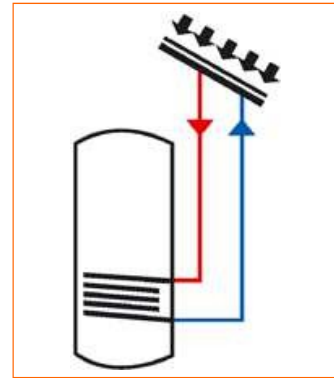


PLEION B35-9 assembly and use

instructions

Solar station for solar systems



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1 Introduction

These instructions describe the installation of the **B 35-9** solar station as well as its use and maintenance.

Read these instructions thoroughly before beginning the installation.

Failure to follow these instructions will void all rights regarding the commercial or legal warranty.

This guide is intended for specialists who have the relevant knowledge of the sector, enabling them to carry out work on heating systems, water pipes, and electrical installations. Installation and commissioning may only be performed by qualified specialists.

The **B35-9** solar station may only be installed and operated in dry locations that are protected against freezing.

It must be installed vertically, with the solar circuit connections facing upwards.

The illustrations are examples and may differ from the product purchased.

Subject to technical modifications and errors.

1.1 Intended use

PLEION solar stations are designed for the operation of heliothermal systems using antifreeze fluids suitable for solar thermal use. Use of a carrier other than the one specified by PLEION is not permitted (FAST G28 standard solar fluid, or the PURE antifreeze series to be mixed on site in the BIO or classic version).

Use that is not compliant with the provisions and any installation, structural, or component changes may jeopardize the safe operation of the system and entail the voiding of all performance and commercial or legal warranty rights.

1.2 Safety instructions

Besides the directives of each country and local standards, the following technical rules must also be followed:

- DIN 1988 Codes of practice for the installation of drinking water systems
- DIN 12828 Heating systems in buildings
- DIN EN 12897 Water supply
- DIN 18380 Installation of central heating systems and hot water supply systems.
- DIN 18382 Electrical installations in buildings
- DIN EN 12975,
- DIN EN 12976,
- DIN EN 12977 Solar thermal systems and components
- VDE 0100 Construction of electrical operating devices
- BGV Professional association injury prevention regulations



As the system can reach temperatures of $> 60^{\circ}\text{C}$, there is a danger of scalding and possibly a danger of burns due to contact with components.

1.3 Associated documentation

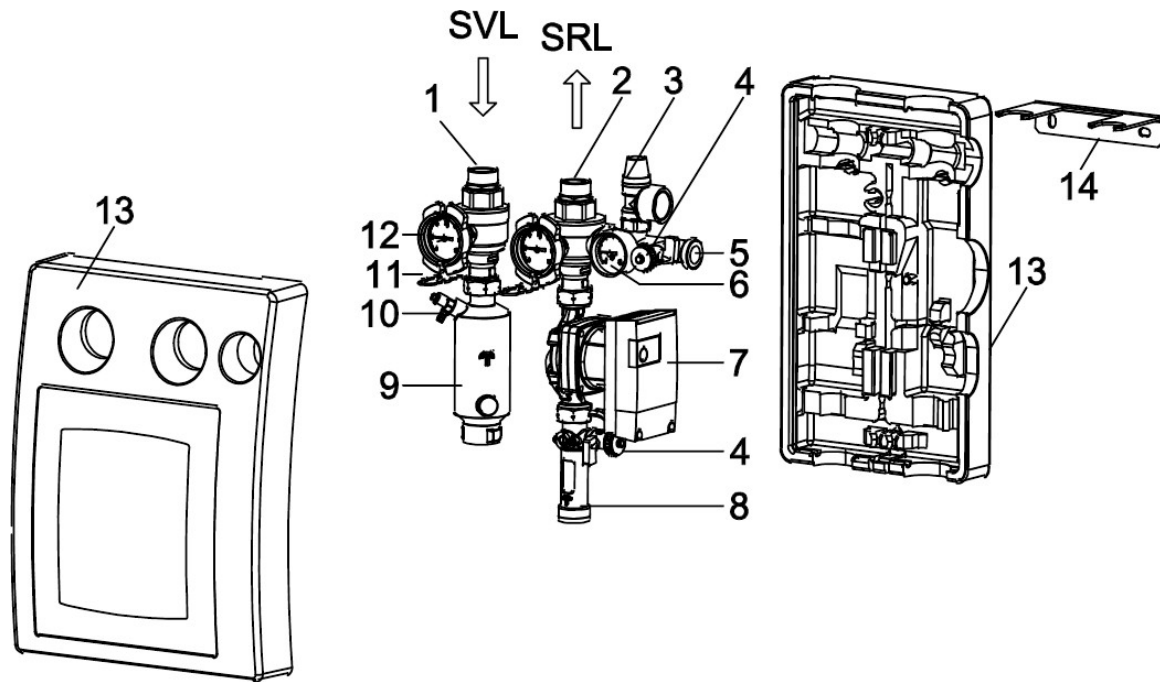
Also observe the installation and operating instructions for the components used, such as the solar control unit and the WILO circulation unit.

