reflex

Thinking solutions.

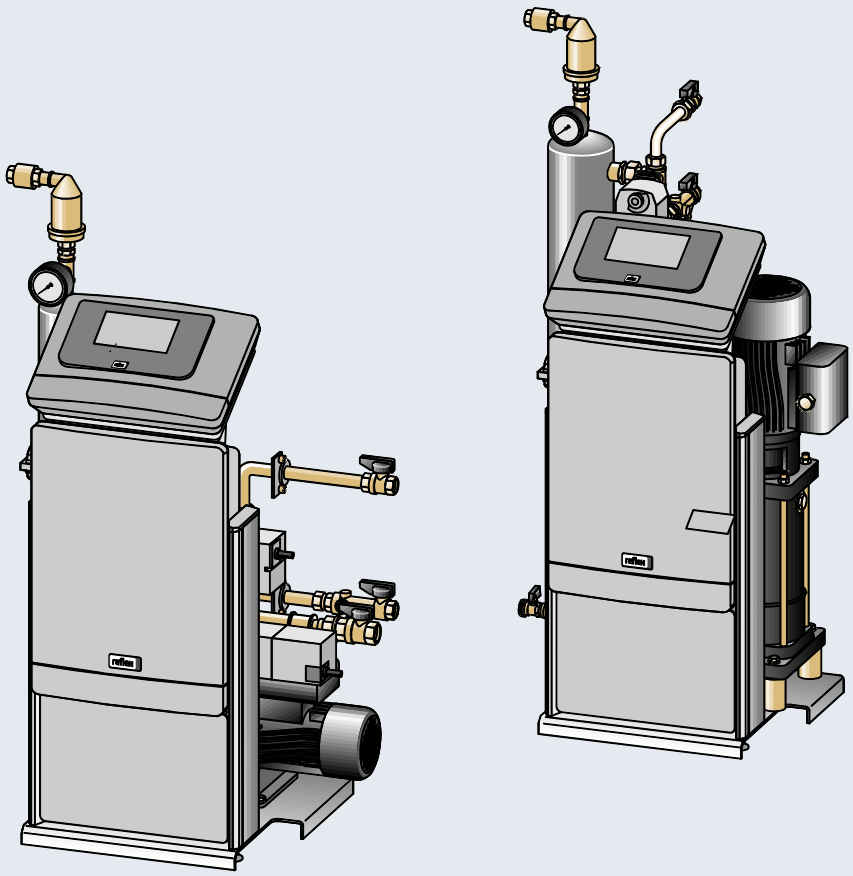
Servitec 35-120 with Touch controller

Vacuum spray degassing

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 4.6 "Optional equipment and accessories" on page 17 .

Note!

Every person installing this equipment or performing any other work at the equipment is required to carefully read this 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 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 12.1 "Reflex Customer Service" on page 74 .

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.

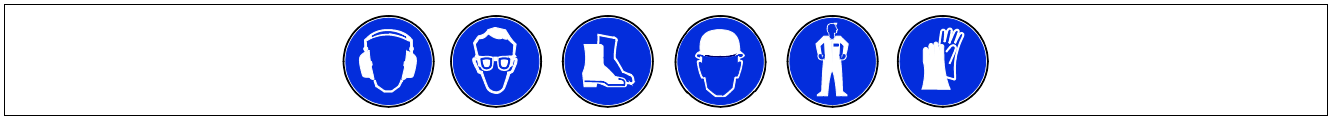
3.2 Personnel requirements

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

When working at the system, wear the stipulated personal equipment such as hearing and eye protection, safety boots, helmet, protective clothing, protective gloves.



See the national regulation of your country for personal protective equipment required.

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 for 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 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 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

4.1 Description

The device is a degassing and water make-up station for plant systems.
The following plant systems are applicable for the device:

- Plant systems with heating circuits.
- Plant systems with cooling circuits.
- Plant systems with solar circuits.
- Plant systems with process circuits.

The device fulfils two functions:

1. Degassing of water.
   - Water from the plant system.
   - Water from the make-up mains for the plant system.

It removes up to 90 % of the dissolved gases from the water. Operating faults in the plant system resulting from free or dissolved gases in the water are avoided.

2. Make-up with water for the plant system.
   - Two make-up variants can be selected for the plant system.
     - Magcontrol make-up variant: For plant systems with diaphragm expansion tanks.
     - Levelcontrol make-up variant: For plant systems with pressure maintaining stations.

The device provides the following safety features:

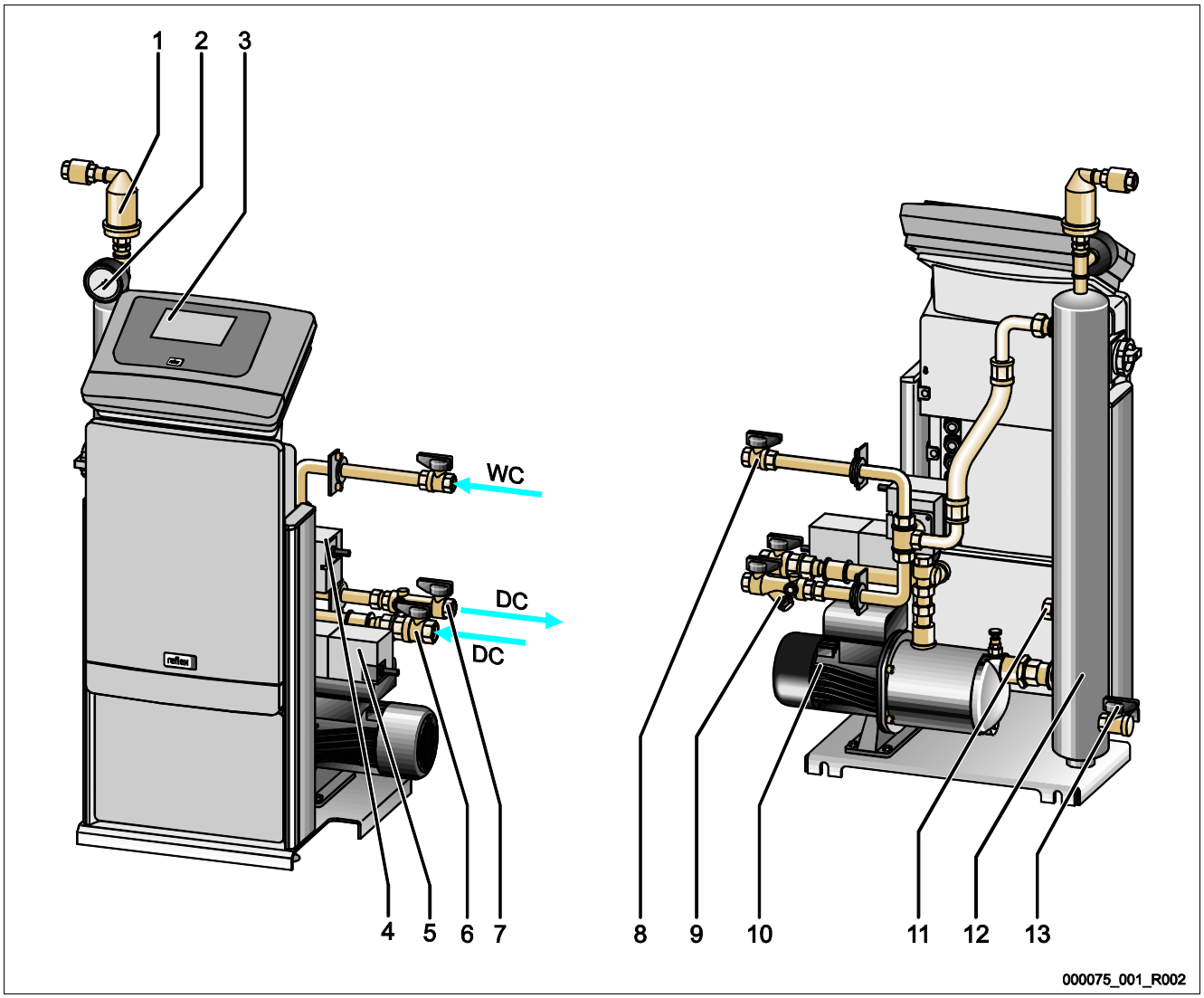
- Control of the pressure maintenance of the plant system
- Automatic make-up with water.
- No water circulation problems in the plant system.
- Reduction of corrosion damage by removal of oxygen from the water.

Note!
The device can only be operated at water temperatures up to a maximum of 90 °C.

4.2 Overview

The unit overviews are only examples. Structure and functionality is the same for the devices below.

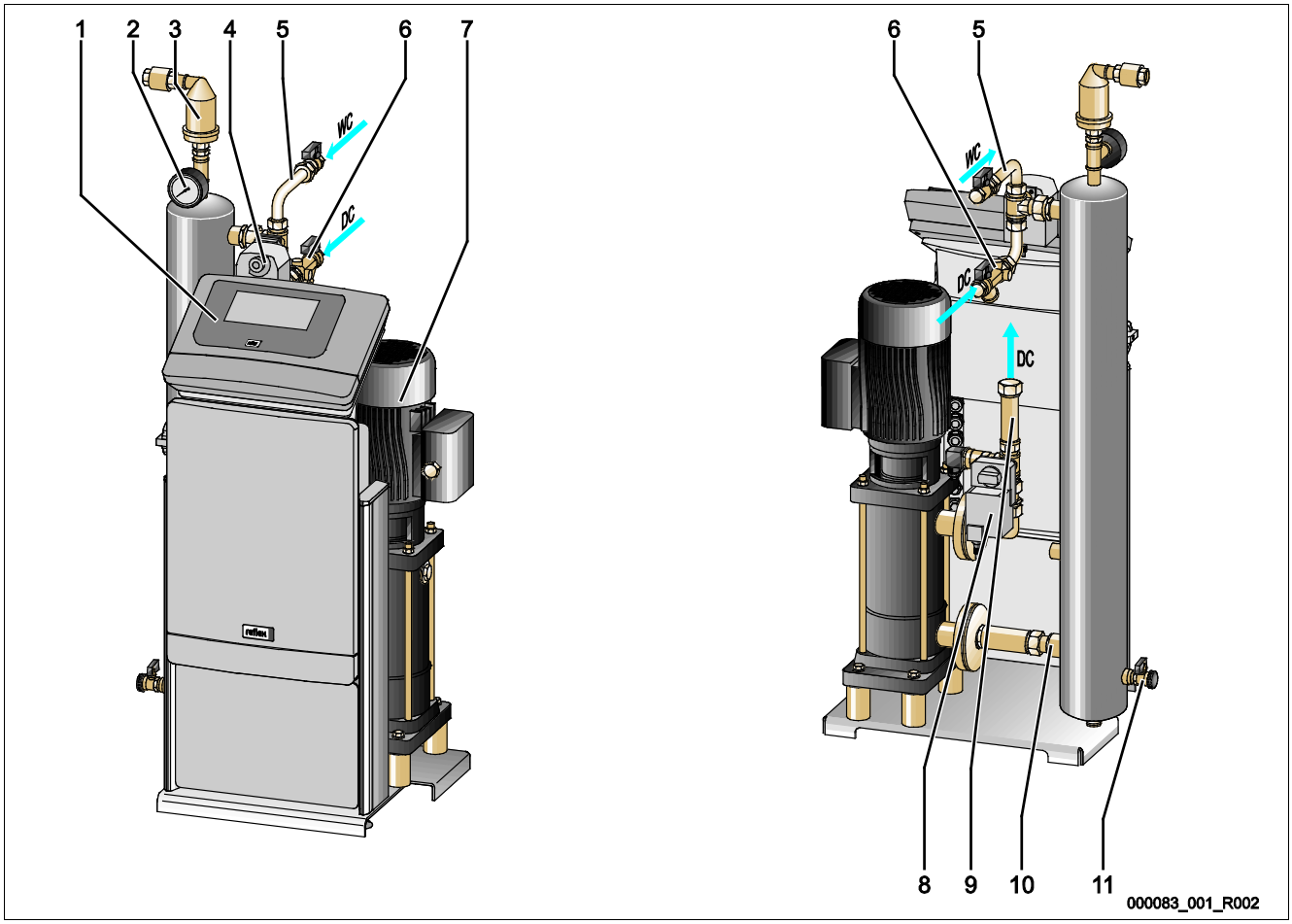
Servitec 35 and Servitec 60(gl)



1	"DV" degassing valve
2	"PI" vacuum gauge
3	Control Touch controller
4	"CD" 3-ways motor control valve upstream of vacuum spray tube
5	"CD" 2-ways motor ball valve downstream of "PU" pump
6	Connection for degassing • Gas-rich water inlet
7	Connection for degassing • Degassed water outlet

8	Make-up to degassing connection
9	"ST" dirt trap
10	"PU“ horizontal pump
11	Insufficient water switch
12	"VT" vacuum spray tube
13	"FD" feed and drain cock

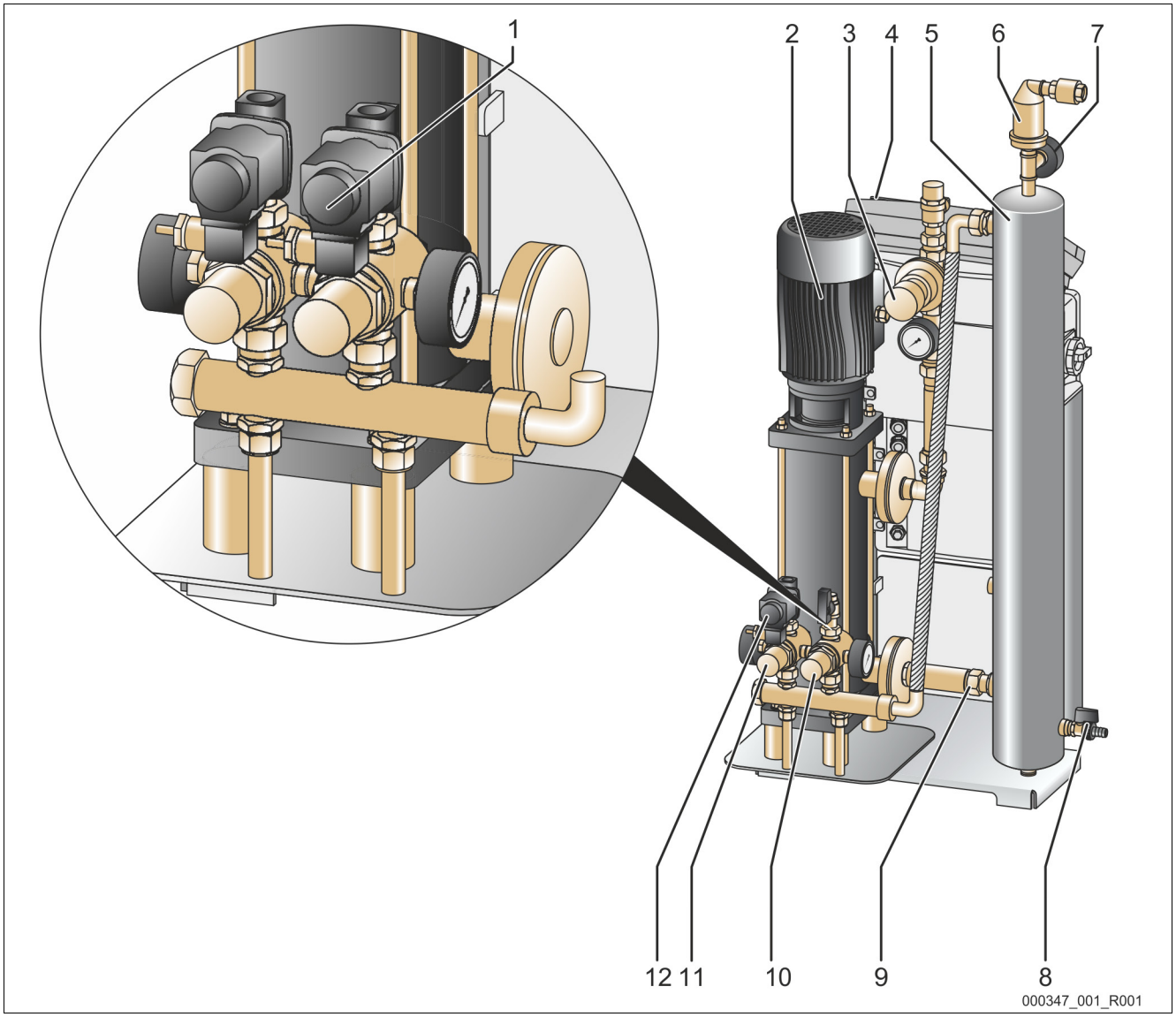
Servitec 75 ad Servitec 95



1	Control Touch controller
2	"PI" vacuum gauge
3	"DV" degassing valve
4	"CD" 3-ways motor control valve upstream of vacuum spray tube
5	Make-up to degassing connection
6	Connection for degassing • Gas-rich water inlet

7	"PU" vertical pump
8	"CD" 2-ways motor ball valve downstream of "PU" pump
9	Connection for degassing • Degassed water outlet
10	Degassed water pump connection
11	Feed and drain cock

Servitec 75(gl), Servitec 95(gl), Servitec 120 (gl) and Servitec 90° models with mechanical actuators.



1	Optional "GV" solenoid valve of the "DC" degassing line • Only with Servitec 75gl, Servitec 95gl and Servitec 120 gl
2	"PU“ vertical pump
3	"CD_p" overflow valve of the "DC" degassing line • For degassed water to the system
4	Control Touch controller
5	"VT" vacuum spray tube
6	"VT" vacuum spray tube

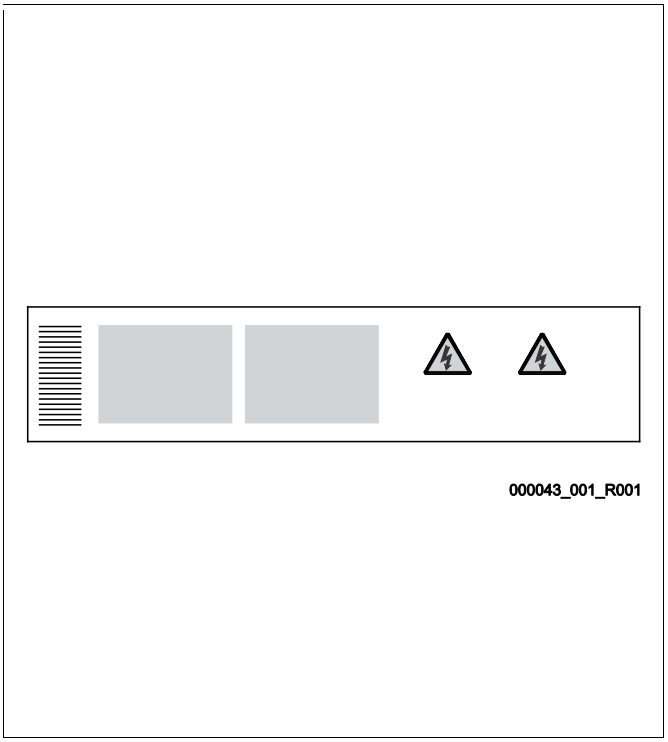
7	"PI" vacuum gauge
8	Feed and drain cock
9	Suction line of the "VT" vertical pump
10	"CD_s" pressure-reducing valve of the "DC" degassing line • For gas-rich water from the system
11	"CD_w" pressure-reducing valve of the "WC“ make-up line
12	"GV" solenoid valve of the "DC" degassing line

4.3 Identification

4.3.1 Nameplate

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

Information on nameplate	Meaning
Type	Device name
Serial No.	Serial number
min. / max. allowable pressure P	Minimum/maximum permissible pressure
max. continuous operating temperature	Maximum temperature for continuous operation
min. / max. allowable temperature / flow temperature TS	Minimum / maximum permissible temperature / TS flow temperature
Year built	Year of manufacture
min. operating pressure set up on shop floor	Factory-set minimum operating pressure
at site	Set minimum operating pressure
max. pressure saftey valve factory - aline	Factory-set opening pressure of the safety valve
at site	Set opening pressure of the safety valve



4.3.2 Type code

No.		Type code (example)
1	Device name	
2	Pump head height	Servitec 35 Touch
3	Controller type	1 2 3

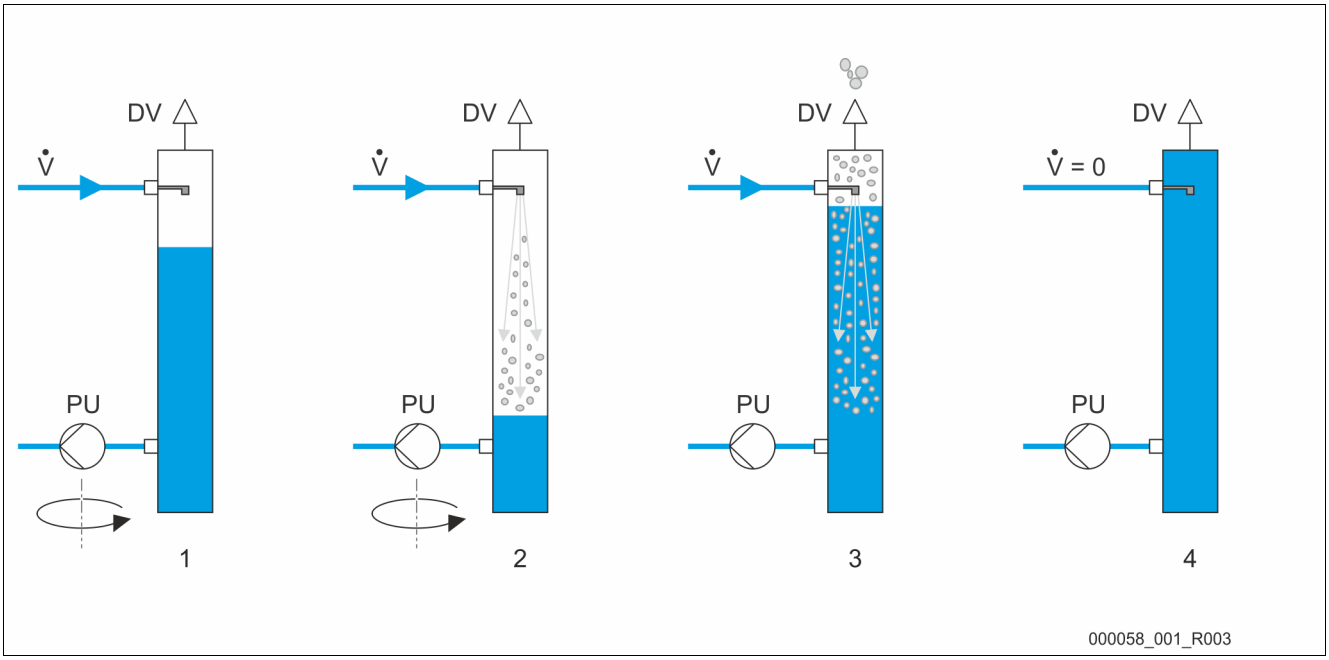
4.4 Function

The device combines the functions make-up and degassing of water for the plant system:

- Gas-rich water is conveyed via the make-up line connection from the plant system to the vacuum spray tube.
- Additional freshwater is conveyed via the make-up line connection from the plant system to the vacuum spray tube.

