SolvisStrato – Installation

Stratified buffer tank

Type sizes: SR-727, SR-917, SR-1427 and SR-1817

- **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.

Copyright

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.

Using these instructions

Additional documentation

Additional documentation, see ➔ *sec. "Scope of Delivery", p. 5.*

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

- Operating instructions for system operators for SolvisVital 3 (P30) or SolvisDirekt (P32)
- Operating instructions for installers for SolvisVital 3 (P31) or SolvisDirekt (P33)
- System diagram for SolvisVital (P38) or SolvisDirekt (P36)
- Start-up report for SolvisVital (P81) or SolvisDirekt (P83)
- Installation instructions for solar heat transfer stations (P39, P40, P41 or P42)
- Installation instructions for fresh water station (P45)
- Installation instructions for charging lance (P49)

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

Observe the safety notes

This is for your own safety

- Make sure that you are familiar with the safety notes before beginning work.
- Observe and adhere to the relevant safety regulations and the valid accident prevention regulations.

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

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.

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.

Work to be performed only by qualified technicians

- Only trained specialist companies may install or maintain the system.
- Only qualified electricians may work on electrical equipment.

Intended use

The units and components in this system are intended only for heating 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.

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.

Observe the following regulations

- DIN EN 12828 Heating systems in buildings
- DIN 4752 Hot water heating systems
- DIN 4757 Solar heating systems
- DIN 4753 Water heating systems
- DIN 4807 Expansion vessels
- DIN EN 1717 Protection of drinking water
- DIN 1988 Drinking water supply systems (TRWI)
- DIN EN 806 Specifications for installations inside buildings conveying water for human consumption
- VDI 2035 Part 1, Prevention of damage in water heating installations - Scale formation
- VDI 2035 Part 2, Prevention of damage in water heating installations - Water corrosion
- Directives of the German Institute for Structural Engineering
- German Building Regulations ("Landesbauordnung" - LBO)
- VDE 0100/IEC 60364 Erection of low voltage systems

3 Equipment

3.1 Applications

The SolvisStrato stratified buffer tank is especially designed for large systems and has many connection options. It is the central component in the heating system. It is the universal heat manager.

The SolvisStrato allows you to connect:

- One or more heat generators (on-site)
- One or more heating circuits (on-site)
- Hygienic drinking water heating in direct flow
- A primary side circulation return, which increases the efficiency of the stratification
- A solar system, charged by our highly efficient, patented stratified chargers
- A system for power-heat coupling via the provided high temperature difference

The main applications are for the SolvisDirekt and SolvisVital systems, and for storage tank extensions in SolvisMax systems.

Fig. 1: SolvisStrato stratified buffer tank (without insulation)

Which connections are made depends on the system being used.

For an overview of systems, see the ➔ *Connection and System Diagrams SolvisVital 3 (P38) or SolvisDirekt (P36).*

3.2 Scope of Delivery

The SolvisStrato stratified buffer tank consists of:

Tank
See ➔ *Fig. 1*.

Insulation
Consisting of:

- Tank insulation
  (in three or four parts, depending on the type size)
- Cover strips
  (three or four pieces, depending on the type size)
- Foot edge
- Cover disks, floor disk, base shell
- Upper cover

Instructions

- Installation instructions (P20, this document)

Seperate package

- sensor cable harness
- manual bleeder
- plastic tubing for manual bleeder
- carrying aid
- floor levelling pack

4 Installation Conditions and Transport

Observe the following conditions

When installing the system, ensure that the following conditions are met, as they may influence proper operation:

- When (dry) storing, transporting and installing the components, ensure that the tank is not scratched, warped or deformed by external factors as these can seriously impair the safe, long-lasting operation of the storage tank.
- The floor of the installation site should be flat and level.
- Use the supplied floor levelling plates to align the tank.
- To prevent sludge accumulation in the storage tank, observe the notes in ➔ *sec. "Requirements for the heating water", p. 9*.
- The system must be installed and operated only inside a building in a frost-proof room.
- The system must not be installed in moist rooms such as kitchens, bathrooms or laundry rooms.

To prevent fluids from spilling (leakages), we recommend that you use a suitable draining option.

CAUTION

Heavy weight of the system may be hazardous.

Risk of damage to the system and building

- Ensure that the floor has sufficient load bearing capacity to support the weight of the system, especially that of the filled storage tank.

Clearances for easy installation

The following minimum clearance should be observed for easy installation of the insulation and for performing maintenance work:

- 0.5 m in front (for operating and performing maintenance work).
- 0.3 m on the side and to the rear (for installation of the insulation, jacket thickness 120 mm).

To save even more energy, install the device as close as possible to the drinking water taps. Short hot water paths could make circulation pipes unnecessary.

Storage tank transport

WARNING

Heavy transport weight (more than 200 kg) may be hazardous.

Personal injury or damage to property.

- Have suitable transport equipment ready or enough people for installing the storage tank.
- The storage tank connections must be facing up so that they do not get damaged.
- To transport the storage tank, tilt it back on the carrying aid. If necessary, a sack trolley can be used under the base ring.

5 Installation

5.1 Placement

Position the storage tank

Space requirement: approx. 0.30 m of space on the sides and to the rear of the storage tank for installing the storage tank insulation.

1. Take the floor levelling pack from the separate package.
2. Slightly tilt the storage tank and place the bottom floor disk (round insulation section) under the storage tank.

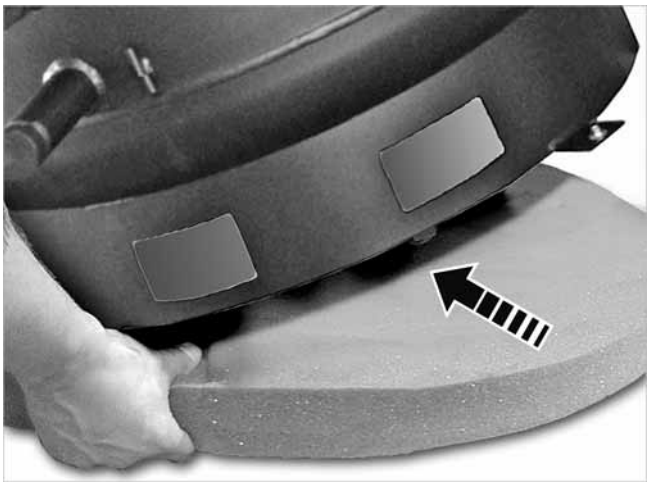

Fig. 2: Place the floor disk under the storage tank

3. Unfasten the carrying aid from the storage tank, seal the manual bleeder and install it on the top of the storage tank.

