Solar heat transfer station installation SÜS-50-HE / SÜS-90-HE

- **Installation**
- **Start-Up**
- **Maintenance**

	Art. Nr.: 25492	**P40-EN**	Subject to technical changes 05.13 / 25492-3a

Contents

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.

A list of our international representatives is provided at www.solvis.com.
Please understand that the telephone numbers are reserved for use by our installers.
Interested system operators should contact their installer.

Copyright

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, H31, P30 or P32)
- Operating Instructions for Installers (L35, L36, H36, P31 or P33)
- Installation Instructions for the System in which the Solar Heat Transfer Station is to Be Installed (F20, G30, M20, H20, H52 or P20).
- System diagram for SolvisVital 3 (P38)

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-50-HE and SÜS-90-HE solar heat transfer stations are designed for use in **matched-flow solar systems** with SolvisFera Standard or SolvisFera Diagonal flat-plate collectors for collector surface areas from approx. 20 - 50 m² or 50 - 90 m².

These complete stations are used to transfer the solar heat to the large solar system SolvisVital 3 or to the SolvisDirekt 3, SolvisMax Pur and Solo systems with the SolvisControl 2 system controller.

In comparison to standard pumps, the high-efficiency pumps that are used in both stations 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, 22 mm
- Ball valve with adjustable gravity brake and thermometer
- Deaerator with manual bleeder
- Flow temperature sensor
- Boiler filling and emptying valve with hose nozzle and cap

Solar return (collector side)

- Manual bleeder
- Flow meter
- Pump, Wilo-Stratos PARA 15/1-11.5 (SÜS-90-HE: Wilo-Stratos PARA 25/1 - 11)
- Ball valve with adjustable gravity brake and thermometer
- Manometer (up to 6 bar)
- ¾" connection for membrane expansion vessel
- Solar safety valve, 6 bar
- Boiler filling and emptying valve with hose nozzle and cap
- Connection, clamp ring screw connection, 22 mm.

Countercurrent plate heat exchanger

IC25Hx30 (SÜS-90-HE: IC25x50), for transferring the solar heat to the buffer tank. Made from stainless steel 1.4401, soldered with copper.

Secondary circuit

For charging the SolvisStrato or SolvisMax stratified buffer tank, consisting of:

Flow (storage tank side)

- Flow temperature sensor
- Boiler filling and emptying valve with hose nozzle and cap
- 8 bar safety valve
- Ball valve with adjustable gravity brake and thermometer
- Connection, clamp ring screw connection, 22 mm.

Return (storage tank side)

- Connection, clamp ring screw connection, 22 mm
- Ball valve with thermometer
- Pump, Wilo-Stratos PARA 15/1 - 7 (SÜS-90-HE: Wilo-Stratos PARA 25/1 - 7)
- Flow meter
- Volume flow encoder
- Return temperature sensor
- Manual bleeder.

Installation accessories

- The station is fully insulated using EPP clamshells
- Wall bracket and attachment material
- For connecting the expansion vessel:
  - ¾" corrugated pipe
  - ¾" 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
- 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. The drilling template is included.
2. Drill the holes and insert the wall plugs provided.
3. Screw in the hanger bolts.
4. Remove the front half of the insulation. Hang the station, attach the washers, and screw on the nuts until tight.

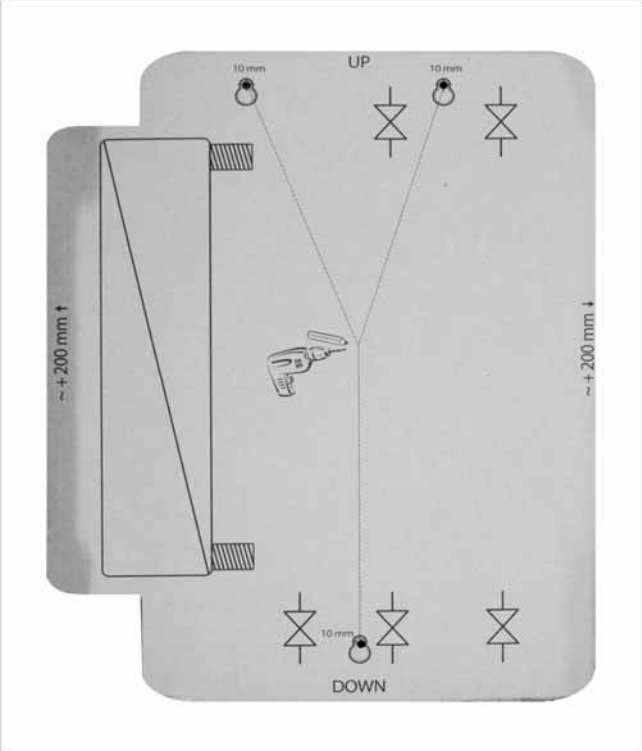

Fig. 1: Drilling template SÜS-50-HE / SÜS-90-HE

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.

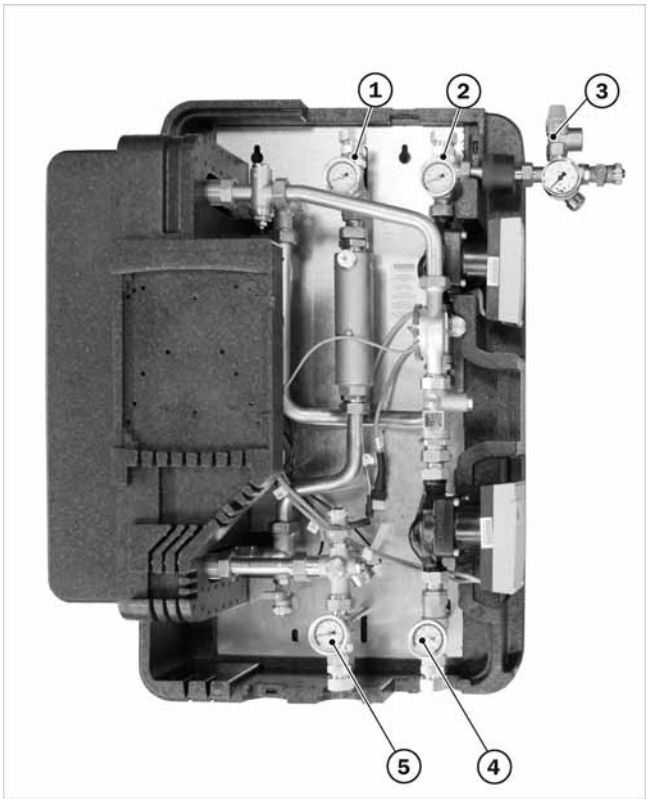

Fig. 2: Mounted safety valves

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 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.

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 on the solar expansion vessel valve or refill with nitrogen if necessary (however, at least to 2.0 bar as with roof heating units with a horizontal difference of 0 - 12 meters).

$$p_0 = \frac{H_{Koll} - H_{Sp}}{10} + 0{,}8\ [bar] \qquad (min.\ 2\ bar)$$

p_0 *Solar expansion vessel admission pressure [bar]*
H_{Coll} *Height of the highest point of the collector [m]*
H_{St} *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 or the floor. 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 onto 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).

