



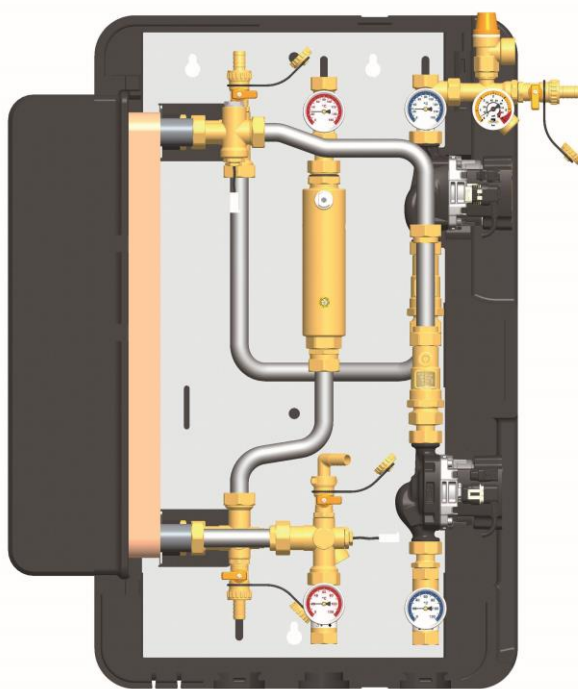
Installation and Operation Instructions

Transfer stations:

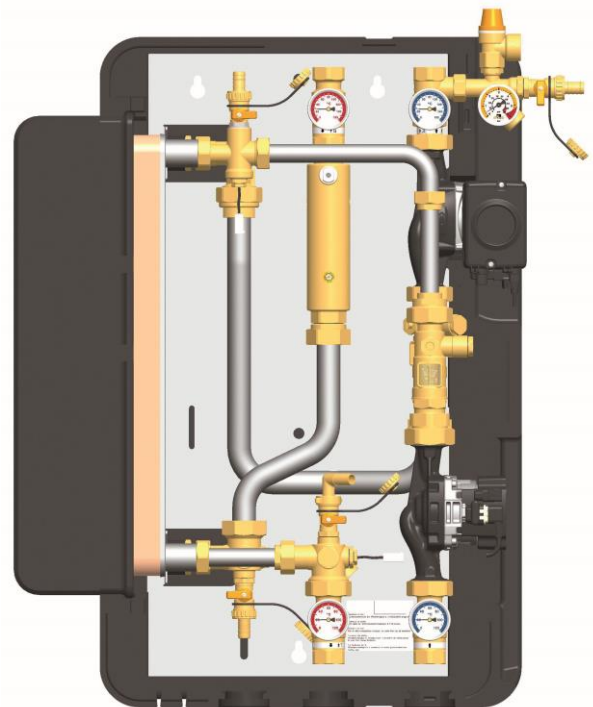
CIRCOtransfer 30 E

CIRCOtransfer 50 E

[Hydraulics]



CIRCOtransfer 30 E



CIRCOtransfer 50 E



EN-XXX_CIRCOTransfer-30E-50E_TI-MA-BA-150401-3PAW0501

Item no. 99609x7WAG0x-mub-en – Version V06 – Issued 2015/03

Translation of the original instructions

We reserve the right to make technical changes without notice!

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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 About these instructions

These instructions describe the function, installation, commissioning and operation of the transfer stations CIRCOTransfer 30 E and CIRCOTransfer 50 E.

The chapters called [specialist] are intended for specialists only. For other components of the installation, such as pumps, controllers or the distribution manifold, see the manufacturers' instructions.

CIRCOTransfer 30 E – item number 150 202 20		
	Power [kW]	Collector surface [m ²]
Low-flow [17 l/m ² h]	30	50
High-flow [35 l/m ² h]	16	26

CIRCOTransfer 50 E – item number 150 202 21		
	Power [kW]	Collector surface [m ²]
Low-Flow [17 l/m ² h]	54	90
High-Flow [35 l/m ² h]	30	50



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 important fittings and safety devices for the operation of the installation:

- 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 and 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
- Fill and drain valves to flush, fill and drain the solar circuit
- Two flow meters and electronic temperature sensors for heat quantity balancing (secondary) and speed control of the pumps 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, 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.



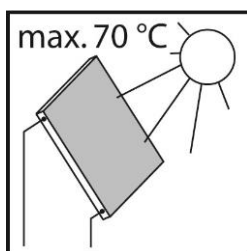
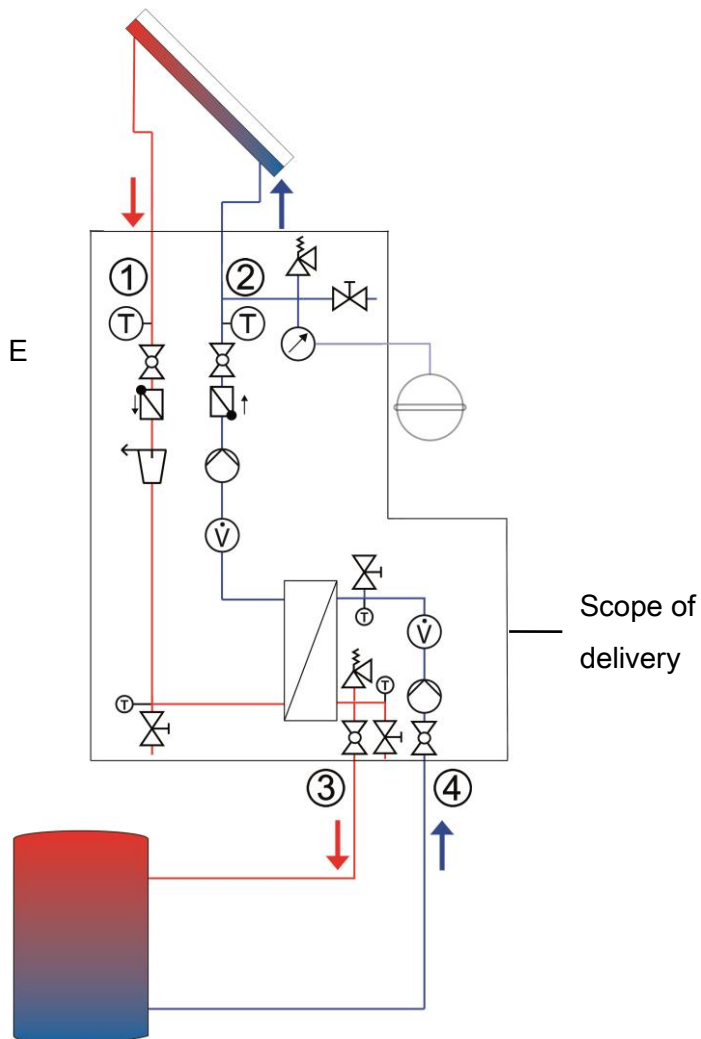
1.3 Designated use

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 original accessories with the transfer station.

Improper usage excludes any liability claims.

Schematic structure
CIRCOTransfer 30 E/50 E



When the sun shines, the collectors 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

	 WARNING
	<p>Danger of scalding due to vapour escape!</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">➤ 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
	<p>Risk of burns!</p> <p>The valves, fittings and the pump may heat up to more than 100 °C during operation.</p> <ul style="list-style-type: none">➤ The shell must remain closed during operation.



