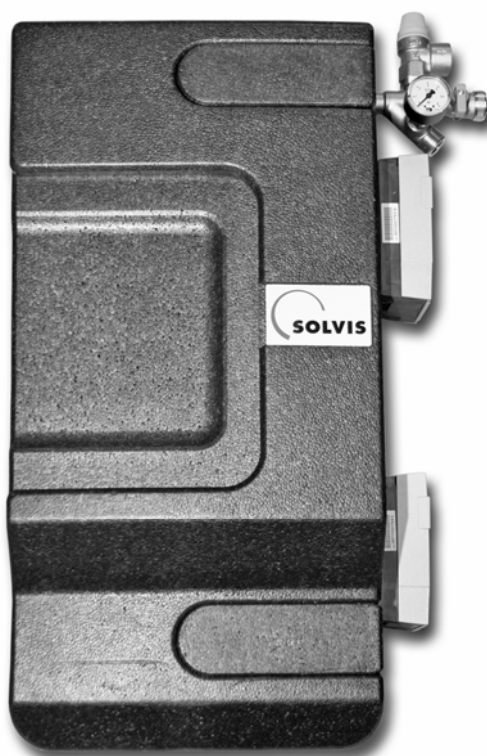


Solar Heat Transfer Station SÜS-S/-20 – Installation



- Installation
- Start-Up
- Maintenance



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1 Information About These Instructions

These instructions are intended for you as a technician from an installation company. You will find the specifications for installation, start-up and maintenance of the system here.

Please keep these instructions with the system so they can be referred to when necessary.

We recommend that you participate in a Solvis training course to ensure safe and proper installation.

As we are interested in improving our technical documentation, we appreciate feedback of any kind.

Interested system operators should contact their installers.

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Using these instructions

Additional documentation

Additional documentation, see → sec. "Scope of Delivery", p. 6.

The following documents, which may be required, are also referred to in these instructions:

- Operating Instructions for System Operators (L30/L31)
- Operating Instructions for Installers (L35/L36)
- Connection and System Diagrams (L38)
- Assembly instructions for the system into which the SÜS-S/-20 is being installed.

Symbols used



DANGER

Immediate danger, with serious health consequences and even death.



WARNING

Danger, with potentially serious health consequences.



CAUTION

Possible risk of moderate or light injury.



CAUTION

Risk of damage to unit or system.



Useful information, notes and work tips.



Change of document, referring to another document.



Energy-saving tip with suggestions on how to save energy. This reduces costs and helps protect the environment.

2 Safety Notes

Make sure that you are familiar with the safety notes before beginning installation. This is for your own safety.

-  Observe and adhere to the relevant safety regulations and the valid accident prevention regulations when installing the system.



DANGER

What to do if there is a risk of fire

- Immediately switch off the heating emergency switch.
- Shut off the fuel supply.
- Have a suitable fire extinguisher ready.



CAUTION

Country-specific regulations

Country-specific regulations can differ depending on the country and the region.

- These are to be observed and adhered to in order to ensure safe and faultless operation.
- If certain laws and regulations do not apply in a particular country, they are to be replaced by the country's own specific laws and regulations.



CAUTION

Please note the following:

- The unit is not suitable for use in potentially explosive atmospheres.
- Install the unit in a dry room only.
- Never install the unit on a flammable surface.



CAUTION

Observe instructions

Solvis is not liable for any damage resulting from non-observance of these instructions.

- Read the instructions carefully before operating or installing the system.
- Contact our Technical Sales department if you have any questions.



CAUTION

Avoid contaminants

- Water, oil, grease, solvent, dust, foreign bodies, aggressive vapours and other contaminants must be kept away from the system and the units.
- Cover the system and the units when performing construction or other work in the area to protect them from dirt and contaminants.



CAUTION

Observe ambient conditions

Malfunction or failure of system possible.

- Avoid ambient temperatures outside of the permitted range of 0°C to +50°C.
- Avoid dew condensation and an annual mean relative humidity higher than 75% (briefly 95%).



CAUTION

Do not make any unauthorised modifications

Otherwise there is no guarantee that the system will function correctly.

- You must not make any changes to the components of the unit.
- Only use original spare parts.



CAUTION

Check for damage

Damage to the controller, to cables or to connected pumps or valves may cause severe damage to the system.

- Do not operate the system/unit if there is visible damage to any of its components.

Exclusion of liability

Solvis accepts no responsibility for damage to the unit or resulting damages if:

- installation and start-up have not been carried out by a specialist company recognised by Solvis,
- the system is not being used as intended or is being operated incorrectly,
- maintenance was not performed, or
- maintenance, modifications or repairs have been performed on the heating system by someone who is not a specialist.

Intended use

The units and components in this system are intended only for heating in the low-temperature range and for hot water production with possible solar support, as described in this document.

Operating this system for any other purpose is prohibited. Exceptions require express written approval or statement from Solvis in advance.

Observe the following regulations

- DIN EN 12828 Heating systems in buildings
- DIN EN 12977 Thermal solar systems
- DIN 4807 Expansion vessels
- DWA-M 115 Notes for discharging waste water

3 Applications

The SÜS-S and SÜS-20 solar heat transfer stations are designed for use in **matched-flow solar systems** with SolvisFera Standard or SolvisCala Standard flat-plate collectors with a surface area up to 20 m².

These complete stations are used to transfer the solar heat to the large solar system SolvisVital 3 or to small solar systems SolvisMax Pur and Solo with the Solvis-Control 2 system controller.

In comparison to standard pumps, the high-efficiency pumps that are used in the SÜS-S significantly reduce the electrical energy that is used.

The solar heat transfer stations are not only compact and space-saving; they are also very quick and easy to install.

4 Scope of Delivery

Primary circuit

Transports the solar liquid between the collector and the countercurrent plate heat exchanger; consisting of:

Solar flow (collector side)

- Connection, clamp ring screw connection, 18 mm
- Ball valve with adjustable gravity brake and thermometer, red
- Flow temperature sensor
- Deaerator with manual bleeder

Solar return (collector side)

- Boiler filling and emptying valve with hose nozzle and cap
- $\frac{3}{4}$ " flow meter, 1 to 15 l/min
- Pump, Wilo-Stratos PARA 15/1-11.5
- Ball valve with adjustable gravity brake and thermometer, blue
- Manometer (up to 6 bar)
- $\frac{3}{4}$ " screw connection for MEV
- Solar safety valve, 6 bar
- Boiler filling and emptying valve with hose nozzle and cap
- Connection, clamp ring screw connection, 18 mm

Countercurrent plate heat exchanger

IC15Hx30, for transferring the solar heat to the buffer tank. Made from stainless steel 1.4401, soldered with copper.

Secondary circuit

For charging SolvisMax Pur systems or SolvisMax Solo; consisting of:

Flow (storage tank side)

- Flow temperature sensor
- Ball valve with adjustable gravity brake and thermometer, red
- Connection, clamp ring screw connection, 18 mm

Return (storage tank side)

- Connection, clamp ring screw connection, 18 mm
- Ball valve with thermometer, blue
- Pump, Wilo-Stratos PARA 15/1-7
- $\frac{3}{4}$ " flow meter, 1 to 15 l/min
- Return temperature sensor
- Safety valve 6 bar

Installation accessories

- The station is fully insulated using EPP clamshells
- Wall bracket and attachment material
- Mounting bracket for solar expansion vessel
- For connecting the expansion vessel:
 - $\frac{3}{4}$ " corrugated pipe
 - $\frac{3}{4}$ " cap valve
- One extension cable per pump for connecting the pumps to the mains
- One common extension cable for the temperature sensors and the controller connection of the pumps (SÜS only)
- SC2 volume flow encoder, including screw connections for installation on the solar return ball valve, secondary side (SÜS-S only)
- Installation instructions (this document)

5 Installation



CAUTION

When installing the system:

- Consider the length of the supplied extension cable when selecting the installation location.
- The installation location must be dry and frost-proof and have sufficient load-bearing capacity.
- Use only temperature-resistant pipe lines and insulation.
- Do not over-tighten the clamp ring screw connections on the piping of the system. Do not tighten by more than one revolution.

5.1 Solar station

Installing the solar heat transfer station

1. Copy the fastening hole measurements onto the installation surface. There is a drilling template on the cardboard beneath the station ("Solex Mini").
2. Drill the holes and insert the wall plugs provided.
3. Insert the screws so that they extend out from the wall by about 3 cm.
4. Remove the front half of the insulation. Hang the station and tighten the screws.

5.2 Safety group



WARNING

When the safety valve trips:

Escaping hot steam may cause severe scalding, possibly even in the face.

- You must create a blow out tube running from the safety valve to a suitable container.

Installing the solar safety group

The solar safety group consists of a solar safety valve (6 bar), a manometer, a boiler filling and draining valve (BFD valve) and a connection for the membrane expansion vessel corrugated pipe.

1. Attach the solar safety group to the side outlet of the solar return ball valve.

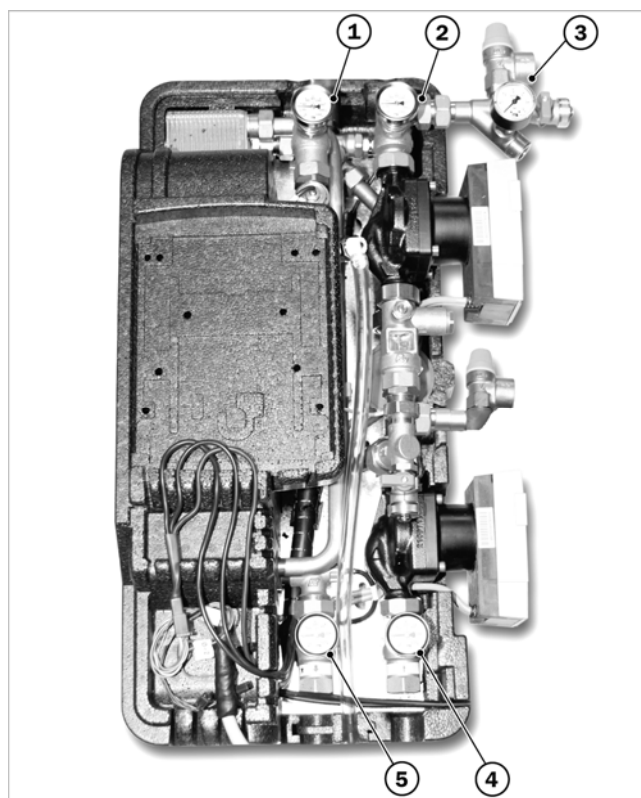


Fig. 1: Mounted safety valves

- 1 Solar flow ball valve, primary side
- 2 Solar return ball valve, primary side
- 3 Solar safety group
- 4 Solar return ball valve, secondary side
- 5 Solar flow ball valve, secondary side

5.3 SC2 volume flow encoder (SÜS-S only)

Install the supplied volume flow encoder on the secondary return ball valve.

