

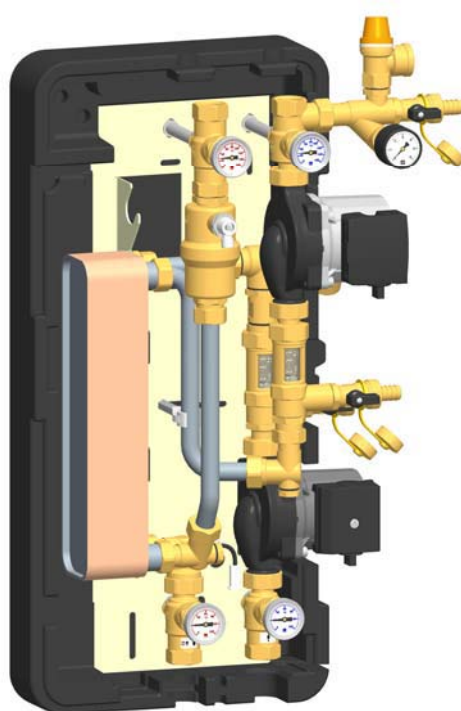


## Installation and Commissioning Instructions

### Transfer Stations:

SolexMini Basic / Premium HZH / HZL

[Hydraulics]





Item no. 99609180xWx – Version V03 – Issued 2010/09

Translation of the original instructions

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## 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 Scope of these instructions

These instructions describe the functioning, installation, commissioning and operation of the SolexMini transfer stations with Basic or Premium equipment and with the versions HZH / HZL. For other components of the solar system, such as collectors, storage tanks, expansion tanks and controllers, please observe the instructions of the corresponding manufacturer. The chapters called [specialist] are intended for specialists only.

#### SolexMini Basic

Equipment	SolexMini	Controller	Item number	Flow rate (max.)	Collector surface (max.)
Basic	HZH		6091803WS	750 l/h	20 m <sup>2</sup>
Basic	HZH		6091903WS	750 l/h	20 m <sup>2</sup>
Basic	HZL		6091804WS	450 l/h	20 m <sup>2</sup>
Basic	HZL		6091904WS	450 l/h	20 m <sup>2</sup>

#### SolexMini Premium

Equipment	SolexMini	Controller	Item number	Flow rate (max.)	Collector surface (max.)
Premium	HZH		6091803WH	750 l/h	20 m <sup>2</sup>
Premium	HZL		6091804WH	450 l/h	20 m <sup>2</sup>

## 1.2 Product description

SolexMini is a premounted group of valves and 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 optionally a preset controller as well as important fittings and safety devices for the operation of the system:

- Ball valves with integrated thermometers in the solar circuit (flow and return)
- Ball valves with integrated thermometers in the 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 return of the secondary circuit
- Pressure relief valves to prevent inadmissible overpressures
- Pressure gauge to display the system pressure in the solar circuit
- Fill and drain valves to flush, fill and drain the solar circuit
- Vent valves to easily vent the solar circuit
- Basic version with two FlowChecks on the primary and secondary side for balancing the flow rates
- Premium version with electronic flow rate sensors for heat quantity balancing (secondary) and speed control of the secondary pump depending on the performance

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. 5302) and the tank connector (item no. 5310), which are also separately available, allow the expansion tank to be easily mounted and separated from the solar system.

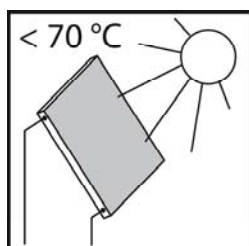
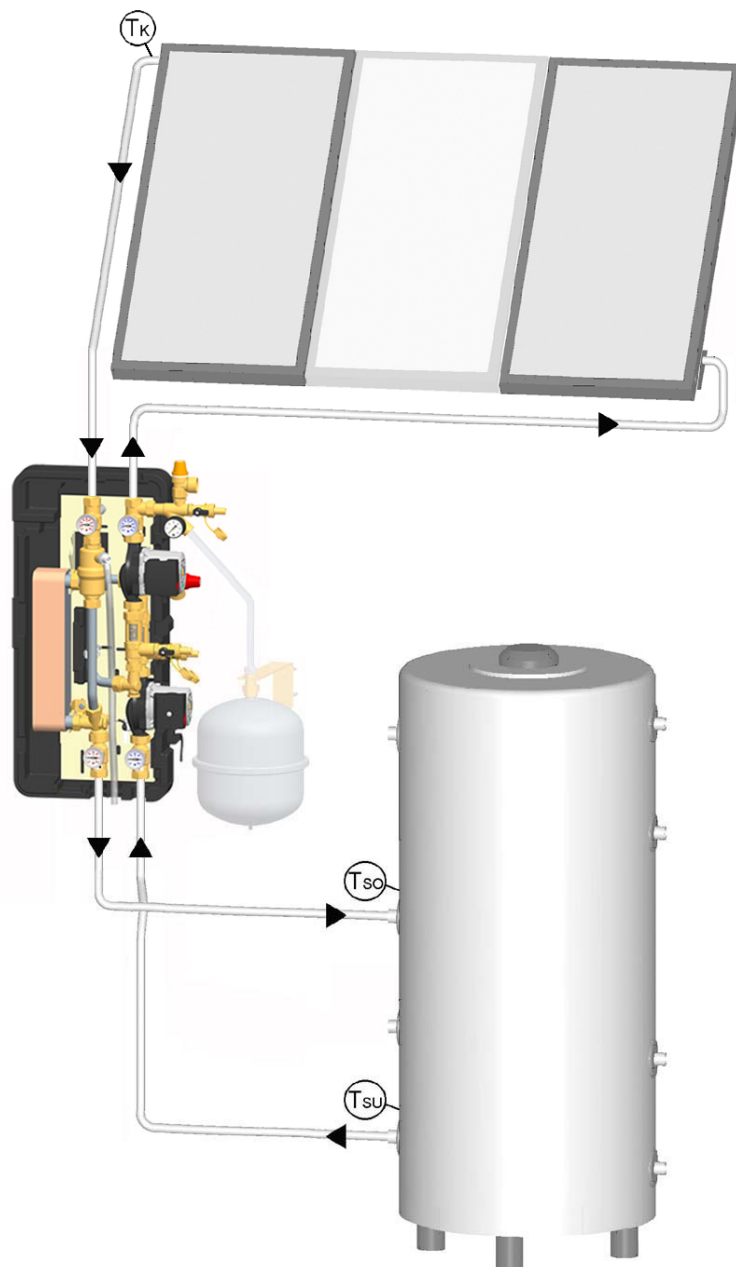
A supplementary set for heat quantity measurement (item no. 131922) may be ordered separately to the Basic transfer station.

Only use PAW accessories with the transfer station.

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

### 1.3 Designated use

SolexMini 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. Improper usage excludes any liability claims.





When the sun shines, the collector can become very hot. The solar fluid in the circuit can heat up to more than 100 °C.



Only flush and fill the solar circuit when 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

	<div data-bbox="357 846 1457 920" style="background-color: yellow; padding: 5px;">  <b>WARNING</b> </div> <p><b>Danger of scalding due to vapour escape!</b></p> <p>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.</p> <ul style="list-style-type: none"> <li>➤ Observe the instructions regarding the pressure relief valve.</li> </ul>
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	<div data-bbox="357 1258 1457 1332" style="background-color: yellow; padding: 5px;">  <b>CAUTION</b> </div> <p><b>Personal injury and damage to property due to overpressure!</b></p> <p>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!</p> <ul style="list-style-type: none"> <li>➤ Only close the ball valves for service and maintenance.</li> </ul>
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**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.