⚠ CAUTION	
	<p>Personal injury and damage to property due to overpressure!</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">➤ Only close the ball valves for service and maintenance.

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 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!

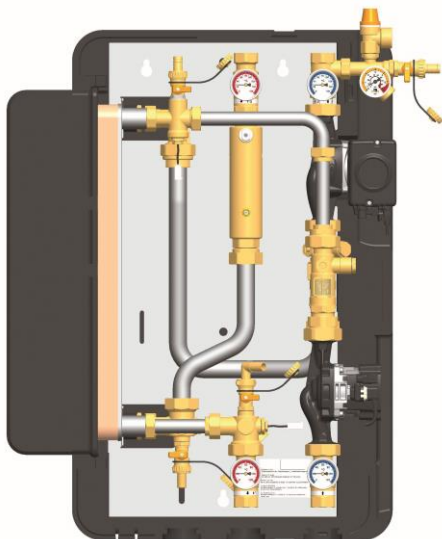
The discharge line of the safety equipment should be guided into a heat-resistant container with corresponding size. This allows you to avoid uncontrolled discharging into the environment and to easily refill the circuits!

NOTICE

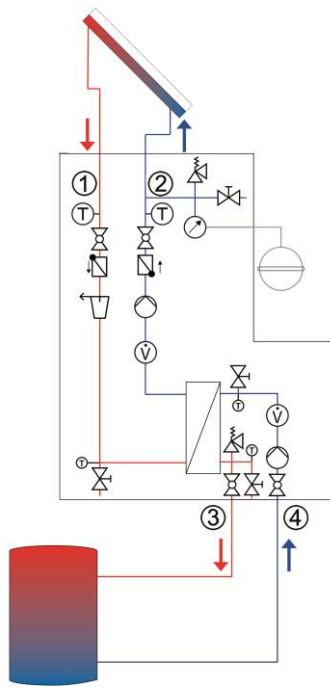
Material damage due to high temperatures!

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.



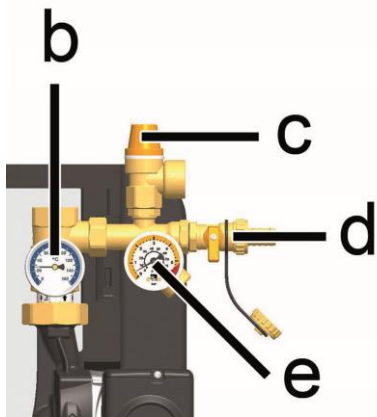
1. You can use a drilling template in order to facilitate the installation, which you can find on the station.
2. Copy the mounting hole measures to the mounting surface.
3. Drill the holes and insert appropriate wall plugs into the holes.
4. Screw in the screws and let them stick about 4 cm out of the wall.
5. Remove the station from the packaging.
6. Remove the insulating front shell.
Hang the station onto the screws and tighten the screws.



7. 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 of the CIRCOtransfer 30 E have $\frac{3}{4}$ " internal threads, all screw connections of the CIRCOtransfer 50 E have 1" internal threads.



8. Mount the safety group, consisting of the pressure relief valve [c], the fill valve [d] and the pressure gauge [e], to the connection of the return ball valve [b].

9. Connect the expansion tank below the pressure gauge [e]. During servicing at the expansion tank, we recommend the installation of a cap valve 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.

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



3.1 Controller connection


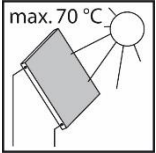
Connect the optional controller to the mains. You can find a detailed description for the operation of the controller in the separate controller manual.

	<p data-bbox="368 539 644 600"> WARNING</p> <p data-bbox="368 622 911 656">Risk to life and limb due to electric shock!</p> <ul data-bbox="416 680 1422 824" style="list-style-type: none">➤ 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. <p data-bbox="464 842 1150 875">Thus, an unintentional start of the motors is avoided.</p>
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4 Commissioning [specialist]

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

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

CAUTION

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 used later to flush and fill the solar installation.

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

CAUTION

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 and that eventually absorbed heat can be dissipated.

4.1 Preparations before flushing and filling

CAUTION

Note regarding the expansion tank

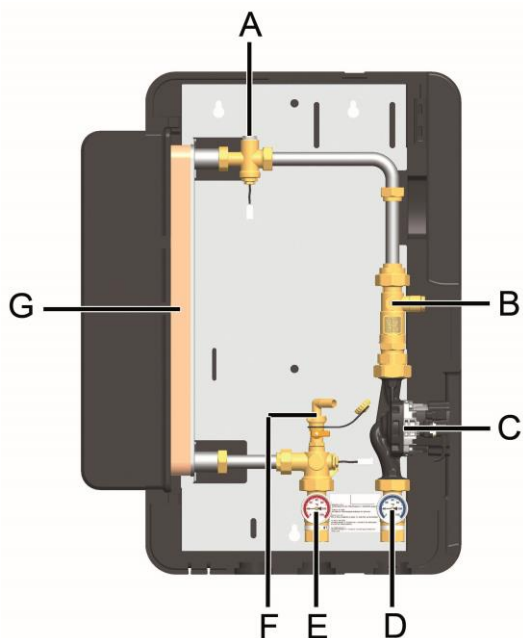
To prevent that the dirt particles in the solar thermal system are flushed into the expansion tank, some manufacturers recommend to disconnect the expansion tank from the solar circuit before flushing and filling. Please observe the instructions of the manufacturer.

4.2 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.



Storage tank circuit

1. Open the ball valves [D|E] and put the check valves out of operation (45°, see next page).

2. Vent the storage tank circuit by operating the vent plug [A] on the cross.

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 vent plug [A] in order to eliminate air still present in the heat exchanger.



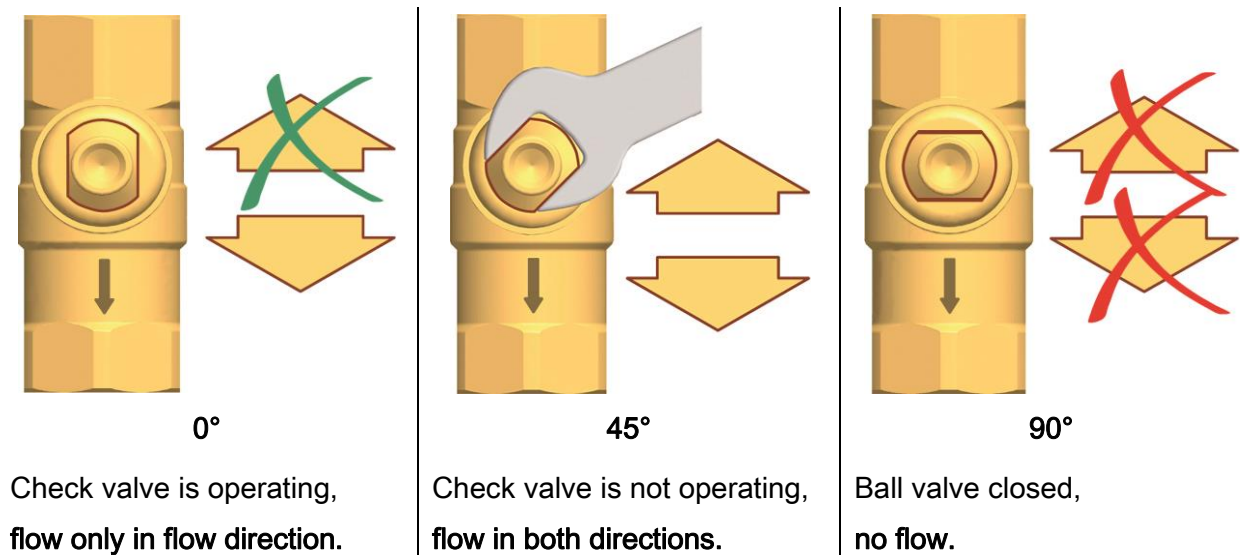
4.3 Flushing and filling the solar circuit

The fill and drain valves required to flush and fill are integrated in the transfer station. Make sure not to wash dirt particles that may be present in the system into the heat exchanger and the expansion tank. Disconnect the expansion tank from the solar circuit during flushing and filling, if necessary, and only use flush and fill stations with fine filters.

