

# Servimat M/L

Pressure maintenance with degassing

## GB Operating manual

Original operating manual



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## 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 6.

### ► Notice!

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

## 2 Liability and guarantee

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

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

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

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

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

### ► Note!

Arrange for Reflex Customer Service to carry out commissioning and annual maintenance, see chapter 12.1 "Reflex Customer Service" on page 25.

## 3 Safety

### 3.1 Explanation of symbols

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

#### **! DANGER**

Danger of death and/or serious damage to health

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

#### **! WARNING**

Serious damage to health

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

#### **! CAUTION**

Damage to health

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

#### **ATTENTION**

Damage to property

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



#### Note!

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

### 3.2 Personnel requirements

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

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

### 3.3 Personal protective equipment



Use the prescribed personal protective equipment as required (e.g. ear protection, eye protection, safety shoes, helmet, protective clothing, protective gloves) when working on the system.

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

### 3.4 Intended use

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

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

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



#### Note!

- Ensure the quality of the make-up water as specified by national regulations.
  - For example, VDI 2035 or SIA 384-1.



#### Note!

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

### 3.5 Inadmissible operating conditions

The device is not suitable for the following applications:

- 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.

#### **⚠ 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.

#### **⚠ CAUTION**

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

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

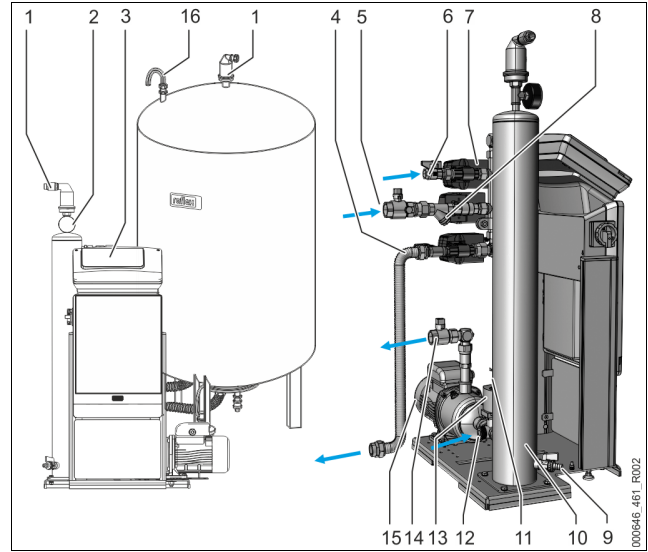
- Use personal protective equipment (safety clothing, gloves and goggles, for example).

## 4 Description of the device

### 4.1 Description

The Servimat is a pump-controlled pressure maintaining, make-up and degassing station for heating and cooling water systems. The Servimat is essentially a control unit with pump, vacuum spray pipe and at least one expansion vessel. The expansion vessel is fitted with a membrane to divide the vessel into an air space and a water space, preventing the ingress of atmospheric oxygen into the expansion water.

### 4.2 Overview

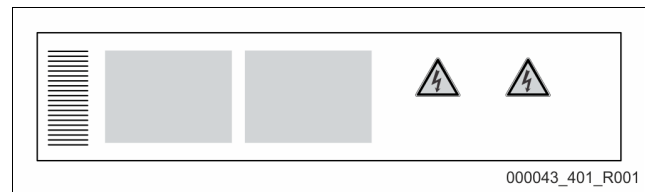


1	"DV" degassing valve
2	"PI" vacuum gauge
3	Control Touch controller
4	Inlet to the expansion vessel
5	Gas-rich water inlet
6	Make-up connection
7	2-way motorized ball valve (in total 3x)
8	"ST" dirt trap

9	"FD" feed and drain cock
10	"VT" vacuum spray pipe
11	Insufficient water switch
12	Connection from the expansion vessel
13	3-way motorized ball valve
14	Degassed water outlet
15	"PU" horizontal pump
16	"VE" pressure compensation elbow

### 4.3 Identification

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



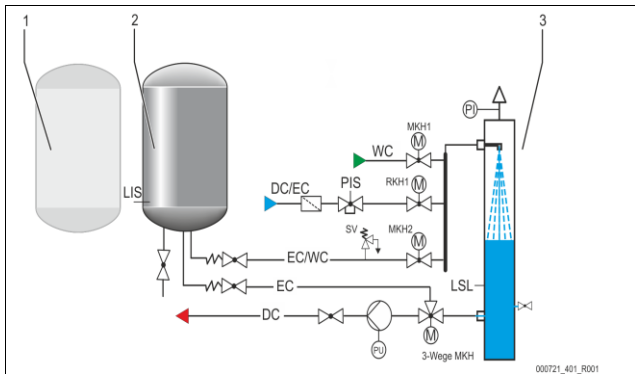
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Information on the type plate	Meaning
Type	Device name
Serial No.	Serial number
min. / max. allowable pressure P	Minimum/maximum permissible pressure
max. continuous operating temperature	Maximum temperature for continuous operation
min. / max. allowable 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 safety valve factory - aline	Factory set actuating pressure of the safety valve
at site	Set actuating pressure of the safety valve

### 4.3.1 Type code

No.		Type code (example)				
1	Device name					
2	"VG" primary tank	Servimat M	VG	500	VF	500
3	Nominal volume	1	2	3	4	5
4	Secondary tank					
5	Nominal volume					

### 4.4 Function



1	Secondary tank (optional)
2	Primary tank
3	Vacuum spray pipe
WC	Make-up pipe
DC	Degassing line <ul style="list-style-type: none"> <li>Gas-rich water from the system</li> <li>Degassed water to the system</li> </ul>
EC	Expansion pipe <ul style="list-style-type: none"> <li>Pipe to the expansion vessel</li> <li>Pipe from the expansion vessel</li> </ul>

The device is a pressure maintaining station for heating and cooling water systems. It is used for maintaining pressure, making-up and degassing the water in heating and cooling systems. The device comprises a control unit consisting of a controller with hydraulic system, vacuum spray pipe and at least one expansion vessel.

#### Expansion vessel:

One primary tank and multiple optional secondary tanks may be connected. A membrane separates the tanks into an air and a water space, preventing the penetration of atmospheric oxygen into the expansion water. The "VE" pressure compensation elbow connects the air space with the atmosphere. The primary tank is hydraulically flexibly connected to the control unit. The function of the "LIS" level measuring using a pressure pick-up is thus ensured.

#### Control unit:

The control unit comprises a control module and a hydraulic module.

- Control module  
Comprising the Control Touch controller and the power connection unit. All pressure maintenance, degassing and make-up processes within the hydraulic module are monitored and controlled by the Control Touch controller.
- Hydraulic module  
The hydraulic module comprises the pump "PU", the overflow valve "PV/RKH1" and the make-up valve "WV/MKH1".

The "PIS" pressure sensor records the pressure and the "LIS" pressure pick-up registers the level; both values are indicated in the Control Touch display. Interfaces enable the use of additional Control Touch functions see chapter 6.4.3 "RS-485 interface" on page 13.

The device fulfils three functions:

#### Maintain pressure:

- The pressure in the facility system rises when the water is heated. When the pressure set at the controller is exceeded, the "PV/RKH1" pressure relief valve opens and drains water from the system into the primary tank, using the "EC" expansion pipe. The pressure within the system drops. The pressure in the facility system drops when the water cools. When the pressure drops below the set value, the "PU" pump is activated and uses the "EC" expansion pipe to transport water from the primary tank back into the system. The pressure in the facility system rises. The controller ensures that the pressure is maintained, further supported by the stabilisation provided by the "MAG" pressure expansion vessel.

#### Degassing:

Two "EC" expansion pipes are required to degas the system water. One pipe is intended for gas-rich water from the system, while one return pipe returns the degassed water to the system. During the degassing action, the "PU" pump and the "PV/RKH1" pressure relief valve are in operation. The pump creates a vacuum in the spray pipe. Gas-rich water is conveyed via the degassing line connection from the facility system to the vacuum spray pipe and degassed. Details see chapter "Sequence of a degassing cycle in the vacuum spray pipe" on page 5. This process can be applied in two different variants (continuous and interval degassing).

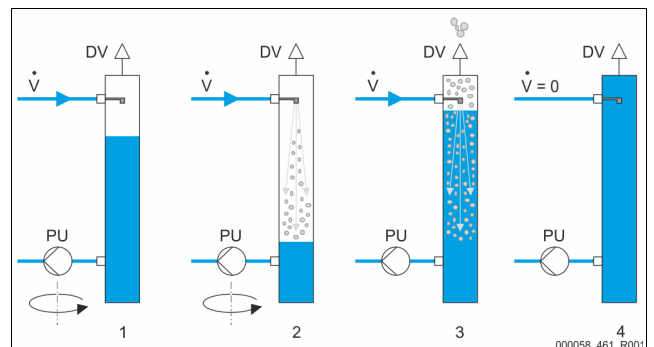
#### Make-up with water for the facility system.

- When the water level in the primary tank falls below the minimum, the "WV/MKH1" make-up valve opens and make-up into the tank continues until the set level is again reached. During the make-up process, the number of requests, the time and the make-up time within a cycle are monitored. Using a FQIRA+ contact water meter, the system monitors each individual make-up quantity and the overall make-up quantity.

The Servimat provides the following safety features:

- Optimisation of all pressure maintenance, degassing and make-up sequences.
  - 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.

#### Sequence of a degassing cycle in the vacuum spray pipe



1	Create vacuum in the spray pipe	3	Discharge
2	Injection	4	Idling time

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

- Create vacuum in the spray pipe.  
The pump starts and conveys water from the vacuum spray pipe. The pump transports more water from the spray pipe than can be transported via the connection lines of the water make-up. A vacuum is created.
- Injection  
Opening of the "PV" overflow valves in the "DC" degassing line routes gas-rich water into the spray pipe. It is atomised by nozzles in the spray pipe. The atomised water is degassed in the vacuum of the vacuum spray pipe because of the large surface area resulting from the atomisation. The degassed water is returned to the facility system via the vacuum pump. The pressure relief valve means that the pump is set to a constant working pressure. The working pressure depends on the respective facility system.

3. Discharge  
The pump shuts down. The pressure in the facility system causes more water to be injected into the vacuum spray pipe and degassed. The water level in the vacuum spray pipe rises. The gases released in the vacuum spray pipe are released into the ambient atmosphere via the degassing valves.
4. Idling time  
When the gas has been discharged, the device will remain idling until the next cycle is started.

**Degassing programmes**

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

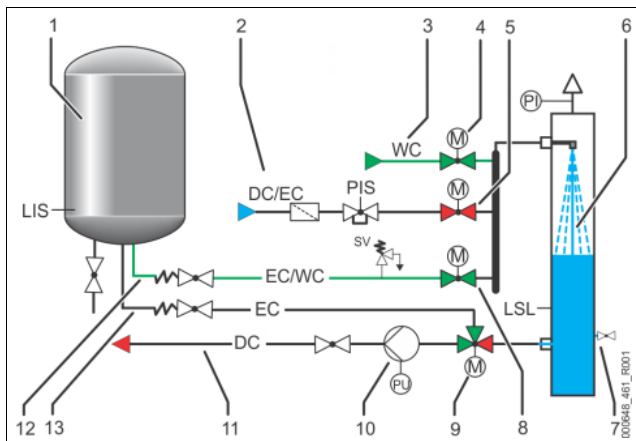
The controller provides 2 different degassing programmes for selection and adjustment:

- 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. There is an idling time between the intervals. This degassing programme must be selected for continuous operation.

