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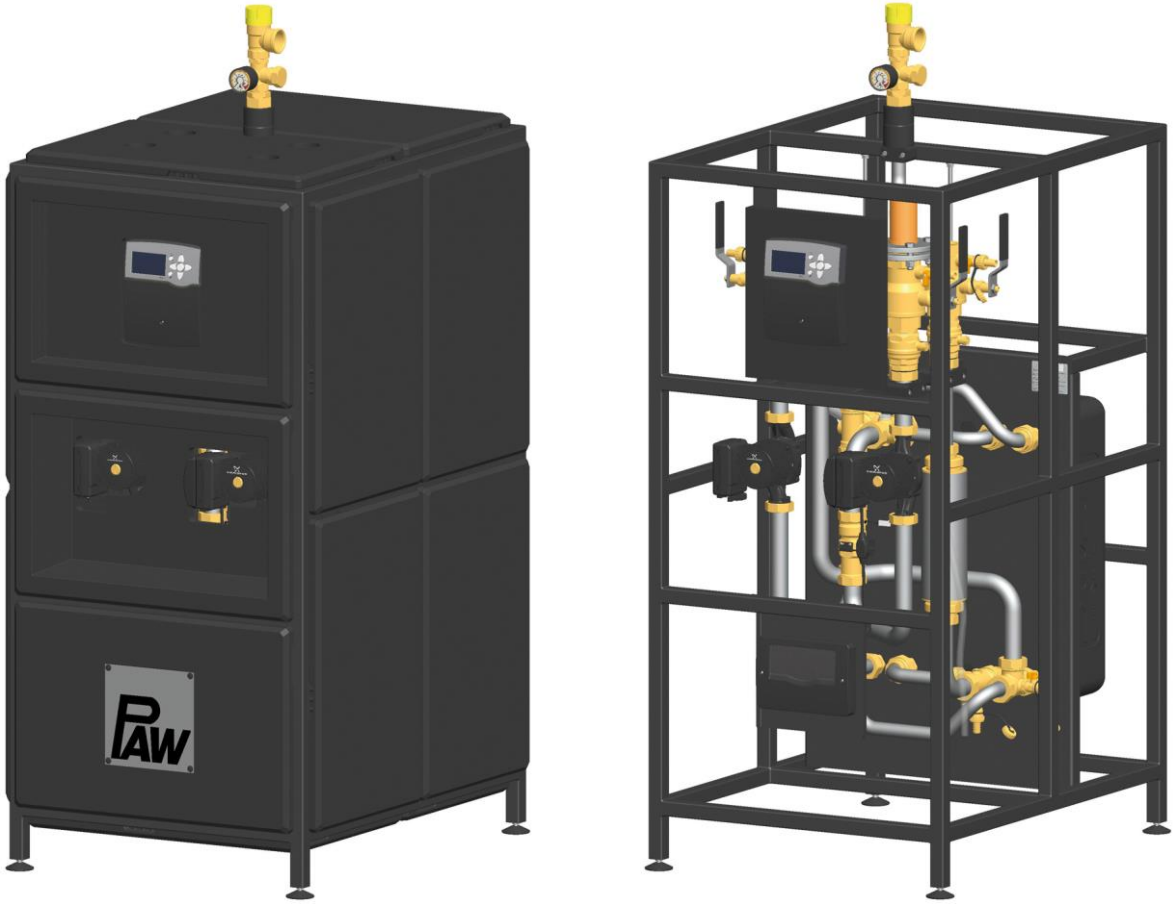
English

Installation and Operation Instructions

Transfer Station

SolexMega HZ – DN 32

[Hydraulics]



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Translation of the original instructions

PAW GmbH & Co.KG

Böcklerstraße 11

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Contents

1 General Information

Carefully read these instructions before installation and commissioning.
Save these instructions in the vicinity of the installation for future reference.

1.1 About these instructions

These instructions describe the functioning, installation, commissioning and operation of the transfer station SolexMega HZ DN 32.
The chapters called [specialist] are intended for specialists only.
For other components of the solar installation, such as pumps, collectors, tanks or expansion tanks, please observe the instructions of the corresponding manufacturer.

Item	Item no.	Nominal diameter	Controller SC5.14	Flow rate (maximum)	Collector surface (maximum)
SolexMega HZ	6097460	DN 32		5000 l/h	200 m²

1.2 About this product

The station is a premounted group of fittings checked for leakage and used to transfer the heat from the primary or solar circuit to the secondary or storage tank circuit.
It contains a preset controller as well as important fittings and safety devices for the operation of the solar thermal system:

- Ball valves in the solar circuit and storage tank circuit (flow and return)
- Check valves to avoid involuntary gravity circulation in the flow and return of the primary circuit and in the secondary circuit
- Pressure relief valves to prevent inadmissible overpressures
- Pressure gauge to display the system pressure in the solar circuit
- Vent valves to easily vent the solar circuit and the storage tank circuit
- Fill and drain valves with caps to flush, fill and drain the solar circuit and the storage tank circuit
- Flow meter (FlowRotor) and temperature sensors for heat quantity balancing (primary) and speed control of the pumps depending on the performance

In the heating circuit, the installation must be equipped with a **safety group**, that can be ordered separately.

The **expansion tank** required for operation must be adapted to the size and the requirements of the installation and must be ordered separately.

The **cap-type** valve (item no. 5301), which is also separately available, allows the expansion tank to be easily mounted and separated from the solar thermal system.

- The wrapping materials are made of recyclable materials and can be disposed of with recyclable materials.

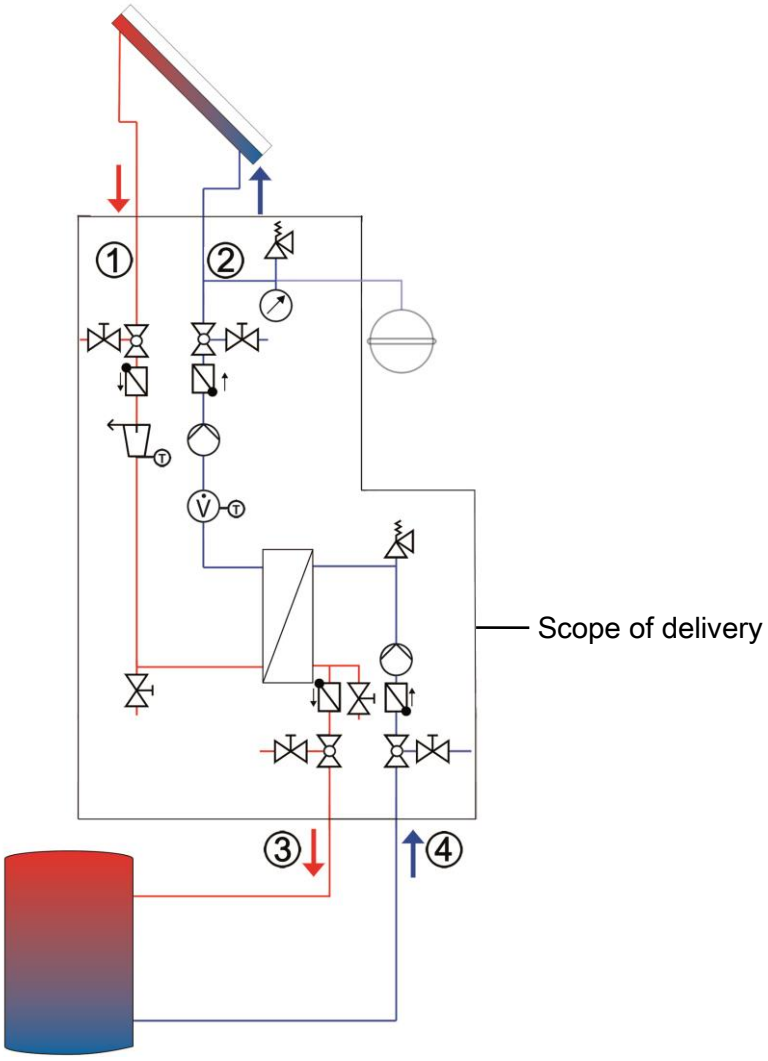
1.3 Designated use

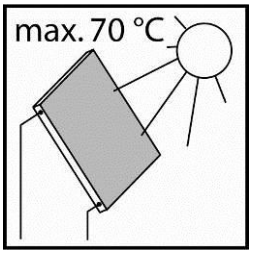
The station may only be used as a transfer station between the solar and the heating circuit in solar thermal systems taking into consideration the technical limit values indicated in these instructions. Due to its design, the station must be mounted and operated as described in these instructions!

Only use PAW accessories with the transfer station.

Improper usage excludes any liability claims.

Schematic structure SolexMega HZ





Under the influence of solar radiation, the collectors can get very hot.

The solar fluid in the circuit can heat up to more than 100 °C.

Only flush and fill the solar circuit if the collector temperatures are below 70 °C.

2 Safety instructions

The installation and commissioning as well as the connection of electrical components require technical knowledge commensurate with a recognised vocational qualification as a fitter for plumbing, heating and air conditioning technology, or a profession requiring a comparable level of knowledge [specialist].