1.4 Supply and transport

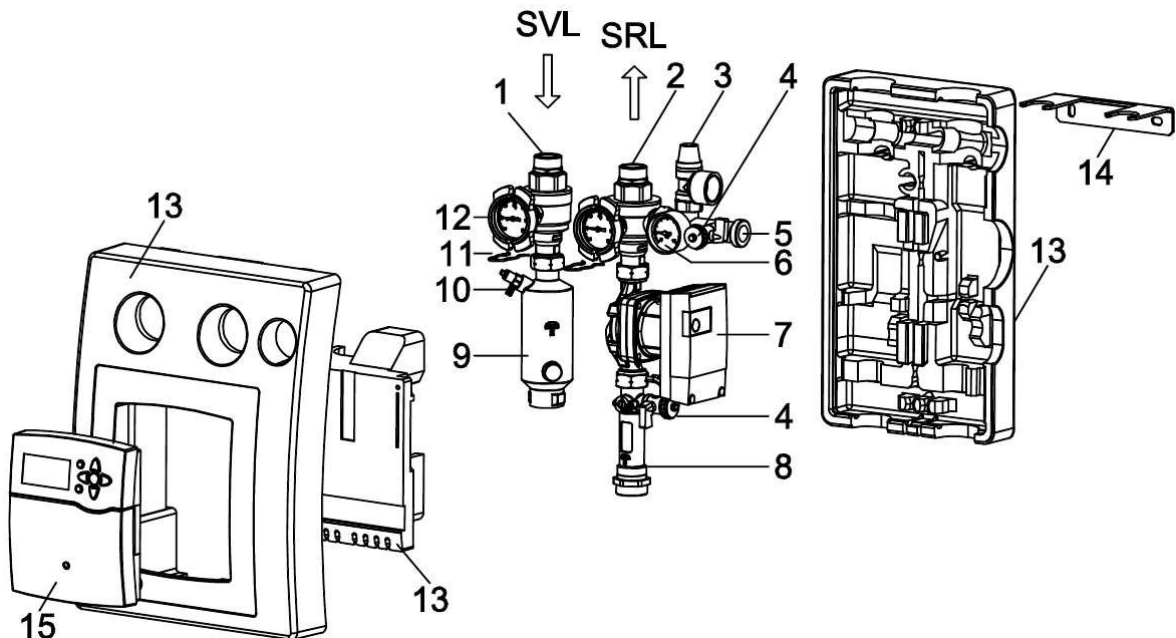
Check the completeness and integrity of the goods immediately upon receipt. Report any damage or complaints immediately.

2 Structure – Supply

B35-9 ECO SOLAR STATION



B35-9 BASIC-PRO SOLAR STATION



Pos.	Name	Pos.	Name
1.	Ball valve check valve 20 mbar	11	Safety spring
2.	Ball valve check valve 20 mbar	12	Thermometer with pointer

3	Solar safety valve 6 bars	13	Complete insulation for BASIC and PRO version only
4	Water heater filling and emptying valve	14	Mounting plates
5	Connection to the proper expansion vessel for use in solar systems	15	Solar control unit according to model (ECO: PB404; PRO: PR504)
6	Gauge		
7	Circulation pump		
8	Flow regulator		
8	Volumetric flow sensor (optional)		
9	Degasser	SVL	Solar outlet
10	Bleed valve	SVR	Solar return

