

SOLVIS

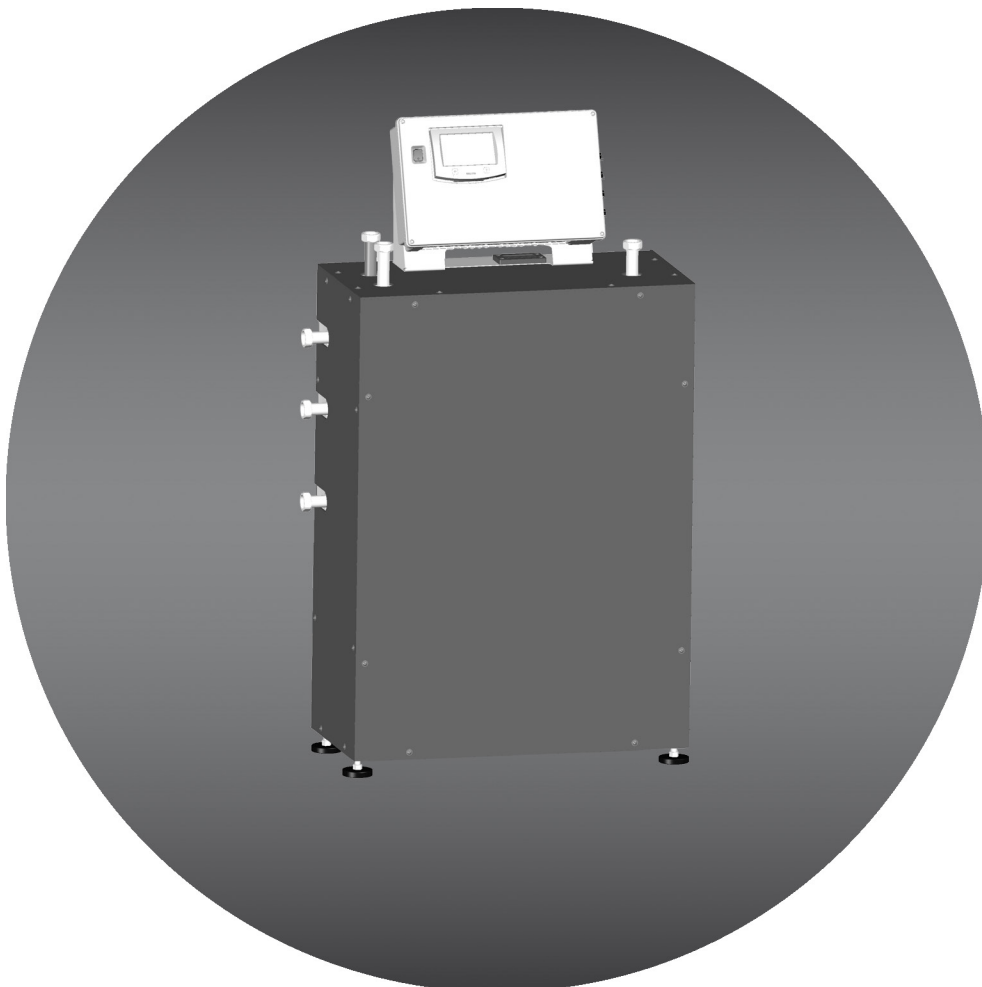
Installation

FWS fresh water station

For use with the SolvisVital 4 system

FWS-M, FWS-L

- 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.

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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:

- SolvisStrato – Installation instructions (MAL-SR-7-EN)
- SolvisVital – Operating instructions for system operators (BAL-SV-4-K-EN)
- SolvisVital – Operating instructions for installers (BAL-SV-4-I-EN)
- SolvisVital – System diagrams (ALS-SV-4-EN)
- Filling Gauge – Installation instructions (MAL-BLL-M)

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 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 applicable safety regulations and accident prevention regulations.
- You should also follow the safety notes from the available system documentation.

The separate, two-stage return of the return flow to the buffer tank prevents mixing. This results in the largest possible volume of cold water in the lower section, which, for example, increases the efficiency of the heat generator.

2.1 Features and applications

A key feature of the SolvisVital system is its centralized, hygienic, and economical hot water production, with a particular focus on meeting the circulation load on an as-needed basis.



Depending on the application, various system configurations are possible; see → *SolvisVital - System diagrams (ALS-SV-4-EN)*.

The SolvisVital fresh water system is designed for optimal use in multi-story residential buildings, sports facilities, hotels and guesthouses, and long-term care facilities.

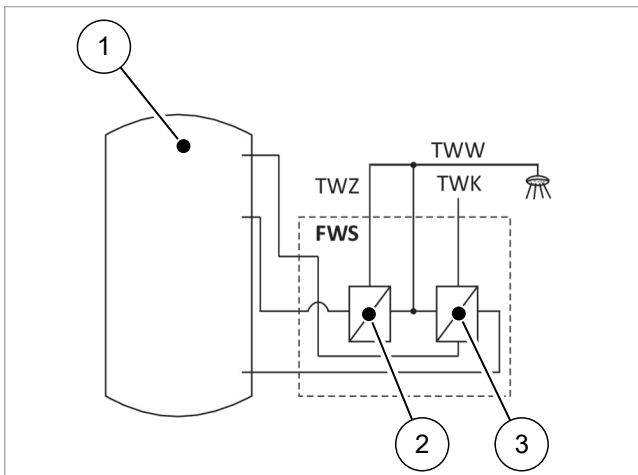


Fig. 1: Structure of the SolvisVital fresh water system

- 1 SolvisStrato buffer tank
- 2 Plate heat exchanger for drinking water circulation
- 3 Plate heat exchanger for hot drinking water
- FWS Fresh water station
- TWK Drinking water, cold
- TWW Drinking water, hot
- TWZ Drinking water circulation

2.2 Functional description

The heat is held in the buffer tank. When hot water is delivered, the plate heat exchanger for drinking water is used to heat the cold drinking water to the target temperature in a continuous process. The cooled heating water on the primary side of the plate heat exchanger is returned to the lower, cold layer of the stratified buffer tank.

