reflex
Thinking solutions.

Reflexomat XS

(RXS)

GB Operating manual

Original operating manual

1 Notes on the operating manual

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

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, 12.1 "Reflex Customer Service", 13.

3 Safety

3.1 Explanation of symbols

The following symbols and signal words are used in these operating instructions.

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

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

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

3.3 Personal protective equipment

Use the prescribed personal protective equipment as required (e.g. ear protection, eye protection, safety shoes, helmet, protective clothing, protective gloves) when working 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 a mini-compressor system for heating and cold water systems. It is used to maintain the water pressure and to make up water in a system. 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

The ingress of atmospheric oxygen by permeation into the entire heating and cold water system, make-up water and similar must be reliably minimized during operation.

3.5 Inadmissible operating conditions

The device is not suitable for the following applications:

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

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

3.6 Residual risks

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

WARNING
Risk of fire due to open ignition sources
The device housing is made of combustible material and is heat-sensitive.

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

WARNING
Risk of injury due to heavy weight
The devices are heavy. Consequently, there is a risk of physical injury and accidents.

- Use suitable lifting equipment for transportation and installation.

CAUTION
Risk of 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.

Note!

When installing the on-site safety valve, the operator must ensure that there is no danger during blow-off.

Note!

Equipment parts with a safety function in respect of water-side pressure limiting according to the Pressure Equipment Directive 2014/68/EU and temperature limiting according to the Pressure Equipment Directive 2014/68/EU are not supplied.
The operator is responsible for on-site provision of water-side pressure and temperature protection.

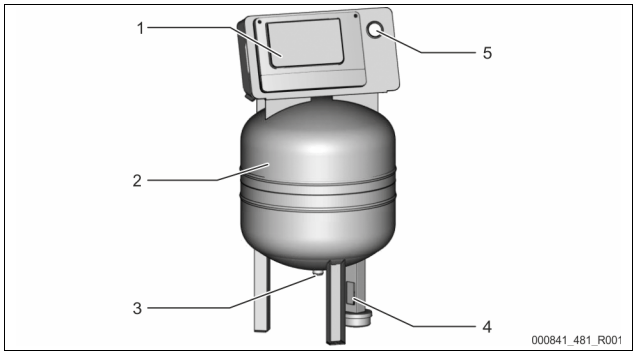
4 Description of the device

4.1 Description

The Reflexomat XS is a mini-compressor system. The main usage areas are heating and cooling circuits.

- An expansion vessel of 80 l nominal volume
- The control unit is factory-installed on the expansion vessel.
- All electric and air connections between control unit and primary vessel are pre-installed.

4.2 Overview

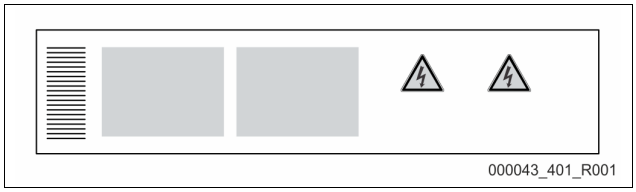


1	Control unit • Compressor • Controller
2	"RG" primary vessel
3	Expansion line "EC"
4	Weight measuring cell "LIS"
5	Pressure gauge

4.3 Identification

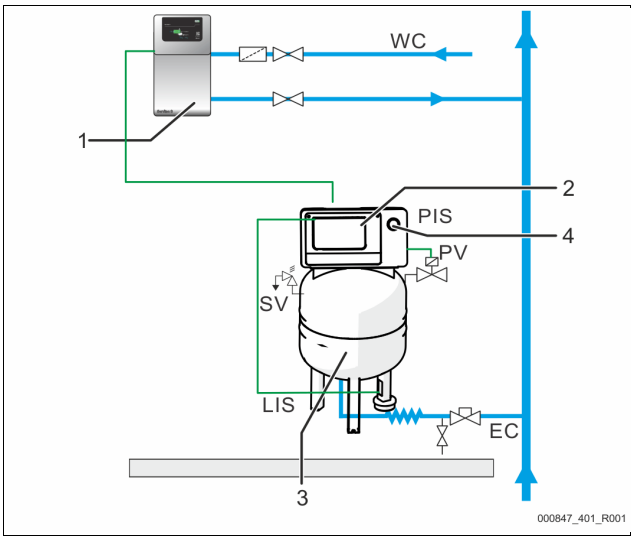
4.3.1 Nameplate

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



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

4.4 Function



1	Make-up with water e.g. using Servitec S
2	Control unit
3	Primary vessel as expansion vessel
4	Pressure gauge
WC	Make-up line
PIS	Pressure sensor
SV	Safety valve
PV	Solenoid valve
LIS	Weight measuring cell for level measurement
EC	Expansion line

Expansion vessel

A diaphragm divides the interior of the vessel into an air space and a water space. This prevents the ingress of atmospheric oxygen into the expansion water. The primary vessel is connected to the air side control unit and connected hydraulically to the system circuit. Pressure relief is provided on the air side by the "SV" safety valves of the vessel.

Control unit

The control unit comprises a "CO" compressor and the "Reflex Control Smart" controller. Via the primary vessel, the pressure is measured with the "PIS" pressure sensor and the water level with the "LIS" weight measuring cell and the values are then displayed via the app, ↳ 9.1 "Reflex Control Smart", 10.

