reflex

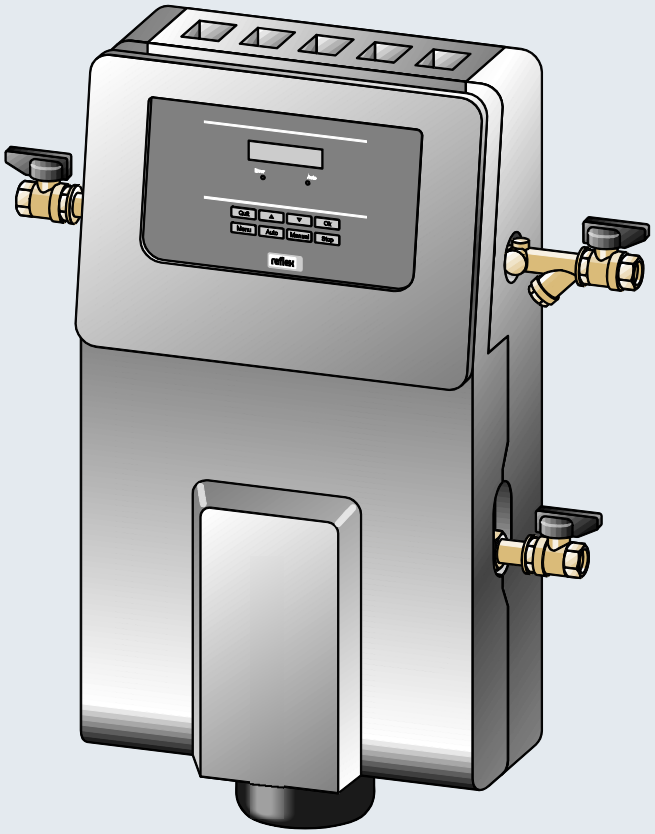
Thinking solutions.

Vacuum spray degassing

Servitec 30

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 13 .

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 53 .

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:

- Outdoor operation.
- For the use with mineral oils.
- For the use with flammable media.
- For the 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.

⚠ 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).

⚠ CAUTION

Risk of injury due to heavy device weight

The device weight may cause physical injury or accidents.

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

ATTENTION

Device damage during transport

Improper transporting procedures can cause damage to the connections for degassing and makeup lines.

- Use suitable covers to protect the connections against damage.
- Only transport the device in an upright position.

ATTENTION

Property damage during transport

Improper transporting procedures may cause damage.

- Fasten the device with suitable transport securing means such as straps.

4 Description of the device

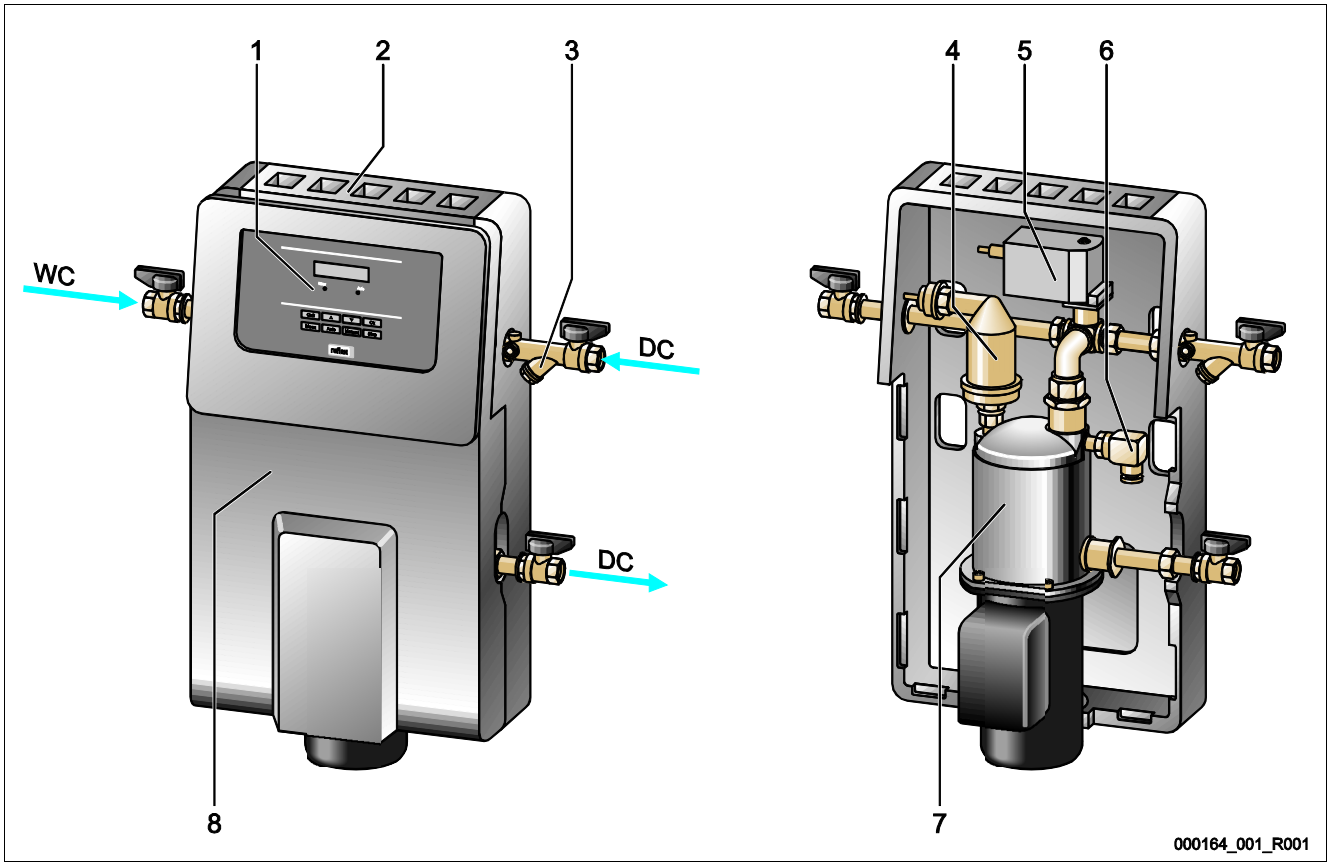
4.1 Description

The device is a degassing and make-up station. Its main areas of application are heating and cooling circuits and systems in which interruptions of operations due to dissolved or free gases. The device works only with a vacuum pump designed for this purpose. This design enables a compact footprint for small and mid-sized systems.

The device provides the following safety features:

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

4.2 Overview



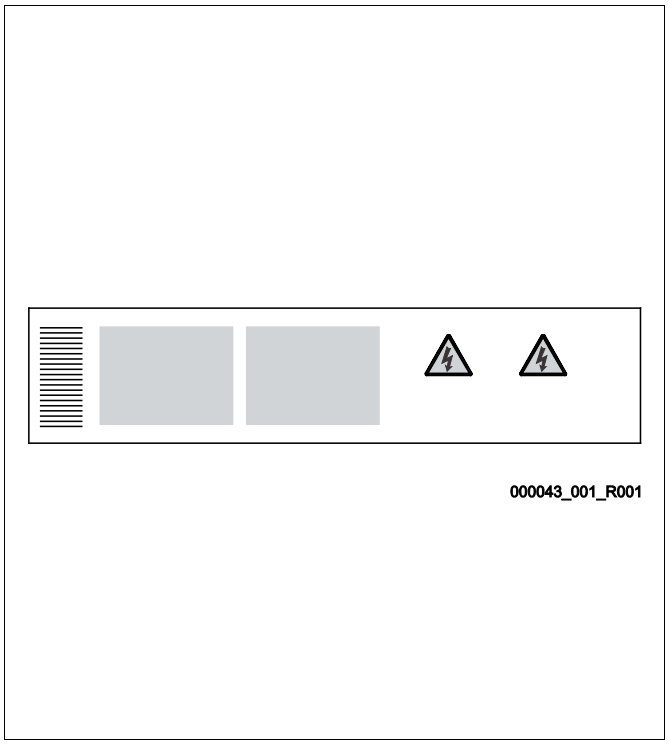
1	Controller
2	Venting grille
3	"ST" dirt trap
4	"DV" degassing valve
5	"CD" 3-ways motor ball valve for the hydraulic regulation of system and make-up degassing

6	"PIS" pressure transducer
7	"PU" vacuum degassing pump
8	Removable front shell
WC	Make-up connection
DC	Degassing connection • Gas-rich water inlet • Degassed water outlet

4.3 Identification

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



4.4 Function

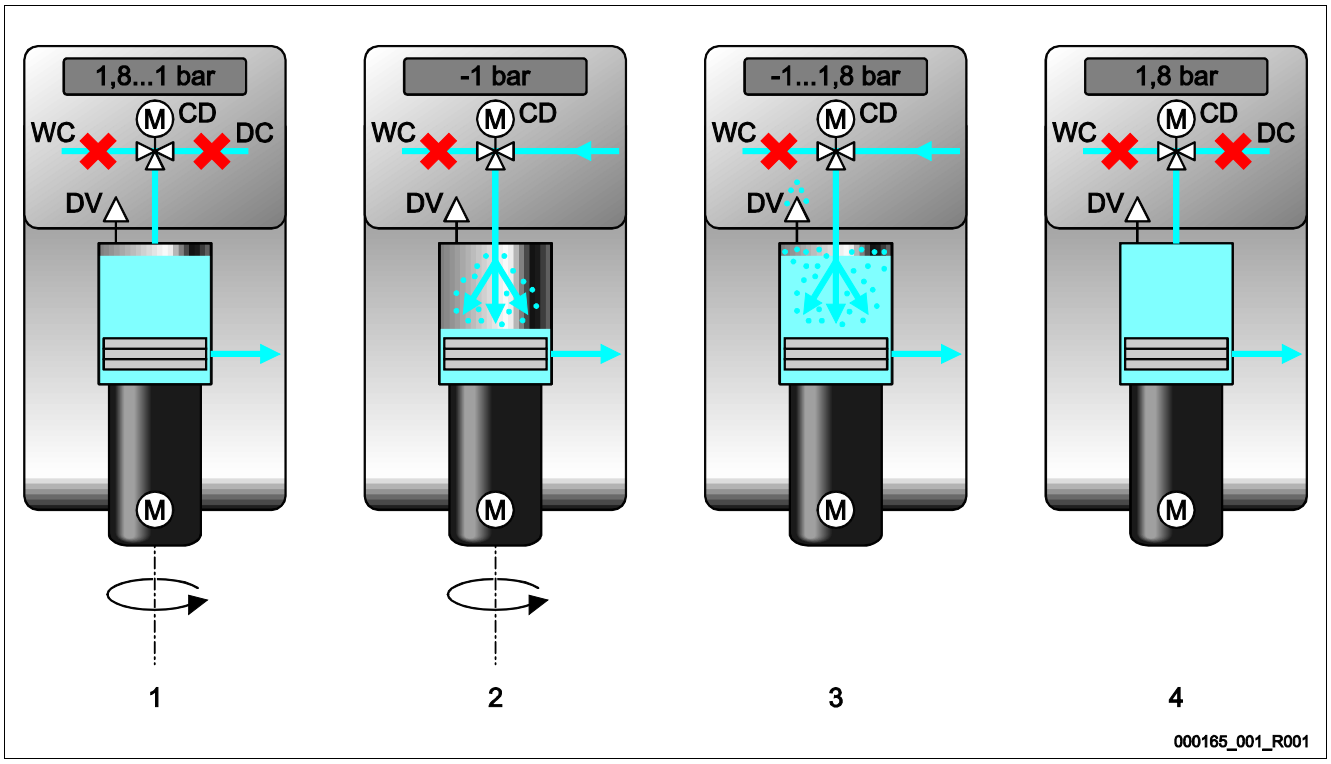
The device degasses the water from the facility system and the fresh water from the make-up line. It removes up to 90 percent of the dissolved gases from the water. The degassing operation uses timer-controlled cycles.

