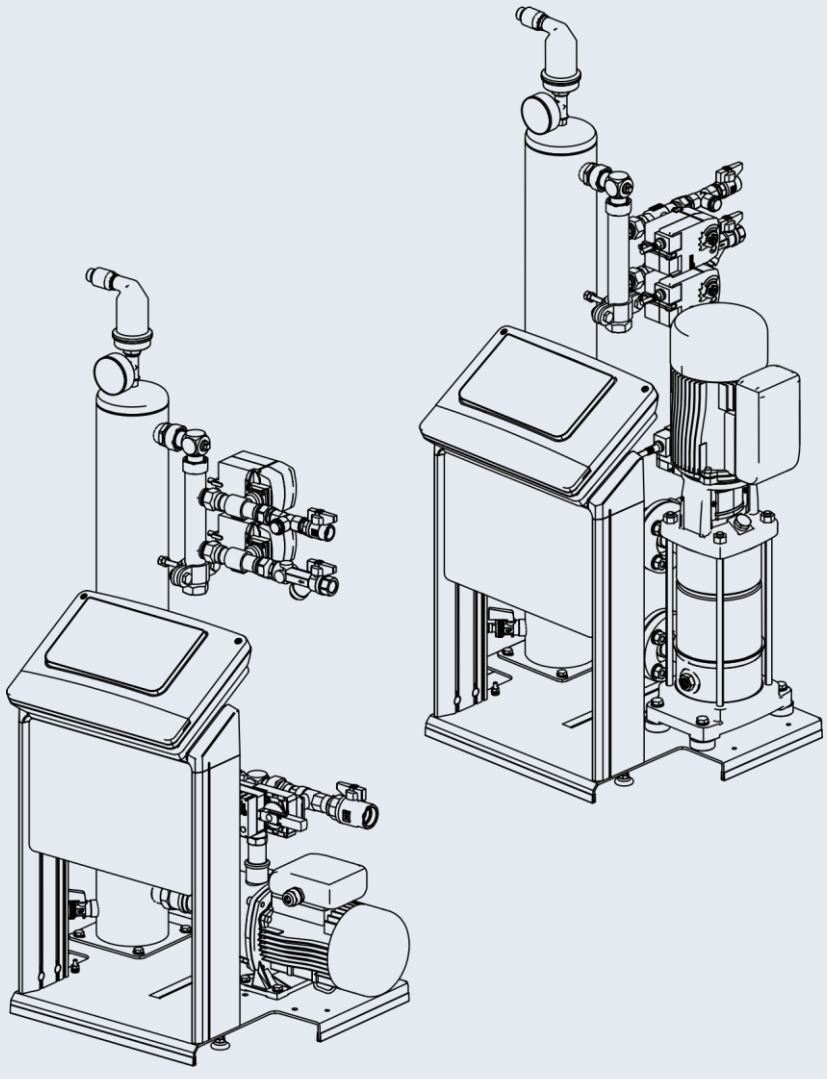
reflex
Thinking solutions.

Vacuum spray degassing

Servitec 35-95
Control Basic controller

GB **Operating manual**

Original operating manual



1 Notes on the operating manual

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

The operating manual will help you to:

- avoid any risks to personnel.
- become acquainted with the device.
- achieve optimal functioning.
- identify and rectify faults in good time.
- avoid any faults due to improper operation.
- cut down on repair costs and reduce the number of downtimes.
- improve the reliability and increase the service life of the device.
- avoid causing harm to the environment.

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.).

This operating manual describes the device with basic equipment and interfaces for optional equipment with additional functions. For optional equipment and accessories, see chapter 4.5 "Optional equipment and accessories" on page 6 .

Notice!

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 product operator and must be stored near the product for access at any time.

2 Liability and guarantee

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.
- 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 Reflex Customer Service to carry out commissioning and annual maintenance, see chapter 11.1 "Reflex Customer Service" on page 18 .

3 Safety

3.1 Explanation of symbols

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

⚠ DANGER

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.

⚠ WARNING

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.

⚠ CAUTION

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.

ATTENTION

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

Only specialist personnel or specifically trained personnel may install and operate the equipment.

The electric connections and the wiring of the device must be executed by a specialist 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 on the system.

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 facility 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 facility 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 pipe 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 Inadmissible operating conditions

The device is not suitable for the following applications:

- Mobile system operation.
- 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

This device has been manufactured to the current state of the art. However, some residual risk cannot be excluded.

⚠ 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.

⚠ WARNING

Risk of injury due to heavy weight

The devices are heavy. Consequently, there is a risk of physical injury and accidents.

- Use suitable lifting equipment for transportation and installation.

⚠ 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).

4 Description of the device

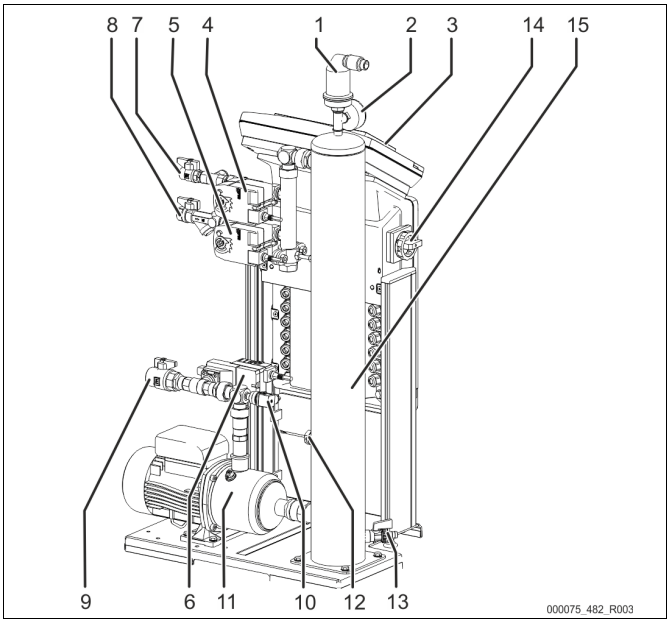
The Servitec is a degassing and make-up station. Its main areas of application are heating and cooling circuits and systems in which malfunctions due to dissolved or free gases are to be prevented. The Servitec provides the following safety features:

- 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.

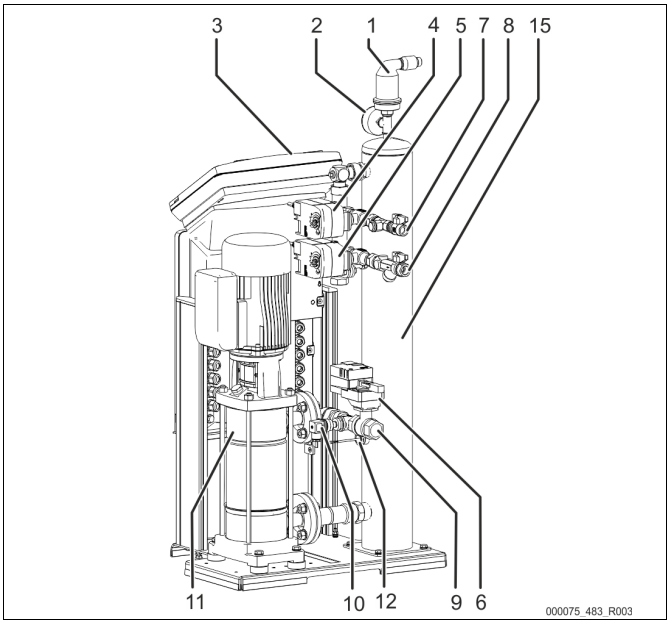
Note!

Operation and functioning at high system temperatures (>70°C):
If a vacuum is created, the boiling point of the medium reduces. This property results in a change in volume of the medium in the vacuum spray tube. If the medium boils, the pressure increases and counteracts the vacuum created in the spray tube. Thanks to this characteristic, the type of degassing changes from vacuum degassing to thermal degassing. If the medium is boiling, the solubility of gases is almost zero. Moreover, a higher pump flow rate does not automatically result in a higher vacuum (at temperatures >70°C).

4.1 Overview



Servitec 35 – 60

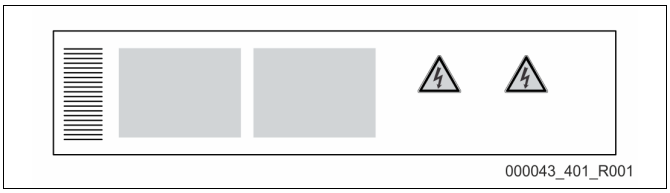


Servitec 75 – 95

1	Degassing valve "DV"
2	Vacuum gauge "PI"
3	Control Touch controller
4	2-way motor control valve "CD" upstream of vacuum spray tube
5	2-way motor control valve "WV" upstream of vacuum spray tube
6	Ball control ball valve "PV" downstream of pump "PU"
7	Connection "WC" for the make-up • Input for gas-rich water from the make-up
8	Connection "DC" for degassing • Input for gas-rich water from the facility system
9	Connection "DC" for degassing • Degassed water outlet
10	Pressure switch "PIS"
11	Pump "PU"
12	Insufficient water switch
13	Feed and drain cock "FD"
14	Main switch
15	Vacuum spray tube "VT"

4.2 Identification

The nameplate is attached below the screw cover of the controller. On it can be found information about the manufacturer, the year of manufacture, the manufacturing number and the technical data.