3 Technical features

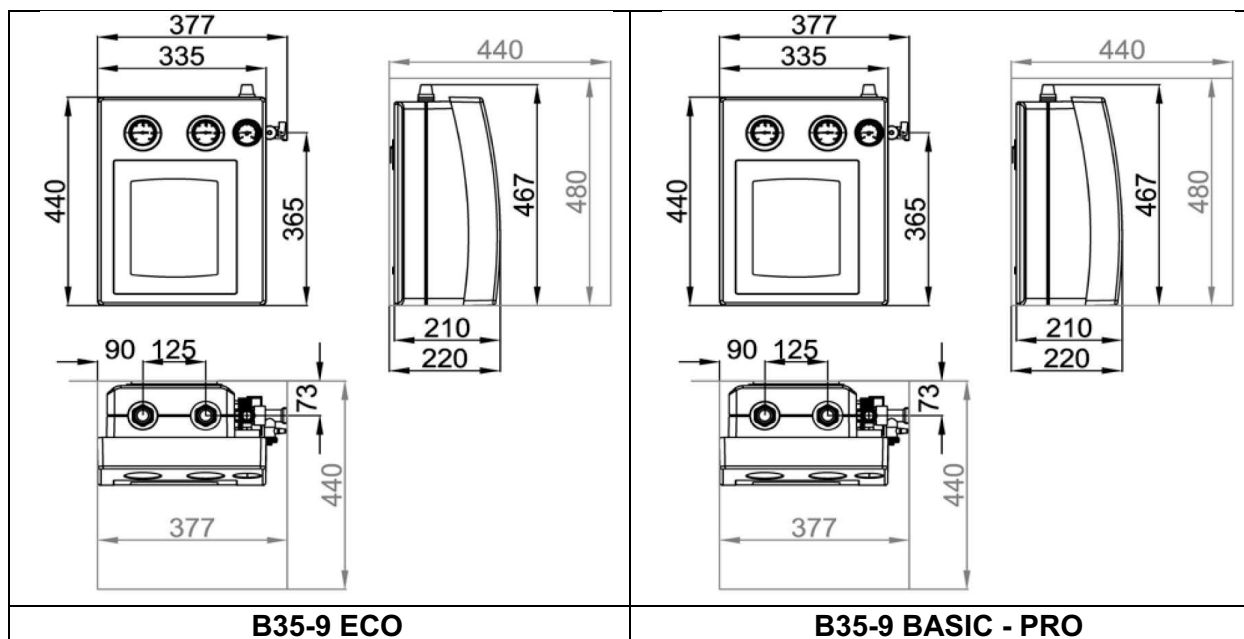
3.1 General

Description / Type		B35-9
Max collector surface (flat collector)		70 m ² (Low Flow, 30 l/m ² h) 47 m ² (High Flow, 45 l/m ² h)
Rated power with ΔT 12 K		35 kW
Recommended operating mode		High Flow (45 l/m ² h)
Max operating pressure		6 bar
Max operating temperature	Outlet Return	140°C 120°C
Liquid		Water with max 50% propylene glycol
Fittings	Solar circuit side (top) Storage tank side (bottom)	G1 FI G1 FI
Flowmeter		5-35 l/min
Volumetric flow sensor (optional)		2-40 l/min
Opening pressure for each gravity brake		20 mbar
Circulation pump, Absorbed power		Wilo Stratos Para 15/1-9; 0-10V, 3.5 – 90 W
	optional	Wilo Yonos Para 15/7.5 PWM2, 3-76 W
	optional	Wilo ST 15/8 Eco 47-86 W
	optional	Grundfos Solar PM2 15-105 PWM2 3.8-70 W
Electrical connection (control network)		230 V CA/ 50-60 Hz
Materials	Housing	CW617N (2.0402)
	Connection pieces	CW614N (2.0401)
	Gaskets	EPDM / AFM 34
	Insulation	EPP foam 0.038 W/mK

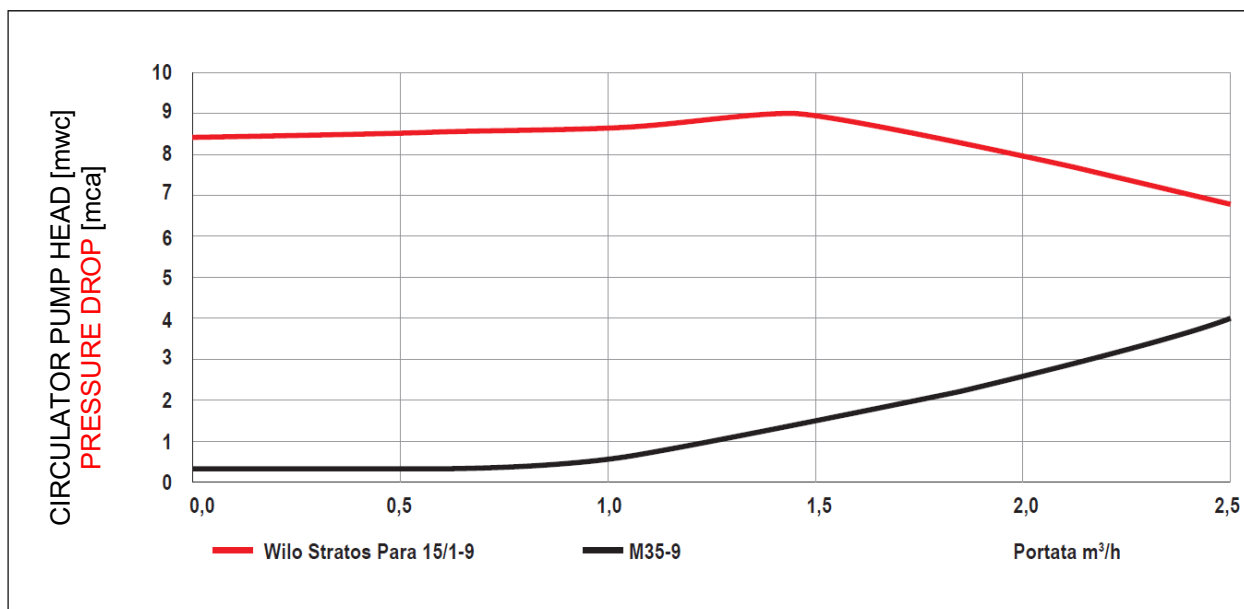
3.2 Dimensions / Size

Dimensions and minimum size for installation and maintenance works.