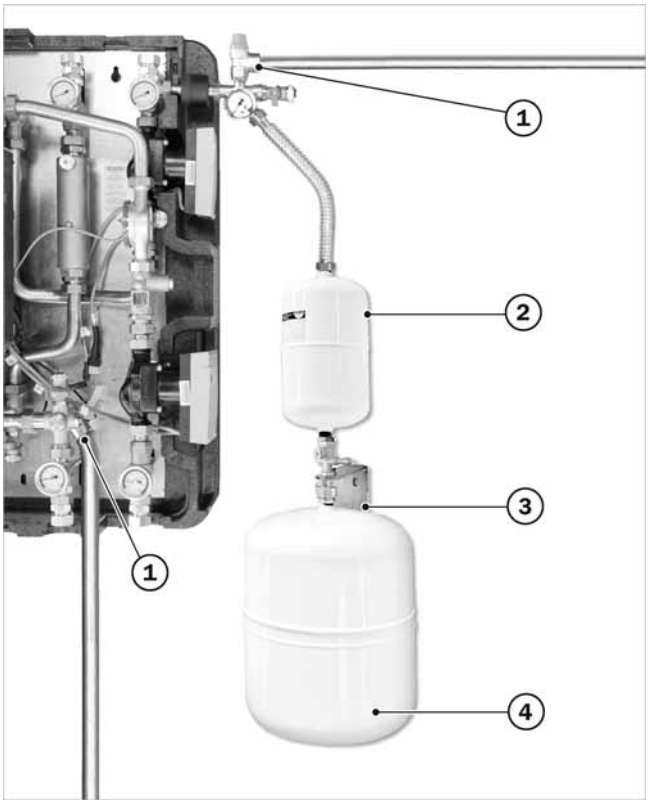

Fig.3: Installed solar expansion vessel (SOL-24 pictured here) and primary tank

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*

5.4 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.
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.

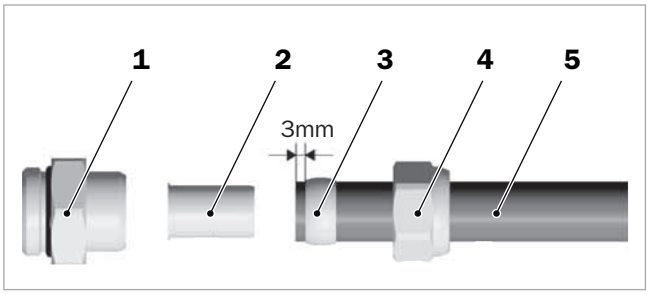

Fig. 4: Installation of clamp ring screw connection

5.5 Electrical connection

5.5.1 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 multiphase 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.

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.

5.5.2 Sensor and control cables

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

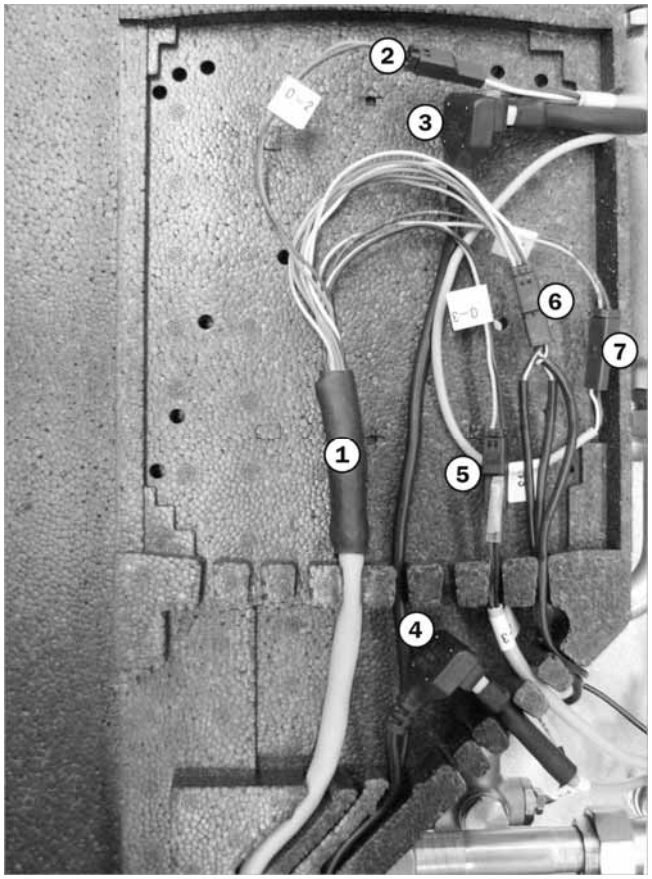

Fig. 5: Connections on the extension cable

1 *Cable loom*

2 *Primary pump controller (collector side) 0-2*
3 *Primary pump cable (collector side) A1*
4 *Secondary pump cable (storage tank side) A7*
5 *Secondary pump controller (storage tank side) 0-3*
6 *Solar circuit sensors S5, S6 and S15*
7 *Volume flow encoder connection S17*

In addition to a power cable for the supply voltage, the primary and secondary pumps 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 to the volume flow encoder.

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 mains module of the SolvisControl 2 system controller.
5. Attach the cable ends to the proper connections as indicated by the labelling:
   - Primary pump 0-2:
     - Red to 0-2 “+”
     - Blue to 0-2 “–”
   - Secondary pump 0-3:
     - Violet to 0-3 “+”
     - Black to 0-3 “–”
   - Volume flow encoder S17:
     - Any polarity to S17
   - Solar circuit sensors S5, S6 and S15:
     - Any polarity to S5, S6 and S15

5.5.3 Voltage supply

Connecting the pumps

1. 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.

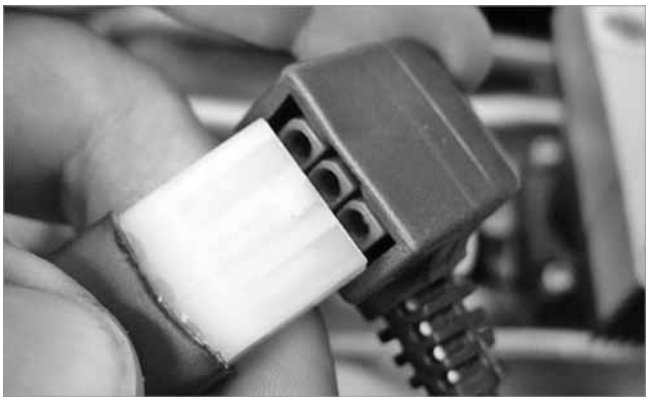

Fig. 6: Connecting the pump plug to the sockets

2. Lay the extension cables in the protective conduit or cable channel to the SolvisMax or to control the SolvisDirekt or SolvisVital system and then on to the

mains module of the SolvisControl 2 system controller.

3. 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.

5.6 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.

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 flow meters 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).