Information on the type plate	Meaning
Type	Device name
Serial No.	Serial number
Min. / max. allowable pressure PS	Minimum/maximum permissible pressure
Max. allowable flow temperature of system	Maximum permissible flow temperature of the system
Min. / max. working temperature TS	Min./max. operating temperature (TS)
Year of manufacture	Year of manufacture
Max. system pressure	Max. system pressure
Min. operating pressure set up on site	Minimum operating pressure, set on site

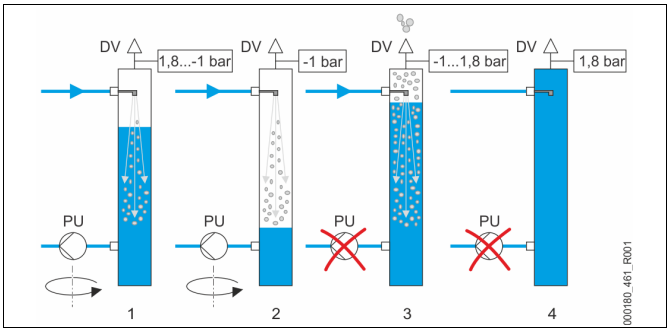
4.3 Function

The Servitec 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:

- Inject and pump down to create a vacuum
  The feed "DC" of gas-rich water from the system to the vacuum spray tube "VT" has been opened. Depending on the requirement, partial flows of the gas-rich system water and the make-up water are atomised in the vacuum spray tube via the lines "DC" and "WC". As less water is injected into the spray tube than is fed back into the system from the vacuum spray tube via the pump "PU", a vacuum is formed in the spray tube. The pump "PU" continues pumping down to create a vacuum until the water saturation pressure is reached. The vacuum is indicated at the vacuum gauge "PI". The large contact surface of the atomised water and the gas saturation gradient to the vacuum result in degassing of the water. The pump returns degassed water from the vacuum spray tube to the system where it again begins to dissolve gases. There it is able to dissolve gases again.
- Discharge
  The "PU" pump shuts off. The system continues to inject and degas water in the "VT" vacuum spray tube. The water level in the vacuum spray tube rises. The gases separated from the water are discharged via the "DV" degassing valve.
- Idling time
  The gas has been discharged, the Servitec will remain idling until the next cycle is started.

Sequence of a degassing cycle in the vacuum spray pipe "VT"

Example: Cooling water system ≤ 30 °C, System pressure 1.8 bar, "DC" system degassing in operation, "WC" make-up degassing closed.



1	Inject and pump down to create a vacuum	3	Discharge
2	Inject and pump down to create a vacuum	4	Idling time

Degassing

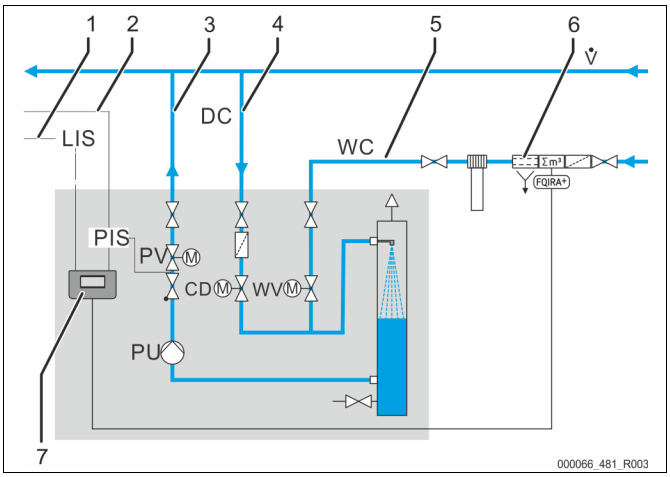
The entire degassing process is hydraulically synchronised by the "PV" motor adjustment apparatus and the Servitec controller. The system monitors the operating states and displays them at the Servitec controller. The controller provides 3 different degassing programmes and 2 different make-up variants for selection and setting.

Degassing programmes

- Continuous degassing:
  For continued degassing over several hours or days in a sequence of degassing cycles without idling periods. This programme is recommended after commissioning and repairs.
- Interval degassing:
  Interval degassing comprises a limited number of degassing cycles. There is an idling time between the intervals. This programme is recommended for continuous operation.
- Make-up degassing:
  With this setting, the make-up water is degassed. A system degassing does not occur.

Make-up variants

There are two make-up variants. Both are monitored via the make-up time and the make-up cycles.



1	Control line of a pressure maintenance station for requesting the make-up in "Levelcontrol" mode
2	Signal line from the "PIS" pressure transducer for "Magcontrol" make-up variant
3	"DC" degassing line (degassed water)
4	"DC" degassing line (gas-rich water)
5	"WC" make-up line
6	Servitec
7	Optional equipment and accessories see chapter 4.5 "Optional equipment and accessories" on page 6

Magcontrol: For systems with expansion vessels.
- Using the integrated "PIS" pressure transducer, 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 pressure maintenance stations.
- Depending on the level in the tank for the "LIS" pressure maintenance station, water is added directly into the station. The make-up function can be triggered by an external 230 V ~ signal.

4.4 Scope of delivery

The scope of delivery is described in the shipping document and the content is shown on the packing.

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:
- Control of the Servitec.
- "DV" degassing valve, box-packaged.
- Plastic sleeve with operating manual and electric wiring diagram (attached to the Servitec).

The Servitec is pre-assembled and shipped on a pallet.

4.5 Optional equipment and accessories

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

- Fillsoft/Fillsoft zero for softening/desalination of the make-up water from the potable water supply system. Replacement of the softening and desalination cartridges.
- Fillset for make-up with water
  - Fillset with integrated backflow preventer, water meter, dirt trap, and shut-ff for the "WC" make-up line
- Fillset Impulse with FQIR+ contact water meter for make-up with water.
  - If the Fillset Impulse is installed, 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.
- Fillset Compact for make-up
  - Fillset Compact with integrated system separator, dirt trap, and shut-off for the "WC" make-up line.
- Fillguard for conductivity monitoring
  - If the Fillguard is fitted, the capacity of the Fillsoft Zero desalination cartridge can be monitored based on the conductivity.
- Enhancements for the device controller.
  - Various controller information can be queried via the RS-485 interface and it can also be used to communicate with control centres or other devices, see chapter 6.5.2.1 "Connecting the RS-485 interface" on page 9 .
    - Bus modules for the communication with control centres.
    - Profibus-DP.
    - Ethernet.
    - I/O module for standard communication.
    - Modbus RTU
    - Control Remote
- Gas discharge measurement for optimised degassing operation.

Note!
Separate operating manuals are supplied with accessories.

5 Technical data

Note!
The following values apply for all systems:

- Permissible operating temperature of the device: 90 °C
- Permissible inlet pressure for make-up: 1.3 bar – 6 bar
- Make-up capacity: Up to 0.55 m³/h
- Separation level, dissolved gases: ≤ 90 %
- Separation level, free gases: 100 %
- Degree of protection: IP 54

5.1 Electrical system

Type	Power output (kW)	Power supply (V / Hz/ A)	Fusing (internal) (A)	Number of RS-485 interfaces	I/O module	Control Unit (V, A)	Noise level (dB)
35	0.7	230 / 50	10	1	No	230, 4	55
60	1.1	230 / 50	10	1	No	230, 4	55
75	1.1	230 / 50	10	1	No	230, 4	55
95	1.1	230 / 50	10	1	No	230, 4	55

5.2 Dimensions and connections

Type	Weight (kg)	Height (mm)	Width (mm)	Depth (mm)	Servitec input connections (system and make-up)	Servitec output connection
35	42	1030	620	440	Internal thread ½ "	Internal thread 1 "
60	40	1215	685	440	Internal thread ½ "	Internal thread 1 "
75	39	1215	600	525	Internal thread ½ "	Internal thread 1 "
95	40	1215	600	525	Internal thread ½ "	Internal thread 1 "

5.3 Operation

Type	System volume (100% water) (m³)	System volume (50% water) (m³)	Working pressure (bar)	Permissible operating gauge pressure (bar)	Setpoint overflow valve (bar)	Operating temperature (°C)
35	up to 220	up to 50	0.5 – 2.5	8	–	>0 – 90
60	up to 220	up to 50	0.5 – 4.5	8	–	>0 – 90
75	up to 220	up to 50	1.3 – 5.4	10	–	>0 – 90
95	up to 220	up to 50	1.3 – 7.2	10	–	>0 – 90

6 Installation

⚠ DANGER

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 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, start-up and maintenance certificate. This action is a prerequisite for the making of warranty claims.

– Have the Reflex Customer Service carry out commissioning and the 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 fittings and electrical connections of the Servitec for proper seating.
  Tighten the screws and fittings as necessary.

Preparing the device installation:

- Frost-free, well-ventilated room.
- Ambient temperature > 0 to maximal 45 °C.
- Level, stable flooring with a drainage facility.
- Filling connection DN 15 to DIN 1988 -100/ -600 / DIN EN 1717.
- Electric connection 230 V~, 50/60 Hz, 16 A with upstream ELCB: Tripping current 0.03 A.

The Servitec can be operated in two different modes for water make-up. When installing the Servitec, note its position within the system:

- Pressure-dependent make-up of system water (Magcontrol).
  – Install the Servitec in the vicinity of the expansion vessel.
- Level-dependent make-up of system water (Levelcontrol).
  – Install the Servitec on the system side in the return upstream of the return flow admixture.

Note!

Servitec make-up line.

– Use the Fillset system separator if the make-up line of the drinking water mains is closed.

– The applicable guidelines and regulations of the country of installation must be observed.