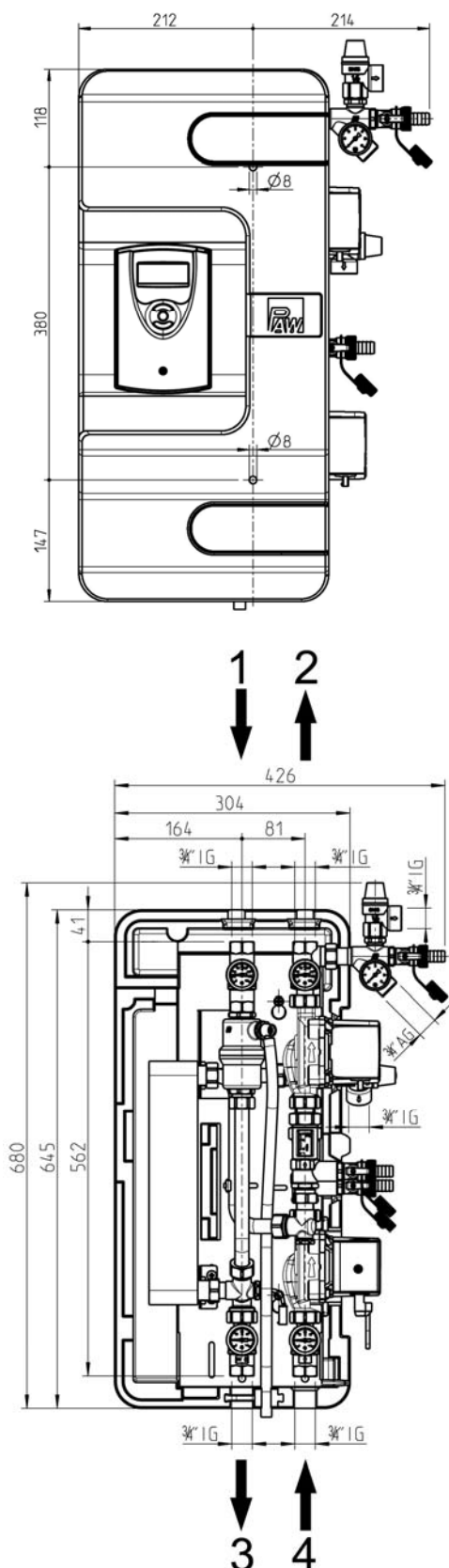
**NOTICE****Material damage due to mineral oils!**

Mineral oil products cause lasting damage to seals made of EPDM, whereby the sealant properties are 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 Assembly and installation [specialist]

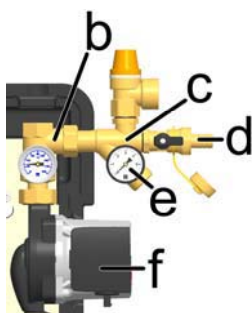


The location of installation must be dry, load-carrying and frost-proof. Furthermore, the access to the control and safety equipment must be guaranteed at all time during operation!

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!

1. Copy the mounting holes to the mounting surface.  
You can find a corresponding drill template on the paper board under the station.
2. Drill the holes and insert the enclosed wall plugs into the holes.
3. Screw in the screws and let them stick about 3 cm out of the wall.
4. Remove the insulating front shell. Hang the station onto the screws and tighten the screws.
5. Connect the transfer station to the system:
  - [1] → Solar flow (from the collector)
  - [2] → Solar return (to the collector)
  - [3] → Flow to the buffer tank
  - [4] → Return from the buffer tank

All screw connections have 3/8" internal threads.



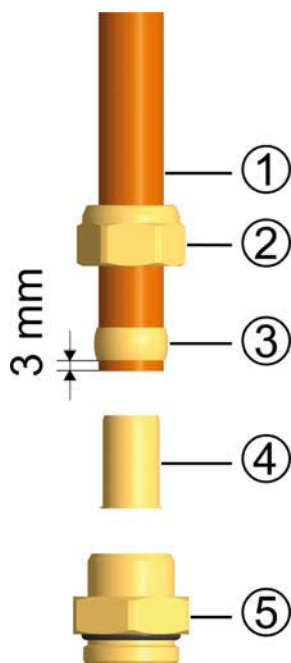
6. Mount the safety equipment [c] to the connection of the return ball valve [b].
7. Connect the pipe for the expansion tank below the pressure gauge [e].
8. Mount the expansion tank.

Note:

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

Pressurise the expansion tank. Observe the separate instructions regarding the expansion tank!

Must be obtained by the customer!





Optional equipment!

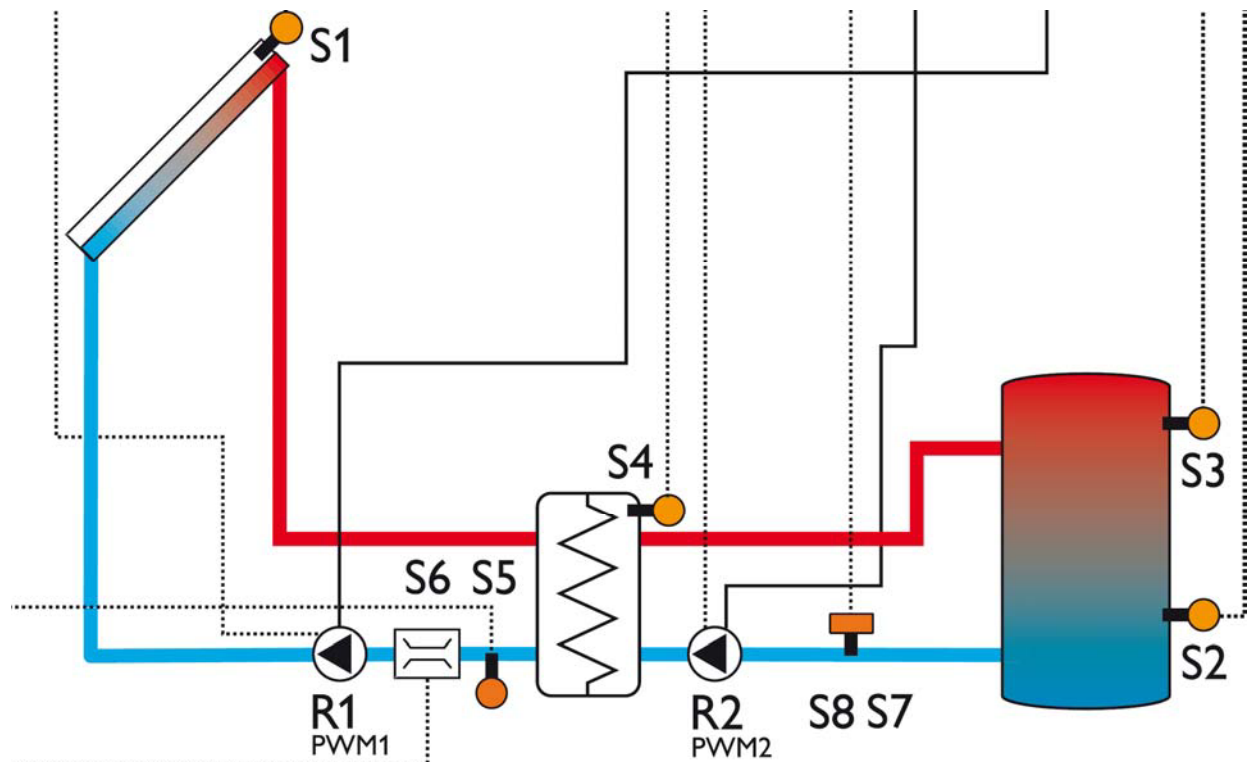
#### Accessories: compression fitting

- Push the union nut ② and the cutting ring ③ onto the copper pipe ①. The pipe must protrude at least 3 mm from the cutting ring in order to ensure the force transmission and the sealing.
- Insert the support sleeve ④ into the copper pipe.
- Insert the copper pipe with the plugged-on individual parts (②, ③ and ④) all the way into the housing of the compression fitting ⑤.
- First screw the union nut ② manually.
- Tighten the union nut ② by rotating one full turn. Secure the housing of the compression fitting ⑤ against distort in order to avoid damaging the sealing ring.

### 3.1 Controller connection

	<div style="background-color: yellow; padding: 5px; border: 1px solid black;">  <b>WARNING</b> </div> <p><b>Risk to life and limb due to electric shock!</b></p> <ul style="list-style-type: none"> <li>➤ Prior to commencing electrical work on the controller, pull the mains plug!</li> <li>➤ Only after completing all installation work, plug the mains plug of the controller into a socket. This avoids an unintentional start of the motors.</li> </ul>
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Possible connection diagram



Observe the separate instructions regarding the controller!

1. Connect the temperature sensors to the controller:



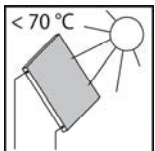
- Collector sensor S1
- Tank sensor bottom S2
- Tank sensor top S3 (optional)

2. Tighten all union nuts and screw connections.

The assembly of the transfer station is now completed and you can put the station into operation.

## 4 Commissioning [specialist]

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

	 <b>WARNING</b>
	<p><b>Risk of burning and scalding!</b></p> <p>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 valves in case of too high system pressure!</p> <p>During venting the solar fluid may escape as vapour and cause scalding!</p> <ul style="list-style-type: none"> <li>➤ Only flush and fill the installation when the collector temperatures are below 70 °C.</li> </ul>

### NOTICE

#### Risk of frost!

It often happens that the solar 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 used later to flush and fill the solar system.