The following must be observed during installation and commissioning:

- relevant local and national regulations
- accident prevention regulations of the professional association
- instructions and safety instructions mentioned in this manual

WARNING

Danger of scalding due to vapour escape!

With pressure relief valves there is risk of scalding due to vapour escape. During installation, check the local conditions and if a discharge line must be connected to the safety group.

- ➢ Observe the instructions regarding the pressure relief valve.
- ➢ The pressures calculated by the installation planner for the expansion tank and the operating pressure of the installation must be set.

CAUTION

Risk of burns!

The fittings and the pump may heat up to more than 100 °C during operation.

- ➢ The shell must remain closed during operation.

CAUTION

Personal injury and damage to property due to overpressure!

By closing the two ball valves in the primary circuit you isolate the pressure relief valve from the heat exchanger. A rise in temperature in the storage tank will cause high pressures and could result in personal injury or damage to property!

- Only close the ball valves for service and maintenance.
- If you close the ball valves in case of servicing, do also put the pumps out of operation and close the ball valves in the secondary circuit.

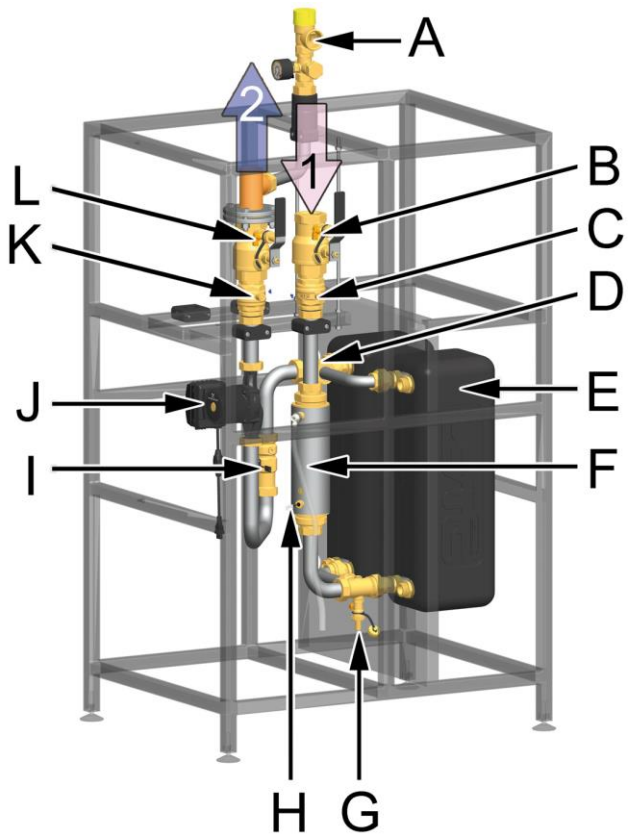
NOTICE

Material damage due to mineral oils!

Mineral oil products cause lasting damage to seals made of EPDM, whereby the sealant properties get lost. We do not assume liability nor provide warranty for damage to property resulting from sealants damaged in this way.

- It is imperative to avoid that EPDM gets in contact with substances containing mineral oils.
- Use a lubricant based on silicone or polyalkylene and free of mineral oils, such as Unisilikon L250L and Syntheso Glep 1 of the Klüber company or a silicone spray.

3 Product description

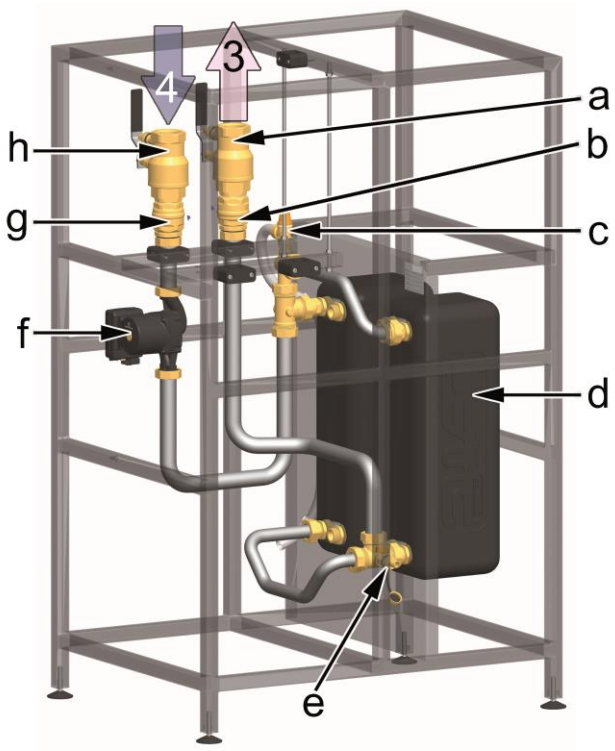


Connections primary circuit

1	Flow from the collector (hot)
2	Return to the collector (cold)

Equipment primary circuit

A	Safety group with pressure relief valve 6 bars, pressure gauge and connection for expansion tank
B	Flow ball valve with fill and drain valve
C	Check valve
D	Vent plug (manual vent valve)
E	Heat exchanger
F	Airstop with manual vent valve
G	Drain valve
H	Temperature sensor Pt1000
I	FlowRotor with Hall sensor and temperature sensor Pt1000
J	Primary pump
K	Check valve
L	Return ball valve with fill and drain valve



Connections secondary circuit

3 Flow to the storage tank (hot)

4 Return from the storage tank (cold)

Equipment secondary circuit

a Flow ball valve with fill and drain valve

b Check valve

c Pressure relief valve 3 bars
Only for the protection of the module. Does not replace the pressure relief valve that has to be mounted on site!

d Heat exchanger

e Drain valve

f Secondary pump

g Check valve

h Return ball valve
with fill and drain valve

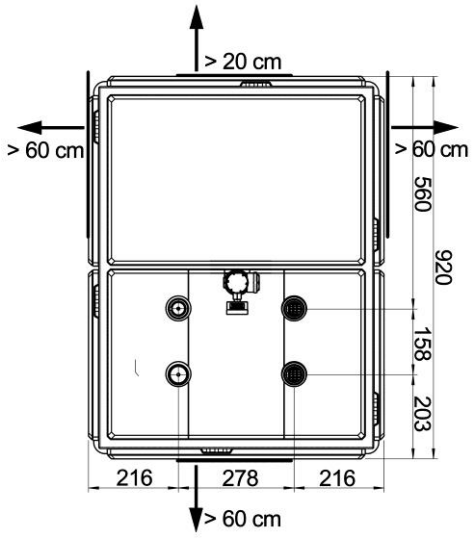
4 Assembly and installation [specialist]

The location of installation must be dry, load-carrying, frost-proof and protected against ultraviolet radiation. Furthermore, the access to the control and safety equipment must be guaranteed at all time during operation!
The discharge line of the safety equipment should be guided into a heat-resistant container with corresponding size. This allows you to avoid uncontrolled discharging into the environment and to easily refill the circuits!

NOTICE

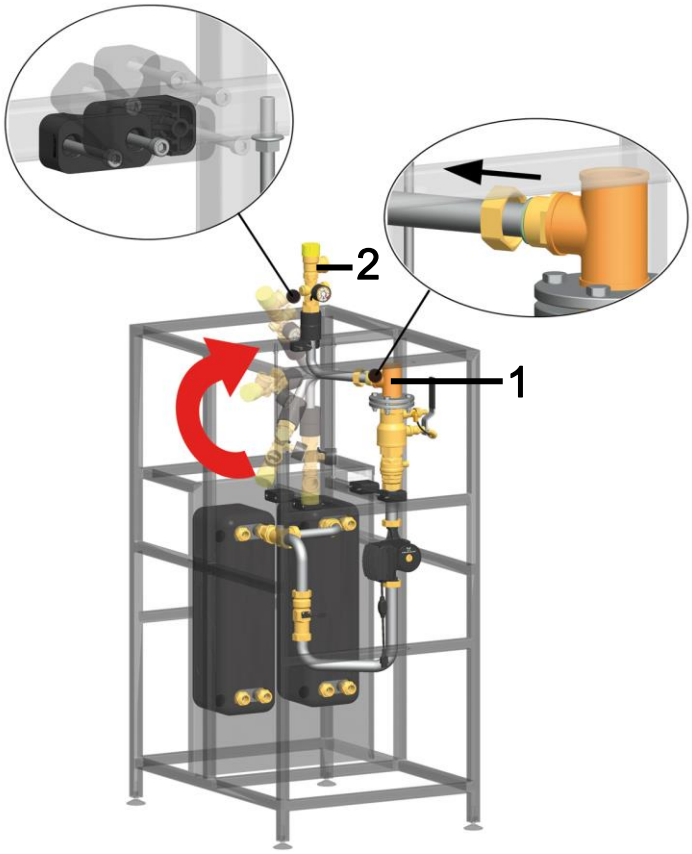
Material damage due to high temperatures!

Install the fitting group at a sufficient distance from the collector field, since the solar fluid may be very hot near the collector.
It may be necessary to install an intermediate tank in order to protect the expansion tank.