A cycle comprises the following phases:

1. Vacuum is drawn
   - The "PU“ pump draws a vacuum. The inlet to the "DC" pump remains closed.
2. Atomisation
   - The inlet to the "PU" vacuum pump is opened. Depending on the actual demand, a partial flow of the gas-rich system water of the facility system or the fresh make-up water are introduced through the "DC" or "WC" lines of the device. The water is then finely atomised in the vacuum pump. The large surface of the atomised water and the large gas saturation headway to the vacuum result in a degassing of the water. The degassed water is returned to the system via the vacuum pump.
3. Discharge
   - The "PU" vacuum pump shuts off. The system continues to atomise and degas water. The water level in the vacuum pump rises. The gases separated from the water are discharged into the ambient atmosphere via the "DV" degassing valve.
4. Idling time
   - When the gas has been discharged, the device will remain in idle until the next cycle is started.

Degassing cycle sequence in the PU vacuum pump

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



1	Vacuum is drawn
2	Atomisation

3	Discharge
4	Idling time

Degassing

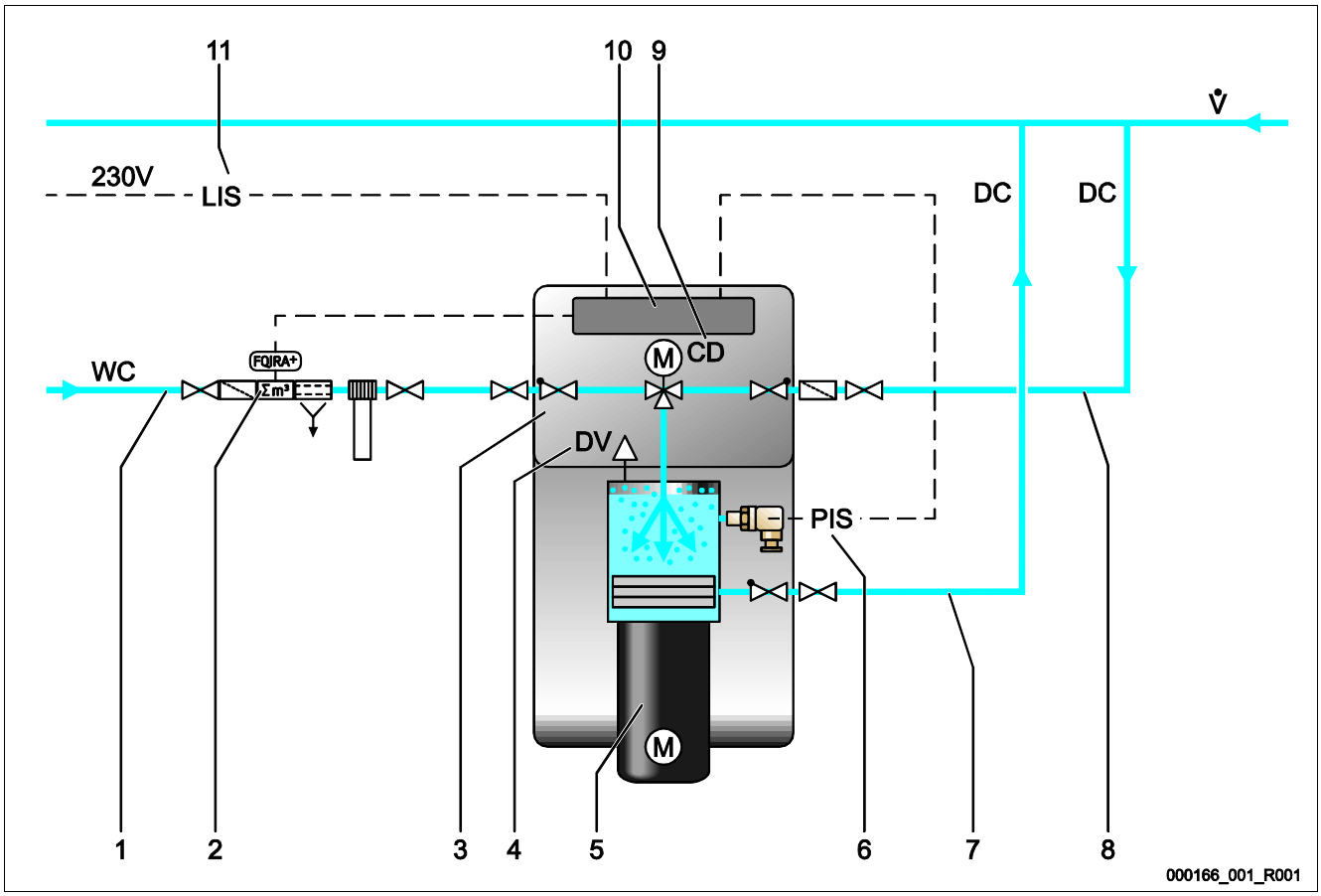
The entire degassing process is hydraulically synchronised by the "CD" 3-ways motor ball valve and the device controller. The system monitors the operating states and displays them at the controller. The controller provides 3 different degassing programmes and 2 different make-up variants for selection and setting.

Degassing programmes

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

Make-up variants

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



1	"WC" make-up line
2	Optional add-on device (see Chapter Optional equipment and accessories)
3	Device
4	"DV" degassing valve
5	"PU" vacuum pump
6	"PIS" pressure transducer from the device

7	"DC" degassing line (degassed water to the facility system)
8	"DC" degassing line (gas-rich water from the facility system)
9	"CD" 3-ways motor ball valve
10	Device controller
11	Signal line from the "LIS" level sensor of a pressure maintaining station

Magcontrol: For systems with diaphragm-type pressure expansion tank.

– Using the integrated "PIS" pressure sensor, the system registers and monitors the pressure in the heating or cooling system. The make-up degassing process is activated as soon as the pressure drops below the calculated filling pressure.

Levelcontrol: For systems with pressure maintaining stations.

– The pressure maintaining station uses the "LIS" pressure pick-up to determine the water level in the expansion tank. The make-up function is triggered by a 230 V signal.

Note!

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

– For the Levelcontrol make-up variant in particular, the signal line from the level sensor of the pressure maintaining station must be connected to the device.

4.5 Scope of delivery

The scope of delivery is described in the shipping document for the initial shipment and the content is shown on the packaging.

Immediately after receipt of the goods, please check the shipment for completeness and damage. Please notify us immediately of any transport damage.

Basic degassing equipment:

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

4.6 Optional equipment and accessories

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

- Fillset for make-up with water.
  - Fillset with integrated backflow preventer, water meter, dirt trap, and locking mechanisms for the "WC" make-up line.
- Fillset Impulse with FQIRA+ contact water meter for make-up with water.
  - If the Fillset Impulse with FQIRA+ contact water meter is installed in the make-up line, you can regulate the entire make-up quantity and the soft water capacity of Fillsoft softening systems. The operational reliability of the device is assured and prevents the automatic make-up during major water loss or small leaks.
- Fillsoft for softening the make-up water from the public water network.
  - Fillsoft is installed between Fillset and the device. The device controller evaluates the make-up quantities and signals a required replacement of the softening 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 6.5.2.1 "Connecting the RS-485 interface" on page 28 . 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
- Reflexomat for system with pressure-maintaining stations.
  - The Reflexomat and device combination is preferred. Despite the degassed network, Reflexomat assured an extremely elastic operation at constant pressure. Make-up is executed depending on the water level measured with the "LIS" level sensor of the Reflexomat in the expansion tank of the pressure maintaining station. For a make-up request, the Reflexomat controller activates a 230 V signal to the device controller.
- Gas discharge measurement for an optimised degassing operation.

Notice!

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

5 Technical data

Note!