Fig. 3: Install the manual bleeder

4. Connect one end of the transparent hose to the connecting piece of the manual bleeder and guide the hose downwards under the insulation to the discharge.
5. Align the storage tank vertically using the floor levelling plates.

5.2 Connections

CAUTION

Plan carefully before beginning work

Be sure to clarify which system diagram is to be used for the specific project, as well as the specific details regarding the hot water priority control system.

The system diagram depends on the application, see ➔ *System diagram for SolvisVital (P38) or SolvisDirekt (P36).*

5.2.1 Hydraulic connection

Lay the on-site piping

1. Dimension the solar, heating, and hot water piping in accordance with the system plan.
2. Install a charging lance if you use any of the connections 2-8 or 10.

For information on how to install a charging lance, see ➔ *"Charging Lance Installation Instructions" (P49).*

Plastic pipes in the heating circuit

In particular, older underfloor heating pipes made of plastic are not equipped to prevent the admission of oxygen.

A system separation is therefore prescribed when using plastic pipes in the heating circuit. Exceptions on request. Additional information on this topic can be obtained from our Technical Sales department.

5.2.2 Safety equipment

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.

Correct dimensioning of the expansion vessel (MEV)

The expansion vessel plays a decisive role in the prevention of oxygen entering the heating system:

- The design of the expansion vessel must not be too small.
- Observe the tank volume and the high tank temperatures when dimensioning the storage tank volume.
- Take into account an additional 10% of the storage tank volume.
- The MEV must be dimensioned according to DIN 4807-2 and equipped with a cap valve according to DIN EN

12828, see ➔ *table: "Minimum sizes of expansion vessels".*

- Expansion vessels must be positioned opposite the heating system so that they can be shut off, and they must be adequately secured so that they cannot be unintentionally closed.
- Expansion vessels must be maintained once a year.
- **Assumption:** max. media temperature of 95 °C, safety valve with 2.5 (3.0) bar, max. static height of 8 m.

Minimum sizes of expansion vessels

Storage tank capacity	+ Water capacity (estimate)	= Total volume	Minimum volume of expansion vessel *
350 l	150 l	**500 l**	**50 l (50 l)**
450 l	150 l	**600 l**	**60 l (50 l)**
550 l	150 l	**700 l**	**70 l (60 l)**
650 l	150 l	**800 l**	**80 l (70 l)**
750 l	200 l	**950 l**	**90 l (80 l)**
950 l	200 l	**1150 l**	**110 l (100 l)**
1450 l	300 l	**1750 l**	**180 l (150 l)**
1850 l	300 l	**2150 l**	**220 l (180 l)**

** Minimum volume for safety valves with 2.5 bar (3 bar)*

Setting the admission pressure on the expansion vessel (MEV)

1. Determine the admission pressure of the expansion vessel with the following formula.
2. Release the admission pressure on the expansion vessel valve or refill with nitrogen if necessary.

- Admission pressure too low:
  Risk of steam build-up and air intake.
- Admission pressure too high:
  Risk of water loss and consequent pressure loss caused by blow out through the safety valve when the maximum operating temperature is reached.

$$p_0 = \frac{H_{Hk} - H_{Sp}}{10} + 0{,}5 \text{ [bar]}$$

P_0 *Expansion vessel admission pressure [bar]*
H_{HC} *Height of the highest point of the radiator [m]*
H_{Sp} *Height of the lower edge of the storage tank [m]*

Installing the safety valve in the heating circuit

1. Install the safety valve on the heating inflow close to the storage tank, see ➔ *sec. "Heating circuit", p. 19*.
2. Close the blow out tube.

CAUTION
Incorrect installation of the safety valve can be dangerous
This could result in excessive overpressure and the uncontrolled escape of hot water.
- No shut-off devices may be installed in the safety lines.
- There are to be no constrictions in the pipes leading to the safety valve. In particular, do not connect the safety valve to the bleeder connection.
- The blow out tube of the safety valve must be designed so that there can be no pressure increases.
- Escaping hot water must be freely diverted in a safe and controlled manner.

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.

5.2.3 Electrical connection

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 fault or failure.
- The overall cable resistance for the sensor cables may not exceed 2.5 Ohms. For cables with a diameter of 0.25 mm², this corresponds to a length of up to 5 m.
- For diameters of 0.5 or 0.75 mm², the maximum cable length is 15 or 50 m.
- The sensor cable may not be longer than necessary. For very long cables, sensor correction can be performed to minimise systematic deviation errors.

Position the sensor on the storage tank

CAUTION

Avoid defective sensors

- Ensure the temperature sensors are correctly positioned.
- When you install the cable that connects the sensor to the controller, make sure that it cannot come into contact with any hot parts.
- We recommend that you use suitable cable channels (provided by the customer).

1. Apply heat conducting paste to the sensors and insert into the corresponding sensor sleeves (pay attention to the labels on the cables).
2. Fasten the sensor lines.