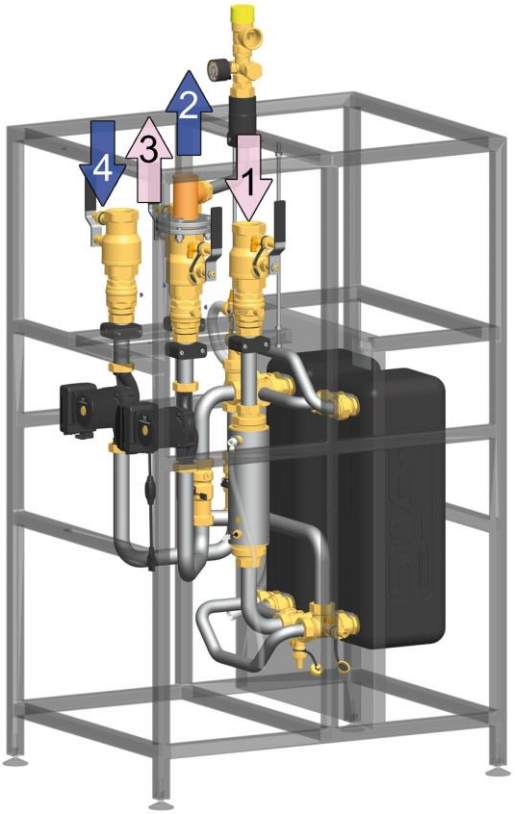
Top view

1. Determine the mounting location of the transfer station near the buffer tank.
   In long pipes the transmission performance may be reduced due to pressure drops.
2. Remove the station from the packaging.
3. Remove the station from the pallet and transport it to the location of installation.
4. Mount the enclosed stand feet in order to compensate the unevenness of the floor.
5. The station can be mounted in a corner. If you want to pull off the insulation shells, you have to leave a space of about 20 cm to the wall (see figure).
6. For the operation of the hydraulics and a subsequent servicing, you have to leave a space of at least 60 cm to the front (controller) and to one of the sides (see figure).



7. In order to prevent damage at the safety group, it is mounted in the station in factory.
   Commission the safety group as follows:
   a. Unscrew the pipe at the connecting T-piece (1) of the solar return.
   b. Mount the pipe at the T-piece (1) with the pressure relief valve (2) in a vertical position.
   c. Fix the pipe with the plastic clamp at the frame (see figure).

8. Connect the transfer station with the installation as shown in the figure below. When the Solex is delivered the ball valves are fitted with caps in order to protect it against dirt. Before connecting the pipes make sure that they are free from dirt.



1 **Primary side: Flow to the collector (hot)**

Connection: 1½" internal thread

2 **Primary side: Return to the collector (cold)**

Connection: 1½" internal thread

3 **Secondary side: Flow to the storage tank (hot)**

Connection: 1½" internal thread

4 **Secondary side: Return from the storage tank (cold)**

Connection: 1½" internal thread

9. Connect the expansion tank below the pressure gauge.
10. During servicing at the expansion tank, we recommend the installation of a cap valve (item no. 5301) on the expansion tank.

NOTICE

Note regarding the expansion tank

The expansion tank must not be connected while flushing and filling in order to avoid that dirt particles are washed in.

11. Pressurise the expansion tank as specified by the manufacturer and connect the expansion tank. Observe the separate instructions regarding the expansion tank!
12. Check all screw connections and tighten them if necessary.

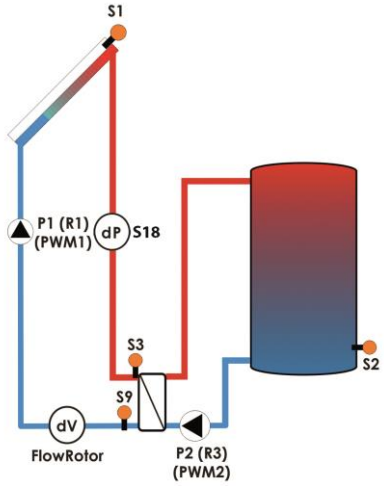
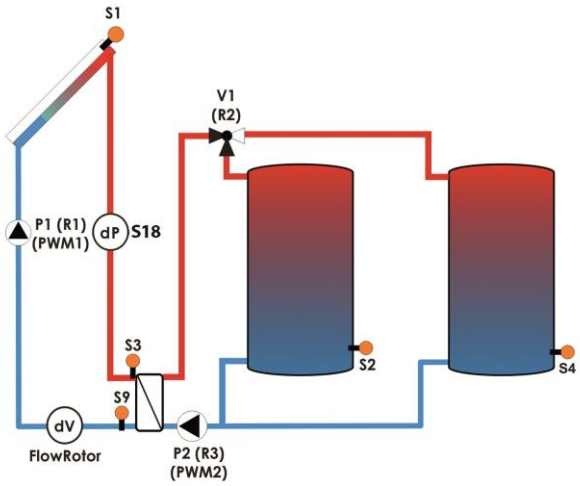
4.1 Controller connection

WARNING

Risk to life and limb due to electric shock!

- Prior to commencing electrical work on the controller, pull the mains plug!
- Only after completing all installation work, flushing and filling, plug the mains plug of the controller into a socket.
  This avoids an unintentional start of the motors.
- The pluggable pipelines are constantly supplied with 230 V and can not be switched off via the controller.

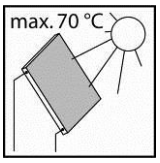
Wiring plan SolexMega HZ

Wiring plan 881	Wiring plan 882
	
Observe the separate instructions regarding the controller SC5.14! Connect the temperature sensors to the controller:	
• Collector sensor S1 • Storage tank 1 bottom: S2 • Integrated: S3, S9, dV (FlowRotor), dP (pressure sensor S18)	• Collector sensor S1 • Storage tank 1 bottom: S2 • Storage tank 2 bottom: S4 • Integrated: S3, S9, dV (FlowRotor), dP (pressure sensor S18)

Tighten all union nuts and screw connections.
The assembly of the transfer station is now completed
and the station can be put into operation.

5 Commissioning [specialist]

Observe the following safety instructions regarding the commissioning of the module:



WARNING

Risk of burns and scalding!

The fittings can heat up to more than 100 °C. Therefore, do not clean or fill the system with the collectors heated (intense sunshine). Please note that hot solar fluid can leak from the pressure relief valve when the system pressure is too high! During venting the solar fluid may escape as vapour and cause scalding!

- ➢ Only flush and fill the solar circuit when the collector temperatures are below 70 °C.

NOTICE

Risk of frost!

It often happens that the solar thermal system cannot be completely drained after flushing. Thus, there is risk of frost damage when flushing with water. Therefore, do only use the solar fluid to be used later for flushing and filling the solar installation.

- ➢ Use a water and propylene glycol mixture with max. 50% of propylene glycol as solar fluid.

NOTICE

Note regarding the commissioning sequence

Flush and fill in the following order:

1. Flush the storage tank (to remove scale residues).
2. Fill the storage tank circuit.
3. Vent the heat exchanger by means of the pressure relief valve.
4. Flush and fill the solar circuit of the heat exchanger.
5. Flush and fill the collector field.
6. Flush and fill the entire solar circuit.

This guarantees that the dirt particles are not flushed into the heat exchanger or the FlowRotor and that eventually absorbed heat can be dissipated.

5.1 Preparations before flushing and filling

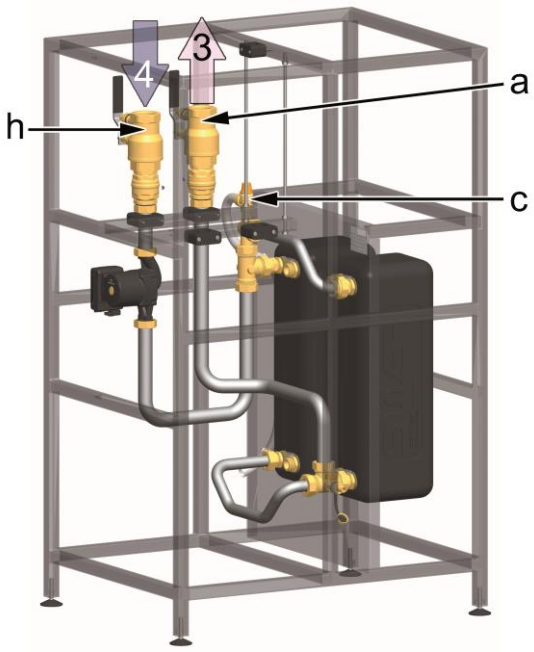
NOTICE

Note regarding the expansion tank

To prevent that the dirt particles in the solar thermal system are flushed into the expansion tank, some manufacturers recommend to disconnect the expansion tank from the solar circuit before flushing and filling. Please observe the instructions of the manufacturer.