Note!

Comply with the Reflex planning directive.

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

6.3 Execution

ATTENTION

Damage due to improper installation

Additional device stresses may arise due to the connection of pipes or system equipment.

- Ensure that pipes are connected (torque-free) from the device to the system without them being stressed or strained.
- If necessary, provide support structures for the pipes or equipment.

ATTENTION

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 appropriate resistance against the facility system temperature.

In heating systems, preferably install the device in the return side.

– In this manner, you ensure that the device is operated within the permissible pressure and temperature ranges.

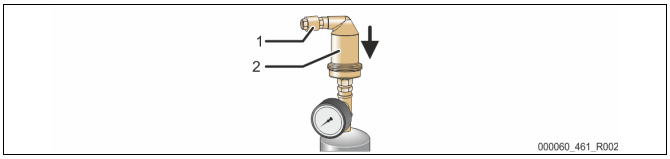
– In systems with return admixtures or hydraulic switching points, the device must be installed upstream of the admixture point to ensure degassing in the "V" main flow volume at temperatures ≤ 90 °C.

The device is pre-wired and must be adapted for the local system conditions. Complete the water-side connection to the system and the electric connection as shown in the terminal diagram, see chapter 6.5 "Electrical connection" on page 9 .

Note!

During installation, pay attention to the operability of the valves and the inlet options for the connecting lines.

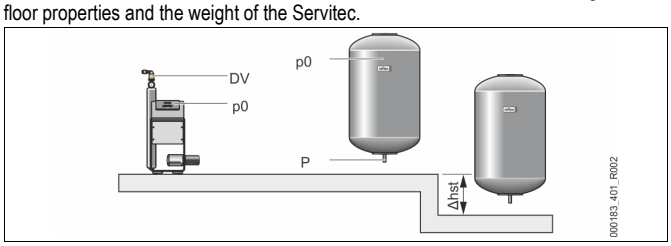
6.3.1 Fitting the add-on components



Install the "DV" degassing valve (2) with the check valve (1) on the "VT" vacuum spray tube. Check all screw fittings of the Servitec for proper seating.

6.3.2 Installation location

The Servitec is installed on the floor. Select the attachment means according to the floor properties and the weight of the Servitec.



Note!

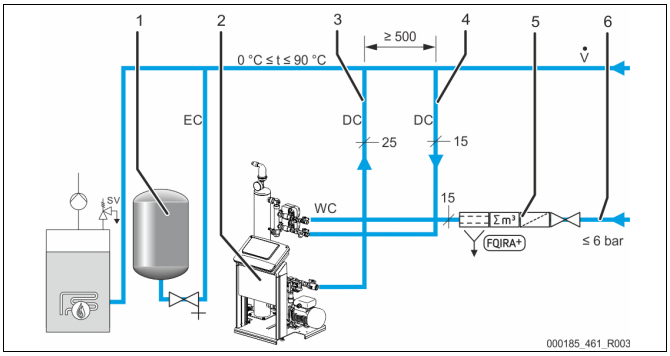
Consider a potential difference in head "h_{st}" between the expansion vessel and the device when calculating the "P_0" minimum operating pressure.

6.3.3 Hydraulic connection

6.3.3.1 Degassing line to the system

The Servitec requires two "DC" degassing lines to the system. One degassing line is intended for gas-rich water from the system, and the other one serves to return the degassed water to the system. For both degassing lines, shut-off devices have been pre-installed at the Servitec. The connection of the degassing lines must be made within the main volume flow of the overall system.

Servitec installation in a heating system – Pressure maintenance with "MAG" expansion vessel



1	Expansion vessel
2	Servitec
3	"DC" degassing line (degassed water)
4	"DC" degassing line (gas-rich water)
5	Optional equipment and accessories see chapter 4.5 "Optional equipment and accessories" on page 6
6	"WC" make-up line

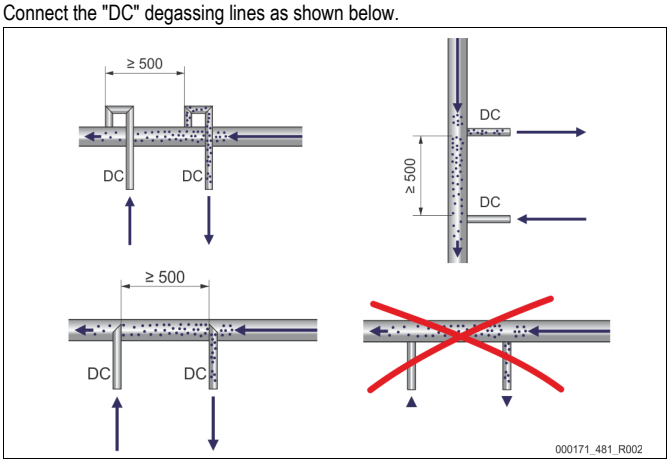
The degassing lines into the system are installed near the integration of the "EC" expansion line. This ensures stable pressure conditions.

If you operate the Servitec with pressure-dependent water make-up, you must install the system near the diaphragm-type "MAG" expansion vessel. This ensures that the

pressure in the diaphragm-type expansion vessel is monitored. In this case, select the "Magcontrol" operating mode in the controller.

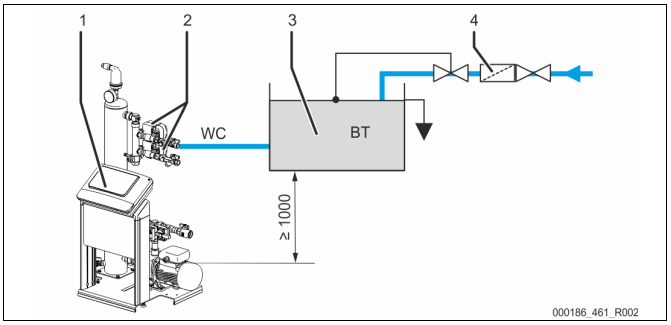
Note!
Ensure the integration in the "V" main flow volume when using switching variants with hydraulic switching points and return admixtures.
– For switching and make-up variants, see chapter 6.4 "Switching and make-up variants" on page 8 .

Installation detail of the "DC" degassing line
Connect the "DC" degassing lines as shown below.



- Ensure that particulate dirt cannot enter and thus create an overload of the Servitec's "ST" dirt trap.
- Connect the degassing line for gas-rich water upstream of the degassing line for degassed water in system direction of flow.
- Ensure that the water temperature is in the range > 0 °C- 90 °C. The return line side should be preferred for heating systems. Consequently the degassing capacity will be independent of the temperature.

6.3.3.2 Make-up line



1	Servitec	3	"BT" system separator vessel
2	"WV" 2-way motorized ball valve	4	"ST" dirt trap

For a water make-up via a "BT" mains disconnect receptacle, its bottom edge must be at least 1000 mm above the "PU" degassing pump.
Various Reflex make-up variants, see chapter 6.4 "Switching and make-up variants" on page 8 .
If you do not connect the automatic water make-up, you must close the connection of the "WC" make-up line with a R ½ " blanking plug and start up the system in "Levelcontrol" mode.
For external water make-up, note the following conditions:
- Install at least one "ST" dirt trap with a mesh size ≤ 0.25 mm close upstream to the "WV" 2-way motorized ball valve or use our Fillset.

Note!
When using an external system make-up, ensure that no Servitec fault occurs as a result of different operating parameters.

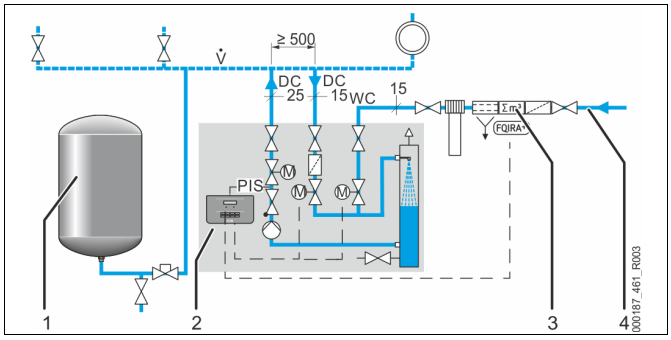
Note!
Use a pressure reducer in the "WC" make-up line if the idle pressure exceeds 6 bar.

6.4 Switching and make-up variants

Select the make-up variant in the Customer menu of the device controller, see chapter 7.8 "Parametrising the controller in the Customer menu" on page 12 .
Choose from one of the following make-up variants in the Customer menu:
- Pressure-dependent "Magcontrol" make-up.
  – In a facility system with diaphragm expansion tank.
- Level-dependent "Levelcontrol" make-up.
  – In a facility system with pressure maintaining station.

6.4.1 Pressure-dependent "Magcontrol" make-up mode

Example representation of a multi-tank system with hydraulic switching point and a "MAG" diaphragm-type expansion vessel.