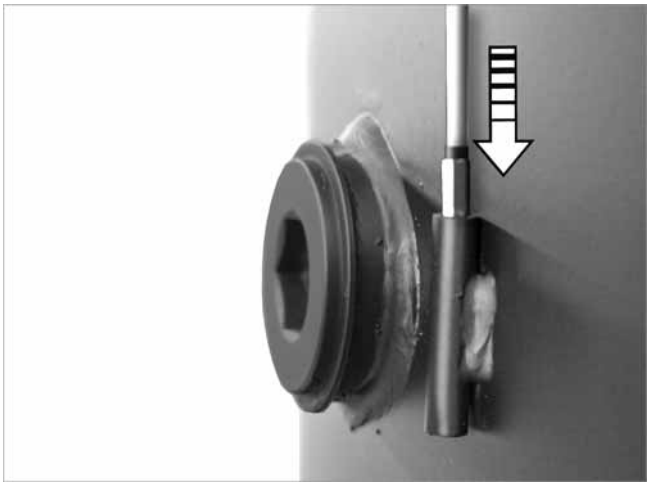

Fig. 4: Install the sensor

The positioning of the sensors depends on the application, see ➔ *System diagram for SolvisVital (P38) or SolvisDirekt (P36).*

5.3 Filling

5.3.1 Requirements for the heating water

CAUTION

Procedures before filling the storage tank

- To prevent damage from limescale formation and corrosion on the heating system, the condition of the fill and make-up water is very important.
- Before filling the system, a water analysis (according to DIN 50930-6) of the fill water must be available. This can be obtained, for example, from the responsible water supply company.
- If the water exceeds the recommended values of the VDI ("Association of German Engineers"), the water must be treated.

Preventing damage caused by limescale formation

Causes of limescale formation

Water contains calcium carbonate ($CaCO_3$) in the form of calcium bicarbonate ($Ca(HCO_3)_2$). The calcium carbonate is held in solution at ambient temperatures by the "free carbonic acid" dissolved in water (calcium carbonate-carbonic acid equilibrium).

However, the solubility of this carbonic acid in water is temperature-dependent and decreases with increasing temperature. The free carbonic acid then escapes and the lime precipitates out. The lime forms solid deposits, known as limescale.

In particular, the condition of the water and the fill/make-up water quantity is important for the extent of limescale formation. Limescale generally forms in hot water heating systems on heat exchange surfaces.

Damage caused by limescale formation

Limescale deposits (lime deposits) form chiefly on the heat transfer surfaces of heat generators (boilers, solar heat exchangers) and thereby diminish heat transfer and consequently the heat output.

These deposits therefore should be kept as low as possible for economical operation of the systems.

Required water quality

To prevent damage, VDI 2035 - part 1 applies. For example, for systems with a total heat output of ≤ 50 kW, this specifies the following values for the fill and make-up water in the following table:

Specific system volume	Total alkaline earths [mol/m³]	Total hardness [°dH]
Between 20 to 50 l/kW for most SOLVIS systems	≤ 2	≤ 11.2
> 50 l/kW for SOLVIS systems with a large storage tank	≤ 0.02	≤ 0.11

Specifications in the obsolete units of "degrees of German hardness" (°dH) can be converted to an approximation in mol/m³ by multiplying by a factor of 0.179.

Preventing damage caused by corrosion

Causes of corrosion on water side

Chemically, corrosion is a reaction comprising an anodic reaction of metallic decomposition and a (separated by space) cathodic reduction of oxygen. In between, a flow of ions flows through the water.

This corrosion process is fostered by the following properties:

- Presence of oxygen.
- Electrically conductive topcoat (bare metal, no protective coating against lime/rust, especially in the case of softened/demineralised water).

- Sufficient ions for adequate electrical conductivity.
- Sufficient anions (chloride, sulphate and nitrate ions).
- Few buffering hydrocarbonate ions (in the case of soft or softened water).

Damage resulting from corrosion (holes resulting from rust) on water side

These form when oxygen is supplied as a result of surface corrosion, shallow pit corrosion, pitting corrosion or welding corrosion.

Iron carbonate residue on heat exchanger surfaces

- Reduces heat transfer, which can result in tears and thermal overload.
- Forms in a similar way to limescale (see above); steel and iron react with carbonic acid here.

Water treatment

CAUTION

To be observed during water treatment

- The pH value of the water in the SolvisMax is to be set to between 8.2 and 8.5 (e.g. using sodium hydroxide to raise the pH value).
- Other chemical additives must not be used in our storage tanks due to the risk of sludge accumulation.

WARNING

Handling acids and alkalis can be hazardous.

Risk of acid burns on hands and face.

- Observe the safety data sheet.
- Apply the specified safety measures.

Recommended water treatment

We recommend the "Permasoft-ALU" system of **permatrade Wassertechnik GmbH**. It involves demineralisation cartridges which are used for filling the system.

Functions:
Water is demineralised by combining a specially designed ion exchange resin with an additional pH stabiliser and is brought to a pH value between 8.2 and 8.5 at the same time.

This results in effective, long-lasting protection against limescale formation and corrosion. No other additives are required for the heating water.

The following cartridge types are suitable:

- permasoft 5000 ALU, type PT-PS 5000 ALU
- permasoft 18000 ALU, type PT-PS 18000 ALU.

For more information can be obtained from our Technical Sales department.

Draining the storage tank

Observe the following when draining the storage tank

If maintenance or repair work is required on the storage tank that requires the tank to be emptied, use treated water to refill it.

Alternatively, the drained water can be collected and used again.

5.3.2 Filling

Filling the storage tank

If the system **does not** have a fresh water station, fill the system as follows:

1. Connect a hose to the bleeder connection (top) to divert any water that might overflow (to prevent water damage).
2. Fill the storage tank with treated water.

If the system does have a fresh water station, use the procedure described in the ➔ *"Start-up" section in the "Fresh Water Installation Instructions" (P45).*

5.4 Insulation

Notes before installation of the storage tank insulation

- **Important**: After installation, the nameplate copy must be attached to the outside of the insulation in a clearly visible location.
- Use the supplied rubber gloves to prevent soiling the insulation.

Do **not** force the tank insulation onto the tank.

Attach storage tank insulation.

