

**reflex**

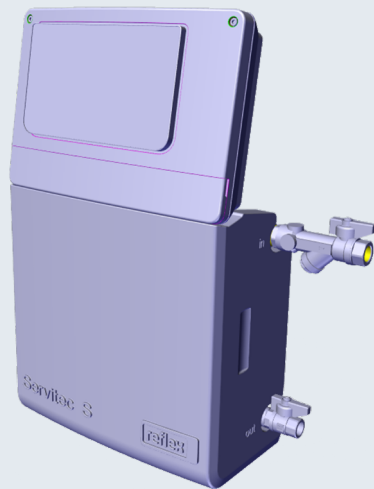
Thinking solutions.

# Vacuum spray degassing

Servitec S

## GB Operating manual

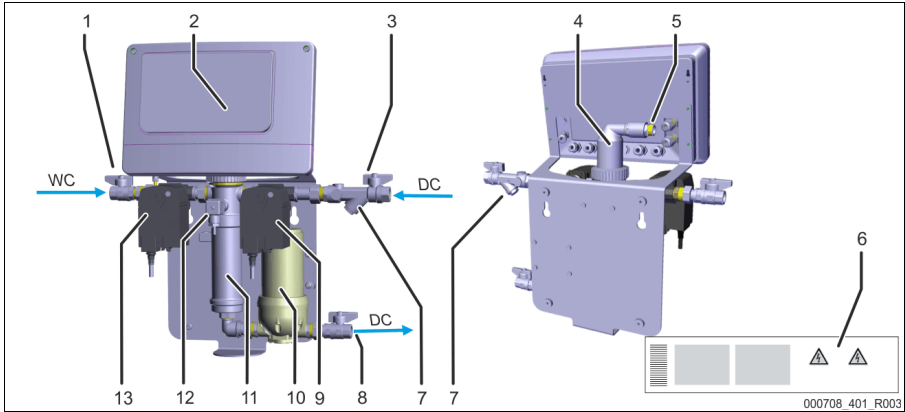
Original operating manual



Reflex Control Smart  
Android & iOS



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See chapter "Overview" on page 7.

## 1 Information concerning the operating manual

This operating manual is an important aid for ensuring the safe and reliable functioning of the device.

Reflex Winkelmann GmbH accepts no liability for any damage resulting from failure to observe the information in this operating manual. In addition to the requirements set out in this operating manual, national statutory regulations and provisions in the country of installation must also be complied with (concerning accident prevention, environment protection, safe and professional work practices, etc.).

### Note!

Every person installing this equipment or performing any other work at the equipment is required to carefully read this operating manual prior to commencing work and to comply with its instructions. The manual is to be provided to the device operator and must be stored near the device for access at any time.

## 2 Liability and warranty

The device has been built according to the state of the art and recognised safety rules. Nevertheless, its use can pose a risk to life and limb of personnel or third persons as well as cause damage to the system or other property.

It is not permitted to make any modifications at the device, such as to the hydraulic system or the circuitry.

The manufacturer shall not be liable nor shall any warranty be honoured if the cause of any claim results from one or more of the following causes:

- Improper use of the device.
- Unprofessional commissioning, operation, service, maintenance, repair or installation of the device.
- Failure to observe the safety information in this operating manual.
- Operation of the device with defective or improperly installed safety/protective equipment.
- Opening the housing of the electrical controller.
- Failure to perform maintenance and inspection work according to schedule.
- Use of unapproved spare parts or accessories.

Prerequisite for any warranty claims is the professional installation and commissioning of the device.

### Note!

Arrange for specialist personnel to carry out commissioning and annual maintenance.

### 3 Safety

#### 3.1 Explanation of symbols

The following symbols and signal words are used in this operating manual.



**Danger of death and/or serious damage to health**

The sign, in combination with the signal word 'Danger', indicates imminent danger; failure to observe the safety information will result in death or severe (irreversible) injuries.



**Serious damage to health**

The sign, in combination with the signal word 'Warning', indicates imminent danger; failure to observe the safety information can result in death or severe (irreversible) injuries.



**Damage to health**

The sign, in combination with the signal word 'Caution', indicates danger; failure to observe the safety information can result in minor (reversible) injuries.



**Damage to property**

The sign, in combination with the signal word 'Attention', indicates a situation where damage to the product itself or objects within its vicinity can occur.



**Note!**

This symbol, in combination with the signal word 'Note', indicates useful tips and recommendations for efficient handling of the product.

#### 3.2 Personnel requirements

Installation and operation tasks are to be carried out by specialist personnel or specially trained personnel only.

The electric connections and the wiring of the device must be executed by a trained electrician in accordance with all applicable national and local regulations.

#### 3.3 Personal protective equipment

Use the prescribed personal protective equipment as required (e.g. ear protection, eye protection, safety shoes, helmet, protective clothing, protective gloves) when working at the system in which the device is installed.



Information on personal protective equipment requirements is set out in the relevant national regulations of the respective country of operation.

#### 3.4 Intended use

The device is used in plant systems for stationary heating and cooling circuits. The devices may be used only in systems that are sealed against corrosion and with the following water types:

- Non-corrosive.
- Chemically non-aggressive.
- Non-toxic.

Minimise the entry of atmospheric oxygen throughout the plant system and into the make-up water.

**Note!**

Ensure the quality of the make-up water as specified by national regulations.

- For example, VDI 2035 or SIA 384-1.

**Note!**

- To ensure fault-free operation of the system over the long-term, glycols whose inhibitors prevent corrosion phenomena must always be used for systems operating with water/glycol mixtures. It must also be ensured that no foam is formed due to the substances in the water. Otherwise this could endanger the entire function of the vacuum spray tube degassing as this can lead to sedimentation in the vent pipe and therefore leaks.
- The specifications of the respective manufacturer are always decisive for the specific properties and mixing ratio of the water/glycol mixtures.
- Types of glycol must not be mixed and the concentration is generally to be checked every year (see manufacturer information).

### 3.5 Impermissible operating conditions

The device is not suitable for the following applications:

- Outdoor operation.
- For use with mineral oils.
- For use with flammable media.
- For use with distilled water.

**Note!**

It is not permitted to make any modifications to the hydraulic system or the circuitry.

### 3.6 Residual risks

The device has been manufactured using state-of-the-art technology. Despite this, residual risks cannot be excluded.

**WARNING****Risk of fire due to open ignition sources**

The device housing is made of combustible material and is heat-sensitive.

- Avoid heat and ignition sources (flames or sparks).

**CAUTION****Risk of burns on hot surfaces**

Hot surfaces in heating systems can cause burns to the skin.

- Wear protective gloves.
- Please place appropriate warning signs in the vicinity of the device.

**CAUTION****Risk of injury due to pressurised liquid**

If installation, removal or maintenance work is not carried out correctly, there is a risk of burns and other injuries at the connection points, if pressurised hot water or hot steam suddenly escapes.

- Ensure proper installation, removal or maintenance work.
- Ensure that the system is de-pressurised before performing installation, removal or maintenance work at the connection points.

**CAUTION****Risk of injury when upon coming into contact with glycol containing water**

Contact with glycol containing water in plant systems for cooling circuits can result in irritation of the skin and eyes.

- Use personal protective equipment (safety clothing, gloves and goggles, for example).

---

## CAUTION

### Risk of injury due to heavy device weight

The device weight may cause physical injury or accidents.

- If necessary, work with a second person during assembly or disassembly.
- 

## ATTENTION

### Device damage during transport

If the device is not transported correctly, it may be damaged.