**Make-up variants**

The filling level in the tank is measured using the LIS Levelcontrol. If the level falls below the pre-set minimum level, then at a specified level, make-up water is fed in a controlled manner into the tank.

Servimat M/L connection diagram



1	Bladder expansion vessel
2	Gas-rich water inlet
3	Make-up pipe
4	Make-up valve
5	Control ball valve (RKH)
6	Vacuum spray pipe
7	Feed and drain cock
8	Motorized ball valve (MKH) to the tank
9	3-way motorized ball valve Hydraulic connection between tank, vacuum spray pipe and pump (system)

10	Pump
11	Degassed water outlet
12	Pipe to the pressure expansion vessel
13	Pipe from the pressure expansion vessel

**4.5 Scope of delivery**

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

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

Basic pressure maintenance equipment:

- The device on a pallet.
  - Control unit
  - Corrugated sheet hose with union angle (enclosed with control unit)
- "DV" degassing valve of the spray pipe, carton packed.
  - Primary tank with accessories packed on the tank mounting.
    - "VE" ventilation
    - Degassing valve for the "DV" tank
    - Reducing coupling
    - "LIS" pressure pick-up
  - Plastic sleeve with operating manual

**4.6 Optional equipment and accessories**

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

- Heat insulation for the primary tank
- Secondary tanks
  - Accessories are packed on the tank mounting
    - "VE" ventilation
    - "DV" degassing valve
    - Reducing coupling
- Additional equipment with unsupervised-operation BOB-pipe for "TAZ+" temperature limiter
- Fillset for make-up with water.
  - Fillset with integrated system isolator, water meter, dirt trap, and locking mechanisms for the "WC" make-up pipe.
- Fillset Impulse with FQIRA+ contact water meter for make-up with water.
- Fillsoft for softening the make-up water from the potable water supply system.
  - The Fillsoft is installed between the Fillset and the device. The device controller evaluates the make-up quantities and signals the required replacement of the softening cartridges.
- Enhancements for the device controller:
  - I/O module for standard communication.
  - Communication module for external operation of the controller
  - Master-Slave-Connect for master controllers for maximum 10 devices.
  - Combined switching to increase capacity and parallel switching of 2 hydraulically directly connected systems
  - Bus modules:
    - Lonworks Digital
    - Lonworks
    - Profibus DP
    - Ethernet
- Diaphragm rupture monitor.

**Note!**  
Separate operating instructions are supplied with accessories.

**5 Technical data**

**5.1 Control unit**

- Note!**  
The following values apply for all control units:
- Permissible flow temperature: 120 °C
  - Permissible operating temperature: 70 °C
  - Permissible ambient temperature: 0 °C – 45 °C

Type	Power output (kW)	Power supply (V / Hz, A)	Degree of protection	Number of RS-485 interfaces	I/O module	Electrical voltage control unit (V, A)	Noise level (dB)	Weight (kg)
Servimat M	1.1	230 / 50, 5	IP 54	1	No	230, 2	55	37
Servimat L	1.1	230 / 50, 5	IP 54	1	No	230, 2	55	53

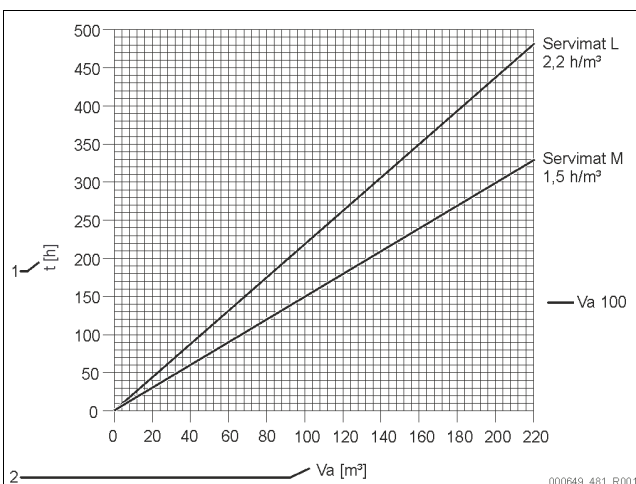
### 5.2 Dimensions and connections

Type	Weight (kg)	Height (mm)	Width (mm)	Depth (mm)	Device connection	Degassing system connection	Make-up connection
Servimat M	36	1215	685	440	Internal thread 1 "	Internal thread 1 "	Internal thread 1/2 "
Servimat L	42	1215	600	525	Internal thread 1 "	Internal thread 1 "	Internal thread 1/2 "

### 5.3 Operation

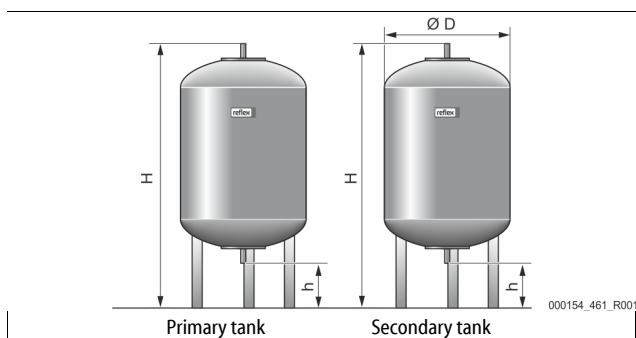
Type	System volume (100% water) (m³)	System volume (50% water 50% glycol) (m³)	Working pressure (bar)	Permissible operating gauge pressure (bar)	Operating temperature (°C)
Servimat M	220	–	0.5 – 4.5	8	>0 – 70
Servimat L	220	–	0.5 – 7.2	10	>0 – 70

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



1	Continuous degassing "t" [h]	2	System volume "Va" [m³]
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### 5.4 Tanks



**Note!**  
Optional heat insulation is available for primary tanks, see chapter 4.6 "Optional equipment and accessories" on page 6.

Type	Ø "D" (mm)	Weight (kg)	Connection (inches)	H (mm)	h (mm)
6 bar - 200	634	37	G1	1060	146
6 bar - 300	634	54	G1	1360	146
6 bar - 400	740	65	G1	1345	133

Type	Ø "D" (mm)	Weight (kg)	Connection (inches)	H (mm)	h (mm)
6 bar - 500	740	78	G1	1560	133
6 bar - 600	740	94	G1	1810	133
6 bar - 800	740	149	G1	2275	133
6 bar - 1000/740	740	156	G1	2685	133
6 bar - 1000/1000	1000	320	G1	2130	350
6 bar - 1500	1200	465	G1	2130	350
6 bar - 2000	1200	565	G1	2590	350
6 bar - 3000	1500	795	G1	2590	380
6 bar - 4000	1500	1080	G1	3160	380
6 bar - 5000	1500	1115	G1	3695	380

## 6 Installation

### **⚠ DANGER**

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

- If live parts are touched, there is risk of life-threatening injuries.
- Ensure that the system is voltage-free before installing the device.
- Ensure that the system is secured and cannot be reactivated by other persons.
- Ensure that installation work for the electric connection of the device is carried out by an electrician, and in compliance with electrical engineering regulations.

### **⚠ CAUTION**

**Risk of injury due to pressurised liquid**

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

### **⚠ CAUTION**

**Risk of burns on hot surfaces**

- Hot surfaces in heating systems can cause burns to the skin.
- Wear protective gloves.
  - Please place appropriate warning signs in the vicinity of the device.



**CAUTION**

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

- Bruising from falls or bumps on system components during installation.
- Wear personal protective equipment (helmet, protective clothing, gloves, safety boots).

**Note!**

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

**6.1 Incoming inspection**

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

Proceed as follows:

- Upon receipt of the goods, check the shipment for
  - completeness and
  - possible transport damage.
- Document any damage.
- 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 device installation:**

- No access by unauthorised personnel.
- Frost-free, well-ventilated room.
  - Room temperature 0 °C to 45 °C (32 °F to 113 °F).
- Level, stable flooring.
  - Ensure sufficient bearing strength of the flooring before filling the tanks.
  - Ensure that the control unit and the tanks are installed on the same level.
- Filling and dewatering option.
  - Provide a DN 15 filling connection according to DIN 1988 - 100 and En 1717.
  - Provide an optional cold water inlet.
  - Prepare a drain for the drain water.
- Electric connection 230 V~, 50/60 Hz, 16 A with upstream ELCB: Tripping current 0.03 A.
- Use only approved transport and lifting equipment.
  - The load fastening points at the tanks must be used only as installation resources.

**Note!**

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

**6.3 Execution**

**ATTENTION**

**Damage due to improper installation**

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

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

For installation, proceed as follows:

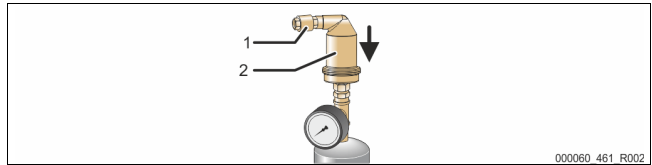
- Position the device.
- Complete the primary tank and the optional secondary tanks.
- Create the water-side connections of the control unit to the system.
- Create the interfaces according to the terminal plan.
- Install the water connections between optional secondary tanks to each other and to the primary tank.



**Notice!**

For installation, note the operability of the valves and the inlet options of the connecting lines.

**6.3.1 Fitting the add-on components for the vacuum spray pipe**

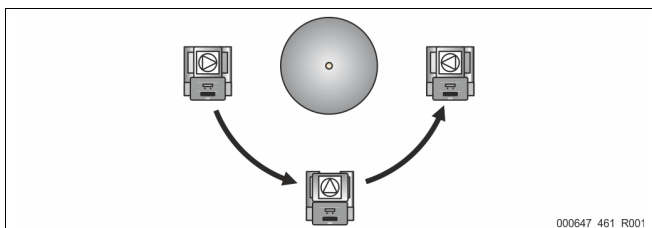


Fit the "DV" degassing valve with pre-assembled check valve on the "VT" vacuum spray pipe.

For optimum reliability, we recommend braided sealing tape (PTFE) or pipe sealing cord (polyamide ww. PTFE) as a seal.

Check all screw fittings of the device for proper seating.

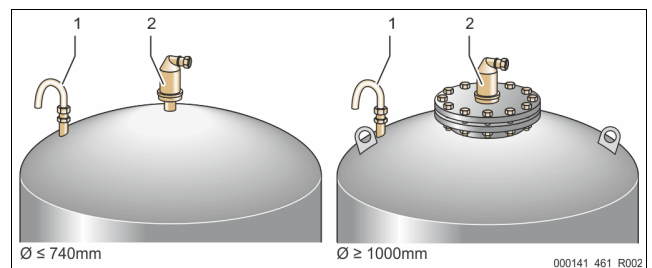
**6.3.2 Positioning**



Specify the position of the control unit and primary tank:

- Servimat:
  - The control unit can be installed on either side or in front of the primary tank. The distance of the control unit to the primary tank results from the connection set supplied.

**6.3.3 Installation of add-on components for the tanks**



The add-on components are packed in plastic bags and attached to the base of the tanks.

- Pressure compensation elbow (1).
- Reflex Exvoid with pre-fitted check valve (2)
- "LIS" pressure pick-up

For add-on components, proceed as follows:

- Install the Reflex Exvoid (2) at the connection of the corresponding tank. For optimum reliability, we recommend braided sealing tape (PTFE) or pipe sealing cord (polyamide ww. PTFE) as a seal.
- Remove the protective cap from the degassing valve.
- Use the compression fitting to install the pressure compensation elbow (1) for ventilation at the tanks.



**Note!**

Install the "LIS" pressure pick-up only after finalising the installation of the primary tank, see chapter 6.3.6 "Fitting the level sensor" on page 10.