Maintaining pressure

- If the water is heated, it expands and the pressure increases in the system circuit. If the pressure set at the controller is exceeded, the "PV" solenoid valve opens and discharges air from the primary vessel. Water flows from the system into the primary vessel and the pressure drops in the system circuit until the pressures in the system circuit and the primary vessel are the same.
- The pressure in the system circuit drops when the water cools. When the pressure drops below the set value, the "CO" compressor cuts in and delivers compressed air into the primary vessel. This displaces water out of the primary vessel into the system circuit. The pressure in the system circuit rises.

Make-up

The addition of more water is controlled via the controller. The "LIS" weight measuring cell determines the water level and sends this value to the controller. This controls an external make-up. Water is directly added into the system circuit in a controlled manner by monitoring the make-up time and the make-up cycles.

If the water level in the primary vessel falls below minimum, a fault message is output from the controller and displayed in the app as well as via LEDs on the control panel.

Note!
Additional equipment for topping up water, 4.6 "Optional equipment and accessories", 5.

4.5 Scope of delivery

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

Basic pressure-maintaining equipment:
- One 80-litre expansion vessel and one compact design control unit.
- "LIS" weight measuring cell for filling level measurement.
- Cap valve
- Mains cable with plug (230V~)

4.6 Optional equipment and accessories

- For make-up with water
  - Solenoid "Fillvalve" with ball valve and Reflex Fillset for make-up with potable water.
- Fillset Impulse with FQIRA+ contact water meter for make-up with potable water.
- Fillsoft for softening or demineralisation of the make-up water from the potable water system.
  - Fillsoft is installed between Fillset and the device. The device controller evaluates the make-up quantities and signals the required replacement of the softening cartridges.
- Fillguard for conductivity monitoring
  - If the Fillguard is fitted, the capacity of the Fillsoft Zero demineralisation cartridge can be monitored based on the conductivity.
- Optional expansions for Reflex controllers:
  - RS-485 interface with Modbus RTU (integrated).
  - Servitec S

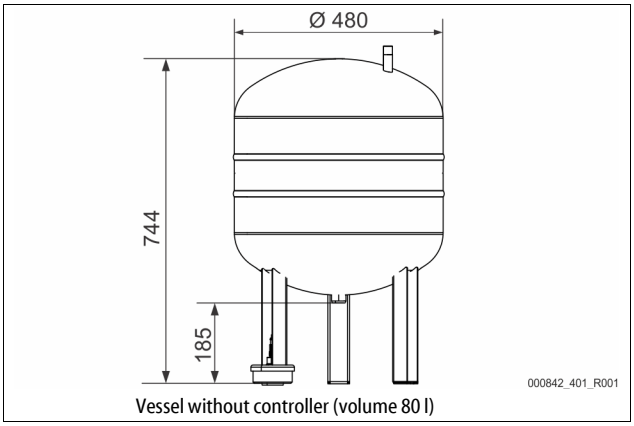
Note!
Separate operating instructions are supplied with accessories.

5 Technical data

5.1 Control unit

Permissible flow temperature	90 °C
Permissible operating temperature	0 – 70 °C
Permissible ambient temperature	+5 – +40 °C
Degree of protection	IP 42
Noise level	60 dB(A) / 1 bar
Electrical power	max. 0,25 kW
Electrical supply	230 V, 50 Hz, 4 A
Electrical voltage control unit	230 V / 2 A
Number of RS-485 interfaces	1
Weight	28 kg

5.2 Vessel



Vessel without controller (volume 80 l)

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 all phases of the mains power supply to the product are disconnected prior to installation.
- 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).

WARNING
Risk of injury due to heavy weight
The devices are heavy. Consequently, there is a risk of physical injury and accidents.
- Use suitable lifting equipment for transportation and installation.

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

6.1 Installation conditions

6.1.1 Incoming inspection

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

Proceed as follows:

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

6.2 Preparatory work

Condition of the delivered device:

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

Preparing the device installation:

- No access by unauthorised personnel.
- Frost-free, well-ventilated room.
  – Room temperature range: +5 °C to +40 °C.
  – Protect the device against direct effects of the weather.
- Level, stable flooring.
  – Ensure sufficient bearing strength of the flooring before filling the vessel.
- Filling and dewatering option.
  – Provide a DN 15 filling connection according to DIN EN 1717.
  – Provide an optional cold water inlet.
  – Prepare a drain for the drain water.
- Electrical connection, 5 "Technical data", 5.
- Use only approved transport and lifting equipment.
  – The load fastening points on the vessel must be used only as installation resources.

Note!
No transverse and longitudinal acceleration forces were allowed for when dimensioning the product. If loads of this typecould occur, a special proof must be provided and agreed.

6.3 Execution

ATTENTION

Damage due to improper installation

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

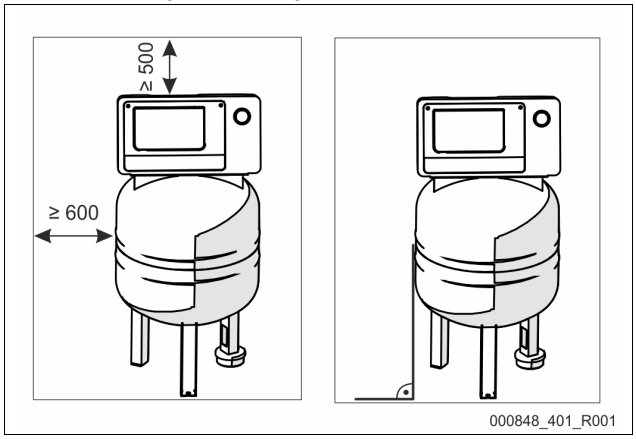
- Pipelines must be connected so there are no residual forces and torques and must be routed so they are free from vibrations.
- If necessary, provide support structures for the pipelines or equipment.
- If you have any questions, please contact Reflex After Sales & Service.