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

### NOTICE

#### Note regarding the commissioning sequence

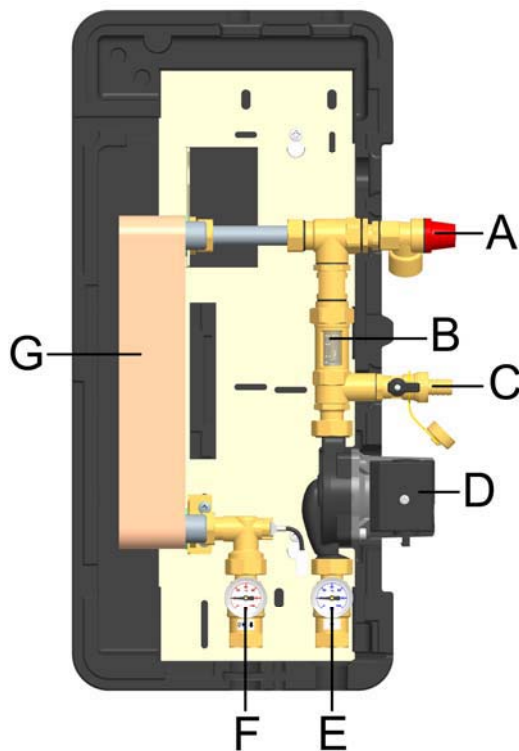
Flush and fill in the following order:

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

#### 4.1 Flushing and filling the storage tank circuit

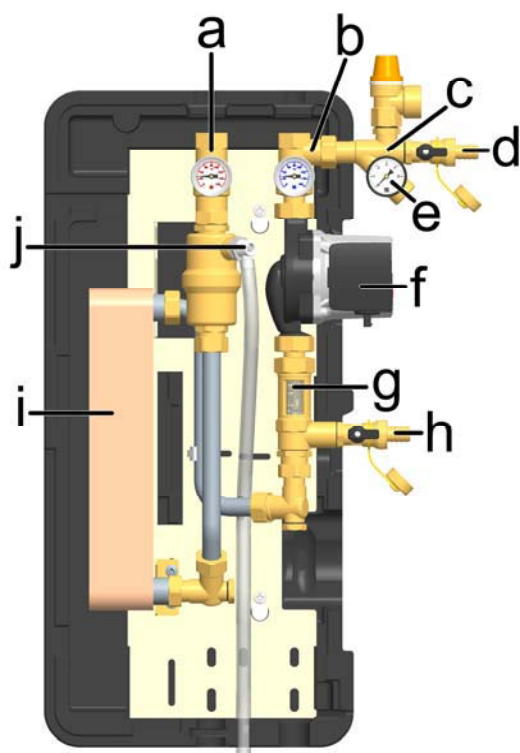
The storage tank circuit is filled by means of the valves and fittings of the heating system. To avoid that dirt particles are washed into the heat exchanger, close the ball valves of the station and wash out the present dirt particles and scale residues before commissioning the tank. Make sure to only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



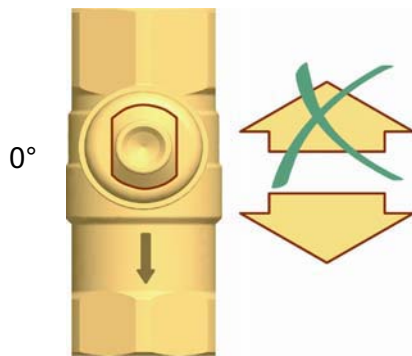
1. Open the ball valves [E|F] and put the check valve of ball valve [F] out of operation (45°, see page 15).
2. Vent the storage tank circuit by operating the pressure relief valve [A] on the secondary side. Make sure that the electrical components do not get wet.
3. Fill heating water into the storage tank circuit by means of the fill and drain valve.
4. Set the required operating pressure after filling the storage tank circuit.
5. During commissioning, vent the station at the pressure relief valve [A] to eliminate air still present in the heat exchanger.

#### 4.2 Flushing and filling the solar circuit

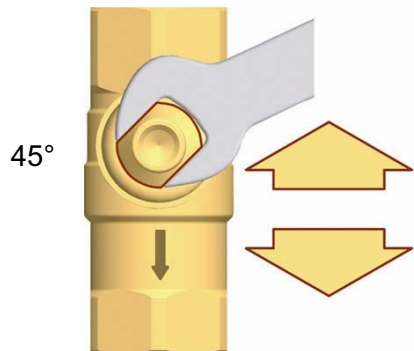
The valves and fittings required to flush and fill are integrated in the transfer station. Make sure not to wash dirt particles into the heat exchanger and the expansion tank. Therefore, only use flush and fill stations with fine filters. The solar circuit is flushed against the flow direction. Make sure that the pump in the solar circuit cannot be switched on.



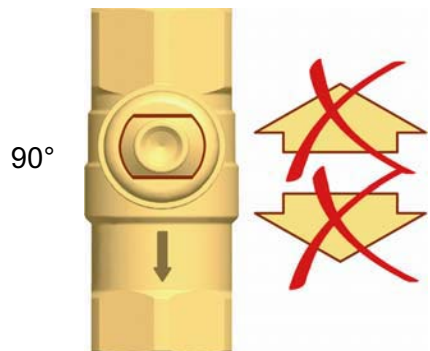
1. Disconnect the expansion tank from the solar system. This avoids the access of dirt particles present in the pipes to the expansion tank.
2. Put the check valve out of operation by turning the flow ball valve [a] to position 45° (see page 15).
3. The return ball valve [b] must stay closed.
4. Connect the flush and fill station:
  - pressure hose to the fill valve [h]
  - flush hose to the drain valve [d].
5. Open the fill and drain valves [h|d] and put the flush and fill station into operation.
6. Slowly open and close the return ball valve [b] during flushing in order to vent the pump section.
7. Flush the solar installation until the solar fluid exits without bubbles.
8. Close the drain valve [d] with the filling pump running and increase the system pressure to about 5 bars. The system pressure can be read on the pressure gauge.
9. Close the fill valve [h] and switch off the pump of the flush and fill station.
10. Check the pressure gauge to see whether the system pressure reduces and eliminate leaks where necessary.



Check valve is operating,  
**flow only in flow direction.**



Check valve is not operating,  
**flow in both directions.**



Ball valve closed,  
**no flow.**



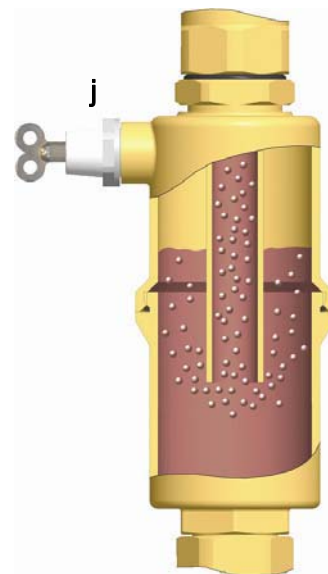
11. Reduce the pressure on the drain valve [d] to the system-specific pressure.
12. Connect the expansion tank to the solar circuit and set the operating pressure of the solar system by means of the flush and fill station (see instructions regarding the expansion tank).
13. Close the fill and drain valves [h|d].
14. Put the check valves into operation by turning the ball valves [a|b|E|F] to position 0°.
15. Connect the controller to the mains. Set the solar circuit pump in the manual mode to ON according to the controller manual.
16. Let the solar circuit pump run at maximum rotation speed for at least 15 minutes.
17. If necessary, increase the system pressure to the operating pressure.
18. Remove the hoses of the flush and fill station and screw the sealing caps onto the fill and drain valves.
19. 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.

## Airstop

The Airstop with manual vent valve is used to vent the solar system.

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	
Ø outside	Ø inside	l/h	l/min
15	13	~ 143	~ 2.4
18	16	~ 217	~ 3.6
22	20	~ 339	~ 5.7



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



### WARNING

**Danger of scalding due to vapour escape!**

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

## Venting the solar system after commissioning

At the beginning, vent the solar system 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.

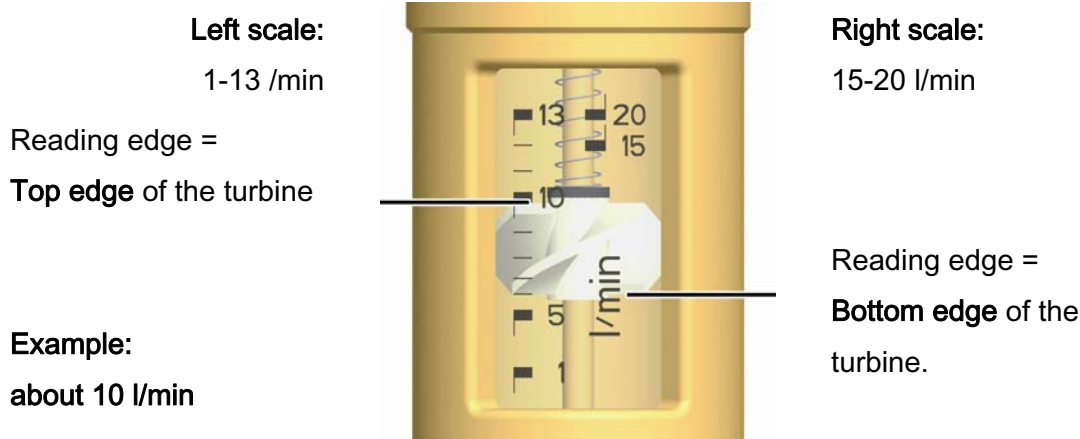


### 4.3 Setting the flow rates (Basic version)

Observe the specifications of the collector manufacturer for the correct adjustment of the flow rate!