Depending on the architecture of the solar piping in the central heating plant, the space needed for proper installation of the solar station must be considered.

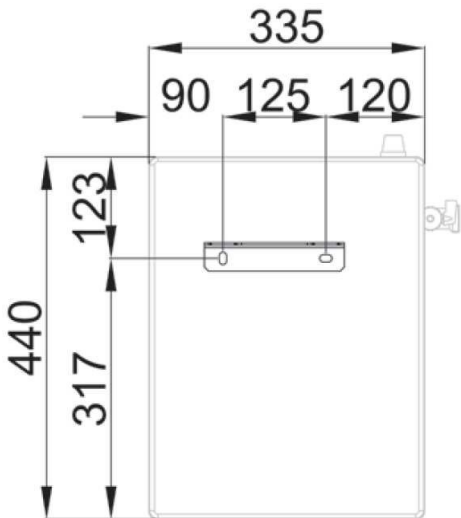
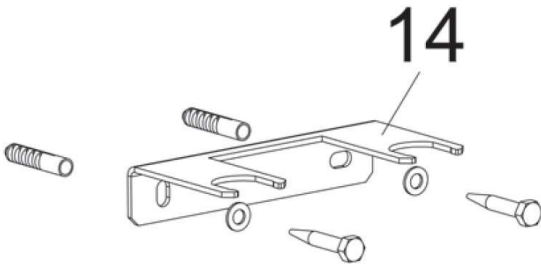


3.3 Characteristics curves

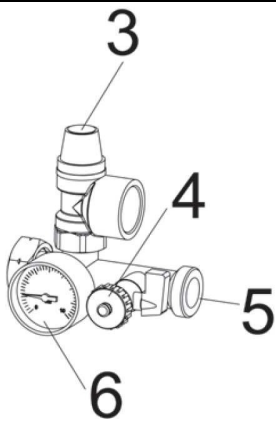


4 Assembling

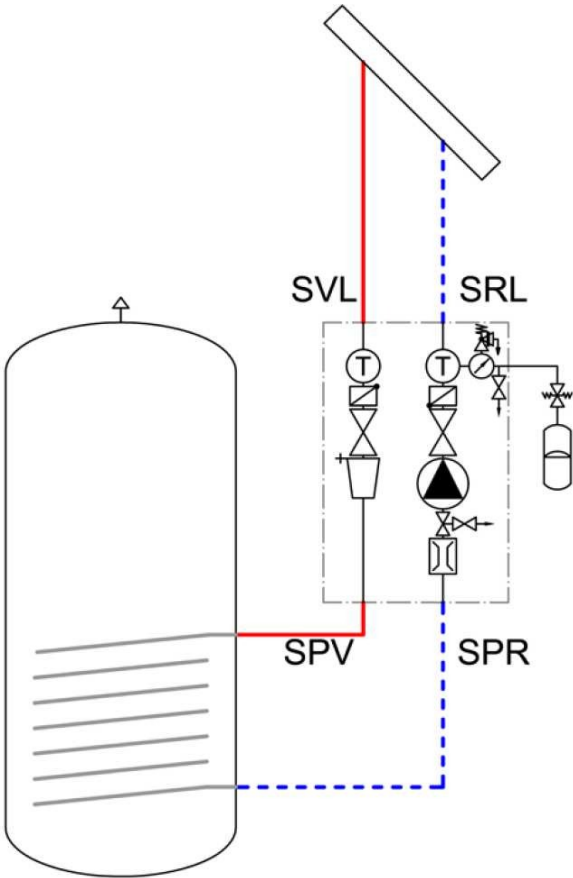
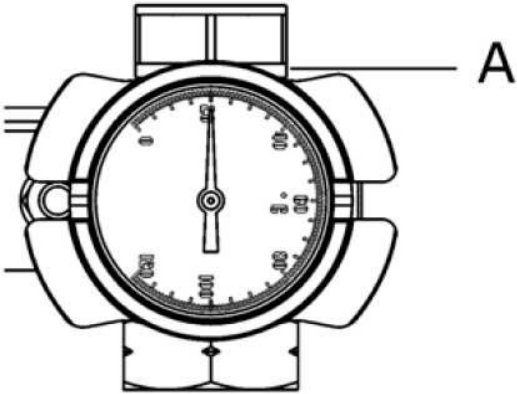
4.1 Wall mounting

	Remove the safety spring [11]. Extract the outlet and return segment from the support bracket [14]. Remove the rear insulating shell. Mark the support bracket [14] mounting points on the wall and drill two holes, $\varnothing 10$ mm each.
	Insert the anchors and attach the mounting bracket [14] using the screws and washers included in the kit. Align the mounting bracket [14] in the horizontal position. Insert the rear insulation shell on the mounting bracket [14]. Insert the outlet and return segment in the support bracket and attach it using the safety springs [11].