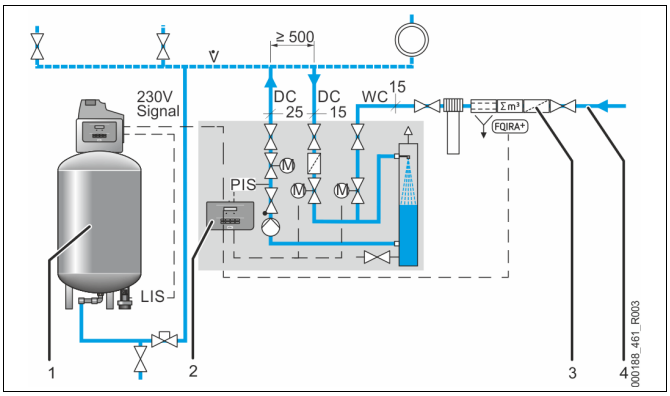
1	"MAG" expansion vessel
2	Servitec
3	Optional equipment and accessories see chapter 4.5 "Optional equipment and accessories" on page 6
4	"WC" make-up line

The "Magcontrol" operating mode is set in the Customer menu of the Servitec controller. This operating mode is used for plant systems with a diaphragm-type expansion vessel. The make-up action depends on the pressure. The required "PIS" pressure sensor is integrated in the Servitec. The "DC" degassing lines are connected close to the diaphragm-type expansion vessel. In this way precise pressure monitoring is enable for demand-matched make-up as.

Note!
Connect the degassing lines on the return side of the system upstream of the hydraulic switching point. In this manner the permissible temperature range of 0° - 90°C is adhered to.

6.4.2 Level dependent "Levelcontrol" make-up mode

Example representation of a multi-tank system with return flow admixture and compressor-controlled pressure maintaining station.



1	Pressure maintenance station
2	Servitec
3	Optional equipment and accessories see chapter 4.5 "Optional equipment and accessories" on page 6
4	"WC" make-up line

The "Levelcontrol" operating mode is set in the Customer menu of the Servitec controller. This operating mode is used for facilities with pressurisation stations and enables flexible operation at constant pressure.
Demand-matched water make-up takes place depending on the measured water level in the expansion vessel of the pressurisation station. The "LIS" pressure transducer determines the water level and sends this value to the controller of the pressure maintaining station. This sends a 230 V signal to the Servitec controller if the water level is too low. Water make-up takes place in a controlled manner by monitoring the make-up time and the make-up cycles via the "WC" make-up line.

6.5 Electrical connection

⚠ DANGER

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.

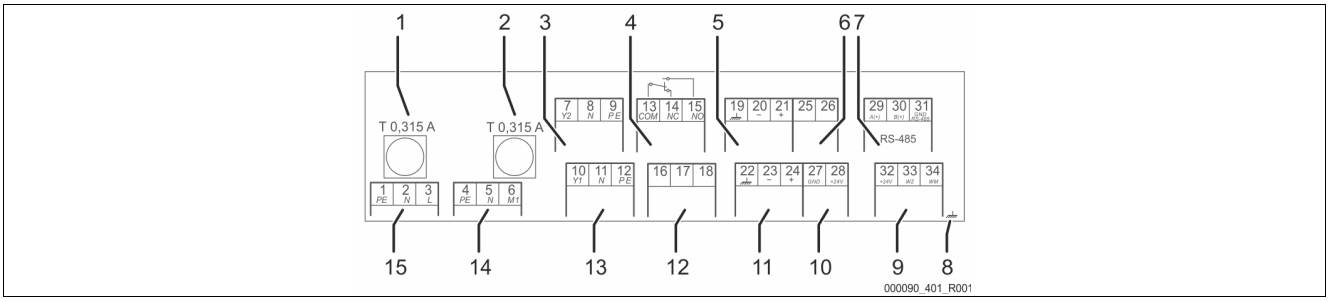
1. Disconnect the system from the power source and secure it against unintentional reactivation.
2. Remove the cover.

⚠ **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 6 .
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



1	Main fuse
2	Fuse for motorized ball valve
3	CD degassing control valve
4	Group message
5	Optional for conductivity
6	Ball control valve (correcting variable (25) / Return value (46))
7	RS-485 interface
8	---

9	Digital inputs: Water meter; Insufficient water
10	Ball control valve (supply)
11	Pressure analogue input
12	External make-up demand (Levelcontrol only)
13	WV make-up valve
14	Pump
15	Mains supply

Terminal number	Signal	Function	Wiring
1	PE	230 V power supply via mains cable and plug.	Pre-wired
2	N		
3	L		
4	PE	"PU" pump	Pre-wired
5N	N		
6 M1	M 1		
7	Y2	CD degassing control valve	Pre-wired
8	N		
9	PE		
10	Y 1	WV make-up valve	Pre-wired
11	N		
12	PE		
13	COM	Group message (floating).	User, optional
14	NC		
15	NO		
16	Not assigned	External make-up demand from a pressurisation station; controller must be set to "Levelcontrol"!	User, optional
17	Make-up (230 V)		
18	Make-up (230 V)		
19	PE shield	Level analogue input, not used by the device.	---
20	- Level (signal)		
21	+ Level (+ 18 V)		
22	PE (shield)	Pressure analogue input	Pre-wired
23	- Pressure (signal)		
24	+ Pressure (+ 18 V)		

Terminal number	Signal	Function	Wiring
25	0 – 10 V (correcting variable)	Ball control valve	Pre-wired
26	0 – 10 V (feedback)		
27	GND		
28	+ 24 V (supply)		
29	A +	RS-485 interface.	User, optional
30	B -		
31	GND		
32	+ 24 V	Insufficient water switch - dry-running protection	Pre-wired
33	E1	Contact water meter, for evaluation of the make-up, terminal 32/33 closed = meter pulse.	User, optional
34	E2	Insufficient water switch, contact 32/34. Lead the cable of the insufficient water switch through the cable gland and connect at the terminals	Pre-wired

6.5.2 RS-485 interface

6.5.2.1 Connecting the RS-485 interface

Connect the interface as follows:

1. For connecting the interface use only a cable with these properties:
   – LJYCY (TP), 4 × 2 × 0.8, maximum overall bus length 1000 m.
2. Use a shielded cable to connect the interface to terminals 29, 30, 31 of the main board in the control cabinet.
   – For connecting the interface, see chapter 6.5 "Electrical connection" on page 9 .
3. When using the device with a control centre not supporting an RS-485 interface (RS-232, for example), you must use a corresponding adapter.

6.6 Installation and commissioning certificate

Data shown on the type plate:	P_0
Type:	P_{SV}
Manufacturing number:	

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.

Note!
When any factory-set values of the device are changed, you must enter this information in the Maintenance certificate, see chapter 9.4 "Maintenance certificate " on page 18 .

For the installation

Place, date	Company	Signature

For the commissioning

Place, date	Company	Signature

7 Commissioning

Note!
Confirm that installation and start-up have been carried out correctly using the installation, start-up and maintenance certificate. This action is a prerequisite for the making of warranty claims.
– Have the Reflex Customer Service carry out commissioning and the annual maintenance.

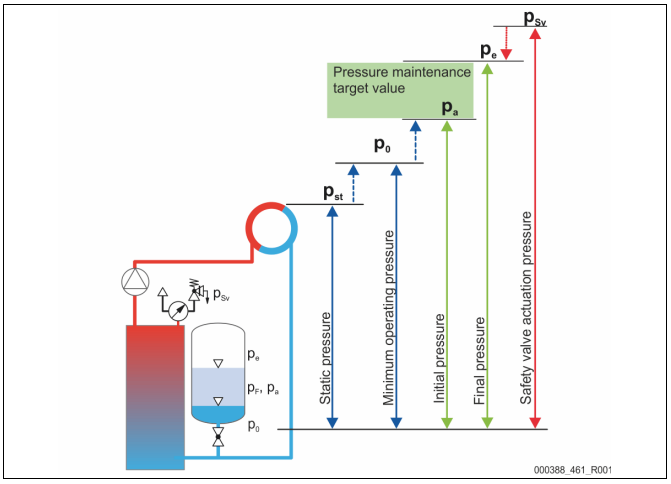
7.1 Checking the requirements for commissioning

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

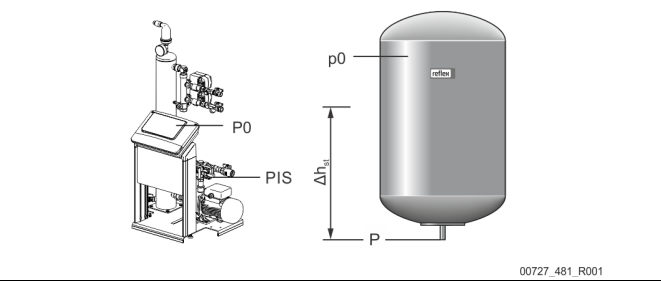
The "p_0" minimum operating pressure is determined by the location of the Servitec.



	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	≤ p_{sv} - 0.5 bar (for p_{sv} ≤ 5.0 bar)
p_{sv}	Safety valve actuating pressure	= p_0 + 1.2 bar (for p_{sv} ≤ 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 "P0" minimum operating pressure of the device relative to the "p0" initial pressure of the expansion vessel.



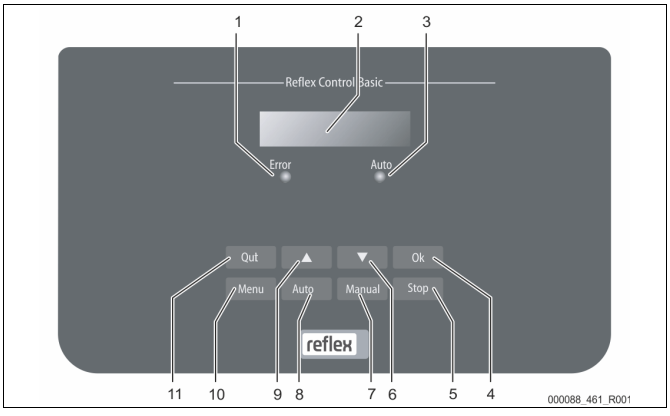
	• The device is installed at the same level as the expansion vessel (Δh_{st} = 0). – P_0 = p0* • The device is installed at a lower level than the expansion vessel. – P_0 = p0 + Δh_{st}/10* • The device is installed at a higher level than the expansion vessel. – P_0 = p0 - Δh_{st}/10* * p0 in bar, Δh_{st} in m

Note!
The safety valve actuating pressure must always be observed for the target value of the Servitec
(see calculation formula).