1. Place the insulation shell around the base of the storage tank so that the stiffer surface is facing out.

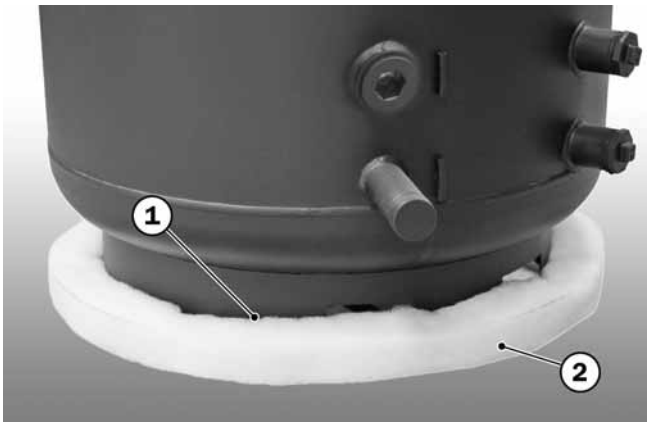

Fig. 5: Place the insulation shell around the base of the storage tank

1 *The soft surface is touching the storage tank base*
2 *The stiff surface is facing outward*

2. Use adhesive strips to attach the insulation shell.

3. Put a narrow insulation section between the connection rows (see ➔ *Fig. 6* (**1**)).
4. Wrap the insulation sections around the storage tank and align them with the narrow insulation section so that the cutouts for the two fastening strips fit snugly around the connections.

Do **not** force the tank insulation onto the tank.

5. Tapping on the sides will move the the insulation forward enough to subsequently seal it.
6. Snap the fasteners into place around the insulation.

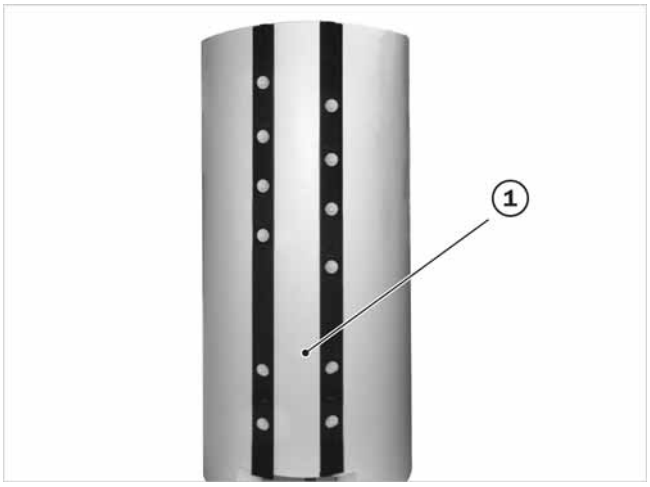

Fig. 6: Close the insulation at the front

1 *Narrow insulation section*

7. Check that the insulation is properly seated, and then clamp it down, notch by notch (moving from top to bottom).

Fig. 7: Close the insulation sections

8. Attach a cover strip to each of the fastening strips.

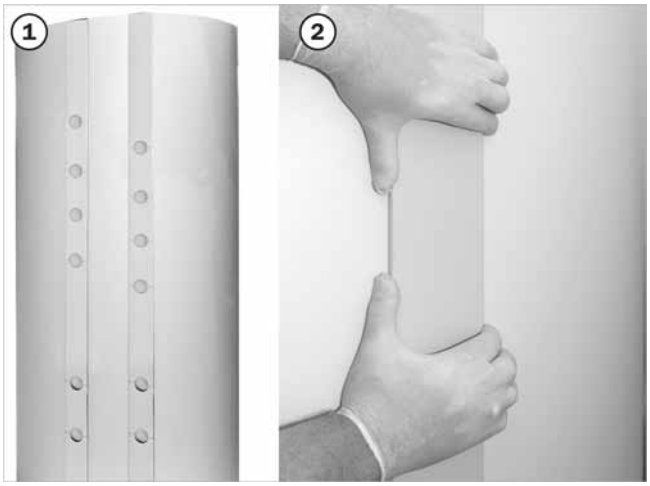

*Fig. 8: Attach cover strips to the front (**1**) and back (**2**)*

9. Place the two cover disks on the top of the storage tank and press them down.

Fig. 9: Insert the cover disks

10. Place the upper cover on top of the cover disks on the storage tank and align it so that the protuberances are positioned over the fastening strips.

Fig. 10: Put the cover on

11. Place the red foot edge around the storage tank and connect it at the front so that it is touching the insulation all the way around.
12. Use the Velcro fastener to tighten and close the foot edge.

Fig. 11: Close the foot edge

6 Start-Up

Start-up takes place in the prescribed order:

When starting up the system, the start-up report (included in the documentation) must be filled out completely and kept together with the system.

Checking the prerequisites

1. Check the installation of the safety equipment before startup.
2. Check whether the tank is filled with water and that it is properly and completely bled.
3. Check the correct connection of the voltage supply.
4. First set the cold heating system to the calculated admission pressure of the expansion vessel (MEV), see ➔ *sec. "Safety equipment", p. 7.*

6.1 Configuration of the SolvisControl

Configuring the SolvisControl

SolvisControl must be configured before starting up the system.
After configuration, the startup process can be continued.

1. Configure the SolvisControl.

To perform all of the described steps, see the ➔ *Start-up section, Operating instructions for installers for SolvisVital (P31) or SolvisDirekt (P33)*.

For a basic introduction to operating the system controller, see the ➔ *Operating the SolvisControl section, Operating instructions for system operators for SolvisVital (P30) or SolvisDirekt (P32)*.

6.2 Heating up the heating system

"Thermally inhibiting" heating water

Before starting up the solar circuit, heat up the heating water to about 60 °C, as measured at the top of the heating buffer (S4). This prevents the remaining limescale in the heating water from concentrating in the solar heat exchanger.
The remaining limescale formation can be distributed specifically and uniformly over the heat exchanger surfaces by setting the maximum inflow temperature for the consumer.
If the heating circuits permit such temperatures, the high flow temperature should also be pumped at full pump load throughout all the heating circuits to reach all the heating water.

1. Switch the hot water pump to "ON" (manual mode) on the SolvisControl while heating up the water to circulate the storage tank volume (output A2) ("Installer menu > Outputs > Manual mode").
2. Set the burner to maximum performance ("INSTALLER menu > Heating > Maintenance function").

The current sensor values are indicated on the SolvisControl in the “System status” window.

Setting the filling pressure of the heating system

1. After heating up the system, set the filling pressure on the storage tank as follows:

- Filling pressure = admission pressure + 0.8 bar
- If the difference between the highest point of the radiator and the lower edge of the storage tank is more than 50 m, the system must be separated.