A freshwater make-up occurs if there is a pressure drop in the plant system.

Sequence of a degassing cycle in the vacuum spray tube



1	Create vacuum in the spray tube
2	Injection

3	Discharge
4	Idling time

The degassing operation uses timer-controlled cycles. A cycle comprises the following phases:

1. Create vacuum in the spray tube.
   - The pump starts and conveys water from the vacuum spray tube The pump transports more water from the spray tube than can be transported via the connection lines of the water make-up. A vacuum is created.
2. Injection
   - Opening of the solenoid valves in the make-up lines routes gas-rich water into the spray tube. It is atomised by nozzles in the spray tube. The atomised water is degassed in the vacuum of the spray tube because of the large surface area resulting from the atomisation. The degassed water is returned to the plant system via the vacuum pump. The overflow valve means that the pump is set to a constant working pressure. The working pressure depends on the respective plant system.
3. Discharge
   - The pump shuts down. The pressure in the plant system causes more water to be injected into the vacuum spray tube and degassed. The water level in the vacuum spray tube rises. The gases released in the vacuum spray tube are released into the ambient atmosphere via the degassing valves.
4. Idling time
   - When the gas has been discharged, the device will remain in idle until the next cycle is started. Post-degassing occurs during the idling time.

Degassing programmes

The device controller regulates the degassing process. The controller monitors the operating states and outputs them to the display.

The controller provides 3 different degassing programmes for selection and adjustment:

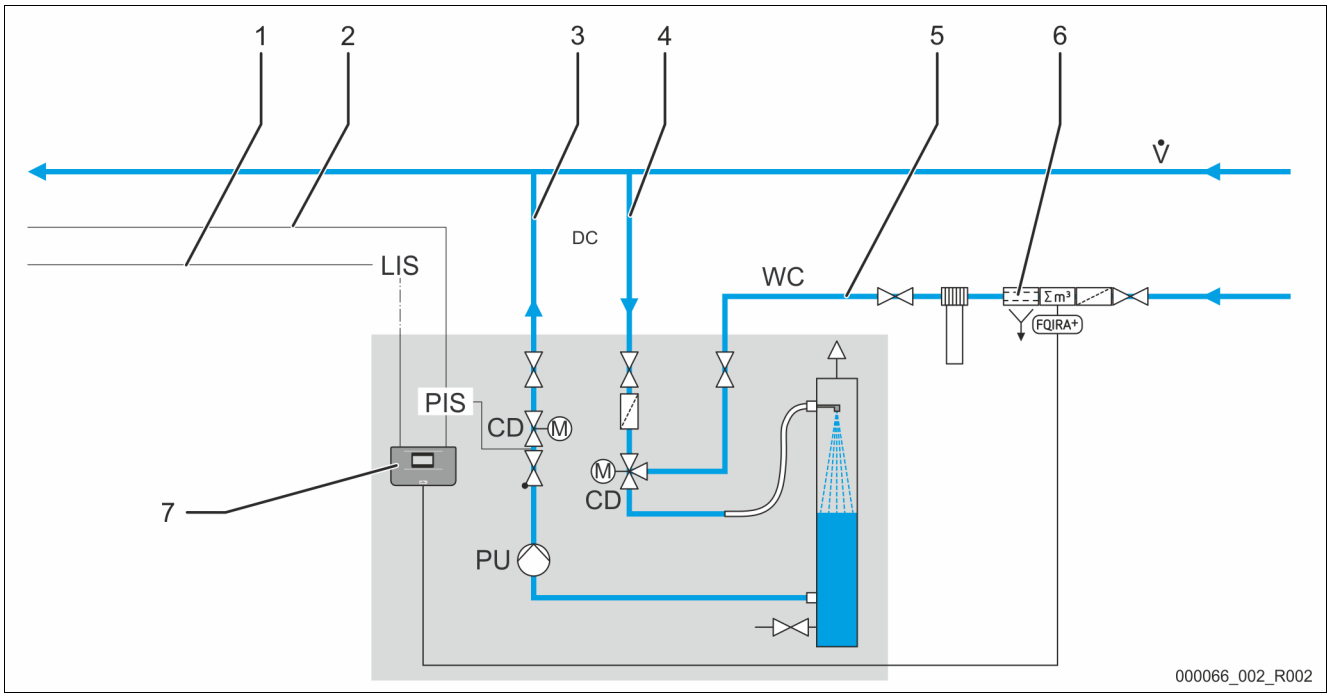
- Continuous degassing
  - For continued degassing over several hours or days in a sequence of degassing cycles without idling periods. This degassing programme must be selected after commissioning and repairs.
- Interval degassing
  - This comprises a limited number of degassing cycles. The system idles between the intervals. This degassing programme must be selected for continuous operation.
- Make-up degassing
  - Is automatically activated for every water make-up during continuous or interval degassing. The sequence corresponds to continuous degassing. The degassing time is limited by the make-up time.

Make-up variants

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

- Magcontrol make-up variant.
  - For plant systems with diaphragm expansion tanks. The pressure in the plant system is monitored with the aid of the integrated pressure sensor in the device. If the plant pressure falls below the calculated filling pressure, water make-up is triggered.
- Levelcontrol make-up variant:
  - For plant systems with pressure maintaining stations. The water level in the expansion tank of the pressure maintaining system is determined with the "LIS" external pressure transducer. If the water level falls in the expansion tank, a signal is triggered at the device controller to start the water make-up.

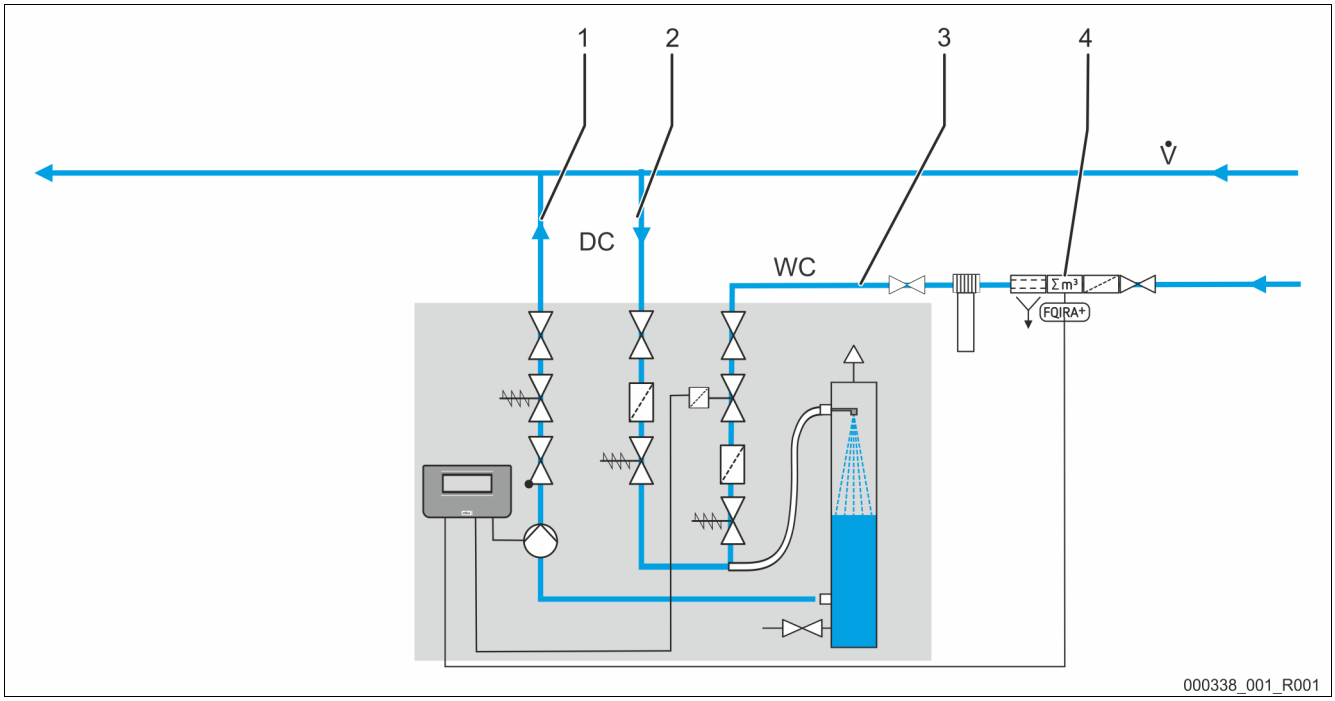
Servitec 35 - 95 with motor ball valve



1	Signal line from the "LIS" level sensor for the "Levelcontrol" make-up variant
2	Signal line from the "PIS" pressure transducer for the "Magcontrol" make-up variant
3	"DC" degassing line (degassed water)
4	"DC" degassing line (gas-rich water)

5	"WC" make-up line
6	For optional equipment and accessories see chapter 4.6 "Optional equipment and accessories" on page 17
7	Control Touch controller

Servitec 75 -95 and 120 with mechanical actuators



1	"DC" degassing line (degassed water)
2	"DC" degassing line (gas-rich water)
3	"WC" make-up line

4	For optional accessories, see chapter 4.6 "Optional equipment and accessories" on page 17
6	Control Touch controller

4.5 Scope of delivery

The scope of delivery is described in the shipping document 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 controller.
- "DV" degassing valve, box-packaged.
- Plastic sleeve with operating manual and electric wiring diagram (attached to the device).

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

4.6 Optional equipment and accessories

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

- Fillset or Fillset Compact for make-up with water.
  - Fillset or Fillset Compact with integrated system separator, water meter, dirt trap, and locking mechanisms for the "WC" make-up line.
- Fillsoft/Fillsoft zero for softening/desalinating the make-up water from the public water network.
  - Fillsoft/Fillsoft zero is installed between Fillset and the device. The device controller evaluates the make-up quantities and signals a required replacement of the softening and desalination cartridges.
- Enhancements for the device controller.
  - Use the RS-485 interface to retrieve various data from the controller and to communicate with control centres or other devices see chapter 6.5.3 "RS-485 interface" on page 35 .. You need the following items for the communication of the RS-485 interface with control centres or other devices:
    - Bus modules for the communication with control centres.
    - Lonworks Digital.
    - Lonworks.
    - Profibus-DP.
    - Ethernet.
    - I/O module for standard communication.
    - Modbus RTU
- Gas discharge measurement for an optimised degassing operation.

Note!

Separate operating instructions are supplied with accessories.

5 Technical data

Note!

The following values apply for all systems:

- Permissible flow temperature: 120 °C
- Permissible inlet pressure for make-up: 1.3 bar – 6 bar
- Make-up capacity: 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)	Fusing (A)	Number of RS-485 interfaces	I/O module	Electrical voltage control unit (V, A)	Noise level (dB)
35	0.85	230 / 50	10	2	Optional	230, 2	55
60	1.1	230 / 50	10	2	Optional	230, 2	55
60 GL	1.1	230 / 50	10	2	Optional	230, 2	55
75	1.1	230 / 50	10	2	Optional	230, 2	55
75 GL	1.1	230 / 50	10	2	Optional	230, 2	55
95	1.1	230 / 50	10	2	Optional	230, 2	55
95 GL	1.1	230 / 50	10	2	Optional	230, 2	55
120	1.5	400 / 50	10	2	Optional	230, 2	55
120 GL	1.5	400 / 50	10	2	Optional	230, 2	55

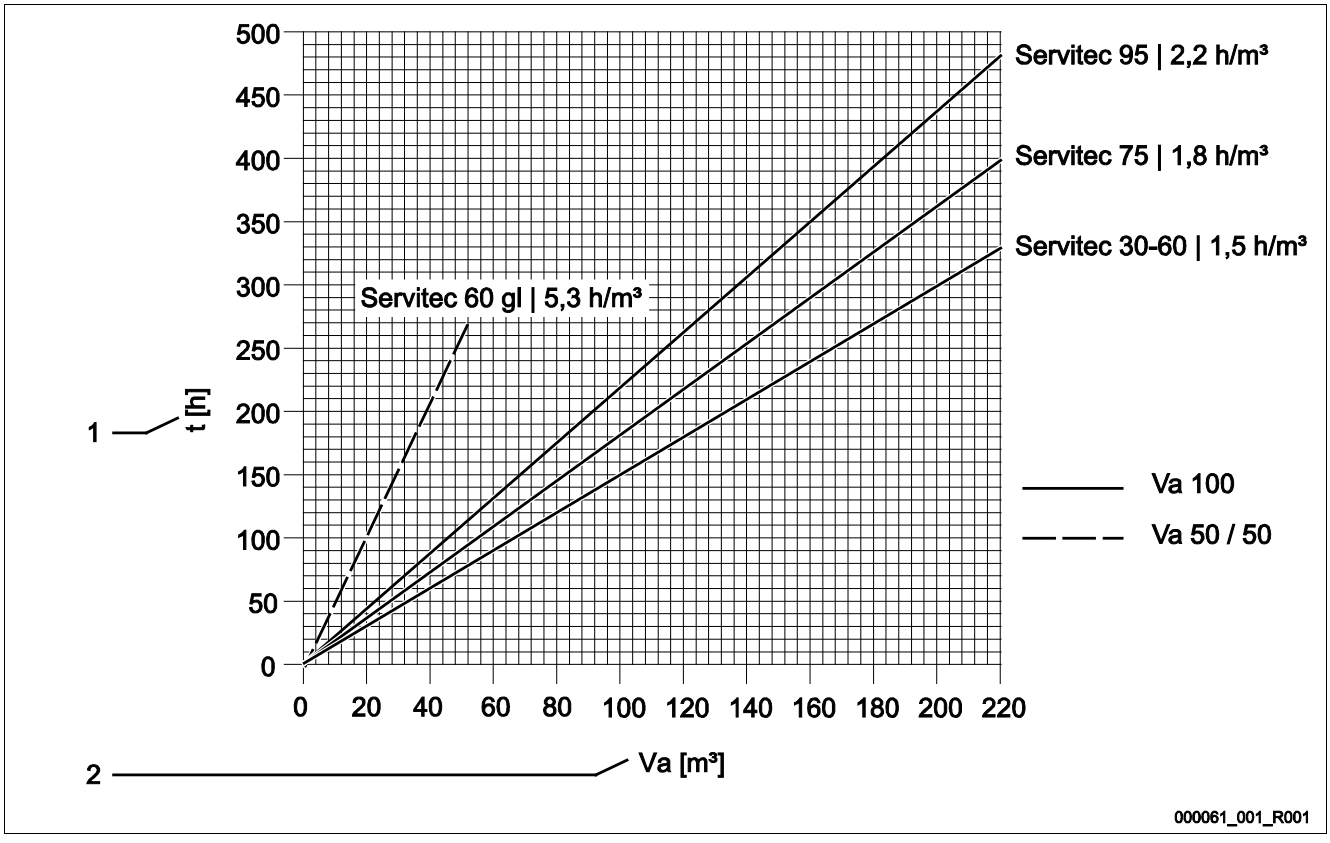
5.2 Dimensions and connections

Type	Weight (kg)	Height (mm)	Width (mm)	Depth (mm)	Degassing device connection	Degassing system connection	Make-up connection
35	30	1030	620	440	IG ½ "	Internal thread 1 "	IG ½ "
60	36	1215	685	440	IG ½ "	Internal thread 1 "	IG ½ "
60 GL	36	1215	685	440	IG ½ "	Internal thread 1 "	IG ½ "
75	41	1215	600	525	IG ½ "	Internal thread 1 "	IG ½ "
75 GL	41	1215	600	525	IG ½ "	Internal thread 1 "	IG ½ "
95	42	1215	600	525	IG ½ "	Internal thread 1 "	IG ½ "
95 GL	42	1215	600	525	IG ½ "	Internal thread 1 "	IG ½ "
120	43	1215	600	525	IG ½ "	Internal thread 1 "	IG ½ "
120 GL	43	1215	600	525	IG ½ "	Internal thread 1 "	IG ½ "

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	220	–	0.5 – 2.5	8	–	>0 – 70
60	220	–	0.5 – 4.5	8	–	>0 – 70
60 GL	–	50	0.5 – 4.5	8	4.7	>0 – 70
75	220	–	0.5 – 5.4	10	–	>0 – 70
75 GL	–	50	0.5 – 5.4	10	5.7	>0 – 70
95	220	–	0.5 – 7.2	10	–	>0 – 70
95 GL	–	50	0.5 – 7.2	10	7.9	>0 – 70
120	220	–	1.3 – 9	10	–	>0 – 70
120 GL	–	50	1.3 – 8.3	10	9.7	>0 – 70

Approximate values for the maximal "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

⚠ 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 Installation conditions

6.1.1 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

Prior to installation, prepare the device as follows:

1. Installation location.
   - Frost-free, well-ventilated room.
   - Ambient temperature > 0 to maximum 45 °C.
   - Level, stable flooring with a drainage facility.
   - Filling connection at least DN 25 according to DIN 1988 -Part 4 and DIN EN 1717.
   - Electric connection 230 V~ or 400 V~, 50/60 Hz, 16 A with upstream RCD: Tripping current 0.03 A.
2. Plant system.
   - Install a temperature and pressure protection system in the plant system.
     – Safety valve and temperature sensor in the plant system.
     – Safety temperature limiter (thermostat) at the heat generator.
3. Position of the device in the plant system.
   - Plant system with diaphragm expansion tank.
     – Connect the device in the vicinity of the diaphragm expansion tank.
   - Plant system with pressure maintaining station.
     – Connect the device in the return upstream of the return flow admixture point in the plant system.
   - Observe the permissible operating temperature at the connection position in the plant system.
4. Condition of the delivered device.
   Check all screw connections of the device for tight seating.
5. Make-up line to the device
   – Use the Fillset system separator if the make-up line of the drinking water mains is closed.

Note!
For the Fillset, see chapter 4.6 "Optional equipment and accessories" on page 17 .