1. Switch on the pumps at the controller in manual mode.  
[ Main menu \ Manual \ All relays: max. ]
2. Set the desired speed level (I to III) of the **solar circuit pump** to obtain the required flow rate.  
The current flow rate can be read on the FlowCheck.

The system must be clean and free of air and contaminants to ensure the perfect functioning of the measuring device.



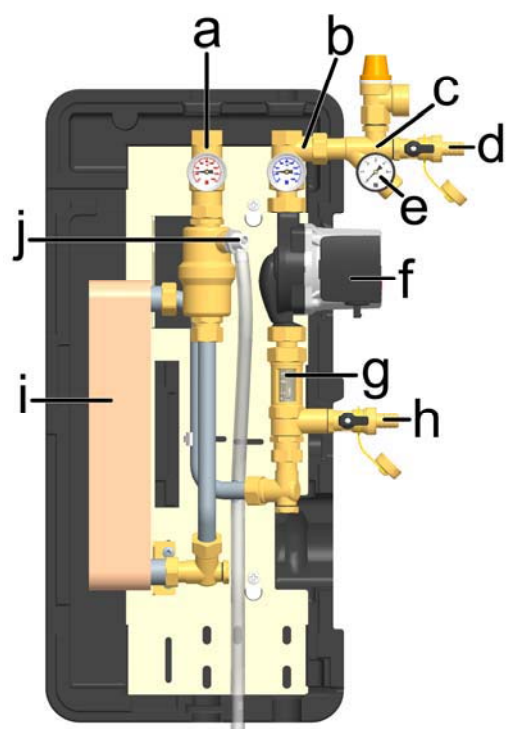
3. Set the speed level of the pump in the **storage tank circuit** to obtain maximally the same flow rate as in the solar circuit.
4. Switch the relays at the controller to automatic mode.  
[ Main menu \ Manual \ All relays: AUTO ]
5. Mount the insulating front shell of the transfer station.

## NOTICE

### Controller preset

Confirming and **saving** a system in the controller will reset the controller to the factory settings and overwrite all presets.

#### 4.4 Draining the solar circuit



1. Switch off the controller and make sure that a restart is not possible.
2. Open the check valves in the flow and return ball valve [a|b] by turning them to position 45°.
3. Connect a heat-resistant hose to the fill valve [h]. Make sure that the solar fluid is collected in a heat-resistant container.



### WARNING



#### Danger of scalding due to hot solar fluid!

The escaping medium may be very hot.

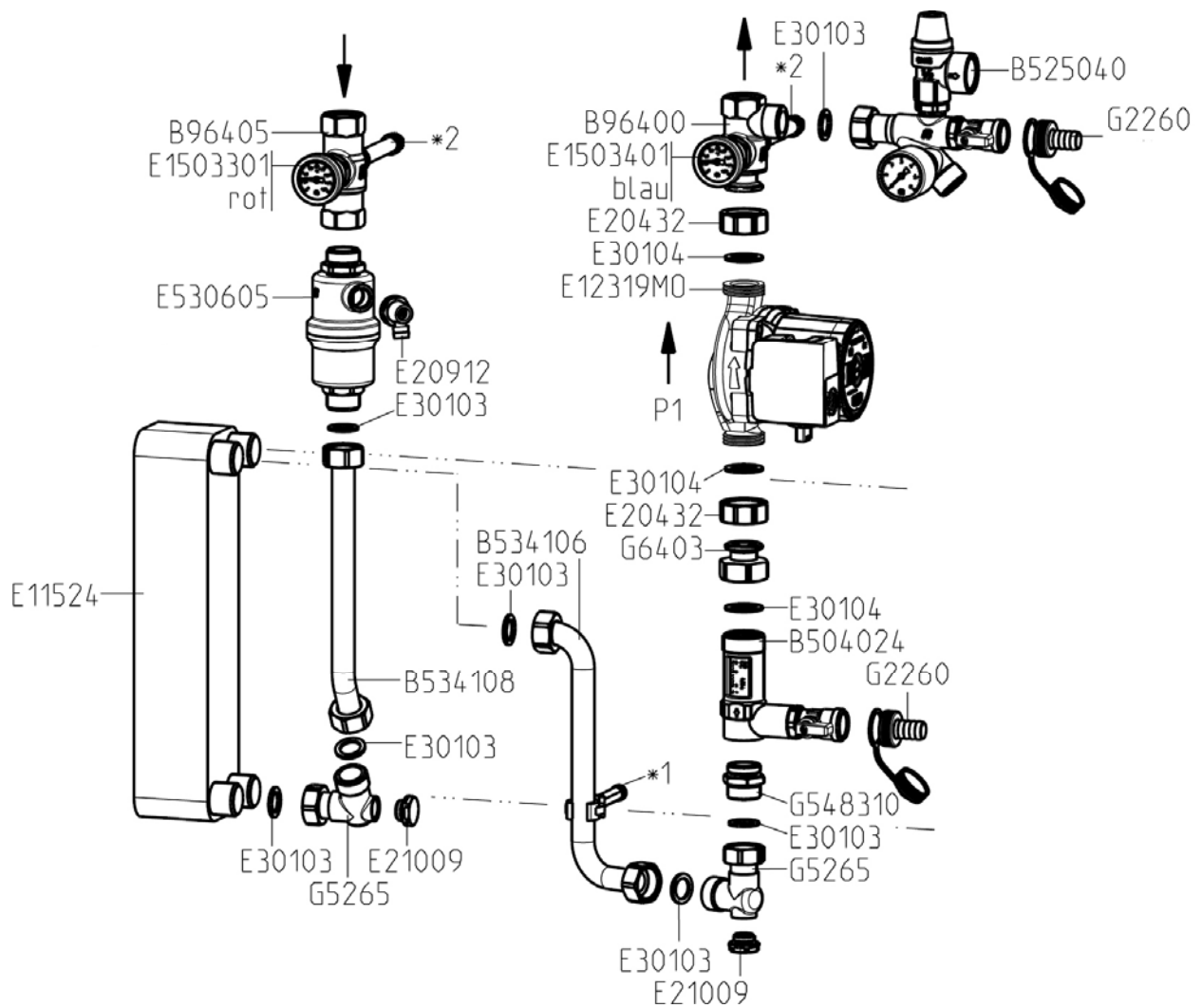
- Place and fix the heat-resistant collecting container so that people standing nearby are not endangered when the solar system is being emptied.

4. Open the fill valve [h] of the transfer station.
5. Open a vent valve that may be present at the highest point of the solar system.
6. Dispose of the solar fluid observing the local regulations.

## 5 Spare parts [specialist]

In case of a complaint, please indicate the serial numbers of the station, the pumps, the controller and the sensors.