The solar circuit is flushed in the direction of flow. Make sure that the pump in the solar circuit cannot be switched on.

Ball valve with integrated flow check valve

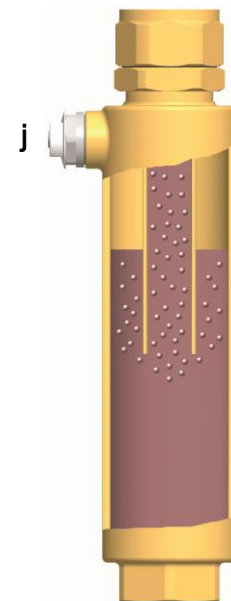
(normal flow direction in the figure below: downwards)







Airstop

The Airstop (air-scoop with plug for manual venting) serves to bleed 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.



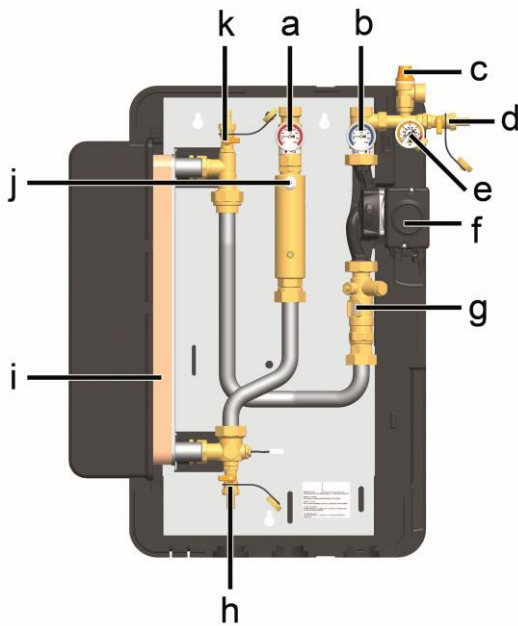
Pipe diameter [mm]		Flow rate at 0.3 m/s	
∅ outside	∅ inside	l/h	l/min
15	13	~ 143	~ 2.4
18	16	~ 217	~ 3.6
22	20	~ 339	~ 5.7
28	25	~ 530	~ 8.8

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
	<p>Danger of scalding due to vapour escape!</p> <p>The escaping fluid can have a temperature of more than 100 °C and cause scalding.</p> <ul style="list-style-type: none"> ➤ Carefully open the vent plug and close it again, as soon as medium escapes.

Venting the solar installation 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.

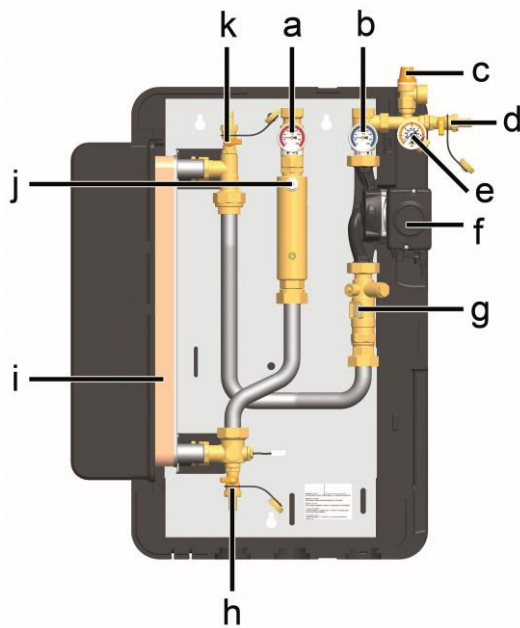


Solar circuit



1. 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!
2. The return ball valve [b] must be closed (90° position, see page 14).
3. Connect the flush and fill station:
 - Pressure hose to the fill valve [d]
 - Flush hose to the drain valve [h].
4. Open the fill and drain valves [d|h] and put the flush and fill station into operation.
5. Slowly open and close the return ball valve [b] and the drain valve [k] during flushing in order to vent the pump section.
6. Flush the solar circuit until the solar fluid exits without bubbles (see page 15).
7. Close the drain valve [h] with the filling pump running and increase the system pressure to about 5 bars. The system pressure can be read on the pressure gauge [e].
8. Close the fill valve [d] and switch off the pump of the flush and fill station.
9. Check the pressure gauge to see whether the system pressure reduces and eliminate leaks where necessary.



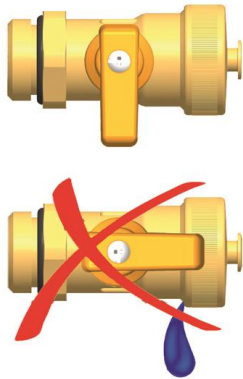
Observe the pressure (max. 6 bars)!



10. Reduce the pressure at the drain valve [h] to the operating pressure, if necessary.
11. 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 the instructions of the expansion tank).
12. Close the fill and drain valves [d|h].
13. Put the ball valve [b] into 0° position (see page 14).

	WARNING
	 <p>Risk to life and limb due to electric shock!</p> <ul style="list-style-type: none">➤ Check if the sensors and the pumps are properly connected to the controller and if the controller housing is closed. <p>Only then should the mains plug of the controller be plugged into a socket.</p>

14. Connect the optional controller to the mains and set the solar circuit pump to ON in the manual mode according to the controller instructions.
15. 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 [j] of the Airstop until the solar fluid exits without bubbles (see page 15).
16. If necessary, increase the system pressure to the operating pressure.



17. 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.

18. Mount the insulating front shell.

19. Set to automatic mode on the controller (see controller instructions).

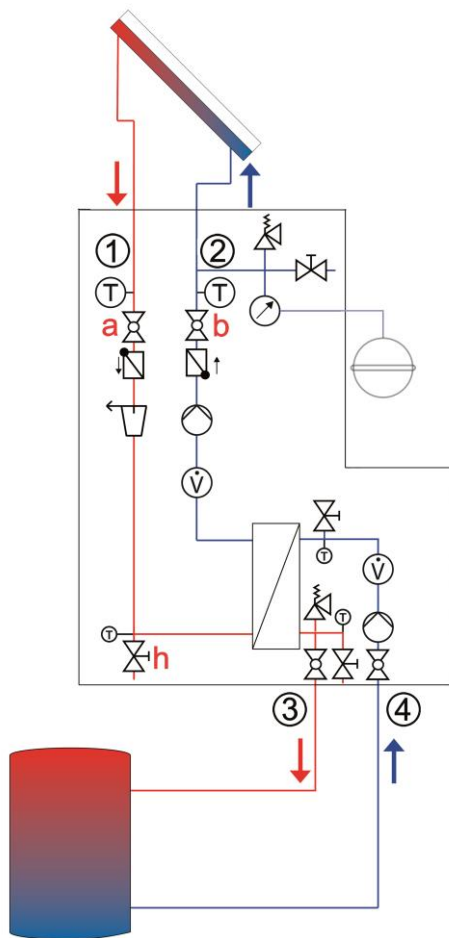
The commissioning of the solar installation is now completed.