2. Recheck the filling pressure after several days and bleed if necessary.

Bleeding the storage tank

WARNING
Sudden steam blasts that occur when bleeding the storage tank can be hazardous.
Risk of scalding hands and face.
- Use a hose and suitable collecting vessel for safe bleeding.

1. Plug the hose onto the bleeder.
2. Carefully bleed the storage tank.

6.3 Starting up the solar circuit

CAUTION
Observe the following before starting up the solar circuit.
Non-observance can result in damage to the heat exchangers.
- The solar circuit must be set up by qualified personnel.
- The buffer must be heated up by the boiler before starting up the solar circuit.

Start up the solar circuit (if available).

For information on starting up the solar circuit, see the ➔ *Start up section, Installation instructions for solar heat transfer stations (P39 to P42).*

6.4 Final tasks

Continue the start-up procedure with the ➔ *Basic settings (part 2) section, Operating instructions for SolvisVital (P31) or SolvisDirekt (P33)*.

7 Maintenance

Maintenance and cleaning work must be performed once a year in accordance with German Energy Conservation Regulations (EnEV) and to maintain warranty claims.

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

7.1 General maintenance

Checking the general condition

1. Check the general condition.
2. Remove dirt with a damp cloth. Do not use caustic or solvent-based cleaners.

Bleeding the storage tank

WARNING
Sudden steam blasts that occur when bleeding the storage tank can be hazardous.
Risk of scalding hands and face.
- Use a hose and suitable collecting vessel for safe bleeding.

1. Plug the hose onto the bleeder.
2. Carefully bleed the storage tank.

Checking the pH value of the heating water

1. Check the pH value of the heating water and reset if necessary, see ➔ *sec. "Water treatment", p. 10.*

Testing the admission pressure on the expansion vessel (MEV)

1. Check the admission pressure of the expansion vessel and adjust if necessary, see ➔ *"Setting the admission pressure on the expansion vessel (MEV)", sec. "Safety equipment", p. 7*.

Checking the filling pressure on the heating system

1. Check the filling pressure of the heating system and adjust if necessary, see ➔ *"Checking the filling pressure on the heating system", sec. "Heating up the heating system", p. 13*.
2. Check all connections for leaks (visual inspection).

Checking the safety functions

1. Check the safety valves for leaks and correct functioning in the heating circuit and, if necessary, in the solar circuit.
2. Check the safety temperature limiter on the burner and, if necessary, on the exhaust system.

7.2 Other care measures

Care instructions
In between annual maintenance work, we recommend that you check the general condition of the system on a regular basis. This helps to conserve the value of the system and ensure continuity of supply.

8 Technical Data

Dimensions and weight

Storage tank size		727	917	1427	1817
Height without insulation	h	1,709	2,099	2,124	2,624
Height with insulation	H	1,810	2,200	2,225	2,725
Height with carrying aid	t	1,849	2,239	2,264	2,764
Tilt height without insulation	k	1,738	2,109	2,140	2,620
Diameter without insulation	d	790	790	1,000	1,000
Diameter with insulation	D	1,010	1,010	1,220	1,220
Minimum clearance at front		500	500	500	50
Minimum clearance at sides and to rear		300	300	300	300
Access opening required to bring the unit inside (minimum door width)		800	800	1,010	1,010
Total weight when empty [kg] incl. insulation		Approx. 140	Approx. 180	Approx. 185	230

All dimension specifications in mm

Dimensions and performance data

Component or connection	Dimensions or values
Stratified buffer tank material	S235JR, primed exterior, raw interior
Max. operating pressure of the stratified buffer tank	6 bar
Max. temperature in the stratified buffer tank	95 °C
Connections 1 and 11	R 1½"
Connections 9 and 12	Rp 1½"
Connections 2 to 8 and 10	Rp 2"
Connection Bleeder	G ½"
Solar heat exchanger	External (accessory)
Discharge heat exchanger	External (accessory)

Volumes and heat loss

Storage tank size	727	917	1427	1817
Actual volume [l]	720	908	1,424	1,813
Heat loss(1) (kWh/24h)	2.84	3.33	3.6	4.53
Hot water standby volume(2) [l]	353	402	764	764
Heating buffer volume(3) [l]	48	152	78	233
Solar volume(4) [l]	315	351	584	817
Volume [l] Cover - connection 1	113	113	374	374
Volume [l] Connection 1 - connection 2	48	97	78	78
Volume [l] Connection 2 - connection 3	48	48	78	78
Volume [l] Connection 3 - connection 4	48	48	78	78
Volume [l] Connection 4 - connection 5	48	48	78	78
Volume [l] Connection 5 - connection 6	48	48	78	78
Volume [l] Connection 6 - connection 7	48	152	78	233
Volume [l] Connection 7 - connection 8	48	48	78	78
Volume [l] Connection 8 - connection 10	133	169	253	389
Volume [l] Connection 10 - connection 9	0	0	0	97
Volume [l] Connection 9 - connection 11/12	60	60	97	97
Volume [l] Connection 11/12 - floor	74	74	156	156

(1) Applies to a storage tank temperature of 65 °C and 20 °C in the installation room (information according to DIN 4753/8)
(2) Cover to connection 6(*)
(3) Connection 6 to connection 7(*)
(4) Connection 7 - floor(*)
(*) For systems with constant hot water usage profile as instructed in the ➔ system diagram (P38)

Connections on the storage tank

For information on making the connections, see ➔ *SolvisVital 3 (P38) or SolvisDirekt 3 (P36)*.