**Note!**

To ensure fault-free operation, do not seal off the ventilation.



6.3.4 Tank installation

**ATTENTION**

**Damage due to improper installation**

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

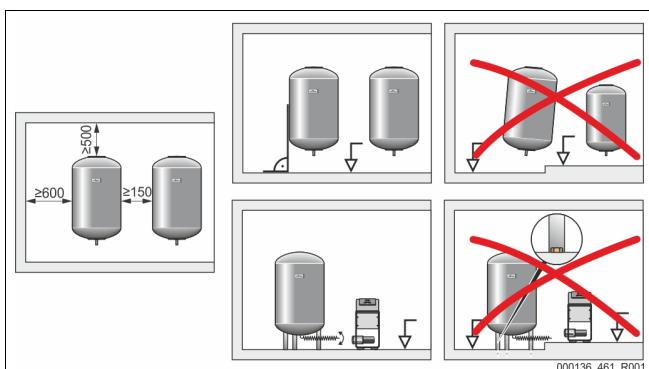
- Ensure that pipes are connected from the device to the system without them being stressed or strained.
- If necessary, provide support structures for the pipes or equipment.

**ATTENTION**

**Device damage resulting from dry running of the pump**

If the pump is incorrectly connected, there is a risk of dry-running.

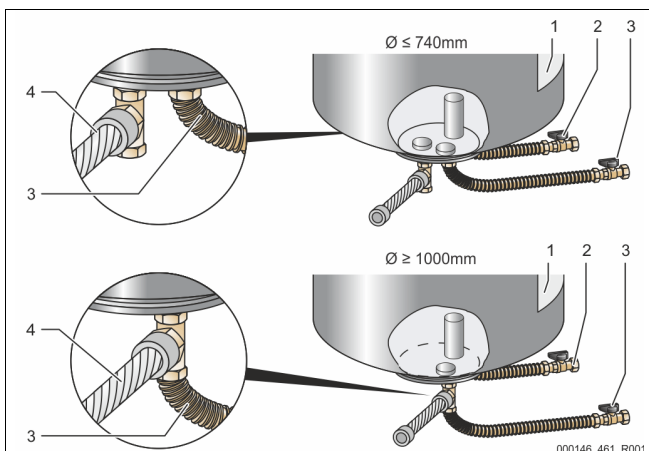
- Ensure that the connections for the overflow collector and the pump are not interchanged.
- Ensure correct connection of the pump to the primary tank.



(All data in mm)

Comply with the following notes regarding the installation of the primary tank and the secondary tanks.

- All flange openings at the tanks are viewing and maintenance openings. Install the primary tank and the secondary tanks, if provided, with sufficient spaces at the sides and the top.
- Install the tanks on a level surface.
- Ensure rectangular and free-standing position of the tanks.
- If you use secondary tanks in addition to the primary tank, ensure that all tanks are of the same type and dimensions.
- Do not attach the tanks to the flooring to ensure the functioning of the "LIS" level sensor.
- Install the control unit on the same level as the tanks.



1	Adhesive label	3	"Pump" connection set
2	"Overflow collector" connection set	4	Secondary tank connection set

- Align the primary tank.
  - The distance of the primary tank to the control unit must match the length of the connection set.

- Connect the connection set (2) and (3) with the screw fittings and gaskets to the connections at the lower tank flange of the primary tank.
  - Ensure that you connect the connection set for the overflow collector to the connection (2) below the label (1).
    - Interchanging the connections may cause the pump to run dry.
  - For tanks up to 740 mm Ø:
    - Connect the connection set (2) and (3) to the two free 1-inch barrel nipples at the tank flange.
    - Connect the connection set (4) of the secondary tank to the T-joint at the outlet of the tank flange.
  - For tanks from 1000 mm Ø:
    - Connect the connection set (2) to the 1-inch barrel nipple of the tank flange.
- Connect the connection sets (3) and (4) to the T-joint at the 1-inch barrel nipple of the tank flange.

**Note!**  
If necessary, install the supplied connection set (4) at the optional secondary tank. Connect the connection set (4) with a user-supplied flexible pipeline to the primary tank.

6.3.4.1 Connection to the facility system

**CAUTION**

**Hot water vapour can cause burns to skin and eyes.**  
Hot steam can escape from the safety valve. The hot steam will cause scalding of the skin and eyes.

- Ensure that the blow-off line of the safety valve is routed so that injuries are not possible.

**ATTENTION**

**Damage due to improper installation**

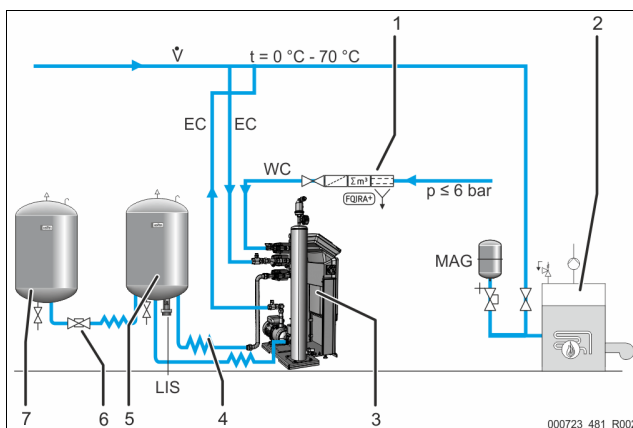
Additional device stresses may arise due to the connection of pipes or system equipment.

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

6.3.4.2 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 facility system.

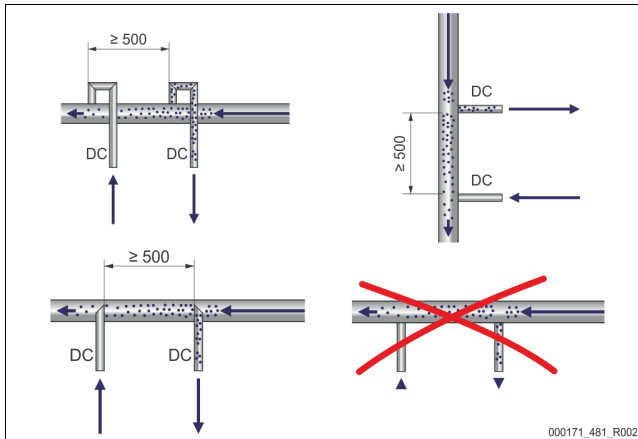
**Device installation in a heating system – Pressure maintenance with diaphragm-type expansion vessel**



1	Optional equipment and accessories see chapter 4.6 "Optional equipment and accessories" on page 6
2	Heat generator
3	Servimat
4	Primary tank connection set
5	Primary tank
6	Reflex rapid-action coupling R 1 x 1
7	Secondary tank
EC	Degassing line <ul style="list-style-type: none"> <li>Gas-rich water from the system</li> <li>Degassed water to the system</li> </ul>
LIS	Level sensor
WC	Make-up pipe
MAG	Expansion vessel

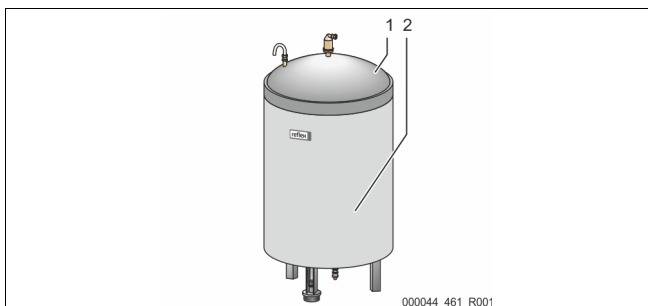
If required, install a bladder expansion vessel MAG ≥ 140 litres (Reflex N, for example). It reduces the switching frequency and can be also used in the individual protection of the heat generators. The p0 setting of the bladder expansion vessel (MAG) should be identical to the p0 setting of the controller. According to DIN / EN 12828, the installation of shut-off devices between the appliance and the heat generator is required for heating systems. Otherwise secure locking mechanisms must be fitted.

**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 direction of flow.
- The water temperature must be in the range 0 °C – 70 °C. The return line side should be preferred for heating systems. This ensures the permissible temperature range for degassing.

**6.3.5 Fitting the thermal insulation**



Install the optional thermal insulation (2) around the primary tank (1) and close the insulation with the zip fastener.

- Note!**
- For heating systems, insulate the primary tank and the "EC" expansion lines against heat loss.
    - Thermal insulation is not required for either the primary tank top or the secondary tank.

- Note!**
- On-site, install thermal insulation when condensate forms.

**6.3.6 Fitting the level sensor**

**ATTENTION**

**Damage to the pressure load cell due to unprofessional installation**  
Incorrect installation may result in damage to the "LIS" level sensor, malfunctioning and incorrect measurements from the pressure load cell.

- Comply with the instructions regarding the installation of the pressure load cell.

The "LIS" level sensor uses a pressure load cell. This pressure pick-up is to be installed after the primary tank has been placed at its final position, see chapter 6.3.4 "Tank installation" on page 9. Comply with the following instructions:

- Remove the transport securing device (squared timber) at the vessel base of the primary tank.
- Replace this transport securing device with the pressure load cell.
  - In the case of a tank volume of 1000 l (Ø 1000 mm) or more, use the supplied screws to attach the pressure load cell at the vessel base of the primary tank.
- Avoid shock-type loading of the pressure load cell by, for example, subsequent alignment of the vessel.
- Use flexible hoses to connect the primary tank and the first secondary tank.
  - Use only the supplied connection sets, see chapter 6.3.4 "Tank installation" on page 9.
- Perform a null balancing of the filling level when the primary tank is aligned and fully emptied, see chapter 9.3.1 "Customer menu" on page 18.

**Standard values for level measurements:**

Primary tank	Measuring range
200 l	0 – 4 bar
300 – 500 l	0 – 10 bar
600 – 1000 l	0 – 25 bar
1500 – 2000 l	0 – 60 bar
3000 – 5000 l	0 – 100 bar

**6.4 Electrical connection**

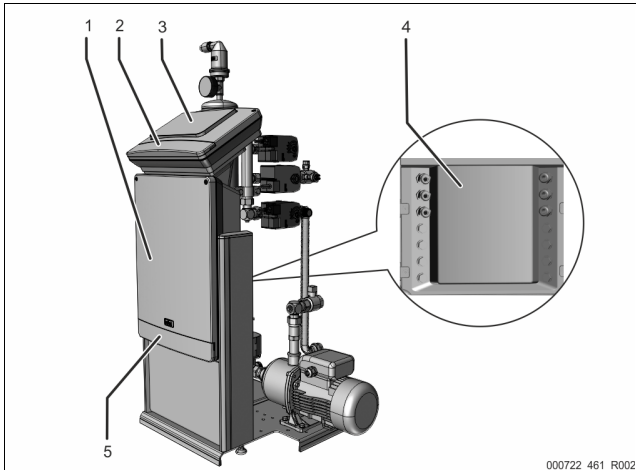
**! DANGER**

**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	Connection unit
2	Covers of the operating unit (folding) <ul style="list-style-type: none"> <li>• RS-485 interfaces</li> <li>• Pressure output</li> </ul>
3	Operating unit (Control Touch controller)
4	Cable bushings

5	Covers of the connection unit (folding) <ul style="list-style-type: none"> <li>• Supply and fusing</li> <li>• Floating contacts</li> <li>• Aggregate connection</li> </ul>
---	--