5.4 Membrane expansion vessel



CAUTION

Expansion vessels are required for solar and heating systems

- Expansion vessels must be used with solar and heating systems.
- Neither install nor operate the system until a system-specific design for the expansion vessel has been laid out.

5 Installation



CAUTION

Observe the admission pressure of the solar expansion vessel

- The admission pressure of the solar expansion vessel must be set carefully in order to ensure safe and fault-free operation.
- Make sure that a counterpressure does not build up in the solar circuit when setting the admission pressure (open solar circuit or open cap and drain valve).



There is a calculation program for designing the expansion vessel and the primary tank (if present) as well as for determining the admission pressure and system filling pressure under the business partner section on the SOLVIS homepage (<http://www.solvis.de>) under "Auslegungsprogramme" (Design Programs) or contact our Technical Sales department.

Setting the admission pressure on the solar expansion vessel

1. Determine the admission pressure of the solar expansion vessel at system height according to the following formula.
2. Release the admission pressure using the solar expansion vessel valve or refill with nitrogen if necessary; the pressure should be at least 2.0 bar (1.7 bar for the SÜS-20) with roof heating units with a height difference of 0 to 12 metres, for example.

$$p_0 = \frac{H_{\text{Koll}} - H_{\text{Sp}}}{10} + 0,8 \text{ [bar]}$$

p_0 Solar expansion vessel admission pressure [bar]

H_{Koll} Height of the highest point of the collector [m]

H_{Sp} Height of the lower edge of the storage tank [m]

Installing the solar expansion vessel and the blow out tube

1. Attach the solar expansion vessel to the wall using the fixing bracket provided for the SOL-24, or use the retaining feet for the SOL-35 or SOL-50. Check the length of the corrugated pipe.
2. If the supplied corrugated pipe is not long enough, we recommend that you use copper pipe from the safety group, and use the corrugated pipe to connect the solar membrane expansion vessel to the copper pipe.
3. Install the cap valve on the SOL-xx solar expansion vessel. Connect it to the corrugated pipe that comes from the station.
4. If the system requires a V-SOL-x primary tank, install it between the cap valve and the corrugated pipe.



Criteria for selecting a primary tank

- A primary tank protects the membrane in the expansion vessel from inadmissibly high temperatures.
- German VDI guideline 6002 recommends the use of a primary tank when the contents of the pipes are less than 50% that of the intake capacity of the expansion vessel that is used.
- Our calculation program and Technical Sales department are available to support you as required.

5. Connect a blow out tube to the outlet of the solar safety valve and run it into a suitable empty container at the installation site.
6. Attach another blow out tube to the secondary safety valve (not running into the same container, but rather into a drain).

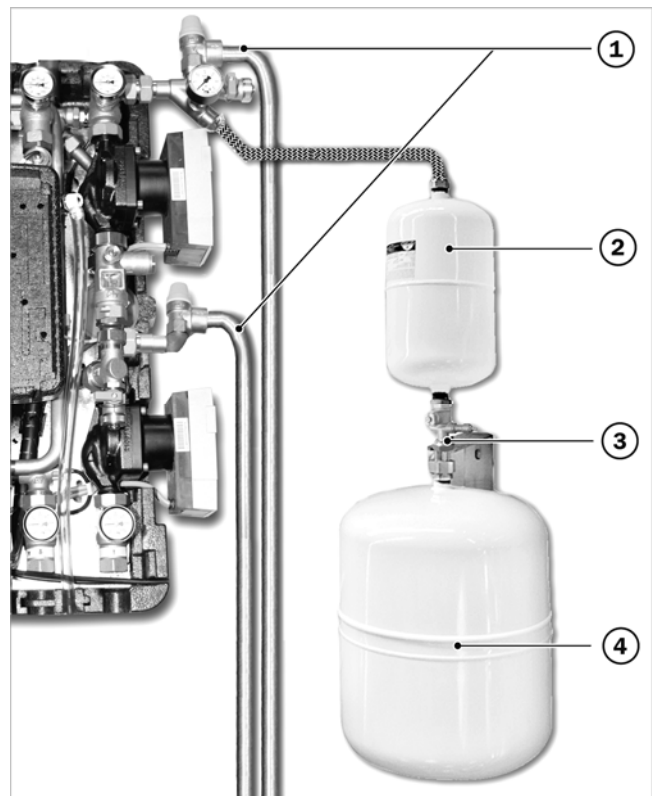


Fig.2: Installed solar expansion vessel (SOL-24 pictured here) and primary tank

- 1 Blow out tubes at the outlets of the solar safety valves
- 2 Primary tank V-SOL-x
- 3 Cap valve
- 4 Solar expansion vessel

5.5 Hydraulic connection

Piping the primary circuit

1. Create the piping between the collector(field) and the station.
2. Use a suitable piping material and insulate for high temperature resistance. We recommend the use of copper pipes or our SMR-15 quick-fit duct.

3. The pipe line must always run downhill from the collector connection points to the station. Whenever possible, do not run the pipe lines higher than the collector connection points.

Piping the secondary circuit

1. Lay the pipe between the storage tank and the station.
2. We recommend installing a T-piece with a boiler filling and emptying valve at the storage tank connection for draining the storage tank. These parts are not included.

Mounting the clamp ring screw connection

1. Slide the union nut (4) and compression ring (3) onto the copper pipe (5). To ensure that the power circuit is safe and sealed, the pipe must extend at least 3 mm from the compression ring.
2. Slide the support sleeve (2) into the copper pipe.
3. Insert the copper pipe with the individual parts connected to it (2, 3 and 4) into the housing of the compression fitting (1) as far as it will go.
4. Tighten the union nut (4) by hand to start with.
5. Then tighten the union nut (4) with one complete rotation. To avoid damaging the sealing ring when doing so, prevent the compression fitting housing (1) from rotating.

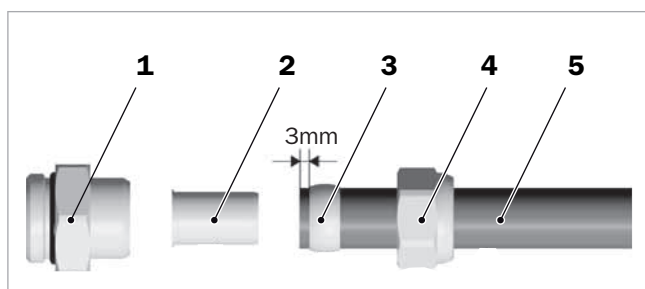


Fig. 3: Installation of clamp ring screw connection

5.6 Electrical connection

5.6.1 General information



DANGER

Risk of electrical shock

Damage to health up to and including cardiac arrest possible

- Disconnect the system from the mains before carrying out work on it and ensure that it cannot be turned on again



WARNING

In the event of incorrect mains connection

Contact voltages can be extremely hazardous.

- All mains connection work must be performed by authorised technicians.
- Work must be done in compliance with relevant regulations, especially DIN VDE 0100/IEC 60364 (Erection of power installations), accident prevention regulations and the guidelines of the responsible power supply company.
- Before connection, the current type and the mains voltage must be compared with the specifications on the unit nameplate.
- The minimum cross section of all connection lines must be designed in accordance with the power consumption of the unit.
- Only operate the unit while observing the prescribed safety measures and information in these instructions.
- Incorporate the unit into the local equipotential bonding while observing the minimum cross section.
- Ensure that the phase is correct during multi-phase mains connection.



CAUTION

Fixed mains connections

- If a fixed mains connection is used, it must be possible to interrupt the mains supply for the controller using a suitable switch.
- No switch is required for a mains connection using a shockproof plug.



CAUTION

Criteria for line installation

Malfunction or failure of heating system possible.

- Check that all cable and plug connections are connected correctly.
- The bus and sensor lines must be routed separately from lines over 50 V to prevent the controller from being influenced by electromagnetic fields.
- Do not install control devices directly adjacent to control cabinets or electrical devices.
- The electrical lines must not come into contact with hot parts.
- If possible, run all lines in a cable channel and, if necessary, secure with strain relief devices.

5 Installation



CAUTION

Criteria for line length

Risk of heating system malfunction or failure.

- The entire cable resistance for the sensor cables must not exceed 2.5 Ohms. This corresponds to a maximum length of 22 m for conventional telephone wires (cross section 0.08 mm²) and a maximum of 50 m for lines with a cross section of 0.75 mm².
- An additional line length restriction is based on the disturbance impulses on a conductor. As a result, the maximum line length for a sensor is: 50 m and for a bus line: 100 m.

5.6.2 Sensor and control cables

The station comes with three temperature sensors. Their cables are routed to a common connection socket at the factory.