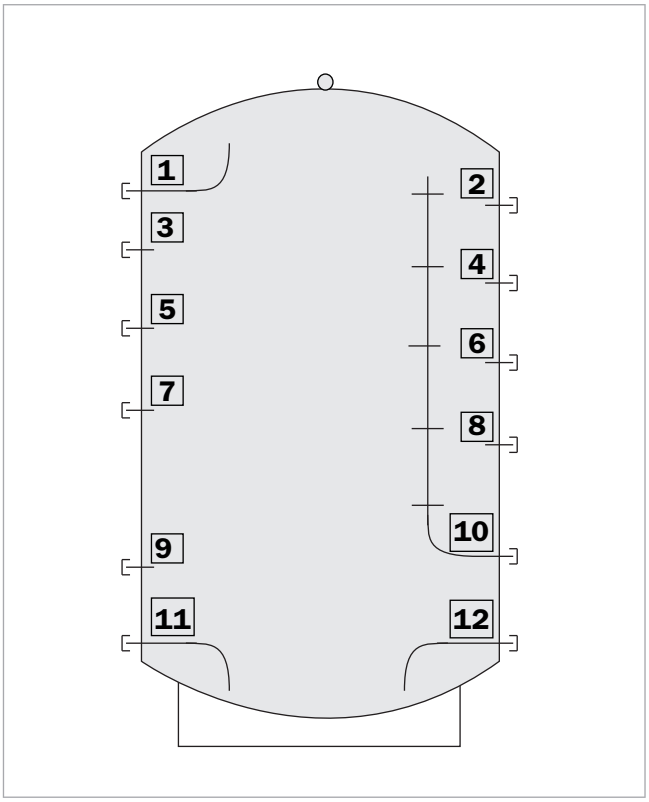

Abb. 12: Connections for the SolvisStrato 3 stratified buffer tank

Connection height

Storage tank size(1)		727	917	1427	1817
Distance from floor to connection	1	1,370	1,760	1,522	2,022
Distance from floor to connection	2	1,270	1,560	1,422	1,922
Distance from floor to connection	3	1,170	1,460	1,322	1,822
Distance from floor to connection	4	1,070	1,360	1,222	1,722
Distance from floor to connection	5	970	1,260	1,122	1,622
Distance from floor to connection	6	870	1,160	1,022	1,522
Distance from floor to connection	7	770	845	922	1,222
Distance from floor to connection	8	670	745	822	1,122
Distance from floor to connection	10	395	395	497	622
Distance from floor to connection	9	395	395	497	497
Distance from floor to connection	11/12	270	270	372	372
Distance from floor to upper bleeder connection	e	1,690	2,080	2,105	2,605

All dimensions are in mm.

(1) All height measurements are without foot plugs; add 5 mm to get the height with foot plugs