Note!
Install the device in the return flow side of the plant system.
– This ensures stable pressure conditions for the device.

6.3 Execution

Perform the installation as follows:

- Preferably install the device in the return side of the plant system. In this manner, you ensure that the device is operated within the permissible pressure and temperature ranges.
- In the case of a plant system with return flow admixture or hydraulic switching points, install the device upstream of the mixing point. In this way, it is ensured that the degassing of water from the main volume flow takes place within the permissible temperature range.

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 plant system. Ensure that all connections to the plant system are free from stresses. If necessary, provide support structures for the pipes.

CAUTION – Property damage caused by leaks! Leaks in the connection lines to the device can cause material damage to the plant system. Use only connection lines with appropriate resistance against the plant system temperature.

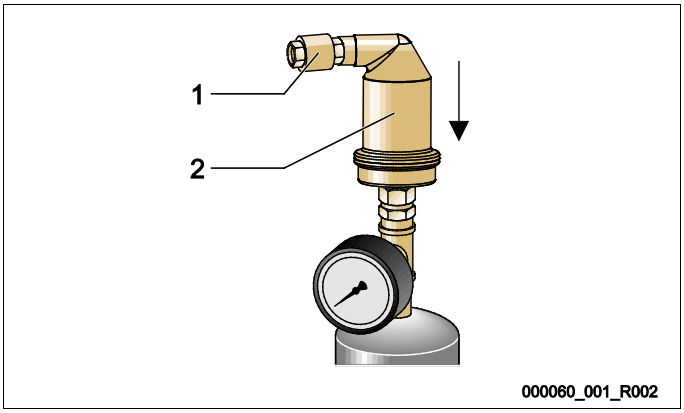
The device is pre-wired and must be adapted for the local system conditions. Complete the water-side connection to the system and the electric connection as shown in the terminal diagram, see chapter 6.5 "Electrical connection" on page 30 .

Note!

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

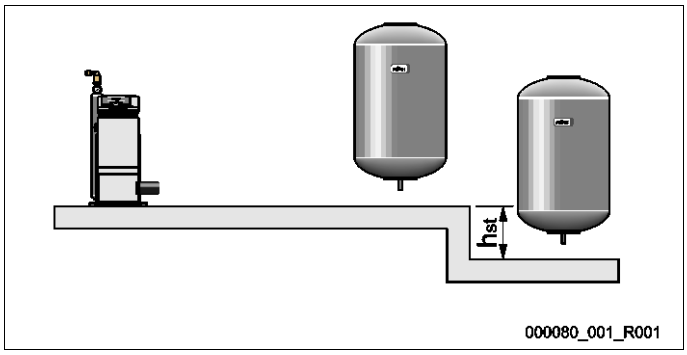
6.3.1 Fitting the add-on components

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



6.3.2 Floor mounting

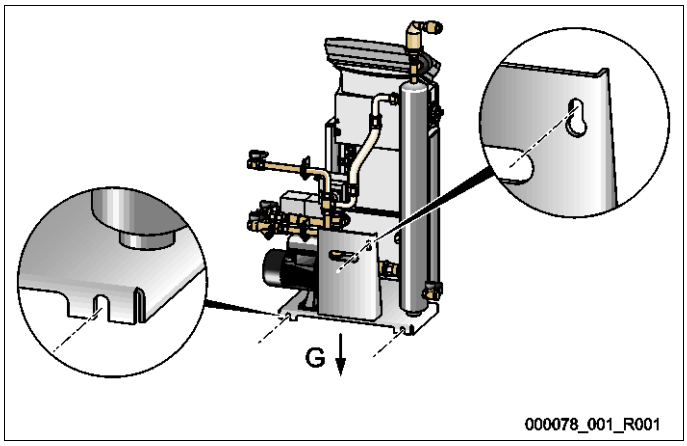
The device is installed on the floor. Select the attachment means according to the floor properties and the weight of the device.



6.3.3 Wall mounting

Applicable only to Servitec 35 and Servitec 60 as an option to floor mounting.

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



Note!

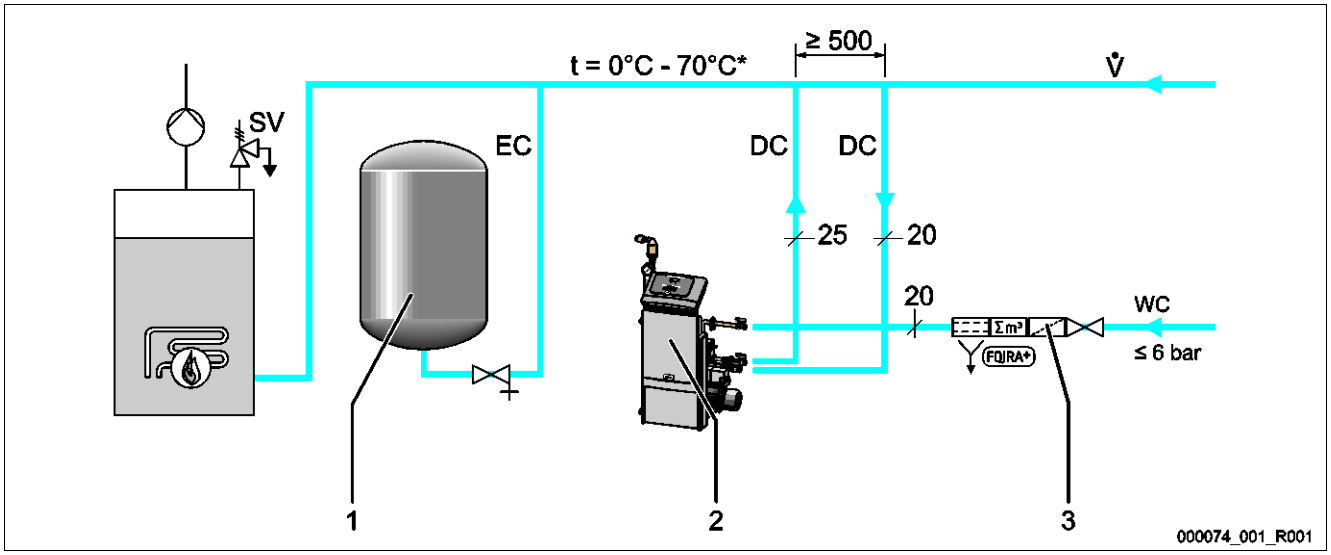
Consider a potential height difference "h_{st}" between the pressure expansion tank and the device when calculating the "P_0" minimum operating pressure.

6.3.4 Hydraulic connection

6.3.4.1 Degassing line to the system

The device 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. Shut-off devices for both degassing lines have been pre-installed at the device. The connections of the degassing lines must be made within the main flow volume of the overall system.

Device installation in a heating system – Pressure maintenance with diaphragm-type expansion tank



* Special types up to 90 °C.

1	Diaphragm expansion tank
2	Servitec device
3	For optional equipment and accessories see chapter 4.6 "Optional equipment and accessories" on page 17 .
DC	Degassing lines • Gas-rich water from the system • Degassed water to the system

EC	Expansion line
WC	Make-up line
SV	Safety valve

The degassing lines into the system are to be installed near the connection point of the "EC" expansion line. This ensures stable pressure conditions. If you operate the device with pressure-dependent water make-up, you must install the system near the diaphragm-type pressure expansion tank. This ensures that the pressure in the diaphragm-type expansion tank is monitored. In this case, select the "Magcontrol" operating mode in the controller.

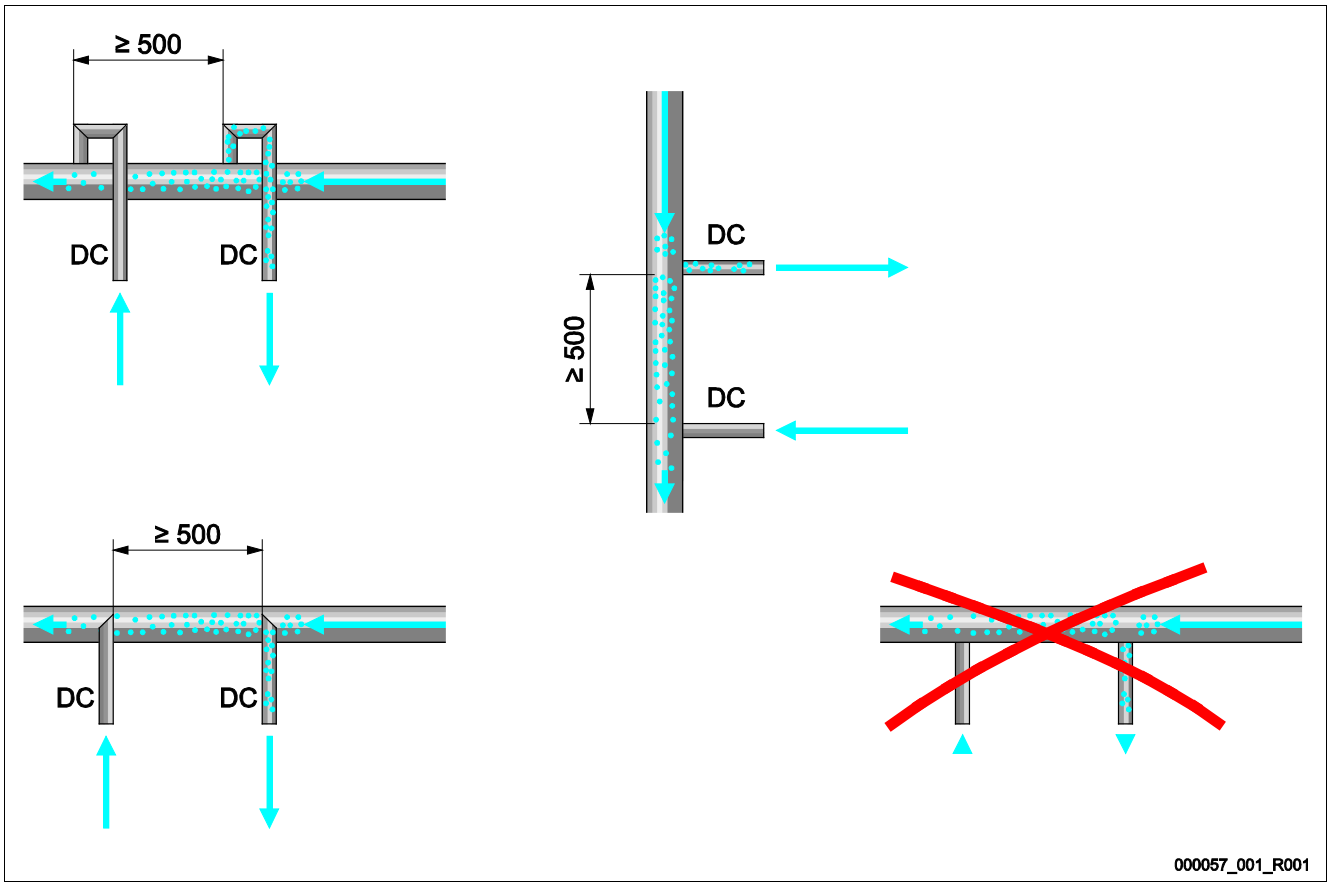
Note!

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 27 .

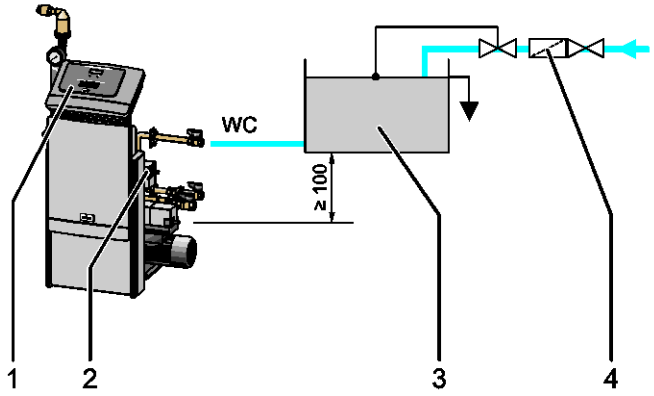
Installation detail of the "DC" degassing line

Connect the "DC" degassing lines as shown below.



- Ensure that particulate dirt cannot enter and thus create an overload of the "ST" dirt trap.
- Connect the degassing line for gas-rich water upstream of the degassing line for degassed water in system flow direction.
- Ensure that the water temperature does not exceed the range 0 °C – 70 °C (special types up to 90 °C). The return line side should be preferred for heating systems. This ensures the permissible temperature range for degassing.

6.3.4.2 Make-up line



1	Device	3	"BT" system separator vessel
2	"CD" 3-ways motor ball valve	4	"ST" dirt trap

For a water make-up via a "BT" system water tank, its bottom edge must be at least 100 mm over the "PU" degassing pump. Various Reflex make-up variants, see chapter 6.4 "Switching and make-up variants" on page 27 .

For water make-up, note the following conditions:

- Use a R ½ inch blind plug to close the connection of the "WC" make-up line.
- Prevent a potential device fault by ensuring manual water make-up.
- Install "ST" dirt traps with a mesh size ≤ 0.25 mm.
  - Upstream of the "CD" 3-ways motor ball valve.
  - Upstream of the connection of the make-up line to the "BT“ system water tank.

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

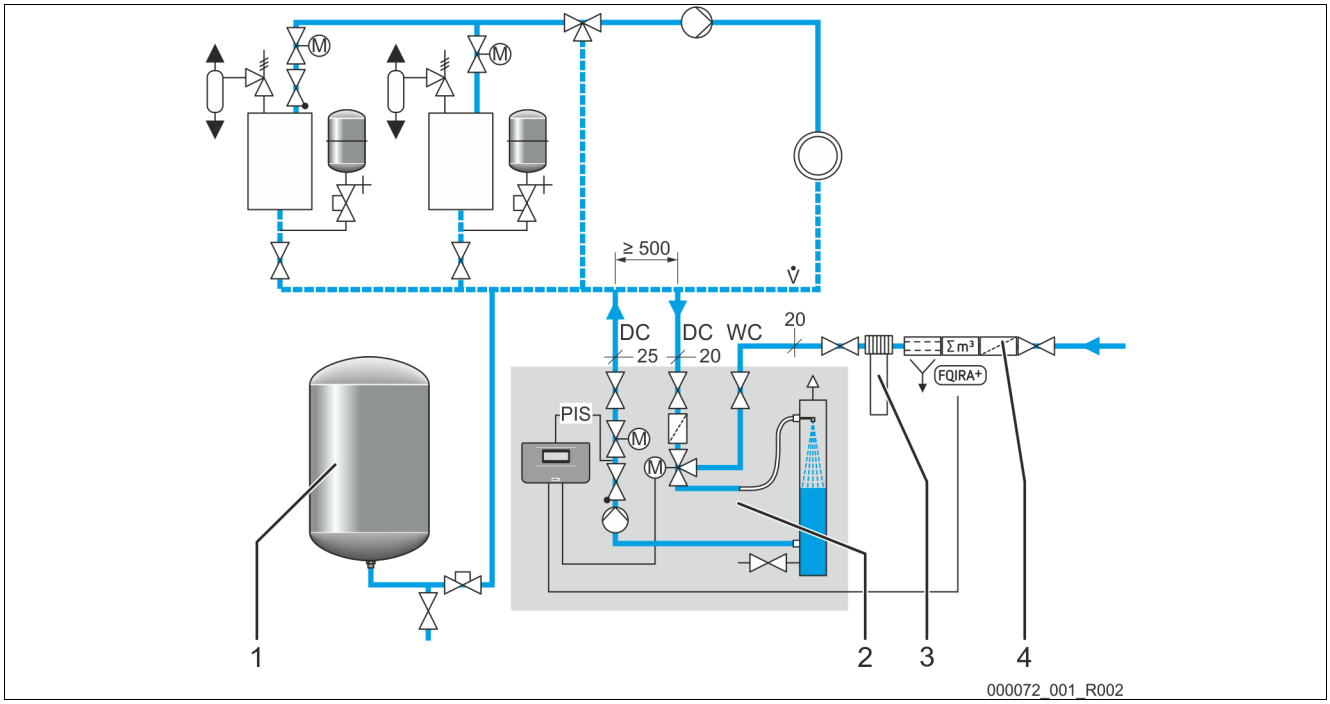
Select the make-up variant in the Customer menu of the device controller, see chapter 9.4 "Configuring settings in the controller" on page 56 .

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 tank.



1	"MAG" diaphragm-type expansion tank
2	Device
3	Fillsoft (optional accessory) see chapter 4.6 "Optional equipment and accessories" on page 17
4	Fillset Impulse (optional accessory) see chapter 4.6 "Optional equipment and accessories" on page 17

WC	Make-up line
DC	Degassing lines
PIS	Pressure transducer

The "Magcontrol" operating mode is set in the Customer menu of the device controller. This operating mode is used for facility systems with a diaphragm-type expansion tank. Water is added according to the pressure in the facility system. The required pressure sensor is integrated in the device. The degassing lines are connected close to the diaphragm-type expansion tank. This ensures that the pressure for the make-up with water is monitored.

Note!

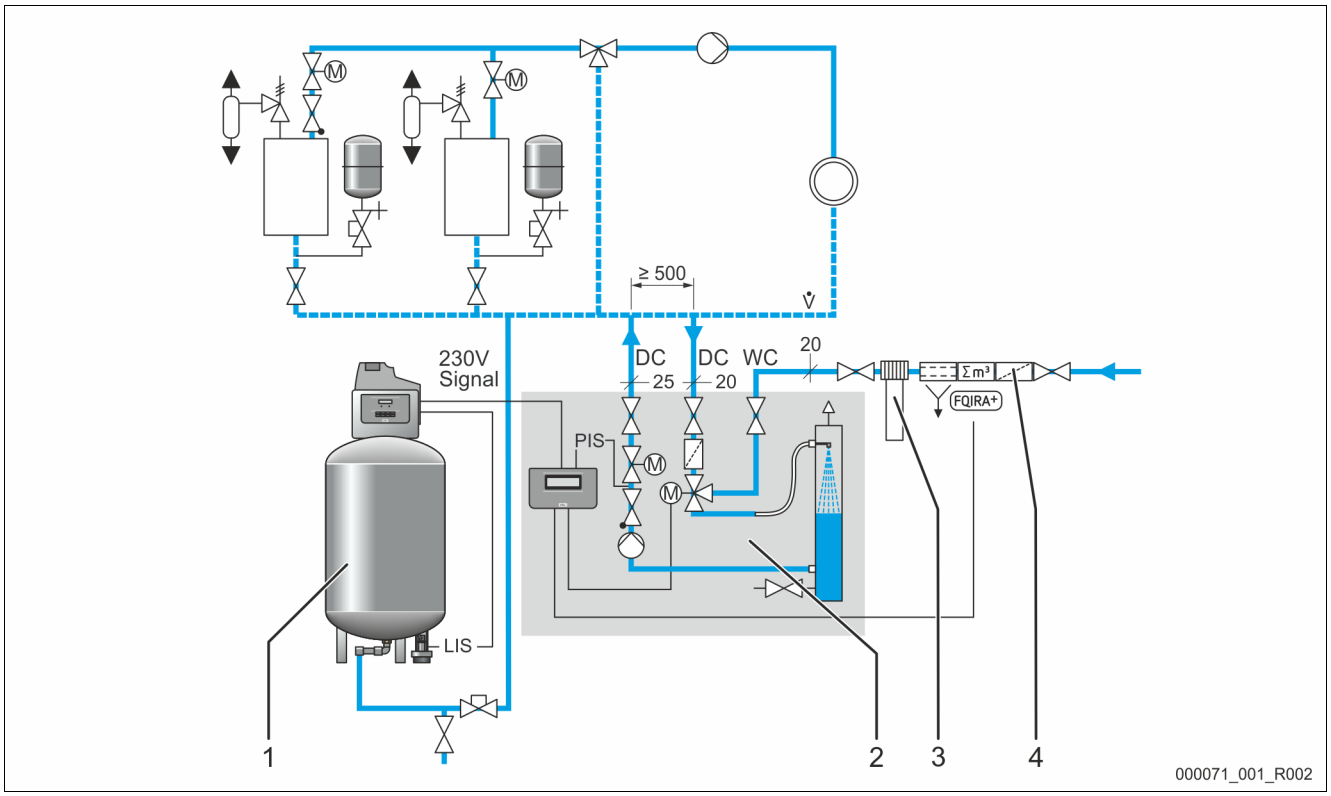
Connect the degassing lines at the return side of the system upstream of the hydraulic switching point. The permissible temperature range of 0 °C – 70 °C (special types up to 90 °C) can thus be met.

