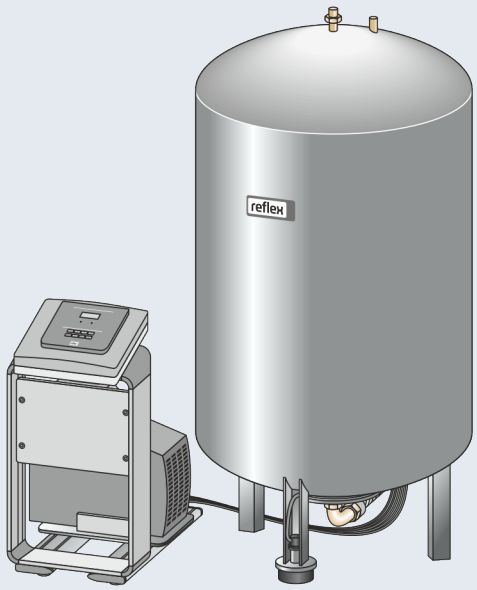
# Reflexomat Basic

## Reflexomat RS 90 / 1 - adjoining
## Reflexomat - external air

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, see chapter 13.1 "Reflex Customer Service" on page 21 .

# 3 Safety

## 3.1 Explanation of symbols

### 3.1.1 Symbols and notes used

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

Assembly, commissioning and maintenance as well as connection of the electrical components may only be carried out by knowledgeable and appropriately qualified electricians.

## 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 pressure maintaining station for heating and cooling water systems. It is used to maintain the water pressure and to add water within 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 cooling 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.

**⚠ CAUTION**
**Risk of burns on hot surfaces**
Hot surfaces in heating systems can cause burns to the skin.

- Wear protective gloves.
- Please place appropriate warning signs in the vicinity of the device.

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

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

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

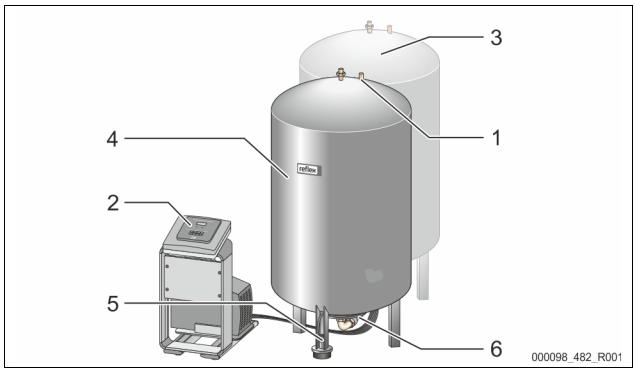
- Use suitable lifting equipment for transportation and installation.

# 4 Description of the device

## 4.1 Description

- "RG" primary vessel with a nominal volume from 800 litres.
  – The RS 90 / 1 control unit as stand-alone console.
- The connection of "RF" secondary vessels to the primary vessel is available as an option

## 4.2 Overview



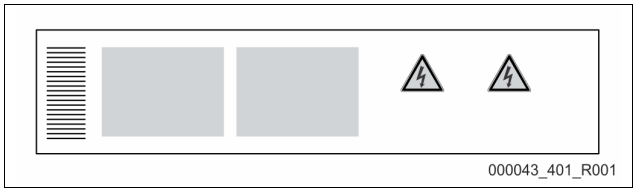

| | |
|---|---|
| 1 | "SV" safety valve |
| 2 | "RS 90 / 1" control unit<br>• Compressor<br>• Controller |

| | |
|---|---|
| 3 | "RF" secondary vessel |
| 4 | "RG" primary vessel |
| 5 | "LIS" level sensor |
| 6 | "EC" expansion line |

## 4.3 Identification

### 4.3.1 Nameplate

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

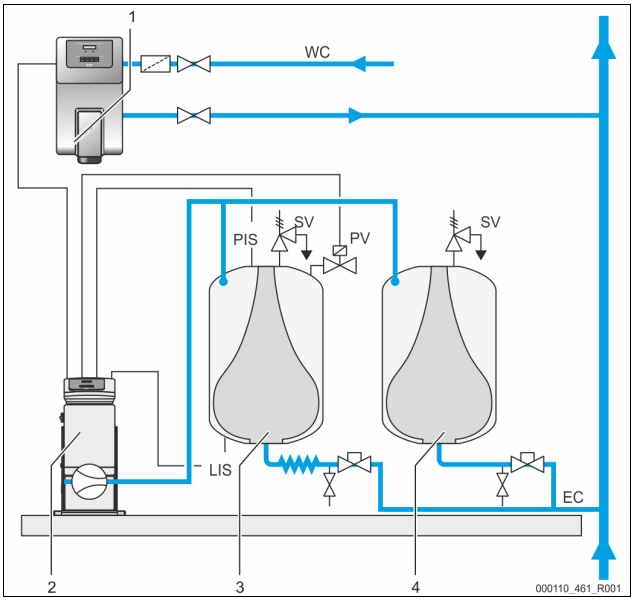



| Information on the type plate | Meaning |
|---|---|
| Type | Device name |
| Serial No. | Serial number |
| min. / max. allowable pressure P | Minimum/maximum permissible pressure |
| max. continuous operating temperature | Maximum temperature for continuous operation |
| min. / max. allowable temperature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