Proceed as follows for the installation:

- Position the device.
- Create the water-side connections of the control unit to the system.
- Create the interfaces according to the terminal plan.

6.3.1 Locating the vessel

Observe the following tips when siting the vessel:



- All flange openings are inspection and maintenance openings.
  – Locate the vessel with a sufficient side and top clearance.
- Install the vessel on a level surface.
- Ensure a perpendicular and free-standing position.
- Ensure proper functioning of the "LIS" Filling level measurement sensor.
  – Do not attach the vessel firmly to the floor.

Note!
The weight measuring cell is not resistant to water hammer; also it must not be painted.

6.3.2 Connection to the facility system

CAUTION

Risk of injury due to falls or stumbling

Bruising caused by falls or stumbling over cables or pipes during installation.

- Wear personal protective equipment (helmet, protective clothing, gloves, safety boots).
- Ensure proper installation of cables and pipes between the control unit and the vessels.

ATTENTION

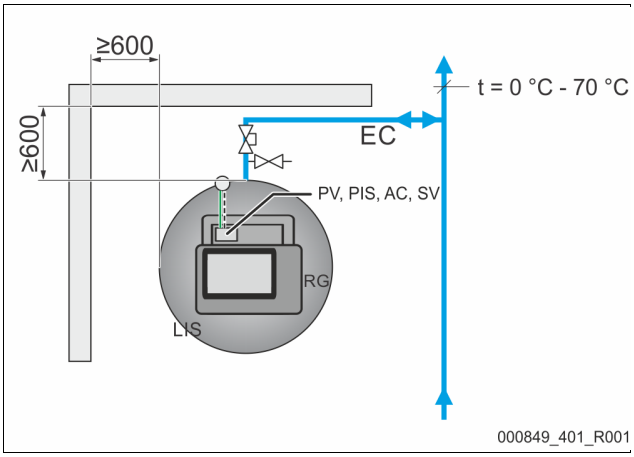
Damage to cables and pipes

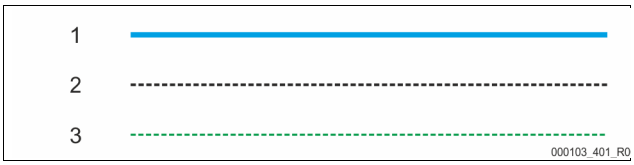
If cables and pipes are not routed professionally between tanks and the control unit, they may become damaged.

- Route cables and pipes in a professional manner over the flooring.

Note!
Each vessel connection on the water side must be provided with a cap valve and a draining device (included in the scope).

6.3.2.1 Water-side connection





1	Water pipe
2	Compressed air line
3	Electrical cable
RG	Primary vessel
LIS	Filling level measurement

SV	Safety valve
PV	Solenoid valve
PIS	Pressure sensor
AC	Compressed air line
EC	Expansion line

To ensure proper functioning of the "LIS" filling level measurement sensor, you must use the supplied hose to flexibly connect the primary vessel to the system circuit.

The primary vessel has a protected shut-off device and a draining valve in the "EC" expansion line.

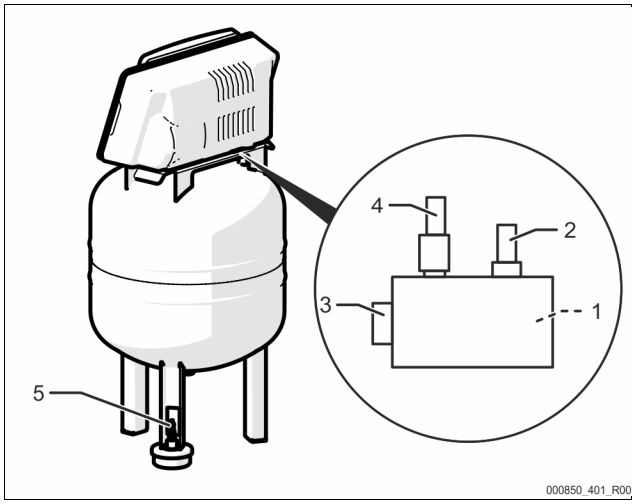
Use points with temperatures between 0 °C and 70 °C to connect to the system circuit. This is the return in heating systems and the flow in cooling systems.

At temperatures below or above 0 °C – 70 °C, you must install in-line vessels in the expansion line between the system circuit and the Reflexomat.

Note!
For details regarding the switching of Reflexomats or in-line vessels and the dimensions of the expansion lines, please see the planning documents. More information is also provided in the Reflex Planning Guide.

6.3.2.2 Control unit connection

The connections are located on a manifold in the housing (pre-assembled in the factory).



1	"PIS" pressure sensor
2	"SV" safety valve
3	Compressed air connection
4	"PV" solenoid valve
5	Weight measuring cell "LIS"

Install the weight measuring cell, see chapter 6.3.3 "Installation of the weight measuring cell" on page 7 .

6.3.3 Installation of the weight measuring cell

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.