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

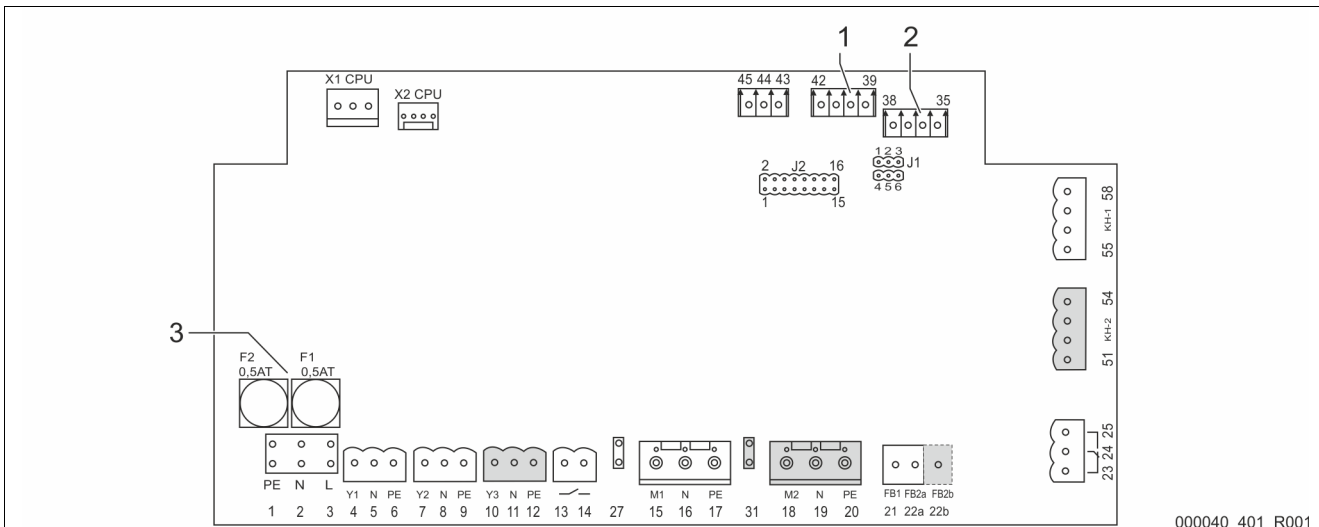
1. Shut down the system and secure it against unintentional reactivation.
2. Remove the covers.

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

3. 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 unit, see chapter 6.4.1 "Terminal plan, connection component" on page 11 .
  - Operating unit, see chapter 6.4.2 "Terminal plan, operating unit" on page 12 .
  - When providing fusing for the appliance, note its connected load, see chapter 5 "Technical data" on page 6 .
6. Install the cover.
7. Connect the mains plug to the 230 V power supply.
8. Activate the system.

The electrical connection is completed.

### 6.4.1 Terminal plan, connection component



000040\_401\_R001

1	Pressure
2	Level

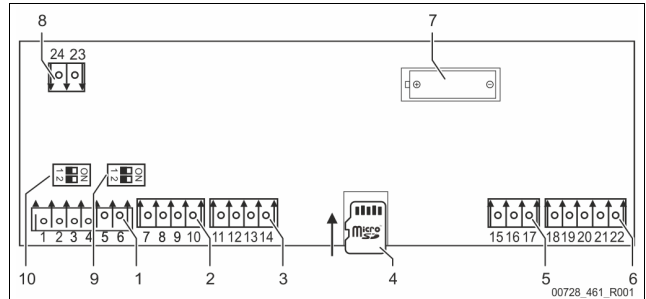
3	Fuses
---	-------

Terminal number	Signal	Function	Wiring
<b>Supply</b>			
X0/1	L	Supply 230 V, maximal 16 A	User supplied
X0/2	N		
X0/3	PE		
X0/1	L1	Supply 400 V, maximal 20 A	User supplied
X0/2	L2		
X0/3	L3		
X0/4	N		
X0/5	PE		

Terminal number	Signal	Function	Wiring
<b>Circuit board</b>			
1	PE	Voltage supply	Factory-provided
2	N		
3	L		
4	Y1	"Safe Control" motorized ball valve for make-up (MKH1) WV	Factory-provided
5	N		
6	PE	Motorized ball valve to the tank (MKH2)	Factory-provided
7	Y2		
8	N		
9	PE		

Terminal number	Signal	Function	Wiring
10	Y3	3-way motorized ball valve	Factory-provided
11	N		
12	PE		
13		Dry-run protection message (floating)	User supplied
14			
15	M1	PU 1 pump	Factory-provided
16	N		
17	PE		
18	M2		
19	N	---	---
20	PE		
21	FB1	Pump 1 voltage monitoring	Factory-provided
22a	FB2a	Pump 2 voltage monitoring	Factory-provided
22b	FB2b	External make-up request together with 22a	Factory-provided
23	NC		
24	COM	Group message (floating)	User supplied
25	NO		
27	M1		
31	M2	Flat plug for supply, pump 2	Factory-provided
35	+18 V (blue)	Analogue input, LIS level measuring at the primary tank	User supplied
36	GND		
37	AE (brown)		
38	PE (shield)		
39	+18 V (blue)	Analogue input, "PIS" pressure measuring at the primary tank	User, optional
40	GND		
41	AE (brown)		
42	PE (shield)		
43	+24 V	Digital inputs	User, optional
44	E1	E1: Contact water meter	Factory-provided
45	E2	Insufficient water switch E2 (LSL)	---
51	GND	---	---
52	+24 V (supply)		
53	0 – 10 V (correcting variable)		
54	0 – 10 V (feedback)	Pressure relief valve (control ball valve RKH1)	Factory-provided
55	GND		
56	+24 V (supply)		
57	0 – 10 V (correcting variable)		
58	0 – 10 V (feedback)		

6.4.2 Terminal plan, operating unit



1	RS-485 interfaces
2	I/O interface
3	I/O interface (reserve)
4	Micro SD card
5	10 V supply
6	Analogue outputs for Pressure and Level
7	Battery compartment
8	Bus module supply voltage
9	RS-485 connection
10	RS-485 connection

Terminal number	Signal	Function	Wiring
1	A	RS-485 interface S1 networking	User supplied
2	B		
3	GND S1		
4	A	RS-485 interface S2 modules: Expansion or communication module	User supplied
5	B		
6	GND S2		
7	+5 V	I/O interface: Interface to the main board	Factory
8	R × D		
9	T × D		
10	GND IO1	I/O interface: Interface to the main board (reserve)	---
11	+5 V		
12	R × D		
13	T × D	10 V supply	Factory
14	GND IO2		
15	10 V~		
16	FE	Analogue outputs: Pressure and Level Standard 4 – 20 mA	User supplied
17	Y2PE (shielding)		
18	Pressure		
19	GND A		
20	Level		
21	GND A		
22	GND A		

### 6.4.3 RS-485 interface

Use the S1 and S2 RS-485 interfaces to retrieve all controller data and to enable the communication with control centres or other devices.

- S1 interface
  - A maximum 10 devices can be used in a master-slave linked circuit via the this interface.
- S2 interface
  - "PIS" pressure and "LIS" level.
  - Operating modes of the "PU" pumps.
  - Operating state of the control ball valve (RKH1) in the pressure relief pipe.
  - "Safe Control" operating state (MKH1) of the make-up.
  - Values of the "FQIRA +" contact water meter.
  - All messages, see chapter 9.4 "Messages" on page 21 .
  - All entries in the fault memory.

The following accessories are available for interface communication.

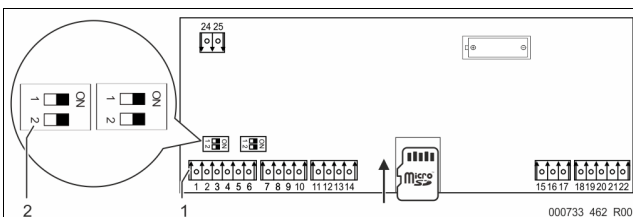
- Bus modules
  - Lonworks Digital
  - Lonworks
  - Profibus-DP
  - Ethernet
  - Optional I/O module, see chapter 6.4.3 "RS-485 interface" on page 13

#### ► 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.

#### 6.4.3.1 Connecting the RS-485 interface

Main circuit board of the Control Touch controller.



1	Connection terminals for RS-485 connection
2	Dip switch 1

Proceed as follows:

1. Use a screened cable to connect the RS-485 interface to the main circuit board.
  - S 1
    - Terminal 1 (A+)
    - Terminal 2(B-)
    - Terminal 3(GND)
2. Connect the cable screen at one side.
  - Terminal 18
3. Activate the terminator on the main circuit board.
  - Dip switch 1

#### ► Note!

Activate the terminator when the device is at the beginning or the end of the RS-485 network.

### 6.5 Installation and commissioning certificate

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

This device has been installed and commissioned in accordance with the instructions provided in the operating manual. The settings in the controller match the local conditions.

#### ► Note!

When any factory-set values of the device are changed, you must enter this information in the Maintenance certificate, see chapter 10.5 "Maintenance certificate" on page 24 .

#### 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.

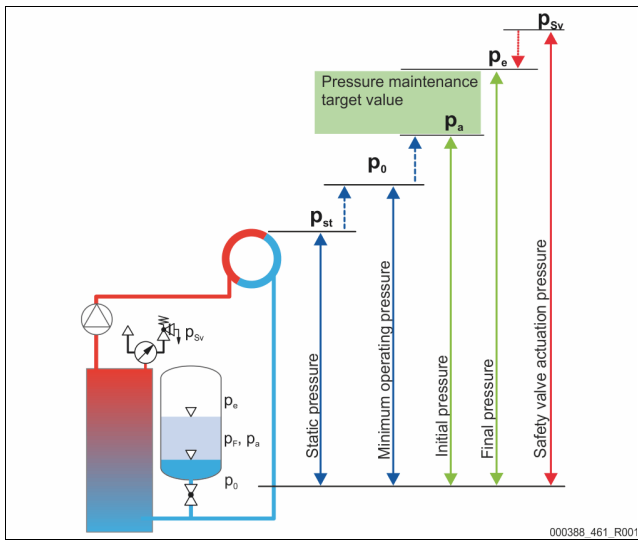
### 7.1 Checking the requirements for commissioning

The device will be ready for initial commissioning when the tasks described in the "Installation" chapter have been completed. The system designer or an assigned expert is responsible for carrying out the commissioning. Commission the storage tank according to the information in the corresponding installation manual. Note the following information on initial commissioning:

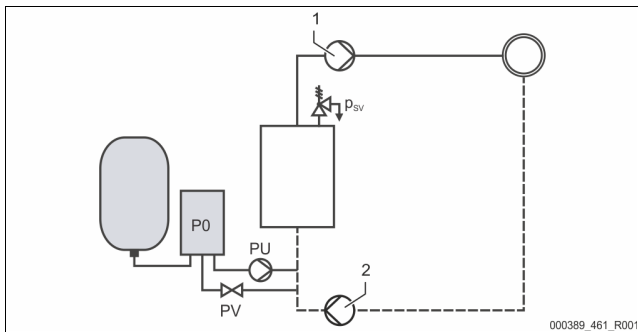
- The control unit is connected to the primary tank and the secondary tanks, if provided.
- The water connections of the tanks to the facility system are established.
- The tanks are not filled with water.
- The valves for emptying the tanks are open.
- The water-side connection of the device to the make-up supply has been created and is operational.
- The connection pipes of the device have been purged and cleaned of welding residue and dirt before commissioning.
- The entire facility system is filled with water and all gases have been vented in order to ensure a circulation through the entire system.
- The electrical connection has been created according to applicable national and local regulations.