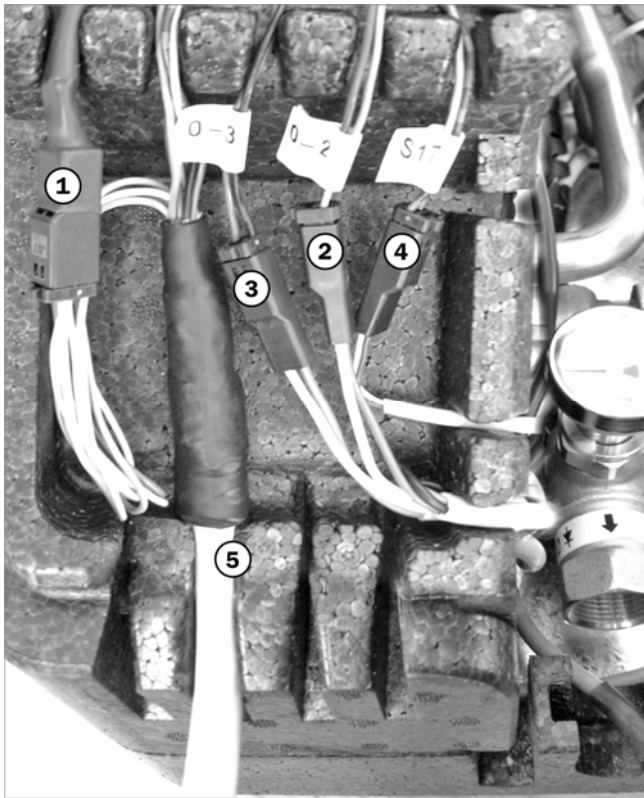


Fig. 4: Connections on the extension cable

- 1 Solar circuit sensors S5, S6 and S15
- 2 Primary pump controller (collector side) O-2 (SÜS-S only)
- 3 Secondary pump controller (storage tank side) O-3 (SÜS-S only)
- 4 Volume flow encoder connection S17 (SÜS-S only)
- 5 Cable loom

In addition to a power cable for the supply voltage, the primary and secondary pumps on the SÜS-S each have an additional cable for carrying control signals so that the controller can adjust the speed remotely. The control cables are each wired with a connection socket at the

factory. This also applies for the volume flow encoder on the SÜS-S.

Establishing the plug connections

1. Route the supplied cable loom (6 x 2 x 0.5 mm²) into the station from below and insert into the slot provided in the insulation shell.
2. Insert the plugs of the cable loom into the sockets of the sensor cables and pump control cables.
3. Connect the cable for collector temperature sensor S8 (FKY-5,5) and an extension cable (not included) to the corresponding terminals on the lightning protection box (BD).
4. Lay the cable loom from the solar transfer station and the extension cable from the lightning protection box in the protective conduit or cable channel to the SolvisMax and then on to the mains module of the SolvisControl 2 system controller.
5. Attach the cable ends to the proper connections as indicated by the labelling:
 - Primary pump O-2:
 - Red to O-2 “+”
 - Blue to O-2 “-”
 - Secondary pump O-3:
 - Violet to O-3 “+”
 - Black to O-3 “-”
 - Volume flow encoder S17:
 - Any polarity to S17
 - Solar circuit sensors S5, S6 and S15:
 - Any polarity to S5, S6 and S15

5.6.3 Voltage supply

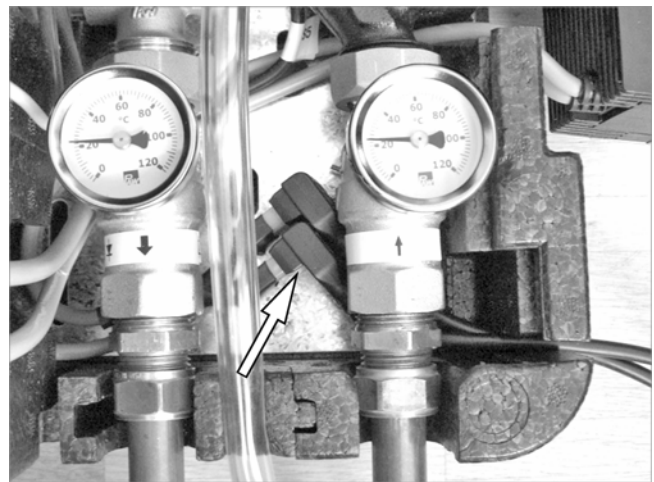


Fig. 5: Connecting the Molex plugs

Connecting the pumps

1. SÜS-S: Guide the two extension cables (included) for connecting the pumps to the mains into the right side of the station from below, and connect the Molex plugs on the pump cables to the sockets on the extension cables.
2. SÜS-20: Connect the extension cables directly to the plugs on the pumps.

3. Lay the extension cables in the protective conduit or cable channel to the SolvisMax and then on to the mains module of the SolvisControl 2 system controller.
4. Attach the cable ends to the proper connections on the mains module of the SolvisControl 2:
 - A1: Primary solar circuit pump 2 (collector side)
 - A7: Secondary solar circuit pump (storage tank side)To avoid malfunctions, be sure to make the connections properly.

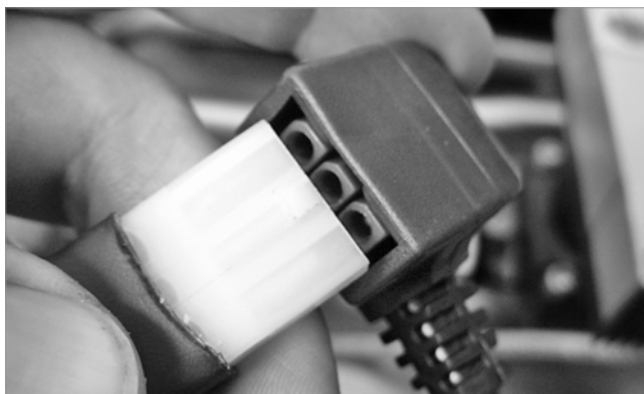


Fig. 6: Connecting the pump plug to the sockets

5.7 Final tasks

Attaching the insulation shell

1. Tighten all connections.
2. After installing and filling the system and checking it for leaks, (see → *Start-Up*, S.12) complete the station by attaching the front insulation shell.

i For detailed specifications of the control parameters, refer to the operating instructions for your system controller.

6 Start-Up

6.1 Filling and flushing



WARNING

Risk of hot steam escaping when working on the solar system

Scalding of hands and face possible.

- Carry out work on the solar system only when there is no direct sunlight or when the collectors are covered.



CAUTION

When filling the solar circuit:

- Use only original Solvis Tyfocor LS-rot ready-mixed heat transfer medium to fill and flush the solar circuit.
- Using other types of heat transfer fluid in this system is prohibited and may damage the solar circuit components.



Prerequisites for a proper start-up:

- The buffer tank must have been started up correctly.
- Use only the Füll-Jet unit to flush and fill the system (order separately)
- Open all adjusting valves fully
- Be sure that all the air is discharged
- Fill in the start-up report and leave it with the system when work is completed.

Start-up takes place in the prescribed order:

6.1.1 Secondary side (storage tank side)

Flushing the secondary side

1. Close the ball valves on the flow and return of the secondary circuit, and flush the storage tank (90° position).

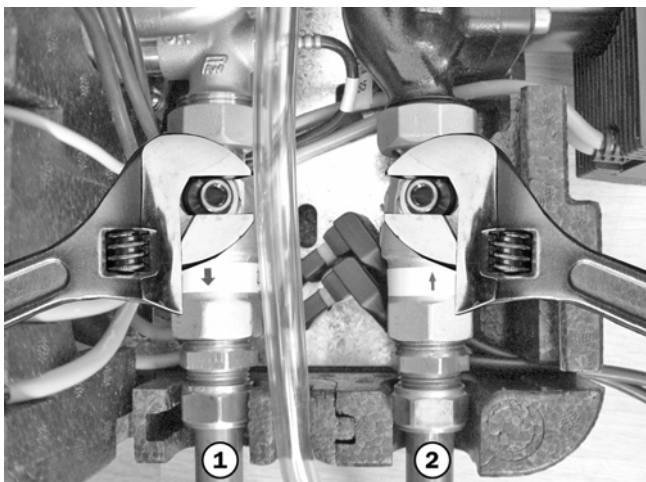


Fig. 7: Ball valves closed

- 1 Flow (here: 90° position – closed)
- 2 Flow (here: 90° position – closed)

2. Fully open the ball valve on the storage tank return (0° position) and open the ball valve on the storage tank flow half way (45° position, the gravity brake is out of operation).



Fig. 8: Ball valves half-open/fully open

- 1 Flow (here: 45° position – half-open, gravity brake off)
- 2 Return (here: 0° position – fully open)

3. Flush the secondary side of the station.
4. Establish the operating pressure in the storage tank circuit.
5. If necessary, bleed via the secondary boiler filling and emptying valve.
6. Next, perform a pressure test on the secondary side.

6.1.2 Primary side (collector side)

Flushing the primary side

1. Close the cap valve to the SOL-MAG (5).
2. Close the ball valve in the return (4) 90° and close the flow ball valve (3) 45° in order to deactivate the gravity brake.
3. Connect the pressure hose of the filling pump to the boiler filling and emptying valve (7).
4. Connect the boiler filling and emptying valve (6) to the flushing container, and insert the intake hose of the filling pump into the flushing container.
5. Open the boiler filling and emptying valves (7) and (6) and flush them with LS-rot antifreeze against the direction of operation: Pump => boiler filling and emptying valve (7) => plate heat exchanger => collector field => boiler filling and emptying valve (6) => filter => container.
6. Open and close the return ball valve (4) while flushing to remove air from the pump lines.

7. Continue to flush in the circuit until all air is discharged and the solar liquid that leaks out is bubble-free.
8. Close the filling and emptying valve (6) and increase the system pressure to 5 bar.