4.2 Installing the safety unit / connecting the expansion vessel

	The return ball valve must be connected to the solar safety unit, equipped with: - solar safety valve [3]; - fitting for connecting the expansion vessel [5]; - system filling valve [4]; - safety gauge [6]; Warning! Provide a pipe to be connected to the safety valve outlet so that, in the event of overpressure, spills can be conveyed to a collection container. This will help possible burns as well as solve any problems with surfaces soiled with solar fluid.
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4.3 Hydraulic connection

	Name	Description
 The illustration is only an example. It makes no claim to completeness and is no substitute for professional design.	SVL SRL SPV SPR	Solar outlet Solar return Tank outlet Tank return
	Warning! To screw in the solar outlet and solar return ball valve connections, turn the ball valve handles to the "closed" position (handles in the horizontal position). To secure the connections, hold them near the ball valve [A]! At the end, turn the ball valves to the "open" position.	

4.4 Electrical connection

4.4.1 General

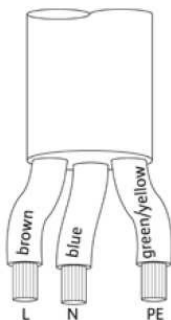
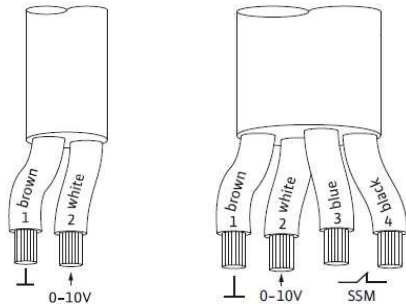
Work on the electrical system and opening the electrical component housings may only be carried out with the power switched off and only by authorised specialists. Check the proper polarity of the attachments and proper connection of the terminals. Protect the regulation device and electrical components from over voltage.

4.4.2 Connecting the solar control unit (only BASIC and PRO version)

In this case, follow the instructions for using the regulation device.

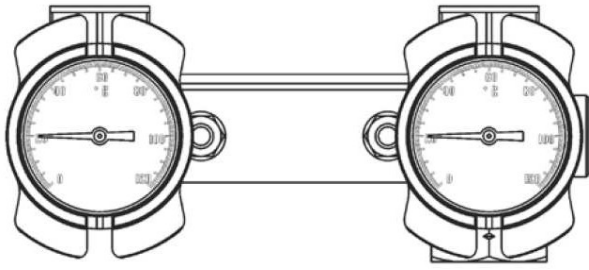
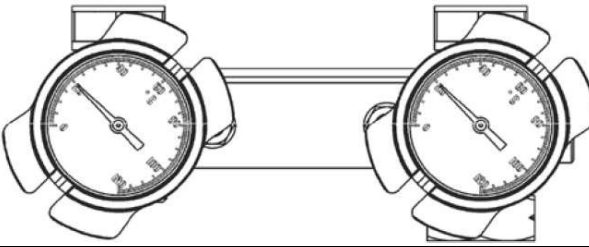
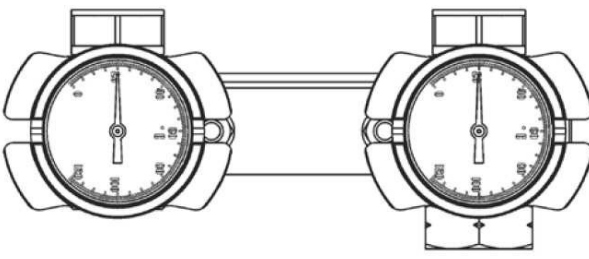
4.4.3 Circulation pump

In this case, follow the instructions for using the pump. Also see the section titled “Information regarding the pump”

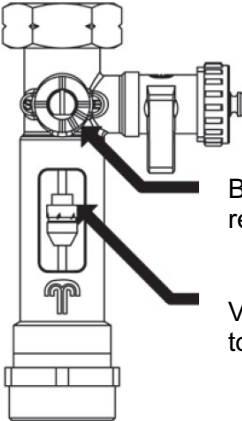
Pump electrical connection 	(1) brown = L (2) blue = N (3) green/yellow = PE
PWM connection (depending upon the model) 	(1) brown = + (2) blue = -
0-10V signal connection (2 or 4 conductors, depending on the model) 	(4) brown = GND (5) white = 0-10V signal (6) blue = MEC (7) black = MEC MEC = Centralized error message