### 7.2 Determining the $P_0$ minimum operating pressure for the controller

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" control ball valve 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	= $p_{st} + 0.2$ bar
$p_a$ Supply pressure (pump "ON")	= $p_0 + 0.3$ bar
Static pressure range (control ball valve RKH1 "CLOSED" / Pump "OFF")	= $p_0 + 0.5$ bar
$p_e$ Final pressure (control ball valve RKH1 "ON")	≤ $p_{sv} - 0.5$ bar (for $p_{sv} \leq 5.0$ bar)
	≤ $p_{sv} \times 0.9$ (for $p_{sv} > 5.0$ bar)
$p_{sv}$ Safety valve actuating pressure	= $p_0 + 1.2$ bar (for $p_{sv} \leq 5.0$ bar)
	= $1.1 \times p_0 + 0.8$ 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<sub>0</sub>" minimum operating pressure is calculated as follows:

Calculation	Description
$p_{st} = h_{st}/10$	$h_{st}$ in metres
$p_0$	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
$P_0$	≥ $p_{st} + p_0 + 0.2$ bar* (suction pressure maintenance)
	≥ $p_{st} + p_0 + d_p + 0.2$ bar* (final pressure maintenance)

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

Calculation example for "P<sub>0</sub>" 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:

$$P_0 = p_{st} + p_0 + 0.2 \text{ bar}^*$$

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

$$p_{st} = 18 \text{ m}/10$$

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

$$p_0 = 0.0 \text{ bar at a safety temperature of } 100 \text{ °C (212 °F)}$$

$$P_0 = 1.8 \text{ bar} + 0 \text{ bar} + 0.2 \text{ bar}$$

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

**Note!**

- The initial and final pressure of the following components must not overlap with the actuating pressure of the safety valve.
  - Control ball valve RKH1
  - Pumps
- The actuating pressure must not fall below the minimum value of the actuating pressure of the safety valve.

**Note!**

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

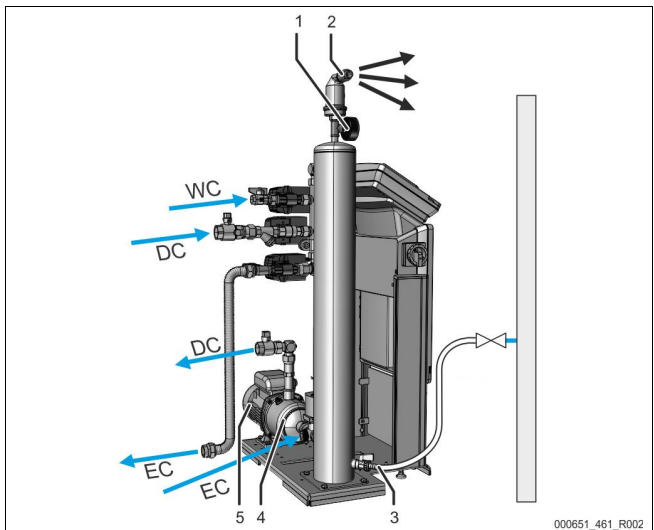
**7.3 Filling the device with water and venting**

**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).

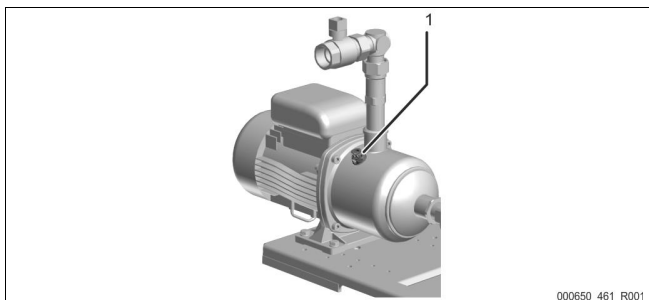


1	"PI" vacuum gauge
2	"DV" degassing valve
3	"FD" feed and drain cock
4	"AV" venting screw

5	"PU" pump
WC	Make-up pipe
DC	Degassing lines
EC	Expansion pipe

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

Vent the pump:



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

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

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

- Water/air mixtures are removed from the pump.

6. Re-tighten the venting screw when only water escapes.
7. Close the feed and drain cock.

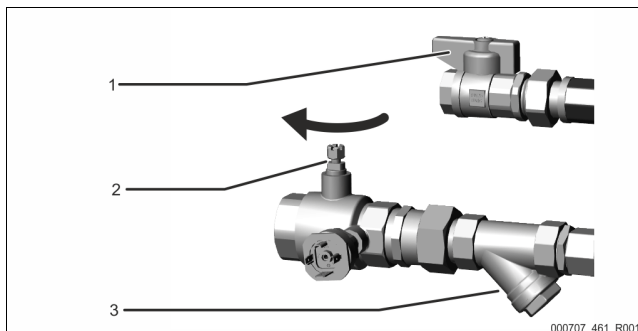
Filling and venting is concluded.

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

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

## 7.4 Vacuum test

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



Proceed as follows:

1. Switch to Manual mode.
  - For more information about Manual mode, see chapter 8.1.2 "Manual mode" on page 16.
2. Close RKH1 (control ball valve) from the system feed line in controller "Manual mode".
3. Close MKH2 (motorised ball valve) to the tank in controller "Manual mode".
4. Close the "Safe Control" make-up valve in the make-up pipe.
5. Open the 3-way motorised ball valve in the direction of the pump/spray pipe.
6. Generate a vacuum in controller manual mode.
7. After 10 minutes, recheck 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 pipe.
  - The venting screw at the "PU" pump.
8. After successful conclusion of the vacuum test, open the ball valve (2).
9. If the controller displays the "Insufficient water" error message, acknowledge the message via button "OK".

**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 5 to 6 until no further pressure rise is observed.

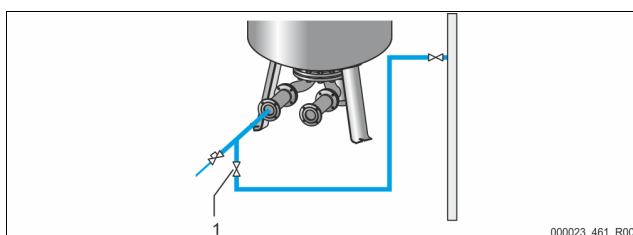
## 7.5 Filling the tanks with water

The following information applies to the devices:

- Control unit and primary tank.
- Control unit and primary tank and one secondary tank.
- Control unit and primary tank and more than one secondary tanks.

Facility system	System temperature	Filling level of primary tank
Heating system	≥ 50 °C (122° F)	Approx. 30 %
Cooling system	< 50 °C (122° F)	Approx. 50 %

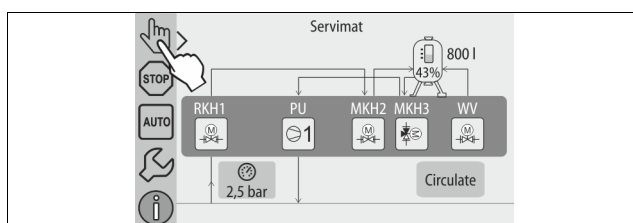
### 7.5.1 Filling with a hose



Preferably use a water hose to fill the primary tank with water when the automatic make-up device is not yet connected.

- Use a vented water hose filled with water.
- Connect the water hose to the external water supply and the "FD" feed and drain cock (1) at the primary tank.
- Check whether the shut-off valves between control unit and primary tank are open (supplied pre-wired in open position).
- Fill the primary tank with water until the filling level has been reached.

### 7.5.2 Filling using Safe Control in the make-up pipe



1. Use the "Manual mode" button to switch to "Manual" mode.
2. Open the "WV make-up valve" and "MKH2" via the corresponding buttons until the specified filling level is reached.
  - Continuously monitor this process.
  - If a high-water alarm is generated, the make-up valve "WV make-up valve" is automatically closed.

## 7.6 Starting Automatic mode

**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 10.3.1 "Cleaning the dirt trap" on page 23.

**Note!**  
The commissioning process is now concluded.



## 8 Operation

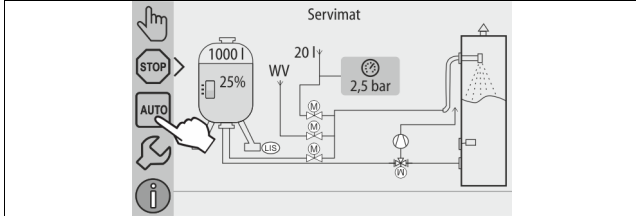
### 8.1 Operating modes

#### 8.1.1 Automatic mode

After successful initial commissioning, start automatic operation of the device. The controller monitors the following functions:

- Maintain pressure
- Compensate expansion volume
- Degas
- Automatic make-up

To start the Automatic mode, proceed as follows:



1. Press "AUTO".
  - The pumps and pressure relief valves are regulated so that the pressure remains constant to within  $\pm 0.2$  bar.
  - Faults are displayed and evaluated.

Automatic mode is activated.

Select a degassing programme for Automatic mode. The Customer menu provides two different degassing programmes for selection, see chapter 9.3.4 "Degassing programmes – overview" on page 20.

- Continuous degassing.
- Interval degassing.

For selection of degassing programmes, see chapter 9.3.5 "Setting degassing programmes" on page 20.

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

#### 8.1.2 Manual mode

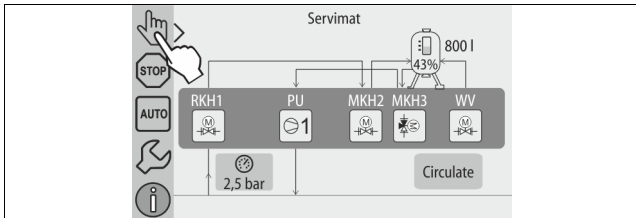
The manual mode is intended for test and maintenance tasks.

Manual mode allows you to select the following functions and to perform a test run:

- "PU" pump.
- The pressure relief valve (opening of RKH1 and MKH2).
- The "WV" Safe Control for the make-up.
- The 3-way motorized ball valve "MKH3"

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:
  - "PU" = Pump
  - "RKH1+MKH2" = Pressure relief valve
  - "WV1" = Safe Control make-up valve
  - "MKH3" = Opening/closing of tank/spray pipe to the system

The change in the filling level and the tank pressure are indicated on the display.

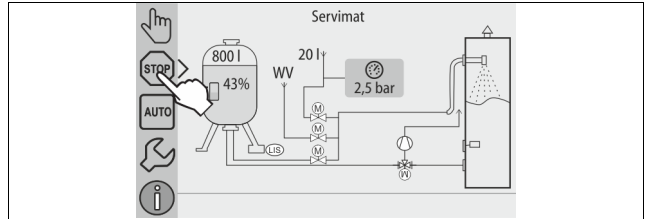
- **Note!** Manual operation can not be performed if safety-relevant parameters are exceeded.
  - Switching is blocked if safety-relevant settings are exceeded.

#### 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-way motorized ball valve in the pressure relief pipe is closed.
- The 2-way motorized ball valve to the tank is closed.
- The 3-way motorized ball valve in the degassing line is closed to the spray pipe.



To start Stop mode operation, proceed as follows:

- Touch "STOP".

- **Note!** The system returns an alarm if the Stop mode is activated for more than 4 hours.
  - If "Volt free contact?" in the Customer menu is set to "Yes", the system outputs the alarm to the group alarm contact.