6.4.2 Level dependent "Levelcontrol" make-up mode

The "Levelcontrol" operating mode is set in the Customer menu of the device controller. This operating mode is used for facility systems with pressure-maintaining stations. The make-up with water depends on the filling level in the expansion tank of the pressure-maintaining station. The "LIS“ pressure pick-up determines the filling level and sends this value to the controller of the pressure maintaining station. The controller sends a 230 V signal to the device controller when the filling level in the expansion tank has fallen below the set value.

Exemplary representation of Servitec 35 - 95 with motor ball valves in a facility system.

- Multi-tank system with return flow admixture and a compressor-controlled pressure-maintaining station.



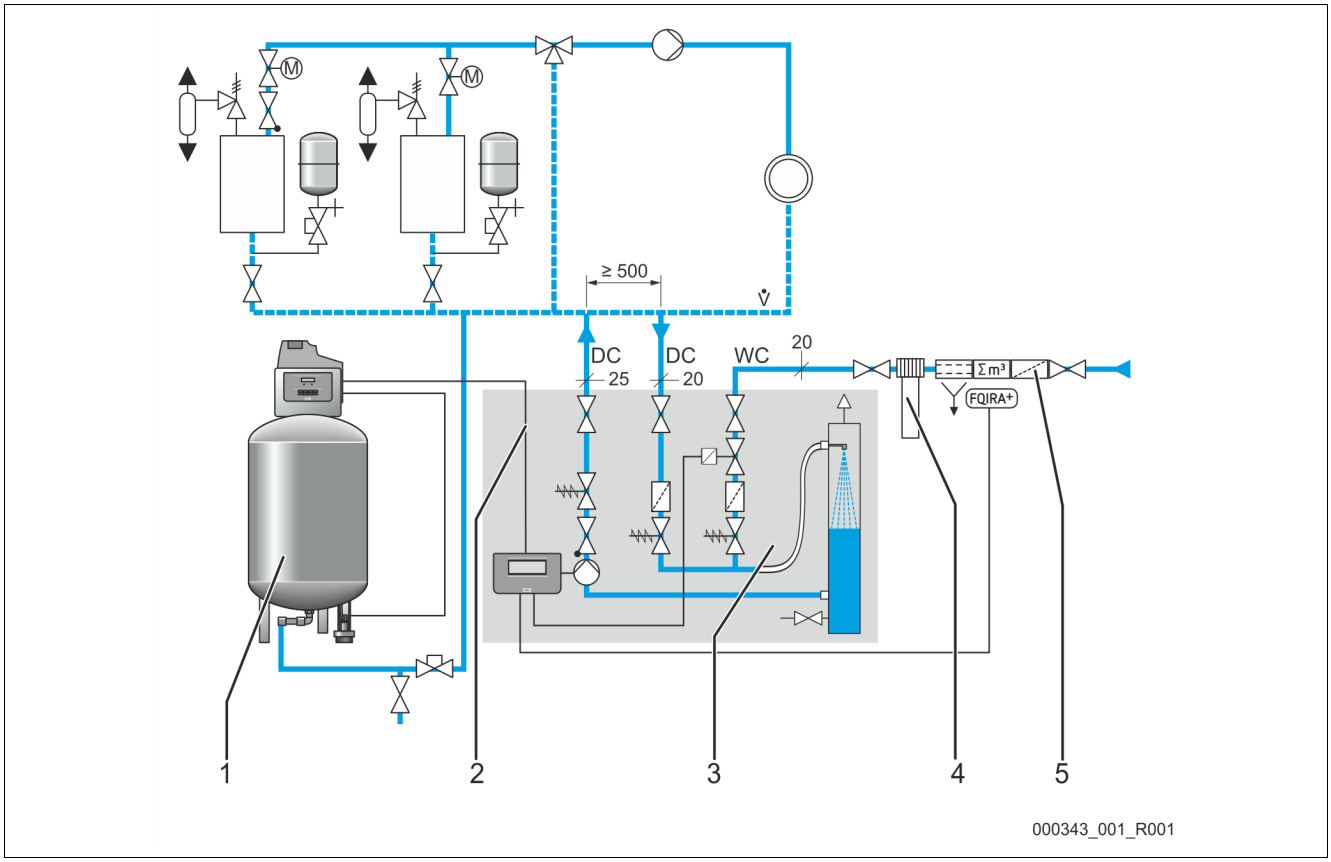
1	Pressure-maintaining station (compressor-controlled) with expansion tank
2	Device
3	Fillsoft (optional accessory) see chapter 4.6 "Optional equipment and accessories" on page 17
4	Fillset Impulse (optional accessory) see chapter 4.6 "Optional equipment and accessories" on page 17

WC	Make-up line
DC	Degassing lines
PIS	Pressure transducer
LIS	Pressure pick-up

Make-up with water is realised by regulating the motor ball valve in the "WC" make-up line. The device controller regulates the motor actuator of the motor ball valve. This ensures a controlled make-up with water and monitoring of the make-up time and cycles.

Exemplary representation of Servitec 75 - 120 with mechanical actuators in a facility system.

- Multi-tank system with return flow admixture and a compressor-controlled pressure-maintaining station.



1	Pressure-maintaining station (compressor-controlled) with expansion tank
2	230 V signal line
3	Device
4	Fillsoft (optional accessory) see chapter 4.6 "Optional equipment and accessories" on page 17
5	Fillset Impulse (optional accessory) see chapter 4.6 "Optional equipment and accessories" on page 17

WC	Make-up line
DC	Degassing lines
PIS	Pressure transducer
LIS	Pressure pick-up

Make-up with water is realised by the solenoid valve in the "WC" make-up line. The device controller opens or closes the solenoid valve. This ensures a controlled make-up with water and monitoring of the make-up time and cycles.

6.5 Electrical connection

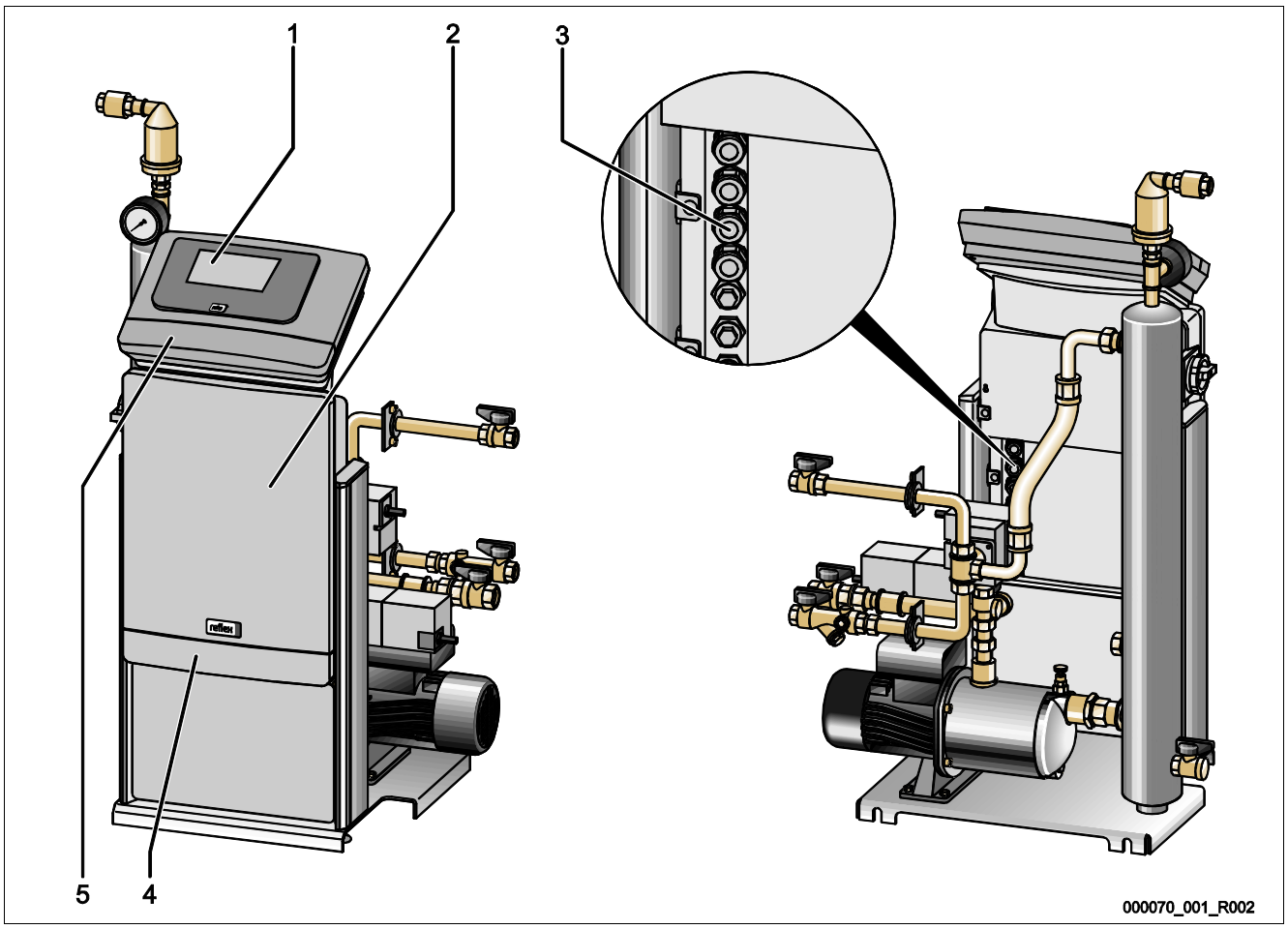
⚠ DANGER

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.

For the electrical connection, you must differentiate between a connection component and an operating component.



1	Operating unit (Control Touch controller)
2	Connection unit
3	Cable bushings

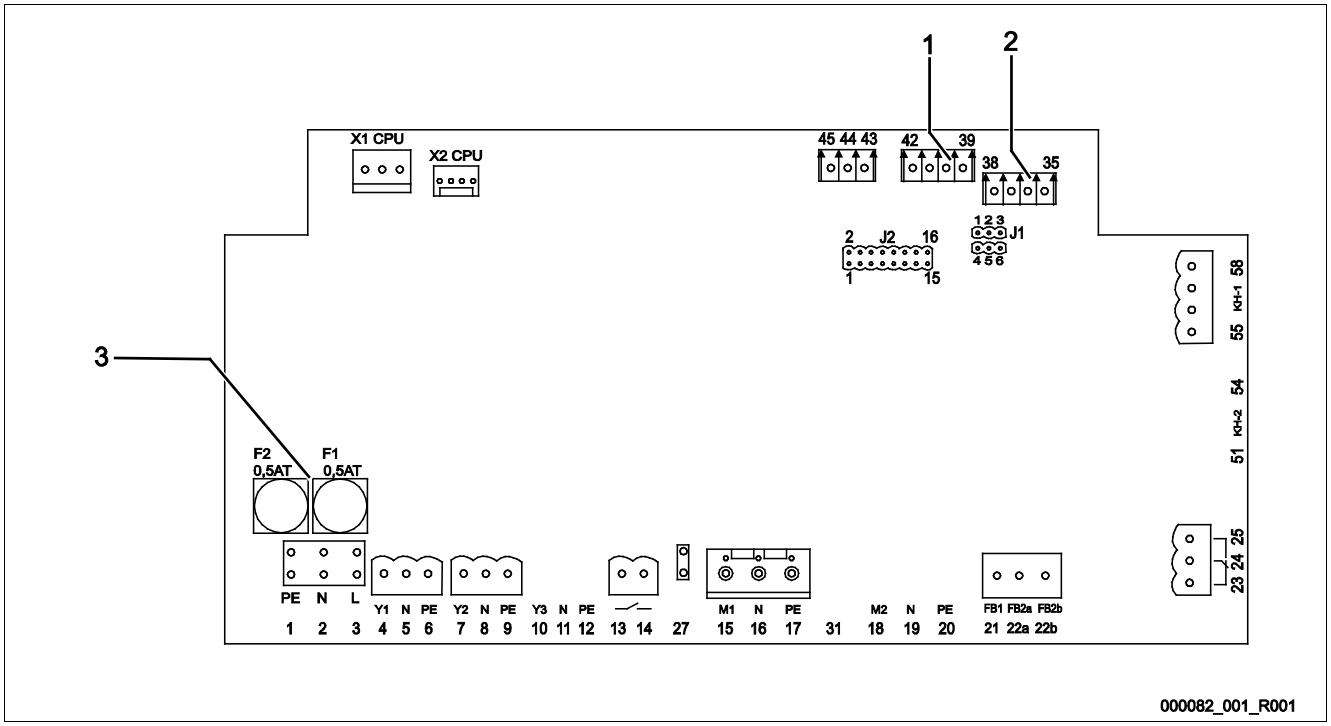
4	Covers of the connection unit (folding) • Supply and fusing • Floating contacts • Aggregate connection
5	Covers of the operating unit (folding) • RS-485 interfaces • Pressure output

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

1. Shut down the system and secure it against unintentional reactivation.
2. Remove the covers.

   ⚠ **DANGER** – electric shock! 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.
3. Insert a suitable screwed cable gland for the cable bushings at the rear of the connection component. M16 or M20, for example.
4. Thread all cables to be connected through the cable glands.
5. Connect all cables as shown in the terminal diagrams.
   - Connection component, see chapter 6.5.1 "Terminal plan, connection component" on page 32 .
   - Operating component, see chapter 6.5.2 "Terminal plan, operating unit" on page 34 .
   - Note the connection ratings of the device for the user-supplied fusing, see chapter 5 "Technical data" on page 18 .

6.5.1 Terminal plan, connection component



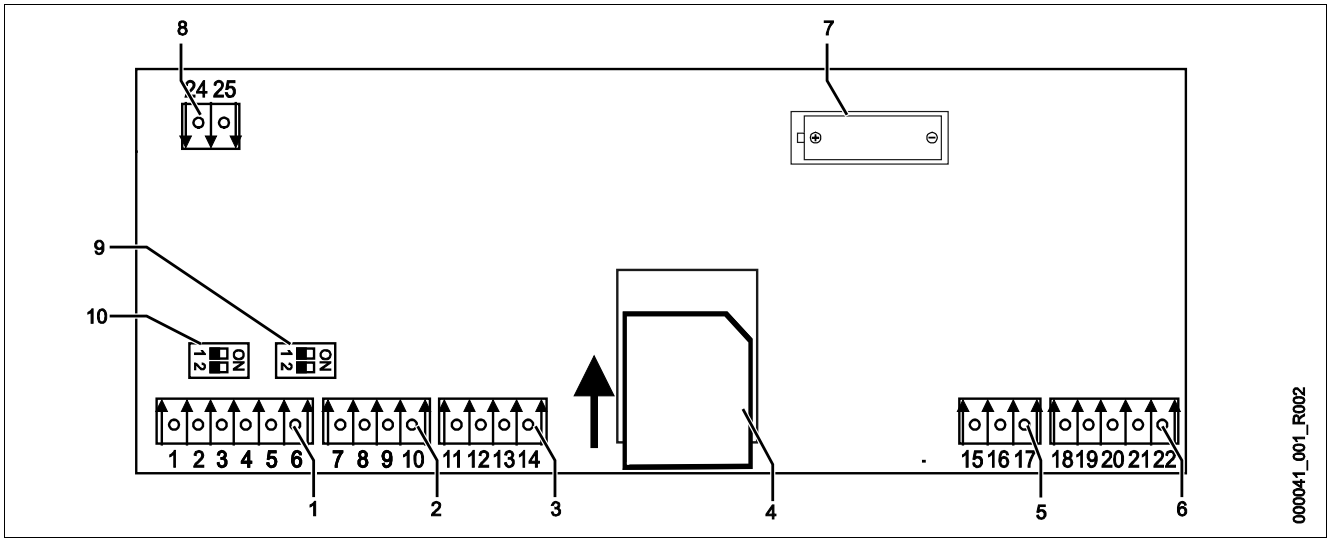
1	Pressure
2	Level - not assigned

3	Fuses

Terminal number	Signal		Function	Wiring
Supply				
X0/1	L		Supply 230 V, maximum 16 A. • Servitec 35-95	User supplied
X0/2	N			
X0/3	PE			
X0/1	L1		Supply 400 V, maximum 20 A. • Servitec 120	User supplied
X0/2	L2			
X0/3	L3			
X0/4	N			
X0/5	PE			
Circuit board				
13			Dry-running protection message (floating).	Not assigned
14				
22a	FB2a	C	External make-up request. – With Levelcontrol setting. Input 230 V signal via L+N.	User, optional
22b	FB2b	N		
23	NC		Group message (floating).	User, optional
24	COM			
25	NO			

Terminal number	Signal	Function	Wiring
43	+24 V	• E1, digital input from the contact water meter. Terminal 43+44.	E1, user option E2, factory
44	E1		
45	E2	• E2, insufficient water switch. Terminal 43+45.	
1	PE	Voltage supply.	Factory
2	N		
3	L		
4	Y1	"CD" 3-ways motor ball valve. (Servitec 35-95, 70°C) – For regulating the degassing of make-up and system water.	Pre-wired
5	N		
6	PE		
7	Y2	PV 1 overflow valve.	---
8	N		
9	PE		
10	Y3	PV 2 overflow valve.	---
11	N		
12	PE		
15	M1	PU 1 pump. – In 400V systems with 6K1 motor protection.	Pre-wired
16	N		
17	PE		
18	M2	PU 2 pump.	---
19	N		
20	PE		
21	FB1	PU 1 pump voltage monitoring.	Pre-wired
27	M1	Flat plug for supply of PU1 pump.	Pre-wired
31	M2	Flat plug for supply of PU2 pump.	---
35	+18V	Analogue input for level measuring.	Not assigned
36	GND		
37	AE (brown)		
38	PE (shield)		
39	+ 18 V (blue)	Analogue input for "PIS" pressure measuring. – For pressure indication and make-up with the "Magcontrol" setting.	Pre-wired
40	GND		
41	AE (brown)		
42	PE (shield)		
51	GND	Motor overflow valve	---
52	+24 V (supply)		
53	0–10V (correcting variable)		
54	0–10V (feedback)		
55	GND	"CD" 2-ways motor ball valve in the pump line (Servitec 35-95, 70°C). – For regulating the hydraulic adjustment of degassing.	Pre-wired
56	+24 V (supply)		
57	0–10V (correcting variable)		
58	0–10V (feedback)		

6.5.2 Terminal plan, operating unit



1	RS-485 interfaces
2	I/O interface
3	I/O interface (reserve)
4	SD card
5	10 V supply

6	Analogue outputs for Pressure and Level
7	Battery compartment
8	KNX bus interface
9	Terminators RS-485 (dip switch)
10	Terminators RS-485 (dip switch)

Terminal number	Signal	Function	Wiring
1	A	RS-485 interface. S1 networking.	---
2	B		
3	GND S1		
4	A	RS-485 interface. S2 modules: Expansion or communication module.	User supplied
5	B		
6	GND S2		
18	PE (shield)	Analogue output: Pressure. Standard 4 – 20 mA.	User supplied
19	Pressure		
20	GNDA		
21	Level	Level analogue output.	Not assigned
22	GNDA		
7	+5 V	Reserve	---
8	R × D		
9	T × D		
10	GND IO1		
11	+5 V	I/O interface: Interface to the main circuit board.	Factory
12	R × D		
13	T × D		
14	GND IO2		
15	10 V~	10 V supply.	Factory
16			
17	FE		

6.5.3 RS-485 interface

Use the S2 RS-485 interface to retrieve all controller data and to enable the communication with control centres or other devices.

– S2 interface
  - "PIS" pressure.
  - Operating modes of the "PU" pump.
  - Values of the "FQIRA +" contact water meter.
  - All messages, see chapter 9.5 "Messages" on page 64 .
  - All entries in the fault memory.

The following accessories are available for interface communication.

– Bus modules
  - Lonworks Digital.
  - Lonworks.
  - Profibus-DP.
  - Ethernet.
  - Optional I/O module, see chapter 4.6 "Optional equipment and accessories" on page 17 .
  - Modbus RTU.

Note!

If required, please contact the Reflex Customer Service for the protocol of the RS-485 interface, details of the connections and information about the accessories offered, see chapter 12.1 "Reflex Customer Service" on page 74 .

6.6 Installation and commissioning certificate

Data shown on the nameplate:	P_0
Type:	P_{SV}
Serial number:	

This device has been installed and commissioned in accordance to 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 10.4 "Maintenance certificate " on page 71 .