Install the weight measuring cell for the "LIS" filling level measurement, when the primary vessel is located in the final position, ↳ 6.3.1 "Locating the vessel", 🗎 6. Comply with the following instructions:
- Remove the transport safety device at the mounting foot of the primary vessel.
- Replace the transport safety device with the weight measuring cell.
- Avoid shock-type loading of the load measuring cell by, for example, subsequent alignment of the vessel.
- Install the M12 plug on the weight measuring cell. (hand-tight)

Standard values for filling level measurements:

Primary vessel	Measuring range
80 l	0 – 4 bar

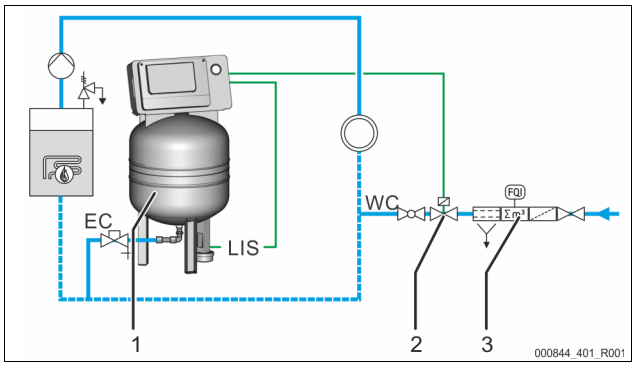
6.4 Make-up and degassing variants

6.4.1 Function

The filling level in the primary vessel is measured by the "LIS" weight measuring cell and evaluated in the controller. When the water level falls below the set value, the external make-up is activated.

6.4.1.1 Make-up without pump

Reflexomat XS with Fillvalve.



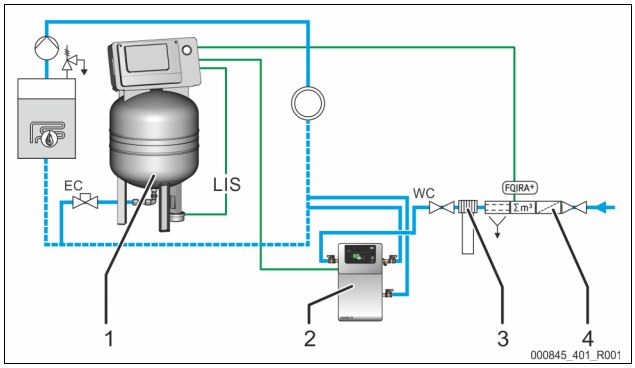
1	Reflexomat XS
2	Fillvalve
3	Reflex Fillset

WC	Make-up line
LIS	Weight measuring cell
EC	Expansion line

Preferably, you should use the Reflex Fillset with integrated system separator when using potable water for make-up, ↳ 4.6 "Optional equipment and accessories", 🗎 5.

6.4.1.2 Make-up with softening and degassing

Reflexomat XS and Reflex Servitec S.



1	Reflexomat XS
2	Reflex Servitec S
3	Reflex Fillsoft
4	Reflex Fillset Impulse

WC	Make-up line
LIS	Filling level measurement
EC	Expansion line

The Reflex Servitec S degassing and make-up unit degasses the water from the system circuit and the make-up water. The automatic make-up for the system circuit is controlled by the pressure maintenance system. Reflex Fillsoft additionally softens or demineralises the make-up water.
- Reflex Servitec degassing and make-up unit, ↳ 4.6 "Optional equipment and accessories", 🗎 5.
- Reflex Fillsoft softening system and Reflex Fillset Impulse, ↳ 4.6 "Optional equipment and accessories", 🗎 5.

Note!
In a setup with a Reflex Fillsoft water treatment system, always install the Reflex Fillset Impulse.
- The controller evaluates the make-up quantity and signals the necessary replacement of the softening or demineralisation cartridge.

6.5 Power Supply

DANGER

Risk of serious injury or death due to electric shock.

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

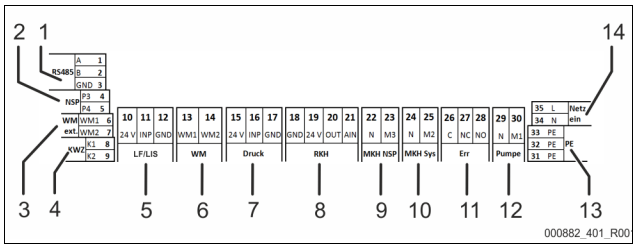
- Ensure that all phases of the mains power supply to the product are disconnected prior to installation.
- Ensure that the system is secured and cannot be reactivated by other persons.
- Ensure that installation work for the electric connection of the device is carried out by an electrician, and in compliance with electrical engineering regulations.

All electric connections between control unit and expansion vessel are pre-installed.

1. Connect the mains plug to the 230 V power supply.
2. Activate the system.

The electrical connection is completed.