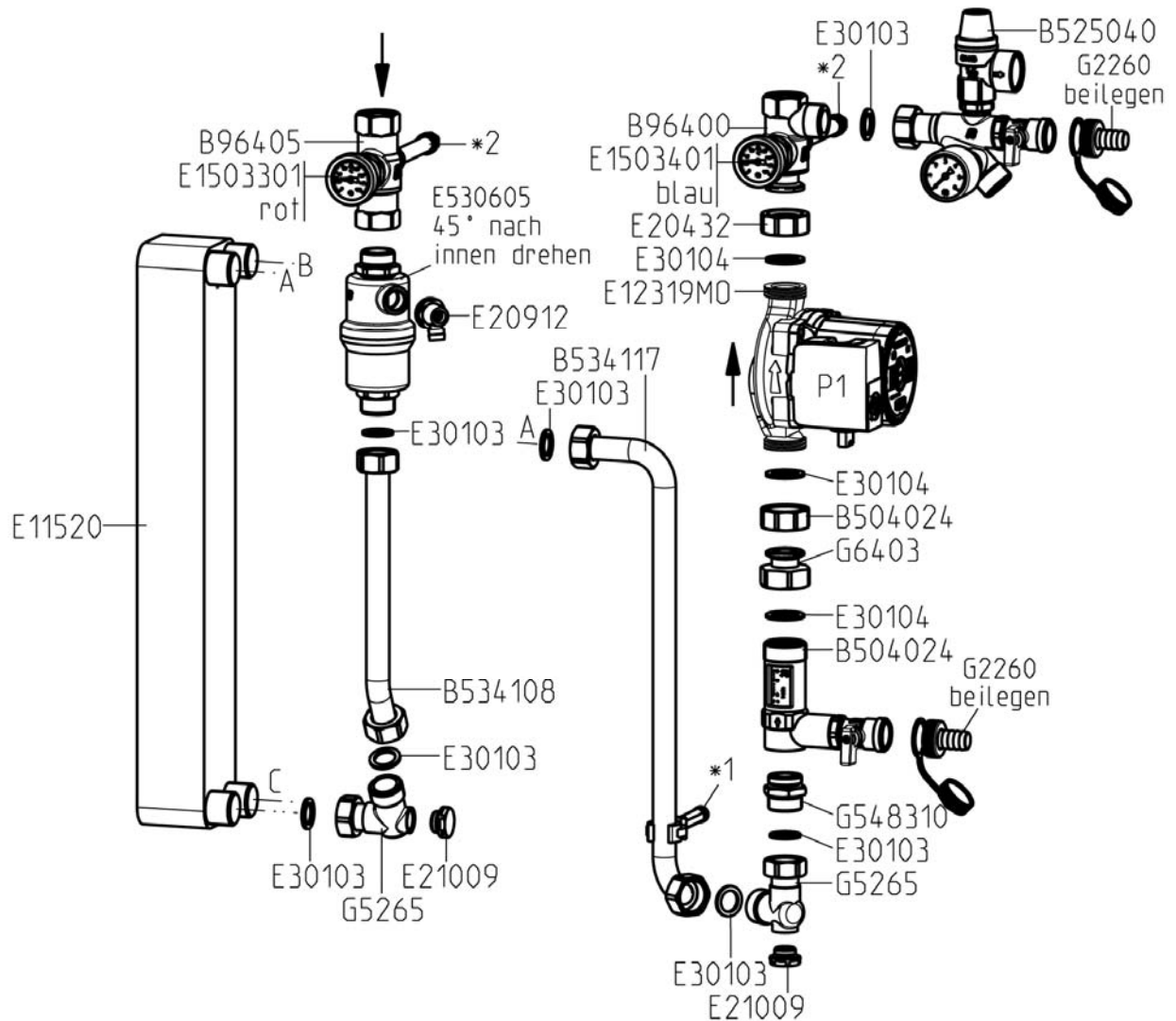
### 5.1 Primary / solar circuit SolexMini Basic HZH (6091803WS)



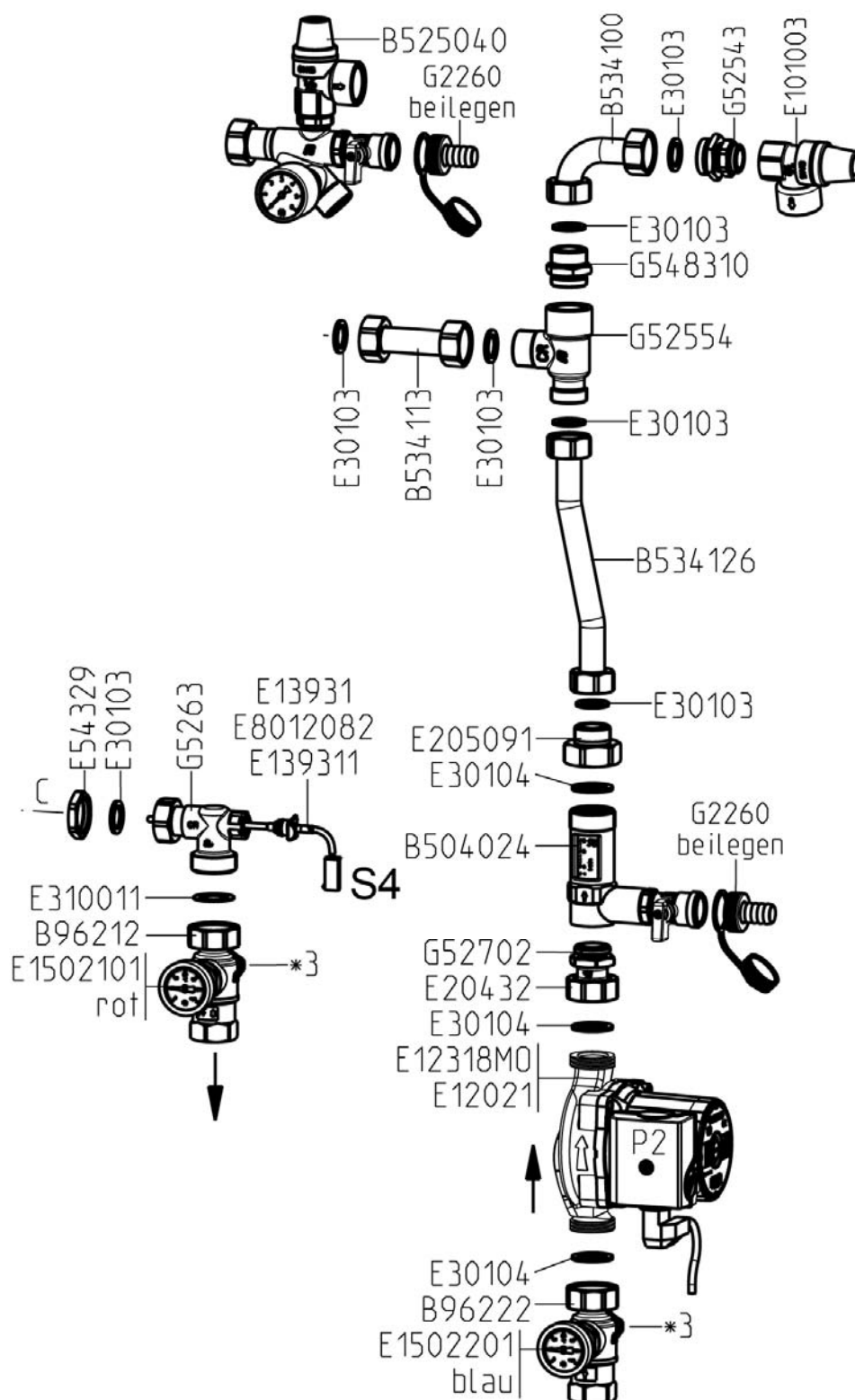
Exploded view diagram of a hydraulic valve assembly. The diagram shows the following components and their assembly sequence:

- Top Components:** E54329, E30103, B534110, E30103, G5255, G52543, E101003.
- Central Components:** E225404, E20503, E30104, G2260 beilegen, B504024, G52702, E20432, E30104, E12318M0, E12021.
- Left Components:** E54329, E30103, G5263, E13931, E8012082, E139311, S4, E310011, B96212, E1502101 rot, \*3.
- Right Components:** E30104, B96222, E1502201 blau, \*3.
- Assembly Instructions:**
  - Arrow pointing down from the left valve assembly.
  - Arrow pointing up from the right valve assembly, labeled P2.