5 Operation of the check valves

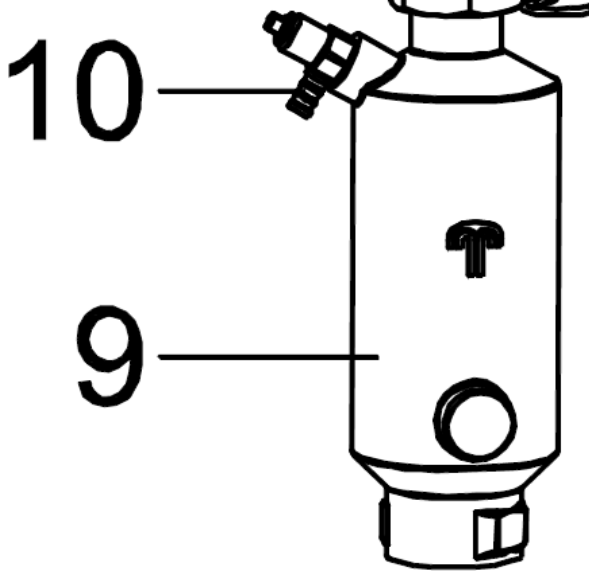
The check valves are built into the outlet [1] and return [2] ball valve. Turn the valve handles to operate.

Operating position 	To prevent undesired circulation, taking advantage of the characteristics of the check valve, the valve taps must not be shut off. The valves are in operation if they are positioned as shown in the figure, with the slots in the vertical position.
Emptying/filling 	For filling and complete draining of the solar system, shut off the check valves by turning the handles to a 45° position, as shown in the figure.
"Closed" Position 	Rotate the handle 90° to the right. The ball valves are closed. The handles are now in a horizontal position, as shown in the figure.

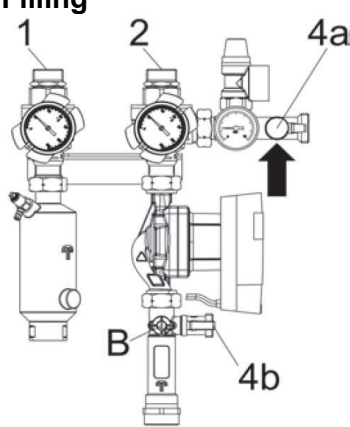
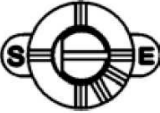
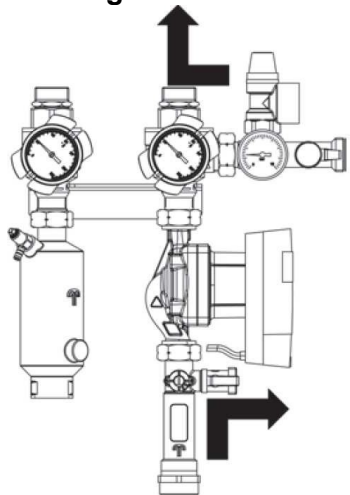
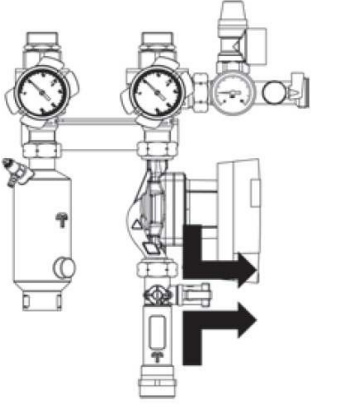
6 Flowmeter

 Butterfly valve [B] for regulating the flow rate Volumetric flow reading at top edge of the float	The system operation is regulated by calibrating the flow rate [l/min] that must recirculate inside the solar circuit. The flow indicator displays the flow rate set during startup. Warning! The operation position is shown in the figure below. 
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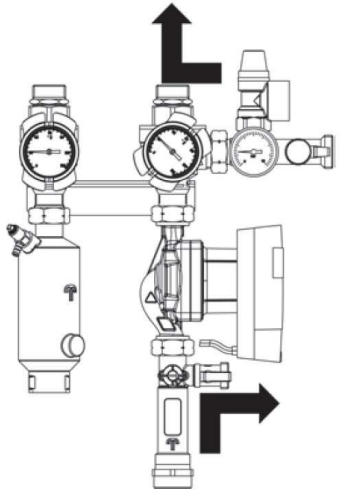
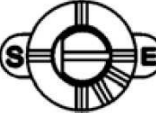
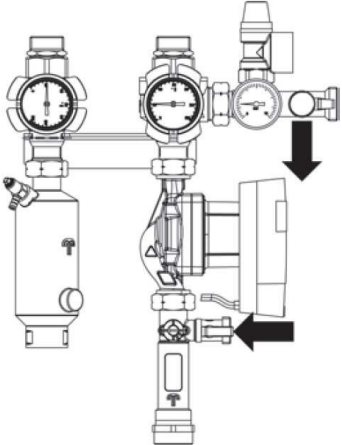
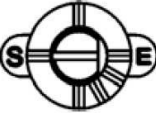
7 Degasser