### 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.

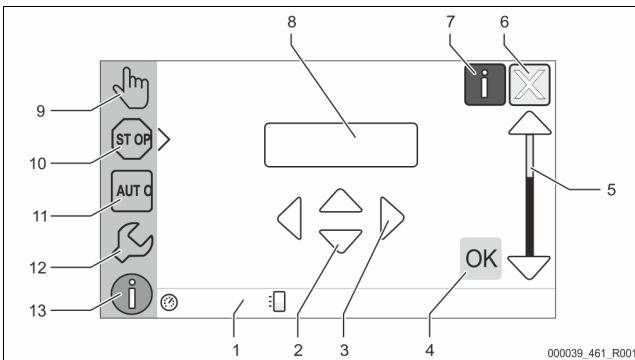
- Switch the pump to a zero-volts state before turning the pump at the fan wheel with a screwdriver.

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

- **Note!** A jamming of the pumps is prevented during operation thanks to forced starting action (after 24 hours).

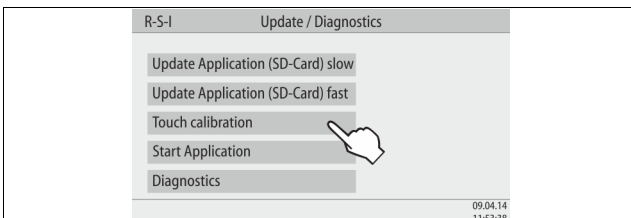
## 9 Controller

### 9.1 Operator panel



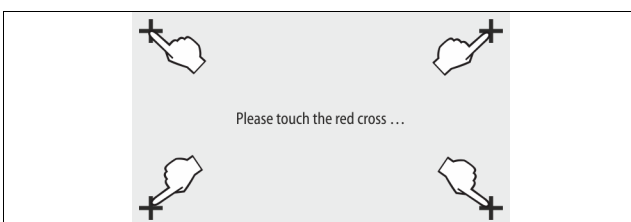
1	Message line	8	Display value
2	"▼"/"▲" buttons • Set digits.	9	"Manual mode" button • For function tests.
3	"◀"/"▶" buttons • Select digits.	10	"Stop mode" button • For commissioning.
4	"OK" button • Confirm/acknowledge input. • Browse in the menu.	11	"Automatic mode" button • For continuous operation.
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. • Page back 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.

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



- Touch the displayed crosses on the touch screen after each other.
- 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

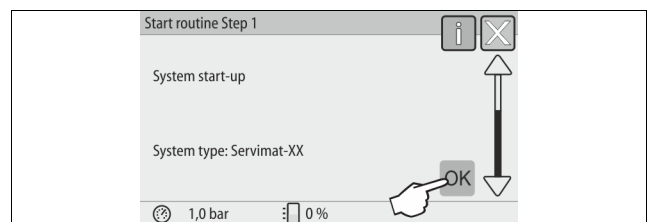
**Note!**  
For handling the operator panel see chapter 9.1 "Operator panel" on page 17

The start routine is used to set the required parameters for the device initial commissioning. It commences with the first activation of the controller and can be run only once. Parameter changes or checks are possible after the start routine in the customer menu is exited, see chapter 9.3.1 "Customer menu" on page 18.

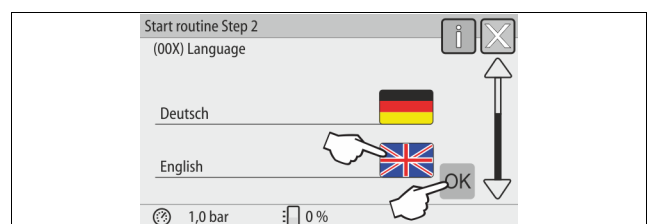
A three-digit PM code is assigned to the setting options.

Step	PM code	Description
1		Start of the start routine
2	001	Select the language
3		Remember: Prior to installation and commissioning, read the operating manual!
4	005	Set the "P <sub>0</sub> " minimum operating pressure, see chapter 7.2 "Determining the P <sub>0</sub> minimum operating pressure for the controller" on page 13.
5	002	Set the time
6	003	Set the date
7	121	Select the primary tank nominal volume
8		Null balancing: The primary tank must be empty! The system checks whether the signal from the level sensor matches the selected primary tank
9		End of the start routine. The stop mode is active.

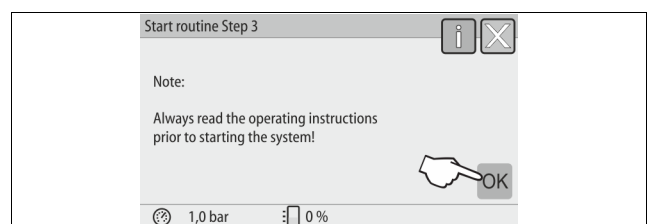
The system automatically displays the first page of the start routine when you switch on the device for the first time.



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

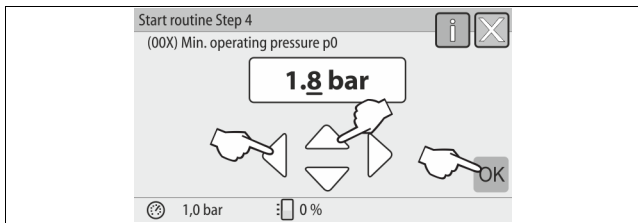


- Select the required language and conform your entry with "OK".

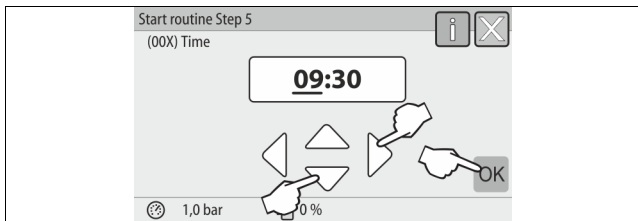


- Follow the instruction and confirm with the "OK" button.

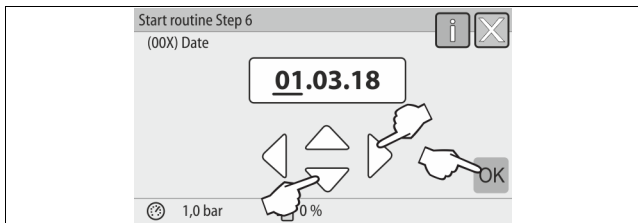
**Note!**  
Always read the operating instructions prior to starting the system!



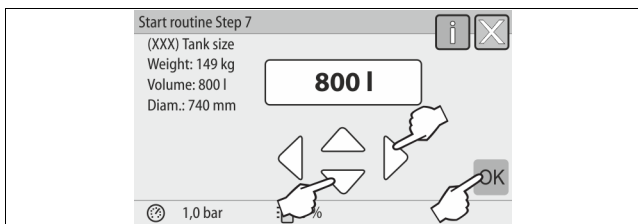
4. Select the calculated minimum operating pressure and conform your entry with "OK".
  - For calculating the minimum operating pressure, see chapter 7.2 "Determining the P<sub>0</sub> minimum operating pressure for the controller" on page 13 .



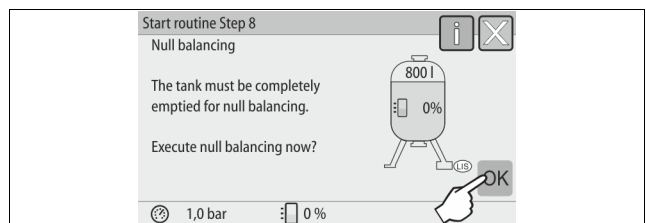
5. Set the time.
  - Use the "Left" and "Right" buttons to select the display value.
  - Use the "Up" and "Down" buttons to change the display value.
  - Confirm your entries with "OK".
  - The time of an alarm will be stored in the fault memory of the controller.



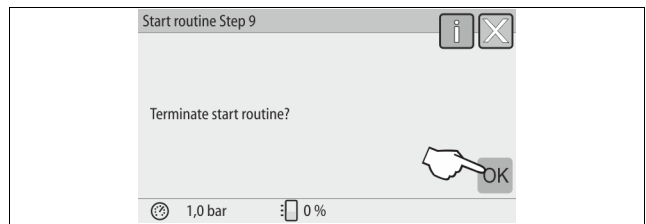
6. Set the date.
  - Use the "Left" and "Right" buttons to select the display value.
  - Use the "Up" and "Down" buttons to change the display value.
  - Confirm your entries with "OK".
  - The date of an alarm will be stored in the fault memory of the controller.



7. Select the size of the primary tank.
  - Use the "Up" and "Down" buttons to change the display value.
  - Confirm your entries with "OK".
  - For the primary tank data, see the name plate or see chapter 5 "Technical data" on page 6 .



- The controller checks whether the level measuring signal matches the dimensional data of the primary tank. The primary tank must be fully emptied, see chapter 6.3.6 "Fitting the level sensor" on page 10 .
8. Press "OK".
    - Null balancing is executed.
    - If null balancing is not successfully completed, you cannot commission the device. In this case, please contact Customer Service, see chapter 12.1 "Reflex Customer Service" on page 25



9. Once null balancing has concluded successfully, you can end the start routine by pressing the "OK" button.

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

### 9.3.1 Customer menu

#### 9.3.1.1 Customer menu – overview

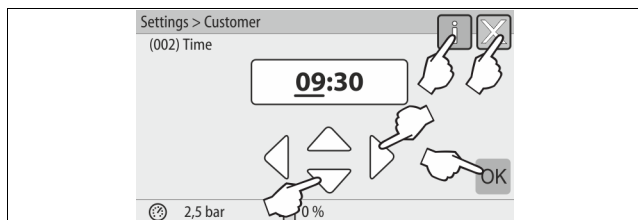
Use the Customer menu to correct or determine system-specific values. In the course of initial commissioning, the factory settings must be adjusted for the system-specific conditions.

**Note!**  
For a description of the operation, see chapter 9.1 "Operator panel" on page 17 .

#### 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
	Execute null balancing <ul style="list-style-type: none"> <li>- The primary tank must be empty</li> <li>- The system checks whether the signal from the level sensor matches the selected primary tank.</li> </ul>
005	Set the P <sub>0</sub> minimum operating pressure, see chapter 7.2 "Determining the P <sub>0</sub> minimum operating pressure for the controller" on page 13 .
	Degassing >
012	<ul style="list-style-type: none"> <li>• Degassing programme                             <ul style="list-style-type: none"> <li>• No degassing</li> <li>• Continuous degassing</li> <li>• Interval degassing</li> </ul> </li> </ul>
013	<ul style="list-style-type: none"> <li>• Continuous degassing time</li> </ul>
	Make-up >
023	<ul style="list-style-type: none"> <li>• Maximum make-up time ... min</li> </ul>
024	<ul style="list-style-type: none"> <li>• Maximum make-up cycles ... /2 h</li> </ul>
027	<ul style="list-style-type: none"> <li>• With water meter "Yes/No"                             <ul style="list-style-type: none"> <li>- If "Yes", continue with 028</li> <li>- If "No", continue with 007</li> </ul> </li> </ul>
028	<ul style="list-style-type: none"> <li>• Make-up quantity (Reset) "Yes/No"                             <ul style="list-style-type: none"> <li>- If "Yes", reset to "0"</li> </ul> </li> </ul>

PM code	Description
029	• Maximum make-up quantity ... l
030	• Softening "Yes/No" – If "Yes", continue with 031 – If "No", continue with 007
007	Maintenance interval... months
008	Floating contact • Message selection > • Message selection: only messages marked with "√" are output. • All messages: All messages are output.
015	Change remote data "Yes/No"
	Fault memory > History of all messages
	Parameter memory > History of parameter input
	Display settings > Brightness, screen saver
009	• Brightness ... %
010	• Screen saver brightness ... %
011	• Screen saver delay ... min
018	• Secure access "Yes/No"
	Information > • Tank • Volume • Weight • Diameter Position motorized ball valve 1 • Software version



- 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.