- Use suitable covers to protect the connections against damage.
- 

## 4 Description of the device

The Servitec is a degassing and make-up station. Its main areas of application are heating and cooling circuits and systems in which malfunctions due to dissolved or free gases are to be prevented. The Servitec provides the following safety features:

- No direct intake of air due to control of pressurisation with automatic make-up.
- No circulation issues caused by free bubbles in the circuit water.
- Reduced corrosion damage due to oxygen removal from fill and make-up water.

### 4.1 Overview

The general view is located at the start of the operating manual.

1	Connection, WC make-up line
2	Controller
3	Gas-rich water inlet / System side DC
4	air vent
5	Check valve at the air vent
6	Nameplate
7	Dirt trap
8	Degassed water outlet / System side DC

9	Motorized ball valve system-side
10	Pump
11	Spray tube
12	Pressure sensor
13	Motorized ball valve make-up side
WC	Make-up connection
DC	Degassing connection <ul style="list-style-type: none"><li>• Degassed water outlet</li><li>• Gas-rich water inlet</li></ul>

### 4.2 Identification

The nameplate provides information about the manufacturer, the year of manufacture, the manufacturing number and the technical data.

### 4.3 Function

The device is suited for the degassing of water from the plant and make-up water. It removes up to 90 % of the dissolved gases from the water. The degassing operation uses timer-controlled cycles. A cycle comprises the following phases:

1. Pump down to create a vacuum	2. Injection	3. Discharge	4. Off time
Gas-rich water is sprayed into the spray tube. The pump draws more water from the spray tube than can flow through the nozzle.	Partial flows of the system or make-up water are finely atomised in the spray tube. The large surface area of the atomised water and the large gas saturation difference relative to that in the vacuum result in degassing of the water. The degassed water is returned to the system via the vacuum pump.	The pump shuts down. The degassing process continues running and the water level in the vacuum spray tube increases. The gases separated from the water are exhausted via the degassing valve.	The device remains idling until the next cycle is started.

Cooling water system  $\leq 30 \text{ }^{\circ}\text{C}$ , System pressure 1.8 bar, DC system degassing in operation, WC make-up degassing closed.

#### Degassing

The entire degassing process is hydraulically regulated using the integrated pressure sensor and the device controller. The operating conditions are monitored and can be called up and displayed from the device controller via a smartphone loaded with the Reflex Control Smart app.

- **Continuous degassing:** (Suitable after commissioning or after repairs)  
For continued degassing over several hours or days in a sequence of degassing cycles without idling periods.
- **Interval degassing:** (suitable for continuous operation)  
Interval degassing comprises a limited number of degassing cycles. There is an idling time between the intervals.
- **Make-up degassing:**  
In Magcontrol and Levelcontrol mode, make-up degassing is automatically activated upon every make-up request during continuous or interval degassing. The make-up volume is monitored via the make-up time and the make-up cycles.

#### Make-up variants

There are two make-up variants for the device. These are selected in the controller and set for the device:

- **Magcontrol** (for systems with diaphragm expansion vessels):  
Using the integrated "PIS" pressure sensor, the system registers and monitors the pressure in the heating or cooling system. Make-up degassing is activated as soon as the pressure drops below the calculated filling pressure.
- **Levelcontrol** (for systems with pressurisation units):  
The pressurisation unit uses the "LIS" pressure pick-up to determine the water level in the expansion vessel. The make-up function is triggered by a 230 V signal.

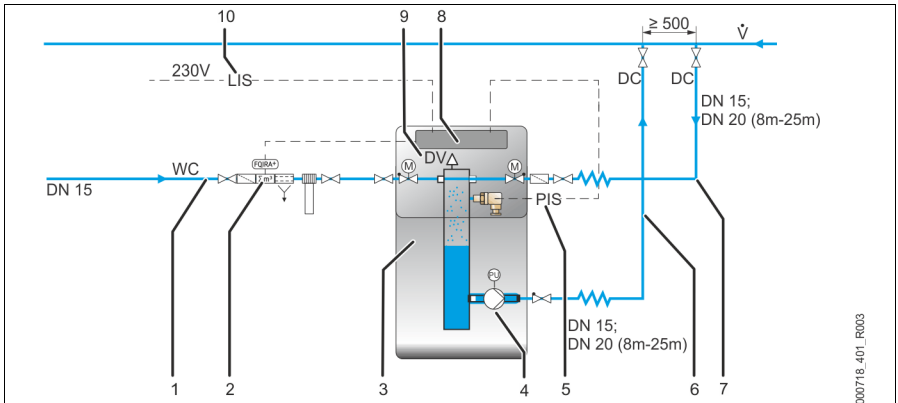
If none of the above described make-up variants is selected, the following selection should be made via the Reflex Control Smart app:

- **"None":** Automatic make-up is deactivated. A pressure-independent system degassing is taking place. Automatic system pressure monitoring must be reliably externally provided.



**Note!**

For pipe lengths greater than 8 m we recommend selecting the next largest nominal diameter DN 20. Max. pipe length 25 m.



1	"WC" make-up line nominal diameter DN 15
2	Optional accessories
3	Device
4	Pump "PU"
5	"PIS" pressure transducer from the device

6	"DC" degassing line (degassed water to the facility system), nominal diameter DN 15; DN 20 (8 m-25 m)
7	"DC" degassing line (gas-rich water from the facility system), nominal diameter DN 15; DN 20 (8 m-25 m)
8	Device controller
9	Degassing valve "DV"
10	230 volt signal - external make-up request from a pressurisation unit

**Note!**

Ensure the correct connection of the device to the facility system.

- For the Levelcontrol make-up variant in particular, the 230 V supply cable for the external make-up request of a pressurisation unit must be connected to the device.
- As supplied, automatic make-up is deactivated. A manual make-up via the make-up button on the device can be performed, see chapter 9.3 "Manual make-up" on page 23 . In operation via the Reflex Control Smart app, this is indicated and selected as "None" under the make-up variants selection.

#### 4.4 Scope of delivery

The scope of delivery is described in the shipping document for the initial shipment and the content is shown on the packaging. Immediately after receipt of the goods, please check the shipment for completeness and damage. Please notify us immediately of any transport damage.

Basic degassing equipment:

- Device
- 3 ball valves for degassing and makeup connections
- Operating manual

## 4.5 Optional equipment and accessories

The following optional equipment and accessories are available for this device:

<b>Fillset</b> – For make-up with water.	Fillset with integrated backflow preventer, water meter, dirt trap, and locking mechanisms for the "WC" make-up line.
<b>Fillset Impuls with contact water meter FQIRA+</b> – For make-up with water.	If the Fillset Impulse with FQIRA+ contact water meter is installed in the make-up line, you can regulate the entire make-up quantity and the soft water capacity of Fillsoft softening systems. The operational reliability of the device is assured and prevents automatic make-up during major water loss or small leaks.
<b>RS-485 interface</b>	This interface is used to retrieve all controller data and to enable the communication with control centres or other devices. The following interfaces can be operated via the RS-485 port: <ul style="list-style-type: none"> <li>• Modbus RTU (integrated)</li> </ul> The list of transmitted data can be found in the Reflex Control Smart app. Other modules upon request
<b>Fillsoft</b> – For softening the make-up water from the potable water supply system.	Fillsoft is installed between Fillset and the device. The device controller evaluates the make-up quantities and signals the required replacement of the softening cartridges.
<b>Reflexomat</b> – For systems with pressurisation units.	Make-up is executed depending on the water level measured with the "LIS" level sensor of the Reflexomat in the expansion vessel of the pressurisation unit. If there is a make-up requirement, the Reflexomat activates the Servitec make-up function via a 230V signal.



**Note!**

Separate installation, operation, and maintenance instructions are supplied with the accessories and optional equipment.