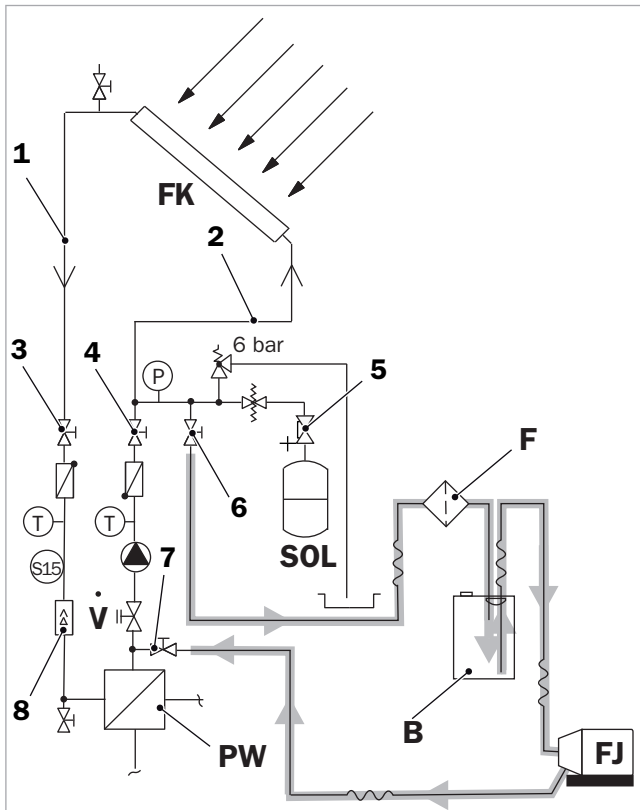


Fig. 9: Primary circuit: flushing the plate heat exchanger

- | | |
|-----|---|
| 1 | Solar return |
| 2 | Solar flow |
| 3 | Ball valve in the solar flow |
| 4 | Ball valve in the solar return |
| 5 | Cap valve |
| 6 | Boiler filling and emptying valve in the safety group |
| 7 | Boiler filling and emptying valve |
| 8 | Deaerator |
| B | Container with Tyfocor LS-rot |
| F | Filter |
| FJ | Füll-Jet filling pump |
| FK | Solvis flat-plate collectors, standard |
| SOL | Solar expansion vessel |
| V | Adjusting valve |

6.2 Bleeding

Bleeding the solar circuit

1. Attach a suitable hose ($\frac{3}{4}$ " connection) to the solar flush-fill-drain valve on the collector.
2. Direct the end of the hose into a suitable collecting container.
3. Gently open the relevant flush-fill-drain valve and allow the air to escape. The solar liquid will flow out under pressure.
4. If the pressure drops too much, top up the solar liquid at the solar station.
5. Close the flush-fill-drain valve firmly.

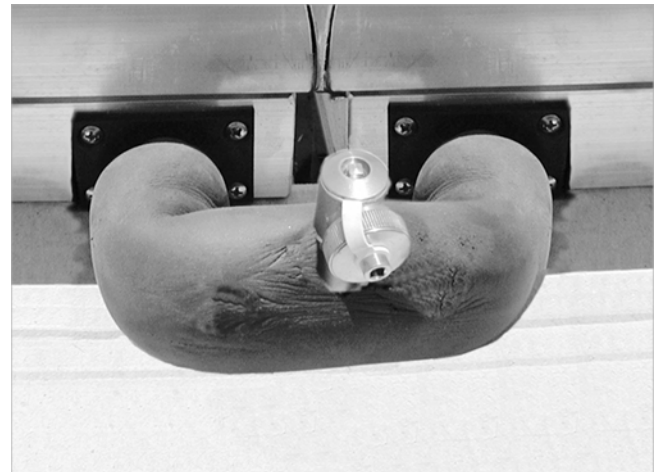


Fig. 10: Example showing SolvisFera Diagonal with flush-fill-drain valve

6. Bleed the station deaerator (8) using the manual bleeder.



Fig. 11: Bleeding the deaerator

6.3 Start-up and pressuretest

6.3.1 Testing the secondary circuit under pressure

1. To test the pressure of the secondary circuit, fill this system component (storage tank circuit) to approximately 3 bar.
2. Bleed using the safety valve in the return (use of a splash guard is recommended) and refill the buffer circuit up to approx. 3 bar, if needed. **Max. operating pressure of the storage tank: 3 bar.**

6 Start-Up

3. Carefully check all connections for leaks.

6.3.2 Testing the primary circuit under pressure

1. Close both filling and emptying valves.
2. Carry out pressure testing with approx. 5 bar.
3. Carefully check all connections for leaks.

6.3.3 Starting up the primary circuit



CAUTION

The adjusting valves must be open

- Because the speed control of the pump is included, the adjusting valves must be open.

1. Ensure that the admission pressure in the solar expansion vessel is set correctly.
2. Set the system to the calculated pressure.
3. Open the cap valve to the SOL-MAG (5).
4. Open the flow and return ball valves (3 and 4) (0° position).
5. Use the system controller to adjust the primary and secondary circuits according to the instructions (see → *Basic settings*, page 14).

Completing the work

1. Ensure that the solar circuit and the storage tank connections are fully insulated.
2. Attach the insulation shell to the station.
3. Set the operating pressure in the secondary circuit to the calculated value.



CAUTION

Bleed the solar system after start-up

- Once the solar circuit has been refilled, gas will be emitted during operation; this will collect in the station deaerator (6). The gas emissions will decrease as the operation time increases. It is therefore important to bleed the deaerator and check the system pressure every day in the first few days after start-up and then at regular intervals once most of the air has been discharged.

6.4 Basic settings

E Basic setting of the primary and secondary circuits adjusts the minimum speed of the affected solar pump to the actual pressure loss.

Benefits

- Increased operating efficiency (less power is required)
- Wear to the pump is reduced
- Reliable supply due to minimum flow.

Prerequisites for setting

- The entire system must be installed properly
- The solar circuit has been flushed and bled properly
- The safety devices must be set correctly
- The solar system is cold

6.4.1 Calculating the minimum volume flow

1. In the primary circuit:

$$\frac{A [\text{m}^2] \times 10 [\text{l/m}^2\text{h}]}{60 [\text{min/h}]} = X [\text{l/min}]$$

A Collector surface area

X Min. volume flow, primary solar circuit

2. In the secondary circuit:

$$\frac{A [\text{m}^2] \times 9 [\text{l/m}^2\text{h}]}{60 [\text{min/h}]} = X [\text{l/min}]$$

A Collector surface area

X Min. volume flow, secondary solar circuit

6.4.2 Setting the SÜS-S

1. Set the pump(s) to "ext. in" using the red operating knob. If this is not done, SolvisControl cannot control the speed automatically.

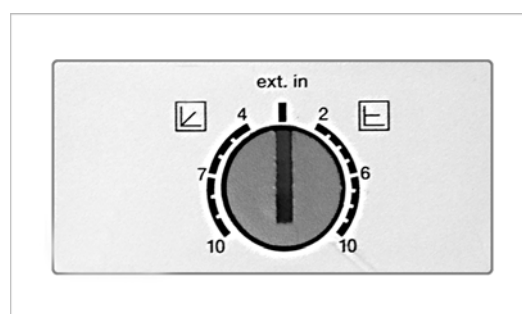


Fig. 12: Setting the pump to "ext. in"

Setting the minimum control

1. Switch to "Installer" user mode.
2. Open the "Outputs" submenu.
3. In the "Outputs" menu, open output A1 (primary circuit) or output A7 (secondary circuit).

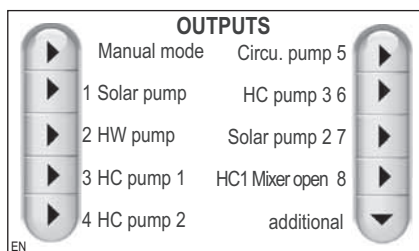


Fig. 13: The "Outputs" menu

4. Switch the solar circuit pump to "Status" = "On".

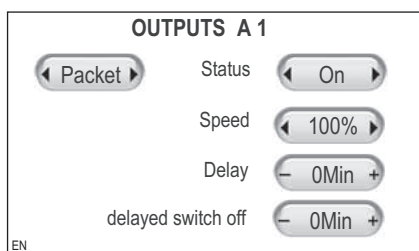


Fig. 14: Switching on the solar pump

5. Use the "Back" button to return to the "Outputs" submenu and select "Additional".
6. In the "Outputs" menu, select menu items "Analog output" and "O-2 Solar pump 1" (primary circuit) or "O-3 Solar pump 2" (secondary circuit).
7. Switch "Type" from "Auto" to "Hand".

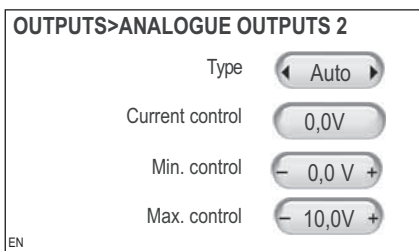


Fig. 15: Menu for analogue output O-2

8. Change "Hand specification" in the analogue outputs from 0 to 10 V.

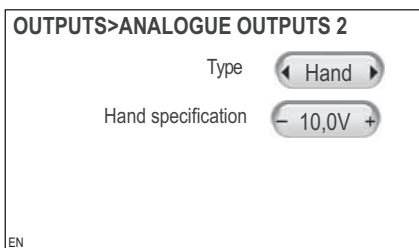


Fig. 16: Set "Hand specification" to 10 V

9. Decrease "Hand specification" step-by-step until the calculated volume flow at the adjusting valve in the primary circuit or secondary circuit has been set. The speed determined in this way is the minimum control.

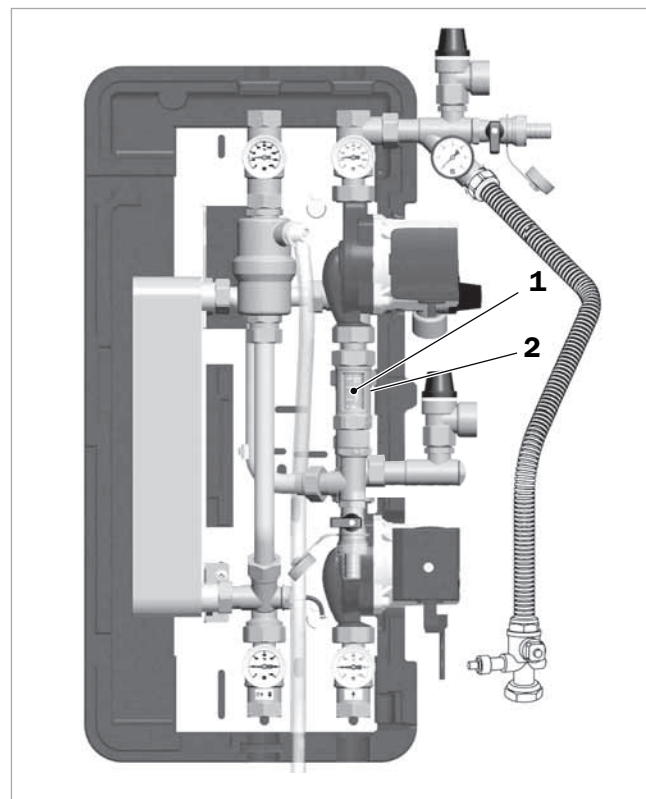


Fig. 17: Position of the adjusting valves

1. Adjusting valve in the primary circuit
2. Adjusting valve in the secondary circuit (concealed)

10. In the secondary circuit, if you cannot set the minimum volume flow with "Hand specification", you can adjust it using the adjusting valve.