### 9.3.2 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 9.3.3 "Default settings" on page 19 .

### 9.3.3 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.

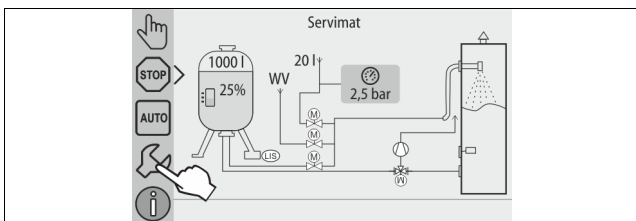
#### Customer menu

Parameter	Setting	Remarks
Language	EN	Display language
Minimum operating pressure P <sub>0</sub>	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
Volt-free 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

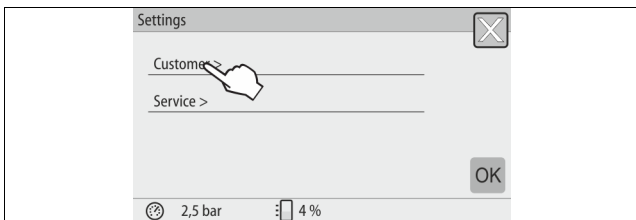
#### 9.3.1.2 Setting the customer menu - "Time" example

The setting of system-specific values is explained below using the setting of the time as example.

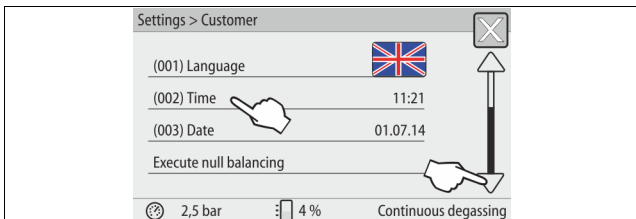
To adjust the system-specific values, proceed as follows:



- Press "Settings".
  - The controller switches to the setting area.



- Press "Customer >".
  - The controller opens the Customer menu.



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

### 9.3.4 Degassing programmes – overview

You can choose between 2 degassing programs:

#### Continuous degassing

- Usage:
  - For device commissioning.
  - For degassing of the water after a device or facility system repair.
- Activation:
  - An automatic activation occurs after completion of the start routine during initial 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.

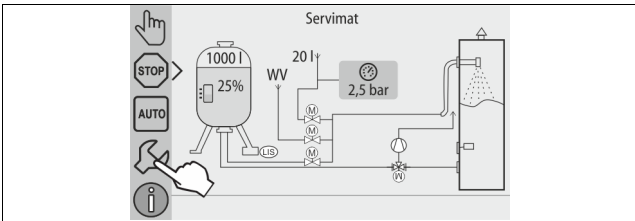
Continuous degassing is pre-set in the customer menu as the default setting.

#### Interval degassing

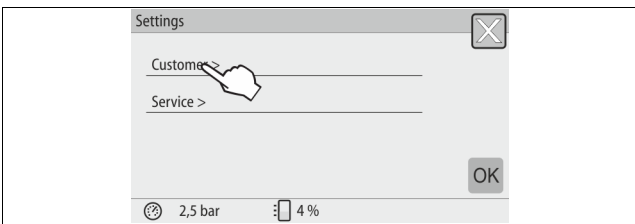
- Usage:
  - For continuous operation of the device.
- Activation:
  - Automatic activation occurs after the ending of continuous degassing.
- Times:
  - 8 degassing cycles per interval is set in the Service menu.
  - After 8 intervals there is an idling time of 24 hours.
  - The times for interval degassing are stored in the Service menu.
  - Daily start of interval degassing is at 8:00 a.m.

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

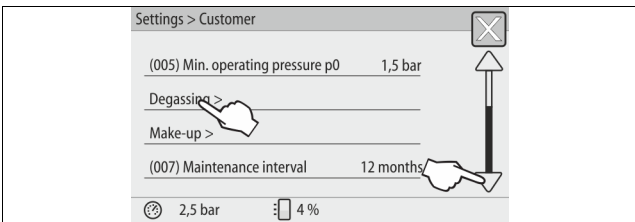
### 9.3.5 Setting degassing programmes



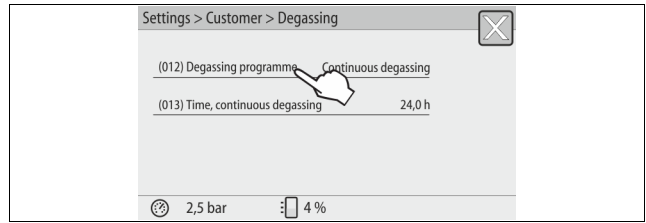
1. Press "Settings".
  - The controller switches to the setting area.



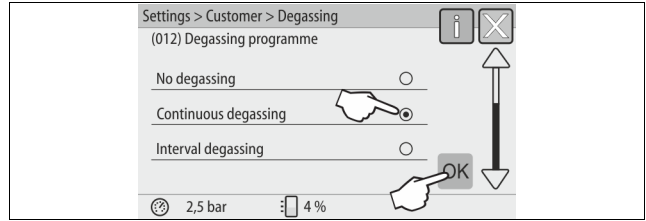
2. Press "Customer >".
  - The controller opens the Customer menu.



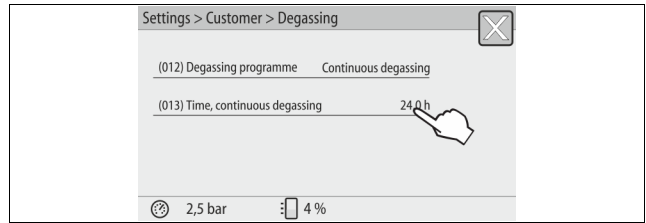
3. Press "Degassing >".
  - The controller switches to the selected area.
  - Use the scroll bar to navigate through the list.



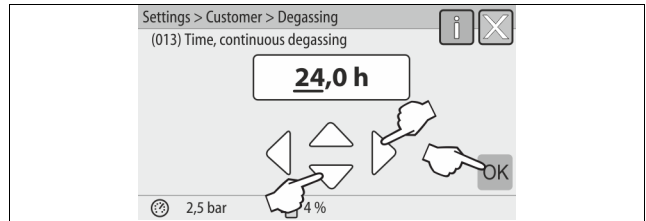
4. Press "(012) Degassing programme".
  - The controller opens the list of degassing programmes.



5. Press the desired button.
  - "Continuous degassing" is selected in this example.
  - No degassing and interval degassing are deselected.
  - Confirm your selection with "OK".
  - Degassing is deactivated.



6. Press "(013) 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".

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.

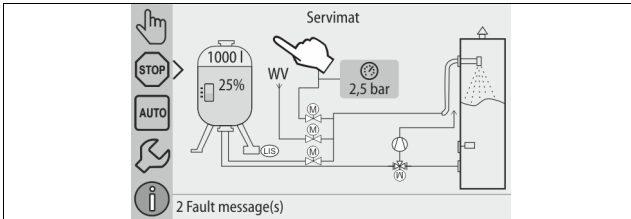
## 9.4 Messages

The messages are impermissible deviations from the normal state. They can be output either via the RS-485 interface or via two floating message contacts. The controller displays the messages with a help text. Message causes can be eliminated by the operator or a specialist workshop. If this is not possible, contact the Reflex Customer Service.

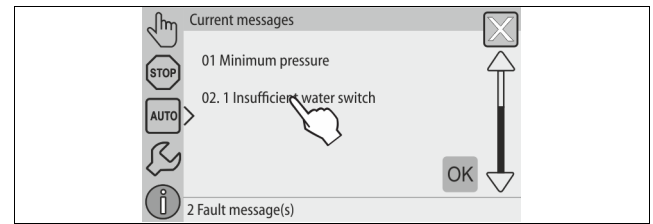
**Note!** When the cause for the message is eliminated, you must acknowledge the fault with "OK" at the controller's operator panel.

**Note!** Floating contacts, setting in the Customer menu, see chapter 9.3.1 "Customer menu" on page 18.

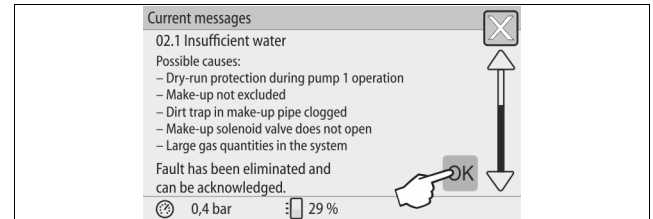
To reset a fault message, proceed as follows:



1. Touch the display.



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



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

ER Code	Alarm	Floating contact	Causes	Remedy	Alarm reset
01	Minimum pressure	YES	<ul style="list-style-type: none"> <li>Set value not reached.</li> <li>Water loss in the system.</li> <li>Pump fault.</li> <li>Controller in Manual mode</li> </ul>	<ul style="list-style-type: none"> <li>Check set value in the Customer or Service menu.</li> <li>Check water level.</li> <li>Check pump.</li> <li>Set the controller to Automatic mode.</li> </ul>	"Quit"
02	Insufficient water	-	<ul style="list-style-type: none"> <li>Set value not reached.</li> <li>Make-up disabled.</li> <li>Air in the system.</li> <li>Solenoid valve does not open.</li> </ul>	<ul style="list-style-type: none"> <li>Check set value in the Customer or Service menu.</li> <li>Clean the dirt trap.</li> <li>Check functioning of the "PV1" solenoid valve.</li> <li>If necessary, manually add water.</li> </ul>	-
03	High water	YES	<ul style="list-style-type: none"> <li>Set value exceeded.</li> <li>Make-up disabled.</li> <li>Manual over supply.</li> <li>Water intake through a leak in a thermal transfer medium of the user.</li> <li>"VG" primary tank too small.</li> </ul>	<ul style="list-style-type: none"> <li>Check set value in the Customer or Service menu.</li> <li>Check functioning of the "WV" solenoid valve.</li> <li>Drain water from the "VG" tank.</li> <li>Check site heat transfer medium for leaks.</li> </ul>	-
04.1	Pump	YES	<ul style="list-style-type: none"> <li>Pump disabled.</li> <li>Pump jammed.</li> <li>Pump motor defective.</li> <li>Pump motor contactor tripped.</li> <li>Fuse defective.</li> </ul>	<ul style="list-style-type: none"> <li>Rotate the pump with screwdriver.</li> <li>Replace the pump motor.</li> <li>Electrically test the pump motor.</li> <li>Replace the fuse.</li> </ul>	"Quit"
05	Pump run time	-	<ul style="list-style-type: none"> <li>Set value exceeded.</li> <li>Severe water loss in the system.</li> <li>Cap valve at the intake side closed.</li> <li>Air in the pump.</li> <li>Control ball valve RKH1 in the pressure relief pipe does not close.</li> </ul>	<ul style="list-style-type: none"> <li>Check set value in the Customer or Service menu.</li> <li>Check the water loss and correct, if necessary.</li> <li>Open the cap valve.</li> <li>Vent the pump.</li> <li>Check the control ball valve RKH1 for correct function.</li> </ul>	-
06	Make-up time	-	<ul style="list-style-type: none"> <li>Set value exceeded.</li> <li>Water loss in the system.</li> <li>Make-up line not connected.</li> <li>Make-up rate insufficient.</li> <li>Make-up hysteresis too low.</li> </ul>	<ul style="list-style-type: none"> <li>Check set value in the Customer or Service menu.</li> <li>Check water level.</li> <li>Connect make-up pipe</li> </ul>	"Quit"
07	Make-up cycles	-	<ul style="list-style-type: none"> <li>Set value exceeded.</li> </ul>	<ul style="list-style-type: none"> <li>Check set value in the Customer or Service menu.</li> <li>Seal any leak in the system.</li> </ul>	"Quit"