For the installation

Place, date	Company	Signature

For the commissioning

Place, date	Company	Signature

7 Commissioning

⚠ 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.

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

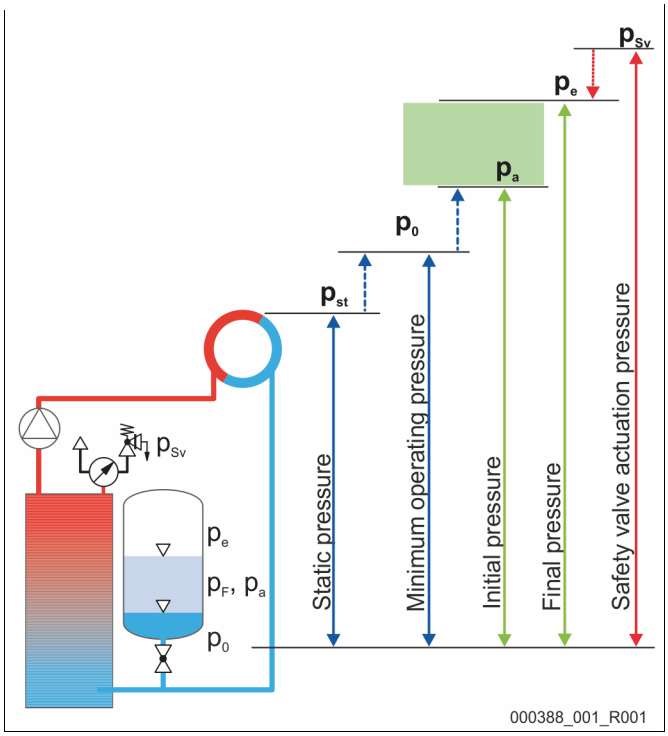
The device will be ready for commissioning when the tasks described in the "Installation" chapter have been completed.

- The device has been mounted.
- The connections of the device to the system has been created and the facility system pressure maintenance is operational.
  – Degassing line to the facility system.
  – Degassing line from the facility system.
- The water-side connection of the device to the make-up has been created and is operational, if automatic make-up is required.
- The connection pipes of the device have been purged and cleaned of welding residue and dirt before commissioning.
- The entire 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.

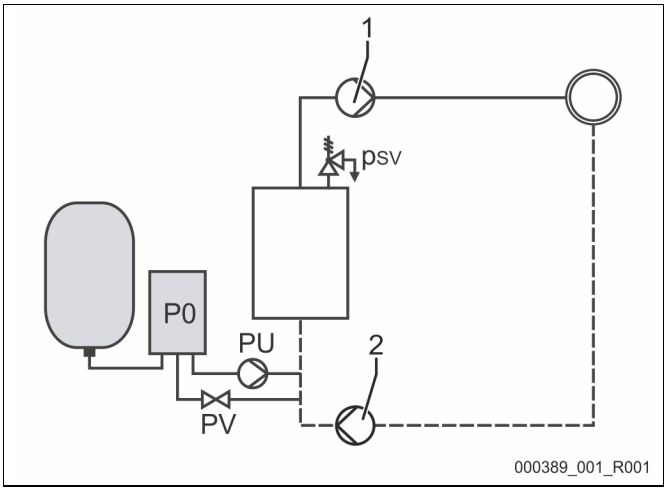
7.2 Setting the minimum operating pressure for Magcontrol

The "p_0" minimum operating pressure is determined by the location of the pressure maintaining device. The controller calculates the switching points for the "PV" overflow solenoid valves and the "PU" pumps from the minimum operating pressure.

	Description	Calculation
p_{st}	Static pressure	= static head (h_{st})/10
p_0	Minimum operating pressure	
p_a	Initial pressure (pump "ON")	= p_0 + 0.3 bar
	Static pressure (overflow solenoid valve "CLOSED" / Pump "OFF")	
p_e	Final pressure (overflow solenoid valve "OPEN")	≤ p_{sv} - 0.5 bar (for p_{sv} ≤ 5.0 bar)
		≤ p_{sv} x 0.9 (for p_{sv} > 5.0 bar)
p_{sv}	Safety valve actuation pressure	= p_0 + 1.2 bar (for p_{sv} ≤ 5.0 bar)
		= 1.1 x p_0 + 0.8 bar (for p_{sv} > 5.0 bar)



1	Suction pressure maintenance • Device on the suction side of the system's circulating pump
2	Final pressure maintenance • Device on the discharge side of the system's circulating pump



The "P_0" minimum operating pressure is calculated as follows:

	Calculation	Description
p_{st}	$= h_{st}/10$	h_{st} in metres
p_D	0.0 bar	for safety temperatures ≤ 100 °C (212° F)
	0.5 bar	for safety temperatures = 110°C (230° F)
d_p	60 - 100 % of the differential pressure of the circulating pump	Depending on the hydraulics
P_0	$\geq p_{st} + p_D + 0.2$ bar* (suction pressure maintenance)	Enter the calculated value in the start routine of the controller, see chapter 7.3 "Modifying the controller's start routine" on page 39 .
	$\geq p_{st} + p_D + d_p + 0.2$ bar* (final pressure maintenance)	

* Addition of 0.2 bar recommended, no addition in extreme cases

Calculation example for "P_0" minimum operating pressure:

Heating system: Static height 18 m, run-on temperature 70 °C (158° F), safety temperature 100 °C (212° F).

Example calculation for suction pressure maintenance:

$P_0 = p_{st} + p_D + 0.2$ bar*

$p_{st} = h_{st}/10$

p_{st}=18 m/10

$\underline{p_{st} = 1.8 \text{ bar}}$

$p_D = 0.0$ bar at a safety temperature of 100 °C (212° F)

$P_0 = 1.8$ bar + 0 bar + 0.2 bar

$\underline{P_0 = 2.0 \text{ bar}}$

Note!

– The initial and final pressure of the following components must not overlap with the actuation pressure of the safety valve.
  • Overflow solenoid valves
  • Pumps
– The actuation pressure must not fall below the minimum value of the actuation pressure of the safety valve.

Note!

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

7.3 Modifying the controller's start routine

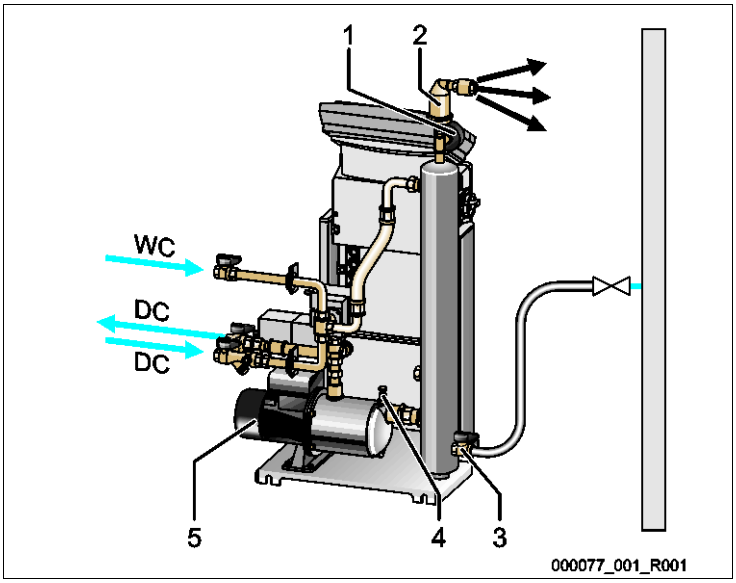
Note!

During commissioning, you must once execute the start routine.

- For information about controller operation, see chapter 9.1 "Operator panel" on page 51 .

7.4 Filling the device with water and venting

1. 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.
2. Optional
   – Use the feed and drain cock to to fill water into the device (3).
   – Connect a hose at the feed and drain cock (3) of the "VT" vacuum spray tube.
3. Fill the vacuum spray tube with water.
   – Air escapes via the degassing valve (2) and the water pressure can be read at the vacuum gauge (1).



1	"PI" vacuum gauge	5	"PU" pump
2	"DV" degassing valve	WC	Make-up line
3	"FD" feed and drain cock	DC	Degassing lines
4	"AV" vent screw		

Vent the pump:

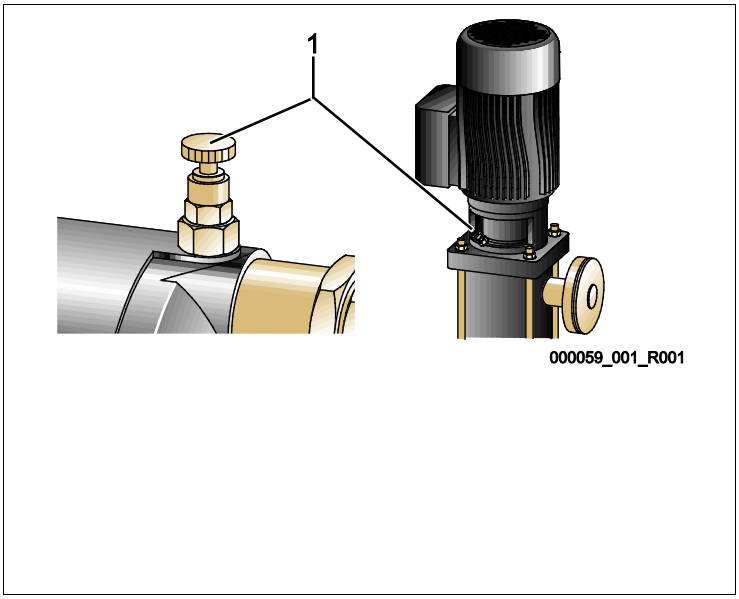
4. Turn the vent screw (1) until air or a water/air mixture escapes.
5. If required, use a screwdriver to rotate the pump at the fan wheel of the pump motor.

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

   CAUTION – Device damage! Pump damage due to a pump start. Switch the pump to a zero-volts state before turning the pump at the fan wheel with a screwdriver.

   – Water/air mixtures are removed from the pump.
6. Re-tighten the vent screw when only water escapes.
7. Close the feed and drain cock.

Filling and venting is concluded.



Note!

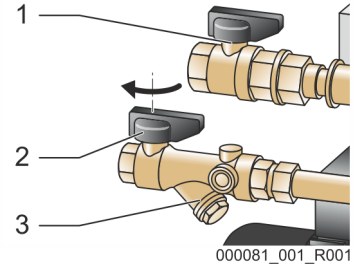
The "PU" pump must not be switched on when the device is filled with water.

Note!

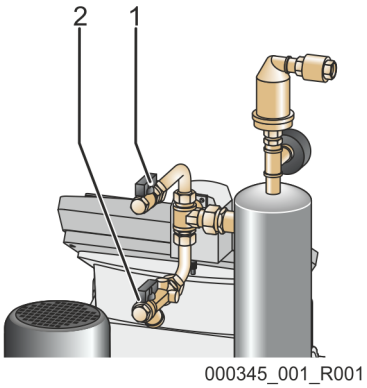
Do not fully unscrew the vent screw. Wait until air-free water appears. Repeat the venting process until the "PU" pump is fully vented.

7.5 Vacuum test

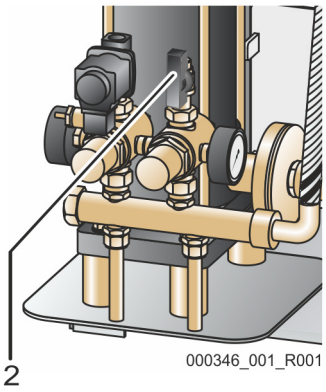
Carefully perform the vacuum test to ensure the proper functioning of the device.



Servitec 35 – 60



Servitec 75 – 95



Servitec 75 – 120

Proceed as follows:

1 Close the ball valve (2) with the dirt trap (3) of the "DC" feed line to the spray pipe. The second ball valve (1) in the feed line from the "DC" pump to the system remains open.

2 Generate a vacuum with the manual mode of the controller.
- Switch to Manual mode.
  - For more information about the Manual mode, see chapter 8.1.2 "Manual mode" on page 48 .

3 Use "Circulate" to activate continuous degassing until the vacuum gauge of the vacuum spray pipe indicates a stable vacuum.
- Record the vacuum value displayed at the vacuum gauge.

4 After 10 minutes, check again the "PI“ vacuum gauge. The pressure must not change. If the pressure has increased, check the device for leaks.
- All screw connections at the "VT“ vacuum spray pipe.
- The "DV" degassing valve at the "VT" vacuum spray tube.
- The vent screw at the "PU" pump.

5 After the vacuum test has been concluded successfully, open the ball valve (2).

6 If the controller displays the "Insufficient water" error message, acknowledge the message with "OK".

The vacuum test is completed.

Note!

The obtainable vacuum corresponds to the saturation pressure at the existing water temperature.

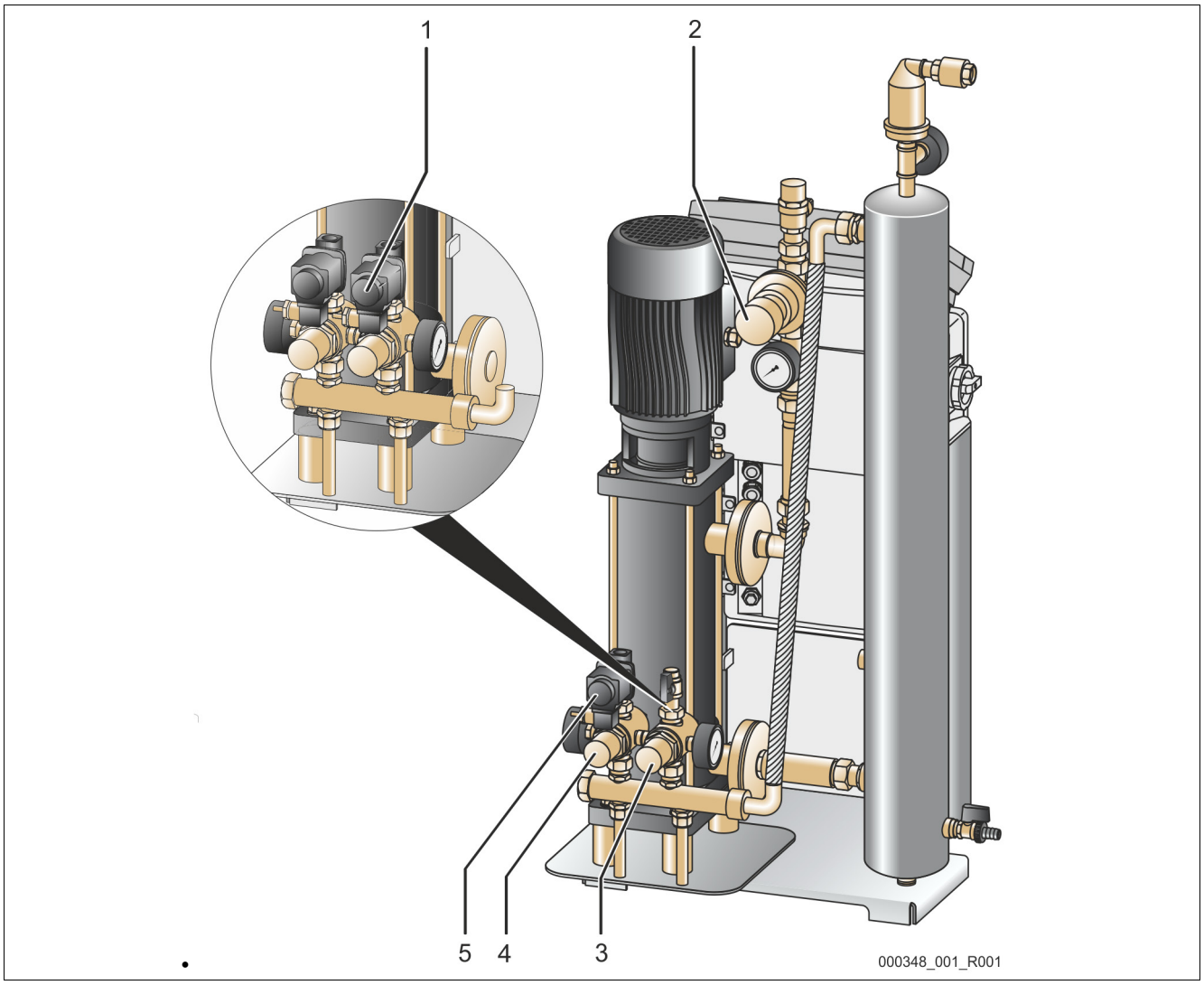
– At 10 °C, a vacuum of approximately. -1 bar can be obtained.

Note!

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

7.6 Hydraulic equalisation

Perform hydraulic equalisation at devices with mechanical actuator.



1	Optional "GV" solenoid valve • Only with Servitec 75gl, Servitec 95gl and Servitec 120gl
2	"CD_p" overflow valve downstream of "VT" pump
3	"CD_s" pressure-reducing valve in the "DC" degassing line
4	"CD_w" pressure-reducing valve in the "WC“ make-up line
5	"GV" solenoid valve

Hydraulic equalisation ensures stable volume flows during operation and over the entire working range of the device. The hydraulic equalisation is performed once by manually adjusting the pressure at the mechanical actuators.

The pressure must be adjusted at these mechanical actuators:

- "CD_s" (4) and "CD_w" (3) pressure-reducing valves
- "CD_p" (2) overflow valve

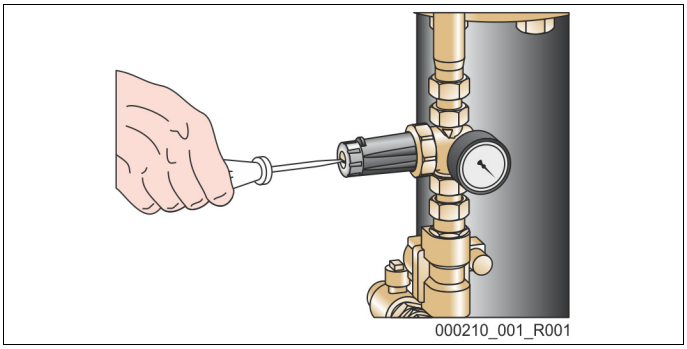
Ensure that the vacuum spray tube is filled with water during hydraulic equalisation. The "GV" solenoid valves must be open for the correct adjustment of the pressure-reducing valves (3) and (4). Sufficient volume must flow through the pressure reducing valves and the overflow valve (2) during the adjustment. Flow noise from the valves indicate that volume flows. The relevant pressure gauges indicate the actual pressure.

Note!

Hydraulic equalisation is not required for Servitec 35-95 devices with motor ball valve.

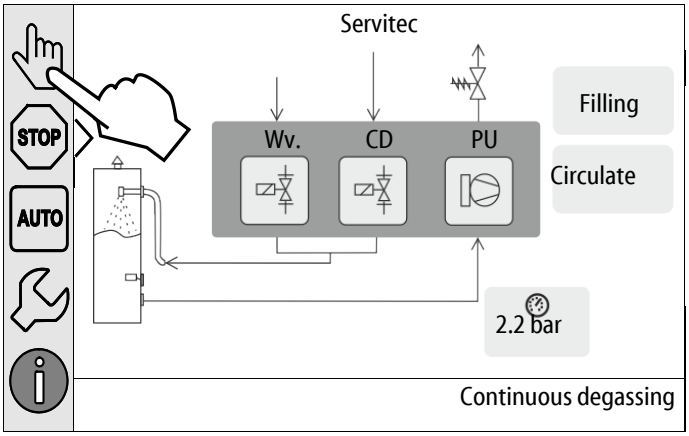
Proceed as follows:

1. Use a screwdriver to undo the locking screws at the caps of the overflow valve (1).
2. Use a screwdriver to undo the locking screws at the caps of the pressure-reducing valves (2, 3).



Complete the hydraulic equalisation of the system degassing:

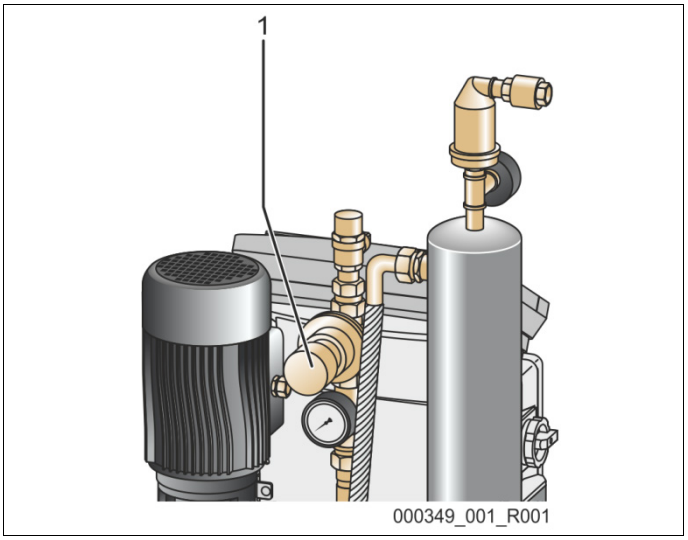
3. Touch "Manual mode" on the controller's operator panel.
4. Touch "Circulating" on the controller's operator panel.
   - The pump is switched on. Continuous degassing is activated.