## 5 Technical data



**Note!**

The following values apply for all systems:

- Permissible operating temperature: 70° C
- Permissible make-up water operating temperature: 0 °C – 30 °C
- Permissible ambient temperature: 0 °C – 35 °C
- Permissible operating gauge pressure: 8 bar
- Maximum inlet pressure for make-up: 6 bar
- Maximum make-up capacity: ≤ 0.08 m³/h
- Separation level, dissolved gases: ≤ 90 %
- Separation level, free gases: 100 %
- Degree of protection: IP 42

### 5.1 Electrical system

Type	Power output (kW)	Power supply (V / Hz)	Fusing (A)	Number of RS-485 interfaces	Noise level (dB)*
Servitec S	0.2	230 / 50	8	1 piece	54

\* the value corresponds to the pump's sound emission value under laboratory conditions.

### 5.2 Dimensions and connections

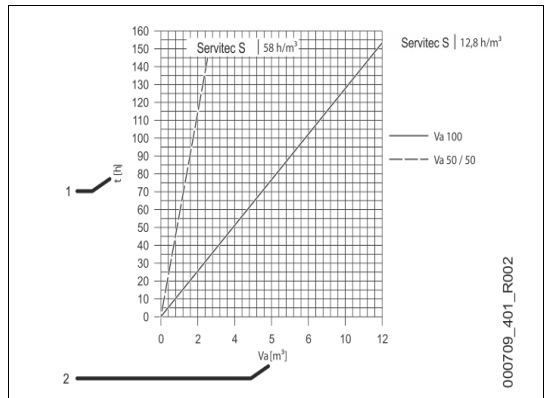
Type	Weight (kg)	Height (mm)	Width (mm)	Depth (mm)	Degassing device connection	Degassing system connection	Make-up connection
Servitec S	12.4	572	340	211	Internal thread ½"	Internal thread ½"	Internal thread ½"

### 5.3 Operation

Type	System volume (100% water) (m³)	System volume (50% water 50% glycol) (m³)	Working pressure (bar)	Permissible operating gauge pressure (bar)	Operating temperature (°C)
Servitec S	6	4	0.5 – 4.5	8	>0 – 70

Standard values for the maximum "Va" system volume to be degassed under extreme conditions during commissioning at a nitrogen reduction from 18 mg/l to 10 mg/l.

1. Continuous degassing "t" [h]
2. System volume "Va" [m³]



## 6 Installation



### Risk of serious injury or death due to electric shock.

If live parts are touched, there is risk of life-threatening injuries.

- Ensure that the system is voltage-free before installing the device.
- Ensure that the system is secured and cannot be reactivated by other persons.
- Ensure that installation work for the electric connection of the device is carried out by an electrician, and in compliance with electrical engineering regulations.



### Risk of injury due to pressurised liquid

If installation, removal or maintenance work is not carried out correctly, there is a risk of burns and other injuries at the connection points, if pressurised hot water or hot steam suddenly escapes.

- Ensure proper installation, removal or maintenance work.
- Ensure that the system is de-pressurised before performing installation, removal or maintenance work at the connection points.

### CAUTION

#### **Risk of burns on hot surfaces**

Hot surfaces in heating systems can cause burns to the skin.

- Wear protective gloves.
  - Please place appropriate warning signs in the vicinity of the device.
- 

### CAUTION

#### **Risk of injury due to falls or bumps**

Bruising from falls or bumps on system components during installation.

- Wear personal protective equipment (helmet, protective clothing, gloves, safety boots).
- 

#### **Note!**

Confirm that installation and start-up have been carried out correctly using the installation and commissioning certificate. This action is a prerequisite for the making of warranty claims.

- Arrange for specialist personnel to carry out commissioning and annual maintenance.

## 6.1 Incoming inspection

Prior to shipping, this device was carefully inspected and packed. Damages during transport cannot be excluded.

Proceed as follows:

1. Upon receipt of the goods, check the shipment for
  - completeness and
  - possible transport damage.
2. Document any damage.
3. Contact the forwarding agent to register your complaint.

## 6.2 Preparatory work

#### **Condition of the delivered device:**

- Check all screw connections of the device for tight seating. Tighten the screws as necessary.

#### **Preparing the connection of the device to the facility system:**

- Barrier-free access to the facility system.
- Frost-free, well-ventilated room. Room temperature > 0 - 35 °C.
- Drain for drain water.
- Filling connection: DN 15 according to DIN EN 1717.
- Electric connection: 230 V~, 50 Hz, 8 A with upstream RCD (tripping current: 0.03 A).

#### **Note!**

Shut-off valves must be used at the connection point to the pipe network.

#### **Note!**

The connection to the existing pipe network must be made via a flexible hose connection (especially in buildings with high noise abatement requirements).

#### **Note!**

The wall mounting must be implemented in a sound-decoupling manner (especially in buildings with high noise abatement requirements).

## 6.3 Execution

### ⚠ CAUTION

#### Risk of injury due to tipping over of the device

Risk of bruising or crushing caused by tipping over of the device.

- Ensure sufficient stability of the device.
- Weigh down the bearing surface of the device's transport unit with suitable means.

#### ► Note!

The screw connections at the device may loosen when the device is moved to another location.

- Before using the device check the screw connections for proper seating and sealing

#### ► Note!

Avoid leaks at the connections.

- When connecting the device to the plant system, ensure that the connections for degassing and make-up are not twisted.

Proceed as follows:

- Connect the device on the return side of the facility system.
  - Ensure that the device is operated within the permissible pressure and temperature ranges.
- In the case of a facility system with return flow admixture or a hydraulic switching point, connect the device upstream of the switching point.
  - In doing so, you guarantee water degassing in the "V" main volume flow at temperatures  $\leq 70$  °C.

**CAUTION** – damage due to improper connection! Bear in mind that the device may be subject to additional stresses through the connection of piping or hose connections to the facility system. Ensure that all connections to the facility system are free from stresses. If necessary, provide support structures for the pipes.

**CAUTION** – Property damage caused by leaks! Leaks in the connection pipes to the device can cause material damage to the facility system. Use only connection pipes with adequate resistance against the facility system temperature.

The device is pre-wired and must be adapted to match the local facility system conditions.

Proceed as follows:

1. Complete the water side connections from the device to the facility system.
2. Complete the electric connection as shown in the terminal plan, see chapter 6.5 "Electrical connection" on page 17 .

#### ► Note!

When connecting, ensure the valves and supply element options of the connecting pipes can be operated.

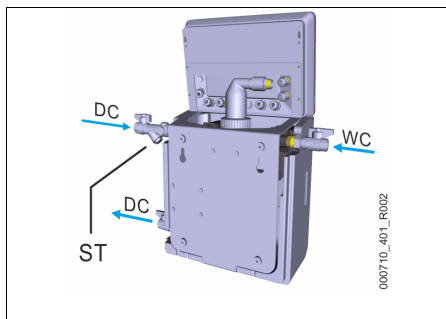
### 6.3.1 Fitting the add-on components

#### ► Note!

In this respect, see the illustrations on the attached supplementary sheet.

Install the ball valves at the device.

1. Attach the ball valve (green handle) for the "WC" make-up connection on the device.
  - If no make-up line is connected, close the "WC" connection with an externally threaded  $\frac{1}{2}$ " blind plug.
2. For the system-side connection, fit the ball valve with the "ST" dirt trap (blue handle) at the "DC" input on the device.
3. For the system-side connection, fit the ball valve (red handle) at the "DC" output on the device.



**6.3.2 Wall mounting**

Use the holes provided at the rear of the housing to attach the device at the wall. Select the attachment means according to the wall properties and the weight of the device.