5.2 Flushing and filling the storage tank circuit (connections secondary)

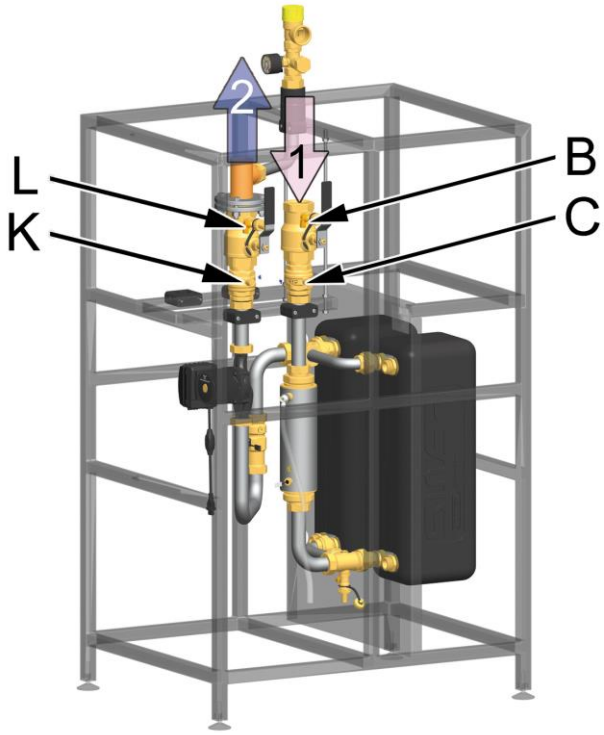
The storage tank circuit is filled by means of the valves and fittings of the heating system. To avoid that dirt particles are washed into the heat exchanger, shut the ball valves of the module and wash out the present dirt particles/scale residues before commissioning the tank. Make sure to only use purified heating water according to VDI 2035 / Ö-Norm H 5195 1.



Storage tank circuit

1. Open the ball valves [a|h] and put the check valves out of operation (180°, see next page).
2. Vent the storage tank circuit by operating the pressure relief valve [c] on the secondary side.
3. Make sure that the electrical components do not get wet.
4. Fill the storage tank circuit by means of the valves and fittings with heating water.
5. Set the required operating pressure of the heating installation after filling the storage tank circuit.
6. If required, vent the station at the pressure relief valve [c] to eliminate air still present in the heat exchanger during operation.

Function check valve



Example: primary circuit

The ball valves [B] and [L] in the primary circuit (see figure) and [a] and [h] in the secondary circuit are equipped with check valves [C] and [K] in order to avoid unwanted gravity circulation.

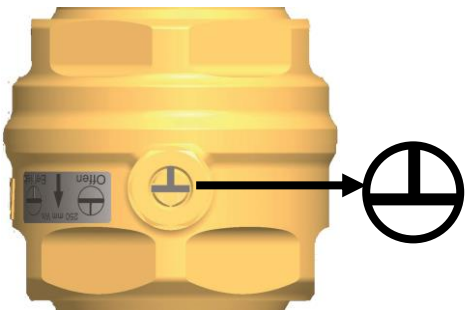
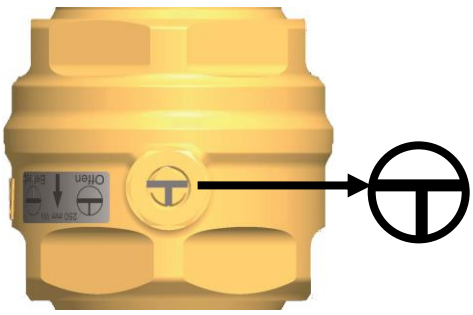
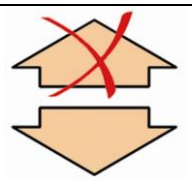
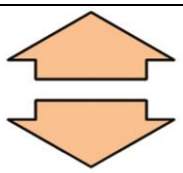
For venting and flushing the installation the check valves must be open.

Turn the opening mechanism of the check valves into **180°** position.

The check valve is not operating, except it is in 0° position.

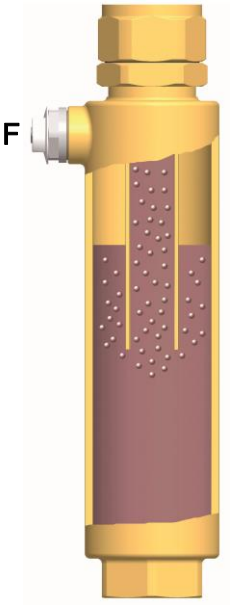
For the operation of the installation all ball valves and valves have to be **completely** open and the check valves have to be put in operating position (position **0°**).

Check valve (Flow direction in the figure: downwards)

	
	
Position 0° Check vale is operating, **flow only in flow direction.**	**Position 180°** Check vale is not operating, **flow in both directions.**

Airstop

The Airstop with manual vent valve is used to vent the solar installation. To ensure perfect deaeration of the solar circuit, the flow velocity must be at least 0.3 m/s in the flow line.



Pipe diameter [mm]		Flow rate at 0.3 m/s	
∅ outside	**∅ inside**	l/h	**l/min**
15	**13**	~ 143	**~ 2.4**
18	**16**	~ 217	**~ 3.6**
22	**20**	~ 339	**~ 5.7**
28	**25**	~ 530	**~ 8.8**
35	**32**	~ 869	**~ 14.5**
42	**39**	~ 1290	**~ 21.5**
54	**50**	~ 2121	**~ 35.3**

The air separated from the solar fluid is collected in the upper part of the Airstop and can be released at the vent plug [F].

WARNING

Danger of scalding due to vapour escape!

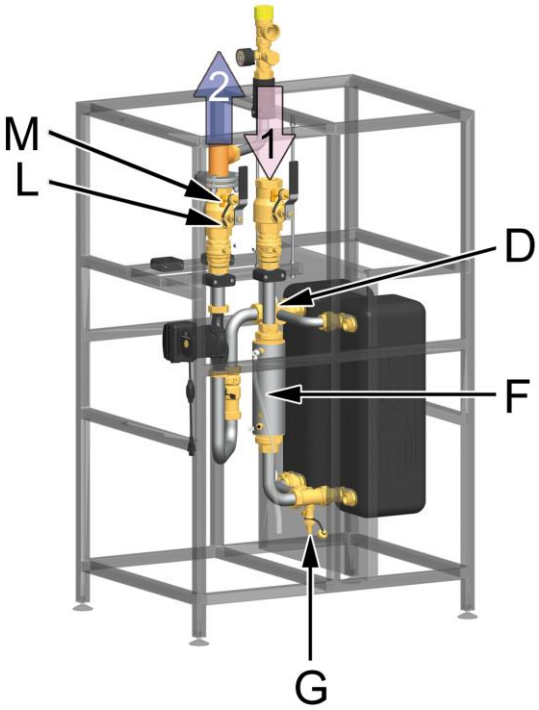
The escaping fluid can have a temperature of more than 100 °C and cause scalding.

- Carefully open the vent plug and close it again, as soon as medium escapes.

Venting the solar thermal system after commissioning

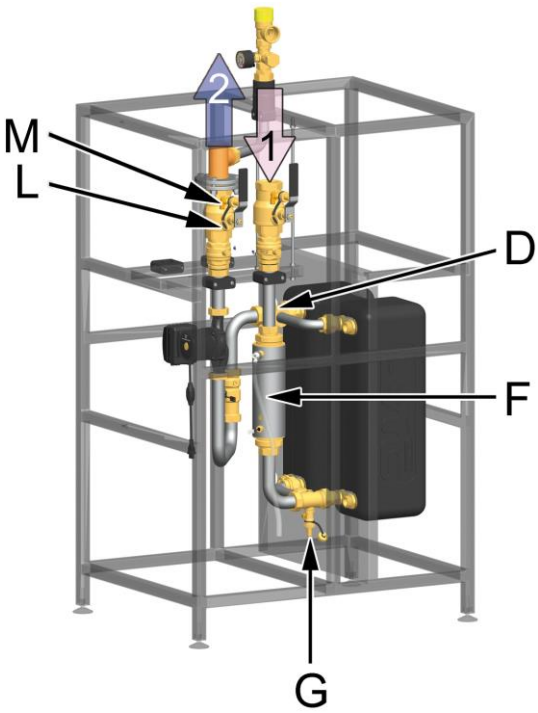
At the beginning, vent the solar installation daily and then weekly or monthly, depending on the vented air quantity. Thus, an optimum operation of the solar installation is ensured. Check the system pressure after venting and increase it to the specified operating pressure, if necessary.

5.3 Flushing and filling the solar circuit (connections primary)



Solar circuit

1. Switch off the solar pump (see controller instructions).
2. Disconnect the expansion tank from the solar installation. This avoids the access of dirt particles present in the pipes to the expansion tank. Observe the separate instructions regarding the expansion tank!
3. Connect the flush and fill station:
   - pressure hose to the fill and drain valve [G]
   - flush hose to the fill and drain valve [M] of the return ball valve [L].
4. Open the fill and drain valves [G|M] and put the flush and fill station in operation.
5. Vent the station at the vent valve [D] and at the Airstop [F].
6. Close the return ball valve [L] as soon as fluid exits from the flush hose.
7. Fill the installation slowly and vent it at the collector, because the air can only escape slowly. Otherwise the mixture of air and water spreads over the entire circuit.
   When you have finished filling the installation, begin flushing it.
8. Slowly open and close the return ball valve [L] during flushing in order to vent the pump section.
9. Flush the solar circuit until the solar fluid exits without bubbles.