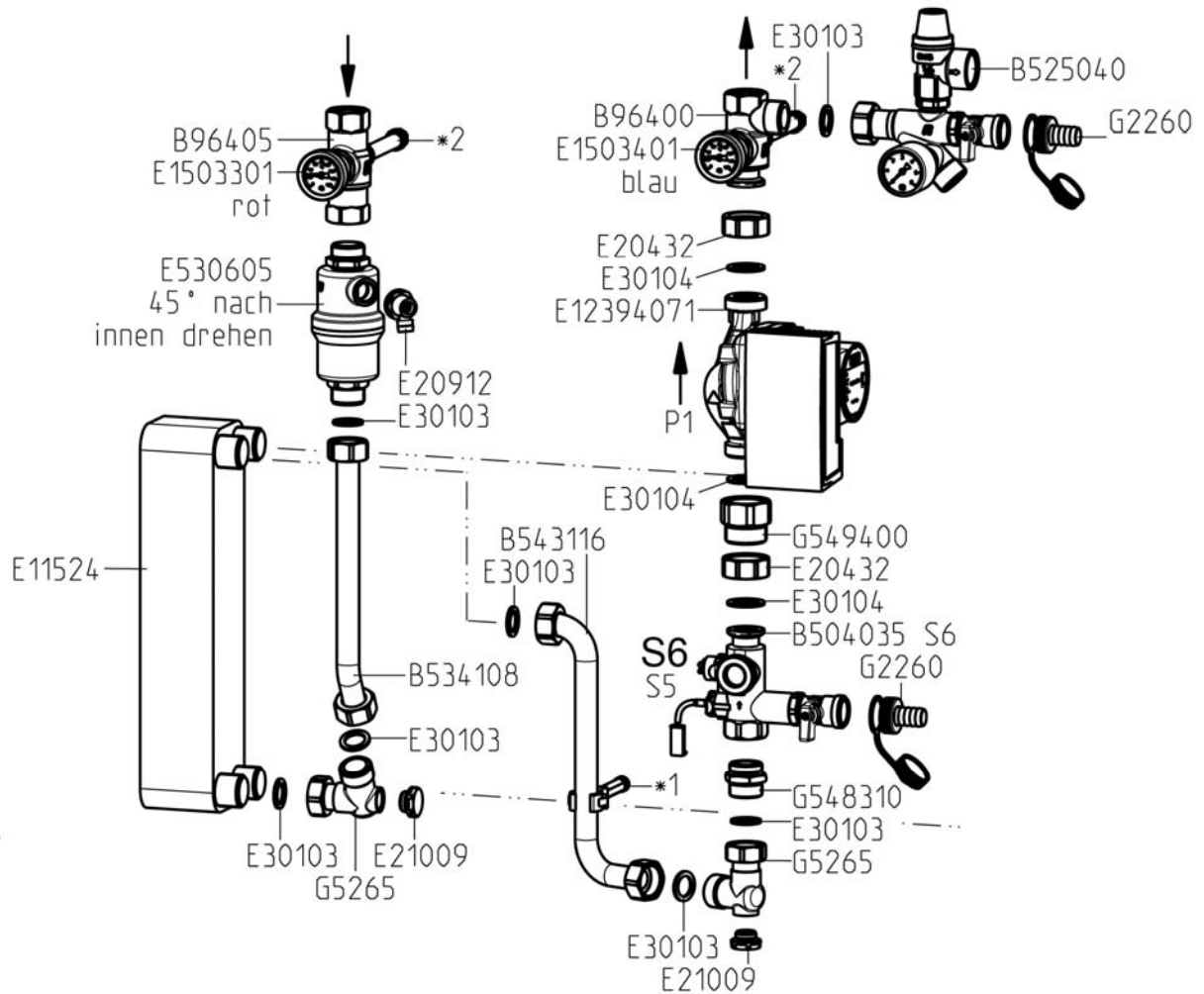
### 5.3 Primary / solar circuit SolexMini Basic HZL (6091804WS)



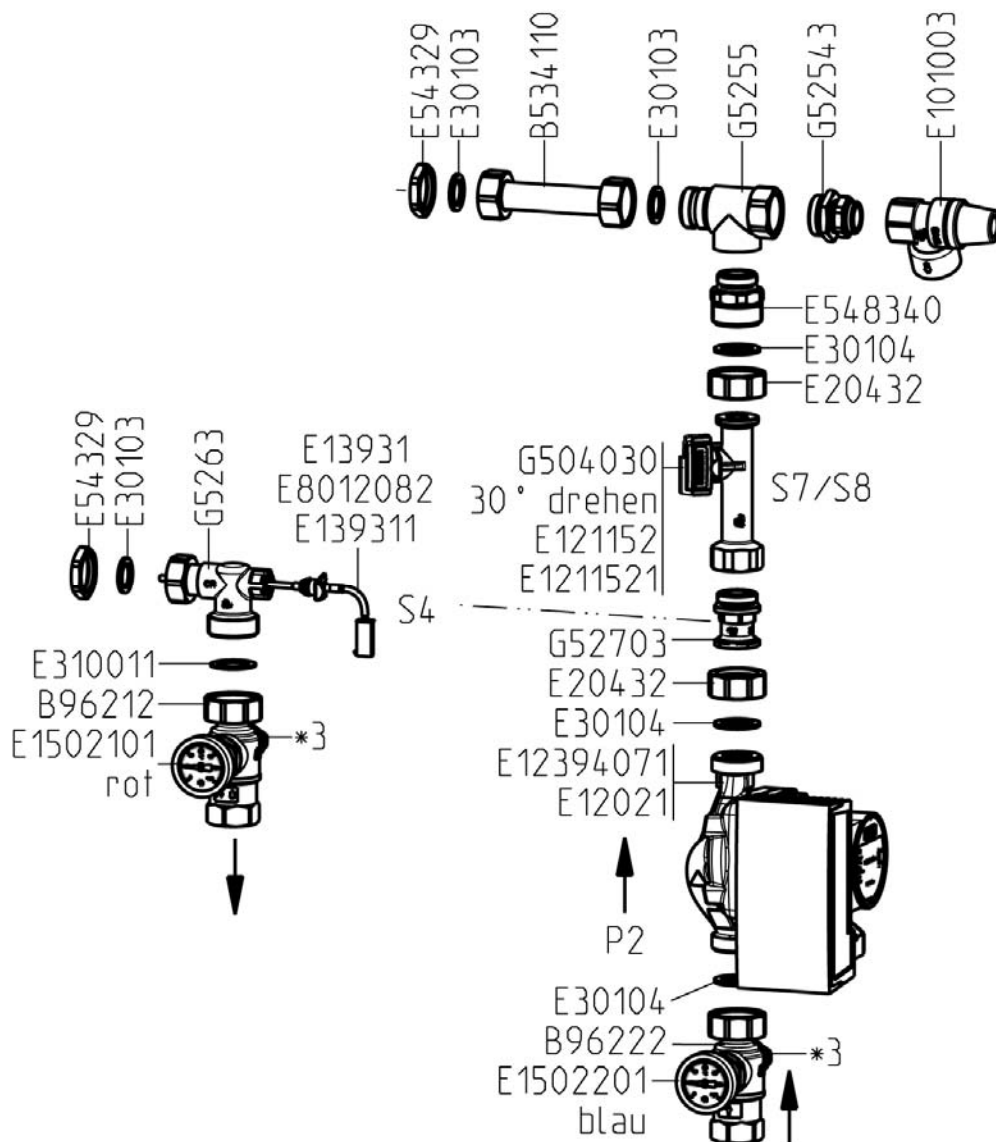
#### 5.4 Secondary / heating circuit SolexMini Basic HZL (6091804WS)