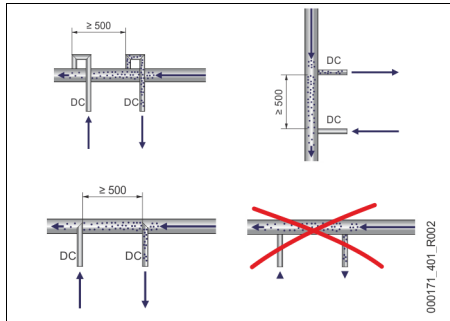
To reduce sound transmission (resonance), installation should be sound-decoupling.

**6.3.3 Degassing line to the system**

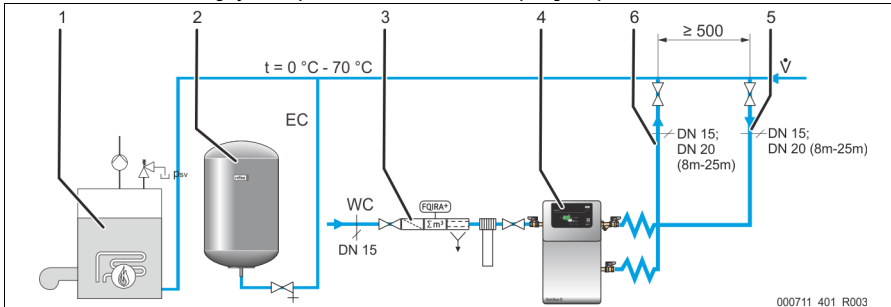
**Installation detail of the "DC" degassing line**

Install the "DC" degassing lines as follows:

- Prevent an overload of the "ST" dirt trap in the device caused by coarse dirt.
- Install the gas-rich degassing pipe "DC" upstream of the gas-poor degassing pipe (when viewed in the system flow direction).
- Preferably install on the return side of the facility system.
  - The water temperature must be in the range 0 °C–70 °C.



**Device installation in a heating system – pressurisation with "MAG" diaphragm expansion vessel**



1	Heating system
2	Diaphragm expansion vessel
3	For optional equipment and accessories, see chapter 4.5 "Optional equipment and accessories" on page 10

4	Device
5	"DC" degassing line (gas-rich water)
6	"DC" degassing line (degassed water)

Proceed as follows:

- Connect the "DC" degassing lines in the "V" main volume flow of the facility system.
- The device requires two "DC" degassing lines.
  - One degassing line for the gas-rich water from the facility system
  - One degassing line for the degassed water back to the facility system.
- Fit the degassing lines near the "EC" expansion line.
  - This ensures stable pressure conditions.



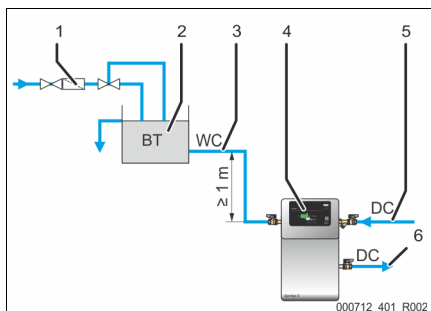
**Note!**

Ensure the integration with the "V" main volume flow. in particular in switching variants with hydraulic switching points and return admixtures.

- For switching and make-up variants, see chapter 6.4 "Switching and make-up variants" on page 15 .

### 6.3.3.1 Make-up line

1	"ST" dirt trap
2	"BT" system separator vessel
3	"WC" make-up line
4	Device
5	"DC" degassing line (gas-rich water)
6	"DC" degassing line (degassed water)



For water make-up, note the following conditions:

- For a water make-up via a "BT" mains disconnect receptacle, its bottom edge must be at least 1 m over the "PU" device pump.
- Close the connection of the "WC" make-up line when a make-up line is not connected.
- Set the make-up variant to "None" via the Reflex Control Smart app.
- Install at least one "ST" dirt trap with a mesh size  $\leq 0.25$  mm closely upstream of the device in the "WC" make-up line (3).

#### ► Note!

Avoid a device fault.

- Ensure that manual water make-up to the facility system is possible.

#### ► Note!

Use a pressure reducer in the "WC" make-up line if the idle pressure exceeds 6 bar.

## 6.4 Switching and make-up variants

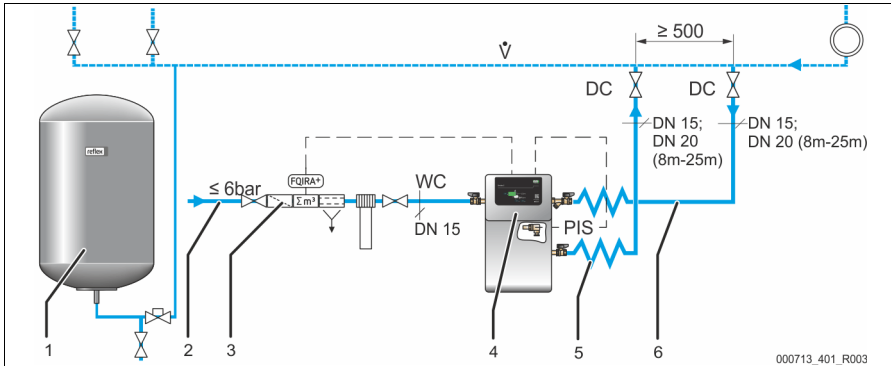
The device has three make-up variants:

- Pressure-dependent "Magcontrol" make-up.
  - In a facility system with an expansion vessel.
- Level-dependent "Levelcontrol" make-up.
  - In a facility system with a pressure maintenance station.
- No make-up
  - No automatic make-up takes place. In operation via the Reflex Control Smart App, this is indicated and selected as "None" under the make-up variants selection.

#### ► Note!

A manual make-up via the make-up button on the device can be performed under level-dependent "Levelcontrol" make-up (see chapter 9.3 "Manual make-up" on page 23 ).  
With the "Magcontrol" variant **no** manual make-up is possible.

**6.4.1 Pressure-dependent "Magcontrol" make-up mode**



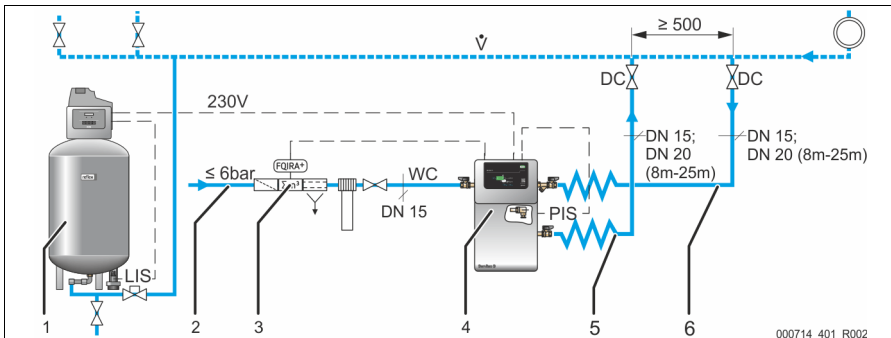
1	Bladder expansion vessel
2	"WC" make-up line
3	For optional equipment and accessories, see chapter 4.5 "Optional equipment and accessories" on page 10

4	Device
5	"DC" degassing line (degassed water)
6	"DC" degassing line (gas-rich water)
	PIS Pressure sensor

Operating mode "Magcontrol" is set using the Reflex Control smart app (see chapter 9.1 "Reflex Control Smart" on page 21 ). This operating mode is used for facility systems with an expansion vessel. Water is added dependent on the pressure in the facility system and the set minimum operating pressure  $p_0$  (see chapter 7.2 "Setting the minimum operating pressure for Magcontrol" on page 19 ). The pressure sensor required for this is integrated in the device. The degassing lines are connected close to the bladder expansion vessel. This ensures that the pressure monitoring for water make-up is provided.