Note!
Avoid dropping below the minimum operating pressure. Vacuum, vaporisation and the formation of vapour bubbles are thus excluded.

7.3 Controller

7.3.1 Operator panel



1	Error LED • The Error LED illuminates in the event of a fault
2	Display
3	Auto LED • The Auto LED illuminates green in Automatic mode • The Auto LED flashes green in Manual mode • The Auto LED is not illuminated when the system is stopped
4	OK • Confirm actions
5	Stop • For commissioning and entry of new values in the controller
6	"Back" to the previous menu
7	Manual • For tests and maintenance tasks
8	Auto • For continuous operation
9	"Forward" to the next menu
10	Menu • Call up the Customer menu
11	Quit • Acknowledge messages

Selecting and changing parameters

1. Use "OK" (5) to select the parameter.
2. Use the "▼" (7) or "▲" (9) arrow keys to change the parameter.
3. Use "OK" (5) to confirm the parameter.
4. Use the "▼" (7) or "▲" (9) arrow keys to switch to a different menu option.
5. Use "Quit" (11) to switch to a different menu level.

7.4 Modifying the controller's start routine

The start routine is used to set the required parameters for the Servitec commissioning. It commences with the first switching on of the controller and can only be set once. The following parameter changes or checks are carried out from the customer menu, see chapter 8.2.1 "Customer menu" on page 14 .

Note!
Plug in the contact plug to provide power (230 V) to the controller.

You are in Stop mode. The "Auto" LED on the operator panel has extinguished.

1. Software language selection. — Language
2. Prior to commissioning, read the operating manual in full and check for proper assembly. — Read the operating manual!
3. Enter the variant of your Servitec. — Select the system.
4. Select the desired make-up variant: — Servitec / Magcontrol

Magcontrol:
Pressure-dependant make-up in a system with an expansion vessel.
Levelcontrol:
Level-dependent make-up in a system with a pressure maintenance station.

Indicated when selecting the "Magcontrol" make-up variant:
5. Enter the actuating pressure of the heat generator safety valve. — Safety valve pressure

Indicated when selecting the "Magcontrol" make-up variant:
6. Enter the minimum operating pressure. For calculating the minimum operating pressure P0, see chapter 7.2 "Setting the minimum operating pressure for Magcontrol" on page 10 . — Min. op. pressure
7. Change the flashing display items for "Hour", "Minute", and "Seconds" to the current time. — Time:

The time of an alarm will be stored in the fault memory.

8. Change the flashing display items for "Day", "Month", and "Year" to the current date. — Date:

The date of an alarm will be stored in the fault memory.

9. Select in the message line and confirm with "OK": — Terminate start routine?

yes: The start routine is terminated. Servitec automatically switches to stop mode.
no: The start routine restarts.

The pressure is displayed only in "Magcontrol" mode. — 2.0 bar / STOP

Note!
You are in Stop mode. Please do not switch from the start routine to Automatic mode after entering the parameters.

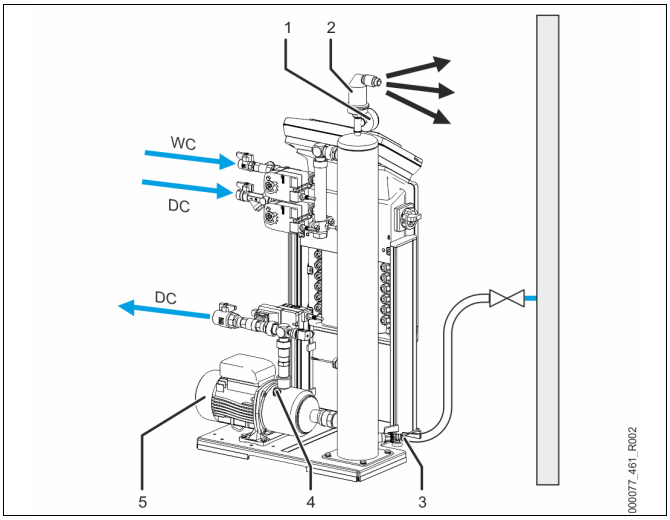
7.5 Filling the device with water and venting

⚠ CAUTION

Risk of injury due to pump start-up
Hand injuries may occur when the pump starts up if you turn the pump motor at the impeller using a screwdriver.
- Switch the pump to a zero-volts state before turning the pump at the fan wheel with a screwdriver.

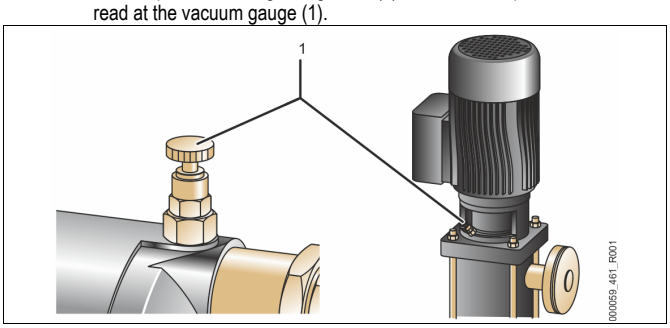
ATTENTION

Device damage due to pump start-up
Pump damage may occur when the pump starts up if you turn the pump motor at the impeller using a screwdriver.
- Switch the pump to a zero-volts state before turning the pump at the fan wheel with a screwdriver.



1	Vacuum gauge "PI"	5	Pump "PU"
2	Degassing valve "DV"	WC	Make-up pipe
3	Feed and drain cock "FD"	DC	Degassing lines
4	"AV" venting screw		

1. Use the facility system to fill the Servitec.
   – After you have opened the "DC" ball valves, the vacuum spray tube will autonomously fill if the facility system provides sufficient water.
2. Optional
   – Use the feed and drain cock (3) to fill water into the Servitec.
   – Connect a hose at the feed and drain cock (3) of the "VT" vacuum spray pipe.
3. Fill the vacuum spray pipe with water.
   – Air escapes via the degassing valve (2) and the water pressure can be read at the vacuum gauge (1).



Vent the pump:
4. Turn the venting screw (1) until air or a water/air mixture escapes.
5. If required, use a screwdriver to rotate the pump at the fan wheel of the pump motor.

   ⚠ **CAUTION** – Risk of injury due to pump start-up! Hand injury due to a pump start-up. Switch the pump to a zero-volts state before turning the pump motor at the fan wheel with a screwdriver.

   CAUTION – Device damage. Pump damage due to a pump start-up. Switch the pump to a zero-volts state before turning the pump motor at the fan wheel with a screwdriver.
   – Water/air mixtures are removed from the pump.
6. Re-tighten the venting screw when only water escapes.

7. Close the feed and drain cock.

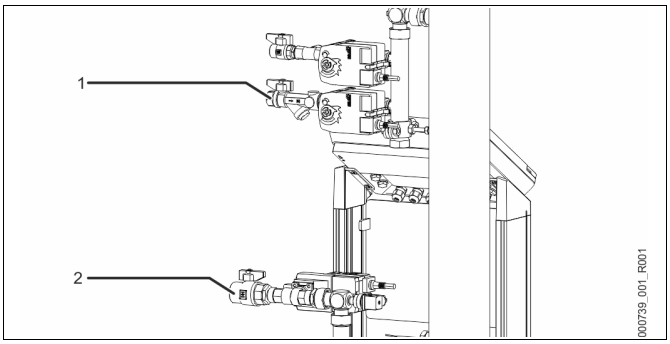
Filling and venting is concluded.

Note!
The "PU" pump must not be switched on when the Servitec is filled with water.

Note!
Do not fully unscrew the venting screw. Wait until air-free water appears. Repeat the venting process until the "PU" pump is fully vented.

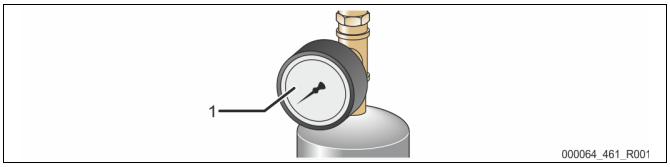
7.6 Vacuum test

Perform the vacuum test to ensure the proper functioning of the Servitec.



1 Close the ball valve (1) with the dirt trap of the "DC" feed line to the spray pipe. The second ball valve (2) in the feed line from the "DC" pump to the system remains open.
2 Generate a vacuum with the manual mode of the controller.
- Press "Manual" on the controller's operator panel.
- Use the "Back" toggle button to select "SE" system degassing at the operator panel.
  – The pump will start after a time delay of 50 seconds.

3 Use the "Back" toggle button to switch off "SE" system degassing after the pump runs for 10 seconds.
- Note the vacuum indicated on the vacuum gauge.



4 Observe the "PI" vacuum gauge (1) for approximately 10 minutes. The pressure must not change. If the pressure has increased, check the Servitec for leaks.
- Check all screw fittings at the "VT" vacuum spray tube for leaks.
- Check the vent screw at the "PU" pump for leaks.
- Check the "DV" degassing valve at the "VT" vacuum spray tube for leaks.

Note!
Repeat steps 2 to 4 until no further pressure rise is observed.