Also using a continuous-flow process, the separate circulation plate heat exchanger reheats the circulation return from the building's hot drinking water system to the set temperature. The primary-side return from this plate heat exchanger is then recirculated separately into the middle section of the buffer storage tank.

3 Scope of Delivery

Fresh water station (FWS-x)

In the SolvisVital system, fresh water stations are available in sizes -M and -L. More detailed information about the stations can be found in chapter → "Technical Data", p. 11.

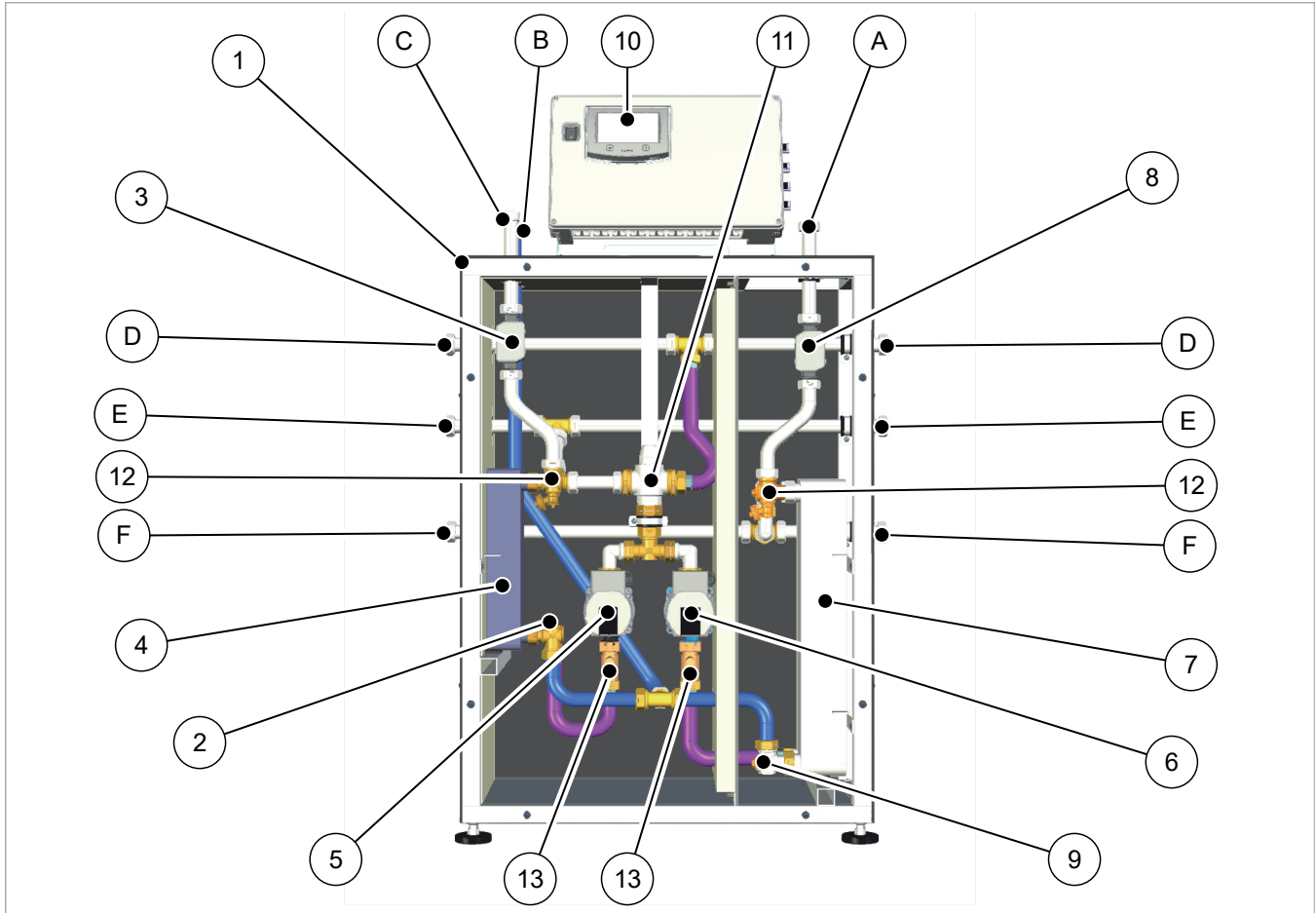


Fig. 2: FWS-M Fresh water station (similar to FWS-L)

- A "Cold drinking water" connection
- B "Hot drinking water" connection
- C "Drinking water circulation" connection
- D "FWS flow" connection*
- E "FWS hot return" connection*
- F "FWS cold return" connection*
- 1 Housing with insulation
- 2 TWZ Temperature Sensor (S11)
- 3 TWZ volume flow/temperature sensor
- 4 Plate heat exchanger for circulation
- 5 Primary circulation pump
- 6 Drinking water heating pump
- 7 Plate heat exchanger for hot drinking water
- 8 TWK volume flow/temperature sensor
- 9 Temperature sensor TWW (S2)
- 10 System controller (see documents BAL-SV-4-K-EN and BAL-SV-4-I-EN)
- 11 TMV (two in parallel for FWS-L)
- 12 BFD valve
- 13 Non-return flap

* Can be installed on either the left or right connection side.
A microbubble air separator must be provided by the customer.