Dimensions of the system

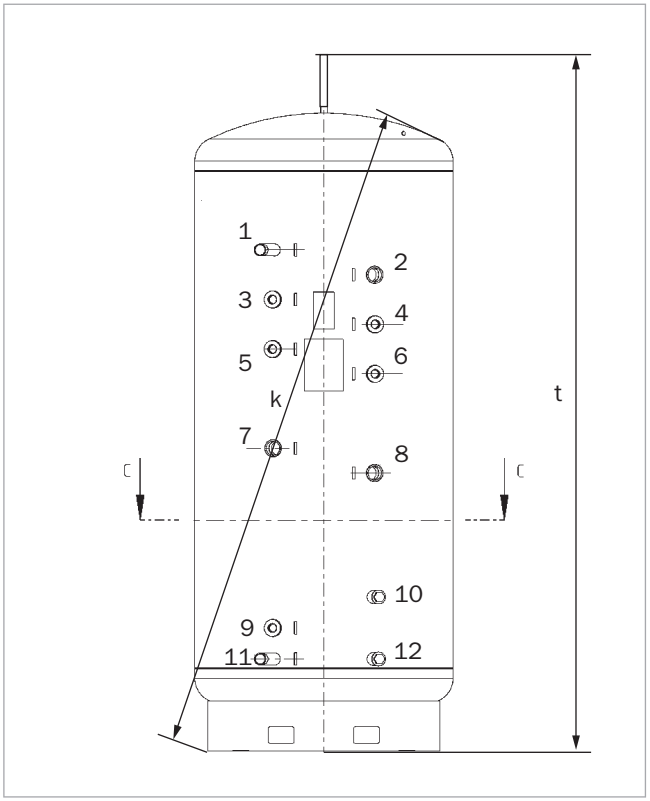

Fig. 13: Front view

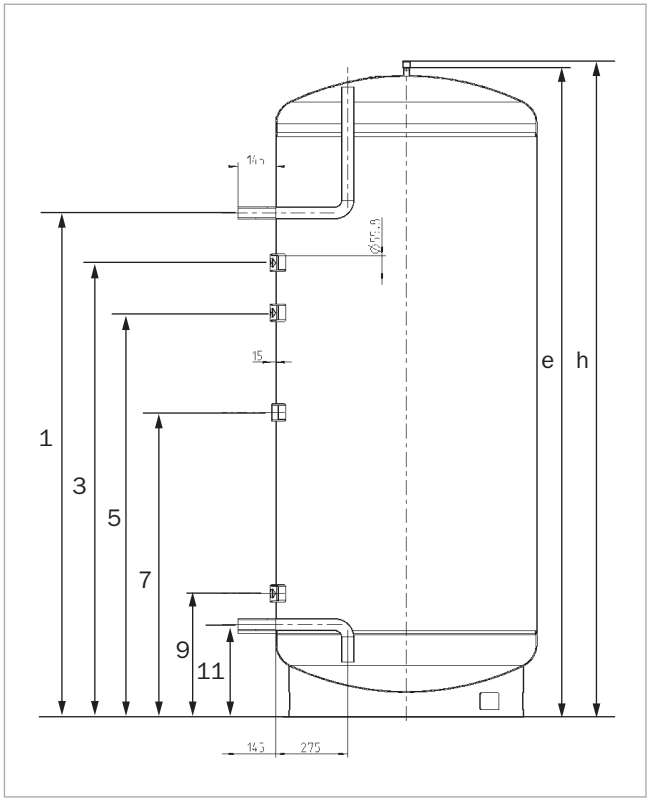

Fig. 15: Section view A - A

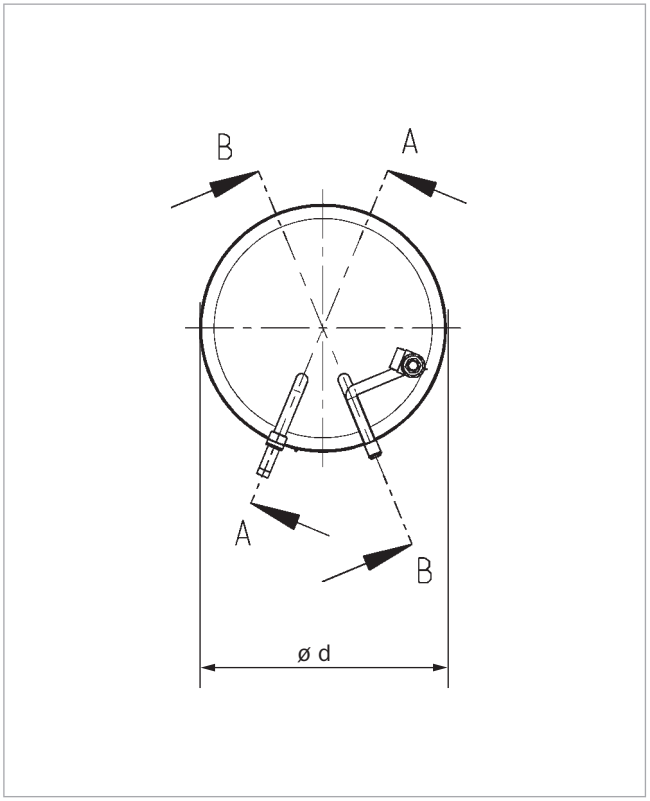

Fig. 14: Section view C - C

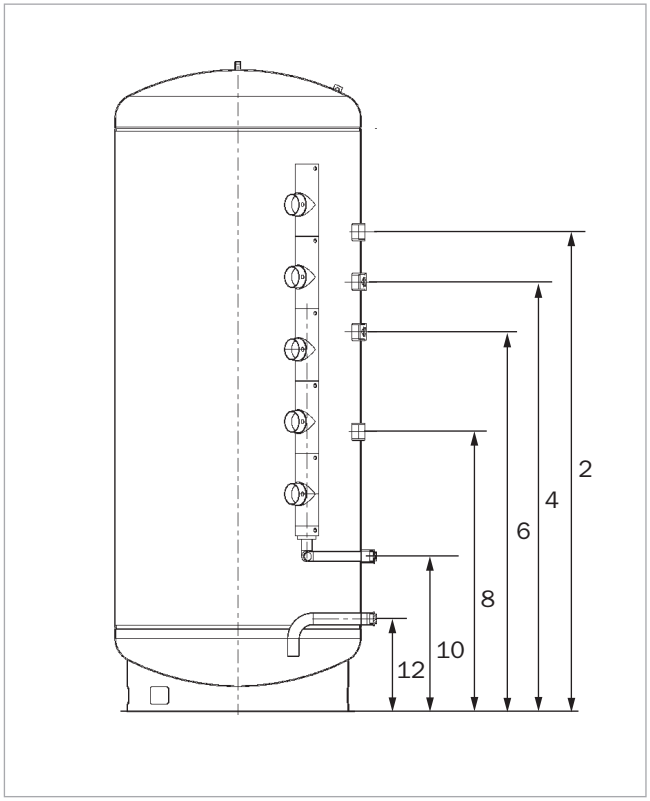

Fig. 16: Section view B - B

9 Appendix

9.1 Accessories

9.1.1 Solar circuit

The following accessories are not included in the delivery and must be ordered separately as required:

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.

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.

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).

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.

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, and for SolvisFera Diagonal.

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.

Corrugated pipe set (WR-SOL-xxxx)
For connection of a membrane expansion vessel or solar primary tank (“IG” version). The following lengths are available:

- 1 metre: WR-SOL-1000 or WR-SOL-1000-IG
- 2 metre: WR-2000

Solar expansion vessel (SOL-XX)
For protecting the collector circuit with 18, 24, 35, 50, 80 or 150 Litres.

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.

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 heat transfer station (SÜS-S)
When used with the SolvisMax Pure or SolvisMax Solo stratified buffer tank, the solar heat transfer station provides the connection to the solar system with a collector surface of up to 25 m². A solar heat exchanger functions as the central component, to which two hydraulically separate circuits (for the solar collector and stratified buffer tank) are connected. The SolvisControl system controller regulates the solar circuit and buffer circuit pumps. The station is equipped with particularly energy efficient pumps.

Solar heat transfer station (SÜS-50-HE)
When used with the SolvisStrato stratified buffer tank, the solar heat transfer station provides the connection to the solar system. A solar heat exchanger functions as the central component, to which two hydraulically separate circuits (solar collector and stratified buffer tank) are connected. The SolvisControl system controller regulates the solar circuit and buffer circuit pumps. It also continuously controls each pump. Suitable for a collector surface area of up to 50 m².

Solar heat transfer station (SÜS-90-HE)
When used with the SolvisStrato stratified buffer tank, the solar heat transfer station provides the connection to the solar system. A solar heat exchanger functions as the central component, to which two hydraulically separate circuits (solar collector and stratified buffer tank) are connected. The SolvisControl system controller regulates the solar circuit and buffer circuit pumps. It also continuously controls each pump. Suitable for a collector surface area of up to 90 m².

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-2,5)
The system controller has an integrated heat quantity counter for the solar circuit. If this is to be used, a vol-

ume 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 2.5 m³/h.

9.1.2 Hot water circuit

Hot water station (WWS-24)
Delivery up to 24 l/min (at 45 °C).
Consisting of:

- Stainless steel plate heat exchanger, copper brazed
- Circulation pump
- Thermostatic mixing valve
- Gravity brake
- Manual bleeder
- Temperature sensor (S2) for hot water production
- Heat insulation
- Volume flow encoder (VSG-W).

Hot water station (WWS-36)
Only with storage tank size 956, delivery up to 36 l/min (at 45 °C).
Consisting of:

- Stainless steel plate heat exchanger, copper brazed
- Circulation pump
- Thermostatic mixing valve
- Gravity brake
- Manual bleeder
- Temperature sensor (S2) for hot water production
- Heat insulation
- Volume flow encoder (VSG-W).