Please fill in completely the commissioning report on page 31.

4.4 Maintenance [specialist]

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

	WARNING
	<p>Risk of burning and scalding!</p> <p>The valves, fittings and solar fluid can reach temperatures of more than 100 °C. The solar fluid can escape as vapor and cause scalding.</p> <ul style="list-style-type: none"> ➤ 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.

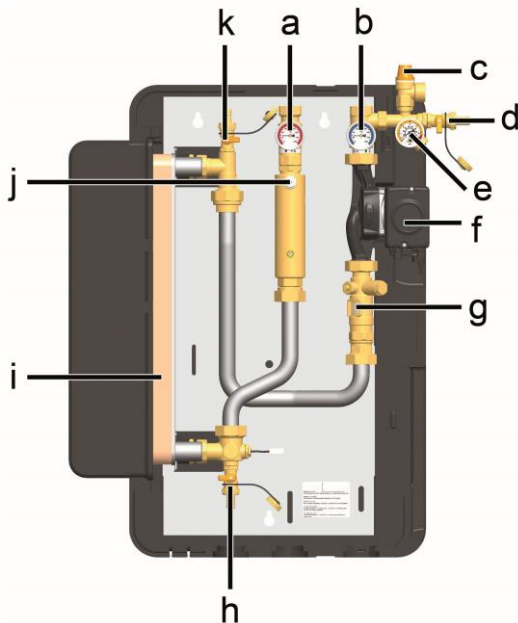


1. Close the ball valves [a|b] and drain the solar fluid at the drain valve [h].
Make sure that the solar fluid is collected in a heat-resistant container.
2. Change the faulty part against the new part.
3. Fill the solar circuit as described in **4.3 Flushing and filling the solar circuit** (see page 14).

Example: CIRCOTransfer 30 E



4.5 Draining the solar installation



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 a **45°** position (see page 14).
3. Connect a heat-resistant hose to the drain valve [h] of the transfer station.
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 and fix the heat-resistant collecting container so that people standing nearby are not endangered when the solar installation is being emptied.

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

4.6 Deinstallation

1. Drain the solar thermal installation as described above.
2. Disconnect the pipe joints with the solar thermal system.
3. Disconnect the cable connections between controllers and sensors (collector/ storage tank).
4. Loosen the fastening screws of the station and take the station off the wall.



5 Spare parts [specialist]

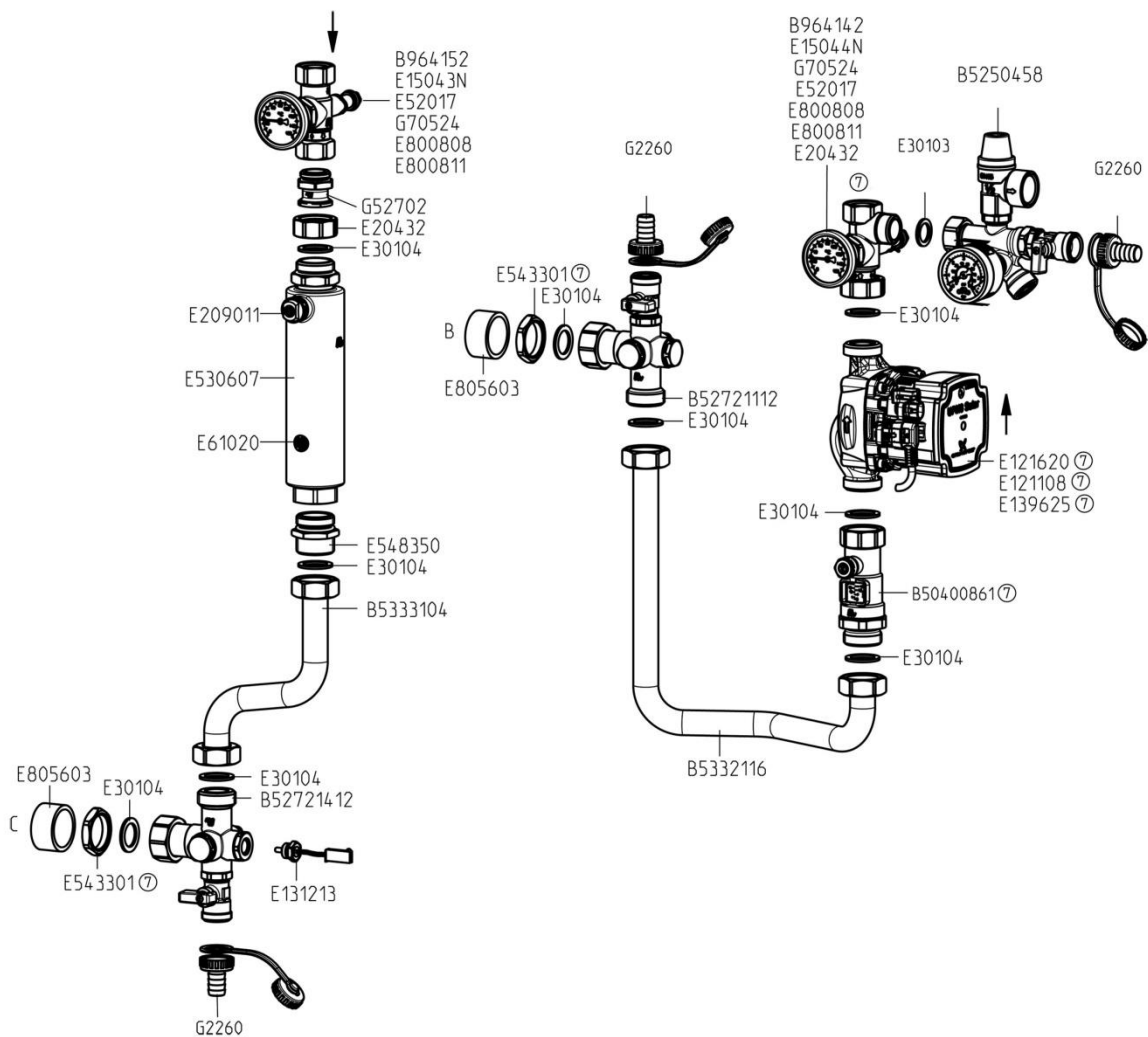
NOTICE

Complaints and requests/orders of spare parts will only be processed with information on the serial number!

The serial number is placed in the lower right corner of the support sheet of the station.