Also included in the scope of delivery (not shown)

- 3 ball valves on the heating side
- 2 plugs on the heating side
- Socket strips for connecting on-site components to the mains circuit board
- Document "SolvisVital 4 - Operating instructions for system operators" (BAL-SV-4-K-EN)
- Document "SolvisVital 4 - Operating instructions for installers" (BAL-SV-4-I-EN)
- Document "SolvisVital 4 - System diagram" (ALS-SV-4-EN)
- Document "SolvisVital 4 - Commissioning protocol" (PTK-SV-4-I-EN)
- Document "SolvisVital 4 - Maintenance protocol" (PTK-SV-4-W-EN)
- Document "FWS Fresh water station - Installation" (MAL-FWS-EN, provided here).

4 Installation



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.

Prerequisites for proper installation

- Correctly install the storage tank
- Correctly install the drinking water installation
- A drinking water connection that complies with technical regulations



For information on setting up the SolvisStrato stratified buffer tank, see → *Installation Instructions (MAL-SR-7-EN)*.

4.1 Placement



CAUTION

Please note during transport

Leaks or damage possible.

- Do not use the pipes for carrying.

The station is delivered fully assembled in an insulated enclosure. The installation location should be chosen so that the length of the connecting lines to the buffer tank does not exceed 3 m if possible, as otherwise the rated output will not be achieved.

When installing the unit, the total weight of the filled station must be taken into account; see → *chapter "Technical Data"*.

4.2 Electrical and hydraulic connection

4.2.1 Hydraulic Connection

For a basic system diagram illustrating the text see → *chapter "Schematic view," p. 13*.

Connect the fresh water station hydraulically

1. Install a drinking water safety valve* on the TWK line on site; see → *chapter "Schematic view," p. 13*.

2. Install drinking water shut-off piston valves* on site.

The heating-side connections "FWS flow" (D), "FWS return, hot" (E), and "FWS return, cold" (F) to the buffer tank can each be connected on the left or right.

3. Install a PWM-controlled drinking water pump* at the "Drinking water circulation" connection.
4. Connect the station to the buffer tank according to the system diagram.



For detailed system diagrams, see the document → *"SolvisVital 4 - System diagram" (ALS-SV-4-EN)*.

5. Connect the station to the drinking water supply and fill it.
6. Seal the unused connection ports "FWS supply" (D), "FWS return, hot" (E), and "FWS return, cold" (F) with

the caps provided. A drain must be provided on-site at the lower connection "FWS return, cold" (F).

7. Install a venting option at the highest point of the "FWS flow" (D) connecting line.
8. When used in combination with a SolvisStrato: Before connecting the circulation return "FWS return, hot" (E) to the storage tank, first install a charging lance (accessory; please order separately) into the connection on the storage tank.



For information on how to install the charging lance, see → *Installation Instructions (MAL-BLL-M)*.

9. After commissioning and pressure testing, insulate the piping and station ball valves.

*Optional accessory; please order separately

Pipe sizing

Item	Diameter	
	FWS-M	FWS-L
VL	DN25	DN35
RL, hot	DN25	DN35
RL, cold	DN25	DN35
TWW	DN25	DN40
TWK	DN25	DN40
TWZ	DN25	DN25

4.2.2 Electrical connection



CAUTION

Complete the hydraulic connection

Do not make the electrical connection until you have completed the hydraulic connection.



DANGER

Risk of electrical shock

Damage to health, cardiac arrest possible.

- Disconnect the system from the mains before carrying out work on it and ensure that it cannot be turned on again
- Observe the 5 safety rules.



CAUTION

Country-specific regulations

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.



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

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 total cable resistance for the sensor cables must not exceed 2.5 ohms. For cables with a cross section of 0.25 mm², this corresponds to a length of up to 5 m.
- For cross sections of 0.5 or 0.75 mm², the maximum cable length is 15 or 50 m.
- Sensor cables for temperature sensors should not be unnecessarily long. For very long cables, sensor correction can be performed to minimise the systematic variance errors.



CAUTION

Observe ambient conditions

Malfunction or failure of system possible.

- Avoid ambient temperatures outside of the permitted range of 5 °C to +50 °C.
- Avoid dew condensation and an annual mean relative humidity higher than 75 % (briefly 95 %).



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.

4 Installation

The sensors (temperature sensors, etc.) and actuators (pumps) inside the fresh water station are fully pre-wired.

Connecting the sensors

1. Open the control console on the station by loosening the screws on the cover and removing the cover.
2. Apply thermal paste to temperature sensors S1, S3, S4, and S9 on the supplied wiring harness for the Solvis-Strato (or optional accessories if a SolvisStrato is not being used), and plug them into the sockets on the buffer tank as indicated in the wiring diagram.
3. Route the wiring harness to the control console and connect it to the corresponding inputs on the main circuit board. If necessary, extend it using a suitable 10-wire cable.
4. Secure the wiring harness with a strain relief.
5. Connect the additional sensors specified in the wiring diagram (e.g., for controlling a heating circuit or the boiler). Follow the respective installation instructions when doing so.