Solar circuit

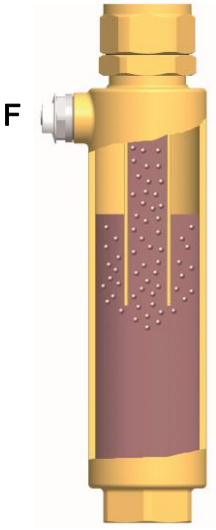
10. If possible, flush each collector field separately!
11. Close the fill and drain valve [M] with the filling pump running and increase the system pressure to about 5 bars. The system pressure can be read on the pressure gauge.
12. Close the fill and drain valve [G] and switch off the pump of the flush and fill station.
13. Check the pressure gauge to see whether the system pressure reduces and eliminate leaks where necessary.
14. Reduce the pressure on the fill and drain valve [M] to the system-specific pressure.
15. Connect the expansion tank to the solar circuit and set the operating pressure of the solar thermal system by means of the flush and fill station (for the required operating pressure, see instructions of the expansion tank).
16. Close the fill and drain valves [G|M].
17. Open the return ball valve [L].

WARNING

Risk to life and limb due to electric shock!

- Check if the sensors and the pumps are properly connected to the controller and if the controller housing is closed. Only then should the mains plug of the controller be plugged into a socket.

SC5.14



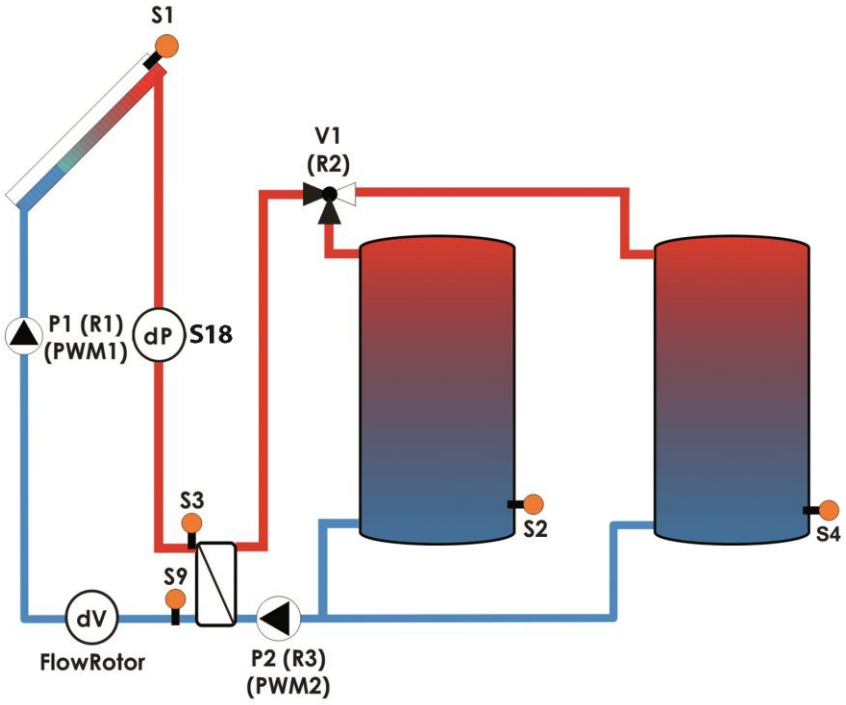
18. Connect the controller to the mains and set the solar circuit pump in the manual mode to ON according to the controller instructions.
19. Let the solar pump run at maximum rotation speed for at least 15 minutes. Meanwhile vent the solar installation several times at the vent plug [F] of the airstop until the solar fluid exits without bubbles (see page 18).
20. If necessary, increase the system pressure to the operating pressure.
21. Remove the hoses of the flush and fill station and screw the sealing caps onto the fill and drain valves.
    The sealing caps only serve to protect the valves against dirt. They are not designed to take up high system pressures. The ball valves must be closed.
22. Mount the insulation.
23. Set to automatic mode on the controller (see controller instructions).

The commissioning of the solar installation is now completed.
Please fill in completely the commissioning report on page 33.

5.4 Parameter: SolexMega with controller SC5.14

The parameters for the sensors and pumps are preset in the controller. If you select and save another system, the parameters are reset to the factory setting. In this case you need to set the following parameters in the menu. In this way you make sure that the installation will work properly. You can find a detailed description for the operation of the controller in the separate controller manual.

Preset system SolexMega HZ



6 Maintenance [specialist]

Make sure that the system is not under pressure and shut off the expansion tank during service and maintenance works at the station.

WARNING

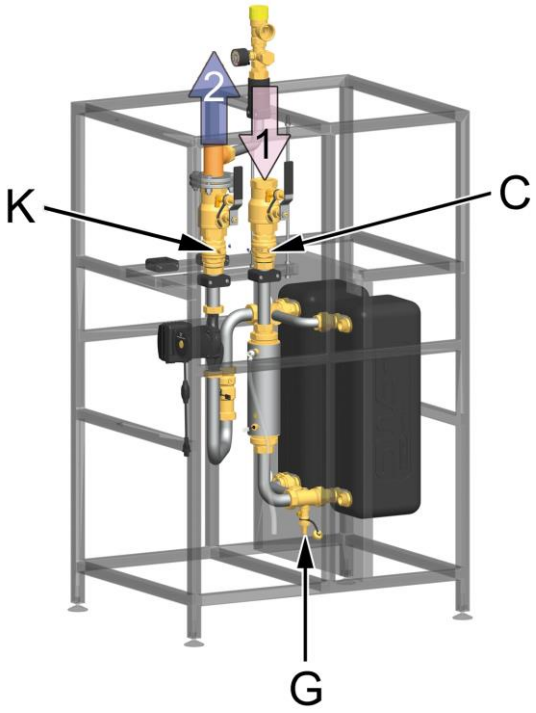
Risk of burns and scalding!

The valves, fittings and solar fluid can reach temperatures of more than 100 °C. The solar fluid can escape as vapor and cause scalding.

- ➢ Only carry out maintenance work when the collector temperatures are below 50 °C.
- ➢ Wait until the solar fluid has cooled down to max. 50 °C.

1. Switch off the controller and make sure that a restart is not possible.
2. Close the shutoff valves and drain the solar fluid or the heating water.
   Make sure that the solar fluid is collected in a heat-resistant container.
3. Change the faulty part against the new part.
4. Fill the installation as described in **5 Commissioning [specialist]** (see page 15).

6.1 Draining the solar station



1. Switch off the controller and make sure that a restart is not possible.
2. Open the check valves [C|K] in the flow and return ball valve by turning them to position **180°** (see page 17).
3. Connect a heat-resistant hose to the fill and drain valve [G]. Make sure that the solar fluid is collected in a heat-resistant container.

WARNING

Danger of scalding due to hot solar fluid!

The escaping fluid may be very hot.

- Place the collecting container so that people standing nearby are not endangered when the solar installation is being emptied.

4. Open the fill and drain valve [G] of the transfer station.
5. To accelerate draining of the solar circuit, you can open the vent valve, if present, at the highest point of the solar thermal system.
6. Dispose of the solar fluid observing the local regulations.