The following values apply for all systems:

– Permissible flow temperature:	120 °C
– Permissible operating temperature makeup degassing:	0 °C – 30 °C
– Permissible ambient temperature:	0 °C – 45 °C
– Permissible operating gauge pressure:	8 bar
– Maximum inlet pressure for makeup:	6 bar
– Makeup capacity:	0.05 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)
30	0.47	230 / 50	10	1	No	230, 4	55
30 GL	0.47	230 / 50	10	1	No	230, 4	55

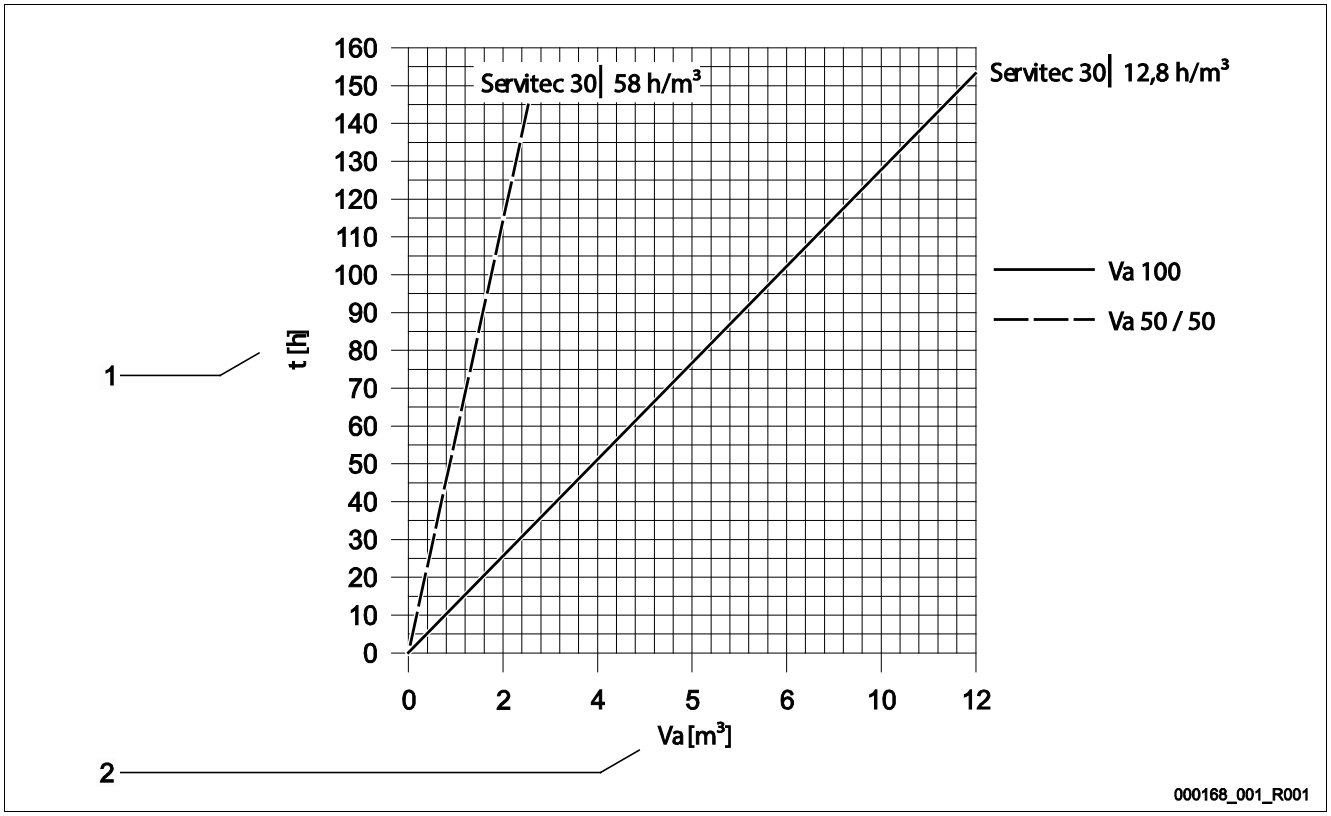
5.2 Dimensions and connections

Type	Weight (kg)	Height (mm)	Width (mm)	Depth (mm)	Degassing device connection	Degassing system connection	Make-up connection
30	13.5	660	545	290	IG ½ "	IG ½ "	IG ½ "
30 GL	13.5	660	545	290	IG ½ "	IG ½ "	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)
30	1	–	0.5 – 3	8	–	>0 – 70
30 GL	–	2.5	0.5 – 3	8	–	>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

Condition of the delivered device:

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

Preparing the connection of the device to the plant system:

- Barrier-free access to the plant system.
- Level and solid placement surface for the device.
- Frost-free, well-ventilated room.
  - Room temperature > 0 - 45 °C.
- Drain for drain water.
- Filling connection.
  - DN 15 according to DIN 1988 T 4.
- Electric connection.
  - 230 V~, 50 Hz, 16 A with upstream ELCB (tripping current: 0.03 A).

6.3 Execution

⚠ CAUTION

Risk of injury due to tipping over of the device

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

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

Note!

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

– Prior to using the device check the screw connections for proper seating and sealing.

Note!

Avoid leaks at the connections.

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

Proceed as follows:

- Connect the device at the return flow 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 a hydraulic switching point, connect the device upstream of the switching point.
  – In this manner, you ensure the water degassing in the 'V' main volume flow at temperatures ≤ 70 °C.

CAUTION – damage due to improper connection! Bear in mind that the device may be subject to additional stresses through the connection of piping or hose connections to the 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 pipes to the device can cause material damage to the plant system. Use only connection pipes with appropriate resistance against the plant system temperature.

The device is pre-wired and must be adapted for the local system conditions.

Proceed as follows:

1. Complete the water side connections from the device to the plant system.
2. Complete the electric connection as shown in the terminal plan, see chapter 6.5 "Electrical connection" on page 25 .

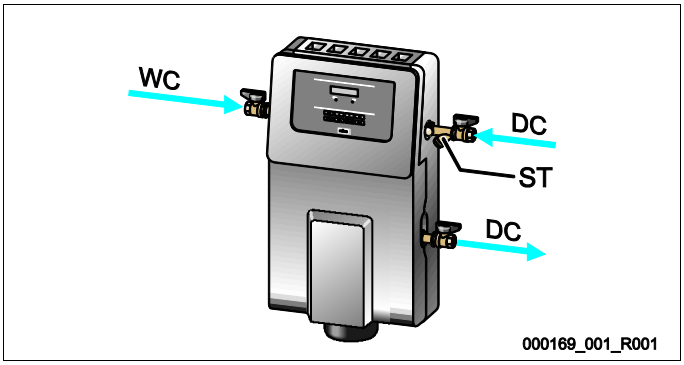
Note!

During connection, ensure the operability of the valves and the inlet options for the connecting lines.

6.3.1 Fitting the add-on components

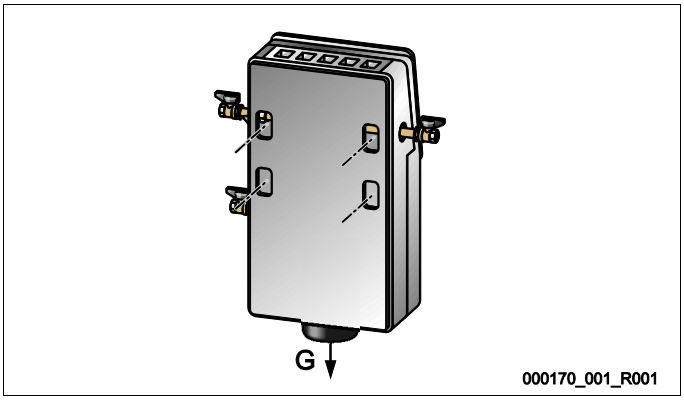
Install the ball valves at the device.

1. Attach the ball valve for the "WC" make-up connection.
   – If you don't connect the automatic make-up, close the "WC" connection with a G ½ " blind plug.
2. Attach the ball valve with the "ST" dirt trap at the "DC" inlet of the degassing.
3. Attach the ball valve at the "DC" outlet of the degassing.



6.3.2 Wall mounting

Use the bores 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.