Connecting actuators

1. Connect the power cord of the external circulation pump to output A1 (L/N/PE) on the power board.
2. Connect the control wire from the customer-supplied circulation pump to "SP2" and "SP-" on the power board.
 If a PWM-controlled circulation pump (e.g., from the Solvis accessory line) is used, connect it to "SP2" and "SP-" on the power supply board. If a PWM-controlled circulation pump is not used, skip this step.
3. Connect the additional pumps and actuators specified in the wiring diagram, e. g. those for the heating circuits and/or the boiler. Follow the respective installation instructions when doing so.

Connecting the power supply

1. Run the power supply line to the control console and connect it to the "Mains PE/N/L" terminals on the expansion board.
2. Lead the supply line through the strain relief device and secure.
 Check that the wiring is correct to prevent unit malfunctions:
 - L=L, N=N, etc.
 - 230 V must be applied on L.
3. Close the control console cover and secure it with screws.

5 Start-Up



CAUTION

Always open the ball valves slowly.

Otherwise, the volume flow encoders may be damaged.

- To prevent damages due to hydraulic shock, make sure that you slowly open the ball valves on the drinking water side (A), (B) and (C).



CAUTION

Clarify the auxiliary heating requirement for hot water

Before start-up, clarify the details regarding auxiliary heating for hot water.



For instructions on how to use the system see → *SolvisVital 4 - Operating instructions for system operators (BAL-SV-4-K-EN)*.

Fill and flush the system on the drinking water side

- Slowly open the on-site valves labeled “Cold drinking water” (A), “hot drinking water” (B), and “drinking water circulation” (C).

The pressure from the connected drinking water supply fills the fresh water station and the hot drinking water (circulation) system.

- Vent the hot drinking water (circulation) system.
- Check for leaks and insulate the connecting pipes, including the ball valves.

Fill and flush the heating system

- Open the ball valves “FWS supply” (D), “FWS return, hot” (E) and “FWS return, cold” (F) on the fresh water station.
- Fill the system.
- Vent the system incl. storage tank.
- Carry out a leak test.
- Reinstall the station's front cover.
- Insulate the side KFE valves and caps with the supplied insulating caps.
- Insulate the piping and ball valves.

Starting up the system

- Commission the system in accordance with the instructions (BAL-SV-4-K-EN, BAL-SV-4-I-EN) for the connected heat generator.
- Follow the instructions for the other system components specified in the system diagram (e. g., the heating circuit station).

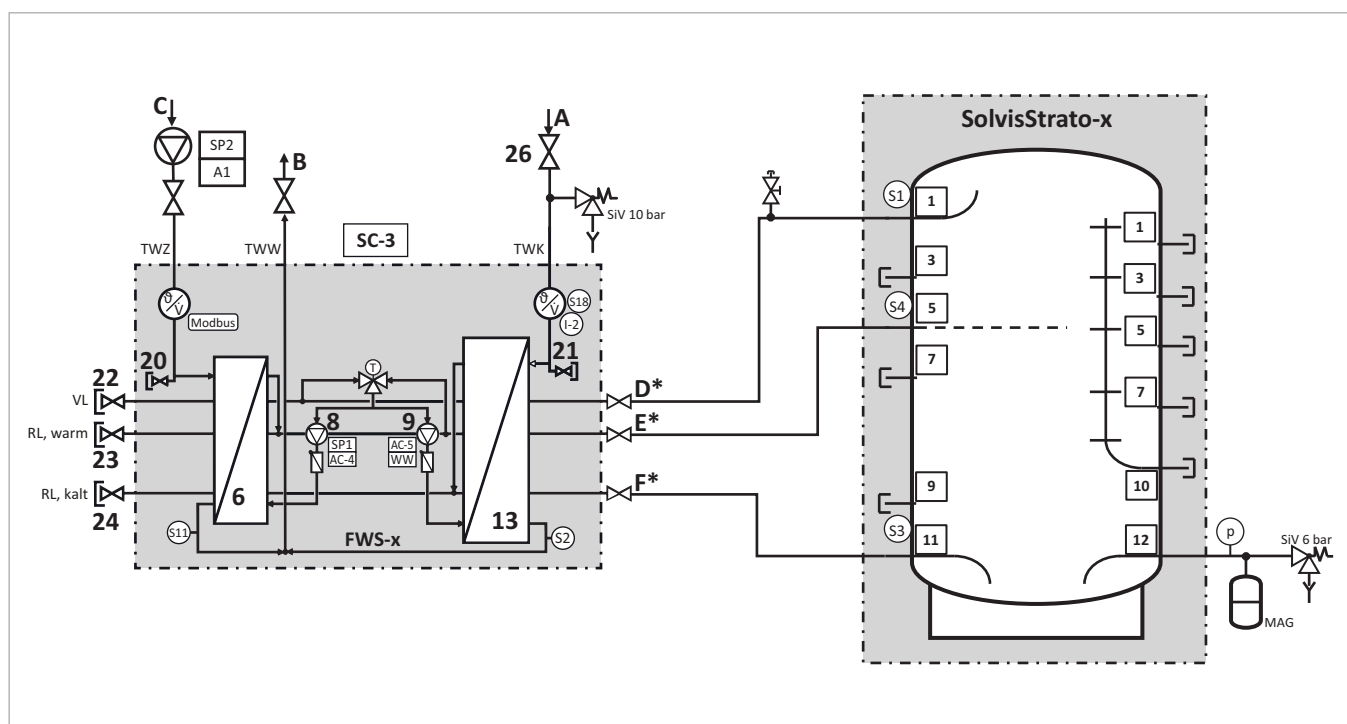


Fig. 3: Hydraulic connection of the fresh water station (single-storage-tank system for heating drinking water)