6.5.1 Terminal diagram



Item no.	Terminal number	Signal	Function	Wiring
1	1	GND	RS485 interface for Modbus RTU or proprietary Reflex protocol	On-site, optional
	2	A		
	3	B		
2	4	P3	External make-up request • With the Levelcontrol setting. Input 230 V signal via L+ N	On-site, optional
	5	P4		
3	6	WM1	---	---
	7	WM2		
4	8	K1	Contact water meter • Digital input	On-site, optional
	9	K2		
5	10	24 V	Filling level measurement • Analogue input 4-20 mA	Factory
	11	INP		
	12	GND		
6	13	WM1	---	---
	14	WM2		
7	15	24 V	Pressure sensor • Analogue input 4-20 mA	Factory
	16	INP		
	17	GND		
8	18	GND	---	---
	19	24 V		
	20	OUT		
	21	AIN		
9	22	N	Make-up request 230 V	On-site, optional
	23	M3		
10	24	N	Solenoid valve on the air side	Factory
	25	M2		
11	26	C	Potential-free group alarm contact (max. 230 V / 8 A)	On-site, optional
	27	NC		
	28	NO		
12	29	N	Compressor/relief valve	Factory
	30	M1		
13	31	PE	Earthing	Factory
	32	PE	Earthing	Factory
14	33	PE	230 V voltage supply via cable with power plug.	Factory
	34	N		
	35	L		

6.5.2 RS-485 interface

This interface is used to retrieve all controller data and to enable communication with control centres or other devices.

The following data can be requested:

- Pressure and filling level.
- Compressor operating states.
- Operating states of make-up via solenoid valve.
- Aggregate volume of the FQIRA + contact water meter.
- All messages, 9.4 "Messages", 11.
- All entries in the error memory.

6.5.2.1 Connecting the RS-485 interface

- Use a shielded cable to connect the interface to terminals 1 – 6 of the circuit board in the control cabinet.
  – For connecting the interface, 6.5 "Power Supply", 8.
- When using the device with a control centre not supporting an RS-485 interface (RS-232, for example), you must use a corresponding (on-site) adapter.

Note!

For connecting the interface use, for example, a cable with these properties.

- LIYCY (TP), 4 × 2 × 0.8, maximum overall bus cable length 1000 m.

6.6 Installation and commissioning certificate

Note!

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

7 Commissioning

Note!

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

Note!

The app guides you through commissioning 9.1 "Reflex Control Smart", 10.

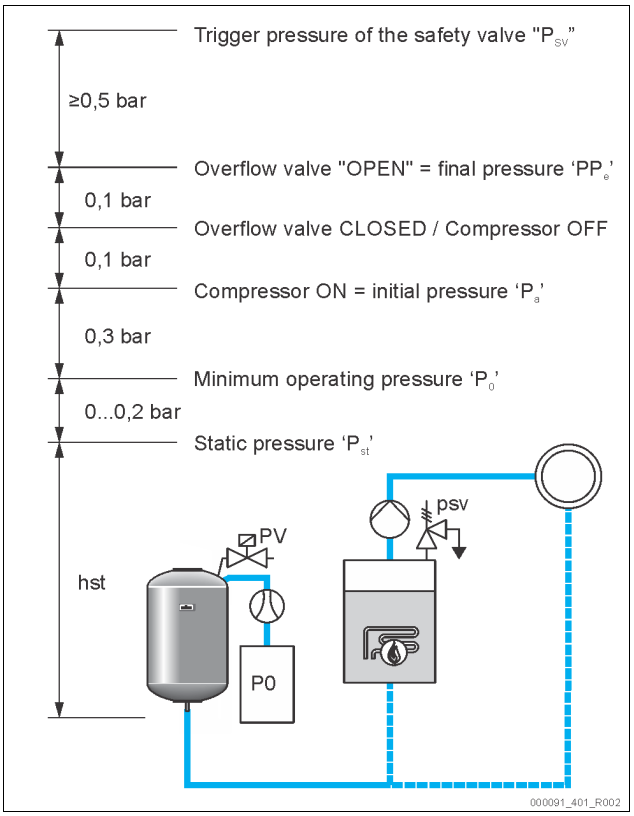
7.1 Requirements for initial commissioning

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

- The Reflexomat has been located.
- The weight measuring cell is connected.
- The water-side connection of the vessel to the system circuit has been established.
- The vessel is not filled with water.
- The connection pipes of the Reflexomat have been purged and cleaned of welding residue and dirt before commissioning.
- The draining valves of the vessel are open.
- The entire system has been filled with water and all gases have been vented in order to ensure circulation throughout the entire system.
- The electrical connection has been created according to applicable national and local regulations.

7.2 Reflexomat switching points

The "P_0" minimum operating pressure is determined by the location of the pressure maintenance system. The controller calculates the switching points for the "PV" solenoid valve and the "CO" compressor from the "P_0" minimum operating pressure.



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

$P_0 = P_{st} + P_D + 0.2$ bar*	Enter the calculated value in the start routine of the controller, 9.1 "Reflex Control Smart", 10.
$P_{st} = h_{st}/10$	h_{st} in metres
$P_D = 0.0$ bar	for safety temperatures ≤ 100 °C
$P_D = 0.5$ bar	for safety temperatures = 110 °C

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

7.3 Venting the vessels

CAUTION

Risk of burns on hot surfaces

Excessive surface temperatures on the compressor can result in skin burns.

- Wear suitable personal protective equipment (safety gloves, for example).

After setting the minimum operating pressure P_0 in the assisted commissioning via the app, the primary vessel must be vented. Proceed as follows:

1. Ensure that the cap valve is closed.
2. Open the draining valve.
3. In the app control panel, press on "Start".

The "CO" compressor builds up the pressure required for venting. This pressure is 0.4 bar above the set minimum operating pressure. The vessel's membrane is acted on by this pressure and the water side in the vessel is vented. Close the draining valves of the vessel after the compressor has been automatically shut down.

