of the flow meter to the flow position (the slot in the spindle is vertical the flat area points downwards).

Open the BFE cocks. The solar plant can now be emptied or filled.

**Rinsing (Fig.7a):**

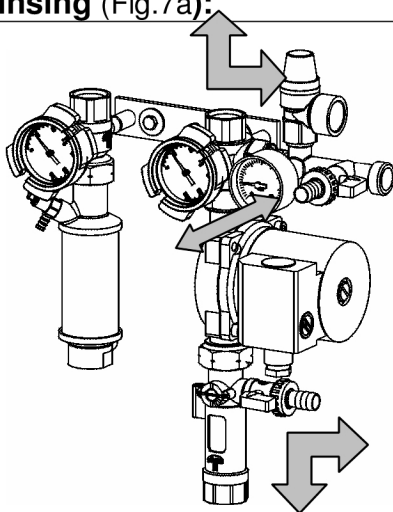
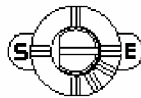


Fig.7a

To rinse the solar plant, turn the supply and return ball valve to the "gravity brake open" position (45°).



Turn the spindle on the flow meter to the "S" position. The slot in the spindle is horizontal, the flat points to the left.

Open the BFE cocks and begin the rinsing procedure

**Service (Fig.7b):**

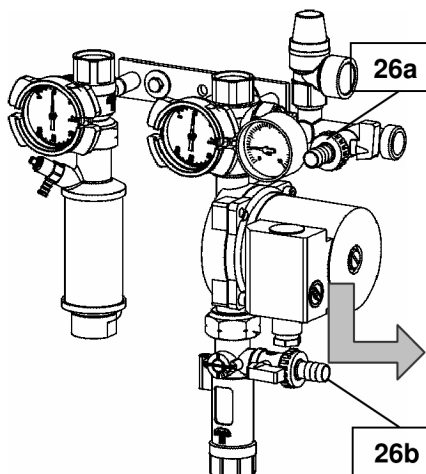
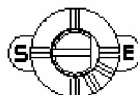


Fig.7b

When maintenance is being carried out (e.g. a pump change), the feed and return ball valve must be closed.



Turn the flow meter spindle to the "E" position. The slot on the spindle is horizontal, the flat points to the right.

With the BFE cock ( 26a) on the membrane expansion vessel closed, open the BFE cock (26b) on the flow meter

The heat transfer fluid in the pump can now be discharged.

## Air jet

The air that remains in the heat transfer fluid collects in the air jet (8) and can be discharged manually via the bleed nipple(9).

To do this, push the hose provided onto the bleed nipple sleeve and catch any fluid that comes out in a suitable container

**Bleeding may only be carried out by trained technical personnel.**

**Uncontrolled bleeding leads to a decrease in pressure and to malfunctions in the solar plant.**

**Warning! Danger of scalding!**

**Both the air that escapes during bleeding and the heat transfer fluid can reach temperatures of over 100 °C.**

Finally, retighten the nipple firmly. When bleeding, check the system pressure. If necessary the solar plant should be refilled with the heat transfer fluid mixture.

## Safety unit / connection for membrane expansion vessel (fig.8)

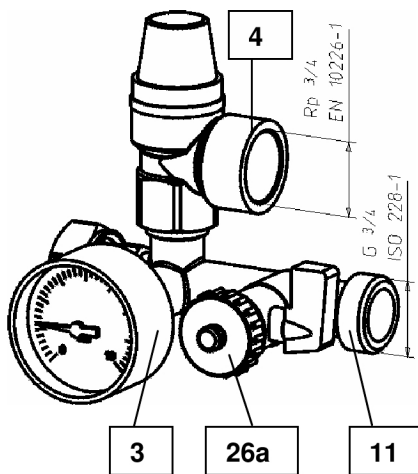


Fig. 8

The solar safety unit on the return ball valve is equipped with

- Solar relief valve (response pressure 6 bar) (4)
- Manometer (measurement range 10 bar) (3)
- Pipe union (11) for the membrane expansion vessel (AG G<sup>3/4</sup>, flat sealing)
- BFE cock (26a)

**Warning!**

Collect any heat transfer fluid from the relief valve in a basin using a suitable pipe.