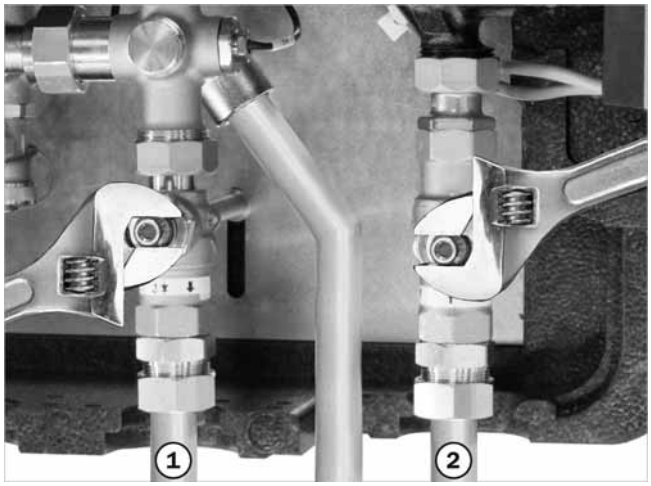

Fig. 7: Ball valves closed

1 *Flow (here: 90° position – closed)*
2 *Return (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).

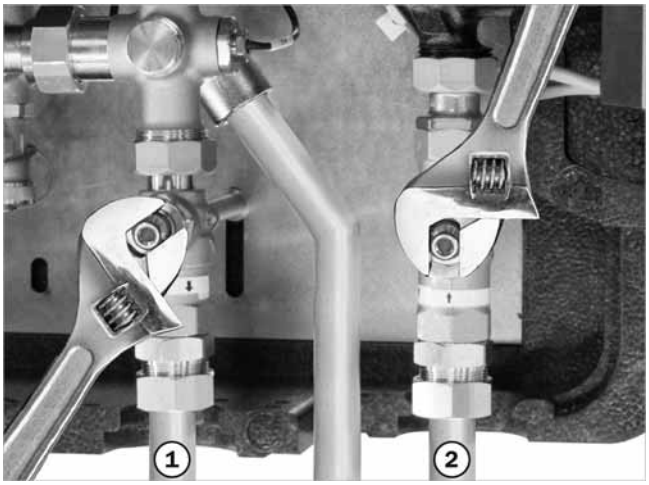

Fig. 8: Ball valves half-open/fully open

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 manual bleeder.
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**) => 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.

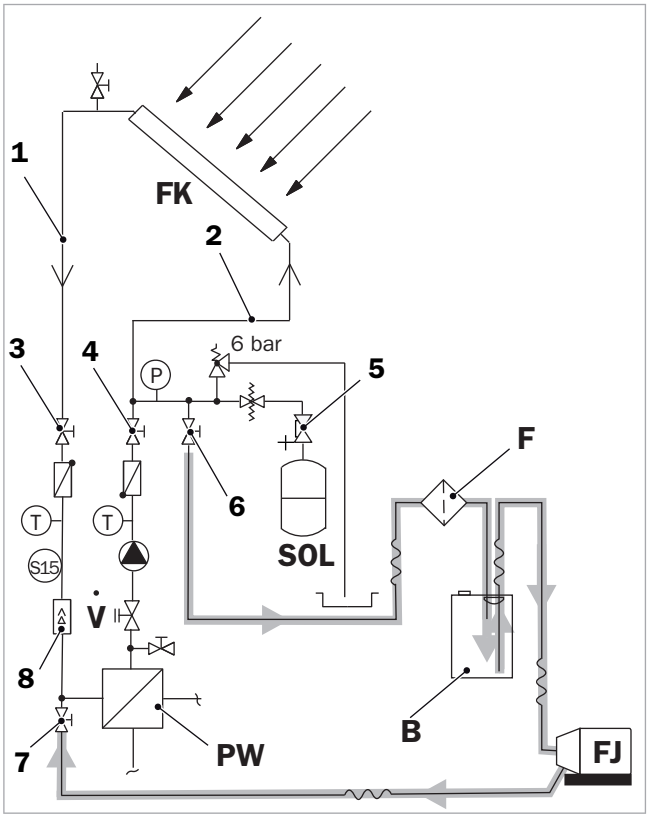

Fig. 9: Primary circuit: flushing the plate heat exchanger

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*
V̇	*Adjusting valve*
PW	*plate heat exchanger*

6.2 Bleeding

Bleeding the solar circuit

1. Attach a suitable hose (¾" 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.

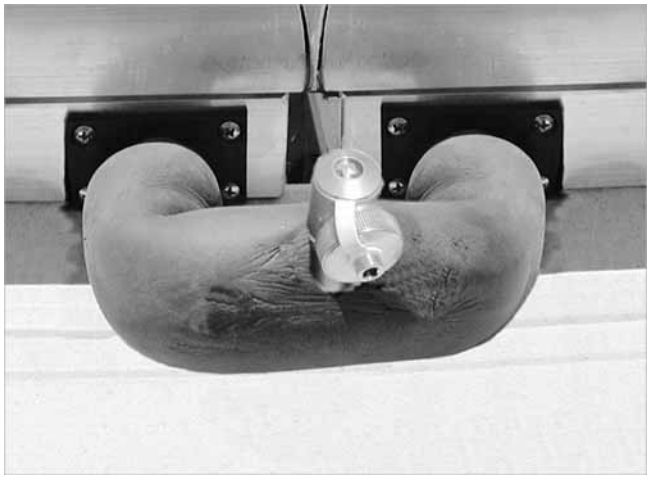

Fig. 10: Example showing SolvisFera Diagonal with flush-fill-drain valve

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

Fig. 11: Bleeding the deaerator

6.3 Start-up and pressuretest

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 (SolvisStrato: 6 bar).
2. Bleed using the manual bleeder in the return and refill the buffer circuit back up to the test pressure, if needed. **Max. operating pressure of the storage tank: 3 bar (SolvisStrato: 6 bar)**
3. Carefully check all connections for leaks.

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.

Starting up the primary circuit

CAUTION
The flow meter in the primary side should be open.
- The flow meter must be open because of the included speed control of the pump.

1. Ensure that the admission pressure in the solar expansion vessel is set correctly.
2. Set the system to the calculated pressure (rule of thumb: admission pressure SOL-MAG + 0.3 bar).
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

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

Set the pumps to “ext. in”

1. Set the pumps to “ext in.” using the red operating knob in order to activate automatic speed control via SolvisControl.

Fig. 12: Setting the pump to “ext. in”

Calculating the minimum volume flow

1. In the primary circuit:

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

A *Collector surface area*
X *Min. volume flow, primary solar circuit*

2. In the secondary circuit:

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

A *Collector surface area*
X *Min. volume flow, secondary solar circuit*

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).