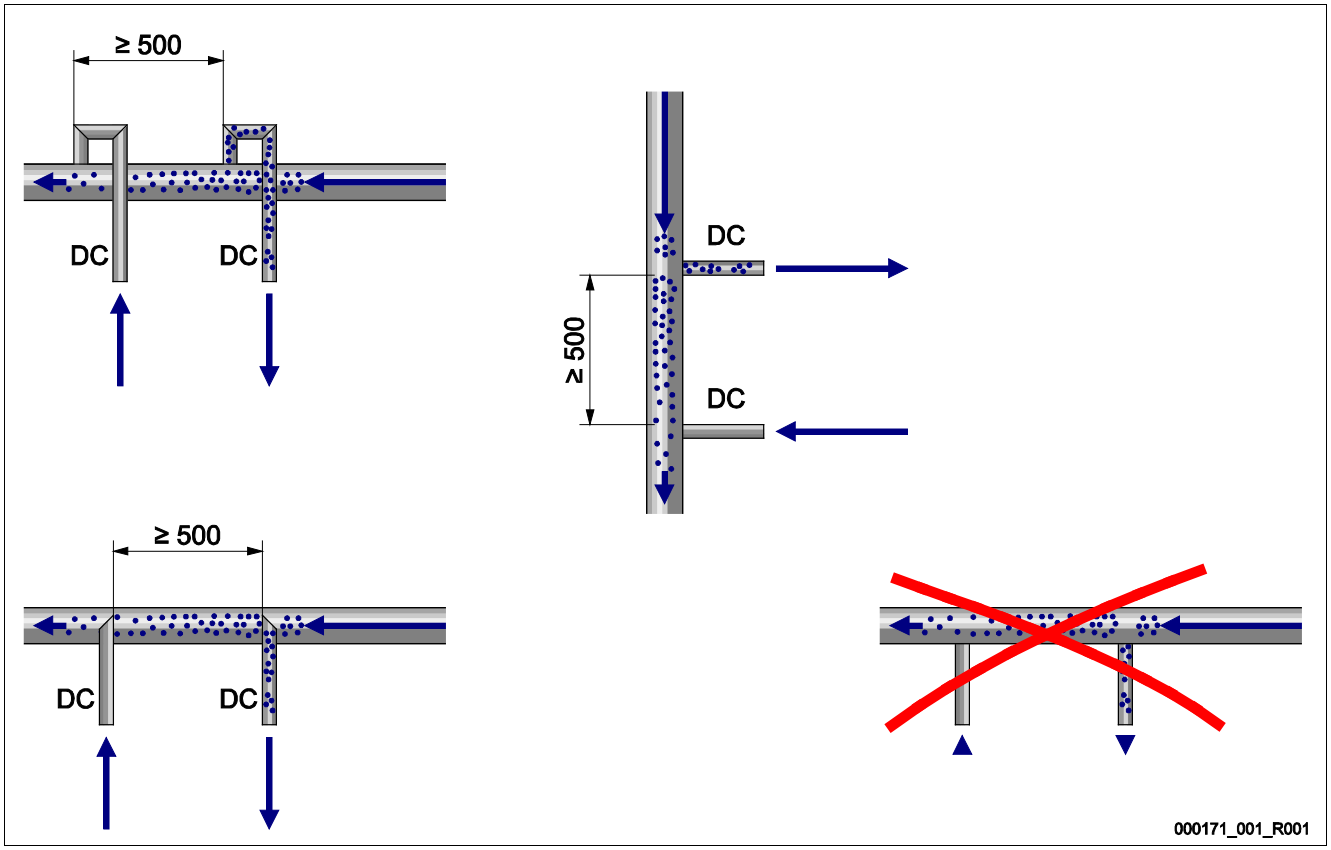


6.3.3 Hydraulic connection

6.3.3.1 Degassing line to the system

Installation detail of the "DC" degassing line

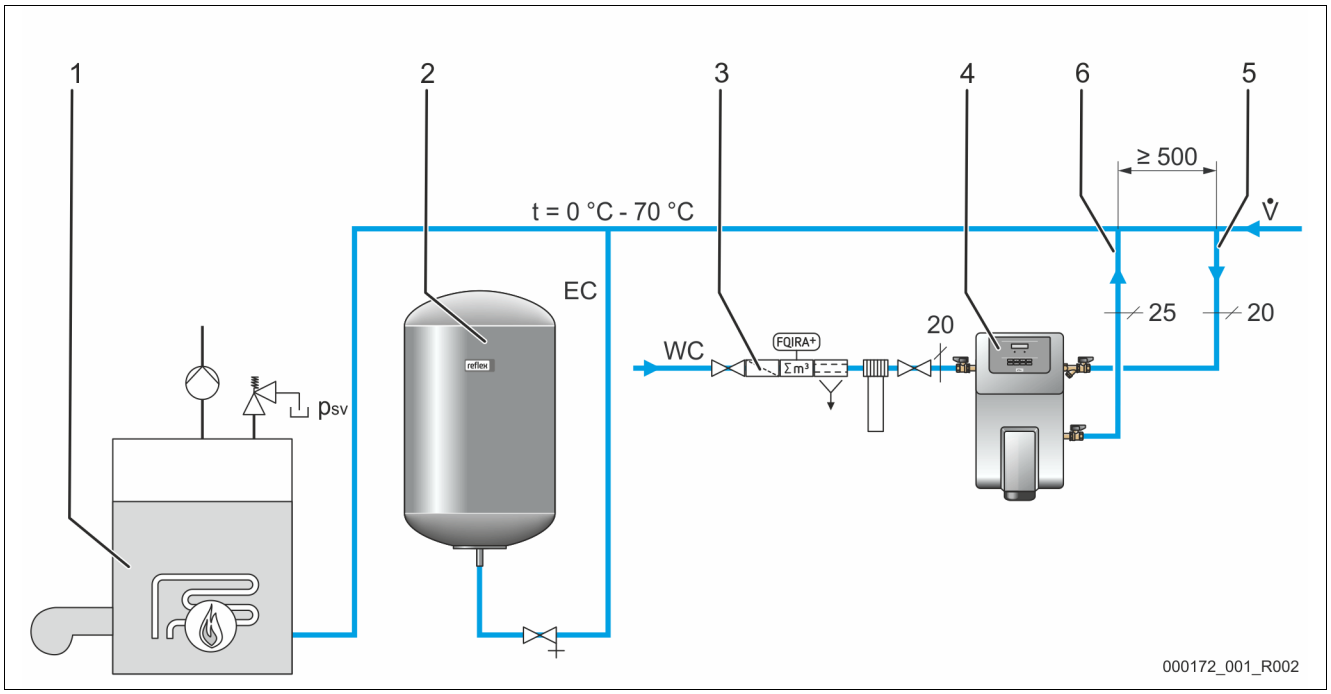
Install the 'DC' degassing pipes as shown below:



Proceed as follows:

- Prevent an overload of the "ST" dirt trap in the device caused by coarse dirt.
- Install the "DC" gas-rich degassing line upstream of the gas-poor degassing line when viewed in system flow direction.
- Preferably install at the return flow side of the plant system.
  - The water temperature must be in the range of 0 °C to 70 °C to ensure sufficient degassing capacity.

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



1	Heating system
2	Pressure expansion tank
3	For optional equipment and accessories, see chapter 4.6 "Optional equipment and accessories" on page 13

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

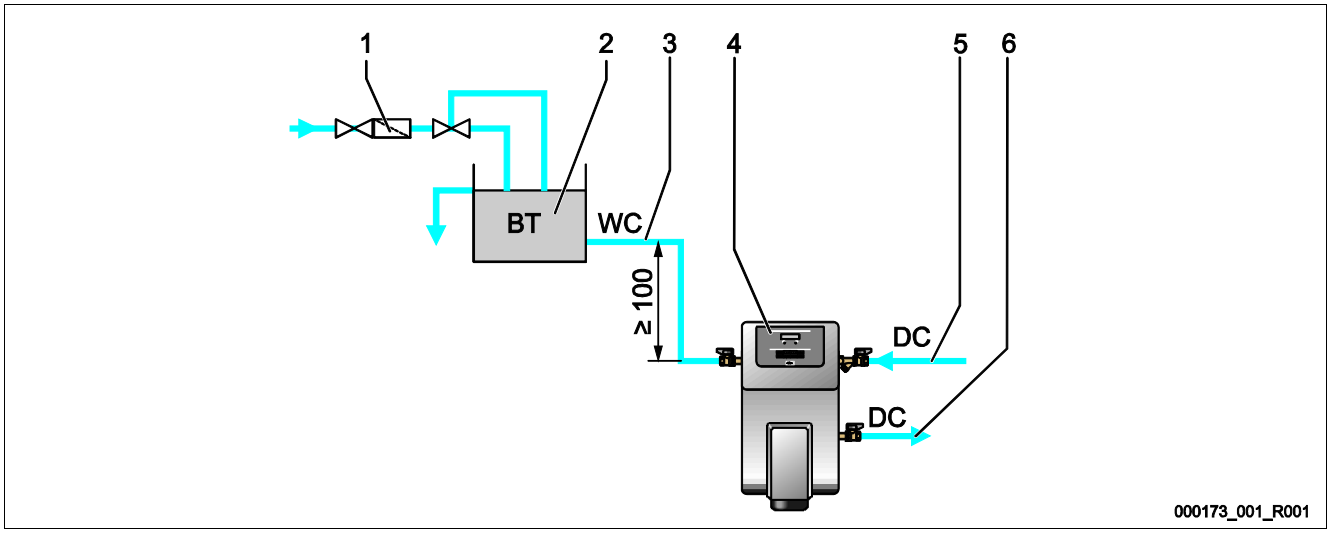
Proceed as follows:

- Connect the "DC" degassing lines in the "V" main volume flow of the plant system.
- The device requires two "DC" degassing lines to the plant system.
  - One degassing line for the gas-rich water from the plant system
  - One degassing line for the degassed water back to the plant system.
- Install the degassing lines near the "EC" expansion line.
  - You ensure stable pressure conditions.
- Install the device near the "MAG" diaphragm expansion tank.
  - You ensure pressure monitoring of the diaphragm expansion tank.
  - Set the "Magcontrol" operating mode at the device controller.

Note!

- Ensure the integration with the "V“ main flow volume. in particular in switching variants with hydraulic switching points and return admixtures.
  - For switching and makeup variants, see chapter 6.4 "Switching and make-up variants" on page 23 .

6.3.3.2 Make-up line



1	"ST" dirt trap
2	"BT" system separator vessel
3	"WC" makeup line

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

For water makeup, note the following conditions:

- For a water makeup via a "BT" mains disconnect receptacle, its bottom edge must be at least 100 mm over the "PU" device pump.
- Close the connection of the "WC" makeup line when a makeup line is not connected.
  - Adjust the "Levelcontrol" makeup variant at the device controller.
- Install at least one "ST" dirt trap with a mesh size ≤ 0.25 mm close upstream to the "CD" 3-ways motor ball valve.

Note!

Avoid a device fault.

- Ensure that manual water makeup to the plant system is possible.

Note!

Use a pressure reducer in the "WC" makeup line if the idle pressure exceeds 6 bar.

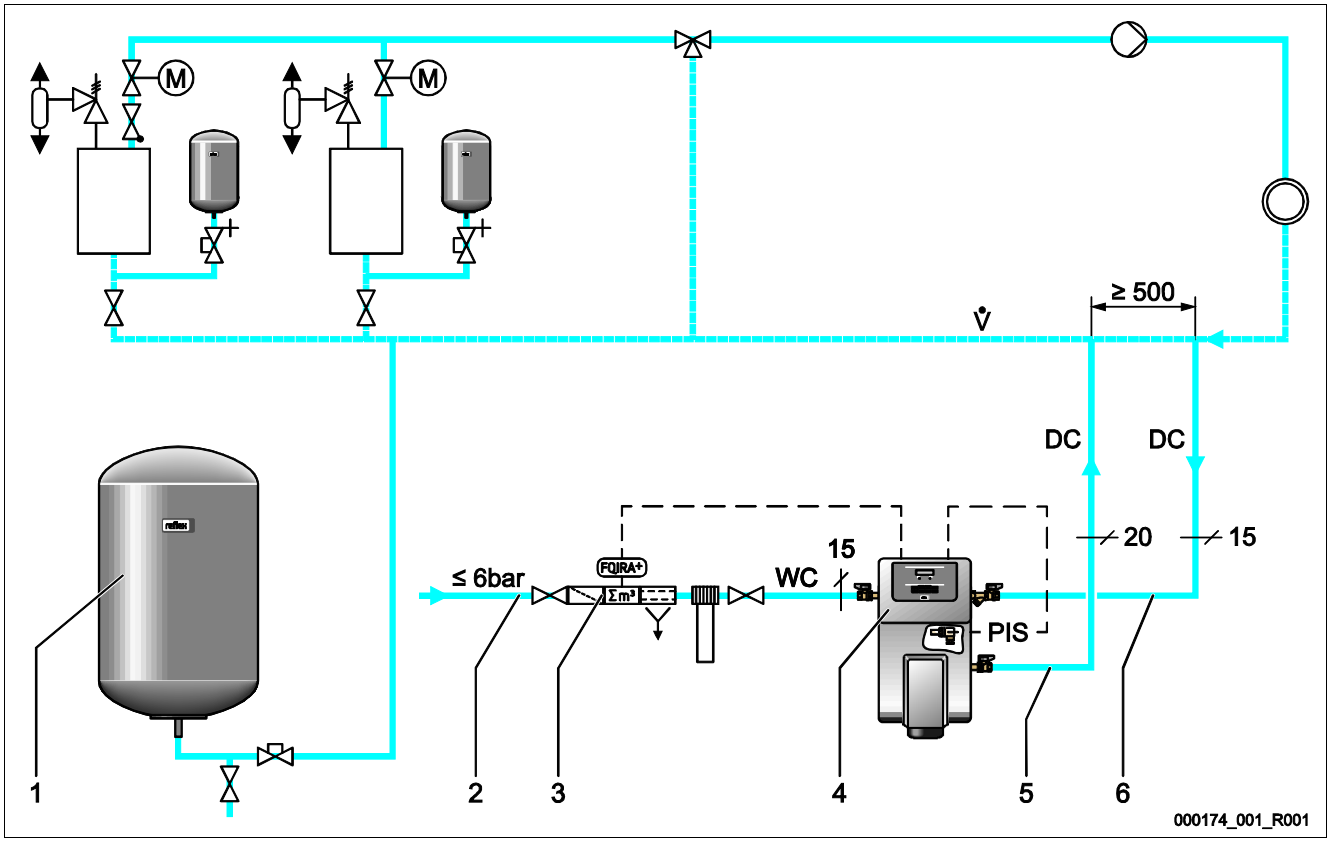
6.4 Switching and make-up variants

Select the make-up variant in the Customer menu of the device controller, see chapter 9.5 "Parametrising the controller in the Customer menu" on page 40 .