When the vacuum gauge at the vacuum spray pipe indicates a stable vacuum, turn the caps at the pressure-reducing valves (2, 3) and the overflow valve (1) to adjust the pressure:

- Clockwise turning increases the pressure.
- Counter-clockwise turning decreases the pressure.

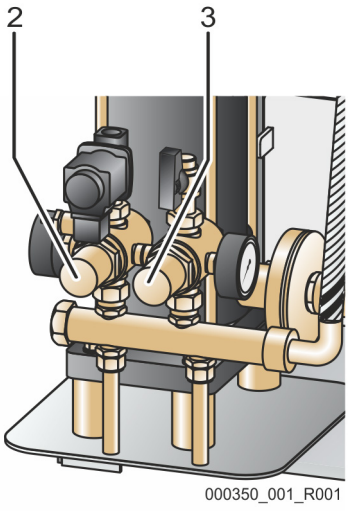
5. Set the overflow valve (1) to the setpoint.
   - Take the setpoint for the setting from the "Technical Data" chapter (overflow valve setpoint (bar)).

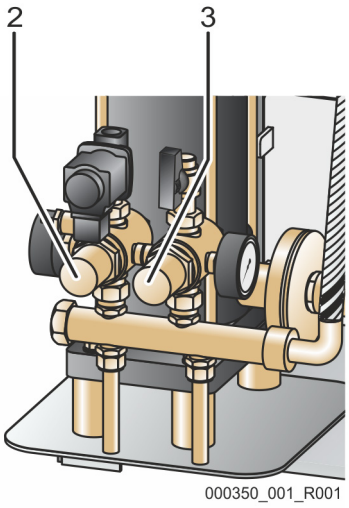


6. Set the pressure-reducing valve (2) to 0.8 bar pressure.

Complete the hydraulic equalisation of the make-up degassing:

7. Touch "Filling" on the controller's operator panel.
   - The make-up valve opens and make-up degassing is started.





When the vacuum gauge at the vacuum spray pipe indicates a stable vacuum, proceed as follows:

8. Set the pressure-reducing valve (3) to 1.0 bar pressure.
9. Use the screwdriver to tighten the locking screws at the caps of the overflow valve (1) and the pressure-reducing valves (2, 3).

Hydraulic equalisation is completed.

Note!

Read the flow pressure at the corresponding manometers when regulating the valves. After the regulation, re-check all setting values at the manometers.

7.7 Use the device to fill the facility system with water

Use the unit for filling the facility system with water. Thus, the oxygen content and the content of free gases is reduced in the facility system after commissioning.

These prerequisites must be met:

- Facility system with a water content of less than 3000 litres.
- Facility system with a pressure maintaining system above a diaphragm expansion tank.

Proceed as follows:

1. Open the "WC" make-up line.
   – Open all shut-off devices between the make-up connection the vacuum spray pipe.
2. Set the controller to "Magcontrol".
   – For the "Magcontrol" make-up variant, see chapter 9.4.1 "Customer menu" on page 56 .
3. Switch the controller to Manual mode.
   – For Manual mode, see chapter 8.1.2 "Manual mode" on page 48 .
4. Touch "Open" in Manual mode.
   – The controller calculates the required filling pressure and the system is filled with water. As soon as the filling pressure 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. Upon detecting the cause of the fault message, press "OK" on the controller's operator panel to acknowledge the fault message. Upon eliminating the fault, continue with filling the system. After filling, vent the system to ensure circulation throughout the entire system.

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

Note!
Fault messages, see chapter 9.5 "Messages" on page 64

7.8 Setting the degassing programme in the Customer menu

During commissioning, remove all free and dissolved from the facility system.

- Start Automatic mode, see chapter 7.10 "Starting Automatic mode" on page 46 .
  – The "Continuous degassing" degassing programme is activated in Automatic mode. All free and dissolved gases are removed from the facility system.
  – Continuous degassing with a pre-set time of 24 hours is stored in the Customer menu.
- Set the time for continuous degassing. The time depends on the device type and the facility volume.
  – Time reference values, see chapter 5 "Technical data" on page 18 .
- Set the time in the Customer menu.
  – Settings in the Customer menu, see chapter 9.4.1 "Customer menu" on page 56 .

Subsequent to the continuous degassing, the controller automatically switches to "interval degassing".

7.9 Parametrising the controller in the Customer menu

Use the Customer menu to display or correct system-specific values. In the course of commissioning, the factory settings must be adjusted for the system-specific conditions.

– For adjusting the default settings, see chapter 7.9 "Parametrising the controller in the Customer menu" on page 45 .
– For information about controller operation, see chapter 9.1 "Operator panel" on page 51 .

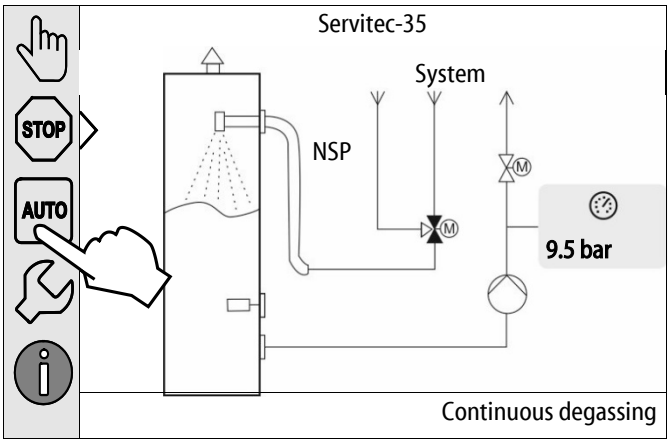
7.10 Starting Automatic mode

Start Automatic mode to complete the commissioning process. These prerequisites must be met for starting Automatic mode:

- System and device are filled with water.
- Servitec and the facility system are vented.
  - If necessary, repeat the "Filling the device with water" process see chapter 7.4 "Filling the device with water and venting" on page 39 .

To start the Automatic mode, proceed as follows:

- Touch the "AUTO" button.



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 10.2.1 "Cleaning the dirt trap" on page 69 .

Note!

The commissioning process is now concluded.

8 Operation

8.1 Operating modes

8.1.1 Automatic mode

Activate Automatic mode. Automatic mode is continuous device operation.

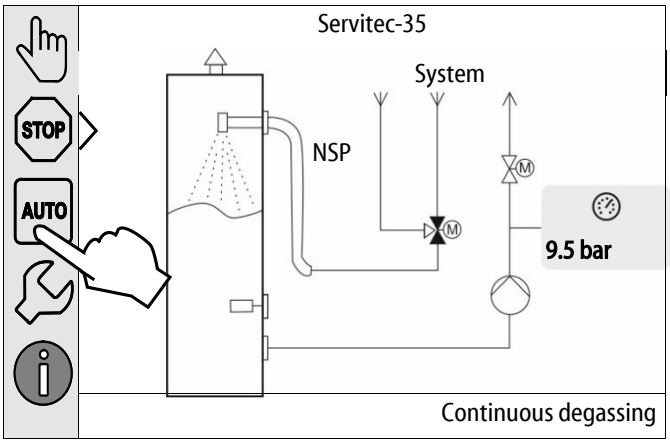
The following functions are active in Automatic mode:

- Facility and make-up water degassing.
- Automatic make-up with water.
  - Automatic make-up with water is an optional function, see chapter 4.6 "Optional equipment and accessories" on page 17 .

The device controller monitors the functions. Faults are displayed and evaluated.

To start the Automatic mode, proceed as follows:

- Touch the "AUTO" button.



Select a degassing programmed for Automatic mode. The Customer menu provides three different degassing programmes for selection, see chapter 4.4 "Function" on page 14 .

- Continuous degassing.
- Interval degassing.
- Degassing the make-up water.

For selecting the degassing programmes, see chapter 7.8 "Setting the degassing programme in the Customer menu" on page 45 .

The controller displays the selected degassing programme in the message line.

8.1.2 Manual mode

Manual mode enables you to select the following For performing a test run and service tasks:

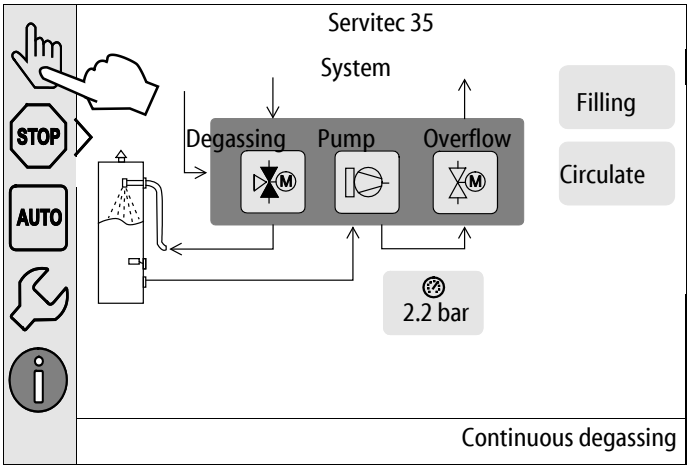
- 3-ways motor ball valve for degassing the facility and the make-up water.
  - Manual actuator for opening or closing.
- Pump.
  - For switching the pump on and off.
- 2-ways motor ball valve in the overflow line downstream of the pump
  - Manual actuator for opening or closing.
- Filling.
  - Make-up degassing is activated.
  - For filling facility systems with pressure-dependent water make-up "Magcontrol".
- Circulation.
  - Activates continuous degassing of the facility water without time limit.
  - For vacuum test during commissioning.

You have the option to simultaneously switch multiple functions and to test them in parallel. Switch the function on and off by touching the corresponding button.

- The button is highlighted green: The function is switched off.
- Press the desired button.
- The button is highlighted blue: The function is switched on.

Proceed as follows:

1. Press "Manual mode“.
2. Select the desired function:
   - 3-ways motor ball valve in the make-up
   - Pump
   - 2-ways motor ball valve in the overflow line
   - Filling
   - Circulate
3. Press "AUTO" to deactivate Manual mode.
   – Automatic mode is activated.



Degassing	3-ways motor ball valve in the make-up
Pump	Pump
Overflow	2-ways motor ball valve in the overflow line

Note!

Manual operation can not be performed if safety-relevant parameters are exceeded.

– Switching is blocked if safety-relevant settings are exceeded.

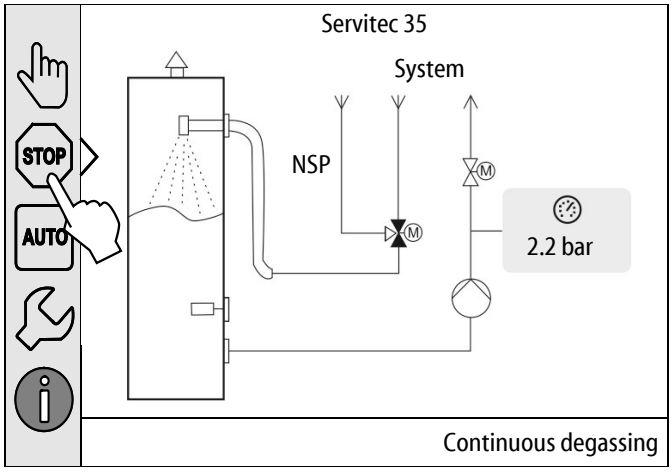
8.1.3 Stop mode

Except for the display of information, the device is non-functional in Stop mode. Function monitoring is stopped.
The following functions are deactivated:

- The pump is switched off.
- The 2-ways motor ball valve in the overflow line is closed.
- The 3-ways motor ball valve in the make-up line is closed.

To start the Stop mode, proceed as follows:

- Touch "STOP".



Note!

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.

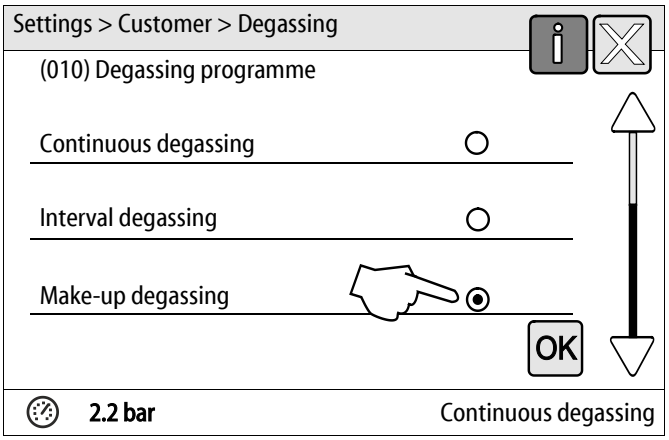
8.1.4 Summer operation

If you have placed the plant system circulating pumps out of service during the summer, no degassing of the plan system water occurs.
Proceed as follows:

- In this case, use the Customer menu to select the "Make-up degassing" degassing programme.
- After Summer, select the "Interval degassing" degassing programme in the Customer menu or "Continuous degassing", if required.

To start Summer operation, proceed as follows:

- Touch "Make-up degassing".



Note!

For a detailed description of the selection of degassing programmes, see chapter 7.8 "Setting the degassing programme in the Customer menu" on page 45 .

8.2 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.

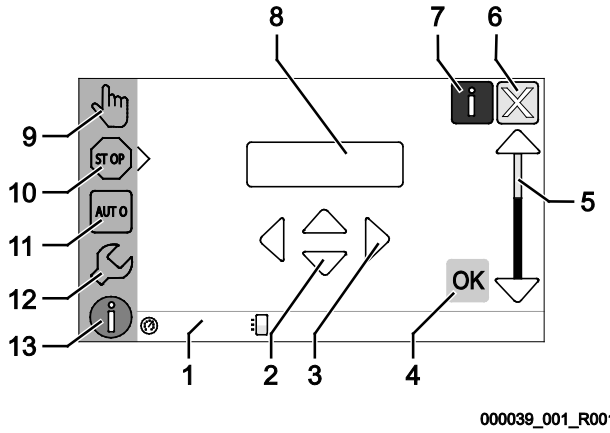
After an extended device standstill time (the device is disconnected from the power or in Stop mode), the pump may jam. For this reason, use a screwdriver to rotate the pump at the fan wheel of the pump motor before restarting.

Note!

Jamming of the pump is prevented during continuous device operation by a forced starting action (after 24 hours).

9 Controller

9.1 Operator panel

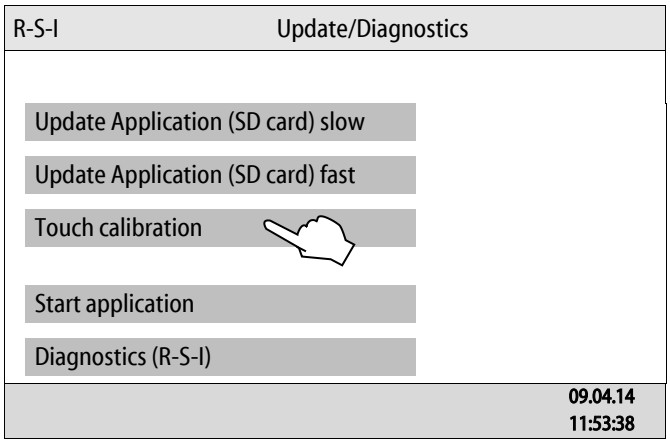


1	Message line		8	Display value
2	"▼"/ "▲" buttons • Set digits.		9	"Manual mode" button • For function tests.
3	"◀"/"▶" buttons • Select digits.		10	"Stop mode" button • For commissioning.
4	"OK" button • Confirm/acknowledge input. • Browse in the menu.		11	"Automatic mode" button • For continuous operation.
5	"Up" and "Down" scroll bar • "Scroll" in the menu.		12	"Set-up menu" button • For setting parameters. • Fault memory. • Parameter memory. • Display settings. • Primary tank information. • Software version information.
6	"Scroll back" button • Cancel. • Move backward up to the main menu.		13	"Info menu" button • Displays general information.
7	"Display help texts" button • Opens help texts.			

9.2 Calibrating the touch screen

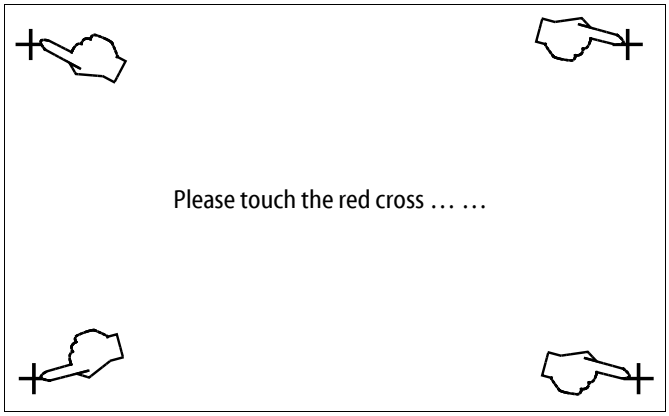
You can calibrate the touch screen when touching the desired buttons does not work satisfactorily.

1. Switch the device off at the main switch.
2. Touch and hold with your finger the touch field.
3. Switch on the main switch while touching the touch field.
   – When starting the program, the controller automatically switches to the "Update/Diagnostics" function.
4. Touch the "Touch calibration" button.



5. Touch the displayed crosses on the touch screen after each other.
6. Switch the device off and on again at the main switch.

The touch screen is fully calibrated.



9.3 Modifying the controller's start routine

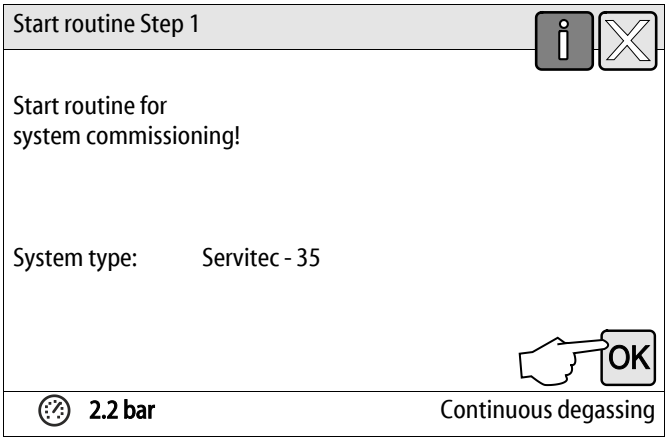
The start routine is used to set the required parameters for the device commissioning. It commences with the first activation of the controller and can be run only once. Parameters can be changed or checked in the customer after the start routine has terminated, see chapter 9.4.1 "Customer menu" on page 56 .

A three-digit PM code is assigned to the setting options.

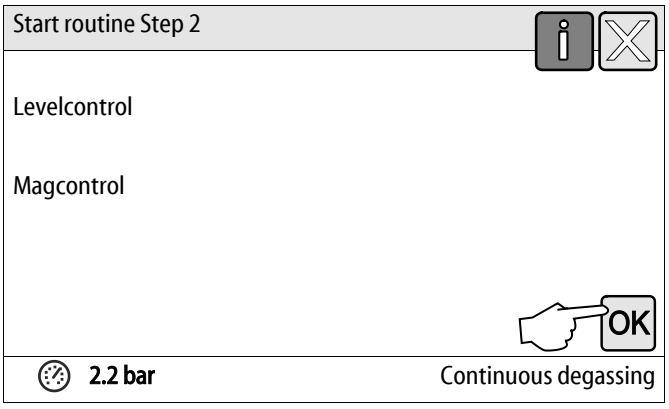
Step	PM code	Description
1		Start of the start routine – Device type information.
2	004	Select the water make-up variant • Levelcontrol – Level-dependent make-up with a pressure maintaining station. – No automatic make-up. • Magcontrol – Pressure-dependent make-up with a pressure expansion tank.
3	001	Select the language
4		Remember: Prior to installation and commissioning, read the operating manual!
5	005	Set the minimum operating pressure P_0, see chapter 7.2 "Setting the minimum operating pressure for Magcontrol" on page 37 .
6	006	Opening pressure of the safety valve
7	002	Set the time
8	003	Set the date
9		End of the start routine. The stop mode is active.