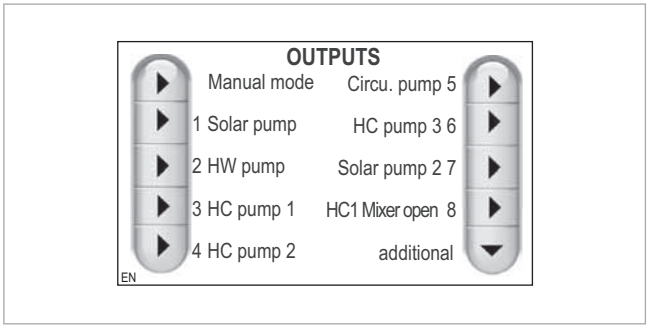

Fig. 13: The “Outputs” menu

4. Switch the solar circuit pump to “Status” = “On”.

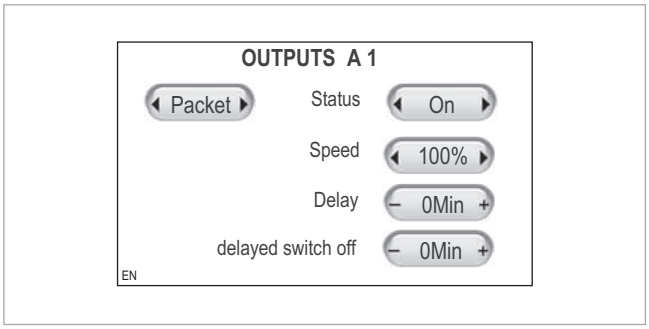

Fig. 14: Switching on the solar pump

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 “0-2 Solar pump 1” (primary circuit) or “0-3 Solar pump 2” (secondary circuit).

7. Switch “Type” from “Auto” to “Manual”.

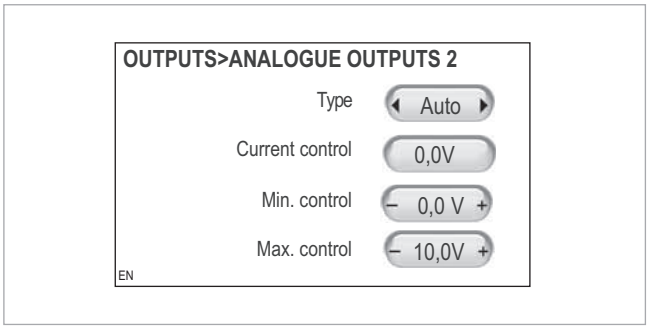

Fig. 15: Menu for analog output 0-2

8. Change “Manual specification” in the analog outputs from 0 to 10 V.

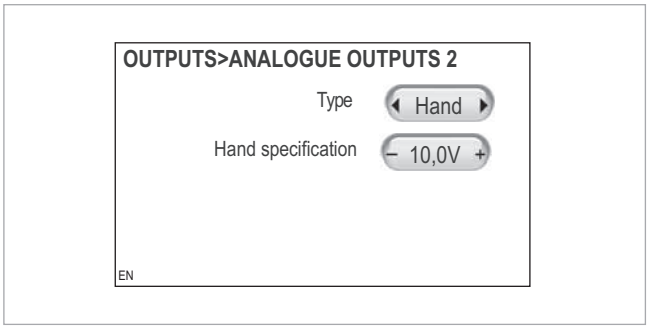

Fig. 16: Set “Manual specification” to 10 V

9. Decrease “Manual specification” step-by-step until the calculated volume flow at the flow meter in the primary circuit or secondary circuit has been set. The speed determined in this way is the minimum control.

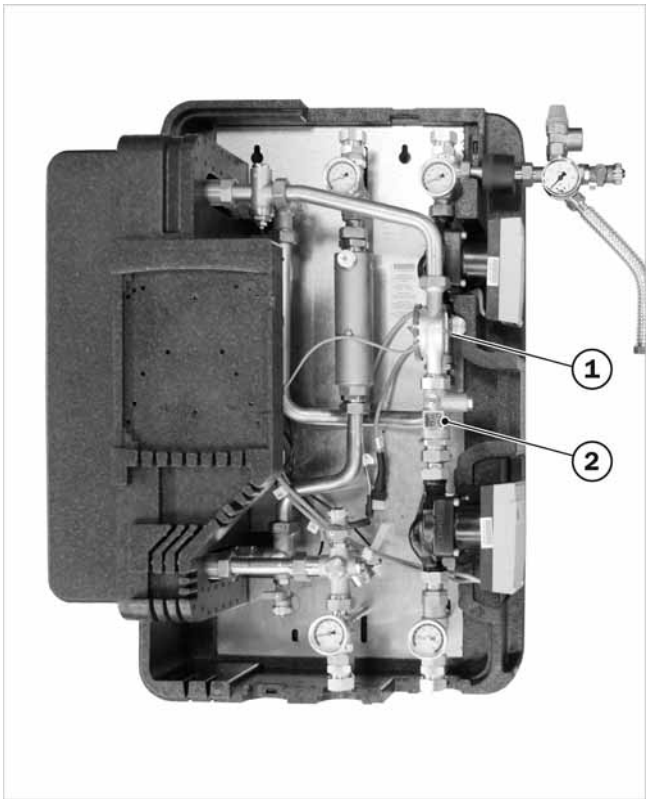

Fig. 17: Position of the flow meter

1 *Flow meter in the primary circuit*
2 *Flow meter in the secondary circuit*

10. In the secondary circuit, if you cannot set the minimum volume flow with “Manual specification”, you can adjust it using the flow meter.

Fig. 18: Read the volume flow at the upper edge of the float

11. Note the determined value in the start-up report, switch “Type” from “Manual” to “Auto” and set “Min. control”.

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 “Manual” and set “Manual specification” to 10 V.

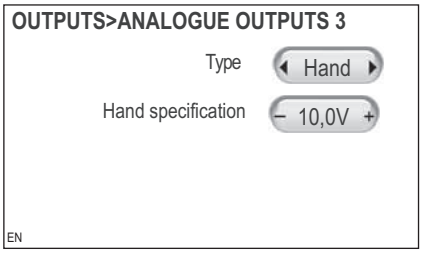

Fig. 19: Set “Manual specification” to 10 V (O-3 only)

3. Decrease “Manual specification” in stages until 15 l/min (Solvis Max) or 35 l/min (SolvisDirekt/SolvisVital) is displayed on the flow meter in the secondary circuit. The speed determined in this way is the “Maximum control”.

The maximum flow of 15 l/min or 35 l/min ensures fault-free operation of the stratified charger in the storage tank.

4. Switch “TYPE” from “Manual” to “Auto” and set “Max. control” in the secondary circuit to the determined value.

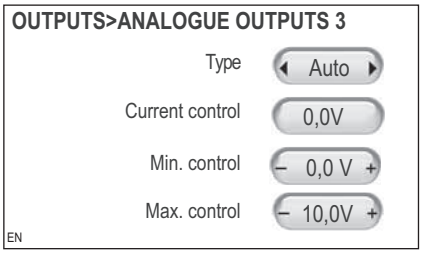

Fig. 20: Set “Max. control” to the determined value (O-3 only)

Switching the solar pumps to “Auto”

1. Switch to the “Outputs” menu.

2. Select output A1 and then select output A7.

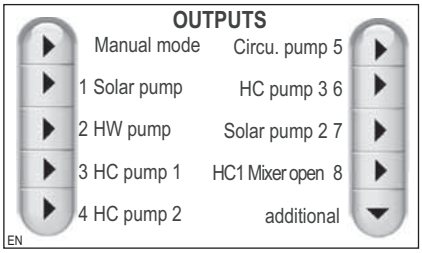

Fig. 21: “Outputs” menu

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

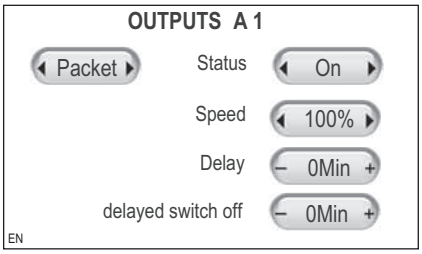

Fig. 22: Switch the status from “On” to “Auto”

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.