## Controller / electrical connections

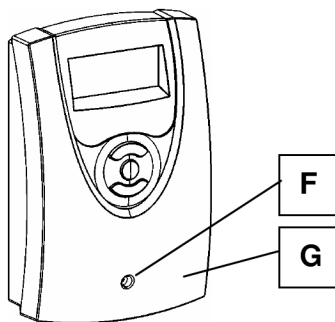


Fig. 10

**Warning!**

Do not bend the cable sharply and do not lay it while energised! Do not run the cable directly over sharp-edged components.  
(For a description of its function and operation, see the controller manual)

**Note**

- Work on live parts may only be carried out by an authorised specialist!
- Fuses, wiring and earthing are to be made according to local regulations.
- The connection to the mains must be made using the attached mains cable.
- The solar controller must be protected against damage by excess voltage
- Opening the controller is only necessary for servicing. Before opening the housing of the solar controller, make sure the device is disconnected from the mains!

Pump cables and mains cables are attached to the solar controller at the factory.

The terminals for the sensors can be accessed after loosening the screw (F) on the solar controller's faceplate (G).

Make the connection with the sensor according to the controller manual

# Extract from the WILO pump installation and operation manual

## CE Declaration of Conformity

We hereby declare that this unit meets the following regulations entspricht:

**EEC machine guidelines**  
**89/392/EWG in this version,**  
**91/368/EWG, 93/44/EWG,**  
**93/68/EWG**

**Electromagnetic compatibility**  
**89/336/EWG ith D F.**  
**92/31/EWG, 93/68/EWG**

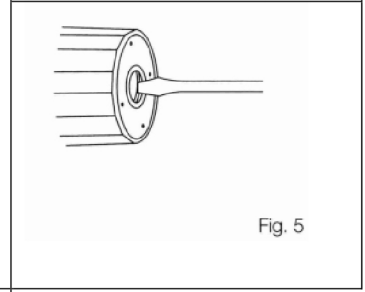
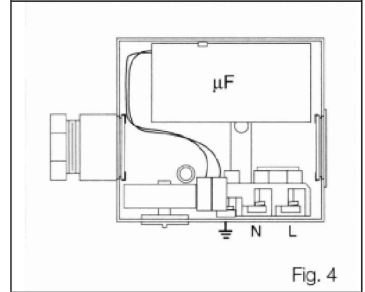
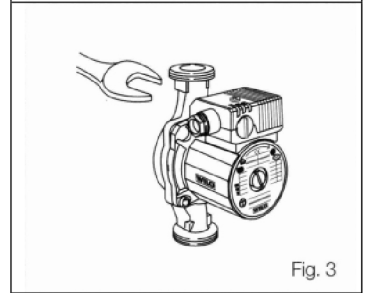
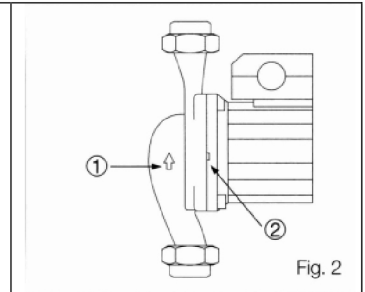
Harmonized standards used, in particular  
**EN 809, EN 50 081-1, EN 50 082-1,**  
**EN 50 081-2, EN 50 082-2.**