**6.4.2 Level dependent "Levelcontrol" make-up mode**

Operating mode "Levelcontrol" is set using the Reflex Control Smart App see chapter 9.1 "Reflex Control Smart" on page 21 . This operating mode is used for systems with pressure maintenance stations and enables flexible operation at constant pressure. Water is added depending on the measured filling level in the expansion vessel of the pressure maintenance station. The "LIS" pressure transducer determines the filling level and sends this value to the controller of the pressure maintenance station. The controller sends a 230 V signal to the device controller when the filling level in the expansion vessel has fallen below the set value. The device controller regulates the motor actuator of the motorized ball valve in the "WC" make-up line. This ensures controlled make-up with water and monitoring of the make-up time and cycles.





1	Pressure maintenance station
2	"WC" make-up line
3	For optional equipment and accessories, see chapter 4.5 "Optional equipment and accessories" on page 10

4	Device
5	"DC" degassing line (degassed water)
6	"DC" degassing line (gas-rich water)
PIS	Pressure sensor

### 6.5 Electrical connection



**Risk of serious injury or death due to electric shock.**

If live parts are touched, there is risk of life-threatening injuries.

- Ensure that the system is voltage-free before installing the device.
- Ensure that the system is secured and cannot be reactivated by other persons.
- Ensure that installation work for the electric connection of the device is carried out by an electrician, and in compliance with electrical engineering regulations.

The following descriptions apply to standard systems and are limited to the necessary user-provided connections.

1. Disconnect the system from the power source and secure it against unintentional reactivation.
2. Remove the cover.

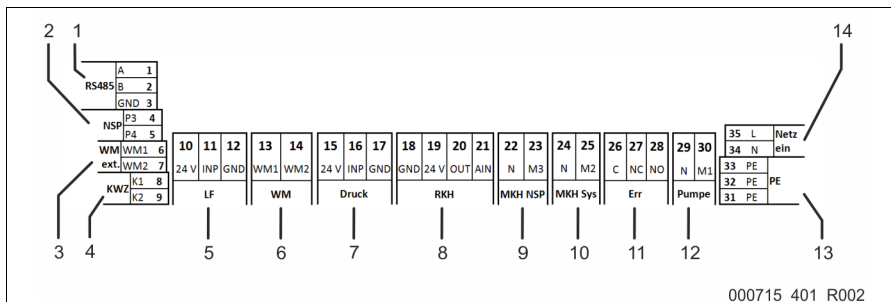


**DANGER** Risk of serious injury or death due to electric shock. Some parts of the device's circuit board may still be live with 230 V even after the device has been physically isolated from the power supply by pulling out of the mains plug. Before you remove the covers, completely isolate the device controller from the power supply. Verify that the main circuit board is voltage-free.

3. Install a screwed cable gland suitable for the respective cable. M16 or M20, for example.
4. Thread all cables to be connected through the cable gland.
5. Connect all cables as shown in the terminal diagram.
  - For installer supplied fusing, comply with the connected loads of the device, see chapter 5 "Technical data" on page 10.
6. Install the cover.
7. Connect the mains plug to the 230 V power supply.
8. Activate the system.

The electrical connection is completed.

#### 6.5.1 Terminal diagram



000715\_401\_R002

Item numbers	Terminal number	Signal	Function	Wiring
1	1	GND	RS485 interface	User, optional
	2	A		
	3	B		

Item numbers	Terminal number	Signal	Function	Wiring
2	4	P3	External make-up request. • With Levelcontrol setting. Input 230 V signal via L+N.	User, optional
	5	P4		
3	6	WM1	Insufficient water external - digital input.	User, optional
	7	WM2		
4	8	K1	Contact water meter	User, optional
	9	K2		
5	10	24 V	Conductivity - analogue input 4-20 mA	User, optional
	11	INP		
	12	GND		
6	13	WM1	---	---
	14	WM2		
7	15	24 V	Pressure sensor - Analogue input 4-20 mA	Factory
	16	INP		
	17	GND		
8	18	GND	---	---
	19	24 V		
	20	OUT		
	21	AIN		
9	22	N	Motorized ball valve on the make-up side	Factory
	23	M3		
10	24	N	Motorized ball valve on the system side	Factory
	25	M2		
11	26	C	Potential-free group alarm contact (max. 230 V / 8 A)	User, optional
	27	NC		
	28	NO		
12	29	N	"PU" pump for degassing.	Factory
	30	M1		
	31	PE		
13	32	PE	Earthing	Factory
14	33	PE	230 V power supply via mains cable and plug.	Factory
	34	N		
	35	L		

## 6.6 Installation and commissioning certificate



### Note!

The installation and commissioning certificate can be found at the end of the operating manual.

## 7 Commissioning



**Note!**

Commissioning and maintenance work must be carried out and confirmed by specialist personnel or the Reflex Customer Service.



**Note!**

The app guides you through commissioning see chapter 9.1 "Reflex Control Smart" on page 21 .

### 7.1 Requirements for initial commissioning

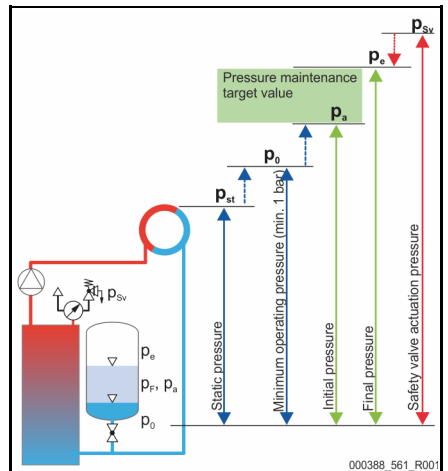
The Servitec will be ready for initial commissioning when the tasks described in the "Installation" chapter have been completed.

- The Servitec has been mounted.
- The connections of the Servitec to the system have been created and plant system pressure maintenance is operational.
  - Degassing line to the facility system.
  - Degassing line from the facility system.
- The water-side connection of the Servitec to the make-up has been created and is operational, if automatic make-up is required.
- The connection pipes of the Servitec have been purged and cleaned of welding residue and dirt before commissioning.
- The entire facility system is filled with water and all gases have been vented in order to ensure a circulation through the entire system.
- The electrical connection has been created according to applicable national and local regulations.

### 7.2 Setting the minimum operating pressure for Magcontrol

The "P<sub>0</sub>" minimum operating pressure is only directly entered together with the pressure-dependent regulated make-up at the Servitec device in systems with an expansion vessel via the Reflex Control Smart operating app. The value is determined at the pressure maintenance location.

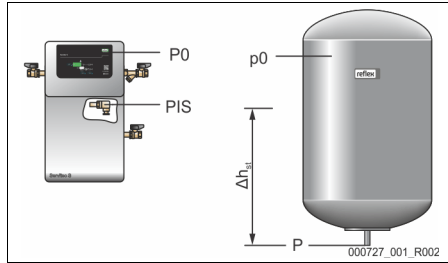
	Description	Calculation
$p_{st}$	Static pressure	= static head ( $h_{st}$ )/10
$p_0$	Minimum operating pressure	= $p_{st} + 0.2$ bar (recommended)
$p_a$	Initial pressure (cold water filling pressure)	= $p_0 + 0.3$ bar
$p_e$	Final pressure	$\leq p_{Sv} - 0.5$ bar (for $p_{Sv} \leq 5.0$ bar)
$p_{Sv}$	Safety valve actuating pressure	= $p_0 + 1.2$ bar (for $p_{Sv} \leq 5.0$ bar)



The calculation of the minimum operating pressure can be directly calculated and saved during initial commissioning using the Reflex Control Smart app for configuration. Please always check the correct inlet pressure of the expansion vessel in the system. Proceed as follows:

1. In the app, set the controller to "Magcontrol".
2. Determine the "P<sub>0</sub>" minimum operating pressure of the device relative to the "p<sub>0</sub>" initial pressure of the expansion vessel.