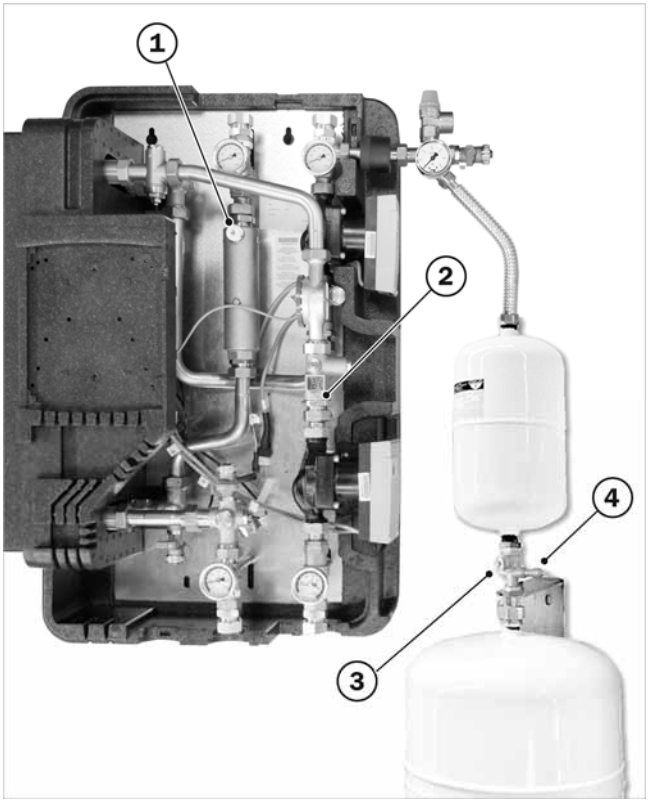

Fig. 23: Position of the valves for maintenance

1 *Manual bleeder for deaerator*
2 *Flow meter in the primary circuit*
3 *Drain valve*
4 *Cap 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. 8.*
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 flow meter 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

Solar heat transfer station characteristics

Designation	Unit	SÜS-50-HE	SÜS-90-HE
Collector surface area (with “matched flow” flow rate)	m²	up to approx. 50*)	up to approx. 90*)
Rated flow (“matched flow” flow rate)	l/m²h	10 - 25	10 - 25
Dimensions (W x H x D)	mm	735 x 800 x 300	735 x 800 x 300
Primary circuit			
Flow meter, ¾"	l/min	3 - 22	5 - 40
Maximum temperature	°C	120 (briefly 160)	120 (briefly 160)
Safety valve	bar	6	6
Insulation, heat insulation made from	–	EPP	EPP
Connection, clamp ring screw connection	mm	22	22
Pump in primary circuit			
Wilo, type	–	Stratos PARA 15/1 - 11.5	Stratos PARA 25/1 - 11
Control signal for remote speed adjustment	V	0 – 10	0 – 10
Maximum permitted operating pressure	bar	10	10
Permitted temperature range (pumping medium)	°C	-10 to +95 (briefly 120)	-10 - +95 (briefly 120)
Ambient temperature range	°C	Maximum +40	Maximum +40
Mains connection	–	1 ~ 230 V; 50 Hz	1 ~ 230 V; 50 Hz
Countercurrent plate heat exchanger			
Type	–	IC25H x 30	IC25H x 50
Number of plates	Pieces	30	50
Capacity per side	l	1.7	2.9
Exchange surface	m²	1.76	3.02
Secondary circuit			
Volume flow encoder		VSG-SÜS	VSG-SÜS
Flow meter, ¾"	l/min		
Maximum temperature	°C	95	95
Safety valve	bar	8	8
Insulation, heat insulation made from	–	EPP	EPP
Connection, clamp ring screw connection	mm	22	22
Pump in secondary circuit			
Wilo, type	–	Stratos PARA 15/1-7	Stratos PARA 25/1-7
Control signal for remote speed adjustment	V	0 – 10	0 – 10
Maximum permitted operating pressure	bar	10	10
Permitted temperature range (pumping medium)	°C	-10 -+95	-10 -+95
Maximum permitted ambient temperature	°C	Approx. +40	Approx. +40
Mains connection	–	1 ~ 230 V; 50 Hz	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