 10 9	During system venting, check the solar circuit pressure. "In the event of low system pressure, leaking of air and fluid would cause a further pressure reduction." If necessary, refill the solar system with the same antifreeze fluid. The residual air contained in the solar circuit is collected and trapped in the degasser [9] and can be evacuated by means of the venting nipple [10]. To do this, push the supplied transparent tube over the vent valve and collect any fluid in a container. Venting may only be performed by trained specialists. With the reduction in pressure, uncontrolled air venting causes failure to the solar system with a system shutdown. Warning, danger of scalding! During venting, the air and internal solar fluid can reach temperatures of 100°C or higher, with a danger of scalding. To complete the operation, firmly close the valve.
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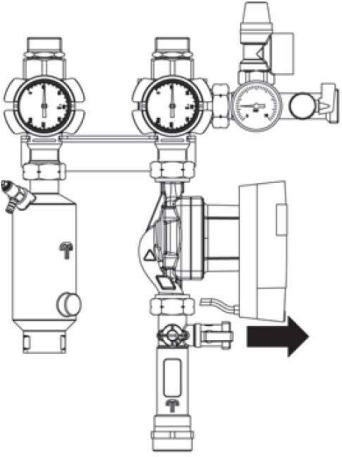
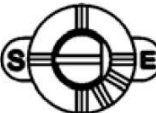
8 Filling, washing, and draining

Filling 		In order to fill the solar system, the outlet and return [1, 2] valve must be in the “check valves shut-off” position (45°). Turn the flowmeter shaft [B] to the "S" position. The notch is now in the horizontal position and the smooth part is turned to the left. Connect the solar station filling hose to the fill valve [4a]. Connect the solar station drain hose to the drain valve [4b]. Open the solar station fill and drain valves, 4a and 4b, and start loading the solar system. Indication: Do not exceed the maximum loading and washing speed of 40 l/min otherwise it could damage some parts of the unit.
Washing 		For washing, the outlet* and return [1, 2] valve must be in the “check valves shut-off” position (45°). Turn the flowmeter shaft [B] to the "S" position. The notch is now in the horizontal position and the smooth part is turned to the left. Open the fill and drain valves [4a, 4b] and start washing. Washing the pump Set the flowmeter rod [B] to “Passage”. The notch is now in the vertical position and the smooth part is turned towards the bottom. The air still contained in the pump may move upwards. Move the flow indicator shaft back to the horizontal position and wash the solar system as connected until there is no longer any residual air in the system. If the flowmeter shows no flow upon start-up after the wash procedure. perform another inspection wash.
Draining 		In order to drain the solar system, the outlet and return [1, 2] valve must be in the “check valves shut-off” position (45°). Move the shaft [B] to the “Passage” position. The notch is now in the vertical position and the smooth part is turned towards the bottom. Open the drain valve [4b].

8.1 Inspection wash

Step 1 		Move the shaft [B] to the "S" position. The notch is now in the horizontal position and the smooth part is turned to the left. The outlet valve [1] is in the operating position and the reflux ball valve [2] is set at 45°. Connect the wash pump outlet hose to the fill valve [4a]. Connect the wash pump return hose to the drain valve [4b]. Open the fill and drain valves [4a and 4b] and perform the inspection wash as shown. Close the valves [4a and 4b] after the wash.
Step 2 		Turn the flowmeter shaft [B] to the "E" position. The notch is now in the horizontal position and the smooth part is turned to the right. Tighten the outlet ball valve [1], the return ball valve [2] in the operating position. Connect the wash pump return hose to the fill valve [4a]. Connect the wash pump outlet hose to the drain valve [4b]. Open the fill and drain valves [4a and 4b] and perform the inspection wash as shown. When finished, close the valves [4a, 4b]. Turn the ball valves [1.2] to the operating position.

8.2 Pump assistance / replacement

Pump assistance / replacement 		Close the outlet and return ball valves [2]. Turn the shaft [B] to the "E" position. The notch is now in the horizontal position and the smooth part is turned to the right. With the fill valve [4a] closed, open the drain valve [4b]. Drain the heat carrier from the pump. When finished, turn the ball valves back to the operating position.
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9 Solar control unit (only BASIC and PRO versions)

The solar control unit is prewired only in the B35-9 Basic and Pro versions.
The probes for the collector and accumulator must be connected to the control units along with the power supply.

9.1 Use

Follow the installation and use instructions for the solar control unit used.

9.2 Settings

Follow the installation and use instructions for the solar control unit used.

10 Commissioning

The system may only be commissioned if all hydraulic and electrical components have been completely installed.

All ball valves must be turned to the operating position.

10.1 Seal inspection

Check the seal for all system components, included all prefabricated elements. In case of leaking, seal appropriately. During this operation, put the system under pressure, reaching the limit allowed for a certain time interval.

10.2 First start-up

Follow the instructions for the regulation device (optional).