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



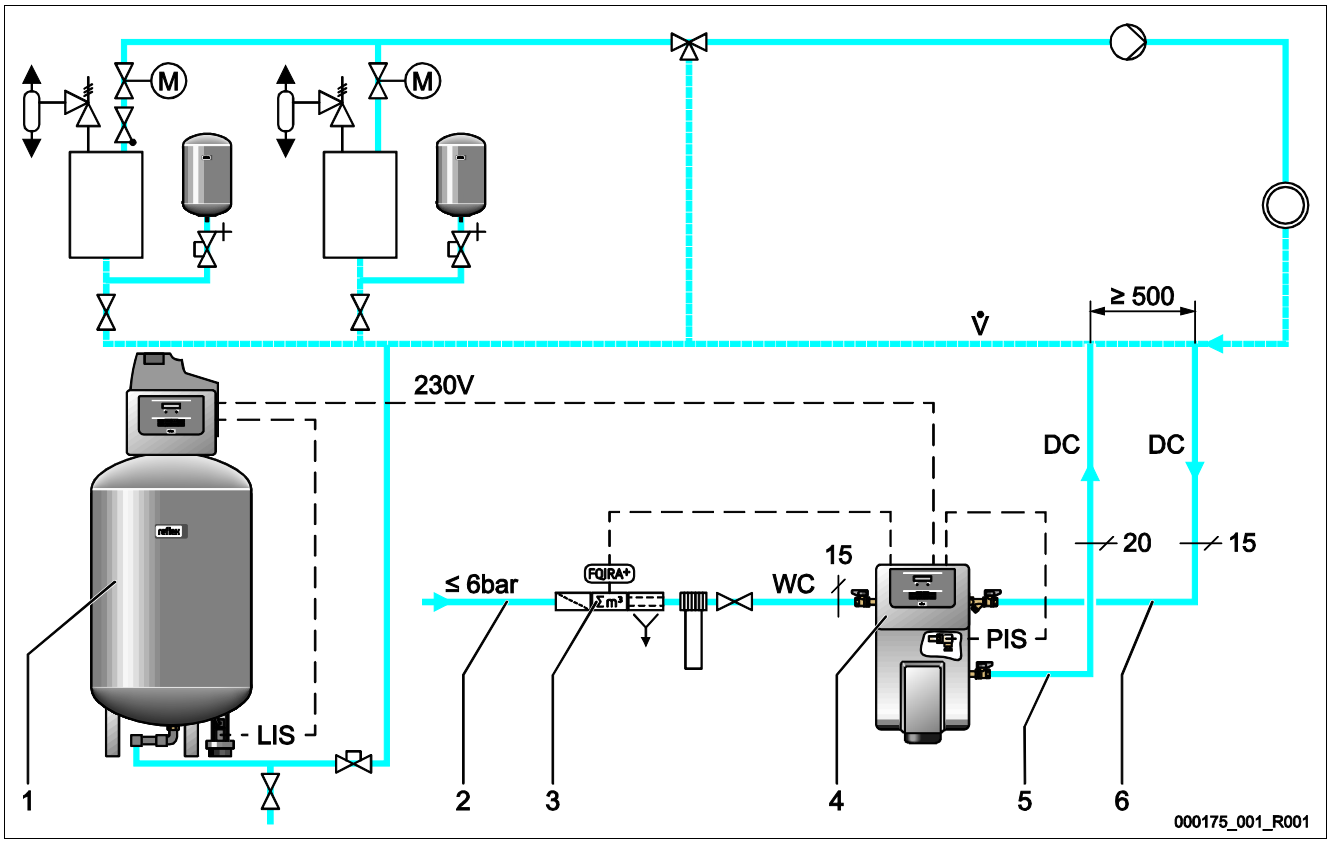
1	Diaphragm expansion tank
2	"WC" make-up line
3	For optional equipment and accessories, see chapter 4.6 "Optional equipment and accessories" on page 13
4	Device

5	"DC" degassing line (degassed water)
6	"DC" degassing line (gas-rich water)
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 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 installed near the diaphragm expansion tank to ensure pressure monitoring for the make-up with water.

6.4.2 Level dependent "Levelcontrol" make-up mode

The device is in "Levelcontrol" operating mode which is used for systems with pressure maintenance stations.



1	Pressure maintaining station
2	"WC" make-up line
3	For optional equipment and accessories, see chapter 4.6 "Optional equipment and accessories" on page 13

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

The "Levelcontrol" operating mode is set in the Customer menu of the device controller. This operating mode is used for facilities with pressure maintaining stations and enables an elastic operation at constant pressure.

Water is added depending on the measured 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. The device controller regulates the motor actuator of the 3-ways motor ball valve in the "WC" make-up line. 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.

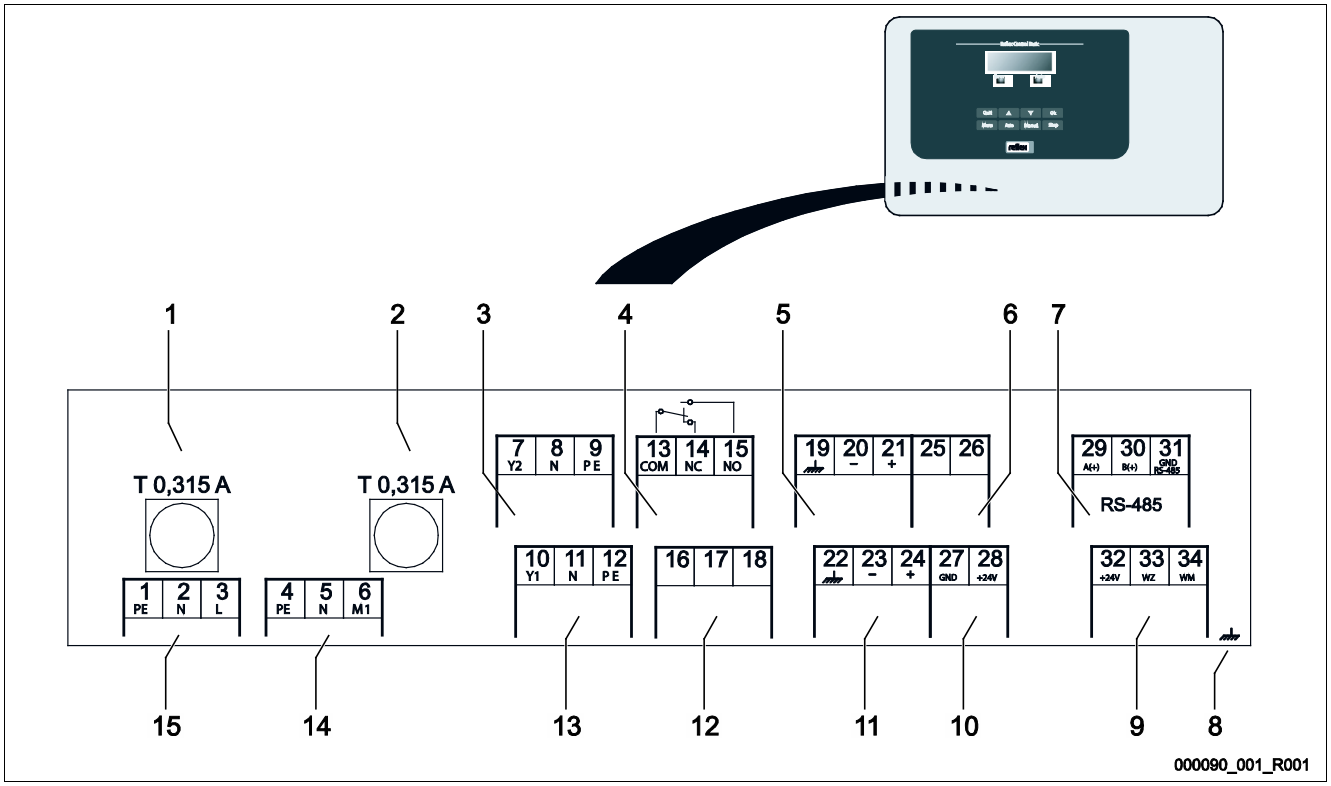
The following descriptions apply to standard systems and are limited to the necessary user-provided connections.

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

   ⚠ **DANGER** Risk of serious injury or death due to electric shock. Some parts of the device's circuit board may still 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. Install a screwed cable gland suitable for the respective cable. M16 or M20, for example.
4. Thread all cables to be connected through the cable gland.
5. Connect all cables as shown in the terminal diagram.
   – Note that the fusing for the device connection is to be provided by the user, see chapter 6.5.1 "Terminal diagram" on page 26 .
6. Install the cover.
7. Connect the mains plug to the 230 V power supply.
8. Activate the system.

The electrical connection is completed.