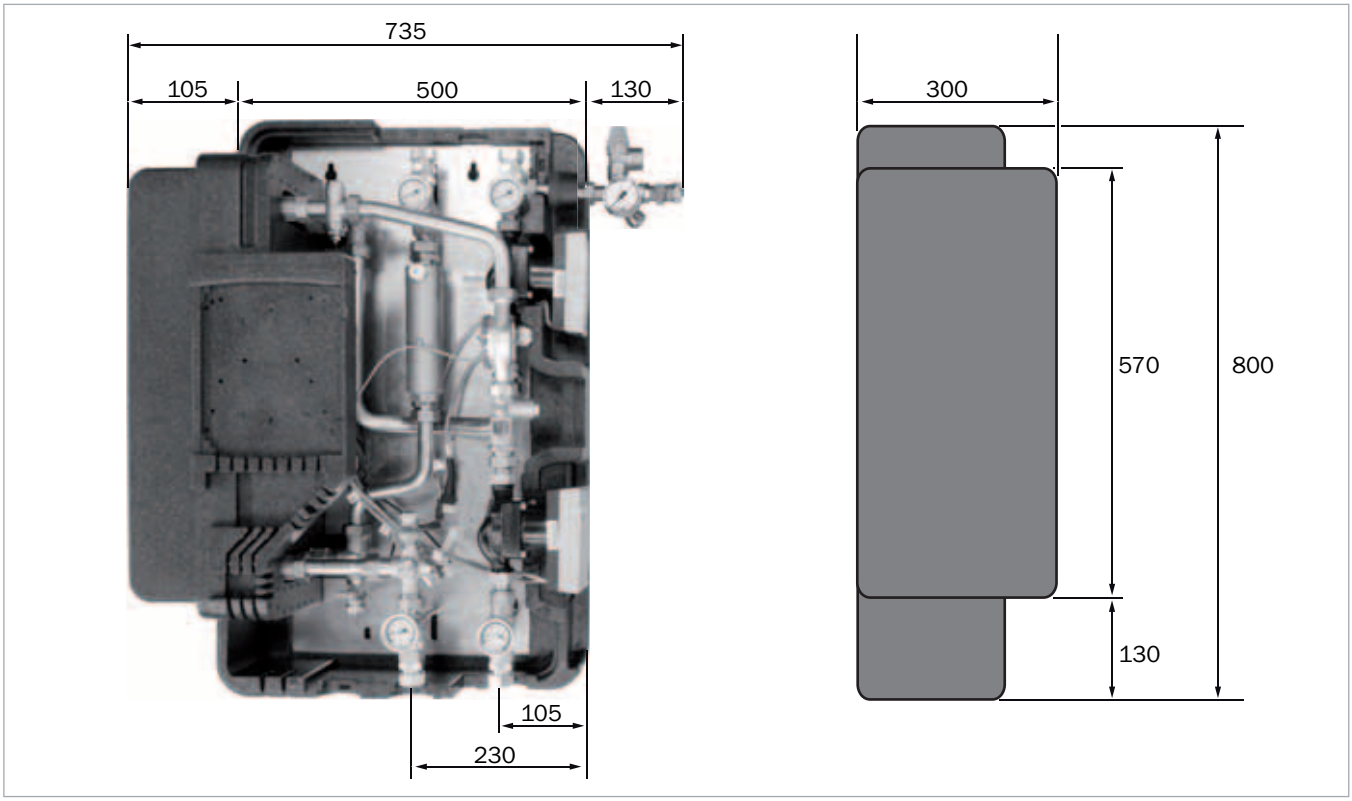

Fig. 24: Dimensions of the solar heat transfer station

8.3 Pressure loss in the SÜS-50-HE

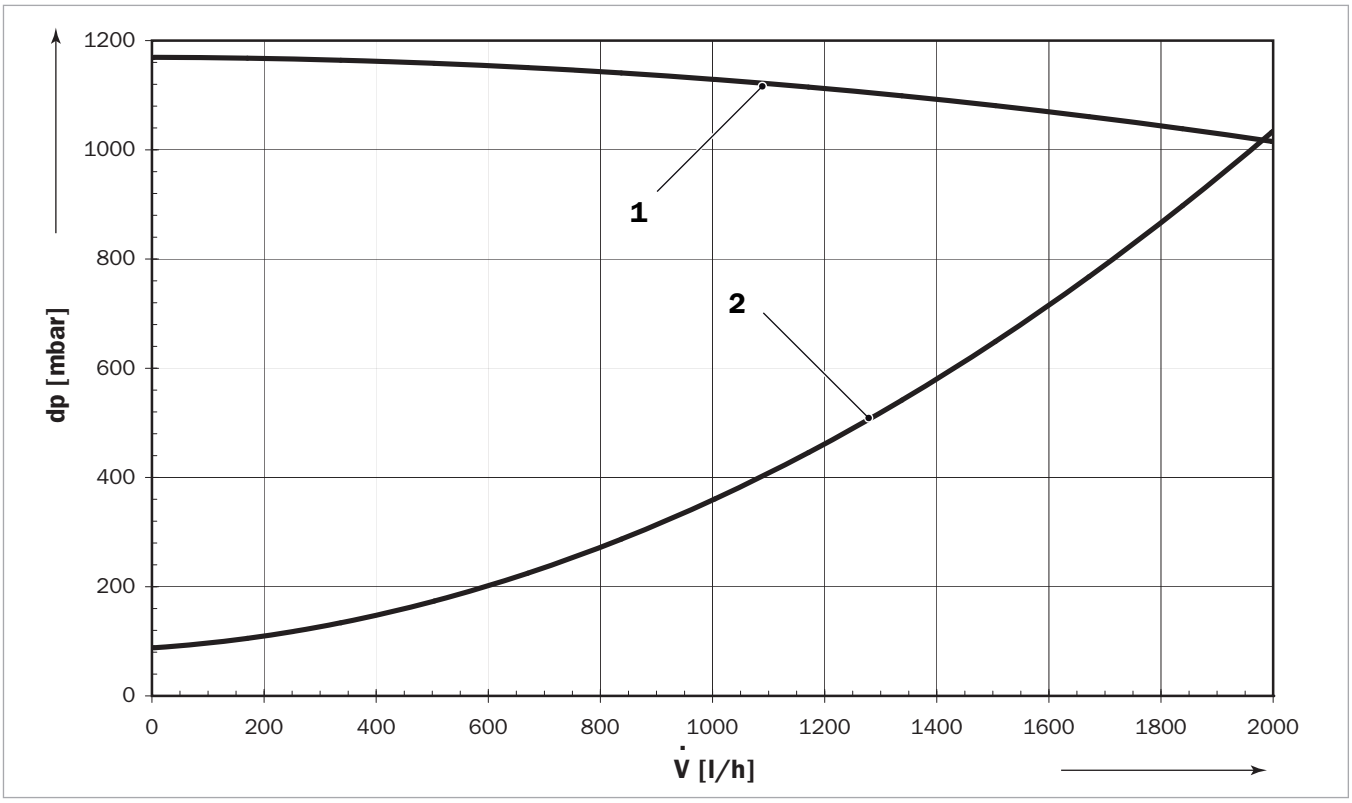

Fig. 25: Pressure loss curve for the primary circuit

1 *Stratos PARA 15/1-11.5* 2 *Primary circuit of the SÜS-50-HE*

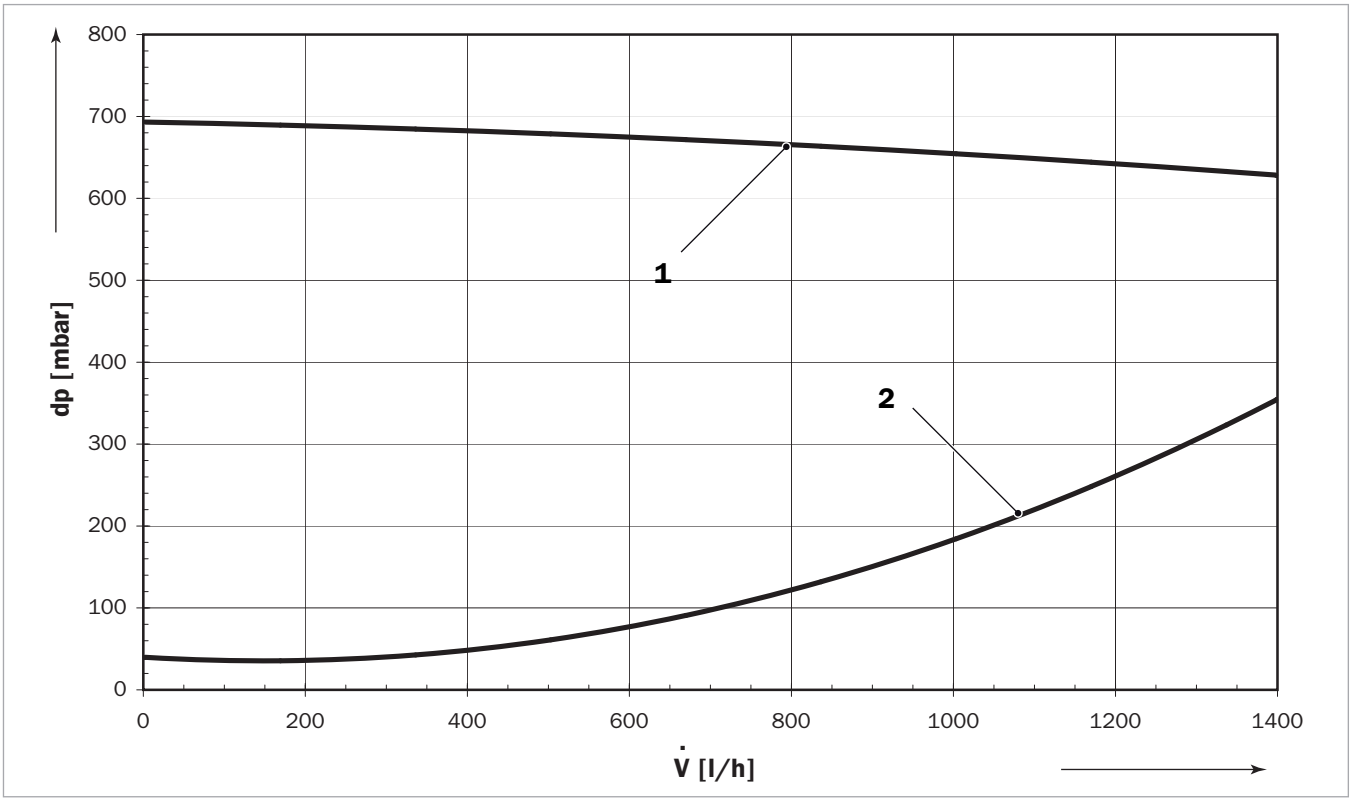

Fig. 26: Pressure loss curve for the secondary circuit

1 *Stratos PARA 15/1-7* 2 *Secondary circuit of the SÜS-50-HE*

8.4 Pressure loss in the SÜS-90-HE

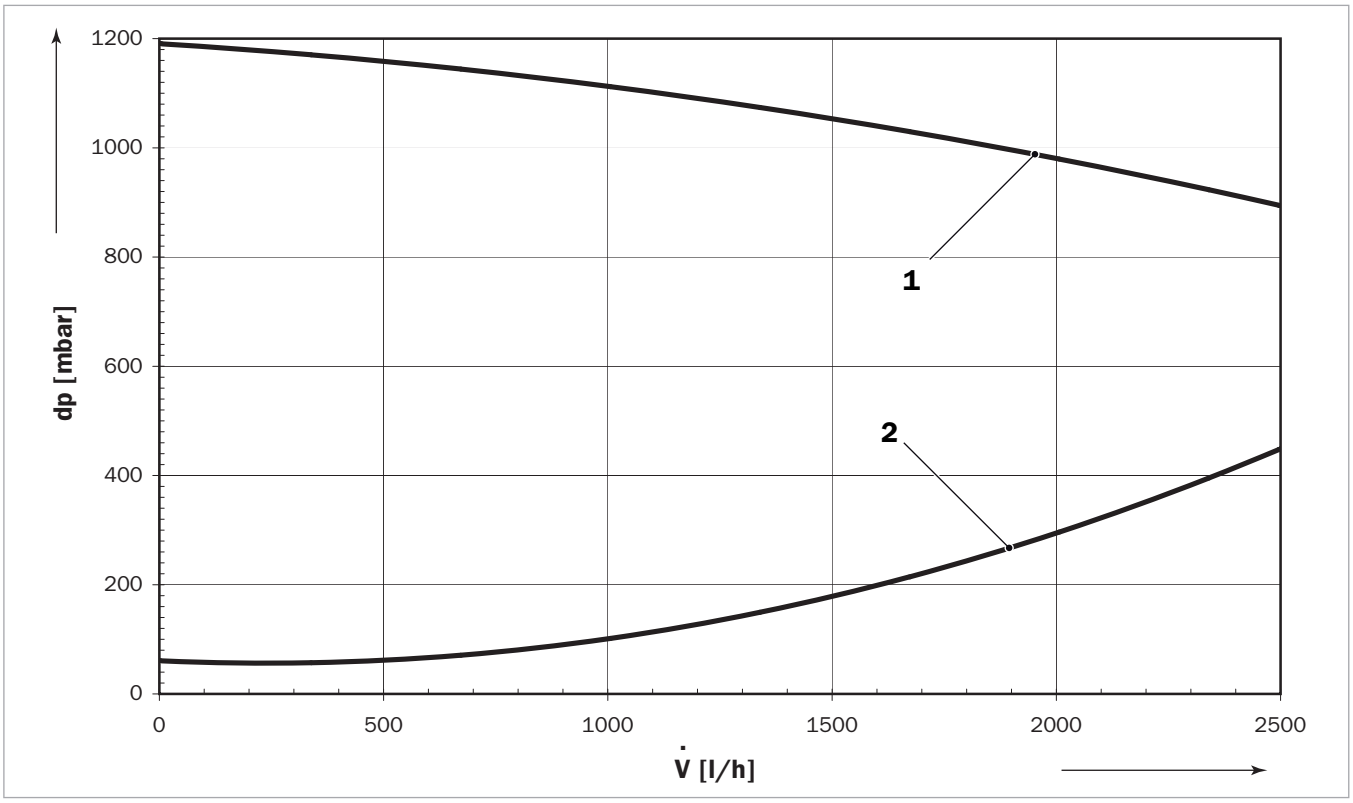

Fig. 27: Pressure loss curve for the primary circuit

1 *Stratos PARA 25 / 1 – 11* 2 *Primary circuit of the SÜS-90-HE*

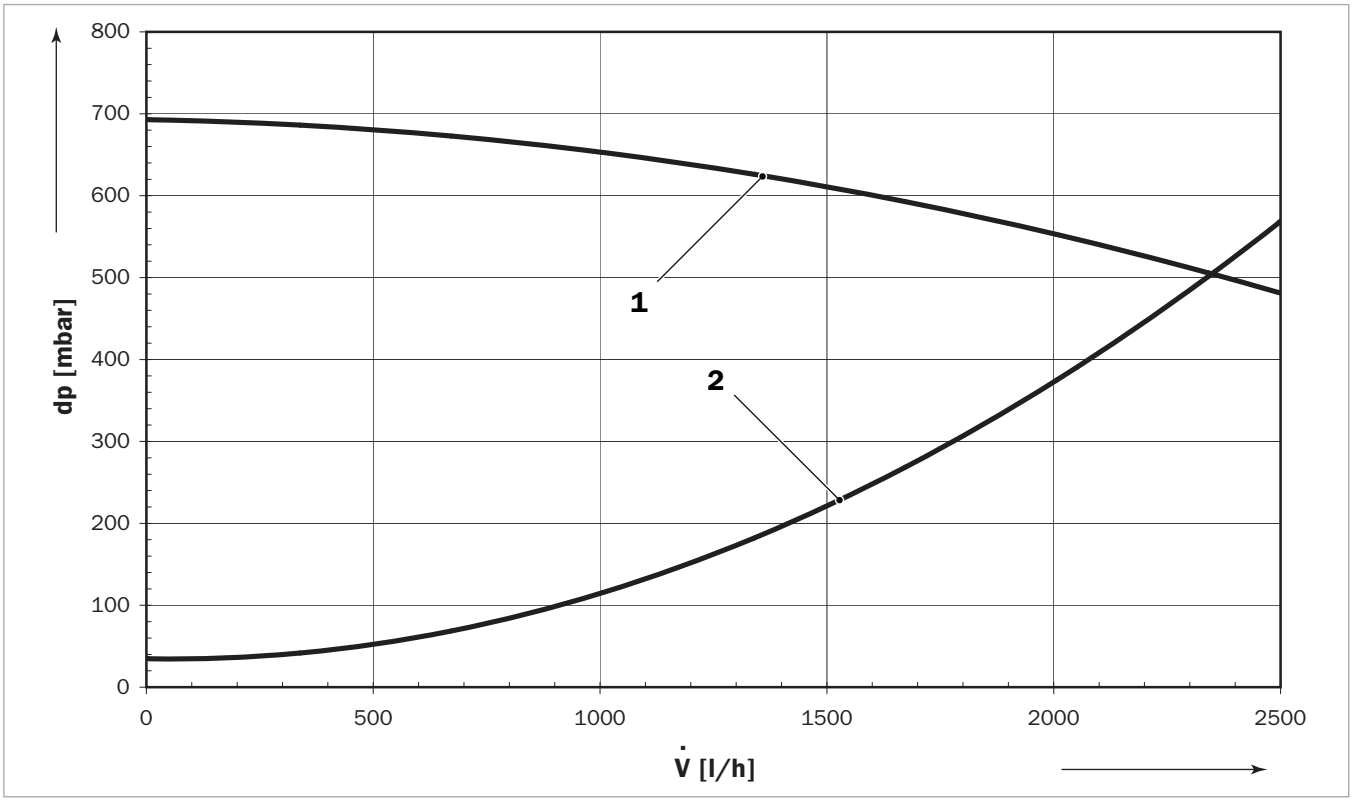

Fig. 28: Pressure loss curve for the secondary circuit