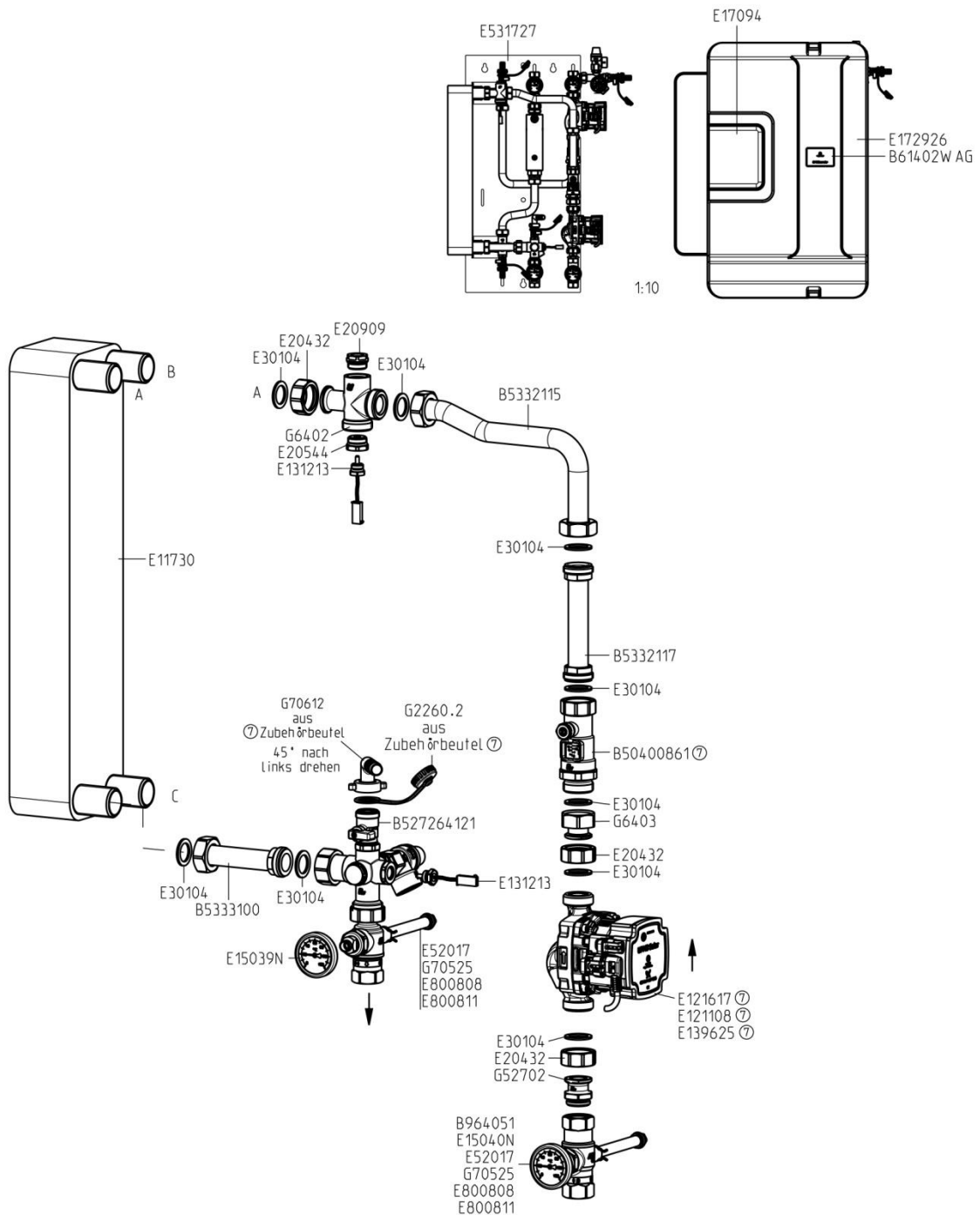
- In case of a complaint, please send us the completely filled commissioning report on page 31.