Note!

Inspect all compressed air connections between the control unit and the vessel to ensure their leak tightness. Subsequently, slowly open all cap valves at the vessel to create the water-side connection to the system circuit.

7.4 Filling the tanks with water

Prerequisite for fault-free filling is a make-up pressure at least 1.5 bar above the final pressure "P_e".

- Without automatic make-up:
  - Use the draining valves or the system circuit to manually fill the vessel to approximately 30 % of the vessel volume, 6.4 "Make-up and degassing variants", 7.
- With automatic make-up:
  - The vessel is automatically filled to 12% of its volume, 6.4 "Make-up and degassing variants", 7.

7.5 Starting Automatic mode

Automatic mode can be set after initial commissioning. Start automatic mode at the control panel of the controller.

The following prerequisites must be met for automatic mode:

- The device is filled with compressed air and water.
- All required parameters are defined in the controller.

Press "Auto" for automatic mode on the control panel of the controller.

- The "Auto" LED on the control panel illuminates to visually signal automatic mode.

Note!

Initial commissioning is completed and the device is in automatic mode.

8 Operation

8.1 Operating modes

8.1.1 Automatic mode

Use:

After initial commissioning has been successfully completed

Start:

Press "AUTO".

Functions:

- In automatic mode, the controller monitors the following functions:
  - Maintaining pressure
  - Expansion volume compensation
  - Automatic make-up.
- The "CO" compressor and the "PV" solenoid valve (optional) are regulated by the controller so that the pressure remains constant in a regulation range of ± 0.1 bar.
- Faults are displayed on the control panel and in the app.

8.1.2 Stop mode

Use:

Stop mode interrupts automatic mode and is a prerequisite for manual mode.

Start:

Press "Stop" on the controller. The Auto LED of the control panel goes out. The Stop LED lights up in yellow.

Functions:

Function monitoring is not performed in stop mode.

The following functions are deactivated:

- The "CO" compressor is switched off.
- The "PV" solenoid valve is closed.

Note!

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

8.1.3 Manual mode

Use:

For testing and maintenance work

Start:

1. In the display, switch the system to stop mode.
2. In the app, switch the system to manual mode.
   Setting → Maintenance → Manual mode
3. Start manual mode.
4. Select the desired function.

Switch the function on and off by touching the corresponding button:
- The button is highlighted white. The function is switched off.

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

Functions:
Manual mode allows you to select the following functions and to perform a test run:
- Compressor
- Solenoid valve
- Make-up
- Potential free group fault.

Note!
The change in the filling level and the vessel pressure are indicated in manual mode in the SmartControl app.

9 Controller

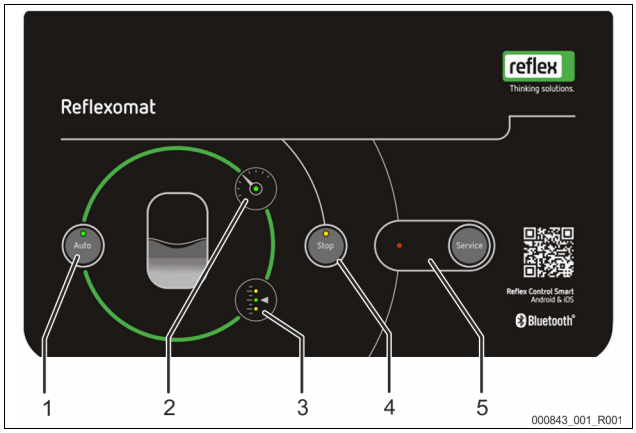
9.1 Reflex Control Smart

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

The Reflex Control Smart app provides the following functions amongst others:
- Intuitive and self-explanatory menu and operating guidance
- Easy and quick commissioning (commissioning-wizard)
- Querying of the system pressure
- Individual configuration
- Maintenance and troubleshooting wizard
- Software updates for system control

Note!
Software updates for system control may only be executed via the app. New available software updates are automatically displayed in the app.

9.2 Operator panel



1	Auto button/LED • The Auto button starts operation after commissioning or from stop mode • The Auto LED illuminates green in Automatic mode • The Auto LED is off in stop mode
2	Pressure LED • The Pressure LED comes on in automatic mode • The Pressure LED flashes if there is a fault or during increasing and decreasing of the pressure
3	Level LEDs • The level LEDs indicate the filling level in the vessel. – High water 3.1 – Auto mode 3 – Low water 3.3 (make-up requirement)
4	Stop button/LED • The stop button is for entering new values in the controller and for manual mode (maintenance mode) • The Stop LED lights up in yellow
5	Service button/LED • Warning and fault messages are acknowledged with the Service button • The Service LED lights up in the event of a warning message • The Service LED flashes in the event of a fault message

9.3 Default settings

The device controller is shipped with the following default settings. Other settings must be made during assisted commissioning using the Reflex Control Smart app.