5 After a successful vacuum test, open the ball valve with dirt trap.
6 If the controller displays the "Insufficient water" error message, confirm with "Quit".

☑ The vacuum test is completed.

Note!
The obtainable vacuum corresponds to the saturation pressure at the existing water temperature.
- At 10 °C, a vacuum of approximately -1 bar can be obtained.

7.7 Use the device to fill the facility system with water

In systems with a water volume less than 3000 litres and a pressure maintenance with diaphragm-type expansion vessels, the Servitec may be used for filling using degassed water. Thus, the oxygen content and the content of free gases is reduced for commissioning.

Set the controller to the following operating modes:
- "Magcontrol" automatic make-up, see chapter 8.2.1 "Customer menu" on page 14 .
- Manual operation, see chapter 8.1.2 "Manual mode" on page 14 .
  – "NE" make-up degassing mode.

The controller calculates the required filling pressure. As soon as this value has been attained, the controller automatically stops the filling process. If the maximum filling time (10 hours by default) is exceeded, the system aborts the make-up process with an error message. After the cause has been found, acknowledge the error message by pressing "Quit" at the controller's operating panel and continue with the filling process, see chapter 8.2.4 "Messages" on page 15 . After filling is completed, you must vent the system to ensure proper circulation through the entire system.

Note!
Monitor the system for the entire automatic filling process.

Note!
Filling the system with water is not part of the deliverables of the Reflex Customer Service.

7.8 Parametrising the controller in the Customer menu

System-specific values can be corrected via the customer menu. In the course of initial commissioning, the factory settings must be adjusted for the system-specific conditions.

Note!
For a description of the operation, see chapter 7.2 "Setting the minimum operating pressure for Magcontrol" on page 10 .

All grey marked menu items must be reviewed during commissioning.

Press "Manual" to switch to manual operation.
Press "Menu" to display the first main menu option "Customer menu".

Switch to the next main menu option.	Customer menu
Standard software in various languages.	Language
Adjust the "Hour", "Minute", and "Second" display when each begins to flash. This time is used for entries in the fault memory.	Time:
This date is used for entries in the fault memory. Adjust the "Day", "Month", and "Year" display when each begins to flash.	Date:
Magcontrol: Select this setting if you want to perform a pressure-dependent automatic make-up in a system with an expansion vessel. Levelcontrol: Select this setting if you want to realise a level-dependent make-up in system with pressure maintenance station.	Servitec 35:
Only displayed if "Magcontrol" has been selected in the "Servitec" menu option. P0 calculation, see chapter 7.2 "Setting the minimum operating pressure for Magcontrol" on page 10 .	Min. op. pressure
Only displayed if "Magcontrol" has been selected in the "Servitec" menu option. – Enter the actuating pressure of the applicable safety valve for protection of the Servitec. This is usually the safety valve at the system heat generator.	Safety valve pressure
Switch to the "Degassing" sub-menu.	Degassing
Switch to the next list item.	└ Degassing
For a detailed description, see chapter 8.1.1 "Automatic mode" on page 13 . Select from 3 degassing programmes: • Continuous degassing • Interval degassing • Make-up degassing	└ Degassing programme
Time setting for Continuous degassing. – For commissioning, we recommend to set the time for continuous degassing depending on the system volume and the glycol content, see chapter 8 "Operation" on page 13 .	└ Time Continuous. degas.
Switch to the "Make-up" sub-menu.	Make-up
Switch to the next list item.	└ Make-up
Maximum time for a make-up cycle. Upon expiry of the set time, the system interrupts the make-up and returns the "Make-up time" fault message.	└ Max. make-up time

Max. make-up cycles

If the set number of make-up cycles is exceeded within 2 hours, the system interrupts the make-up and returns the "Make-up cycles" fault message.

Make-up pressure

This setting is relevant for the actuation of the "CD" 2-way motorized ball valve in make-up degassing.

Standard: Make-up pressure > 2.3 bar.

1.3 – 2.3 bar: The make-up pressure is in this range.

< 1.3 bar: The make-up pressure is less than 1.3 bar

With water meter.

yes: FQIRA+ contact water meter is installed, see chapter 4.5 "Optional equipment and accessories" on page 6 .
This is the prerequisite for the make-up quantity monitoring and the operation of a softening system.

no: A contact water meter is not installed (standard).

Make-up quantity

Only displayed if "YES" has been set in the "With water meter" menu option.

OK Delete meter:

yes: Set the displayed make-up quantity to 0.

no: The displayed water quantity is retained.

Max. make-up quantity

Only displayed if "YES" has been set in the "With water meter" menu option.
When the set quantity is exceeded, the system interrupts the make-up process and returns the error message "Max. make-up quantity exceeded".

Water treatment

Only displayed if "YES" has been set in the "With water meter" menu option.

- Softening:
  Further queries follow about softening.
- Desalination:
  Further queries follow about desalination.
- None:
  No further queries on water treatment are output.

Conductivity monitoring

Only displayed if "Desalination" has been selected in the "Water treatment" menu option.

yes: The capacity of the desalination cartridge is monitored based on the conductivity.

Disable make-up?

Only displayed if "Softening" or "Desalination" has been selected in the "Water treatment" menu option.

yes: The system stops the make-up process when the set soft water capacity is exceeded.

Hardness reduction

Only displayed if "Softening" or "Desalination" has been selected in the "Water treatment" menu option.
Is calculated from the difference of the overall water hardness GH_{actual} and the target water hardness GH_{target} as defined by the manufacturer specification:
Hardness reduction = GH_{actual}-GH_{target} °dH
Enter the value in the controller. Consult the manufacturer information for third-party products.

Cap. soft water

Only displayed if "Softening" or "Desalination" has been selected in the "Water treatment" menu option.
The attainable soft water capacity is calculated from the type of softening used and the specified hardness reduction.

- Fillsoft I : Soft water capacity ≤ 6000/hardness red. l
- Fillsoft II : Soft water capacity ≤ 12000/hardness red. l
- Fillsoft Zero I : Soft water capacity ≤ 3000/hardness red. l
- Fillsoft Zero II : Soft water capacity ≤ 6000/hardness red. l

Enter the value in the controller. Consult the manufacturer information for third-party products.

Remaining cap. soft w.

Only displayed if "Softening" or "Desalination" has been selected in the "Soft water capacity" menu option.
Available soft water capacity.

Replacement in

Only displayed if "Softening" or "Desalination" has been selected in the "Soft water capacity" menu option.
Manufacturer specification for the replacement interval of the softening cartridges, regardless of the calculated soft water capacity. The system displays the "Softening" message.

Next maintenance

Recommended maintenance message.

Off: Without maintenance recommendation.

001 – 060: Maintenance recommendation in months.

Floating fault contact

For the output of messages to the floating contact, see chapter 8.2.4 "Messages" on page 15 .

yes: Output of all messages.

no: Output of all messages identified with "xxx" ("01", for example).

Change Rem. data (015)

Switch to the Change Rem. Data menu option or switch to the next menu option.

Fault memory

Switch to the fault memory or into the next main menu option.

ER 01…xx

The last 20 alarms are stored with fault type, date, time, and fault code.
See the chapter "Messages" for more information about the ER... messages.

Parameter memory

Switch to the parameter memory or into the next main menu option.

P0 = xx.x bar

The last 10 entries of the minimum working pressure are stored with date and time.

Pos. motorized ball valve

Position of the "CD" motorized ball valve at the pressure side of the pump to
the controller of the degassing process.

Servitec 35-95

Information about the software version.

7.9 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.

During commissioning, continuous degassing is automatically activated to remove any residual free or dissolved gases from the system. This time can be set in the Customer menu as required by the system conditions. The default setting is 24 hours. Subsequent to the continuous degassing, the device automatically switches to interval degassing.

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 9.2 "Cleaning the dirt trap" on page 17 .

8 Operation

8.1 Operating modes

8.1.1 Automatic mode

Upon successful commissioning, you can activate the automatic mode with the degassing functions and, optionally, the automatic make-up. The Servitec controller monitors the functions. Faults are displayed and evaluated.
For automatic mode, you can set three different degassing programmes in the Customer menu, see chapter 8.2.1 "Customer menu" on page 14 . Relevant information is displayed in the message line of the controller display.

Continuous degassing of the system water

Continuous degassing

Select this programme after commissioning and repairs of the connected system. The device will continuously degas for a set period of time. Free and dissolved gases are quickly removed. Upon request of make-up, make-up degassing is automatically activated for the set make-up time. In "Magcontrol" mode, the pressure is monitored and displayed.

Start/setting:

– Automatic start after execution of the start routine during commissioning.
– Activated from the Customer menu.
– Degassing time. Can be set in the Customer menu, dependent on the actual system. The default setting is 24 hours. After expiry of the set time, the device automatically switches to interval degassing.

Interval degassing of the system water

Interval degassing

Designed for continuous operation. An interval comprises a number of degassing cycles, with the number to be set in the Service menu. An idling time follows an interval. The daily start of the interval degassing can be set to a specific time.

Start/setting:

– Automatic activation upon expiry of continuous degassing.
– Degassing cycles: 8 cycles per interval, to be set in the Service menu.
– Start time interval: To be set in the Service menu.
– Idling time between intervals: To be set in the Service menu.

Degassing the make-up water

Make-up degassing

Is automatically activated for every make-up during continuous or interval degassing. The corresponding setting must have been made in the Customer menu.

The 2-way motorized ball valve switches the volume flow from system to make-up water. The process is the same as in continuous degassing. If the system water is not to be degassed or if the system is in Summer operation with circulating pumps shut down If the, you can activate the make-up degassing in the Customer menu.