Operating phase	Procedure	OK
Preparations and checks	• Visual inspection • Are all sensors correctly installed and connected? • Are all outputs connected?	
Activate the solar control unit.	Power supply present	
Setting the regulation device	Follow the instructions or basic preset settings	
Check the outputs	Activate all outputs individually and then simulate automatic system operation	
Flow regulation	Regulate the flow rate by adjusting the pump speed and operating the flow regulator.	_____
Operation inspection	Check the circulation pump operation.	

11 Troubleshooting

Error messages are shown on the solar control unit display. Follow the instructions for the device.

Failure	Possible cause	Elimination
Pump motor	Air in the system	Vent and perform a wash cycle
	Insufficient system pressure	Check the pressure and increase if necessary
The pump operates, but the flowmeter shows no flow rate.	Air in the system	Vent and perform a wash cycle
	Insufficient system pressure	Check the pressure and increase if necessary
	Flowmeter jammed or defective.	Check the flowmeter operation.
	The shutoff device is closed.	Open the shutoff device.
The accumulator cools down at night. After turning off the pump there are different outlet and return temperatures. At night, the collector temperature is higher than the outdoor temperature.	The volume flow regulating butterfly valve is closed.	Open the butterfly valve.
	The check valve does not close.	Check the position of the regulation handle and check the seal on the gravity brake (check for jammed chips or dirt particles in the valve seal). Change the pipe layout. Make a siphon through the pipes connecting to the heat exchanger "U", this helps the check valve action. At the limit, it is possible to fit a two-way valve activated at the same time as the pump.
	Incorrect flow occurs due to circulation within the pipe, especially in short pipe networks with reduced pressure loss.	Installation of a gravity brake or thermal insulation circuit (siphon) in the outlet.

12 Maintenance / assistance

The manufacturer recommends having maintenance performed every year by authorized specialists.

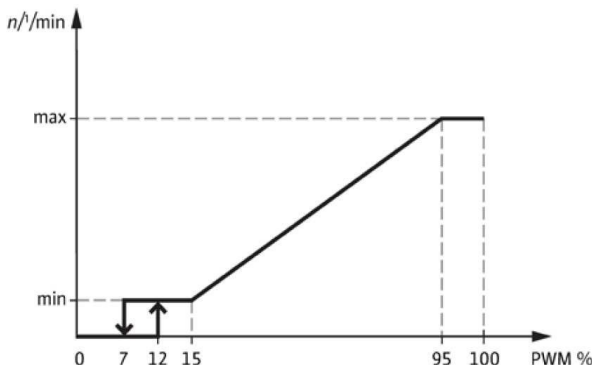
13 Shutdown

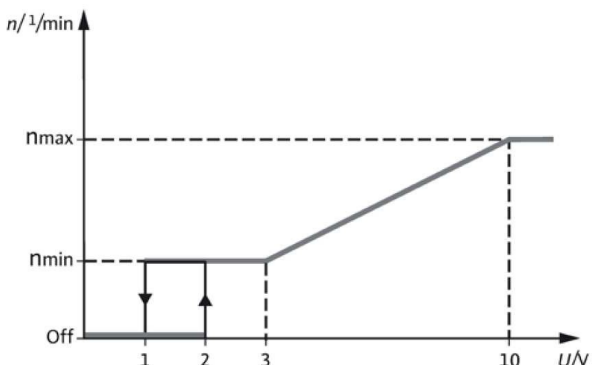
If the solar station is shut down for a long period of time in an area with a risk of freezing temperatures, the power must be disconnected and the system completely emptied.

If the solar station is shut down for good, disconnect the power supply to all parts of the system involved and completely empty the pipes and all parts of the system.

The definitive shutdown, dismantling, and disposal must only be performed by authorized specialists. The parts and materials must be properly disposed of in compliance with the standards in force.

14 Information regarding the pump

PWM2 signal logic		
 The graph shows RPM (n/min) on the y-axis and PWM % on the x-axis. The curve starts at 0 RPM for PWM % from 0 to 7. At 7%, it drops to a minimum RPM (n_min). Between 7% and 12%, it rises linearly to n_min. At 12%, it stays at n_min until 15%. From 15% to 95%, it rises linearly to a maximum RPM (n_max). At 95%, it stays at n_max until 100%.	< 7%	Pump off
	7 - 12%	RPM (in operation)
	12 - 15%	RPM (startup)
	15 - 95%	Variable RPM between n_{min} and n_{max} (linear)
	> 95%	Max RPM

0-10V signal logic		
 The graph shows RPM (n/min) on the y-axis and U/V on the x-axis. The curve is at 'Off' (0 RPM) for U/V from 0 to 1. At 1V, it rises linearly to n_min. Between 1V and 2V, it stays at n_min. At 2V, it stays at n_min until 3V. From 3V to 10V, it rises linearly to n_max. At 10V, it stays at n_max.	< 1 V	Pump off
	1 - < 3 V	RPM (in operation)
	2 - < 3 V	RPM (startup)
	3 - < 10 V	Variable RPM between n_{min} and n_{max} (linear)