## 5.5 Primary / solar circuit SolexMini Premium HZH (6091803WH)

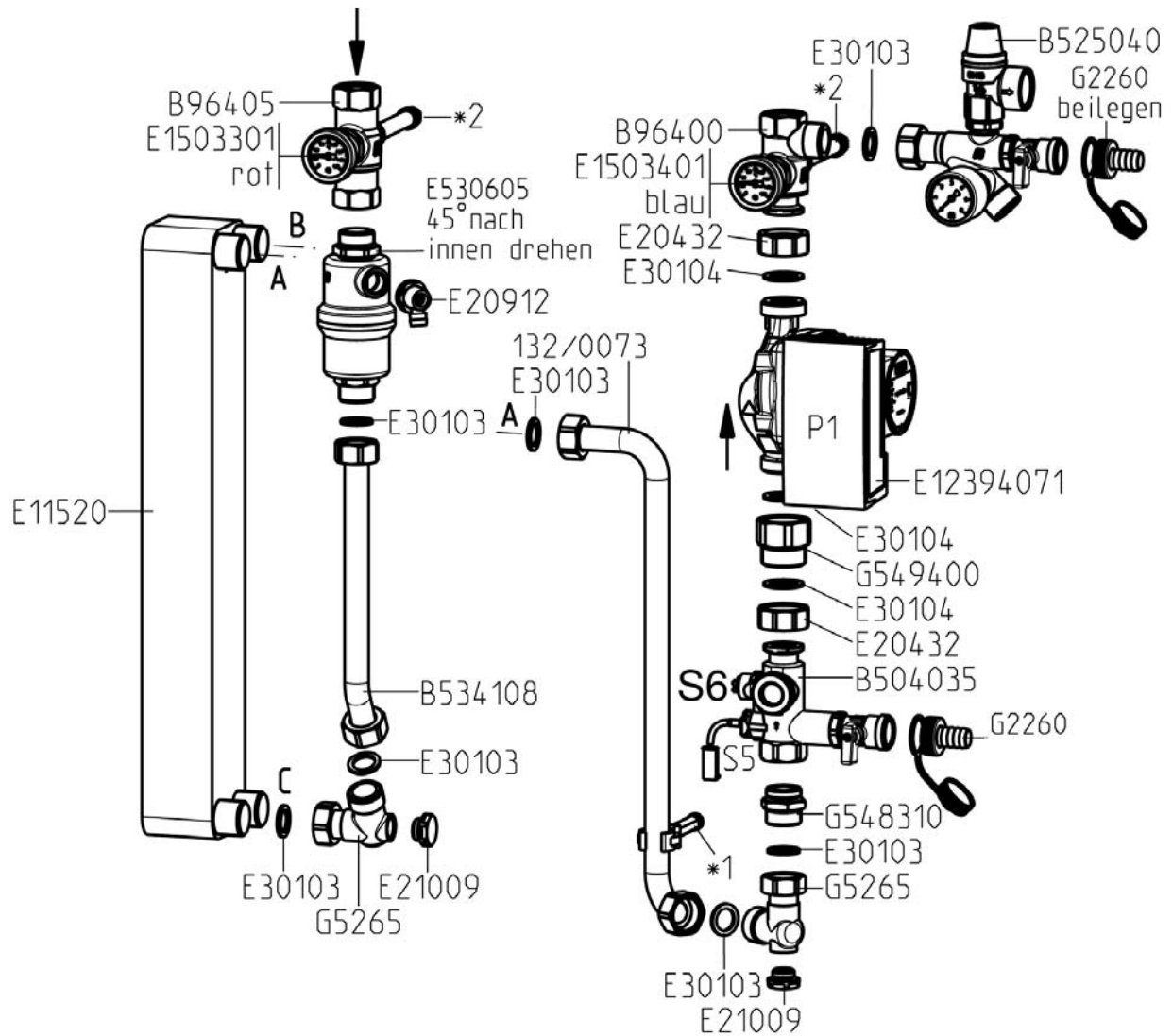


## 5.6 Secondary / heating circuit SolexMini Premium HZH (6091803WH)

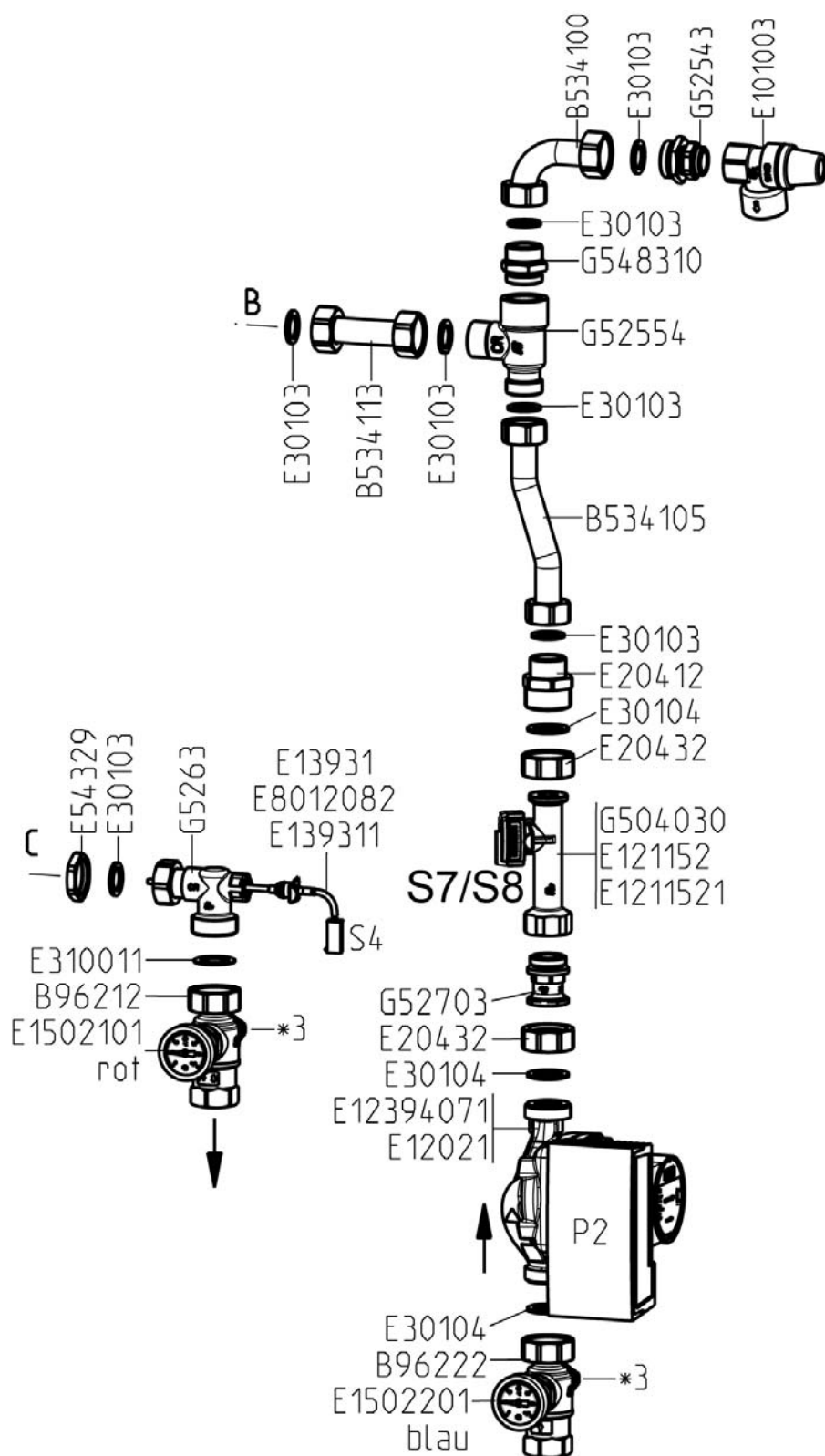




## 5.7 Primary / solar circuit SolexMini Premium HZL (6091804WH)



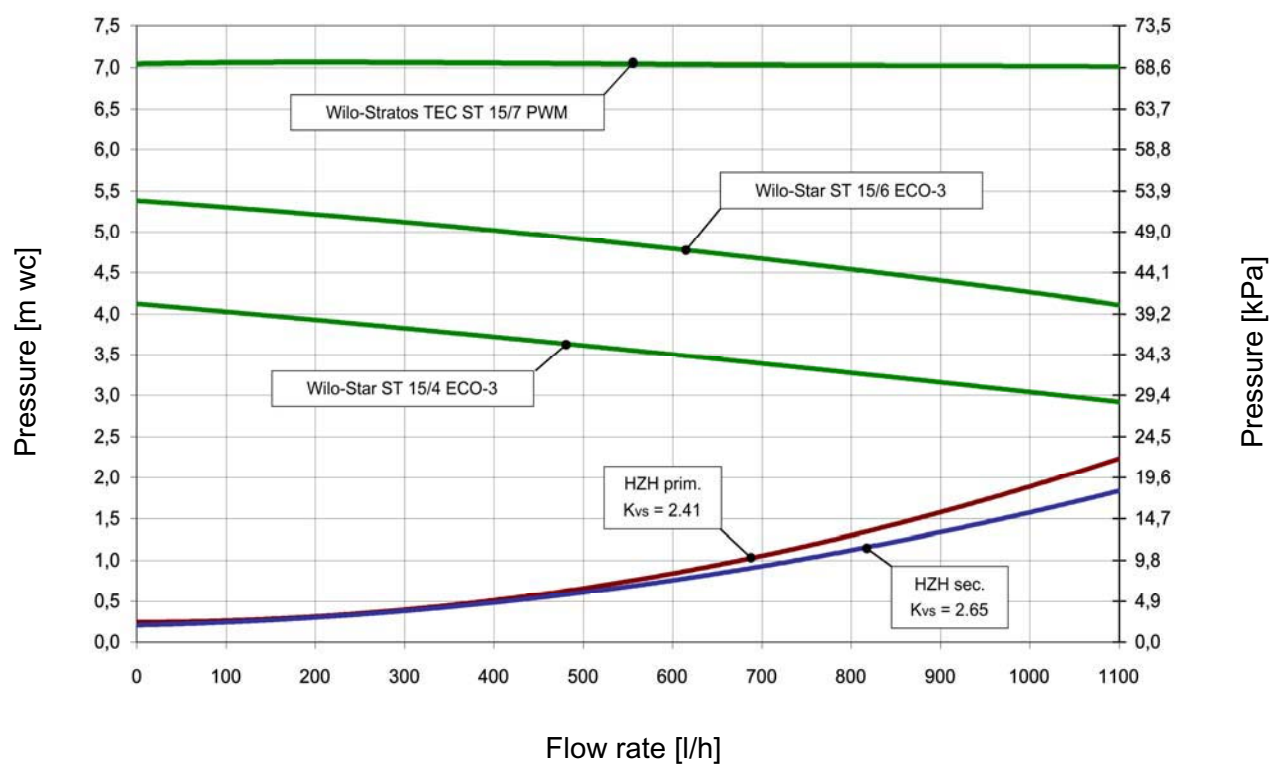
## 5.8 Secondary / heating circuit SolexMini Premium HZL (6091804WH)