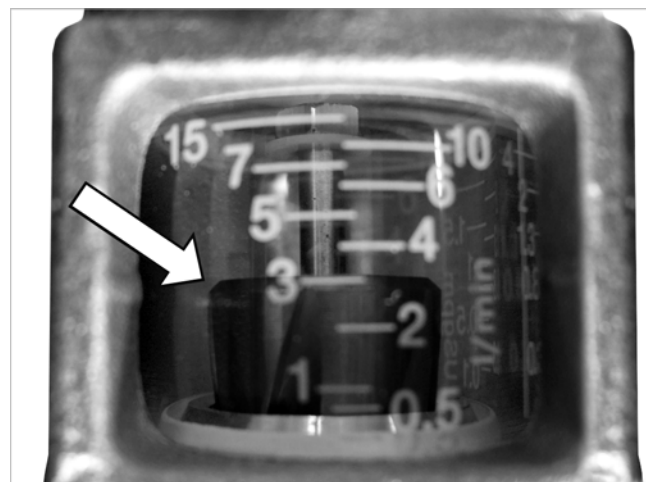


Fig. 18: Read the volume flow at the upper edge of the float (here: 3 l/min)

11. Switch "Type" from "Hand" to "Auto". Set "Min. control" to the determined value, and make a note of this value in the start-up report.

6 Start-Up

12. Carry out the procedure for the primary circuit and secondary circuit.

Setting the maximum control

1. In the primary circuit (O-2), leave "Max. control" at 10.0 V.
2. In the secondary circuit (O-3), switch "Type" from "Auto" to "Hand" and set "Hand specification" to 10 V.

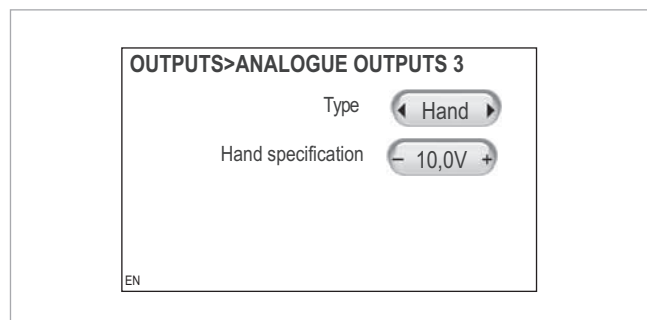


Fig. 19: Set "Hand specification" to 10 V (O-3 only)

3. Decrease "Hand specification" step-by-step until 15 l/min has been set at the adjusting valve in the secondary circuit. The speed determined in this way is the "maximum control".

The maximum flow of 15 l/min ensures fault-free operation of the stratified charger in the storage tank.

4. Switch "TYPE" from "Hand" to "Auto" and set "Max. control" in the secondary circuit to the determined value.

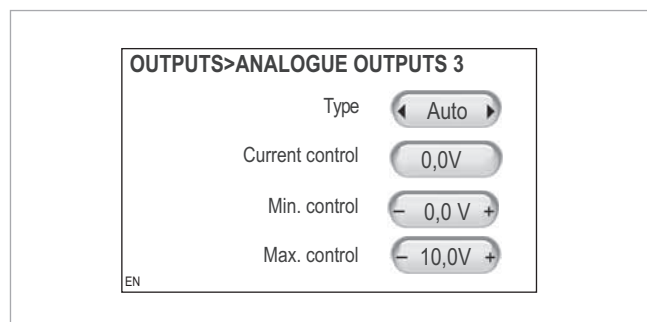


Fig. 20: Set "Max. control" to the determined value (O-3 only)

Switching the solar pumps to "Auto"

1. Switch to the "Outputs" menu.
2. Select output A1 and then select output A7.

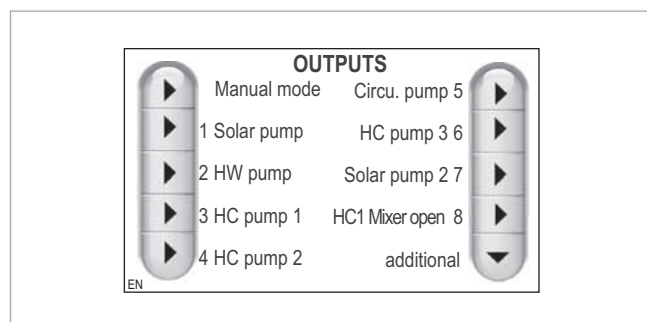


Fig. 21: "Outputs" menu

3. Set the "Status" in outputs A1 and A7 to automatic ("Auto").

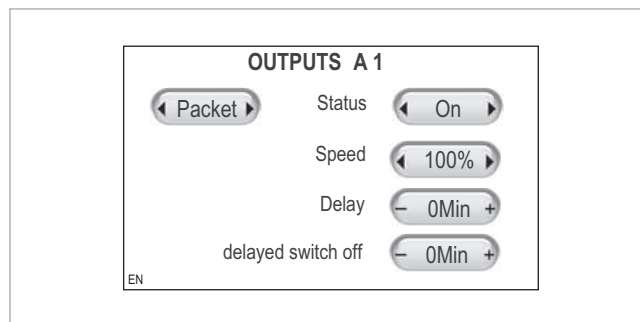


Fig. 22: Switch the status from "On" to "Auto"

6.4.3 Setting the SÜS-20

Step 1: Determine the minimum speed

1. Switch to "Installer" user mode.
2. In the "Outputs" menu, switch the solar circuit pump ("Status") on output A1 (secondary circuit: output A7) to "On", the speed is set to 100%.
3. Decrease "Speed" until the calculated volume flow is set. This speed is the minimum speed.
4. Carry out the procedure for the primary circuit and secondary circuit.

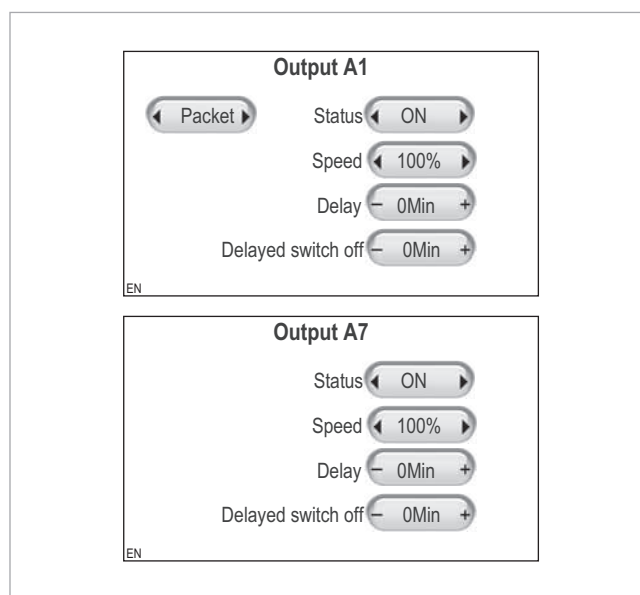


Fig. 23: Determining the minimum speed



Switch the status for outputs A1 and A7 back to "AUTO"

Step 2: Set the minimum speed

1. To set, open the following menu (see figures below): SOLAR>PRIMARY SPEED 1/4 (or SOLAR>SECONDARY SPEED 1/4 for the secondary circuit).
2. Change the value for "Min. speed" to the value that was determined in step 1.



“Max. speed” must be set to 100%.

3. Carry out the procedure for the primary circuit and secondary circuit

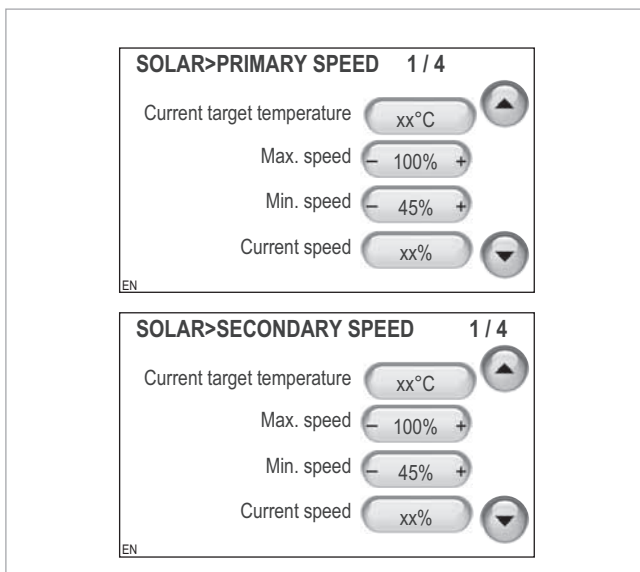


Fig. 24: Setting the minimum speed

7 Maintenance



WARNING

Risk of hot steam escaping when working on the solar system

Scalding of hands and face possible.

- Carry out work on the solar system only when there is no direct sunlight or when the collectors are covered.



- Maintenance must be performed by a specialist and documented in the maintenance report.
- Keep the maintenance report together with the system.

Checking the solar liquid (annually)

1. Bleed the solar circuit and take a sample from the deaerator while doing so.
2. Perform a sensory test. Replace if there is a pungent odour or dark colour.
3. Check the antifreeze using the antifreeze refractometer (the antifreeze limit may not exceed -23 °C).
4. Test the pH value with a test strip. (If the pH value is below 8.0, replace the solar liquid.)
5. Check the solar operating pressure.