The system automatically displays the first page of the start routine when you switch on the device for the first time.

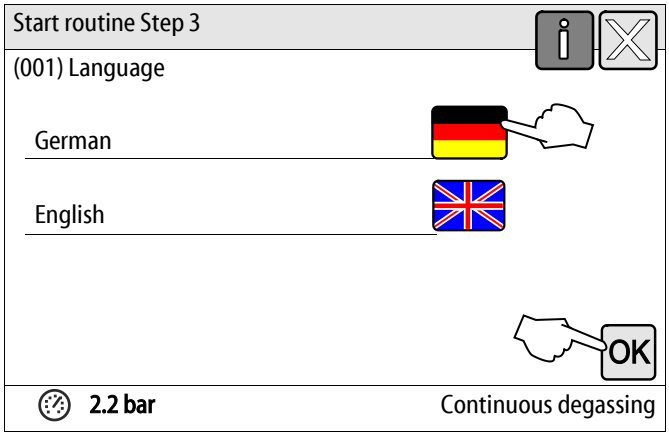
1. Press "OK".
   – The start routine moves to the next page.



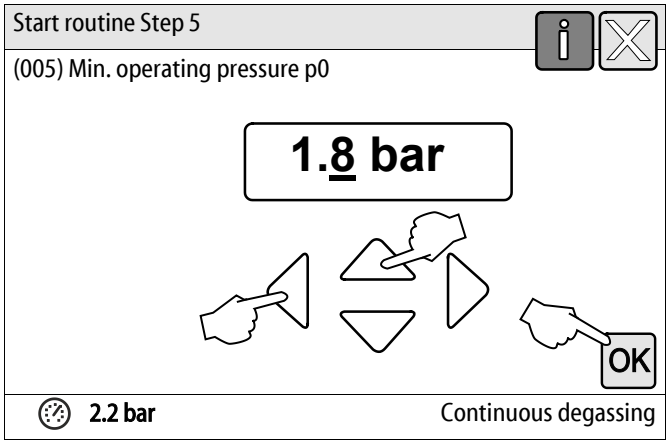
2. Select the required water make-up mode and confirm with "OK".
   – For calculation of the make-up variant, see chapter 6.4 "Switching and make-up variants" on page 27 .



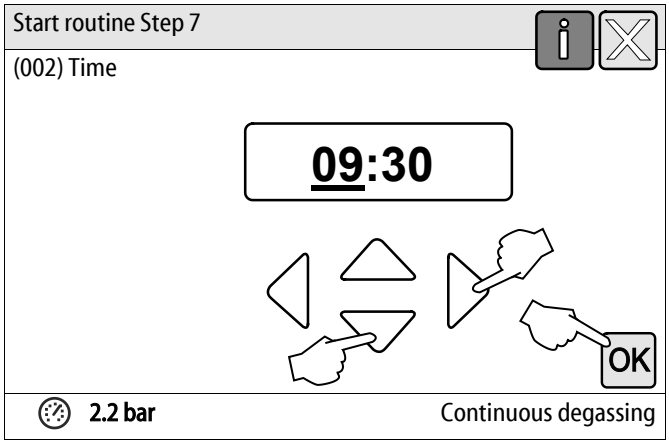
3. Select the required language and conform your entry with "OK".
   - You can select between 16 different languages.



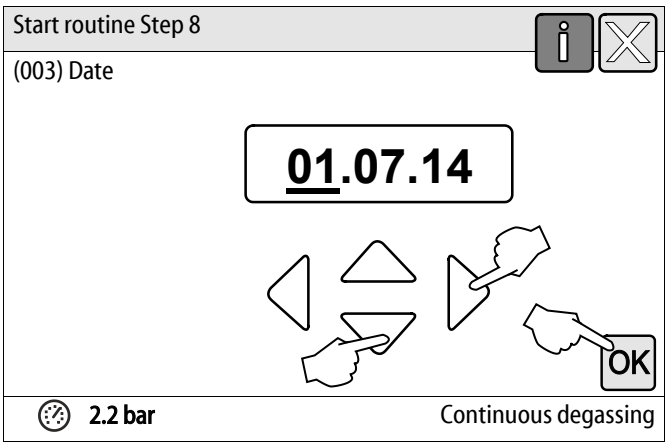
4. Select the calculated minimum operating pressure and conform with "OK".
   – For calculation of the minimum operating pressure, see chapter 7.2 "Setting the minimum operating pressure for Magcontrol" on page 37 .



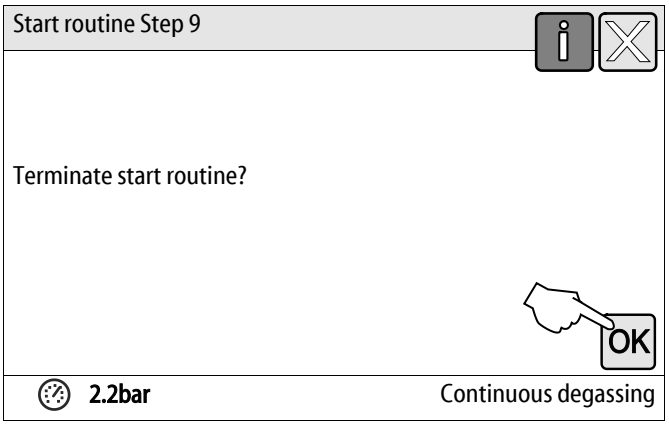
5. Set the time. The time of an alarm will be stored in the controller's fault memory.
   – Use the "Left" and "Right" buttons to select the display value.
   – Use the "Up" and "Down" buttons to change the display value.
   – Confirm your entries with "OK".



6. Set the date. The date of an alarm will be stored in the controller's fault memory.
   - Use the "Left" and "Right" buttons to select the display value.
   - Use the "Up" and "Down" buttons to change the display value.
   - Confirm your entries with "OK".



7. Press "OK" to conclude the start routine.



Note!

After successful conclusion of the start routine, you are in Stop mode. Do not yet switch to Automatic mode.

9.4 Configuring settings in the controller

You can configure the controller settings regardless of the currently selected and active operating mode.

9.4.1 Customer menu

9.4.1.1 Customer menu – overview

Use the Customer menu to correct or determine system-specific values. In the course of commissioning, the factory settings must be adjusted for the system-specific conditions.

Note!

For a description of the operation, see chapter 9.1 "Operator panel" on page 51 .

A three-digit PM code is assigned to the setting options.

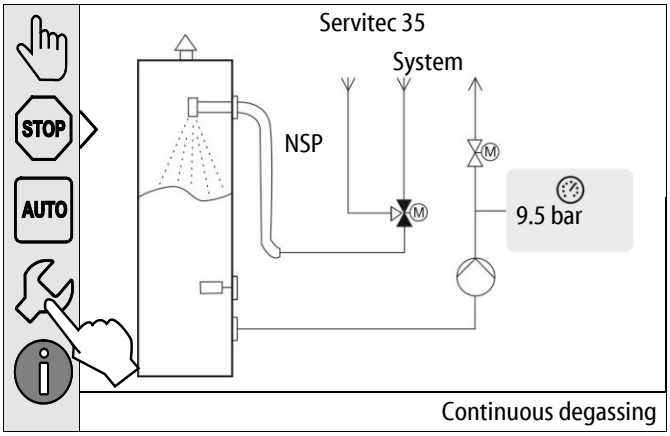
PM code	Description
001	Select the language
002	Set the time
003	Set the date
	Select the system type • Levelcontrol • Magcontrol
005	Set the "P_0" minimum operating pressure, see chapter 7.2 "Setting the minimum operating pressure for Magcontrol" on page 37 .
006	Set the actuating pressure for the system safety valve. – The actuating pressure protects the device.
	Degassing >
010	• Degassing programme • Continuous degassing • Interval degassing • Run-on degassing
011	• Continuous degassing time
	Make-up >
023	• Maximum make-up time …min.
024	• Maximum make-up cycles … /2 h. – Frequency of make-up cycles in 2 hours.
024	• Make-up pressure for the Magcontrol make-up variant. – Standard = Make-up pressure > 1.3 bar. – Setting range 1.3 – 2.3 bar. – < 1.3 bar.
027	• With contact water meter "Yes/'No". – If "Yes", continue with 028. – If "No", continue with 007.
028	• Reset make-up quantity "Yes/No". – If "Yes", reset to "0".
029	• Maximum make-up quantity ... l
030	• With softening "Yes/'No". – If "Yes", continue with 031. – If "No", continue with 007.

PM code	Description
031	• Block make-up "Yes/No" (if water capacity is exhausted).
032	• Hardness reduction … °dH = GHactual – GHtarget – Calculate the required reduction in overall hardness GH before input.
033	• Soft water capacity ... l – Calculation required before input. • Fillsoft I: Soft water capacity = 6000 l / hardness reduction. • Fillsoft II: Soft water capacity = 12000 l / hardness reduction. • Desalination capacity …l – Calculation required before input. • Fillsoft Zero I: Capacity of desalination cartridge = 3000 l / °dH • Fillsoft Zero II: Capacity of desalination cartridge = 6000 l / °dH
034	• replacement interval… months (for softening cartridges according to manufacturer).
007	Maintenance interval… months
008	Floating contact • Message selection > • Message selection: only messages marked with "√" are output. • All messages: All messages are output.
	Fault memory > History of all messages
	Parameter memory > History of parameter input
	Display settings > Brightness, screen saver
	Information > • Position of the "CD" 2-ways motor ball valve at the pressure side of the pump. – Position in % • Software version

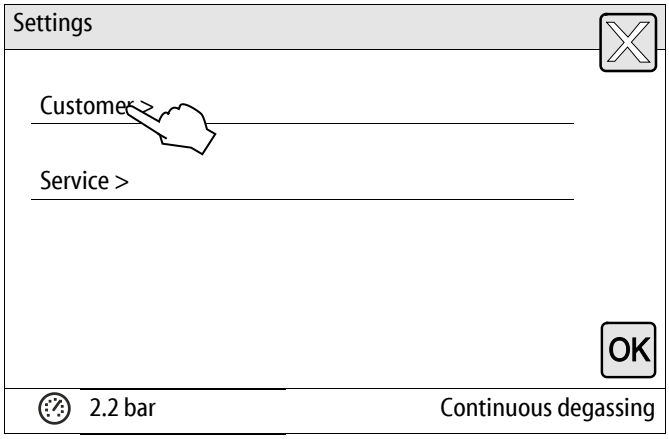
9.4.1.2 Setting the customer menu - "Time" example

The setting of system-specific values is explained below using the setting of the time as example.
To adjust the system-specific values, proceed as follows:

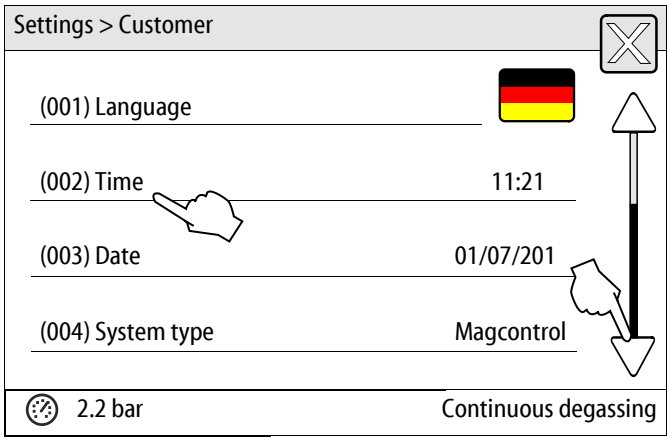
1. Press "Settings".
   – The controller switches to the setting area.



2. Press "Customer >".
   – The controller opens the Customer menu.

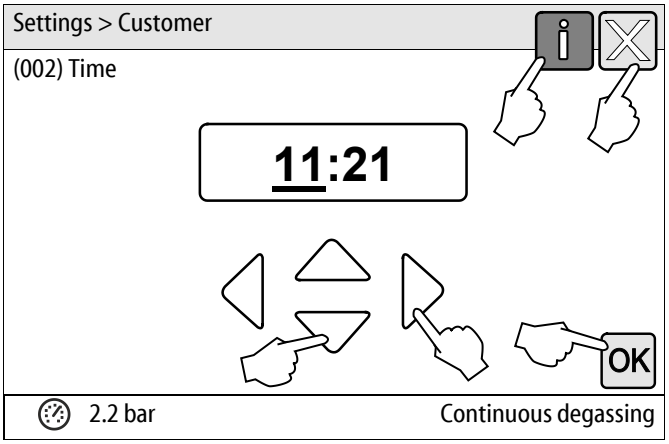


3. Press the required area.
   – The controller switches to the selected area.
   – Use the scroll bar to navigate through the list.



4. Set the system-specific values for the individual areas.
   - Use the "Left" and "Right" buttons to select the display value.
   - Use the "Up" and "Down" buttons to change the display value.
   - Confirm your entries with "OK".

– Press "i“ to display a help text for the selected area.
– Press "X“ to cancel your input without saving the new settings. The controller automatically opens again the list.



9.4.2 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, see chapter 9.4.3 "Default settings" on page 60 .

9.4.3 Default settings

The device 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
Servitec	Magcontrol	For systems with diaphragm-type pressure expansion tank
Minimum working pressure P_0	1.5 bar	Only Magcontrol
Safety valve, pressure	3.0 bar	Pressure value for the safety valve of the heat generator in the system to trip
Next maintenance	12 months	Time left to the next due maintenance
Floating alarm contact	YES	All messages from the Messages list are displayed
Make-up		
Maximum make-up quantity	0 Litres	Only if controller with "With water meter yes"
Maximum make-up time	20 minutes	Magcontrol
Maximum make-up cycles	3 cycles within 2 hours	Magcontrol
Degassing		
Degassing programme	Continuous degassing	
Continuous degassing time	24 hours	
Softening (Only if "With softening yes")		
Lock 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

Service menu

Parameter	Setting	Remarks
Make-up		
Pressure differential, "NSP" make-up	0.2 bar	Only Magcontrol
Pressure differential, filling pressure PF – P_0	0.3 bar	Only Magcontrol
Maximum filling duration	10 h	Only Magcontrol
Degassing		
Idling times between degassing intervals	10 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

9.4.4 Degassing programmes – overview

You can choose between 3 degassing programs:

Continuous degassing

- Usage:
  - For device commissioning.
  - For degassing of the water after a device or plant system repair.
- Activation:
  - An automatic activation occurs after completion of the start routine during commissioning.
- Times:
  - The time can be set in the Customer menu.
  - The default setting is 24 hours. Subsequently, the system automatically switches to Interval degassing.

In continuous degassing, the degassing cycles are sequentially performed for 24 hours.

Interval degassing

- Usage:
  - For continuous operation of the device.
- Activation:
  - Automatic activation occurs after the ending of continuous degassing.
- Times:
  - 8 degassing cycles per interval is set in the Service menu.
  - After 8 intervals there is a pause time of 12 hours.
  - The times for interval degassing are stored in the Service menu.
  - Daily start of interval degassing is at 8:00 a.m.

Interval degassing is preset in the customer menu as the default setting.

Make-up degassing

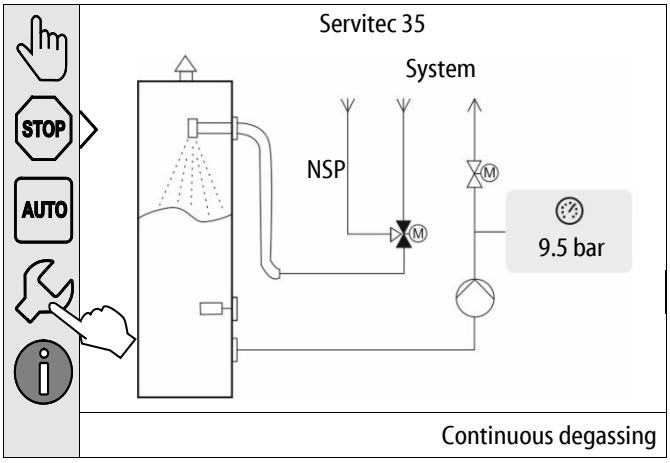
- Usage:
  - For gas-rich water from the make-up.
  - For summer operation when the circulating pumps of the plant system are shut down, see chapter 8.1.4 "Summer operation" on page 49 .
  - If the plant system water is not to be degassed.
- Activation:
  - Automatic activation occurs at every water make-up.
    - During continuous degassing.
    - During interval degassing.
- Times:
  - The make-up water is degassed for as long as it is supplied, see chapter 9.4.1 "Customer menu" on page 56 .

Note!

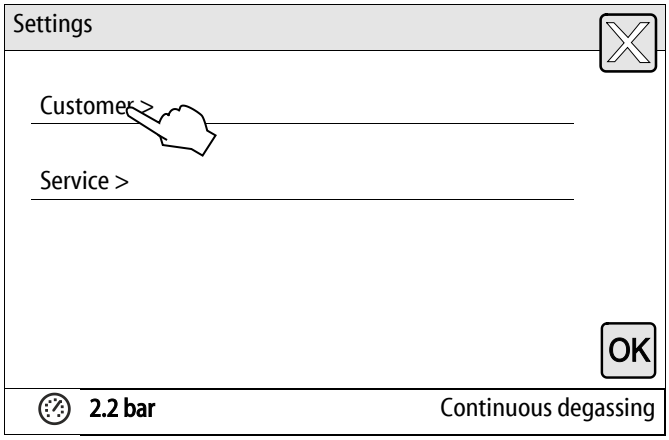
Manual activation of the degassing program takes place in the customer menu.

9.4.5 Setting degassing programmes

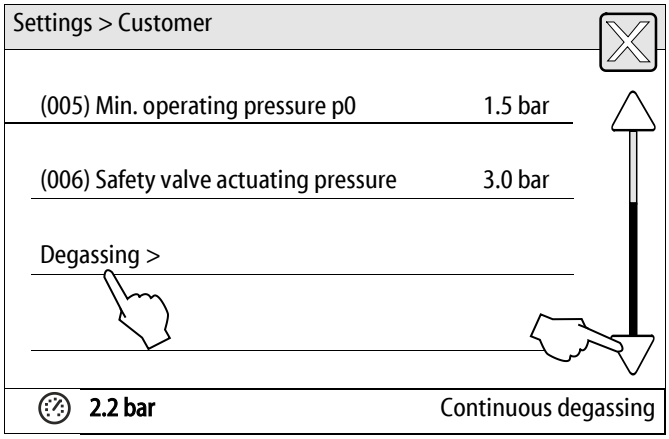
1. Press "Settings".
   – The controller switches to the setting area.



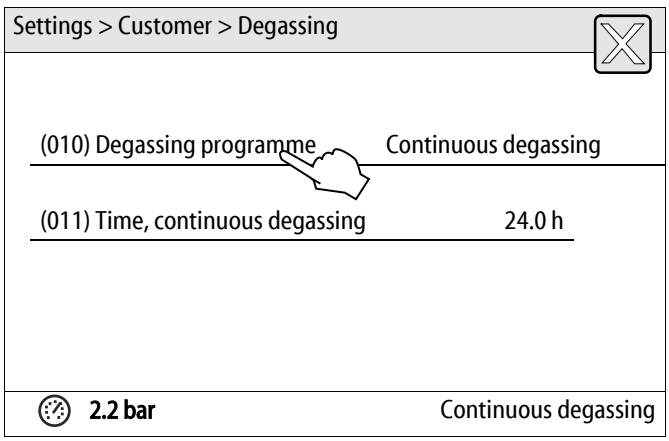
2. Press "Customer >".
   – The controller opens the Customer menu.



3. Press "Degassing >".
   – The controller switches to the selected area.
   – Use the scroll bar to navigate "up" and "down" through the list.