6.5.1 Terminal diagram



1	"L" fuse for electronics and solenoid valves
2	"N" fuse for solenoid valves
3	Overflow valve (not for motor ball valve)
4	Group message
5	Optional for second pressure value
6	"CD" 3-ways motor ball valve
7	RS 485 interface
8	Shielding

9	Digital inputs • Water meter • Insufficient water
10	"CD" 3-ways motor ball valve
11	Pressure analogue input
12	External makeup demand (Levelcontrol only)
13	Makeup valve
14	Pump
15	Mains supply

Terminal number	Signal	Function	Wiring
1	PE	230 V power supply via mains cable and plug.	Pre-wired
2	N		
3	L		
4	PE	"PU" vacuum pump for degassing.	Pre-wired
5N	N		
6 M1	M 1		
7	Y2	Overflow solenoid valve Not used in standard model	---
8	N		
9	PE		
10	Y 1	"CD" 3-ways motor ball valve for regulating the degassing of makeup and system water.	Pre-wired
11	N		
12	PE		
13	COM	Group message (floating).	User, optional
14	NC		
15	NO		
16	Not assigned	External makeup demand from a pressurisation station; controller must be set to "Levelcontrol"!	User, optional
17	Makeup (230 V)		
18	Makeup (230 V)		
19	PE shield	Level analogue input, not used by the device.	---
20	- Level (signal)		
21	+ Level (+ 18 V)		
22	PE (shield)	Pressure analogue input for display and makeup; controller must be set to "Magcontrol"!	Pre-wired
23	- Pressure (signal)		
24	+ Pressure (+ 18 V)		
25	0 – 10 V (correcting variable)	"CD" 3-ways motor ball valve, not used with the device.	---
26	0 – 10 V (feedback)		
27	GND		
28	+ 24 V (supply)		
29	A	RS-485 interface.	User, optional
30	B		
31	GND		
32	+ 24 V (supply) E1	Supply for E1 and E2.	Pre-wired, bridged
33	E1	Contact water meter, for example in Fillset, see chapter 4.6 "Optional equipment and accessories" on page 13 , for makeup evaluation, contact 32/33 closed = meter pulse.	User, optional
34	E2	Insufficient water switch, not used with the device, contact 32/34 closed = OK.	Pre-wired, bridged

6.5.2 RS-485 interface

Use this interface to retrieve all controller data and to enable the communication with control centres or other devices.
The following data can be requested:

- Pressure.
- Operating modes of the "PU" vacuum pump.
- Operating modes of the "CD" 3-ways motor ball valve for degassing.
- Values of the "FQIRA+" contact water meter.
- All messages, see chapter 9.6 "Messages" on page 44 .
- All entries in the fault memory.

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.

6.5.2.1 Connecting the RS-485 interface

Connect the interface as follows:

1. For connecting the interface use only a cable with these properties:
   – LJYCY (TP), 4 × 2 × 0.8, maximum overall bus length 1000 m.
2. Use a shielded cable to connect the interface to terminals 29, 30, 31 of the main board in the control cabinet.
   – For connecting the interface, see chapter 6.5 "Electrical connection" on page 25 .
3. When using the device with a control centre not supporting an RS-485 interface (RS-232, for example), you must use a corresponding adapter.

6.6 Installation and commissioning certificate

Data shown on the 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 10.3 "Maintenance certificate " on page 50 .

For the installation

Place, date	Company	Signature

For the commissioning

Place, date	Company	Signature

7 Commissioning

Note!

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

– Have the Reflex Customer Service carry out commissioning and the annual maintenance.

7.1 Checking the requirements for commissioning

The 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 required only for the make-up with pressure-dependent control in systems with a diaphragm expansion tank.

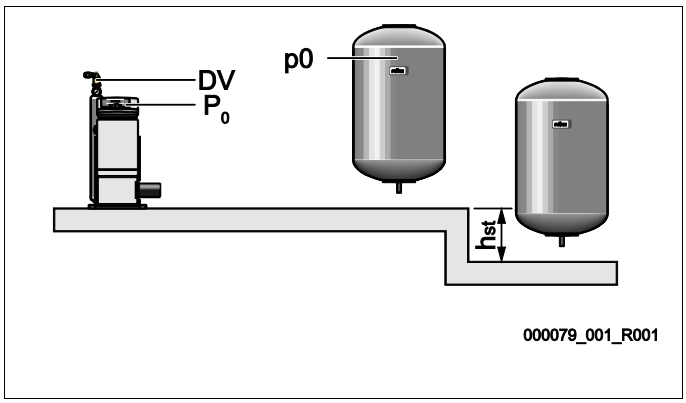
Proceed as follows:

1. Activate "Magcontrol" in the controller's Customer menu.
2. Determine the "P_0" minimum operating pressure of the device relative to the "p0" initial pressure of the diaphragm expansion tank.

Calculate the minimum operating pressure as follows:

- The device is installed at the same level as the diaphragm expansion tank (hst = 0).
  – $P_0 = p0^*$
- The device is installed at a lower level than the diaphragm expansion tank:
  – $P_0 = p0 + h_{st}/10^*$
- The device is installed at a higher level than the diaphragm expansion tank:
  – $P_0 = p0 - h_{st}/10^*$

* p0 in bar, h_{st} in m



Note!

- Comply with the Reflex planning directive.
  – During planning, take into account that the working range of the device must be between the "pa" initial pressure and the "pe" final pressure in the working range of the pressure maintenance.

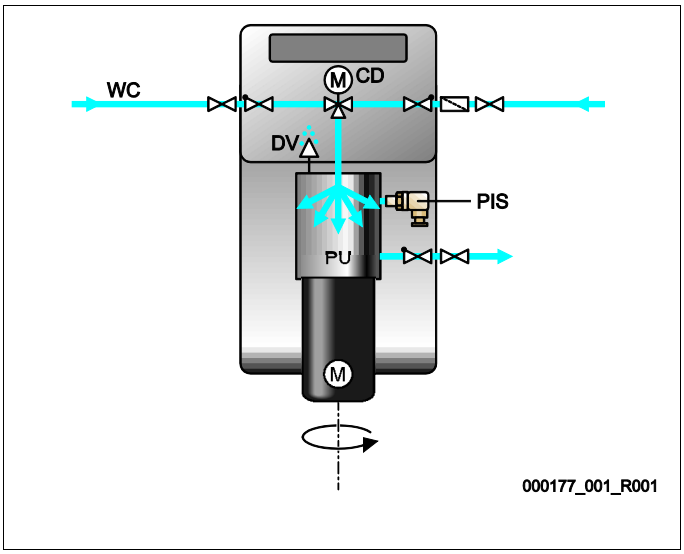
7.3 Filling the device with water

Use the system to fill water into the device.

1. Open the "CD" 3-ways motor ball valve to the system.
2. Start turning the "PU" vacuum pump at the fan wheel using a screw driver.

   ⚠ **CAUTION** – Injuries caused by pump start-up. 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.

   – Water flows in and air escapes from the vacuum pump via the "DV" degassing valve.



7.4 Modifying the controller's start routine

The start routine enables the setting of the essential parameters required for the device's 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 9.5 "Parametrising the controller in the Customer menu" on page 40 .

Notice!

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

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

Magcontrol:

Select this setting if you want to realise a pressure-dependent automatic make-up in a system with diaphragm expansion tank.

Levelcontrol:

Select this setting if you want to operate a level-dependent make-up in a system with pressure maintenance station.

Servitec
Magcontrol

Standard software with various languages.

Language

Prior to commissioning, read the entire operating manual and verify the proper assembly.

Read the operating manual!

Only displayed if "Magcontrol" has been selected in the "Servitec" menu option.

P0 calculation, see chapter 7.2 "Setting the minimum operating pressure for Magcontrol" on page 30 .

Min. op. pressure

Only displayed if "Magcontrol" has been selected in the "Servitec" menu option.

– Specify the tripping pressure of the applicable safety valve for the device protection. This is usually the safety valve at the system heat generator.

Safety valve pressure

Change the flashing display items for "Hour", "Minute", and "Seconds" to the current time.

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

Time:

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

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

Date:

Select in the message line and confirm with "OK":

yes: The start routine is terminated. Servitec automatically switches to stop mode.

no: The start routine restarts.

Terminate start routine?

The pressure is displayed only in "Magcontrol" mode.

2.0 bar
STOP

Notice!

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

7.5 Starting Automatic mode

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

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

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

Note!

The commissioning process is now concluded.

Notice!

The "ST" dirt trap in the "DC" degassing line must be cleaned after the expiry of the continuous degassing time at the latest, see chapter 10.2.1 "Cleaning the dirt trap" on page 49 .

8 Operation

8.1 Operating modes

8.1.1 Automatic mode

Upon successful commissioning, you can activate the automatic mode with the degassing functions and, optionally, the automatic make-up. The device controller monitors the functions. Faults are displayed and evaluated.

For automatic mode, you can set three different degassing programmes in the Customer menu, see chapter 9.5 "Parametrising the controller in the Customer menu" on page 40 . Relevant information is displayed in the message line of the controller display.

Continuous degassing of the system water

Continuous degassing

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

Start/setting:

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

Interval degassing of the system water

Servitec
Interval degassing

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

Start/setting:

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

Degassing the make-up water

Servitec
Make-up degassing

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

The 3-ways motor ball valve switches the volume flow from system to make-up water. The process is the same as in continuous degassing. If the system water is not to be degassed or if the system is in Summer operation with circulating pumps shut down, you can activate the make-up degassing in the Customer menu.

Activation/setting:

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

8.1.2 Manual mode

The manual mode is intended for test and service tasks.

Press "Manual" at the controller. The Auto LED at the operator panel flashes to visually indicate that manual mode is active. In manual mode, you manually switch the "PU" vacuum pump and the "CD" 3-ways motor ball valve. Both can be switched after each other and tested at the same time. The switching operation is blocked when safety-relevant parameters are exceeded (maximum pressure, for example). Use the arrow buttons at the operator panel to select the vacuum pump and the 3-ways motor ball valve.

- "Up" and "Down" buttons
  - Selects "PU" or "CD".
- "OK" button
  - Starts and shuts down "PU" or "CD".
- "Quit" button
  - Shuts down "PU" or "CD" in reverse sequence.
  - The last pressing switches you to Stop mode.
- "Auto" button
  - Return to Automatic mode.

* "!" PU or CD is active

Notice!

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

8.1.3 Stop mode

The Stop mode is intended for the device commissioning.