5.1 Spare parts primary circuit CIRCOTransfer 30 E (15020220)



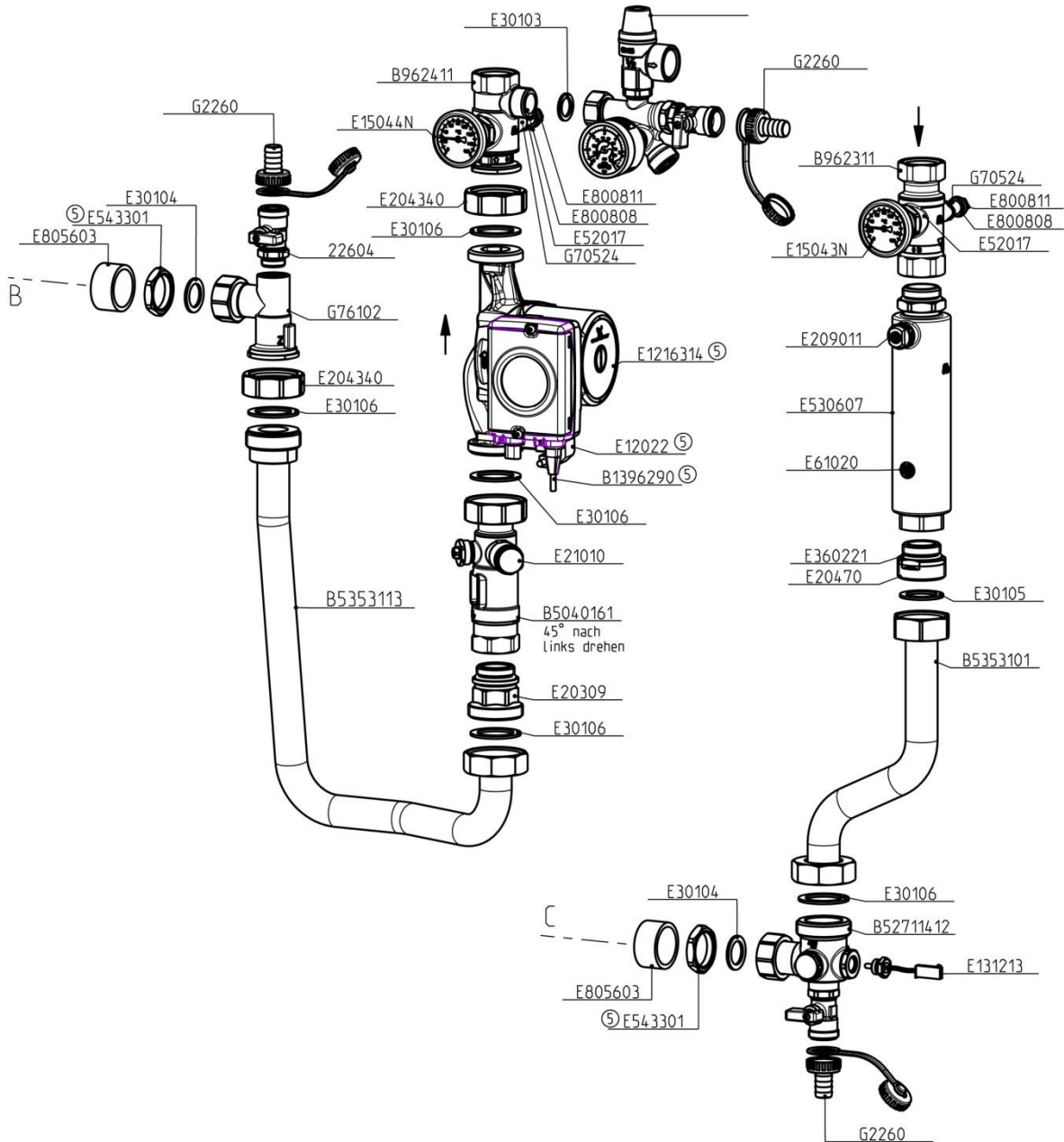


5.2 Spare parts secondary circuit CIRCOTransfer 30 E (15020220)



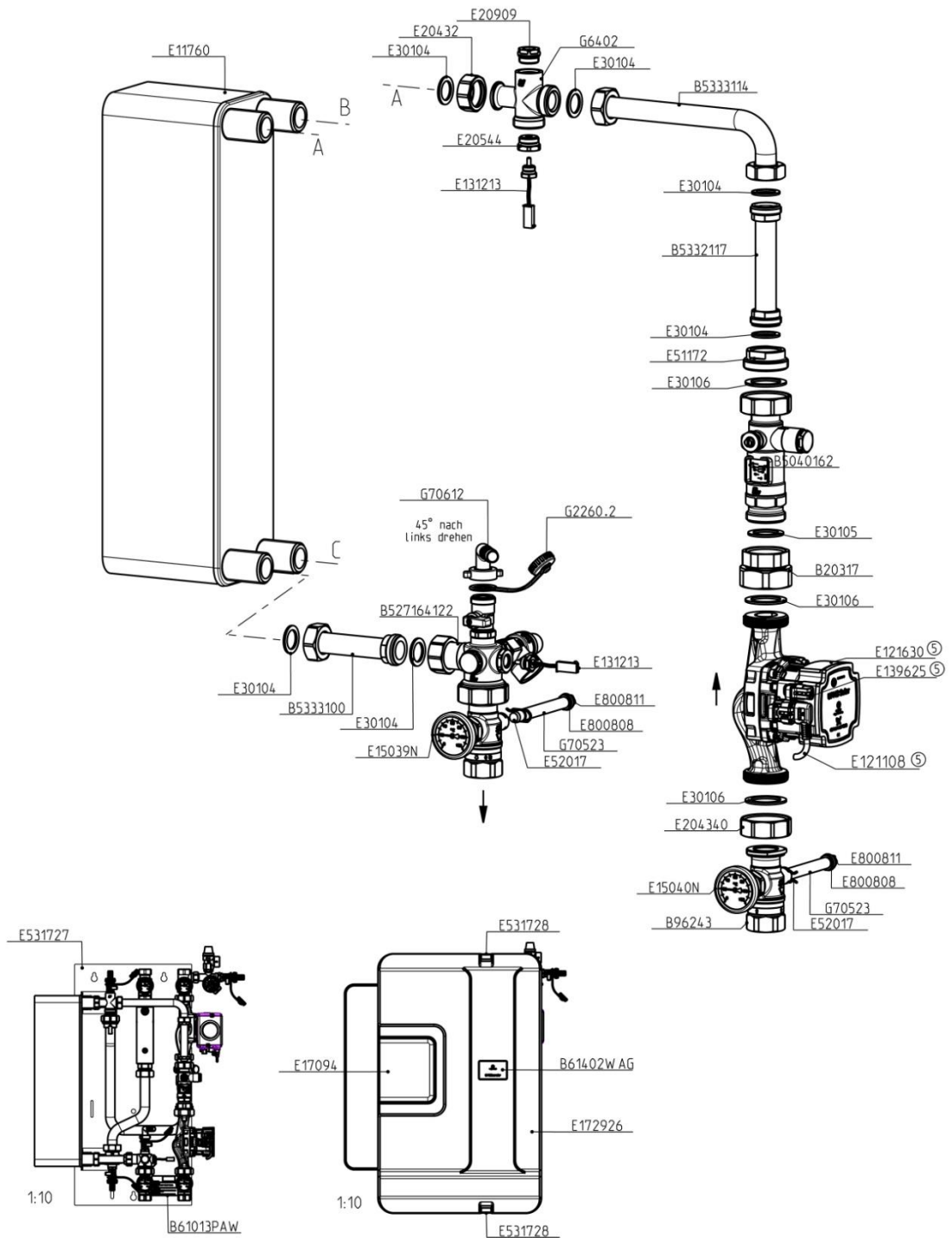


5.3 Spare parts primary circuit CIRCOtransfer 50 E (15020221)





5.4 Spare parts secondary circuit CIRCOtransfer 50 E (15020221)



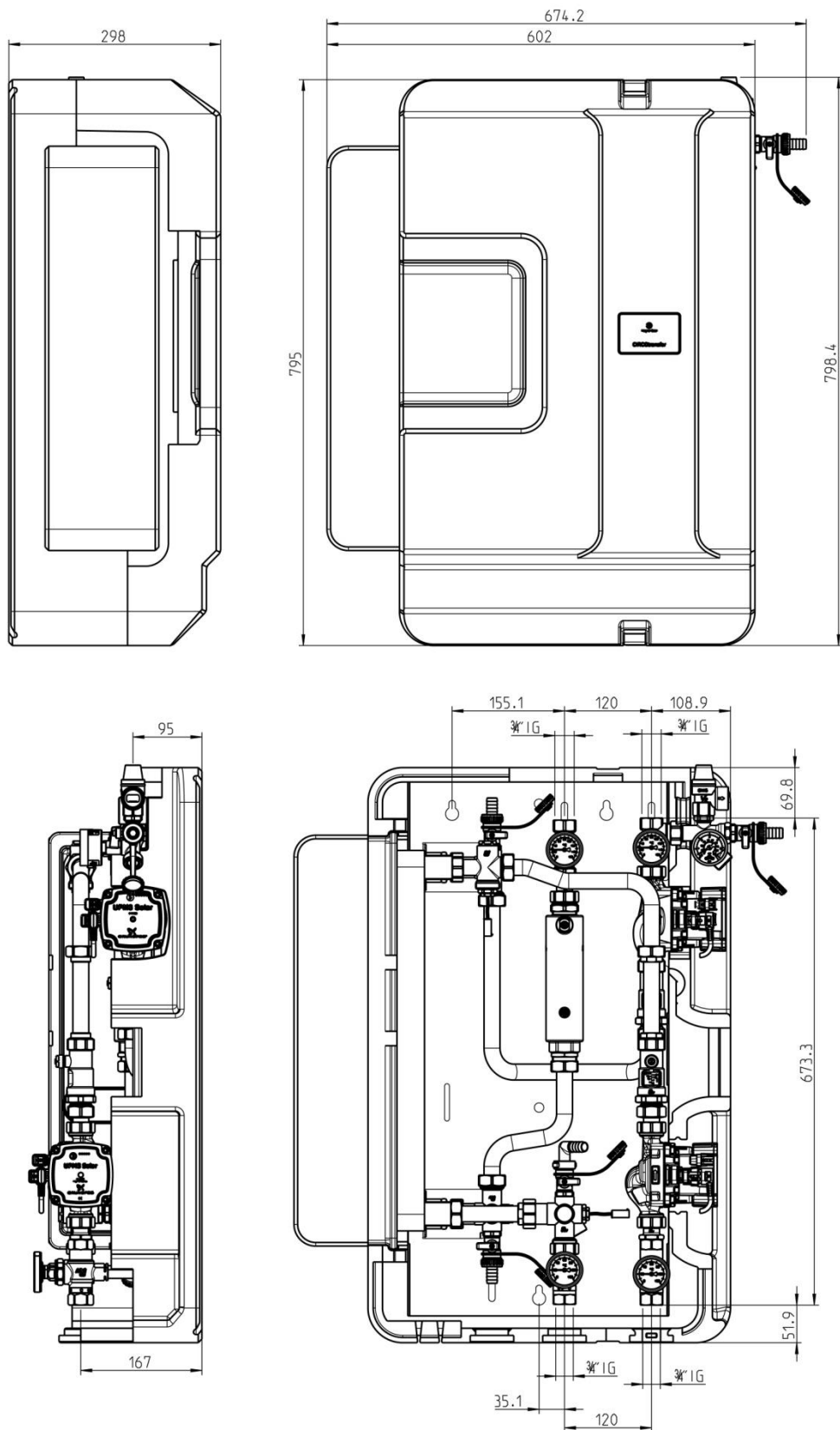


6 Technical data

Dimensions	CIRCOtransfer 30 E	CIRCOtransfer 50 E
Height (total)	795 mm	829 mm
Width (total)	674 mm	676 mm
Depth (total)	298 mm	298 mm
Centre distance flow - return:	120 mm	120 mm
Pipe connections	¾" internal thread	1" internal thread
Connection for expansion tank	¾" external thread, flat sealing	
Outlet pressure relief valve	¾" internal thread	
Operating data		
Max. admissible pressure	6 bars	
Max. operating temperature	120 C	
Max. stagnation temperature	140 C	
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	
Flowmeter	2 x Flowmeter: 3-22 l/min	2 x Flowmeter: 5-40 l/min
Sensors	3 PT1000 (mounted)	3 PT1000 (mounted)
Check valves (integrated in the ball valves)	Prim.: 2 x 200 mm wc, can be opened Sec.: 2 x 200 mm wc, can be opened	
Material		
Valves and fittings	Brass	
Gaskets	EPDM	
Check valves	Brass	
Insulation	EPP, $\lambda = 0,041 \text{ W/(m K)}$	