- The device is installed at the same level as the expansion vessel ( $\Delta h_{si} = 0$ ).
    - $P_0 = p_0^*$
  - The device is installed at a lower level than the expansion vessel.
    - $P_0 = p_0 + \Delta h_{si}/10^*$
  - The device is installed at a higher level than the expansion vessel.
    - $P_0 = p_0 - \Delta h_{si}/10^*$
- \*  $p_0$  in bar,  $\Delta h_{si}$  in m



**Note!**

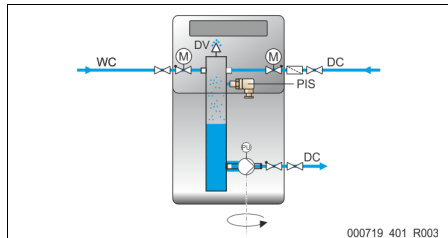
Comply with the Reflex planning directive.

- During planning, take into account that the working range of the device must be between the "pa" supply pressure and the "pe" final pressure in the working range of the pressure maintenance system.

### 7.3 Filling the device with water

Use the facility system to fill the device.

- After you have opened the "DC" ball valves, the vacuum spray tube will autonomously fill if the facility system provides sufficient water.
- Air escapes via the "DV" degassing valve and the water pressure can be read off on an external pressure gauge.



### 7.4 Starting Automatic mode

Automatic mode can be started as soon as the system is filled with water and the gases contained have been vented.

- Press "Auto" on the controller's operator panel.

A vacuum test is performed automatically during initial commissioning and after a reset. In doing so, both motorized ball valves are closed and the pump switched on. A vacuum must be built up during the pumping time and then must not decrease by more than 0.1 bar inside 50 s.

After the vacuum test has been passed, automatic mode can be started.

During commissioning, continuous degassing is automatically activated to remove any residual free or dissolved gases from the system. The times for continuous and interval degassing can be set in the customer menu of the Reflex Control Smart app dependent on the system conditions. The default setting is 24 hours. Subsequent to the continuous degassing, the device automatically switches to interval degassing.

#### Operation without Reflex Control Smart

The preset default values are the following:

- Continuous degassing during initial commissioning (24 hours).
- Thereafter the system switches over to interval degassing (10 cycles per day).

**Note!**

Continuous degassing can be interrupted by pressing the "Stop" button. The device is switched on again by the subsequent pressing of the "Auto" button. The Servitec S is now operating in interval degassing mode (10 degassing cycles every 24 hours).

The start of interval degassing is automatically based on the time of initial commissioning. For example, if initial commissioning is started at 15:00, automatic switch-over to interval degassing would occur after 24 hours with 10 cycles being performed.

**Note!**

The commissioning process is now concluded.

**Notice!**

The "ST" dirt trap in the "DC" degassing line must be cleaned after the expiry of the continuous degassing time at the latest, see chapter 10.1.1 "Cleaning the dirt trap" on page 26 .

## 8 Operation

### 8.1 Operating modes

#### 8.1.1 Automatic mode

Automatic mode includes the two operating modes continuous degassing and interval degassing.

**Note!**

- The starting time of the degassing processes is specified based on the initial commissioning time.
- To reset and for new setting of the start times, see chapter 9.5 "Reset" on page 25

#### Continuous degassing

This mode is started during first commissioning by pressing the Auto button. Multiple degassing cycles without pause times are carried out over a fixed period of several hours during the day. The daily start time is set based on the time of the initial commissioning.

Once continuous degassing has completed, interval degassing starts automatically.

#### Interval degassing

This mode comprises repeating intervals. There is an idling time between the intervals.

#### 8.1.2 Stop mode

On the controller, press 'Stop' to activate stop mode. The Auto LED of the operating panel goes out, the Stop LED lights up. Function monitoring is not performed in stop mode. The pump is switched off.

**Note!**

If stop operation is activated for longer than 4 hours, an error message appears on the device to signal an uncontrolled deactivation. This is also indicated in the app Reflex Control Smart.

#### 8.1.3 Restarting

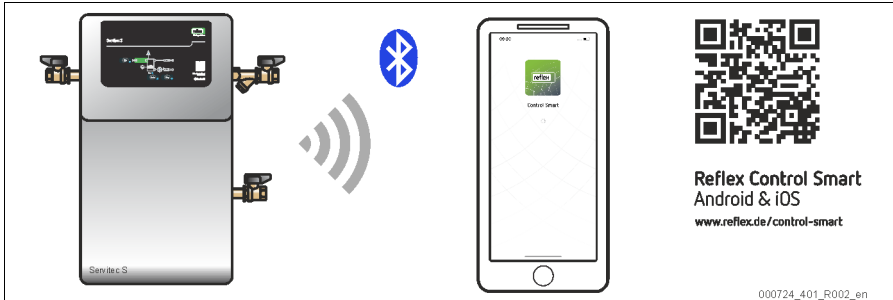
**Note!**

Recommissioning after a long shut-down takes place by pressing the 'Auto' button.

## 9 Controller

### 9.1 Reflex Control Smart

Access to the Servitec S is possible using the Reflex Control Smart app via a Bluetooth-connected smartphone or tablet. The app is available from the app store (Android or iOS), or via the QR code given below.

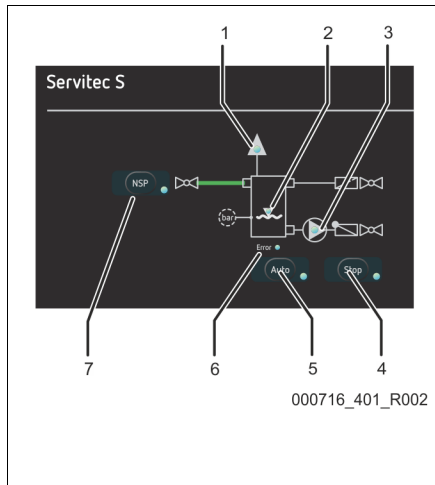


The Reflex Control Smart app provides the following functions amongst others:

- Intuitive and self-explanatory menu and operating guidance
- Easy and quick commissioning (commissioning-wizard)
- Querying of the system pressure
- Setting of operating mode Levelcontrol, Magcontrol and make-up degassing
- Individual configuration of the degassing mode (operating times for continuous and interval degassing, number of cycles, day of the week and time)
- Maintenance and troubleshooting wizard
- Software updates for system control

## 9.2 Operator panel

1	Degassing LED <ul style="list-style-type: none"> <li>• Turns green during degassing</li> </ul>
2	Water level LED <ul style="list-style-type: none"> <li>• Lights up red if a warning exists</li> </ul>
3	Pump LED <ul style="list-style-type: none"> <li>• Lights up green during operation</li> <li>• Flashes during vacuum test</li> </ul>
4	Stop button/LED <ul style="list-style-type: none"> <li>• For stop mode</li> <li>• Lights up yellow</li> </ul>
5	Auto button/LED <ul style="list-style-type: none"> <li>• For automatic mode</li> <li>• Acknowledge error messages</li> <li>• Lights up green</li> </ul>
6	Error LED <ul style="list-style-type: none"> <li>• Lights up red if an error exists</li> </ul>
7	Make-up button/LED <ul style="list-style-type: none"> <li>• For manual make-up</li> <li>• Lights up green if make-up is necessary</li> </ul>



### 9.3 Manual make-up

Manual make-up can be performed via the make-up button (1):

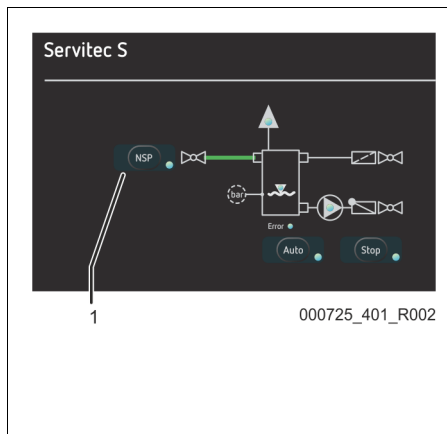
- Press the button for > 5 seconds to increase the pressure by 0.1 bar.
- Repeat for a further pressure increase.