ER Code	Alarm	Floating contact	Causes	Remedy	Alarm reset
08	Pressure measurement	YES	<ul style="list-style-type: none"> <li>Controller receives incorrect signal.</li> </ul>	<ul style="list-style-type: none"> <li>Connect the plug.</li> <li>Check functioning of the pressure sensor.</li> <li>Check the cable for damage.</li> <li>Check the pressure sensor.</li> </ul>	"Quit"
09	Level sensor	YES	<ul style="list-style-type: none"> <li>Controller receives incorrect signal.</li> </ul>	<ul style="list-style-type: none"> <li>Check functioning of the load cell.</li> <li>Check the cable for damage.</li> <li>Connect the plug.</li> </ul>	"Quit"
10	Maximum pressure	-	<ul style="list-style-type: none"> <li>Set value exceeded.</li> <li>Pressure relief pipe not functioning.</li> <li>Dirt trap clogged.</li> </ul>	<ul style="list-style-type: none"> <li>Check set value in the Customer or Service menu.</li> <li>Check functioning of the pressure relief pipe.</li> <li>Clean the dirt trap.</li> </ul>	"Quit"
11	Make-up quantity	-	<ul style="list-style-type: none"> <li>"With water meter" must be activated in the Customer menu.</li> <li>Set value exceeded.</li> <li>Severe water loss in the system.</li> </ul>	<ul style="list-style-type: none"> <li>Check set value in the Customer or Service menu.</li> <li>Check water loss in the system and repair, if necessary.</li> </ul>	"Quit"
14	Discharge period	-	<ul style="list-style-type: none"> <li>Set value exceeded.</li> <li>Degassing pipe closed.</li> <li>Dirt trap clogged.</li> </ul>	<ul style="list-style-type: none"> <li>Check degassing line.</li> <li>Check dirt trap.</li> </ul>	
15	Make-up valve	-	<ul style="list-style-type: none"> <li>Contact water meter measures without make-up requirement.</li> </ul>	<ul style="list-style-type: none"> <li>Check the make-up valve for leaks.</li> </ul>	"Quit"
16	Power failure	-	<ul style="list-style-type: none"> <li>No power.</li> </ul>	<ul style="list-style-type: none"> <li>Connect to power supply.</li> </ul>	-
18	Parameter	-	<ul style="list-style-type: none"> <li>Parameter settings incorrect.</li> </ul>	<ul style="list-style-type: none"> <li>Check settings, if necessary make basic settings in the service menu.</li> </ul>	
19	Stop > 4 hours	-	<ul style="list-style-type: none"> <li>Device is in Stop mode for more than 4 hours.</li> </ul>	<ul style="list-style-type: none"> <li>Set the controller to Automatic mode.</li> </ul>	-
20	Max. Make-up volume	-	<ul style="list-style-type: none"> <li>Set value exceeded.</li> </ul>	<ul style="list-style-type: none"> <li>Reset the "Make-up quantity" meter in the Customer menu.</li> </ul>	"Quit"
21	Maintenance recommended	-	<ul style="list-style-type: none"> <li>Set value exceeded.</li> </ul>	<ul style="list-style-type: none"> <li>Perform maintenance and reset the maintenance counter upon completion.</li> </ul>	"Quit"
24	Replace cartridge	-	<ul style="list-style-type: none"> <li>Set value for soft water capacity exceeded.</li> </ul>	<ul style="list-style-type: none"> <li>Replace cartridges.</li> <li>Set soft water capacity.</li> </ul>	"Quit"
25	Datalogger	-	<ul style="list-style-type: none"> <li>No SD card inserted.</li> <li>SD card write protected.</li> <li>SD card not recognised.</li> </ul>	<ul style="list-style-type: none"> <li>Insert FAT16 or FAT32 formatted SD card.</li> <li>Disable write-protection.</li> <li>Check SD card.</li> </ul>	-
30	I/O module fault	-	<ul style="list-style-type: none"> <li>I/O module defective.</li> <li>Connection between option card and controller faulty.</li> <li>Option card defective.</li> </ul>	<ul style="list-style-type: none"> <li>Inform Reflex Customer Service.</li> </ul>	-
31	EEPROM defective	YES	<ul style="list-style-type: none"> <li>EEPROM defective.</li> <li>Internal calculation error.</li> </ul>	<ul style="list-style-type: none"> <li>Inform Reflex Customer Service.</li> </ul>	"Quit"
32	Undervoltage	YES	<ul style="list-style-type: none"> <li>Supply voltage too low.</li> </ul>	<ul style="list-style-type: none"> <li>Check power supply.</li> </ul>	-
33	Adjustment parameter faulty	YES	<ul style="list-style-type: none"> <li>EPROM parameter memory defective.</li> </ul>	<ul style="list-style-type: none"> <li>Inform Reflex Customer Service.</li> </ul>	-
34	Communication Main board faulty	-	<ul style="list-style-type: none"> <li>Connecting cable defective.</li> <li>Main board defective.</li> </ul>	<ul style="list-style-type: none"> <li>Inform Reflex Customer Service.</li> </ul>	-
35	Digital input voltage faulty	-	<ul style="list-style-type: none"> <li>Short-circuit of input voltage.</li> </ul>	<ul style="list-style-type: none"> <li>Check the wiring at the digital inputs (water meter, for example).</li> </ul>	-
36	Analogue input voltage faulty	-	<ul style="list-style-type: none"> <li>Short-circuit of input voltage.</li> </ul>	<ul style="list-style-type: none"> <li>Check the wiring at the analogue inputs (pressure/level).</li> </ul>	-
37	No MKH 1 input voltage	-	<ul style="list-style-type: none"> <li>Short-circuit of input voltage.</li> </ul>	<ul style="list-style-type: none"> <li>Check wiring of the ball valve.</li> </ul>	-
38	No MKH 2 input voltage	-	<ul style="list-style-type: none"> <li>Short-circuit of input voltage.</li> </ul>	<ul style="list-style-type: none"> <li>Check wiring of the ball valve.</li> </ul>	-
39	Pressure jumper	-	<ul style="list-style-type: none"> <li>Jumper J1 on the main board set incorrectly.</li> </ul>	<ul style="list-style-type: none"> <li>Change the jumper setting accordingly.</li> </ul>	
40	Level jumper	-	<ul style="list-style-type: none"> <li>Jumper J1 on the main board set incorrectly.</li> </ul>	<ul style="list-style-type: none"> <li>Change the jumper setting accordingly.</li> </ul>	
41	Replace battery	-	<ul style="list-style-type: none"> <li>Buffer battery discharged.</li> </ul>	<ul style="list-style-type: none"> <li>Replace the battery in the operating unit (CPU).</li> </ul>	
42	Bus module	-	<ul style="list-style-type: none"> <li>Bus module activated but not present.</li> <li>Connecting cable defective.</li> <li>Bus module defective.</li> </ul>	<ul style="list-style-type: none"> <li>Connect bus module.</li> <li>Check connection cable.</li> <li>Replace bus module.</li> </ul>	



10 Maintenance

**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).

**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.

The device is to be maintained annually.

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

The annual maintenance is displayed upon expiry of the set operating time. Use "OK" to acknowledge the "Maintenance recommended" message. Reset the maintenance counter in the Customer menu.

**Note!**  
The maintenance intervals for the secondary tanks may be extended to 5 years if operation has been trouble-free.

**Note!**  
Maintenance work must be carried out and confirmed by specialist personnel or the Reflex Customer Service, see chapter 10.5 "Maintenance certificate" on page 24.

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 23 . • "PU" pump. • Screw connections. • "DV" degassing valve.	▲	■		Annually
Recurring inspection, see chapter 10.2 "Recurring inspection" on page 23 • Vacuum spray tube	▲	■	●	5 - 10 years
Vacuum function test. – see chapter 10.3.1 "Cleaning the dirt trap" on page 23	▲			Annually
Clean the dirt trap. – see chapter 9.3.1 "Customer menu" on page 18	▲	■	●	Depending on the operating conditions
Check the controller settings, see chapter 9.3.3 "Default settings" on page 19 .	▲			Annually
Function test. • Degassing of water from the facility. • Degassing of water from the	▲			Annually

Maintenance task	Conditions			Interval
▲ = Check, ■ = Service, ● = Clean				
make-up.				
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 Servimat 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 Recurring inspection

Comply with all applicable national regulations for the operation of pressure equipment. Before testing pressurised parts, they must first be depressurised (see Removal). Arrange for Reflex Customer Service to perform the inspection. To contact Reflex Customer Service, see chapter 12.1 "Reflex Customer Service" on page 25 .

10.3 Cleaning

10.3.1 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.

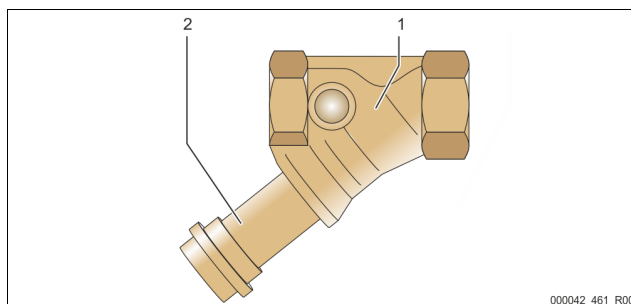
- Ensure proper installation, removal or maintenance work.
- Ensure that the system is de-pressurised before performing installation, removal or maintenance work at the connection points.

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).



## 10.6 Inspection

### 10.6.1 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).

### 10.6.2 Inspection prior to commissioning

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

### 10.6.3 Inspection intervals

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

#### External inspection:

No requirement according to Annex 2, Section 4, 5.8.

#### Internal inspection:

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

#### Strength test:

Maximum interval according to Annex 2, Section 4, 5 and 6.

Furthermore, compliance with Section 16 of the Industrial Safety Regulation and Section 16 (1) in particular, in conjunction with Annex 2, Section 4, 6.6 and Annex 2, Section 4, 5.8, must be ensured.

The actual intervals must be specified by the operating company based on a safety evaluation taking into consideration the actual operating conditions, experience with the mode of operation and charging material and the applicable national regulations for the operation of pressure equipment.

## 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 to the Servimat and de-pressurise the Servimat. Then disconnect the Servimat from all voltages.

Proceed as follows:

1. Switch the system to stop mode and secure it to prevent it being switched back on.
2. Lock out the "DC" degassing lines and the "WC" make-up line.
3. Switch the system to a voltage-free state. Unplug the Servimat's mains plug from the power supply.
4. Disconnect all cables from the terminals of the Servimat controller.

**! DANGER** – Risk of serious injury or death due to electric shock. Some parts of the Servimat's circuit board may still be live with 230 V even after the device has been physically isolated from the power supply by pulling out of the mains plug. Before you remove the covers, completely isolate the Servimat 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 Servimat until the spray tube no longer contains any water.
6. If necessary, physically remove the Servimat 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 - 9523

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

#### Technical Hotline

For questions about our products

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

Monday to Friday 8:00 to 16:30

### 12.2 Conformity and standards

Device conformity declarations are available on the Reflex homepage.

[www.reflex-winkelmann.com/konformitaetserklaerungen](http://www.reflex-winkelmann.com/konformitaetserklaerungen)

Alternatively, scan the QR code:



### 12.3 Guarantee

The respective statutory guarantee regulations apply.



Thinking solutions.

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