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

Except for the display of information, the device is non-functional in Stop mode. Function monitoring is stopped.

The "PU" vacuum pump is switched off. The system returns an alarm if the Stop mode is activated for more than 4 hours.

If "Floating alarm contact?" in the Customer menu is set to "Yes", the system outputs the alarm to the group alarm contact.

8.1.4 Summer operation

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

Setting in the Customer menu, see chapter 9.5 "Parametrising the controller in the Customer menu" on page 40 .

Select from 3 degassing programmes.

Degas. programme
Make-up degassing

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

Notice!

For a detailed description of the selection of degassing programmes, see chapter 4.4 "Function" on page 10 .

8.1.5 Restarting

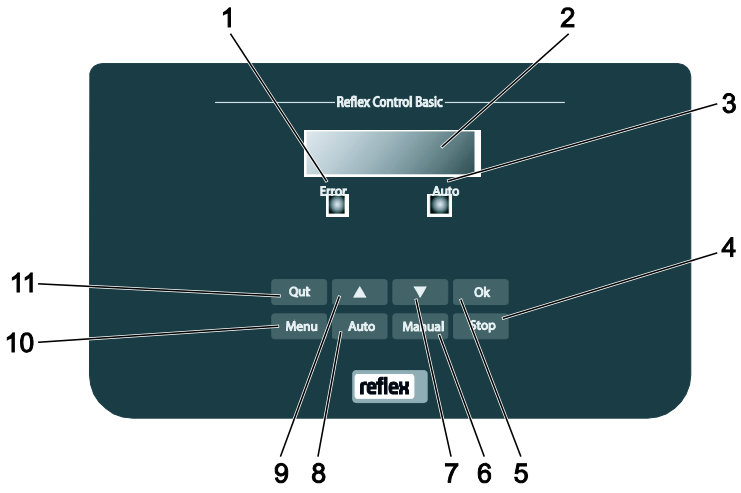
After an extended standstill time (the device is de-energised or in stop mode), the "PU" vacuum pump may jam. For this reason, use a screwdriver to rotate the vacuum pump at the fan wheel of the pump motor before restarting.

Notice!

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

9 Controller

9.1 Operator panel



1	Error LED • The Error LED illuminates in the event of a fault
2	Display
3	Auto LED • The Auto LED illuminates green in Automatic mode • The Auto LED flashes green in Manual mode • The Auto LED is not illuminated when the system is stopped
4	Stop • For commissioning and entry of new values in the controller
5	OK • Confirm actions
6	Manual • For tests and maintenance tasks

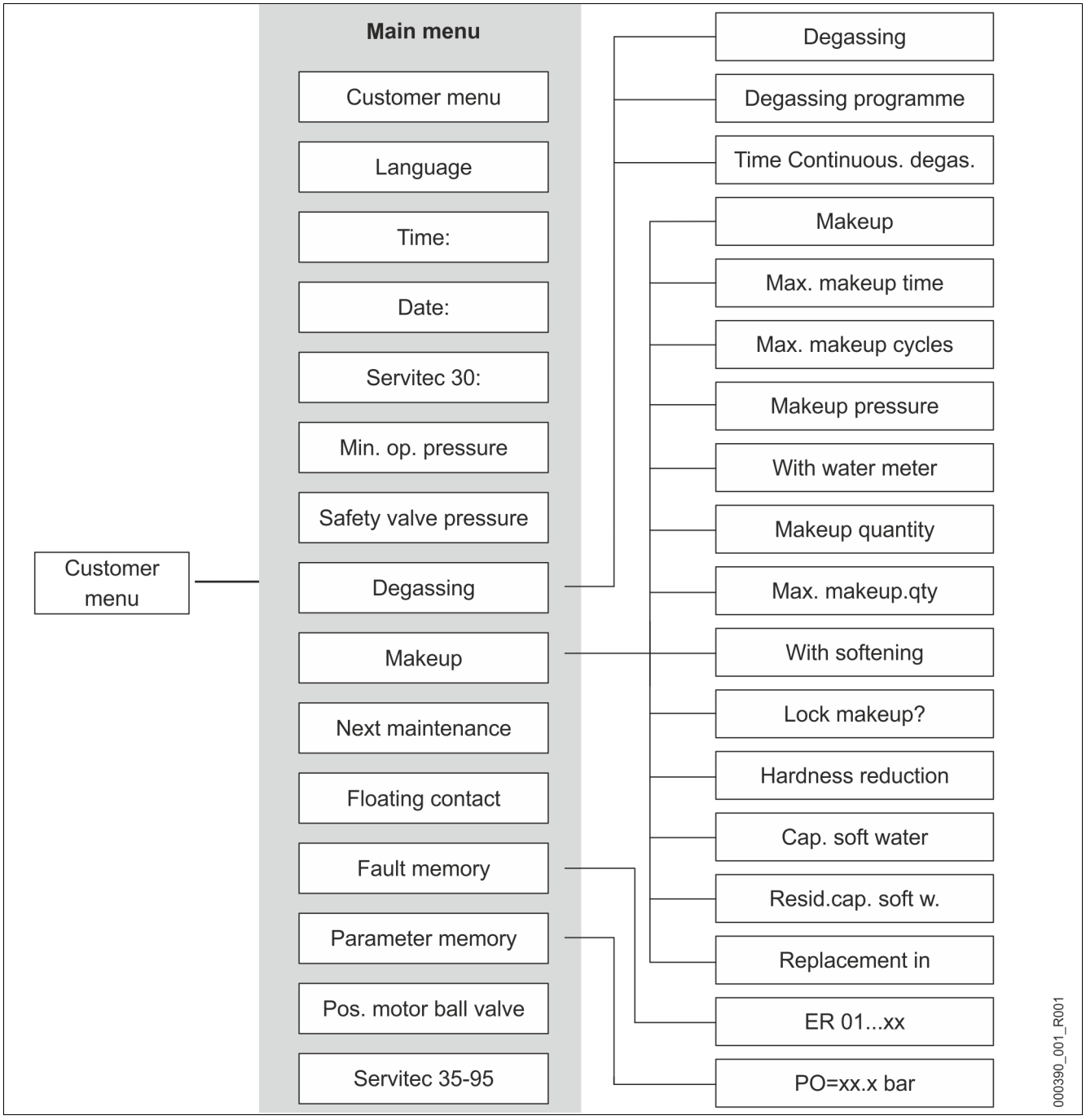
7	"Back" to the previous menu
8	Auto • For continuous operation
9	"Forward" to the next menu
10	Menu • Call up the Customer menu
11	Quit • Acknowledge messages

Selecting and changing parameters

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

9.2 Customer menu

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.



see chapter 9.5 "Parametrising the controller in the Customer menu" on page 40 .

9.3 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 "Default settings" on page 39 .

9.4 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 operating pressure p0	1.0 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	NO	Only the messages marked in the message list
Makeup		
Maximum makeup quantity	1000 Litres	Only if controller with "With water meter yes"
Maximum makeup time	20 minutes	Only Magcontrol
Maximum makeup cycles	3 cycles within 2 hours	Only Magcontrol
Degassing		
Degassing programme	Interval degassing	Continuous operation with degassing cycles
Continuous degassing time	5 hours	Time of continuous degassing
Softening (Only if "With softening yes")		
Lock makeup	No	Available soft ware capacity = 0
Hardness reduction	8°dH	= Target – Actual
Maximum makeup quantity	0 Litres	Attainable makeup quantity
Soft water capacity	0 Litres	Attainable water capacity
Cartridge replacement	18 months	Replace cartridge

Service menu

Parameter	Setting	Remarks
Makeup		
Pressure differential, "NSP" makeup	0.2 bar	Only Magcontrol
Pressure differential, filling pressure PF – P0	0.3 bar	Only Magcontrol
Degassing		
Idling times between degassing intervals	23 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

9.5 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, see chapter 7.4 "Modifying the controller's start routine" on page 32 .

Notice!

Operation description, see chapter 9.1 "Operator panel" on page 37 .

All grey marked menu items must be reviewed during commissioning.

Press "Manual" to switch to manual operation.

Press "Menu" to display the first main menu option "Customer menu".

Switch to the next main menu option. → Customer menu

Standard software with various languages. → Language

Change the flashing display items for "Hour", "Minute", and "Seconds" to the current time. → Time:

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

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

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

Magcontrol: → Servitec 30:

Select this setting if you want to realise a pressure-dependent automatic make-up in system with diaphragm expansion tank.

Levelcontrol:

Select this setting if you want to realise a level-dependent make-up in system with pressure maintenance station.

Only displayed if "Magcontrol" has been selected in the "Servitec" menu option. → Min. op. pressure

P0 calculation, see chapter 7.2 "Setting the minimum operating pressure for Magcontrol" on page 30 .

Only displayed if "Magcontrol" has been selected in the "Servitec" menu option. → Safety valve pressure

– Specify the tripping pressure of the applicable safety valve for the device protection. This is usually the safety valve at the system heat generator.

Switch to the "Degassing" sub-menu. → Degassing

Switch to the next list item. → Degassing

For a detailed description, see chapter 8.1.1 "Automatic mode" on page 34 . → Degas. programme

Select from 3 degassing programmes:

- Continuous degassing
- Interval degassing
- Make-up degassing

Time setting for Continuous degassing.

Time Continuous. degas.

– For commissioning, we recommend to set the time for continuous degassing depending on the system volume and the glycol content, see chapter 5.3 "Operation" on page 14 .

Switch to the "Make-up" sub-menu.

Make-up

Switch to the next list item.

Make-up

Maximum time for a make-up cycle. Upon expiry of the set time, the system interrupts the make-up and returns the "Make-up time" fault message.

Max. make-up time

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

Max. make-up cycles

This setting is relevant for the actuation of the "CD" 3-ways motor ball valve in make-up degassing.

Make-up pressure

> System pressure: Make-up pressure > system pressure

≤ System pressure: Make-up pressure ≤ system pressure

yes: FQIRA+ contact water meter is installed, see chapter 4.6 "Optional equipment and accessories" on page 13 .

With water meter

This is the prerequisite for the make-up quantity monitoring and the operation of a softening system.

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

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

Make-up quantity

OK Delete meter:

yes: The displayed make-up quantity is set to 0.

no: The displayed water quantity is retained.

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

Max. make-up quantity

When the set quantity is exceeded, the system interrupts the make-up process and returns the error message "Max. make-up quantity exceeded".