Default settings

Parameter	Setting	Comment
Next maintenance	12 months	Time left to the next due maintenance.
Floating contact	YES	↳ 7.2 "Reflexomat switching points", 9.
Make-up		
Make-up "ON"	8 %	
Make-up "OFF"	12 %	
Maximum make-up quantity	0 Litres	Only when using a water meter.
Maximum make-up time	30 minutes	
Maximum make-up cycles	6 cycles within 2 hours	
Pressure maintenance		
Compressor "ON"	P_0 + 0.3 bar	Differential pressured added to the "P_0" minimum operating pressure.
Compressor "OFF"	P_0 + 0.4 bar	Differential pressured added to the "P_0" minimum operating pressure.
"Compressor run time exceeded" message	180 minutes	The message is displayed in the app after compressor running of 180 minutes.
Outward flow solenoid valve "CLOSE"	P_0 + 0.4 bar	Differential pressured added to the "P_0" minimum operating pressure.
Outward flow solenoid valve "OPEN"	P_0 + 0.5 bar	Differential pressured added to the "P_0" minimum operating pressure.
Maximum pressure	PSv – 0.3 bar	Differential pressure as the triggering pressure of the response pressure of safety valve "PSv".
Filling levels		
Low water "ON"	5 %	
Low water "OFF"	12 %	
Solenoid valve in overflow pipe "CLOSED"	90 %	

9.4 Messages

Messages are displayed using the LEDs on the control panel with the meanings specified in the table. A precise description of the LEDs, 9.2 "Operator panel", 10. A detailed description of the error is available via the app.

LED		Function / display	Meaning
Auto		Button	Start
		LED lights up	Automatic operating mode
Stop		Button	Maintenance / Interruption
		LED lights up	Error
Service		Button	Acknowledge / Start Self-Service
		LED lights up LED flashes	Warning Error
Pressure		LED lights up LED flashes	Automatic operating mode Fault (min. pressure, defective pressure measurement, deviation from set pressure, etc.)
Level		LED lights up in green LED lights up in yellow LED flashes yellow	Automatic operating mode Warning (make-up request, high water) Fault (low water, weight measuring cell defective)

Alarm causes can be eliminated by the operator or a specialist workshop. If this is not possible, contact the Reflex Customer Service.

Note!
Elimination of the cause must be confirmed via the service button on the control panel of the controller. All other alarms are automatically reset as soon as the cause has been eliminated.

ER Code	Alarm	Causes	Remedy	Alarm reset
01	Minimum pressure [1] Auto LED lights up [5] Error LED lights up [2] Pressure LED flashes	Set value p_0 not reached: • Compressor fault. • Air side leak of the system.	• Check the functioning of the compressor. • Check the sealing points for leak tightness.	-
02.1	Low water [1] Auto LED lights up [5] Error LED lights up [3.3] Level LED flashes	Too little water in the vessel (filling level <5%): • Make-up disabled. • Water loss in the system. • Filling level measurement defective.	• If necessary, manually add water. • Check water level.	-
03	High water [1] Auto LED lights up [5] Error LED lights up [3.1] Level LED lights up	Filling level >90%: • Make-up function defective (continuous water supply) • External water entry through the system (e.g. defective heat exchanger)	• Check the make-up unit. • Check functioning of the "PV" solenoid valve. • Drain water from the vessel. • Check on-site heat exchanger for leakage.	-
05	Compressor run time [1] Auto LED flashes [4] Stop LED flashes [5] Error LED flashes [2] Pressure LED flashes [3] Level LED off	Maximum compressor run time exceeded: • Air side leak. • Compressor has no power.	• Check the water loss and correct, if necessary. • Seal any leak in the air system. • Check functioning of "PV" air side solenoid valve. • Check functioning of compressor.	"Service"
06	Make-up time [1] Auto LED lights up [5] Error LED lights up [3] Level LED flashes	Set max. make-up time has been exceeded: • Water loss in the system. • Automatic make-up not connected. • Make-up output insufficient. • Make-up hysteresis too high.	• Check the set values. • Check automatic make-up. • Check water level. • Connect make-up line. • Seal any leakage in the system.	-
07	Make-up cycles [5] Error LED lights up [4] Stop LED lights up [3.3] Level LED lights up	Number of set max. make-up cycles has been exceeded: • Leakage in the system.	• Check the set value. • If necessary, manually add water. • Check system for leakage.	-
08	Pressure measurement [1] Auto LED off [4] Stop LED flashes [5] Error LED flashes [2] Pressure LED flashes	• Controller receives incorrect signal.	• Check the plug connection at the pressure sensor. • Check functioning of the pressure sensor. • Compare the values from the app with the pressure gauge • Check the cable for damage.	-
09	Filling level measurement [1] Auto LED off [4] Stop LED flashes [5] Error LED flashes [3] Level LED flashes	• Controller receives incorrect signal from the weight measuring cell.	• Check the plug connection at the weight measuring cell. • Check the functioning of the weight measuring cell. • Check the cable for damage.	"Service"

ER Code	Alarm	Causes	Remedy	Alarm reset
10	Maximum pressure [1] Auto LED lights up [2] Pressure LED flashes [5] Error LED lights up	Set value (P_{sv}-0.3 bar) exceeded: • Air side solenoid valve does not blow off. • Compressor runs continuously.	• Check the set values. • Check system-side water connection. • Check functioning of air side solenoid valve. • Clean the silencer of the air-side solenoid valve. • Check the compressor relay.	-
11	Make-up quantity	Specified make-up quantity has been exceeded • Severe water loss in the system.	• Check system for leakage.	-
15	Make-up valve	Contact water meter measures without make-up request	• Check system for leakage. • Clean make-up valve. • Replace make-up valve (if necessary).	-
19	Stop > 4 hours [4] Stop LED lights up [5] Error LED flashes	• Device is in Stop mode for more than 4 hours.	• Reset using the SmartControl app.	"Service"
20	Max. make-up quantity	Max. set make-up quantity exceeded	• Set make-up quantity correctly.	-
21	Maintenance recommended [1] Auto LED lights up [5] Error LED lights up	• Maintenance interval exceeded.	• Carry out maintenance. • Reset maintenance counters in the app.	"App"
24	Softening/demineralisation	Soft water capacity used up	• Replace the cartridge (Fillsoft).	-

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 supply cable to the device is disconnected and secured against being switched back on.
- 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 locally applicable electrical engineering regulations.