#### Note!

When pressing the make-up button, the system pressure must be monitored using a suitable pressure gauge.

Monitoring of the system pressure and make-up takes place automatically if there are connected pressurisation units (Levelcontrol operating mode) and also in Magcontrol operating mode.



### 9.4 Messages

If errors occur during operation of the system, they are visualised via the Error LED in combination with other LEDs.

- Errors must be acknowledged with the Auto button. Until acknowledgement, the system remains in the error state.
- Warnings must not be acknowledged. The system continues to run. As soon as the cause of the warning is cleared, the corresponding LED goes out.

#### Error table

Troubleshooting is also described in detail in the app Reflex Control Smart. Detection of an error on the device is indicated by flashing LEDs and the errors are listed in the following table.

Error/message	Cause	Reaction	Alarm reset	LED no. / f [Hz]
01 - Minimum pressure (diaphragm expansion vessel)	<ol style="list-style-type: none"> <li>1. Set value P0 not reached</li> <li>2. Water loss in the system</li> <li>3. Pump fault</li> <li>4. Expansion vessel defective</li> <li>5. Make-up interrupted – or a make-up error.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check P0 set value.</li> <li>2. -</li> <li>3. Arrange for the pump to be checked.</li> <li>4. Check the system's expansion vessel.</li> </ol>	✓	06 / 100 Hz 02 / 1 Hz 03 / 1 Hz
02.1 - Low water	<ol style="list-style-type: none"> <li>1. Dirt trap clogged.</li> <li>2. Feed pipe blocked.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean the dirt trap.</li> <li>2. Unblock the feed pipe/check the make-up pipe.</li> </ol>	✓	06 / 100 Hz 02 / 1 Hz 07 / 1 Hz.
02.2 - Low water	<p>Vacuum is not generated quickly enough.</p> <ol style="list-style-type: none"> <li>1. Pump defective.</li> <li>2. Gas in the pump.</li> <li>3. Degassing valve/check valve at the quick air vent leaking.</li> <li>4. Quick air vent dripping</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the pump and replace as necessary.</li> <li>2. + 3. Replace the check valve at the quick air vent.</li> <li>4. Check the water quality – fluid foaming/oxygen inhibitor. Water quality must comply with VDI 2035</li> </ol>	✓	06 / 100 Hz 02 / 1 Hz

Error/message	Cause	Reaction	Alarm reset	LED no. / f [Hz]
<b>05</b> - Vacuum error	<ol style="list-style-type: none"> <li>It is not possible to create a vacuum</li> <li>A vacuum cannot be maintained</li> </ol>	<ol style="list-style-type: none"> <li>Check pump</li> <li>Seal the leak in the system.</li> </ol>	✓	06 / 100 Hz 07 / 1 Hz 01 / 1 Hz
<b>06</b> - Make-up time exceeded	<ol style="list-style-type: none"> <li>Set time exceeded.</li> <li>Make-up rate insufficient.</li> <li>Water loss in the system.</li> </ol>	<ol style="list-style-type: none"> <li>Check the set value.</li> <li>Check feed pipe.</li> <li>Check system for leaks.</li> </ol>	✓	06 / 100 Hz 07 / 100 Hz
<b>07</b> - Number of make-up cycles exceeded	<ol style="list-style-type: none"> <li>Set value exceeded</li> </ol>	<ul style="list-style-type: none"> <li>Seal the leak in the system</li> <li>Reset the cycle counter – occurs by acknowledging the error</li> </ul>	✓	06 / 100 Hz 07 / 1 Hz
<b>08</b> - Pressure measurement (diaphragm expansion vessel)	<ol style="list-style-type: none"> <li>Controller receives incorrect signal</li> <li>Pressure sensor outputs values outside the working range (4-20 mA)</li> </ol>	<ul style="list-style-type: none"> <li>Connect the pressure sensor - plug</li> <li>Check the cable for damage.</li> <li>Replace the pressure sensor.</li> </ul>	✓	06 / 1 Hz
<b>10</b> - Maximum pressure	<ol style="list-style-type: none"> <li>Set value Pmax = Psv-0.5 bar exceeded</li> </ol>	<ul style="list-style-type: none"> <li>Check the set value</li> <li>Check the pressure transducer</li> <li>Lower the pressure</li> <li>Check diaphragm expansion vessel</li> </ul>	✓	06 / 1 Hz 02 / 1 Hz 03 / 1 Hz
<b>14</b> - Discharge time	<ol style="list-style-type: none"> <li>Degassing line closed.</li> <li>Dirt trap clogged.</li> </ol>	<ol style="list-style-type: none"> <li>Open the degassing line.</li> <li>Clean the dirt trap.</li> </ol>	✓	06 / 100 Hz 01 / 1 Hz
<b>19</b> - Continuous stop > 4 h	<ol style="list-style-type: none"> <li>The system has been in stop mode for more than 4 hours.</li> </ol>	<ul style="list-style-type: none"> <li>Set the controller to automatic mode – by pressing the Auto-button on the system.</li> </ul>	✓	06 / 100 Hz 04 Stop LED / flashes (1 Hz)
<b>20</b> - Make-up quantity/quantity exceeded	<ol style="list-style-type: none"> <li>Set value exceeded</li> </ol>	<ul style="list-style-type: none"> <li>Check the system for leaks.</li> <li>Check the make-up tank filling level</li> <li>Reset the counter.</li> </ul>	✓	06 / 100 Hz 07 / 1 Hz
<b>21</b> - Maintenance recommended	<ol style="list-style-type: none"> <li>Service interval time exceeded.</li> </ol>	<ul style="list-style-type: none"> <li>Arrange for a service to be performed.</li> <li>Reset the set value.</li> </ul>		Stop LED 04 flashes. The LEDs that are displayed in normal operation also light up in parallel to this (warning).
<b>24</b> - Softening/desalination	<ol style="list-style-type: none"> <li>Soft water capacity too low.</li> <li>Conductivity of the fluid is too high</li> <li>Maximum operating duration has been exceeded.</li> </ol>	<ol style="list-style-type: none"> <li>Replace softening cartridge (Fillsoft).</li> <li>Replace softening cartridge (Fillsoft Zero).</li> <li>Perform service and reset the counter</li> </ol>	✓	05 / 1 Hz 01 / 1 Hz



## 9.5 Reset

Resetting via the Reflex Control Smart app is also possible. Follow the instructions in the Reflex Control Smart app.

Alternatively, the system can also be reset to its factory setting directly on the device.

1. Ensure that the system is in stop mode.
2. Simultaneously press the Auto button and the Stop button for longer than 5 seconds. All LEDs flash briefly.
3. Release the stop and auto buttons again.

The reset is performed and the device is reset to the factory settings. The device can be restarted via the Reflex Control Smart app. Alternatively, the system can be operated in Levelcontrol mode without the app.



### Note!

After the reset, the continuous degassing and interval degassing operating times are automatically synchronised from this new point in time, see chapter 8.1.1 "Automatic mode" on page 21 .