Activation/setting:

– Automatic activation for every make-up.
– Activated from the Customer menu.
– Degassing time = Make-up time.

8.1.2 Manual mode

Manual mode is intended for test and service tasks.

Press "Manual" at the controller. The Auto LED at the operator panel flashes to visually indicate that manual mode is active. Manually activate or deactivate the "SE" system degassing or the "NE" make-up degassing.

"SE" system degassing of the system water

The system degassing process corresponds to the continuous degassing in Automatic mode. The degassing time, however,

is not automatically limited. This setting is required for the vacuum test during commissioning (see chapter 7.6 "Vacuum test" on page 12)) and test runs during service work (see chapter 9.3 "Inspecting system degassing and make-up degassing" on page 17).

"NE" make-up degassing of the fill and make-up water

The make-up degassing is required for test runs during service work (see chapter 9.3 "Inspecting system degassing and make-up degassing" on page 17) and in the "Magcontrol" mode when filling the entire system with water.

- "Next" and "Back" buttons
  – Selecting "NE" or "SE".
- "Auto" button
  – Return to Automatic mode.

		2.5 bar
NE▼*	SE▲*	010 h

* Flashing mode "NE▼" or "SE▲" is activated

8.1.3 Stop mode

Stop mode is intended for commissioning of the Servitec.

Press "Stop" on the controller. The Auto LED at the operator panel extinguishes.

Except for the display of information, the Servitec is non-functional in Stop mode. Function monitoring is stopped. The "PU" pump is switched off. The system returns an alarm if the Stop mode is activated for more than 4 hours. If "Floating alarm contact?" in the Customer menu is set to "Yes", the system outputs the alarm to the group alarm contact.

8.1.4 Summer operation

The degassing of the network water is not assured if the circulating pumps of the system are shut down during Summer because gas-rich water cannot reach the Servitec. In order to save energy, use the Customer menu to set the degassing programme to make-up degassing. If the Servitec is operated with make-up degassing during Summer, you must switch to interval or continuous degassing after the circulating pumps have been activated.

Setting in the Customer menu, see chapter 8.2.1 "Customer menu" on page 14 .

Selection from 3 degassing programmes.

Degassing programme
Make-up degassing

- Continuous degassing
  – For commissioning and repairs.
- Interval degassing
  – For continuous operation (time-controlled).
- Make-up degassing
  – Only for make-up water. The machine is not degassed.

Note!

For a detailed description of the selection of degassing programmes, see chapter 9.3 "Inspecting system degassing and make-up degassing" on page 17 .

8.1.5 Restarting

⚠ CAUTION

Risk of injury due to pump start-up

Hand injuries may occur when the pump starts up if you turn the pump motor at the impeller using a screwdriver.

- Switch the pump to a zero-volts state before turning the pump at the fan wheel with a screwdriver.

ATTENTION

Device damage due to pump start-up

Pump damage may occur when the pump starts up if you turn the pump motor at the impeller using a screwdriver.

- Switch the pump to a zero-volts state before turning the pump at the fan wheel with a screwdriver.

After an extended standstill time (the device is de-energised or in Stop mode), the "PU" pump may jam. For this reason, use a screwdriver to rotate the pump at the fan wheel of the pump motor before restarting.

Note!

A jamming of the "PU" pump is prevented during operation thanks to forced starting action (after 24 hours).

8.2 Controller

8.2.1 Customer menu

Use the Customer menu to set the device controller during commissioning. You can then correct or retrieve system-specific values during operation, see chapter 8.2.1 "Customer menu" on page 14 .

8.2.2 Service menu

This menu is protected with a password. It can be accessed only by the Reflex Customer Service. A partial summary of the settings stored in the Service menu is proved in the Chapter Default settings.

8.2.3 Default settings

The Servitec controller is shipped with the following default settings. Use the Customer menu to adjust these values to local conditions. In specific cases, it is possible to further adjust the values in the Service menu.

Customer menu

Parameter	Setting	Remarks
Language	EN	Display language
Time		
Date		
Servitec	Magcontrol	For systems with diaphragm-type expansion vessel
Minimum operating pressure p0	1.5 bar	Only Magcontrol
Safety valve, pressure	3.0 bar	Actuating pressure of the system's heat generator safety valve
Degassing		
Degassing programme	Continuous degassing	
Continuous degassing time	24 hours	
Make-up		
Maximum make-up quantity	0 Litres	Only if controller with "With water meter yes"
Maximum make-up time	20 minutes	Magcontrol and Levelcontrol
Maximum make-up cycles	3 cycles within 2 hours	Magcontrol and Levelcontrol
Softening (only if "Water treatment" with "Softening")		
Shut off make-up	No	In the case of soft water residual capacity = 0
Hardness reduction	8°dH	= Target – Actual
Maximum make-up quantity	0 Litres	Attainable make-up quantity
Soft water capacity	0 Litres	Attainable water capacity
Cartridge replacement	18 months	Replace cartridge
Desalination (only if "Water treatment" with "Desalination")		
Conductivity monitoring	No	
Shut off make-up	No	In the case of soft water residual capacity = 0
Hardness reduction	8°dH	= Target – Actual
Maximum make-up quantity	0 Litres	Attainable make-up quantity
Soft water capacity	0 Litres	Attainable water capacity
Cartridge replacement	18 months	Replace cartridge
Next maintenance	12 months	Time left to the next due maintenance
Volt-free contact	Yes	Only the messages marked in the "Messages" list

Service menu

Parameter	Setting	Remarks
Make-up		
Pressure differential, "NSP" make-up	0.2 bar	Only Magcontrol
Pressure differential, filling pressure PF – P0	0.3 bar	Only Magcontrol
Maximum filling duration	10 h	Only Magcontrol
Degassing		
Idling times between degassing intervals	12 hours	Idling times between the degassing intervals
Number of degassing cycles for each interval	n = 8	Number of degassing cycles in one interval
Daily start	08:00 h	Start of the daily degassing intervals
Next maintenance	12 months	Time left to the next due maintenance
Volt-free contact	YES	Only the messages marked in the message list

8.2.4 Messages

The display provides alarms in plain text and the ER codes listed below. Use the arrow buttons to scroll through multiple alarms displayed at the same time.
The fault memory stores the last 20 alarms for review, see chapter 8.2.1 "Customer menu" on page 14 .
Alarm causes can be eliminated by the operator or a specialist workshop. Please contact the Reflex customer service for alarms that cannot be repaired.

Note!
Some messages must be acknowledged with the "Quit" key on the operator panel of the controller (see following table), after the cause has been corrected. All other alarms are automatically reset as soon as the cause has been eliminated.

Note!
Floating contacts, setting in the Customer menu, see chapter 8.2.1 "Customer menu" on page 14 .

ER Code	Alarm	Floating contact	Cause	Remedy	Alarm reset
01	Minimum pressure	Yes	For "Magcontrol" setting only. • Set value not reached. • Water loss in the system. • Pump fault. • Expansion vessel defective.	• Check set value in the customer or service menu. • Check water level. • Check pump. • Check expansion vessel.	-
02.1	Low water	-	Dry run protection: Low water switch • Defective. • Not cabled. • Triggered for too long.	• Check low water switch. • Open the degassing line. • Clean the dirt trap. • Replace the degassing valve.	Quit
02.2	Low water	-	Dry run protection: Low water switch has actuated too often.	• Clean the dirt trap. • Replace the degassing valve.	Quit
02.4	Low water	-	Vacuum during make-up feed.	Open the make-up ball valve.	-
06	Make-up time	-	• Set value exceeded. • Water loss in the system. • Make-up line not connected. • Make-up output insufficient.	• Check set value in the customer or service menu. • Check water level. • Connect make-up line.	Quit

ER Code	Alarm	Floating contact	Cause	Remedy	Alarm reset
07	Make-up cycles	-	Continuous water loss in the system.	• Check set value in the customer or service menu. • Seal the leakage in the system.	Quit
08	Pressure measurement	-	• Controller receives incorrect signal.	• Check/connect the plug connection at the pressure transmitter • Check the cable for damage. • Check the pressure sensor.	Quit
10	Maximum pressure	-	For "Magcontrol" setting only. • Set value exceeded.	• Check set value in the customer or service menu. • Set the actuating pressure of the safety valve.	-
11	Make-up quantity	-	"With water meter" must be activated in the Customer menu. • Set value exceeded. • Severe water loss in the system.	• Check set value in the customer or service menu. • Check the water loss and correct, if necessary.	Quit
12	Filling time	-	Set value for the maximum filling duration has been exceeded	• Check set value in the customer or service menu. • Check the water loss and correct, if necessary.	Quit
13	Filling volume	-	Set value exceeded.	• Check set value "Max. Fill Contact (128)" in the service menu. • Check the water loss and correct, if necessary.	Quit
14	Discharge time	-	• Set value exceeded. • "DC" degassing line closed. • Dirt trap clogged.	• Check set value in the customer or service menu. • Open the degassing line. • Clean the dirt trap.	Quit
15	Make-up valve	-	Contact water meter measures without make-up request.	Check the make-up valve for leak tightness.	Quit
16	Power failure	-	No voltage supply available.	Connect to voltage supply.	-
18	Parameter	-	Setting parameter not entered correctly.	Check setting parameter and correct if necessary.	-
19	Stop > 4 hours	-	Device is in stop mode for more than 4 hours.	Set the controller to Automatic mode.	-
20	Maximum make-up quantity	-	Set value exceeded.	Reset the "Make-up quantity" meter in the Customer menu.	Quit
21	Maintenance recommended	-	Set value exceeded.	Carry out maintenance.	Quit
22	Blow-off time	-	Blow-off time outside the set value. (Only if appropriate sensors are used.)	Check set value in the Customer or Service menu.	Quit
24	Water treatment	-	• Set value for soft water capacity exceeded. • Time interval for replacement of the cartridge exceeded.	• Replace water treatment cartridges. • Confirm cartridge replacement in the customer menu by pressing the "OK" button twice in the "Make-up" menu → "Soft water capacity (032)"	-
26	Conductivity measurement	-	Measured value outside the measuring range.	• Check set value in the customer or service menu. • Check the sensor and cabling.	-
27	Conductivity exceeded	-	• Set value exceeded. • Cartridge capacity expired.	• Check set value in the customer or service menu. • Replace cartridge.	-
30	I/O module fault	-	• I/O module defective. • Connection between option card and controller faulty. • Option card defective.	• Replace the I/O module. • Check the connection between option card and controller. • Replace the option card.	-
31	EEPROM defective	Yes	• EEPROM defective. • Internal calculation error.	Inform Reflex Customer Service.	-
32	Under voltage	Yes	Supply voltage not achieved.	Check voltage supply.	-
33	Adjustment parameter	-	EPROM parameter memory defective.	Inform Reflex Customer Service.	Quit
35	Digital limit switch voltage faulty	-	Short-circuit of limit switch voltage.	Check the wiring at the digital inputs (water meter, for example).	-