6	Plate heat exchanger for circulation	SC-3	SolvisControl 3
8	Primary circulation pump	SIV	Safety valve
9	Hot water production pump	TWZ	Drinking water circulation
13	Plate heat exchanger for hot drinking water	TWW	Drinking water, hot
20–24	BFD valve	TWK	Drinking water, cold
26	Shut-off valve	VL	Flow
FWS-x	Fresh water station	RL, warm/kalt	Return hot/cold
*	The storage tank can be connected on the left or right. Position the KFE valves 22–24 on the side opposite the storage tank.		

6 Maintenance

The (German) Building Energy Act (GEG) requires efficient heating systems. This includes regular inspection and maintenance.

To maintain your warranty coverage, we require annual maintenance.

6.1 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.

Checking the controller

1. Check that the system controller functions flawlessly (sensor values, operating modes and set values).
2. Check that hot water production and the circulation controller function properly.

Checking the pumps

1. Check that the pumps function flawlessly (drinking water circulation pump and hot water pumps).

Flushing the hot water heat exchanger, if necessary

Flush only if dirt or scale build-up is causing a disruption in the hot water supply. Disconnect the heat exchanger from the power supply before flushing.

1. Flush the hot water heat exchanger on the drinking water side with a 20% formic acid solution.
2. Check the aerators on the taps and clean if necessary.
3. Carefully flush the taps after cleaning.



WARNING

Handling acids and alkalis can be hazardous.

Risk of acid burns on hands and face.

- Observe the safety data sheet.
- Observe the specified safety measures.
- Wear work clothing that covers the body and safety boots.
- Use personal protective equipment (PPE).



For information on the required maintenance work for the stratified buffer tank, see → *SolvisStrato – Installation Instructions (MAL-SR-7-EN)*.

Check safety features

1. Check safety valves in the drinking water, charging, and heating circuits for proper function and leaks.

6.2 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.

7 Technical Data

General data about the fresh water station

Designation	Unit	FWS-M	FWS-L
Rated discharge capacity (TWW/TWK/VL/RL [°C])**)	kW	139 (60/10/66/25)	312 (60/10/66/20)
Rated volumetric flow rate at rated discharge capacity	l/min	40	90
Maximum circulation capacity (TWW/TWZ/VL/RL-W [°C])**)	kW	10 (60/55/64/55.5)	20 (60/55/62/55.5)
Plate heat exchanger, tap	---	Danfoss XB37M-1-40 StS	Danfoss XB37H-1-90 StS
Plate heat exchanger, circulation	---	Danfoss XB06H-1-40 StS	Danfoss XB37M-1-40 StS
Primary pump, circulation	---	Wilo Para 15-130/7-50/iPWM1-12	Wilo Para MAXO 25-130-8-F21
Hot water production pump	---	Wilo Para 15-130/9-87/iPWM1	Wilo Para MAXO 25-130-10-F21
Maximum permitted operating pressure	bar	Buffer tank: 6, drinking water circuit: 10	
Permitted media temperature	---	95 °C, at a maximum ambient temperature of 40 °C	
Control	---	SC-3 Control Console	
Electrical voltage supply	---	230 V AC/50 Hz	
Max. power consumption ^{of fresh water station**)}	W	142	328
Empty weight	kg	72	111

^{*)} preliminary values; final laboratory tests are still pending

^{**) To determine the total power consumption, take the connected components (e.g., heating circuit station) into account.}