## 10 Maintenance



### CAUTION

#### Risk of burns on hot surfaces

Hot surfaces in heating systems can cause burns to the skin.

- Wait until hot surfaces have cooled down or wear protective safety gloves.
- The operating authority is required to place appropriate warning signs in the vicinity of the device.



### CAUTION

#### Risk of injury due to pressurised liquid

If installation, removal or maintenance work is not carried out correctly, there is a risk of burns and other injuries at the connection points, if pressurised hot water or hot steam suddenly escapes.

- Ensure proper installation, removal or maintenance work.
- Ensure that the system is de-pressurised before performing installation, removal or maintenance work at the connection points.

The 'Servitec' must be serviced annually or after 16,000 degassing intervals, whichever comes first.



### Note!

This corresponds to a continuous degassing time of approximately 14 days or a continuous degassing time of 7 days + 1 year interval degassing with a standard setting.

The maintenance intervals depend on the operating conditions and the degassing times.

The following recommended standard value must not be exceeded:

- Continuous degassing: Continuous degassing time for the largest "Va" system volume, see chapter 5 "Technical data" on page 10 .
- Interval degassing: Setting values according to the Service menu.

An indication that the annual service is to be performed after the set device operating time has elapsed is given in the form of a warning (LED configuration, see chapter 9.4 "Messages" on page 23 ). The warning is acknowledged by pressing the Auto button. The warning is also displayed in the app.



### Note!

Commissioning and maintenance work must be carried out and confirmed by specialist personnel or the Reflex Customer Service.

## 10.1 Maintenance schedule

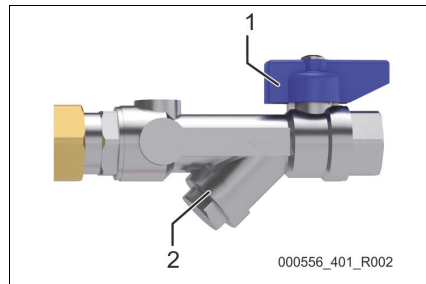
The maintenance schedule is a summary of maintenance tasks to be carried out regularly.

Maintenance task	Conditions			Interval
▲ = Check, ■ = Service, ● = Cleaning				
Check for leaks. • Screw connections • Degassing valve	▲	■		Annually
Pump function check. 1. Press and hold the Stop button for at least 2 seconds. – The pump continues running. – Allow the pump to run for not more than 30 sec. 2. Wait two minutes 3. The process can be repeated by pressing the button again.	▲			Annually
Clean the dirt trap. – see chapter 10.1.1 "Cleaning the dirt trap" on page 26	▲	■	●	Depending on the operating conditions

### 10.1.1 Cleaning the dirt trap

The dirt trap in the degassing pipe must be cleaned no later than after the expiry of the continuous degassing time. Check the dirt traps after every filling action or extended operation.

- Press 'Stop' on the controller's operator panel.
  - The device is non-functioning and the pump is shut down.
- Close the ball valve (1) upstream of the dirt trap (2).
- Slowly unscrew the cap of the dirt trap together with the sieve.
  - The residual pressure in the pipe segment is released.
- Pull the sieve out of the cap.
- Clean the sieve with a soft brush and rinse it with clear water.
- Check the seal for damage and replace as necessary.
- Insert the sieve in the cap and turn the cap with the sieve in the housing of the dirt trap (2).
- Open the ball valve (1) upstream of the dirt trap (2).
- Check the dirt trap for leaks.
- Press 'Auto' on the controller's operator panel.
  - The device is switched on and the pump is in operation.



## 11 Removal



### Risk of serious injury or death due to electric shock.

If live parts are touched, there is risk of life-threatening injuries.

- Ensure that the system is voltage-free before installing the device.
- Ensure that the system is secured and cannot be reactivated by other persons.
- Ensure that installation work for the electric connection of the device is carried out by an electrician, and in compliance with electrical engineering regulations.

 **CAUTION**
**Risk of burns**

Escaping hot medium can cause burns.

- Maintain a sufficient distance from the escaping medium.
- Wear suitable personal protective equipment (safety gloves and goggles).

 **CAUTION**
**Risk of burns on hot surfaces**

Hot surfaces in heating systems can cause burns to the skin.

- Wait until hot surfaces have cooled down or wear protective safety gloves.
- The operating authority is required to place appropriate warning signs in the vicinity of the device.

 **CAUTION**
**Risk of injury due to pressurised liquid**

If installation or maintenance work is not carried out correctly, there is a risk of burns and other injuries at the connection points, if pressurised hot water or steam suddenly escapes.

- Ensure proper disassembly.
- Ensure that the system is de-pressurised before performing the disassembly.

 **CAUTION**
**Risk of injury due to tipping over of the device**

Risk of bruising or crushing caused by tipping over of the device

- Ensure sufficient stability of the device.
- Weigh down the bearing surface of the device's transport unit with suitable means.

 **CAUTION**
**Risk of injury when upon coming into contact with glycol containing water**


Contact with glycol containing water in plant systems for cooling circuits can result in irritation of the skin and eyes.

- Use personal protective equipment (safety clothing, gloves and goggles, for example).

Prior to disassembly, shut off the degassing pipes from the system to the device and de-pressurise the device. Then disconnect the device from all electrical power sources.

Proceed as follows:

1. Set the device controller to stop mode.
2. Close the connections from the device for the degassing pipes.
3. Then disconnect the facility system from all electrical power sources.
4. Disconnect the power cable of the device from the power supply.
5. Secure the facility system to prevent it from being switched back on.

 **DANGER** – Risk of serious injury or death due to electric shock. Some parts of the device's circuit board may still be live with 230 V even after the device has been physically isolated from the power supply by pulling out of the mains plug. Before you remove the covers, completely isolate the device controller from the power supply. Verify that the main circuit board is voltage-free.

6. Remove the degassing pipes from the device.
  - Ensure that the device shut-offs are not twisted when you remove the pipes.
  - Slowly disconnect the pipes and if necessary catch any escaping residual water in a container.
7. Physically remove the device from the system.
8. Drain all residual water from the device.
  - At the device, open the connections for the degassing pipes.

- Use a suitable container to catch the residual water.

The device is removed.

## 12 Disposal

The intentional or unintentional reuse of used components can result in a hazard for persons, the environment and the system. Therefore, please observe the following points:

- The operating company is responsible for proper disposal.
- Only to be disposed of by specialist personnel.
- Upon conclusion of the useful life, strip the system down into different separable materials and deliver to a specialist company for recycling.



### Note!

The following included materials are fully recyclable:

- EPP (housing)
- ABS (front cover of the controller)
- PP (back cover of the controller)

## 13 Appendix

### 13.1 Reflex Customer Service

#### Central customer service

Switchboard: Telephone number: +49 (0)2382 7069 - 0

Customer Service extension: +49 (0)2382 7069 - 9505

Fax: +49 (0)2382 7069 - 9523

E-Mail: [service@reflex.de](mailto:service@reflex.de)

#### Technical Hotline

For questions about our products

Telephone number: +49 (0)2382 7069-9546

Monday to Friday 8:00 to 16:30

### 13.2 Warranty

The respective statutory warranty regulations apply.

### 13.3 Conformity and standards

Device conformity declarations are available on the Reflex homepage.  
[www.reflex-winkelmann.com/konformitaetserklaerungen](http://www.reflex-winkelmann.com/konformitaetserklaerungen)  
 Alternatively, scan the QR code:



**EN** **Installation and commissioning certificate** - This device has been installed and commissioned in accordance with the instructions provided in the operating manual. The settings in the controller match the local conditions.



Typ / Type:	
P <sub>0</sub>	
P <sub>SV</sub>	
Fabr. Nr. / Serial-No.	









Thinking solutions.

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