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

With softening

yes: The system offers more queries regarding the softening process.

no: The system does not offer more queries regarding the softening process.

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

Lock make-up?

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

no: The system does not stop the make-up process. The system displays the "Softening" message.

Hardness reduction

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

Is calculated from the difference of the overall water hardness GH_{actual} and the target water hardness GH_{target} as defined by the manufacturer specification:

Hardness reduction = GH_{actual}-GH_{target}I °dH

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

Cap. soft water

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

The attainable soft water capacity is calculated from the type of softening used and the specified hardness reduction.

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

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

Remaining cap. soft w.

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

Available soft water capacity.

Replacement in

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

Manufacturer specification for the replacement interval of the softening cartridges, regardless of the calculated soft water capacity. The system displays the "Softening" message.

Vacuum test

Mandatory during commissioning and annual maintenance!

The system must be in manual mode!

Close all inlets to the "PU" vacuum pump.

yes: The system starts and automatically executes the test.

"Vacuum OK" is displayed if the test is successful.

"Vacuum Fault" is displayed if the test is failed.

Possible causes for the alarm:

– The vacuum pump is jammed. Start turning the pump at the fan wheel using a screw driver.
– "DV" degassing valve draws air. Install a new degassing valve.

Check and repair all potential causes and repeat the test.

After the test is successfully concluded, open the inlets to the pump.

no: The system does not execute a test.

Next maintenance

Recommended maintenance message.

Off: Without maintenance recommendation.

001 – 060: Maintenance recommendation in months.

Floating fault contact

For the output of messages to the floating contact, see chapter 9.6 "Messages" on page 44 .

yes: Output of all messages.

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

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

Fault memory

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

ER 01…xx

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

Parameter memory

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

P0 = xx.x bar

Information about the software version.

Servitec 30

9.6 Messages

The display provides alarms in plain text and the ER codes listed below. Use the arrow buttons to scroll through multiple alarms displayed at the same time.

The fault memory stores the last 20 alarms for review, see chapter 9.5 "Parametrising the controller in the Customer menu" on page 40 .

Alarm causes can be eliminated by the operator or a specialist workshop. Please contact the Reflex customer service for alarms that cannot be repaired.

Note!

Clearing of the cause must be confirmed by pressing the “Ack” button on the operator panel. All other alarms are automatically reset as soon as the cause has been eliminated.

Note!

Floating contacts, setting in the Customer menu, see chapter 9.5 "Parametrising the controller in the Customer menu" on page 40 .

ER Code	Alarm	Floating contact	Cause	Remedy	Alarm reset
01	Minimum pressure	Yes	For "Magcontrol" setting only. • Set value not reached. • Water loss in the system. • Fault "PU" vacuum pump. • Expansion tank defective.	• Check set value in the Customer or Service menu. • Check water level. • Check vacuum pump. • Check expansion tank.	-
02.1	Insufficient water	-	• Insufficient pressure in the vacuum pump. • Dirt trap clogged. • "DC" degassing incoming line locked. • "WC" makeup line locked.	• Check set value in the Customer or Service menu. • Clean the dirt trap. • Unblock the incoming pipes.	Quit
02.2	Insufficient water	-	Vacuum is not generated quickly enough. • "PU" vacuum pump defective. • Gas in the vacuum pump. • "DV" degassing valve leaking.	• Check the vacuum pump and replace, if necessary. • Replace the degassing valve.	Quit
02.4	Insufficient water	-	Vacuum during makeup feed.	Open the makeup ball valve.	-
04.1	Pump	Yes	Vacuum pump disabled. • Pump jammed. • Pump motor defective. • Pump motor contactor (Klixon) tripped. • Fuse defective.	• Rotate the pump with screwdriver. • Replace the pump motor. • Electrically test the pump motor. • Replace the 10 A fuse.	Quit

ER Code	Alarm	Floating contact	Cause	Remedy	Alarm reset
06	Makeup time	-	• Set value exceeded. • Water loss in the system • Makeup line not connected. • Makeup rate insufficient. • Makeup hysteresis too low.	• Check set value in the Customer or Service menu. • Check water level. • Connect "WC" makeup line.	Quit
07	Makeup cycles	-	Set value exceeded.	• Check set value in the Customer or Service menu. • Seal the leak in the system.	Quit
08	Pressure measurement	-	For "Magcontrol" setting only. • Controller receives incorrect signal.	• Connect the plug. • Check the cable for damage. • Check the pressure sensor.	Quit
10	Maximum pressure	-	For "Magcontrol" setting only. • Set value exceeded.	• Check set value in the Customer or Service menu. • Set the tripping pressure of the safety valve.	-
11	Back-up volume	-	"With water meter" must be activated in the Customer menu. • Set value exceeded. • Severe water loss in the system.	• Check set value in the Customer or Service menu. • Check the water loss and correct, if necessary.	Quit
14	Discharge period	-	• Set value exceeded. • "DC" degassing line closed. • Dirt trap clogged.	• Check set value in the Customer or Service menu. • Open the "DC" degassing line. • Clean the dirt trap.	Quit
15	Makeup valve	-	Contact water meter measures without makeup request.	Check the "CD" 3-ways ball valve for leaks.	Quit
16	Power failure	-	No power.	Connect to power supply.	-

ER Code	Alarm	Floating contact	Cause	Remedy	Alarm reset
19	Stop > 4 hours	-	Device is in stop mode for more than 4 hours.	Set the controller to Automatic mode.	-
20	Maximum makeup quantity	-	Set value exceeded.	Reset the "Makeup quantity" meter in the Customer menu.	Quit
21	Maintenance recommended	-	Set value exceeded.	Carry out maintenance.	Quit
24	Softening	-	• Set value for soft water capacity exceeded. • Time interval for replacement of the softening cartridge exceeded.	Replace the softening cartridges.	Quit
30	I/O module fault	-	• I/O module defective. • Connection between option card and controller faulty. • Option card defective.	• Replace the I/O module. • Check the connection between option card and controller. • Replace the option card.	-
31	EEPROM defective	Yes	• EEPROM defective. • Internal calculation error.	Inform Reflex Customer Service.	Quit
32	Undervoltage	Yes	Supply voltage not achieved.	Check power supply.	-
33	Adjustment parameter faulty	-	EPROM parameter memory defective.	Inform Reflex Customer Service.	Quit
34	Main board communication faulty	-	• Connecting cable defective. • Main board defective.	Inform Reflex Customer Service.	Quit
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	No input voltage at the 3-ways motor ball valve	-	Short-circuit of input voltage.	Check the wiring at the 3-ways motor ball valve.	-

10 Maintenance

⚠ CAUTION

Risk of burns on hot surfaces

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

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

⚠ CAUTION

Risk of injury due to pressurised liquid

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

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

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

▶ **Note!**

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

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

The following recommended standard value must not be exceeded:

- Continuous degassing: Continuous degassing time for the largest "Va" system volume, see chapter 5 "Technical data" on page 14 .
- Interval degassing: Setting values according to the Service menu.

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

▶ **Note!**

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

10.1 Maintenance schedule

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

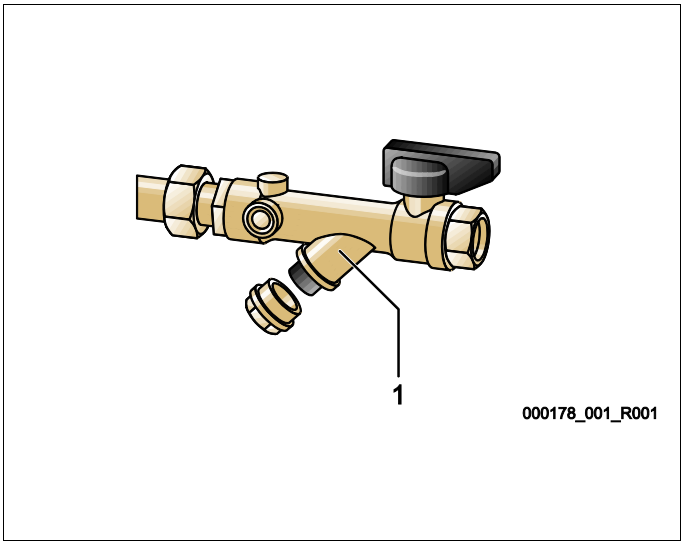
Maintenance task	Conditions			Interval
▲ = Check, ■ = Service, ● = Clean				
Check for leaks. • "PU" vacuum pump • Screw connections • "DV" degassing valve	▲	■		Annually
Function test of the vacuum pump. – see chapter 9.5 "Parametrising the controller in the Customer menu" on page 40	▲			Annually
Clean the dirt trap. – see chapter 10.2.1 "Cleaning the dirt trap" on page 49	▲	■	●	Depending on the operating conditions
Check the controller settings.	▲			Annually
Function test of "CD" 3-ways motor ball valve and "PU" vacuum pump. – see chapter 8.1.2 "Manual mode" on page 35	▲			Annually
When operating with water/glycol mixtures • Control of the mixing ratio. • If necessary, adjust according to manufacturer information.	▲			Annually

10.2 Cleaning

10.2.1 Cleaning the dirt trap

The "ST" dirt trap in the "DC" degassing line must be cleaned after the expiry of the continuous degassing time at the latest. Check the dirt traps after every filling action or extended operation.

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



Notice!

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

10.3 Maintenance certificate

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

Date	Service organisation	Signature	Remarks

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.

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

⚠ CAUTION

Risk of injury due to pressurised liquid

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

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

⚠ CAUTION

Risk of injury upon coming into contact with glycol containing water

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

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

Prior to the disassembly, lock out the "DC" degassing lines and the "WC" makeup line from the system and de-pressurise the device. Then disconnect the device from all electrical power sources.

1. Disconnect the system from the power supply and secure it against unintended reactivation.
2. Lock out the "DC" degassing lines and the "WC" makeup line.
3. Set the device controller to manual mode, see chapter 8.1.2 "Manual mode" on page 35 .
4. Open the "CD" 3-ways motor ball valve until you have attained equal pressure with the ambient atmosphere.
5. Disconnect the power cable of the device from the power supply.
6. 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.
7. If necessary, remove the device from the system area.

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 Guarantee

The respective statutory guarantee regulations apply.

SI1419enB / 9125077 / 12-17

reflex
Thinking solutions.

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