Dimensions of the fresh water station

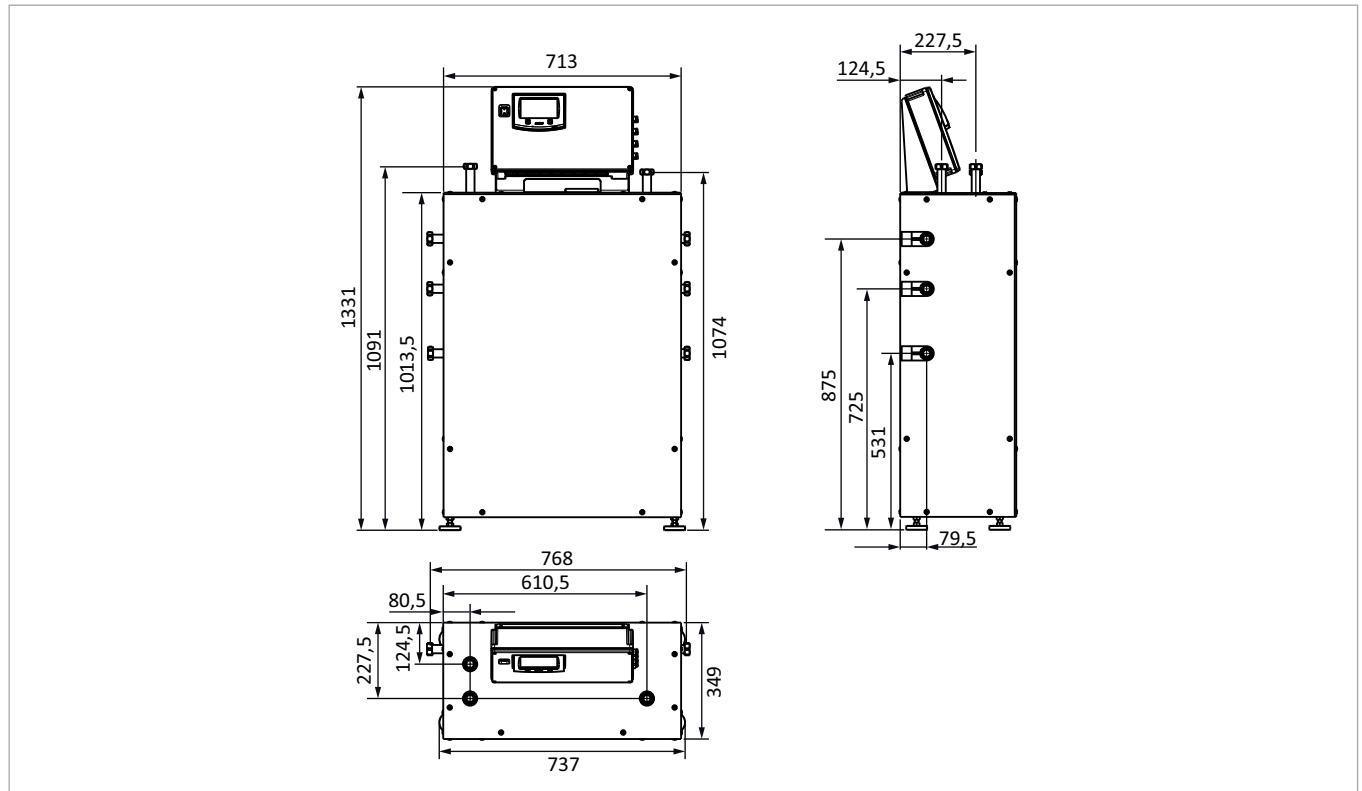


Fig. 4: Dimensions of the FWS-M fresh water station

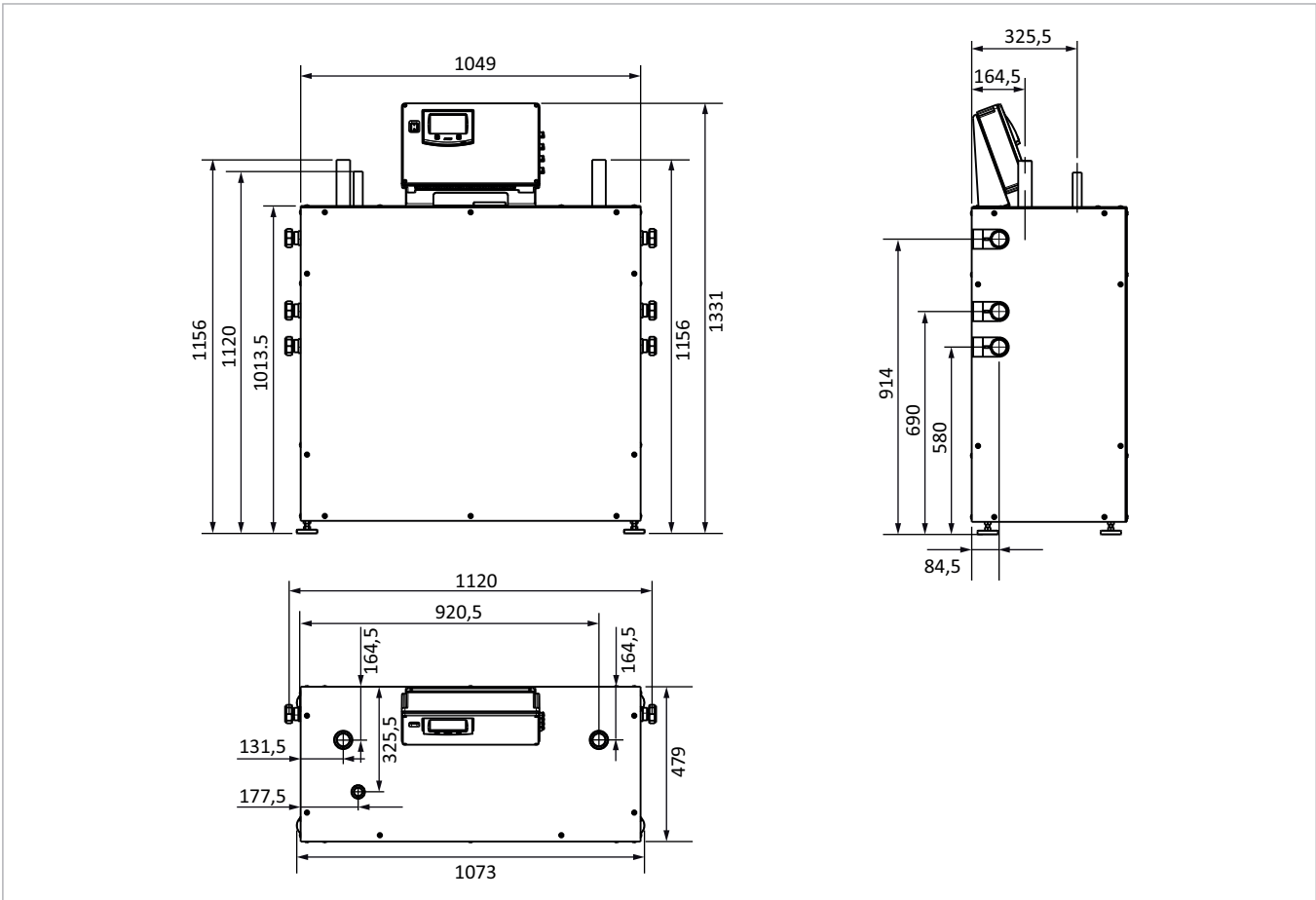


Fig. 5: Dimensions of the FWS-L fresh water station

Connection dimensions for fresh water station

Designation	FWS-M	FWS-L
Drinking water, hot, cold, circulation	1" male thread	1½" female thread
Supply	1" male thread	1½" female thread
Return, cold	1" male thread	1½" female thread
Return, hot	1" male thread	1½" female thread

8 Appendix

8.1 Schematic view

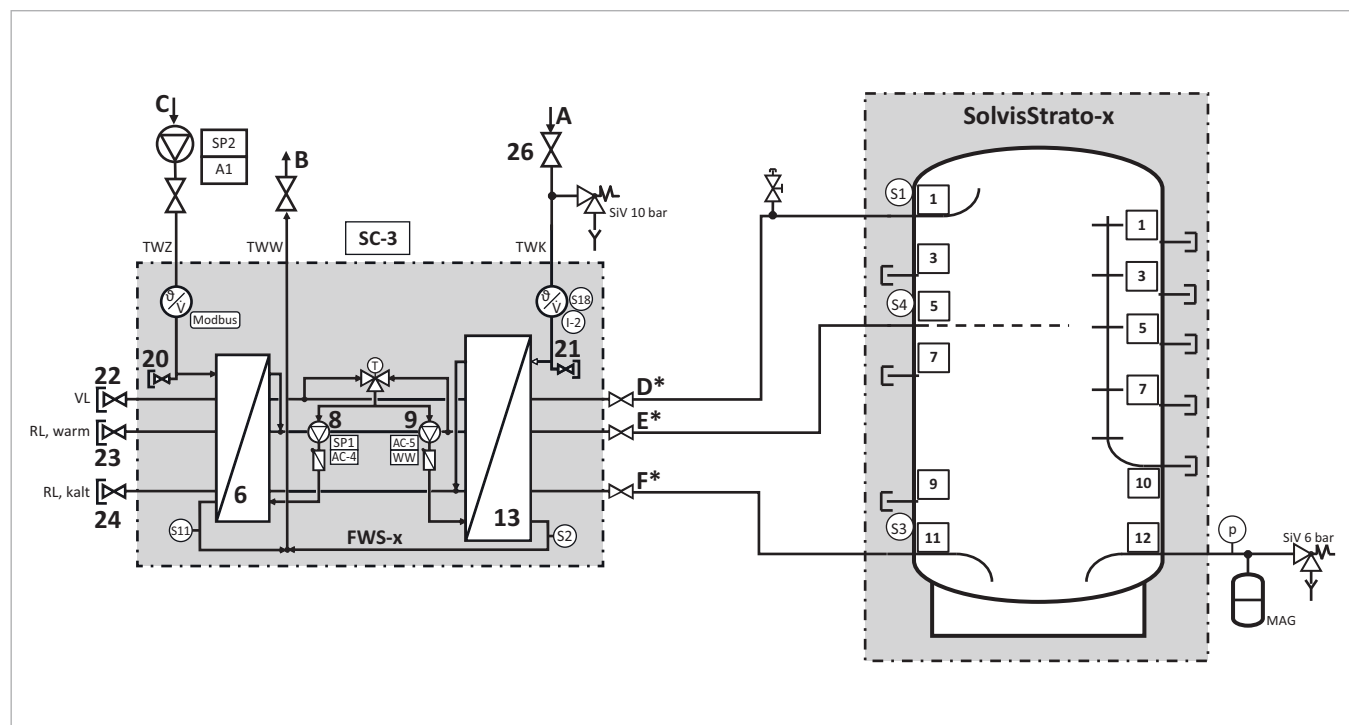


Fig. 6: Hydraulic connection of the fresh water station (single-storage-tank system for heating drinking water)

6	Plate heat exchanger for circulation	SC-3	SolvisControl 3
8	Primary circulation pump	SIV	Safety valve
9	Hot water production pump	TWZ	Drinking water circulation
13	Plate heat exchanger for hot drinking water	TWW	Drinking water, hot
20–24	BFD valve	TWK	Drinking water, cold
26	Shut-off valve	VL	Flow
FWS-x	Fresh water station	RL, warm/kalt	Return hot/cold
*	The storage tank can be connected on the left or right. Position the KFE valves 22–24 on the side opposite the storage tank.		

The diagram shown represents an overview of the system based on the information available to us. It does not replace detailed and specific planning. Please note: to ensure the system functions correctly, the installation, operating and maintenance instructions must be followed. When connecting a third-party boiler, do not rely solely on the information provided by Solvis – always consult the manufacturer of the boiler.



The shut-off and safety valves shown provide a rough guide only. Observe all the relevant standards, guidelines and technical rules at all times. This is the only way to ensure that installations are carried out correctly.