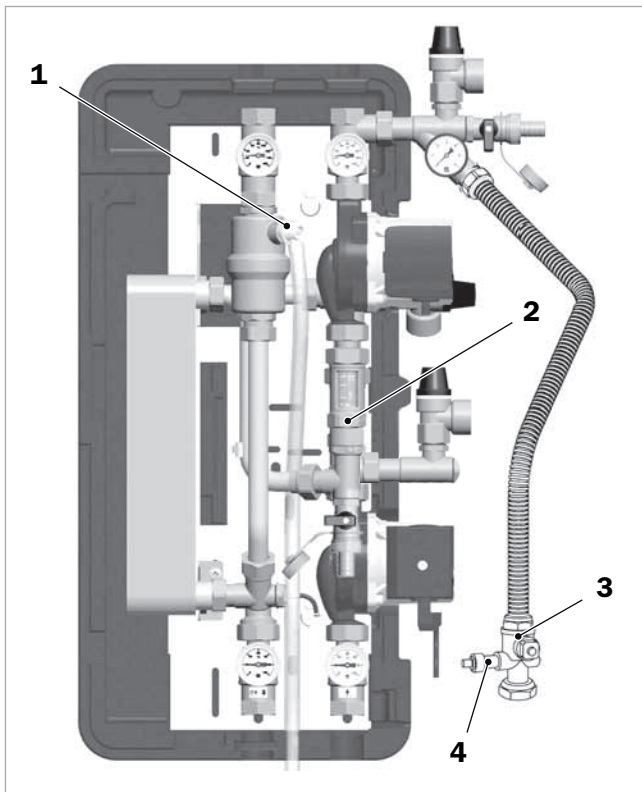


Fig. 25: Position of the valves for maintenance

- 1 Manual bleeder for deaerator
- 2 Adjusting valve in the primary circuit
- 3 Cap valve
- 4 Drain valve

Checking the solar expansion vessel admission pressure

(every two years)

1. Close the cap valve (3) on the solar expansion vessel with a 17 mm jaw spanner (with the marking horizontal).
2. Open the drain valve (4) with a 6 mm jaw spanner and release the overpressure from the expansion vessel.
3. Check the admission pressure on the expansion vessel valve and refill with nitrogen if necessary, see → "Setting the admission pressure on the solar expansion vessel", sec. "Membrane expansion vessel", pg. 7.
4. Close the drain valve.
5. Open the cap valve (with the marking vertical).

Check the flow (every 2 years)

1. Switch on the solar pump (manual mode).
2. Read the flow at the adjusting valve of the primary solar circuit (collector circuit).
3. Compare the value that was read with the target value shown in the start-up report.
4. Reset the flow, if necessary.

Checking the sensor values

1. Check that the temperatures measured at the solar heat transfer station are plausible.
2. Check that the temperatures measured on the collector sensor and the storage tank reference sensor are plausible.

Checking the solar circuit

1. Visually check all the components and safety valves of the solar station for leaks and ensure that they are functioning properly.
2. Visually check the collector(s), pipe lines and associated insulation.
3. Check that the collector mounting system is positioned and functioning correctly.

8 Technical Information

8.1 Technical Data

Characteristics of the SÜS-S/SÜS-20 solar heat transfer station

Designation	Unit	Value
Collector surface area (with "matched flow" flow rate)	m ²	up to approx. 20*)
Rated flow ("matched flow" flow rate)	l/m ² h	10 - 25
Dimensions (W x H x D)	mm	430 x 720 x 250
Primary circuit		
Flow meter, ¾"	l/min	1 - 15
Maximum temperature	°C	120 (briefly 160)
Safety valve	bar	6
Insulation, heat insulation made from	–	EPP
Connection, clamp ring screw connection	mm	18
Pump in primary circuit		
Wilo, type	–	SÜS-S: Stratos PARA 15/1-11.5; SÜS-20: ST 15/8 ECO
Control signal for remote speed adjustment	V	0-10 (SÜS-S only)
Maximum permitted operating pressure	bar	10
Permitted temperature range (pumping medium)	°C	-10 to +95 (briefly 120)
Ambient temperature range	°C	Maximum +40
Mains connection	–	1 ~ 230 V; 50 Hz
Countercurrent plate heat exchanger		
Type	–	IC15H x 30P
Number of plates	Pieces	30
Capacity per side	l	0.9
Exchange surface	m ²	0.95
Secondary circuit		
Connections	–	¾"
Volume flow encoder		VSG-SÜS (SÜS-S only)
Flow meter, ¾"	l/min	1 - 15
Maximum temperature	°C	120
Safety valve	bar	6
Insulation, heat insulation made from	–	EPP
Connection, clamp ring screw connection	mm	18
Pump in secondary circuit		
Wilo, type	–	SÜS-S: Stratos PARA 15/1-7; SÜS-20: RS 15/4
Control signal for remote speed adjustment	V	0-10 (SÜS-S only)
Maximum permitted operating pressure	bar	10
Permitted temperature range (pumping medium)	°C	-10 - +95
Maximum permitted ambient temperature	°C	Approx. +40
Mains connection	–	1 ~ 230 V; 50 Hz

*) The size of the possible collector surface area depends on the pressure loss through the collector field and the piping.