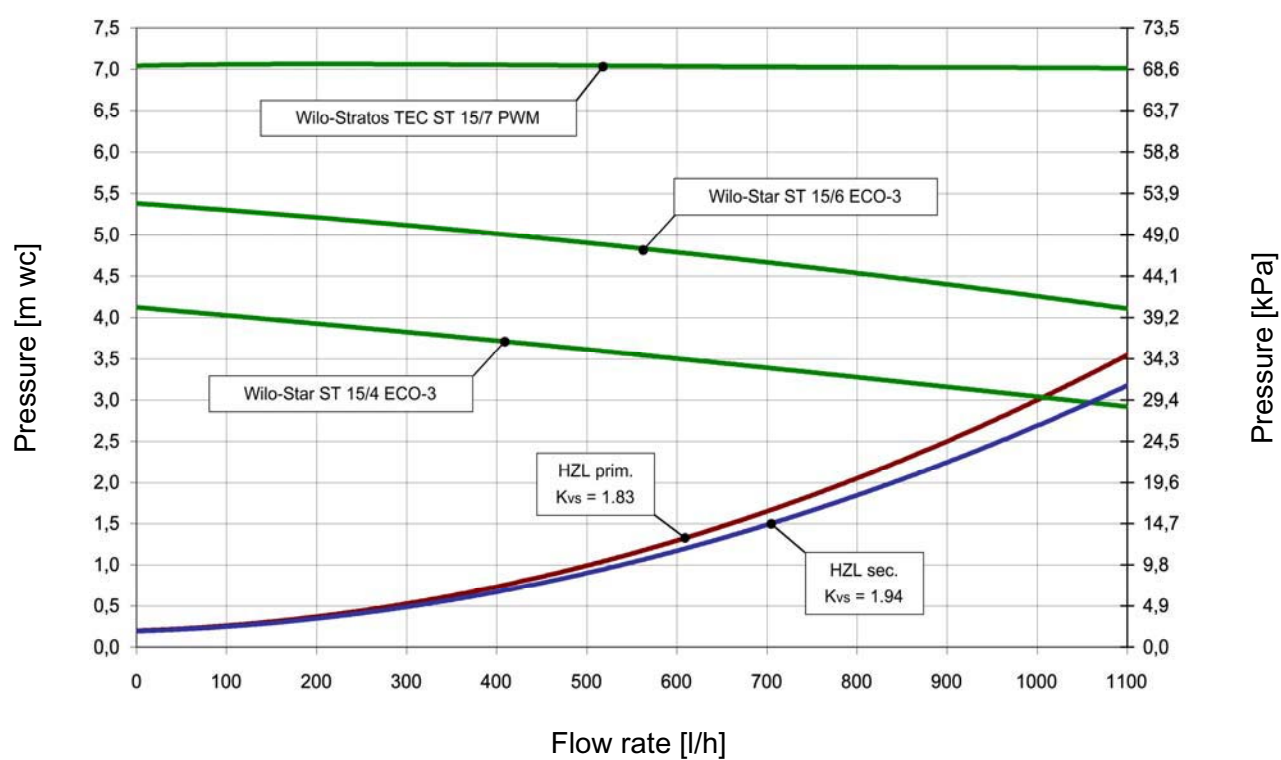
## 6 Technical data

<b>Dimensions:</b>	Height (with safety equipment):	680 mm
	Width (with safety equipment):	430 mm
	Depth (with insulation):	~250 mm
	Centre distance, primary circuit:	85 mm
	Centre distance, secondary circuit:	85 mm
	Pipe connections:	¾" internal thread
	Connection for expansion tank:	¾" external thread, flat sealing
	Outlet pressure relief valve:	¾" internal thread
<b>Operating data:</b>	Max. admissible pressure:	6 bars
	Max. operating temperature:	120 °C
	Max. propylene glycol concentration:	50 %
<b>Equipment:</b>	Pressure relief valve, primary circuit:	6 bars
	Pressure relief valve, secondary circuit:	3 bars
	Manometer, primary circuit:	0 - 6 bars
	Check valves:	Opening pressure 200 mm wc, can be opened manually
	Dial thermometers:	0 - 160 °C prim., 0 - 120 °C sec.
	Basic, prim./sec.: FlowCheck	1 - 20 l/min
	Premium, prim.: FlowRotor	1 - 15 l/min
	Premium, sec.: Grundfos VFS	2 - 40 l/min
<b>Materials:</b>	Valves and fittings:	Housing: brass
	Plate heat exchanger:	Plates: stainless steel 1.4401/1.44004 Solder: copper (99.99 %)
	Pipes:	Stainless steel 1.4400
	Seals, o-rings:	EPDM / Viton
	Seals, flat sealings:	AFM 34, asbestos-free
	Insulation:	EPP, $\lambda = 0.041 \text{ W/(m K)}$

## 6.1 Differential pressure diagram SolexMini Basic / Premium HZH



## 6.2 Differential pressure diagram SolexMini Basic / Premium HZL



## 7 Function: check valves

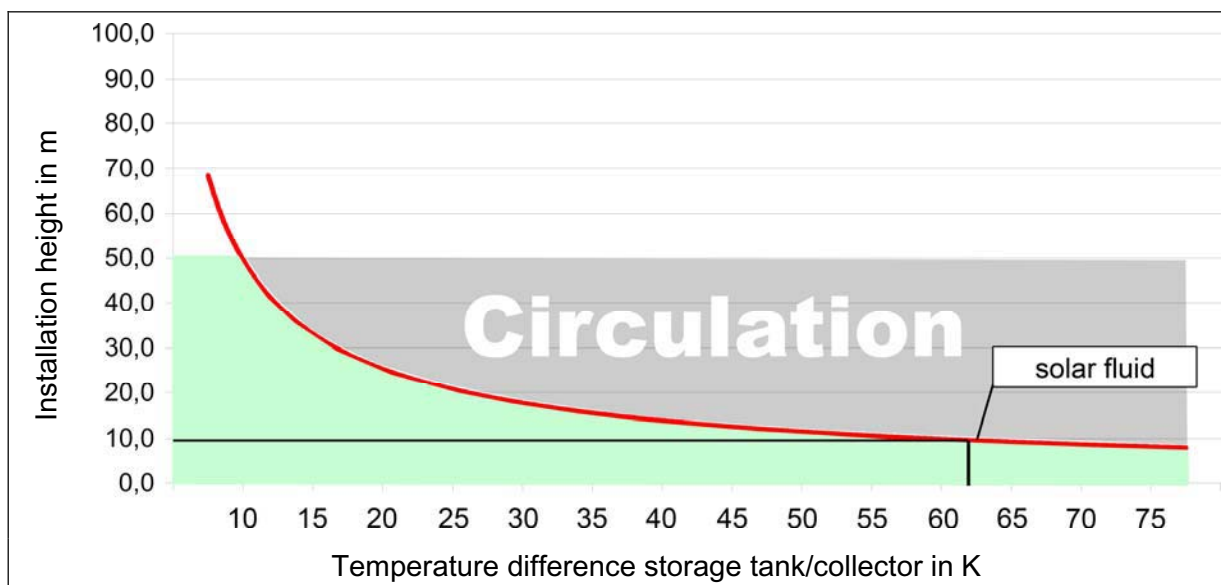
Within their application range, the check valves in this station prevent unwanted gravity circulation. The efficiency of the check valves depends on:

- 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 whether the check valves integrated in the station are sufficient. If the check valves are not sufficient, you need to install additional components to prevent gravity circulation. You can mount, for example, syphons ("heat traps"), 2-way valves (zone valves) or additional check valves.

### 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 need to know it exactly?

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: $\Delta p = \Delta \rho \cdot g \cdot h$

Collector temperature: 5 °C → Density solar fluid  $\rho_1 = 1042 \text{ kg/m}^3$

Storage tank temperature: 67 °C → Density solar fluid  $\rho_2 = 1002.5 \text{ kg/m}^3$

$$\Delta \rho = \rho_1 - \rho_2 = 39.5 \text{ kg/m}^3$$

$$g = 9.81 \text{ m/s}^2$$

Installation height  $h = 10 \text{ m}$

$$\Delta p = 3875 \text{ Pa} = 395 \text{ mm wc}$$

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.



## 8 Commissioning report

Installation operator \_\_\_\_\_

Location of installation \_\_\_\_\_

Collectors (number / type) \_\_\_\_\_

Collector surface \_\_\_\_\_ m<sup>2</sup>

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

Pipes  $\varnothing$  = \_\_\_\_\_ mm I = \_\_\_\_\_ m

Venting ☐ Manual vent valve ☐ Automatic deaerator  
(collector field)

☐ No ☐ Vented

Airstop (station) ☐ Vented

Solar fluid (type) \_\_\_\_\_ % glycol

Antifreeze tested up to: \_\_\_\_\_ °C

Flow rate \_\_\_\_\_ l/m

Pump (type) \_\_\_\_\_

Pump speed level (I, II, III) \_\_\_\_\_

System pressure \_\_\_\_\_ mbar

Expansion tank (type) \_\_\_\_\_

Initial pressure \_\_\_\_\_ mbar

Pressure relief valve ☐ Checked

Check valves ☐ Checked

Serial numbers	
Station	
Controller	
Software version	
:	

Plumbing company

Date, signature