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For detailed system diagrams, see the document
➔ "System diagram SolvisVital 4" (ALS-SV-4-EN).

Hydraulic connection for FWS-xxx fresh water station

Item	Description of connection	Connect to	Item
A	"Drinking water, cold"	Drinking water supply, cold	TWK
B	"Drinking water, hot"	Drinking water system, hot	TWW
C	"Drinking water circulation"	Drinking water system, circulation line	TWZ
D	"FWS supply line"	SR, upper storage tank	1
E	"FWS hot return"	SR, middle storage tank	5*
F	"FWS-cold return"	SR, bottom of storage tank	11

*The exact location of the connection depends on the system variant used; see the document ➔ : "Connection and system diagrams" (ALS-SV-4-EN).

8.2 Connection Diagram

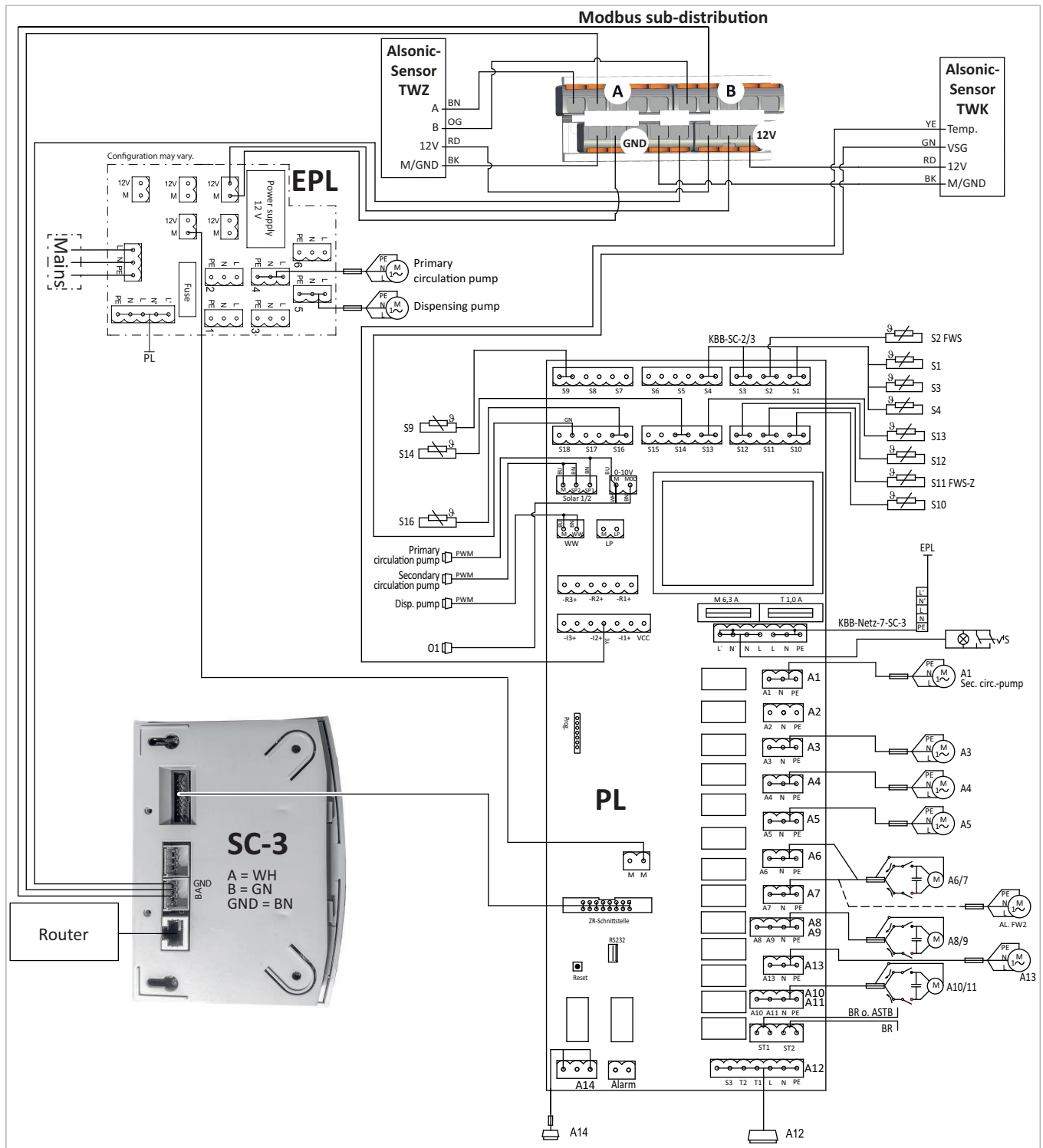


Fig. 7: Wiring diagram for FWS-x mains circuit board

AL. FW2 Alternative Connection for External Heat Generator 2
 BR Jumper
 PL Mains circuit board
 EPL Expansion board
 FWS Fresh water station
 FWS-Z Circulation unit of the fresh water station

Mains Voltage supply
 SC-3 SolvisControl 3
 PWM Pulse width modulation
 TWK Drinking water, cold
 TWZ Drinking water circulation

This diagram is not a substitute for detailed technical planning. To ensure the correct function of the system, our installation, operating and maintenance instructions must be followed. When establishing a network connection, do not rely solely on the information provided – always consult the network operator.

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8.3 Accessories



All accessories are listed in the → *Solvis price list*.

Notes

Notes

Notes

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