8.2 Connection dimensions

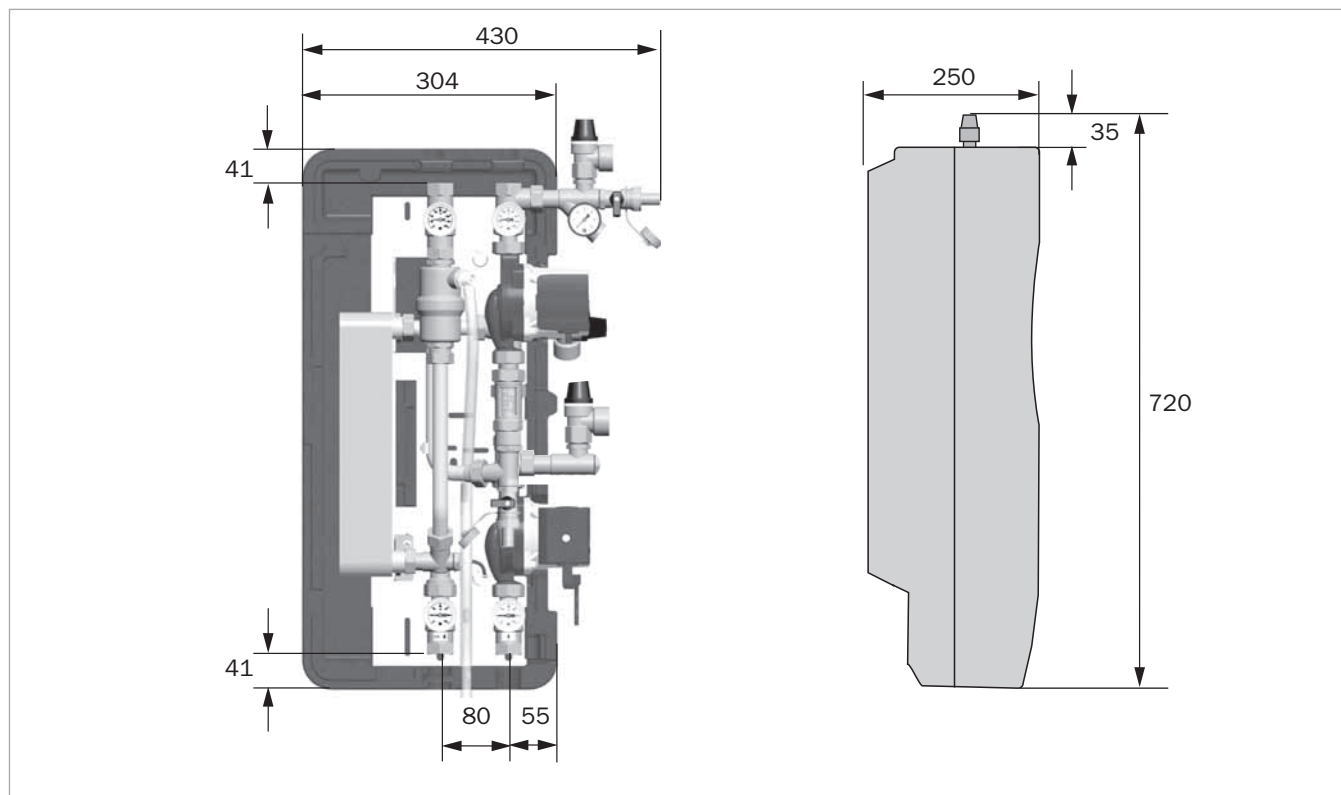


Fig. 26: Dimensions of the solar heat transfer station

8.3 Pressure loss in the SÜS-S

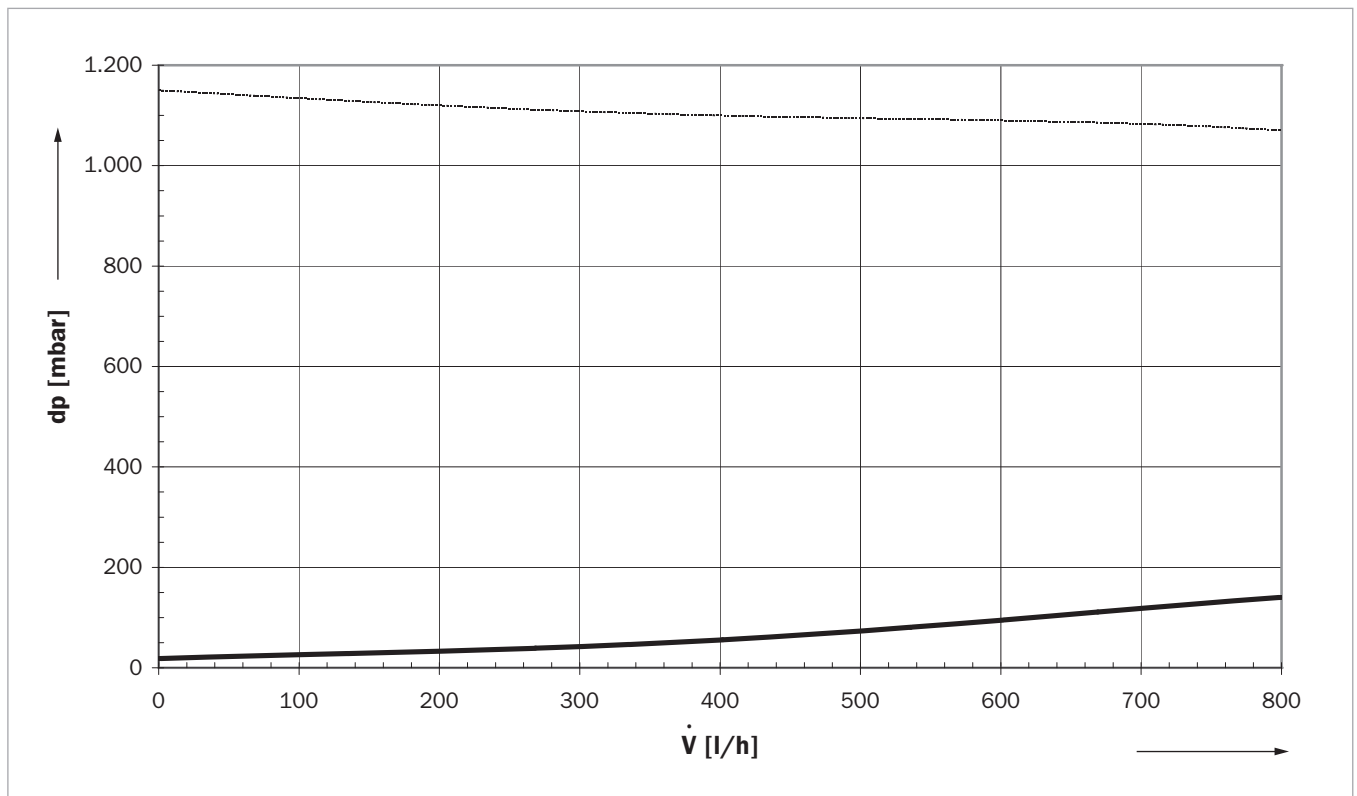


Fig. 27: Pressure loss curve for the primary circuit

1 Stratos PARA 15/1-11.5

2 Primary circuit of the SÜS-S

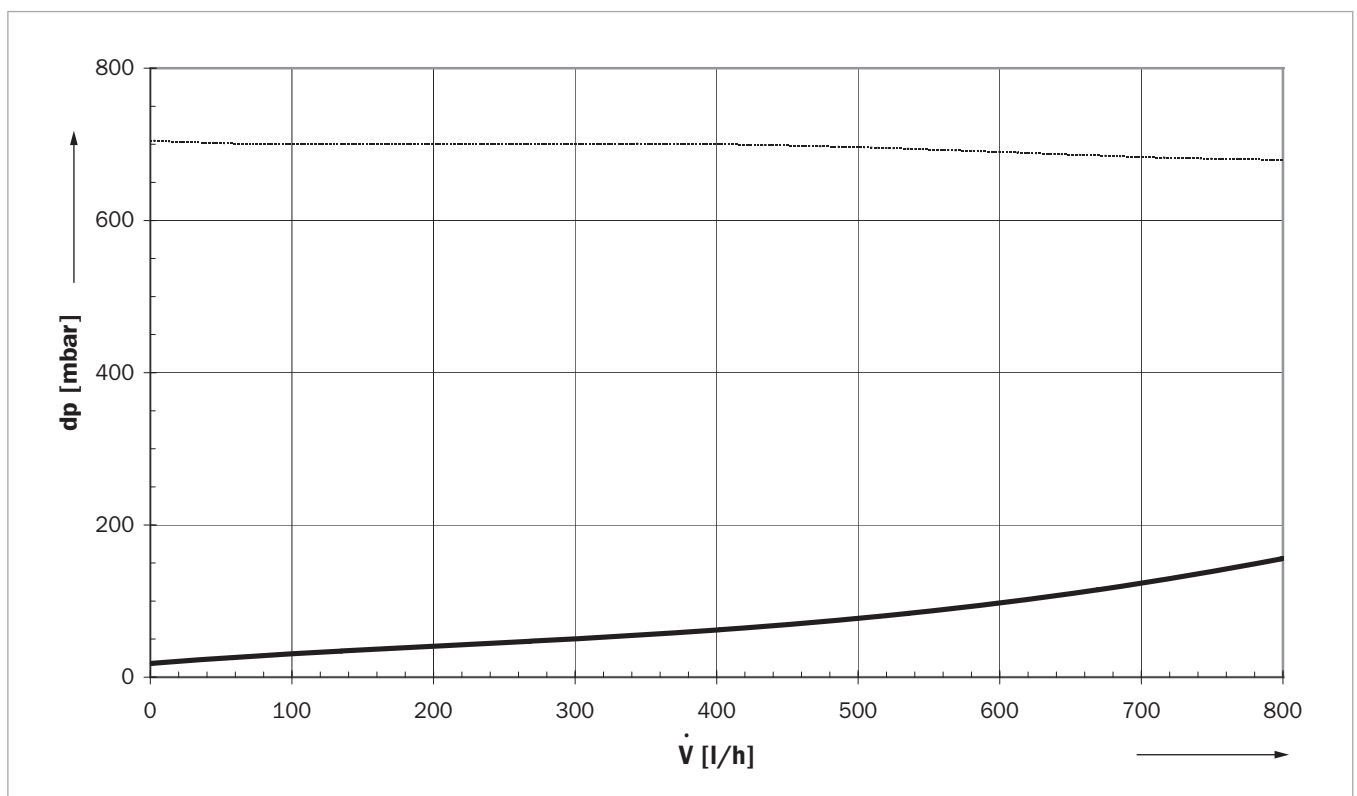


Fig. 28: Pressure loss curve for the secondary circuit

1 Stratos PARA 15/1-7

2 Secondary circuit of the SÜS-S

8.4 Pressure loss in the SÜS-20

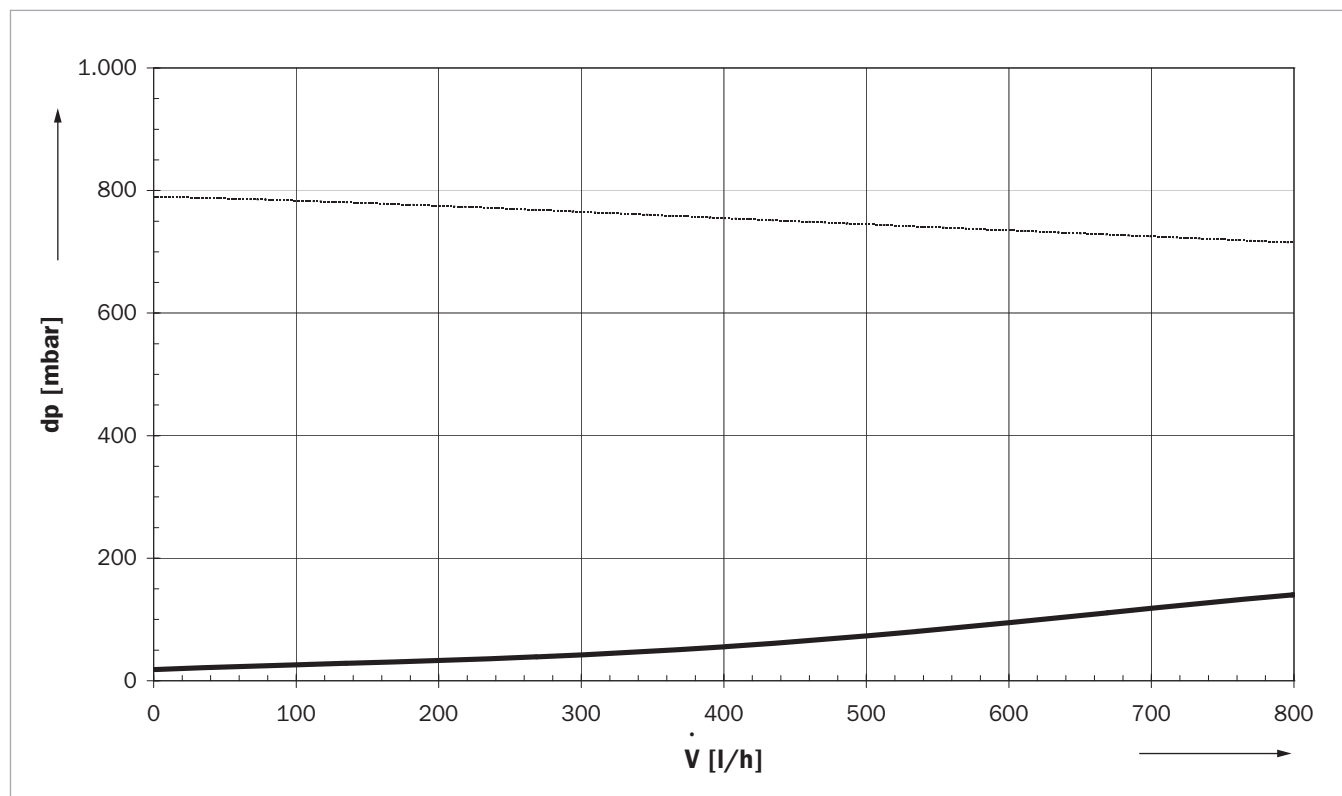


Fig. 29: Pressure loss curve for the primary circuit

1 ST 15/8

2 Primary circuit SÜS-20

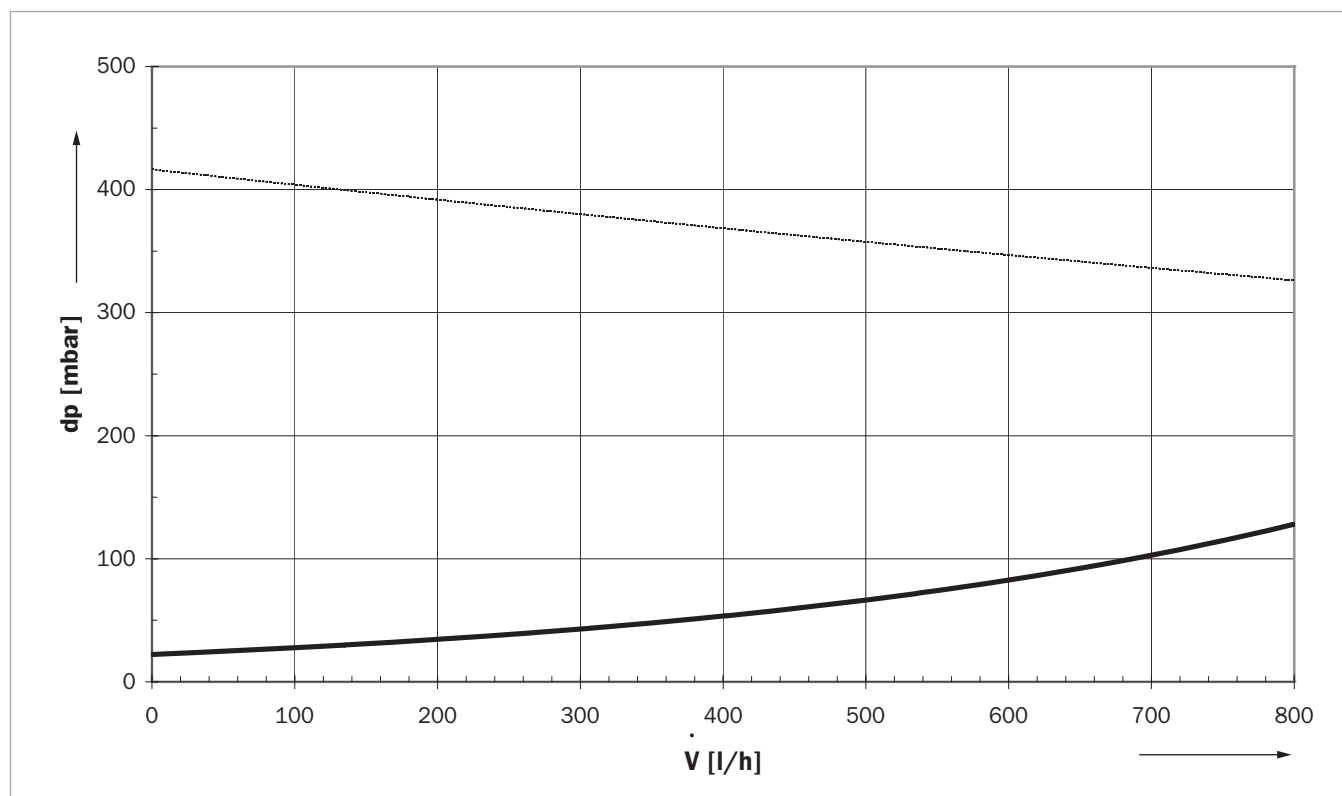


Fig. 30: Pressure loss curve for the secondary circuit

1 ST 15/4

2 Secondary circuit SÜS-20

9 Appendix

9.1 System diagram

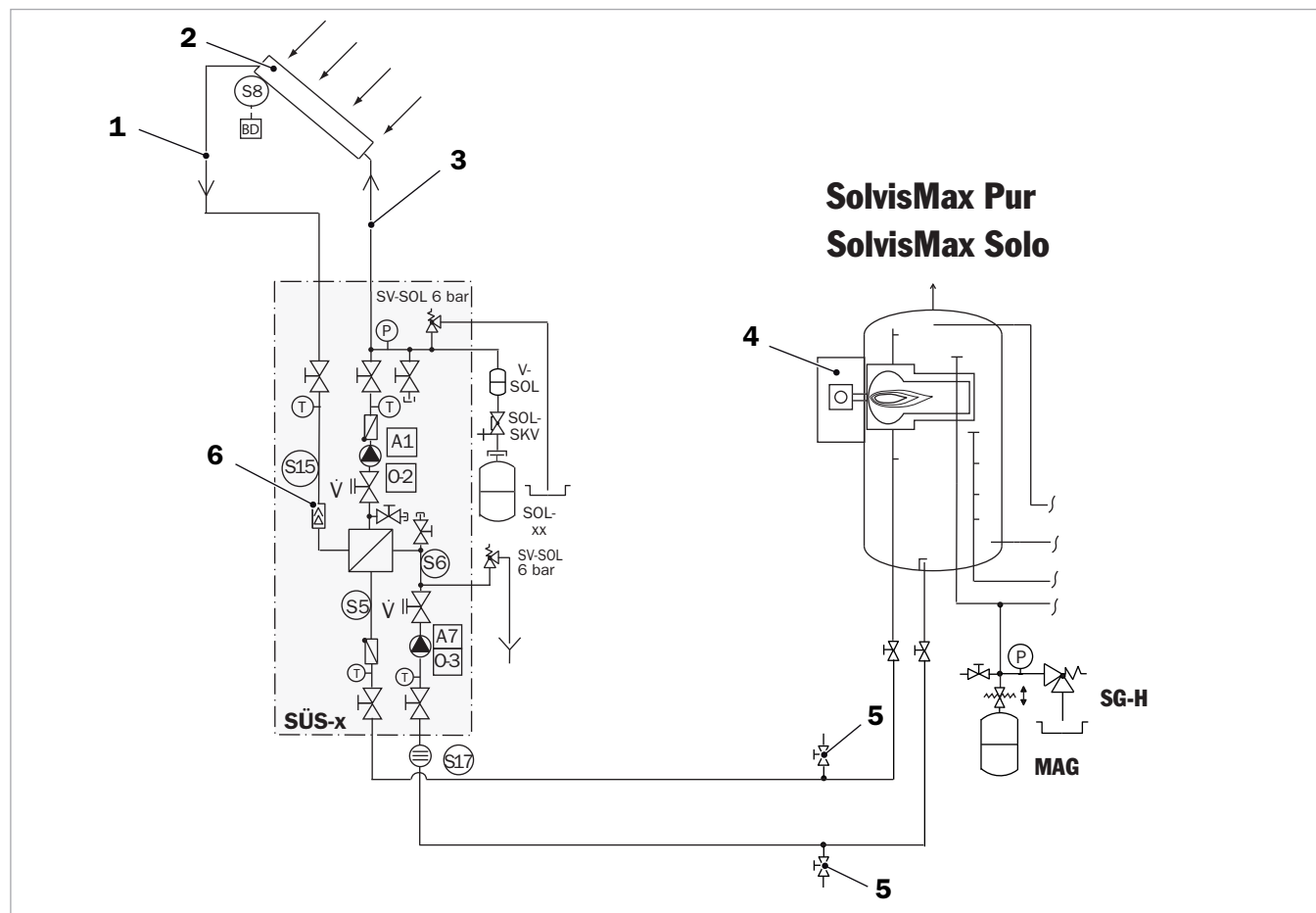


Fig. 31: Solar heat transfer station with SolvisMax Pur system (gas, oil, district heating or heat pump) or SolvisMax Solo

Inputs:

S5	Solar flow 2
S6	Solar return 2
S8	Collector
S15	Solar flow 1
S17	Solar circuit volume flow encoder

Outputs:

A1	Solar circuit pump 1 (voltage supply)
A7	Solar circuit pump 2 (voltage supply)
O-2	Solar circuit pump 1 (control line)
O-3	Solar circuit pump 2 (control line)

Accessories:

SOL	Solar expansion vessel
SOL-SKV	Solar cap valve
SÜS-S	Solar heat transfer station
V-SOL	Solar primary tank

Additional components:

1	Solar flow
2	Solvis flat-plate collector(s), standard
3	Solar return
4	Gas or oil-burner, district heating module or heat pump
5	Shut-off valves and boiler filling and emptying valves (on site)
6	Deaerator (bleeding)
MAG	Membrane expansion vessel
SG-H	Safety group heating circuit (installed on site)

9.2 Accessories

SolvisCala (C-253-S)

High-performance flat-plate collector supplied in modular form with corrosion and weather-resistant aluminium frame, glass already fitted, height: 98 mm. The "Standard" mounting position is used.

SolvisFera (F-XX2-S)

High-performance flat-plate collector with corrosion and weather-resistant aluminium frame, height: 105 mm. The "Standard" mounting position is used.

Various installation kits

For SolvisFera / SolvisCala for in-roof, roof-mounted, flat-roof or wall-mounted installation.

Collector connector set (KA-S)

For SolvisFera / SolvisCala Standard.

Collector connector (KV-x-x)

For connecting collectors of the same type. The following versions are available:

- KV-253-S for SolvisCala Standard
- KV-F-N for SolvisFera Standard, horizontally mounted