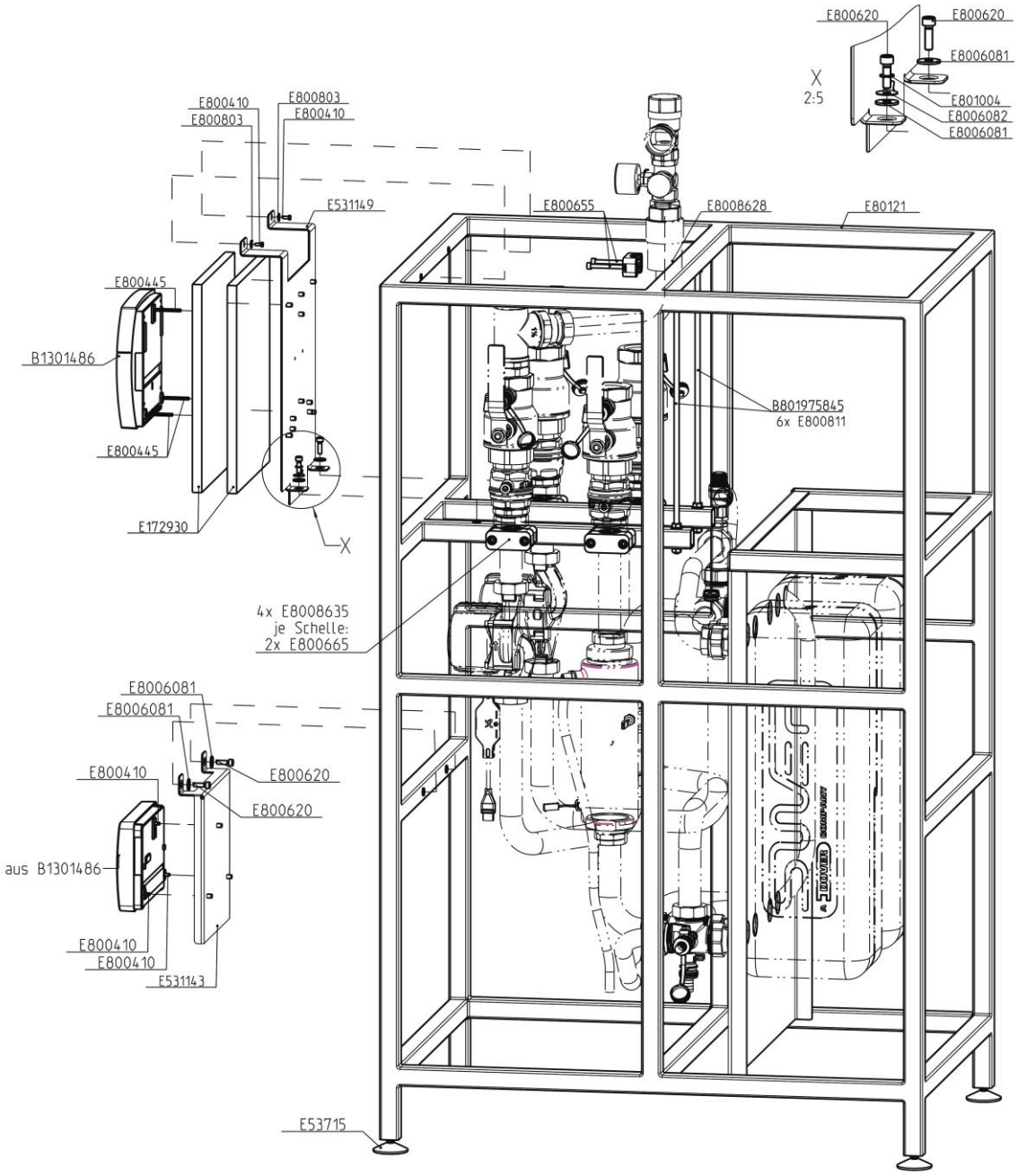
7 Spare parts [specialist]

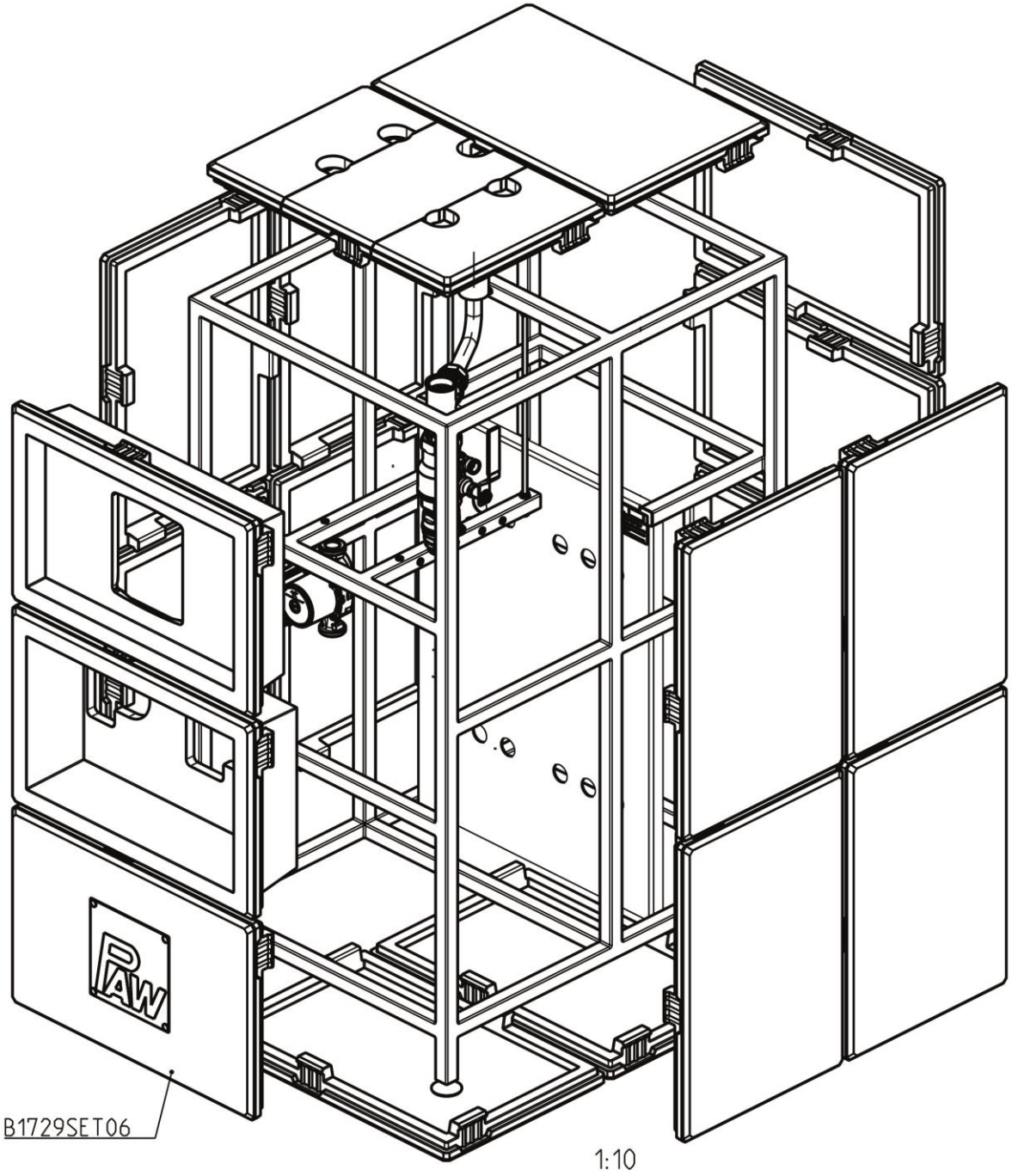
NOTICE

Complaints and requests/orders of spare parts will only be processed with information on the serial number! The serial number is placed in the upper right corner of the support sheet in the station.

- In case of a complaint, please send us the completely filled commissioning report on page 33.