1 *Stratos PARA 25/1-7* 2 *Secondary circuit of the SÜS-90-HE*

9 Appendix

9.1 System diagram

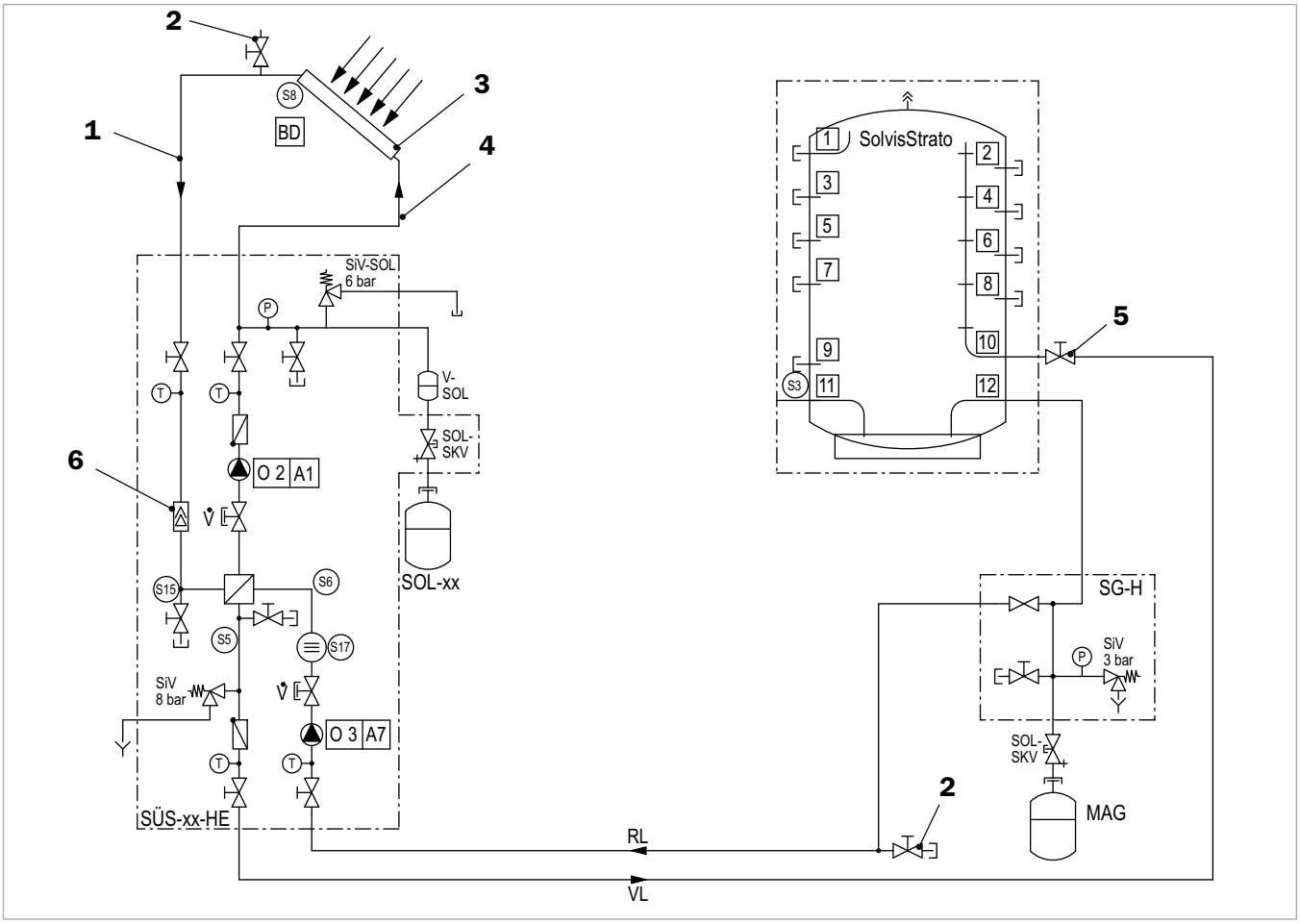

Fig. 29: Solar heat transfer station SÜS-50-HE / SÜS-90-HE on the SolvisStrato

Inputs:

S3	*Sto. tank reference*
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:

LPB	*Lightning protection box*
SOL	*Solar expansion vessel*
SOL-SCV	*Solar cap valve*
SÜS-xx-HE	*Solar heat transfer station*
V-SOL	*Solar primary tank*

Additional components:

1	*Solar flow*
2	*Boiler filling, fill/bleed (on-site)*
3	*Solvis flat-plate collector(s), standard or diagonal*
4	*Solar return*
5	*Shut-off valves (on site)*
6	*Deaerator (bleeding)*
MEV	*Membrane expansion vessel*
SaV	*Safety valve*
SaV-SOL	*Solar safety valve*
SG-H	*Safety group heating circuit (installed on site)*
V̇	*Adjusting valve*

9.2 Accessories

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.

SolvisFera (F-XX2-D)

High-performance flat-plate collector with corrosion and weather-resistant aluminium frame, height: 105 mm. The “Diagonal” 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 Standard and Diagonal.

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, and for SolvisFera Diagonal.

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).

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, premixed 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.

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.

10 Index

Note

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