- KV-F-Ü for SolvisFera Standard, vertically mounted.

Collector temperature sensor (KF-PT1000)

An Pt1000 collector sensor is required in every Solvis solar system. The cable is resistant to high temperatures and is 1.5 m long. The sensor has a Pt1000 characteristic curve.

Lightning protection box (BD)

A lightning protection box must be installed directly in front of the collector sensor to protect the controller from overvoltage (such as local atmospheric discharges).

Quick-fit duct (SMR-15-XXm)

For the SolvisMax Pur / Solo, SolvisTherm or SolvisStrato storage tank series. The quick-fit duct is a flexible, fully insulated solar line system (solar flow and return plus sensor line). It is available in the following lengths: 15 m or 25 m. The pipe diameter is 15 mm.

Solar expansion vessel (SOL-XX)

For protecting the collector circuit with 18, 24, 35, 50, 80 or 150 Litres.

Solar primary tank (V-SOL-XX)

For protecting the solar expansion vessel against excessively high temperature loads when the system is stopped, in systems with relatively short line lengths (e.g. roof heating units). Volumes from 5 to 18 l are available, e.g. V-SOL-5, V-SOL-12, V-SOL-18.

Our application consultants will be glad to assist you with selection and dimensioning.

Solar liquid Tyfocor (LS-ROT)

Original heat transfer medium Solvis Tyfocor LS-rot, pre-mixed for the solar collector circuit. Do not use any other medium.

Flushing and filling equipment (FÜLL-JET)

For starting up solar systems with the SolvisTherm and SolvisStrato storage tank series, consisting of:

- 230 V jet pump, max. delivery height 35 m water column
- Suction and pressure hose
- Filter.

Volume flow encoder (VSG-S-1,5)

The system controller has an integrated heat quantity counter for the solar circuit. If this is to be used, a volume flow encoder must be installed in the solar return and connected to the system controller. The volume flow encoder is designed for flows up to 1.5 m³/h.

Solar/brine maintenance kit (SB-SOL)

Contains all the test equipment required to carry out maintenance work on the solar circuit (solar system) or brine circuit (heat pump system) of a Solvis system. It includes, for example, 100 indicator strips (pH value 4.5 – 10) for checking the solar liquid, an antifreeze refractometer for checking the frost protection of the brine/solar liquid as well as an admission pressure tester for the membrane expansion vessels.

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