Circulation station (CS)
For circulation loads of up to 6 kW in the SolvisMax and SolvisDirekt systems, consisting of:

- Stainless steel plate heat exchanger, welded stainless steel
- Circulation pump
- Thermostatic mixing valve
- Thermometer
- T-piece with ball valve
- T-piece with safety valve W, 10 bar
- Heat insulation shell EPP
- Wall bracket and seals

Fresh water station (FWS-xx)
In the SolvisVital system, fresh water stations are available in these four sizes: -20, -40, -80 and -120. More information on the stations is included in the “Technical Data” section.

The basic hydraulic design is the same on all of the stations.

SolvisControl temperature sensor (TF-SC)
KTY 2 kOhm sensor as contact sensor with 3 m connection cable for connection to the SolvisControl system controller.

9.1.3 Heating circuit

Limited heating circuit station (HKS-B-3,0)
For an unmixed, temperature limited heating circuit consisting of:

- Flow line with high efficiency pump
- Return line
- Thermostatic mixing valve
- Thermometer
- Shut-off valves
- Heat insulation shells
- Threaded connection parts
- Attachment material.

Application range: over 800 l/h.

Mixed heating circuit station (HKS-G-6,3)
For a mixed heating circuit consisting of:

- Flow line with high-efficiency pump
- Return line
- Three-way mixer and servomotor
- Thermometer
- Shut-off valves
- Heat insulation shells
- Threaded connection parts
- Attachment material

Application range: 800 to 2000 l/h.

Mixed heating circuit station (HKS-G-18)
For a mixed heating circuit consisting of:

- Flow line with high efficiency pump
- Return line
- Three-way mixer and servomotor
- Thermometer
- Shut-off valves
- Heat insulation shells
- Threaded connection parts
- Attachment material

Application range: over 2000 l/h

Heating circuit station, 4-way (HKS-G-4W)
Used in combination with the HKS-G heating circuit station in systems with two heating circuits and differing temperature levels. When used in this way, the HKS-4W mixes the return from the HKS-G (high temperature level) with the heating circuit having the lower temperature level. The return temperature to the storage tank drops and a higher solar yield and better fuel value utilisation can be achieved.

Another way that the HKS-4W can be used is as an optimum combination with special large storage tanks that can provide two flows having differing temperature ranges. The station consists of:

- Flow line with high efficiency pump
- Return line
- Four-way mixer and servomotor
- Thermometer
- Shut-off valves
- Heat insulation shells
- Threaded connection parts
- Attachment material

Application range: over 800 l/h

Buffer charging station (PLAS-G-6,3)
The PLAS-G-6,3 allows the return temperature to be controlled using the integrated return temperature sensor and a 3-way mixing valve in a fashion optimised for the connected heat generator. The charge volume flow is adjusted to meet the current power requirement of the connected system by the speed-controlled, high-efficiency pump.

Suitable for Solvis heating circuit distributors and Solvis heating circuit stations. With 20 mbar gravity brake, fully insulated and packaged in a box. Kvs value 6.3, maximum operating pressure 6 bar, maximum media temperature 90 °C.

Buffer charging station (PLAS-G-18)
The PLAS-G-18 allows the return temperature to be controlled using the integrated return temperature sensor and a 3-way mixing valve in a fashion optimised for the connected heat generator. The charge volume flow is adjusted to meet the current power requirement of the connected system by the speed-controlled, high-efficiency pump.

Suitable for Solvis heating circuit distributors and Solvis heating circuit stations. With 20 mbar gravity brake, fully insulated and packaged in a box. Kvs value 18, maximum operating pressure 6 bar, maximum media temperature 90 °C.

Connecting piece for distributor bar safety group (ASS-VB)
Needed to connect the safety group to the heating circuit distributor bar (VB-2 or VB-3).

Heating circuit distributor bar, thermally isolated (VTL-X)
For mounting up to three heating circuit stations on the wall, or for additionally connecting a pellet boiler to the buffer charging station, 1" flat sealing connections, welded construction, insulated with perfect fit.

Flow and return chambers as well as pipe lead-throughs are thermally isolated from one another by an air gap. This prevents unintentional return increase and improves the energy efficiency of the system.

Designs:

- **VTL-2**: Kvs = 20.5 m³/h, for connecting two heating circuits, or one heating circuit and a buffer charging station.
- **VTL-3**: Kvs = 23.8 m³/h, for connecting up to three heating circuits, or two heating circuits and one buffer charging station.

Connection elbow (HKS-4W-AB)
The connection elbow allows the HKS-4W, combined with an HKS-G, to be mounted on a VTL-2 or VTL-3 heating circuit distributor bar.

The connection elbow connects connection 2 on the mixing valve of the HKS-4W with the flow outlet on the heating circuit distributor bar.

Safety group (SG-H)
For the heating circuit, consisting of:

- Manometer 6 bar
- Safety valve 3 bar with ¾" blow out tube
- Shut-off ball valve
- Fill and drain connection
- Connection for an expansion vessel ¾" male thread.

Sludge separator (SAS-X)
For installation in the heating return.

- Brass housing, 10 bar, 1" thread
- Horizontal installation (SAS-H)
- Vertical installation (SAS-V)
- Compatible insulation shell (SAS).

Air separator (LA-X)
For installation in the heating flow.

- Brass housing, 10 bar, 1" thread
- Horizontal installation (LA-H)
- Vertical installation (LA-V)
- Compatible insulation shell (LA).

SolvisControl temperature sensor (TF-SC)
KTY 2 kOhm sensor as contact sensor with 3 m connection cable for connection to the SolvisControl system controller.

Room sensor (RF)
With room temperature display. For connection to the SolvisControl system controller. Can be used for both mixed and unmixed heating circuits.

9.1.4 Heat generator

SolvisLino pellet boiler (LI3)
Solid fuel boiler for climate-neutral combustion of wood pellets. The intelligent pellet feeding system and automatic ash discharge allow for fully automated combustion. Much less fine particle pollution is produced (as compared to chimneys or other wood log boilers). The

emission values are far below the legally prescribed limit values. The following boilers are available:

- LI3-10-XX
- LI3-15-XX
- LI3-21-XX
- LI3-26-XX

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Note

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