The device is to be maintained annually.

- The maintenance intervals depend on the local operational conditions.

An indication that the annual service is to be performed after the set device operating time has elapsed is given in the form of a warning. The warning is also displayed in the app. The maintenance interval must be reset using the app.
Use "manual mode" for maintenance ↳ 8.1.3 "Manual mode", 9.

Note!
Arrange for maintenance tasks must be carried out only by specialist personnel or Reflex Customer Service.

10.1 Maintenance schedule

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

Activity	Check	Wait	Clean	Interval
Check for leak tightness. • "CO" compressor. • Screw connections of the compressed air connections.	x	x		Annually
Check switching points. • Cut-in pressure "CO" compressor. • Low water. • Make-up with water.	x			Annually

10.2 Checking switching points (during vessel draining)

Prerequisite for checking the switching points are the following correct settings:

- Minimum operating pressure P_0, ↳ 7.2 "Reflexomat switching points", 9.
- Filling level measurement in the primary vessel.

Preparation

1. Switch to Automatic mode.
2. Close the cap valves upstream of the vessel.
3. Record the indicated filling level (value in %) from the app.
4. Drain the water from the vessel.

Note!
During vessel draining, continuously monitor the filling level and pressure values in the app and check the switching points.

Check the cut-in pressure during draining

5. Check the cut-in and cut-out pressure of the compressor "CO". (Factory setting)
   – The compressor cuts in at P_0 + 0.3 bar.
   – The compressor cuts out at P_0 + 0.4 bar.

Check make-up "On"

6. If necessary, check the make-up display value in the app.
   – Automatic make-up is switched on at a filling level of 8 %.
   – If the cut-in point is reached, automatic make-up is to be deactivated.

Check low water "On"

7. Drain more water from the vessel.
8. Check the display value of the "Low water" filling level message in the app. Ensure that the vessel is completely empty for this purpose.
   – Low water "On" is displayed in the app or as an LED on the device once a minimum filling level of 5% is reached.
9. Switch to Stop mode.
10. Completely disconnect the system from the power supply.

Note!
The membrane is defective if, with the vessel empty, air flows continuously out of the draining valve.
-> Replace vessel

Switch on the device

11. Reconnect the power supply to the system.
12. Ensure that the automatic make-up is switched off or shut off.
13. Perform a calibration to calibrate the weight measuring cell by (Setting → Maintenance → Calibration)
14. Change to automatic mode and wait until the compressor has reached its cut-off pressure.
15. Slowly open the cap valves upstream of the vessel and secure them against unauthorised closing.

16. Activate automatic make-up.

Check low water "Off"

17. Check the display value for the low water "Off" filling level message in the app.
    – Low water "Off" is displayed in the app or as an LED on the device once a filling level of 8% is reached.

Check make-up "Off"

18. If necessary, check the make-up display value in the app.
    – Automatic make-up is deactivated at a filling level display of 12 %.

Maintenance is completed.

Note!
Alternatively, the functioning of the individual components (solenoid valve, compressor) can be checked by switching in manual mode. (Setting → Maintenance → Manual mode).

Note!
If no automatic make-up is connected, manually fill the vessel with water up to the noted filling level.

Note!
The setting values for pressure maintenance, filling levels and make-up can be found in the chapter Default settings, 9.3 "Default settings ", 10.

10.3 Inspection

10.3.1 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).

10.3.2 Inspection prior to commissioning

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

10.3.3 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 and disposal

⚠ 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 supply cable to the device is disconnected and secured against being switched back on.
- 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 locally applicable electrical engineering regulations.

⚠ CAUTION

Risk of burns on hot surfaces
Hot surfaces in heating systems can cause burns to the skin.
- Wait until hot surfaces have cooled down or wear protective safety gloves.
- The operating authority is required to place appropriate warning signs in the vicinity of the device.

⚠ CAUTION

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

- Prior to disassembly, block off all "water"-side connections to the device.
- De-pressurise the device by venting it.

1. Disconnect the system from the power supply and secure it against unintended reactivation.
2. Disconnect the power plug of the device from the voltage supply.
3. Open the draining valve at the vessel until all water and compressed air have been drained.
4. Undo all hose and pipe connections from the vessel and the control unit of the device to the system and remove them completely.

Note!
When using environmentally harmful media, an adequate liquid capture facility must be provided when draining. Moreover, the operator is obliged to ensure correct disposal of any such media.

Note!
When using environmentally harmful media, an adequate liquid capture facility must be provided when draining. Moreover, the operator is obliged to ensure correct disposal of any such media.

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

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

Alternatively, scan the QR code:

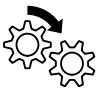
12.3 Guarantee

The respective statutory guarantee regulations apply.

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

Typ / Type:	
P_0	
P_{SV}	
Fabr. Nr. / Serial-No.	



Notes

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