ER Code	Alarm	Floating contact	Cause	Remedy	Alarm reset
36	Analogue limit switch voltage faulty	-	Short-circuit of limit switch voltage.	Check the wiring at the analogue inputs (pressure/conductivity).	-
37	Limit switch voltage MBV1	-	Short-circuit of limit switch voltage.	Check the wiring of the 2-way motorized ball valve.	-
43	Outside operating range	-	Operating range exceeded.	• Lower the system pressure. • Check ball valves on pump discharge side.	-

9 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!

Shorter maintenance intervals are required if the default setting for interval degassing of 8 degassing cycles and 12 h idling time exceeds the following times for continuous degassing:

- Continuous degassing time of about 14 days

or

- Continuous degassing time of 7 days + 1 year interval degassing with default setting.

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

The annual maintenance is displayed upon expiry of the set operating time. Use "Quit" to acknowledge the "Maintenance recommended" message.

Note!

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

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

Maintenance task	Conditions			Interval
▲ = Check, ■ = Service, ● = Clean				
Check for leaks, see chapter 9.1 "Exterior leak test" on page 17 . • "PU" pump • Screw connections • "DV" degassing valve	▲	■		Annually
Vacuum function test. – see chapter 7.6 "Vacuum test" on page 12	▲			Annually
Clean the dirt trap. – see chapter 9.2 "Cleaning the dirt trap" on page 17	▲	■	●	Depending on the operating conditions
Check the controller settings.	▲			Annually
Function test. • "SE" system degassing • Make-up degassing "NE" see chapter 9.3 "Inspecting system degassing and make-up degassing" on page 17	▲			Annually
When operating with water/glycol mixtures • Control of the mixing ratio. • If necessary, adjust according to manufacturer information.	▲			Annually

9.1 Exterior leak test

Check the following Servitec components for leaks:

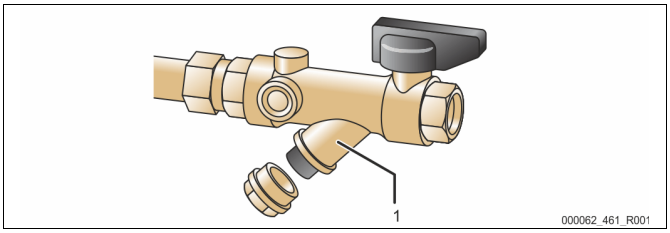
- Pump
- Screw connections
- Degassing valves

Proceed as follows:

- Seal any leaks at the connections or replace the connections, if required.
- Seal leaking screw connections or replace, if required.

9.2 Cleaning the dirt trap

The "ST" dirt trap in the "DC" degassing line must be cleaned no later than after the continuous degassing time has elapsed. Check the dirt traps after every filling action or extended operation.



1	"ST" dirt trap

1. Press "Stop" on the controller's operator panel.
   – The Servitec is non-functioning and the "PU" pump is shut down.
2. Close the ball valve upstream of the "ST" (1) dirt trap.
3. Slowly unscrew the cap with the dirt trap insert at the dirt trap to release any residual pressure in the pipeline section.
4. Pull the mesh from the cap and rinse it with clear water. Use a soft brush for cleaning.
5. Re-insert the mesh into the cap, check the gasket for damage, and screw the cap back into the housing of the "ST" (1) dirt trap.
6. Open the ball valve upstream of the "ST" (1) dirt trap.
7. Press "Auto" on the controller's operator panel.
   – The Servitec is switched on and the "PU" pump is in operation.

Note!

Clean all other installed dirt traps (in the Fillset, for example).

9.3 Inspecting system degassing and make-up degassing

Inspect the "SE" system degassing followed by the "NE" make-up degassing. Press "Manual" at the controller to switch to manual mode. The Auto LED at the operator panel flashes to visually indicate that manual mode is active. Manually activate or deactivate the "SE" system degassing and the "NE" make-up degassing. You should run at least ten cycles each in the "SE" and the "NE" modes. The gas must be eliminated before the next cycle starts. Subsequently, check the following conditions:

- With cold water, the "PI" vacuum gauge must eventually show a value of approx. -1 bar.
- The "Insufficient water" message must not be displayed at the controller.

After the inspection is completed, reset the device to Automatic mode.

- "Next" and "Back" buttons
  – Selecting "NE" or "SE".
- "Auto" button
  – Return to Automatic mode.

		2.5 bar
NE▼*	SE▲*	010 h

* Flashing mode "NE▼" or "SE▲" is activated

9.4 Maintenance certificate

All maintenance tasks have been completed according to the Reflex Installation, Operating and Maintenance Manual.

Date	Service organisation	Signature	Remarks

9.5 Inspection

9.5.1 Pressure-bearing components

Comply with all applicable national regulations for the operation of pressure equipment. De-pressurise all pressurised components prior to inspection (see disassembly information).

9.5.2 Inspection prior to commissioning

In Germany, follow the Industrial Safety Regulation [Betriebssicherheitsverordnung] Section 14 and Section 14 (3) No. 6 in particular. This regulation demands an inspection prior to commissioning only for PS·V > 50 bar x litres. This is not the case with this device. Customised systems with special spray tubes may be affected, in which case the shipping documents will contain a corresponding note.

9.5.3 Inspection intervals

Recommended maximum inspection intervals for operation in Germany pursuant to Section 16 of the Industrial Safety Regulation [Betriebssicherheitsverordnung] and the vessel classification of the device in diagram 2 of the Directive 2014/68/EC, applicable in strict compliance with the Reflex Installation, Operation and Maintenance Manual.

External inspection:
No requirement according to Annex 2, Section 4, 5.8.

Internal inspection:
Maximum interval according to Annex 2, Section 4, 5 and 6; if necessary, suitable replacement actions are to be taken (such as wall thickness measurement and comparison with the design specification which may be requested from the manufacturer).

Strength test:
Maximum interval according to Annex 2, Section 4, 5 and 6.
Furthermore, compliance with Section 16 of the Industrial Safety Regulation and Section 16 (1) in particular, in conjunction with Annex 2, Section 4, 6.6 and Annex 2, Section 4, 5.8, must be ensured.
The actual intervals must be specified by the operating company based on a safety evaluation taking into consideration the actual operating conditions, experience with the mode of operation and charging material and the applicable national regulations for the operation of pressure equipment.

10 Disassembly

⚠ DANGER

Risk of serious injury or death due to electric shock
Some parts of the device's circuit board may still carry 230 V voltage even with the device physically isolated from the power supply.
- Before you remove the covers, completely isolate the device controller from the power supply.
- Verify that the main circuit board is voltage-free.

⚠ 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.

Prior to the disassembly, shut off the "DC" degassing lines and the "WC" make-up line from the system to the Servitec and de-pressurise the Servitec. Then disconnect the Servitec from all voltages.
Proceed as follows:
1. Switch the system to stop mode and secure it to prevent it being switched back on.
2. Shut off the "DC" degassing lines and the "WC" make-up line.
3. Switch the system to a voltage-free state. Unplug the Servitec's mains plug from the power supply.
4. Disconnect all cables from the terminals of the Servitec controller.
   ⚠ **DANGER** – Risk of serious injury or death due to electric shock. Some parts of the Servitec'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 Servitec controller from the power supply. Verify that the main circuit board is voltage-free.
5. Open the "FD" drain cock at the "VT" spray tube of the Servitec until the spray tube no longer contains any water.
6. If necessary, physically remove the Servitec from the system.

The dismantling process is completed.

11 Annex

11.1 Reflex Customer Service

Central customer service
Central 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

Technical Hotline
For questions about our products
Telephone number: +49 (0)2382 7069-9546
Monday to Friday 8:00 to 16:30

11.2 Guarantee

The respective statutory guarantee regulations apply.

11.3 Conformity and standards

Device conformity declarations are available on the Reflex homepage.
www.reflex-winkelmann.com/konformitaetserklaerungen

Alternatively, scan the QR code:

SI2003enC / 04-22

reflex

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