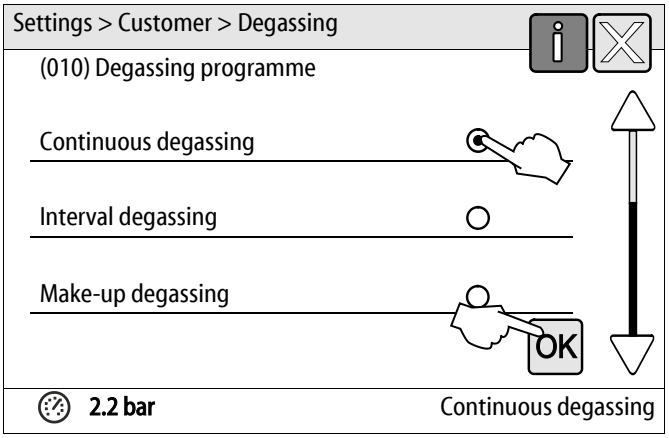


4. Press "(010) Degassing programme".
   – The controller opens the list of degassing programmes.

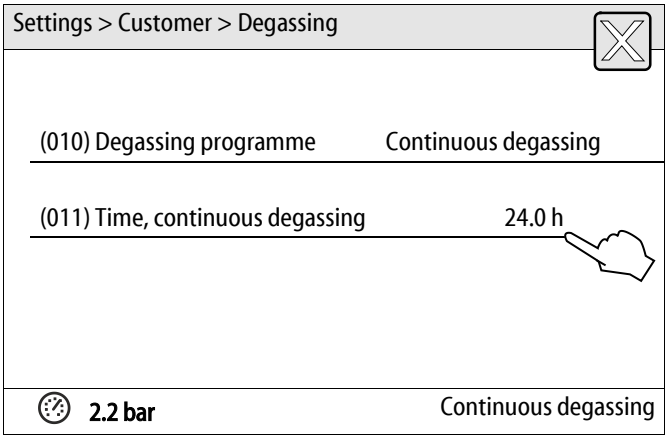


5. To select a menu item, press the "Up" or "Down" scroll bar until this menu item is displayed.
   - Press the desired button.
     - "Continuous degassing" is selected in this example.
     - Interval degassing is deactivated.
     - Make-up degassing is deactivated.
   - Confirm your selection with "OK".

   Continuous degassing is activated.



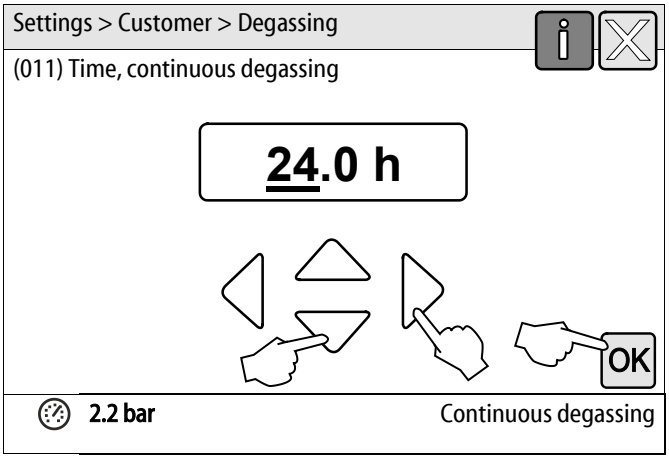
6. Press "(011) Time, continuous degassing“.



7. Set the time for continuous degassing.
   - Use the "Left" and "Right" buttons to select the display value.
   - Use the "Up" and "Down" buttons to change the display value.
   - Confirm your entries with "OK".

   The time for continuous degassing is set.

– Press "i“ to display a help text for the selected area.
– Press "X“ to cancel your input without saving the new settings. The controller automatically opens again the list.



9.5 Messages

The messages indicate impermissible deviations from the unit's normal operating state. They are output either via the RS-485 interface or via two floating message contacts.

The controller displays the messages with a help text. By selecting the fault memory in the Customer menu, you display the last 24 messages. Message causes can be eliminated by the operator or a specialist workshop. If required, please contact the Reflex Customer Service.

Note!

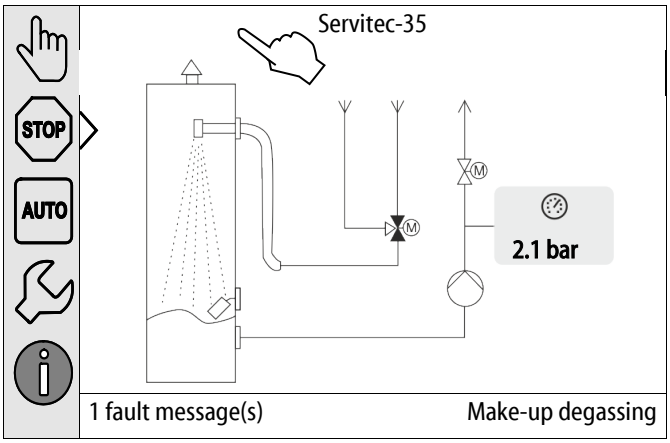
Messages identified with "OK" must be confirmed with the "OK" button on the display. The device operation is otherwise interrupted. The readiness for operation is maintained for all other messages. They are displayed.

Note!

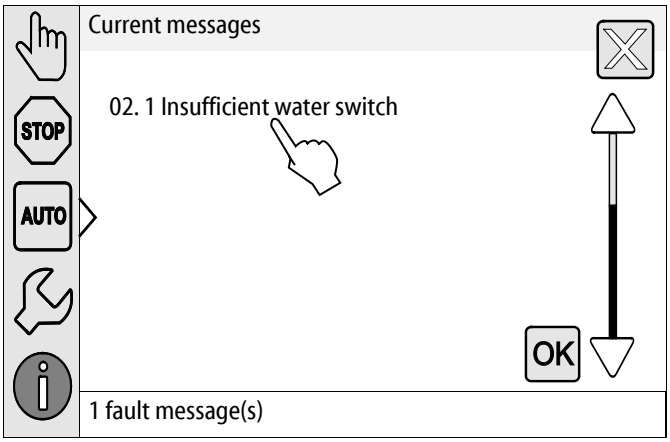
If necessary, you can set the output of messages via a floating contact in the Customer menu.

To reset a fault message, proceed as follows:

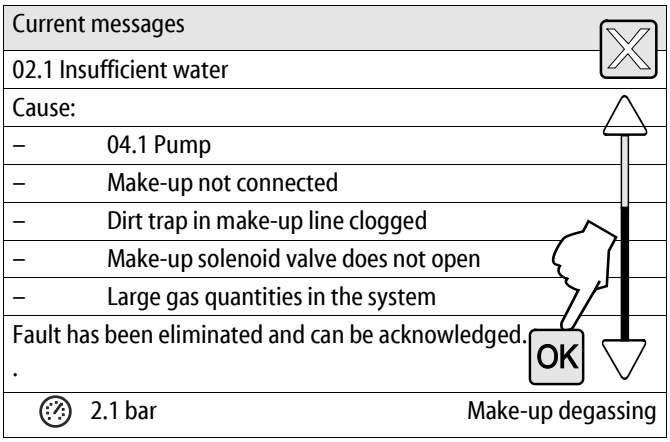
1. Touch the display.



   – The current fault messages are displayed.
2. Touch a fault message.



   – The system displays the possible causes for the fault.
3. When the fault is eliminated, confirm the fault with "OK".



ER Code	Alarm	Causes	Remedy	Alarm reset
01	Min. pressure – Only with Magcontrol.	Set value for minimum pressure has been exceeded. • Water loss in the system. • Expansion tank defective. • Fault at the "PU" pump.	• Check the system for leaks. • Replace the expansion tank. • Check the function in manual mode. – "PU“ pump	–
02.1	Insufficient water	Insufficient water switch has actuated too long. • Degassing pipe closed. • Dirt trap clogged. • Insufficient water switch defective.	• Open the degassing pipe. • Clean the dirt trap. • Replace the insufficient water switch.	–
02.2	Insufficient water	Insufficient water switch has actuated too often. • Dirt trap clogged. • Degassing valve defective.	• Clean the dirt trap. • Replace the degassing valve.	
04.1	Pump	Pump does not start. • "PU" pump is stuck. • Pump motor defective. • 10 A fuse defective. • Contactor (Klixon) tripped.	• Manually turn the pump to start. • Replace the pump motor. • Replace the fuse. • Check the mechanical and electrical functions of the pump motor.	"OK"
06	Makeup time	Set time for the make-up time has been exceeded. • Severe water loss in the system. • Makeup line not connected. • Make-up rate insufficient. • Make-up hysteresis too high.	• Check the system for leaks. • Connect the make-up system. • Check the make-up rate. • Check the make-up hysteresis.	"OK"
07	Makeup cycles	Set value for the make-up cycles has been exceeded. • Leakage in the system.	• Check the system for leaks.	"OK"
08	Pressure measurement – Only with Magcontrol	Controller receives incorrect signal. • Pressure transducer plug not plugged in. • Broken wire from "PIS“ pressure transducer. • "PIS" pressure transducer defective.	• Plug in the plug. • Replace the wire. • Replace the "PIS“ pressure transducer.	"OK"
10	Maximum pressure – Only with Magcontrol	Set value for the maximum pressure has been exceeded. • Safety valve defective. • Pipe to system has insufficient diameter.	• Check the actuating pressure of the safety valve. • Replace the safety valve. • Install new pipe to the system with sufficient diameter.	"OK"
11	Make-up quantity – Only if "With water meter" is activated in the Customer menu.	Set value of the water meter has been exceeded. • Leakage in the system. • Water quantity per contact incorrectly set in the Service menu.	• Check the system for leaks. • Check the set value.	"OK"
14	Discharge period	Set value for the discharge period has been exceeded. • Degassing pipe closed. • Dirt trap clogged.	• Open the degassing pipe. • Clean the dirt trap.	"OK"

ER Code	Alarm	Causes	Remedy	Alarm reset
15	Make-up valve	Contact water meter measures without makeup request.	Check the motor ball valve in the make-up line for leaks.	"OK"
16	Power failure	No power.	Check power supply.	–
19	Stop > 4 h	The device is in Stop mode for more than 4 hours.	Select Automatic mode.	–
20	Max. Make-up volume	Set value for the make-up quantity has been exceeded.	Reset the "Makeup quantity" meter in the Customer menu.	"OK"
21	Maintenance recommended	Set value exceeded.	Carry out maintenance.	"OK"
24	Softening	• Set value for the water capacity has been reached. • Time interval for replacement of the softening cartridge has been reached.	• Replace the softening cartridge.	"OK"
30	I/O module fault	• I/O module defective. • Connection between option card and controller faulty. • Option card defective.	Inform Reflex Customer Service.	–
31	EEPROM defective	• EEPROM defective. • Internal calculation error.	Inform Reflex Customer Service.	"OK"
32	Undervoltage	Supply voltage too low.	Check power supply.	–
33	Adjustment parameter faulty	EPROM parameter memory defective.	Inform Reflex Customer Service.	–
34	Main board communication faulty	• Connecting cable defective. • Main board defective.	Inform Reflex Customer Service.	–
35	Digital input voltage faulty	Short-circuit of input voltage.	Check the wiring at the digital inputs (water meter, for example).	–
36	Analogue input voltage faulty	Short-circuit of input voltage.	Check the wiring at the analogue inputs (pressure/level).	–
37	Input voltage missing	Short-circuit of input voltage.	Check the wiring at the 2-ways motor ball valve in the overflow line.	–

10 Maintenance

⚠ 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.

Maintain the device at least once per year. The maintenance intervals depend on the operating conditions and the degassing times.

Do not exceed the maintenance intervals:

– Service after a year.

– Service after 16,000 degassing intervals.

Perform servicing, if the intervals have been exceeded.

▶ **Note!**

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

▶ **Note!**

The annual maintenance is displayed upon expiry of the set operating time. • Press "OK" to acknowledge the "Service recommended" message.

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 10.1 "Exterior leak test" on page 68 . • "PU" pump • Screw connections • "DV" degassing valve	▲	■		Annually
Vacuum function test. – see chapter 7.5 "Vacuum test" on page 41	▲			Annually
Clean the dirt trap. – see chapter 10.2.1 "Cleaning the dirt trap" on page 69	▲	■	●	Depending on the operating conditions
Check the controller settings.	▲			Annually
Function test. • "SE" system degassing • Makeup degassing “NE” see chapter 9.4.1 "Customer menu" on page 56	▲			Annually
When operating with water/glycol mixtures • Control of the mixing ratio. • If necessary, adjust according to manufacturer information.	▲			Annually

10.1 Exterior leak test

Check the following device 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.

10.2 Cleaning

10.2.1 Cleaning the dirt trap

⚠ CAUTION

Risk of injury due to pressurised liquid

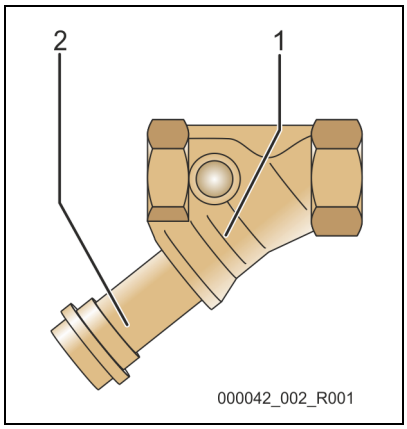
If installation, removal or maintenance work is not carried out correctly, there is a risk of burns and other injuries at the connection points, if pressurised hot water or hot steam suddenly escapes.

- 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.

Clean the dirt trap in the make-up and overflow line.

- After the degassing time has elapsed.
- After the maintenance intervals have elapsed.

An inspection is also required after longer lasting operation.



Proceed as follows:

1. Switch to Stop mode.
2. Close the ball valves upstream of the dirt trap (1).
3. Slowly screw the insert (2) out of the dirt trap.
   – The residual pressure in the pipe section escapes from the dirt trap.
4. Remove the sieve from the insert.
5. Rinse the sieve with clean water.
6. Use a soft brush to clean the sieve.
7. Push the sieve onto the insert.
8. Check the insert seal for damage
   – If necessary replace the seal.
9. Screw the insert into the housing of the dirt trap (1).
10. Open the ball valves upstream of the dirt trap (1).
11. Vent the "PU“ pump, see chapter 7.4 "Filling the device with water and venting" on page 39 .
12. Switch to Automatic mode.

The dirt trap has been cleaned.

Note!

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

Note!

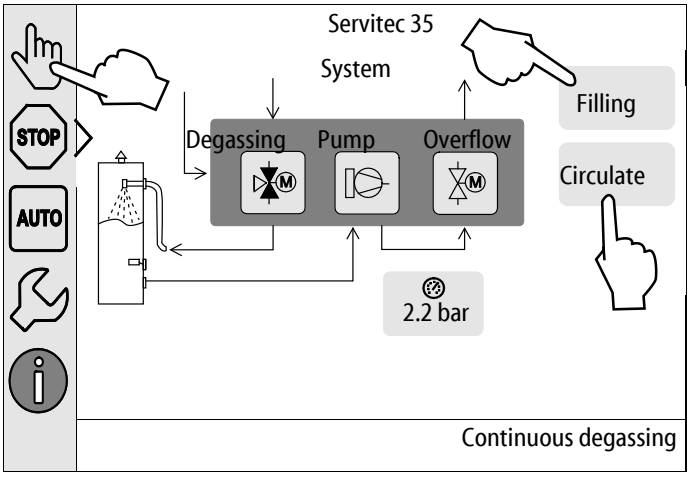
Perform a fine adjustment of the hydraulic compensator, if the dirt traps are heavily soiled.

10.3 Function test

Check in sequence the degassing of facility water and make-up water.

Proceed as follows:

1. Switch to Manual mode, see chapter 8.1.2 "Manual mode" on page 48 .
2. Run 10 cycles for facility water degassing.
   – To degas the facility water, touch "Circulate". The "Circulate" function activates the continuous degassing of facility water.
3. Run 10 cycles for make-up water degassing.
   – To degas the make-up water, touch "Fill". The "Fill" function activates the continuous degassing of make-up water.



Note!

The gas must be eliminated from the device before the next interval starts.

After the cycles are completed, a saturation pressure is present. With cold water, the "PI" vacuum gauge must eventually show a value of approx. -1 bar.

– The following saturation pressure apply to pure water:

Water temperature in° Celsius	10	30	50	70
Saturation pressure in bar(g)	-0.99	-0.96	-0.88	-0.69

4. Press "AUTO" to deactivate Manual mode.
   – Automatic mode is activated.

The inspection of the degassing is concluded.

Note!

The "Insufficient water" message must not be displayed at the controller.

10.4 Maintenance certificate

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

Date	Service organisation	Signature	Remarks

10.5 Inspection

10.5.1 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).

10.5.2 Inspection prior to commissioning

In Germany, follow the Industrial Safety Regulation [Betriebssicherheitsverordnung] Section 15 and Section 15 (3) in particular.

10.5.3 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).

Tightness 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 determined by the user on the basis of a safety-technical assessment taking into account the real operational conditions, the experience with the operation and the charging material, and the national regulations for the operation of pressure equipment.

11 Disassembly

⚠ 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 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.

- Wear protective gloves.
- Please 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, lock out the "DC" degassing lines and the "WC" make-up line from the system and de-pressurise the device. Then disconnect the device from all electrical power sources.

Proceed as follows:

1. Disconnect the system from the power supply and secure it against unintended reactivation.
2. Lock out the "DC" degassing lines and the "WC" make-up line.
3. Disconnect the power cable of the device from the power supply.
4. Disconnect all cables from the terminals of the device controller.
   ⚠ **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.
5. Open the "FD" drain cock at the "VT" spray tube of the device until the spray tube no longer contains any water.
6. If necessary, physically remove the device from the system.

The dismantling process is completed.

12 Annex

12.1 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 - 9588
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

12.2 Conformity and standards

Declaration of conformity for electrical installations in the pressure maintaining, makeup or degassing systems

1. We hereby confirm that the products meets the essential protection requirements as established in the Council Directive to approximate the laws of the Member States relating to electromagnetic compatibility (2014/30/EU).
   The following Standards have been applied to assess the products: DIN EN 61326 – 1:2013-07
2. We hereby confirm that the control cabinets meet the essential requirements of the Low-voltage Directive (2014/35/EU).
   The following Standards have been applied to assess the products: DIN EN 61010 – 1:2011-07; BGV A2

Declaration of conformity for a pressure device (tank or assembly)
Applied assessment of conformity procedure according to the Pressure Equipment Directive 2014/68/EU of the European Parliament and the Council of 15 May 2014
Design, manufacture, and testing of pressure equipment

Vacuum spray tube and degassing system: Servitec
For universal application in heating, solar and cooling water systems

Type	According to tank nameplate	
Serial No.	According to tank nameplate	
Year of manufacturing	According to tank nameplate	
min. / max. permissible pressure (PS)	According to tank nameplate	
Test pressure (PT)	According to tank nameplate	
Min. / max. permissible temperature (TS)	According to tank nameplate	
Charging material	Water	
Standards and set of rules	Pressure Equipment Directive AD 2000 according to tank nameplate	
Pressure equipment	**Tank / vacuum spray tube** Article 4 Para. (1) a) i) 2. dash (Annex II, diagram 2) with • **Accessories**, Article 4 Para. (1) d): Spray tube, degassing valve, vacuum gauge, pressure connection with nozzle, level switch, feed and drain cock, connection hose, suction connection **Assembly** Article 4 Para. 2 clause b comprising: • **Tank / vacuum spray tube** Article 4 Para. (1) a) i) 2. dash (Annex II, diagram 2) with **Accessories**, Article 4 Para. (1) d): Spray tube, degassing valve, vacuum gauge, pressure connection with nozzle, level switch, feed and drain cock, connection hose, suction connection • **Accessories**, Article 4 Para. (1) d): Controller with control cabinet and operating panel, check valve, pressure transducer, 1"ball valve, ½" ball valve, ½" ball valve with dirt trap, pump, 3-ways motor ball valve, 2-ways motor ball valve, pump drain screw, pump vent screw	
Fluid group	2	
Conformity assessment to module	B+D	Servitec
Labelling according to Directive 2014/68/EU	CE 0045	
Certificate No. of the design type examination	See Annex 2	
Certificate No., QA system (Module D)	07 202 1403 Z 0780/15/D/1045	
Notified body for the assessment of the QA system	TÜV Nord Systems GmbH & Co. KG Große Bahnstraße 31, 22525 Hamburg, Germany	
Register No. of the notified body	0045	
Manufacturer **Reflex Winkelmann GmbH** Gersteinstraße 19 59227 Ahlen - Germany Telephone: +49 2382 7069 -0 Fax: +49 2382 7069 -9588 E-mail: info@reflex.de	The manufacturer declares that the pressure equipment (the tank / the assembly) complies with the requirements of Directive 2014/68/EU. Norbert Hülsmann Members of the Board of Directors Volker Mauel	

12.3 Certificate No. of the CE type test

Type			Certificate number
Servitec	DN 80 / 100 / 150 / 250	10 bar – 120 °C	07 202 1403 Z 0006 /2/ D0045
	DN 80 / 100 / 150 / 250	16 bar – 120 °C	07 202 1403 Z 0475 /2/ D0045

12.4 Guarantee

The respective statutory guarantee regulations apply.

SI1429enB / 9125205 / 01-18

reflex

Thinking solutions.

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