7.1 Controller and insulation

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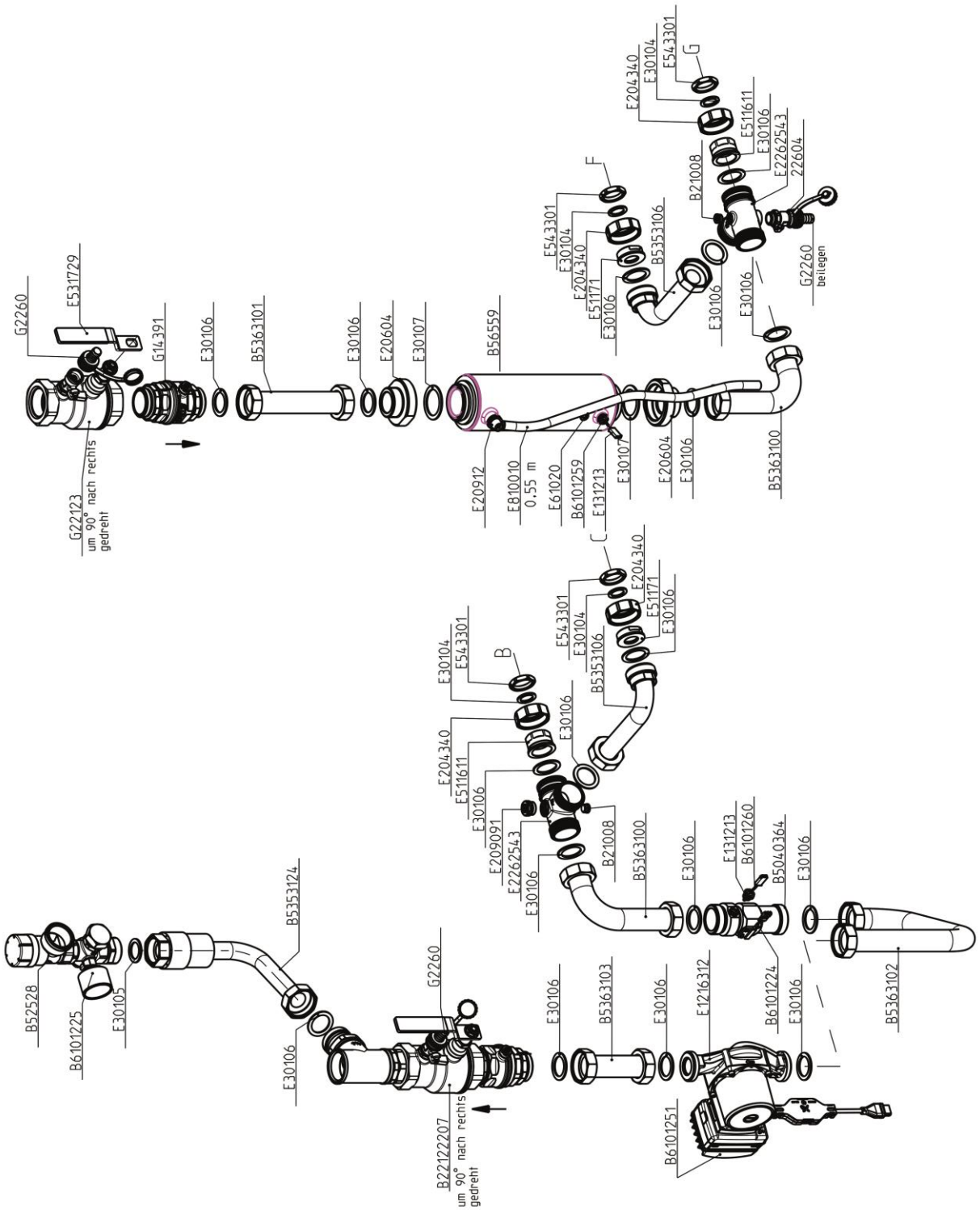
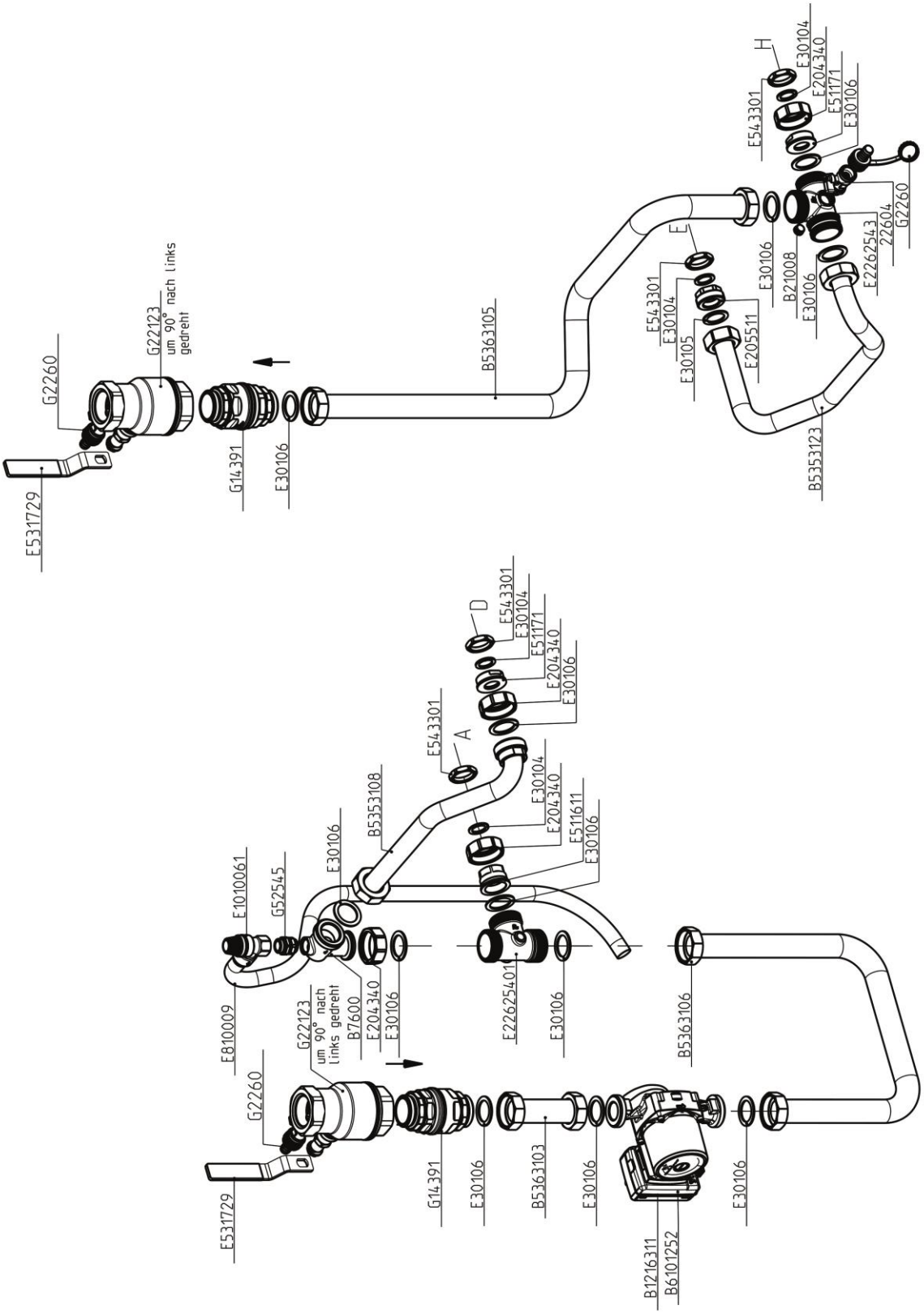
7.2 Hydraulics primary circuit



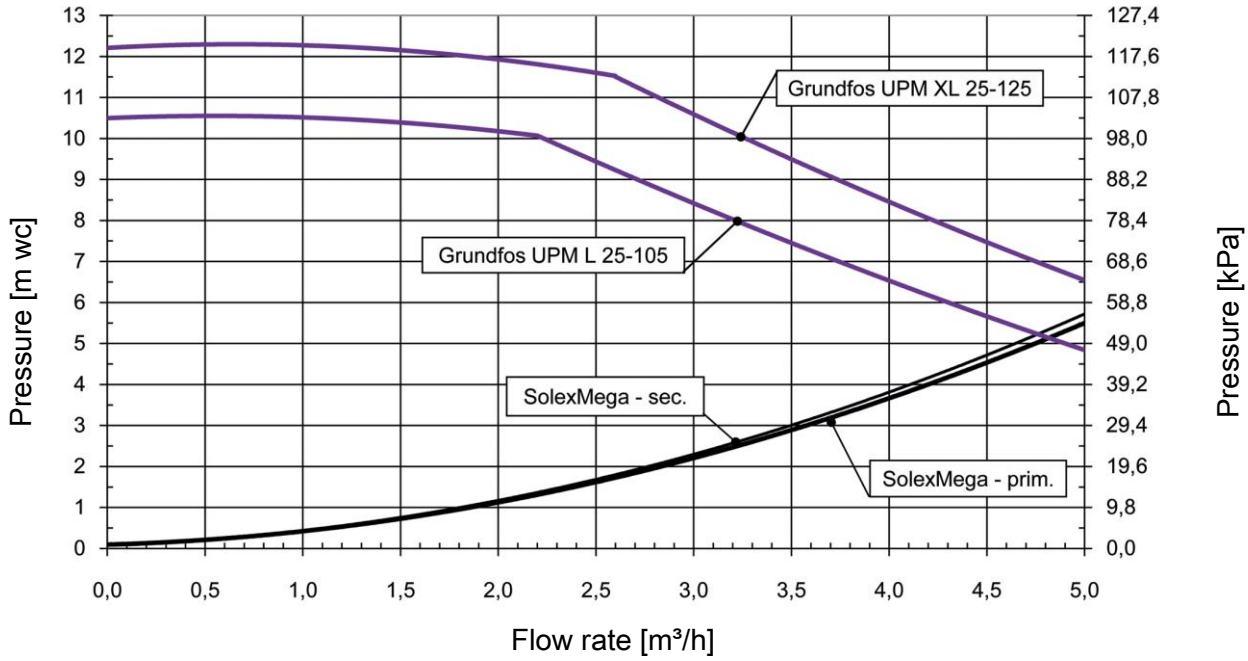
7.3 Hydraulics secondary circuit



8 Technical data

Dimensions	SolexMega HZ
Height (total)	1649 mm + change of the stand feet approx. 15 mm
Width (total)	710 mm
Depth (total)	920 mm
Centre distance primary circuit:	158 mm
Centre distance secondary circuit:	158 mm
Pipe connections primary circuit	1½" internal thread
Pipe connections secondary circuit	1½" internal thread
Connection for expansion tank	1" external thread, flat sealing
Outlet pressure relief valve	primary: 1¼" internal thread / secondary: ¾" internal thread
Operating data	
Max. admissible pressure	prim.: 6 bars / sec.: 6 bars
Max. operating temperature	prim.: 120 °C / sec.: 95 °C
Max. stagnation temperature	140 °C primary
Max. propylene glycol content	50 %
Operating temperature sensors	-25 °C to +120 °C
Equipment	
Pressure relief valve	prim.: 6 bars / sec.: 6 bars
Pressure gauge	0-6 bars (primary)
Flow rate measurement device	FlowRotor, measuring range: 5-130 l/min, 55 Imp./litre
Sensors	2 x Pt1000 (mounted)
Check valves	prim.: 2 x 200 mm wc, can be opened sec.: 2 x 200 mm wc, can be opened
Materials	
Valves and fittings	Brass
Gaskets	EPDM or AFM 34, asbestos-free
Check valves	Brass
Insulation station	EPP, λ = 0.039 W/(m K)
Insulation heat exchanger	EPP, λ = 0.035 W/(m K)
Admissible medium	primary: propylene glycol (max. 50 %) secondary: heating water according to VDI 2035 / Ö-Norm H 5195-1