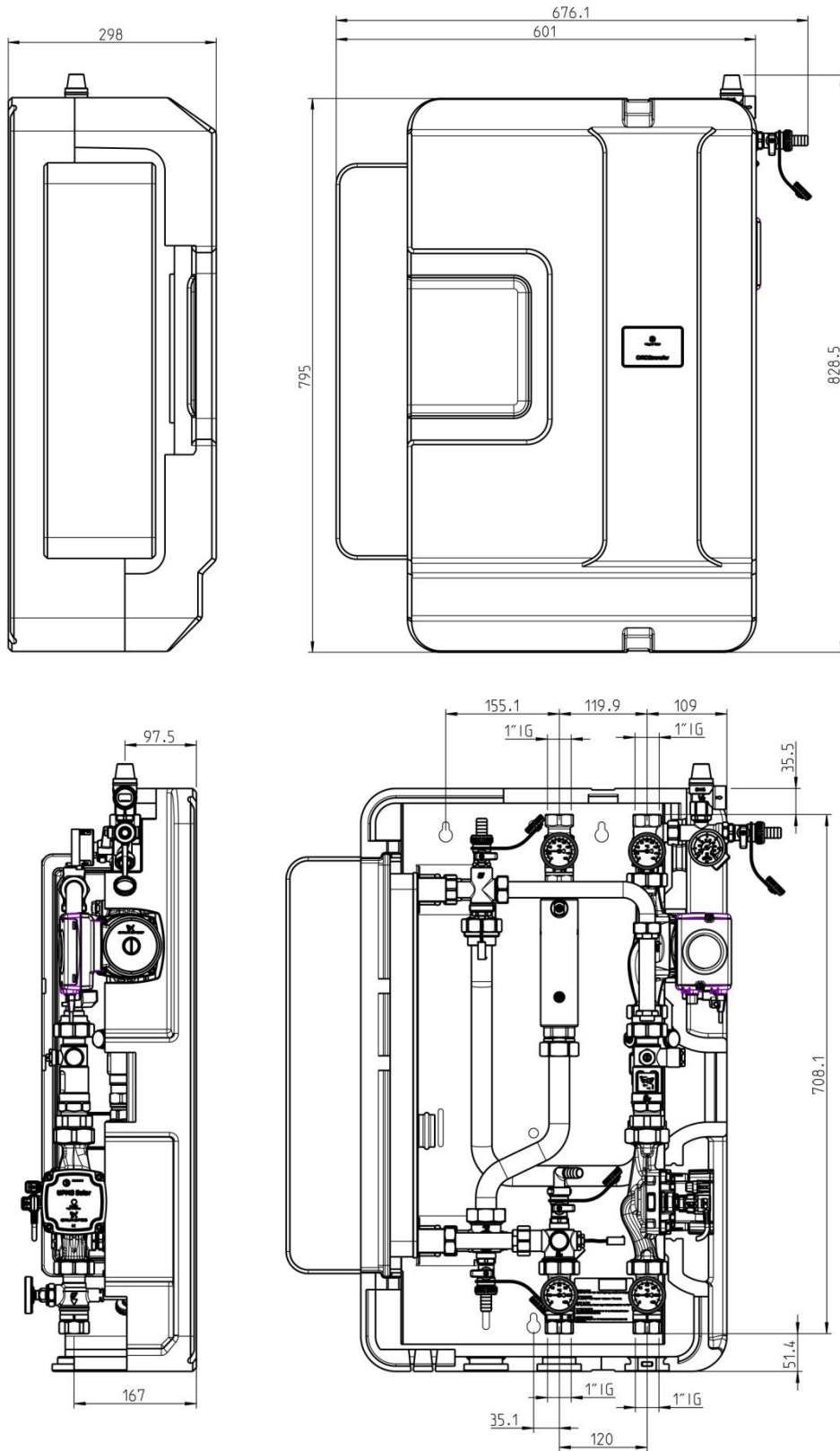


6.1 Dimensional drawing CIRCOTransfer 30 E



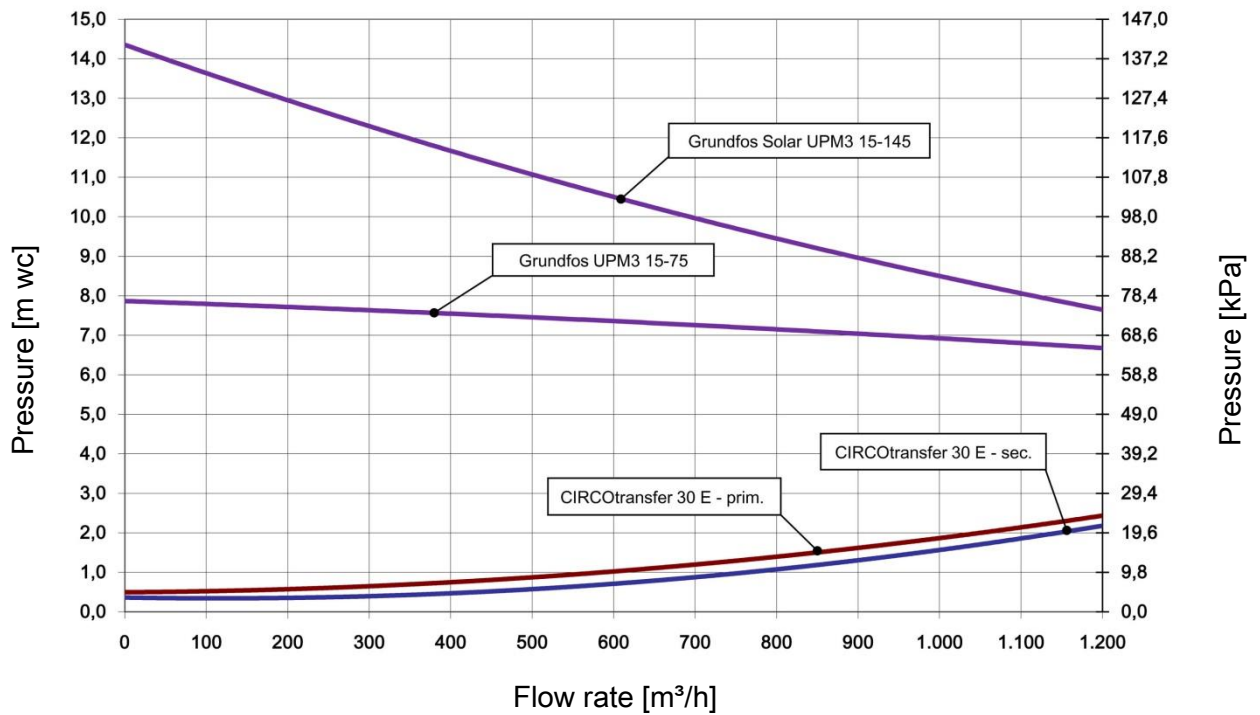


6.2 Dimensional drawing CIRCOTransfer 50 E

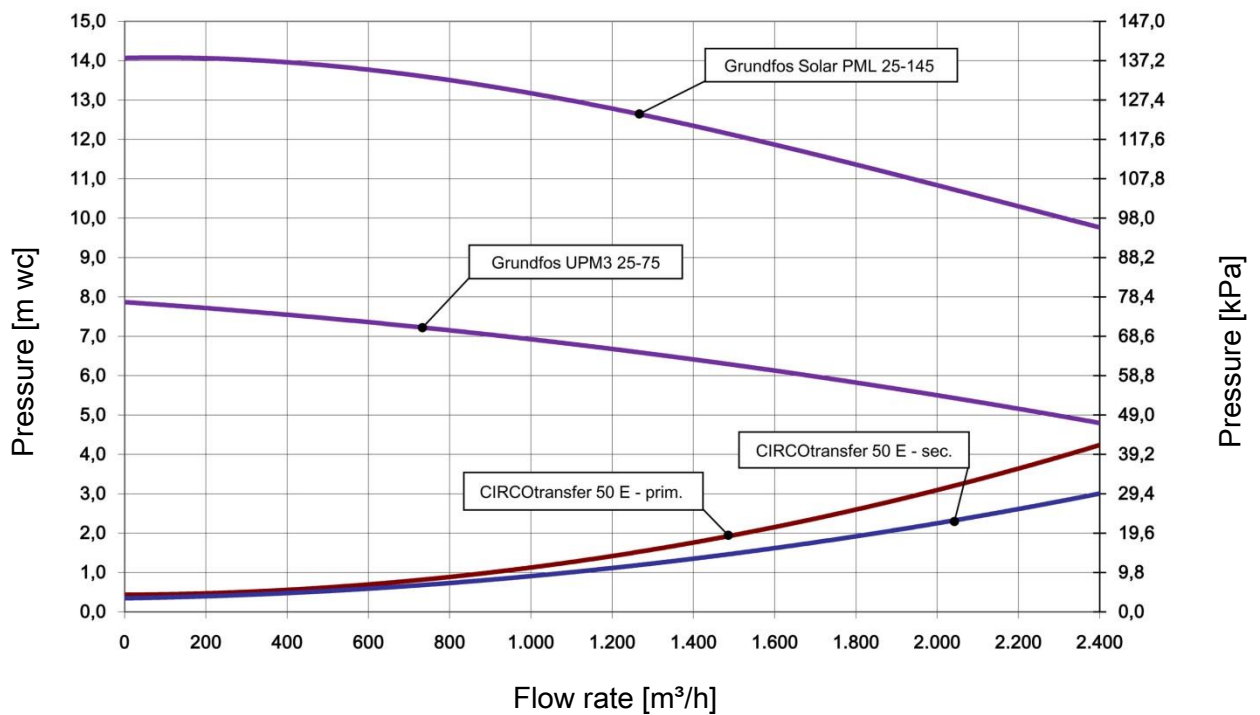




6.3 Pressure drop characteristics CIRCOtransfer 30 E



6.4 Pressure drop characteristics CIRCOtransfer 50 E



7 Function of the check valves [specialist]

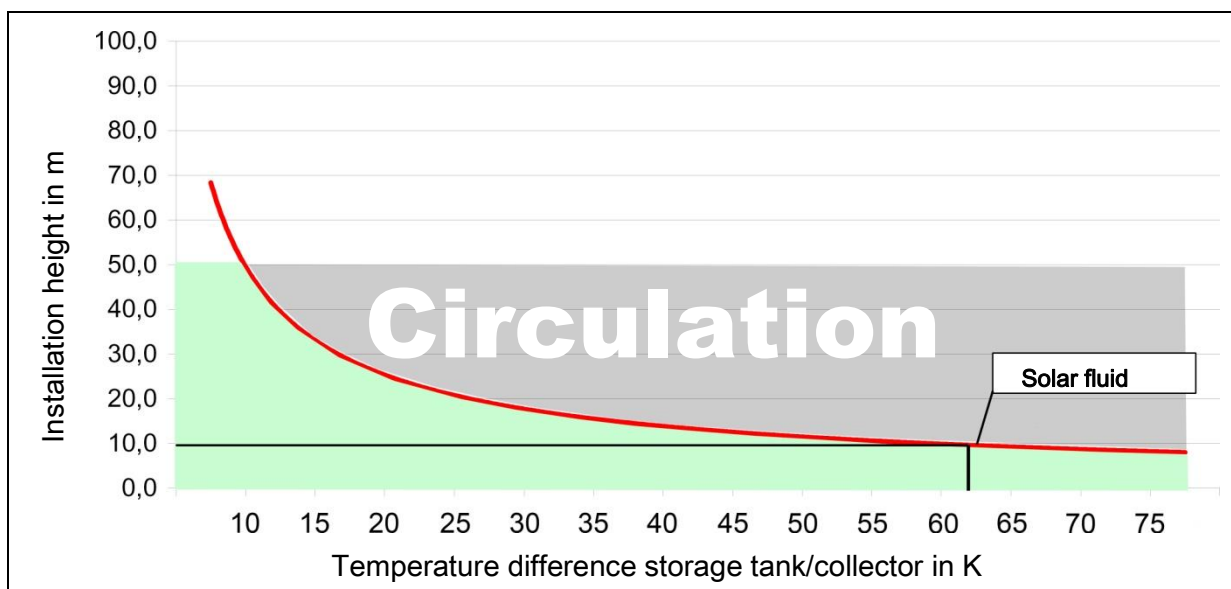
Within their application range, the check valves in this station prevent unwanted gravity circulation. The efficiency of the check valves depends on:

- 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 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 components such as 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.

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 _____ m²

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

Pipes $\varnothing =$ _____ mm $l =$ _____ m

Venting (collector field) Not existent Vented
 Manual vent valve Automatic deaerator

Airstop (station) Vented

Solar fluid (type) _____ % glycol

Antifreeze (tested up to): _____ °C

Flow rate _____ l/m

Pump (type) _____

System pressure _____ mbars

Expansion tank (type) _____

Initial pressure _____ mbars

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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