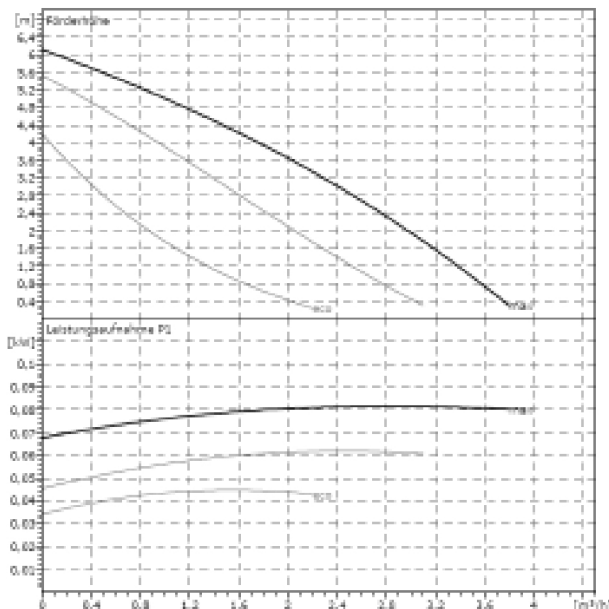

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Quality Management



## WILO STAR ST 20/6



## Operating instructions for the operator

### 1. General information

Installation and start-up may only be carried out by technical personnel

#### 1.1 Intended purpose

- Type: ST: for thermal solar plants

#### 1.2 Connection and performance data

Minimum inlet pressure at the intake \*

at a temperature f + 50 °C:	0.05 bar
at a temperature f + 95 °C:	0,3 bar
at a temperature of +110 °C:	1,0 bar
Permissible temperature range:	-10 °C to +120 °C
Maximum permitted ambient temperature:	+40 °C

\* These values apply at 300m above sea level - adder for higher locations: 0.01 bar/100m increase in altitude

To avoid cavitation noise, the minimum inlet pressure at the pump intake should be adhered to.

#### Fluids to be pumped:

Water and water / glycol mixtures in ratios up to 1:1.

When adding glycol, the higher viscosity requires that the pumping data is corrected according to the mixing ratio.

Only use branded goods with corrosion inhibitors, and observe manufacturer's data.

## 2. Safety

### 2.1 Safety instructions for the operator

Take note of current regulations for the prevention of accidents.

Eliminate all electrical risks.

Take note of regulations and those of local electricity supply companies.

### 2.2 Safety instructions for inspection and assembly work

The operator must ensure that all inspection and assembly work is carried out by authorized, qualified technical personnel who have studied the manual in sufficient detail.

Work on the pump / plant may only be carried out when it is not in operation.

### 2.3 Prohibited modes of operation

The operational safety of the pump / plant supplied is only guaranteed when used as intended according to section 1 of the manual. The limit values indicated in the data sheet may under no circumstances be exceeded.

## 3. Description of product and accessories

The ST 20 (25)/... pump is a solar thermal pump with special hydraulics (coated pump housing) for the use in thermal solar plants.

A motor contactor is not required. Even the maximum overload current cannot damage the motor, as it is that engine is block current-proof.

#### Changing the r.p.m.:

All pumps have a knob on the terminal box for manually changing the speed in r.p.m. in 3 steps [1 (min.) - 2 - 3 (max.)]. At the lowest step, the number of revolutions is reduced to around 40 - 50 % of the maximum. The power input is reduced by approximately 50 %.

#### 4. Set up / installation

##### **Assembly**

- The directional marker on the pump housing shows the direction of flow (Fig. 2, pos. 1).
- When bolting the pump onto the piping, the pump can be secured to prevent rotation by using a combination wrench on the flats provided (Fig. 3).

##### **Electrical connections**

- The connecting cable is to be laid in such a way that the piping, the pump housing and motor housings are not affected.
- The type of current and voltage of the mains supply must correspond to the data given on the identification plate.
- Carry out the connection to the mains according to fig. 4.
- Earth the pump / plant correctly.

#### 5. Start-up

##### **Bleeding**

Bleeding the pump rotor area takes place automatically after a short period of operation. Unlubricated operation for brief periods does not harm the pump. If however it should be necessary to bleed the rotor area directly, proceed as follows:

- Switch off pump,
- Close the line on the pressure side,
- Carefully open the vent screw with a suitable screwdriver (Fig. 5).



Depending upon the temperature of the delivery medium and the system pressure, when opening the vent screw, hot delivery medium - in liquid or vapour form - can leak or shoot out under high pressure.

**There is a risk of scalding!**

- Carefully push back the pump shaft with a screwdriver several times,
- protect electrical parts before allowing water to flow out
- Switch on pump,
- after 15 - 30 s close the bleed screw again,
- Open the shutoff valve again.

##### **WARNING!**

Where the screw plug is opened, and depending on the operating pressure, the pump may block



Depending on the operating condition of the pump or the plant (temperature of the delivery medium) the entire pump can become very hot.

**There is a risk of burning if the pump is touched!**