8.1 Pressure drop characteristic curve SolexMega HZ



9 Function of the check valves [specialist]

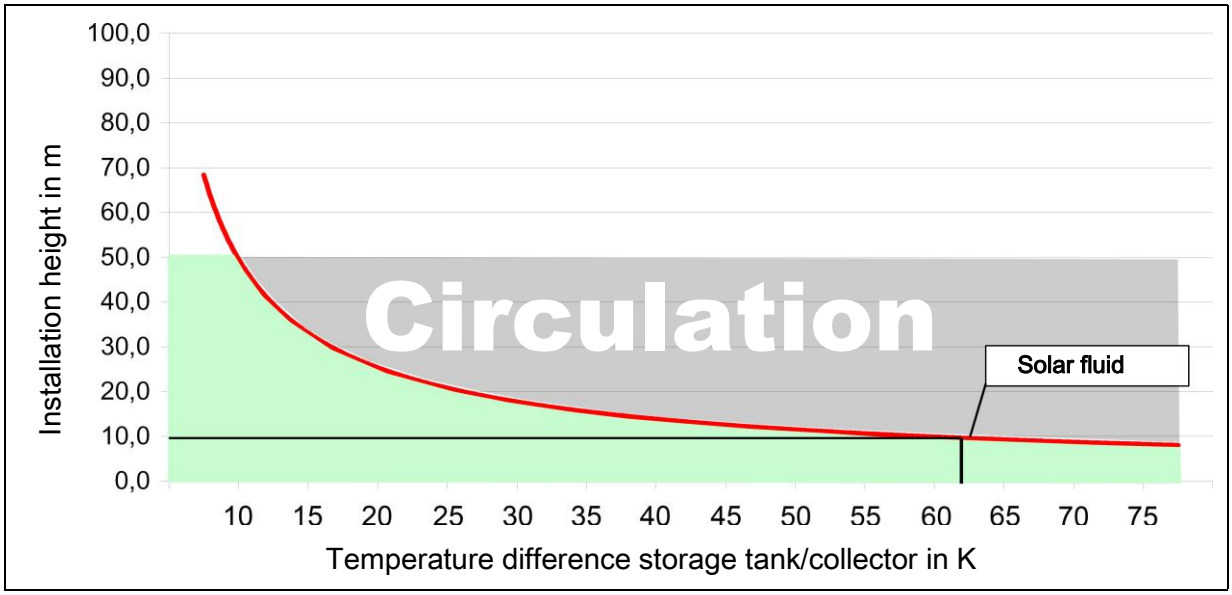
Within their application range, the check valves in this station prevent unwanted gravity circulation. The efficiency of the check valves depends on:

- the installation height
- the temperature difference between the storage tank and the collector
- the type of heat transfer medium

In the diagram below, you can see if the check valves integrated in the station are sufficient. If the check valves are not sufficient, additional components must be installed to prevent gravity circulation. Components such as syphons ("heat traps"), 2-way valves (zone valves) or additional check valves can be mounted.

Example:

- The station comprises two check valves (2 x 200 mm wc = **400 mm wc**).
- You use a mixture of water and 40% of propylene glycol as a **solar fluid**.
- The installation height between the collector and the storage tank is **10 m.**



Result:

The check valves prevent gravity circulation up to a temperature difference of about **62 K**. If the temperature difference between the collector and the tank is larger, the difference in density of the solar fluid will be so large, that the check valves are pushed open.

Do you wish to get further information?

The density of the solar fluid decreases with rising temperature. In high installations with large temperature differences, the difference in density will cause gravity circulation. This circulation can cool down the storage tank.

Calculation example: **$\Delta p = \Delta \rho * g * h$**

Collector temperature: 5 °C → Density solar fluid ρ_1 = 1042 kg/m³

Storage tank temperature: 67 °C → Density solar fluid ρ_2 = 1002.5 kg/m³

$\Delta \rho = \rho_1 - \rho_2$ = 39.5 kg/m³

g = 9.81 m/s²

Installation height h = 10 m

Δp = 3875 Pa = 395 mm wc

The two check valves in the station (2 x 200 mm wc) are sufficient for an installation height of 10 m and a temperature difference between the collector and the tank of up to 62 K.

10 Commissioning report

Installation operator _____

Location of installation _____

Collectors (number / type) _____

Collector surface _____ m²

Installation height _____ m (Difference in height between station and collector field)

Pipes ⌀ = _____ mm l = _____ m

Venting (collector field) ☐ Not existent ☐ Vented

☐ Manual vent valve ☐ Automatic vent valve

Airstop (station) ☐ Vented

Solar fluid (type) _____ % glycol

Antifreeze (tested up to): _____ °C

Flow rate _____ l/min

Pump (type) _____

_____

_____

System pressure _____ bars

Expansion tank (type) _____

Initial pressure _____ bars

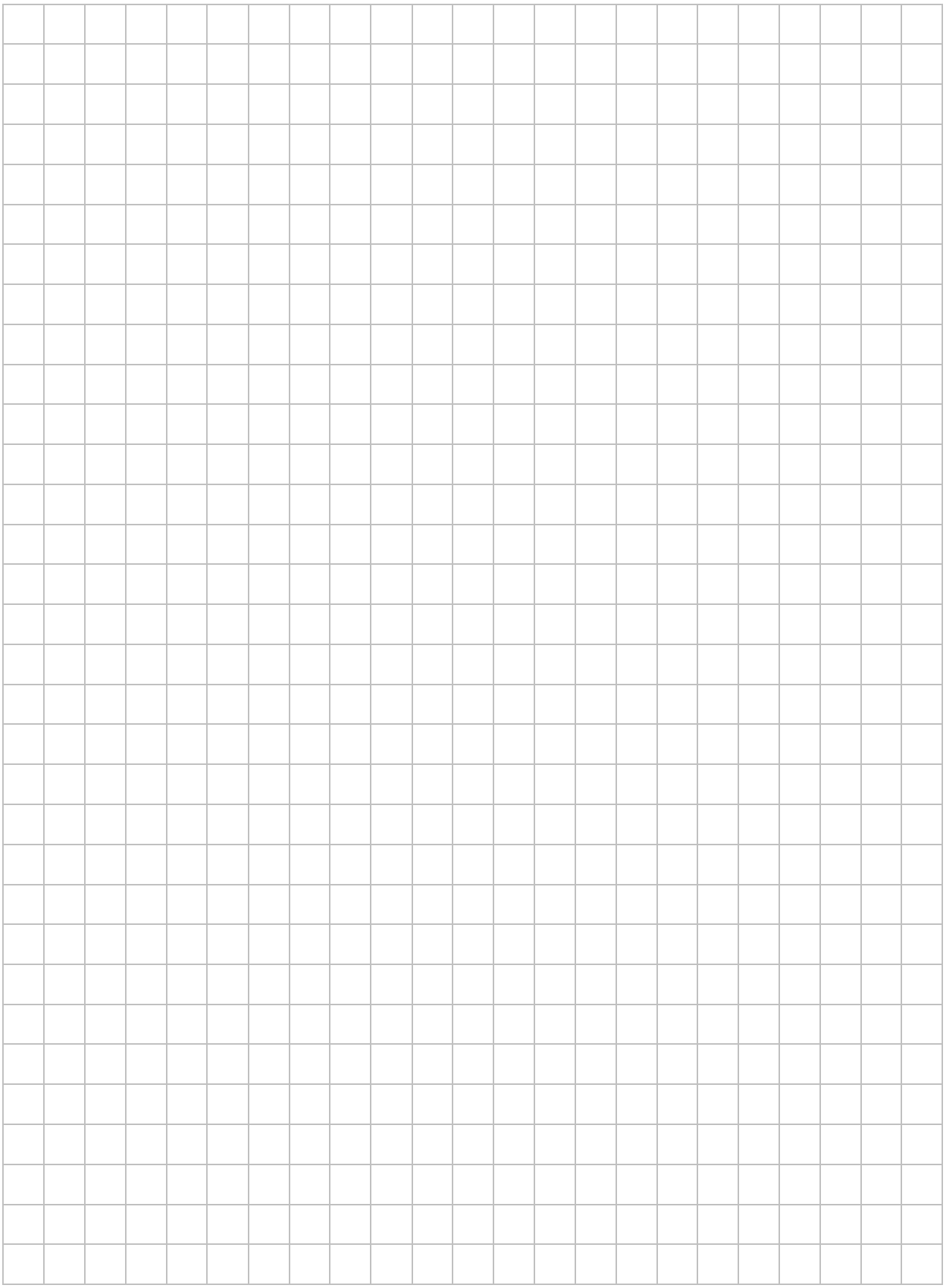
Pressure relief valve ☐ Checked

Check valves ☐ Checked

Serial numbers	
Station	
Flow rate sensor	
Temperature sensor	
Controller	
Software version	

Plumbing company

Date, signature



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