### 4.3.2 Type code

| No. | | Reflexomat Basic type key | | |
|---|---|---|---|---|
| 1 | Control unit designation | Reflexomat | RS 90/ | 1 |
| 2 | Number of compressors | | 1 | 2 |

## 4.4 Function




| | |
|---|---|
| 1 | Make-up with water using "Fillcontroll Auto" |
| 2 | Control unit |
| 3 | Primary vessel as expansion vessel |
| 4 | Secondary vessel as additional expansion vessel |
| WC | Make-up pipe |
| PIS | Pressure sensor |
| SV | Safety valve |
| PV | Solenoid valve |
| LIS | Pressure load cell |
| EC | Expansion pipe |

**Expansion vessels**

One primary vessel and multiple optional secondary vessels may be connected. A membrane separates the vessels into an air and a water space, preventing the penetration of atmospheric oxygen into the expansion water. The primary vessel is connected to the control unit downstream and connected hydraulically to the plant system. The pressure is protected at the air side by the "SV" safety valves of the vessels.

**Control unit**

The control unit comprises a "CO" compressor and the "Reflex Control Basic" controller. Via the primary vessel, the pressure is measured with the "PIS" pressure sensor and the water level with the "LIS" pressure load cell and the values then displayed in the controller display.

**Pressurisation**

- If the water is heated, it expands and the pressure increases in the plant system. 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 plant system until the pressure in the plant system and the primary vessel is equalised.
- The pressure in the plant system 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 plant system. The pressure in the facility system rises.

**Make-up**

The addition of more water is controlled within the controller. The "LIS" pressure load cell determines the water level and sends this value to the controller of the pressure maintaining station. This controls an external make-up. Water is directly added into the system 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 shown in the display.

**Note!**

Additional equipment for topping up water, see chapter 4.6 "Optional equipment and accessories" on page 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 primary vessel from 800 litres and one stand-alone control unit.
- "LIS" pressure load cell for level sensing.

### 4.6 Optional equipment and accessories

- Secondary vessels with connection sets for the primary vessel.
- For make-up with water
  - Make-up without pump:
    - Solenoid "Fillvalve" with ball valve and Reflex Fillset for make-up with drinking water.
  - Make-up with pump:
    - Reflex Fillcontrol Auto, with integrated pump and a system separation vessel or Auto Compact
- For make-up and degassing with water:
  - Reflex Servitec S
  - Reflex Servitec 35- 95
- Fillset for make-up with drinking water.
  - With integrated system separator, water meter, dirt trap and locking mechanisms for the "WC" make-up line.
- Fillset Impulse with FQIRA+ contact water meter for make-up with drinking water.
- Fillsoft for softening or desalination of the make-up water from the drinking water network.
  - 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.
- Optional expansions for Reflex controllers:
  - I/O module for standard communication, see chapter 5 "I/O module (optional expansion module)" on page 5 .
  - Master-Slave-Connect for master controllers for maximum 10 devices.
  - Bus modules:
    - Profibus DP
    - Ethernet
- Diaphragm rupture monitor

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

## 5 I/O module (optional expansion module)

The I/O module is connected and wired in the factory.
It is used to expand the inputs and outputs of the Control Basic controller.
The I/O module has two isolating amplifiers for analogue signals:
- Pressure measurement
- Level sensor

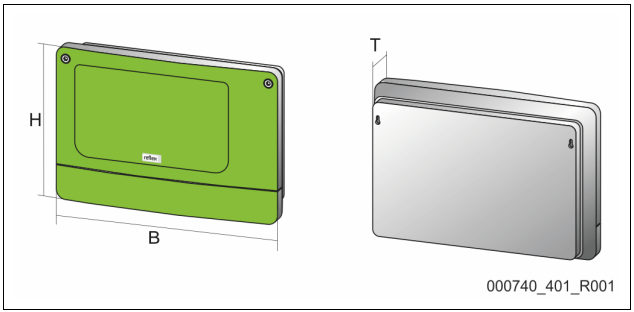
Six digital inputs and six digital outputs are used to process messages and alarms:

| Inputs |
|---|
| Three inputs, N.C. with 24 V self potential for standard settings.<br>• External temperature monitoring<br>• Minimum pressure signal<br>• Manual make-up of water |
| Three inputs, N.O. with 230 V self potential for standard settings.<br>• Emergency-Off<br>• Manual operation (e.g. for pump or compressor)<br>• Manual operation for the overflow |

| Outputs |
|---|
| Potential-free as changeover contacts. Default settings for messages:<br>• Make-up fault<br>• Below minimum pressure<br>• Above maximum pressure<br>• Manual or Stop operation |

**Note!**
- For the default settings of the I/O modules, see Chapter 5.2.4 "I/O module default settings" page 7
- All digital inputs and outputs can be set freely as option. Settings to be made by Reflex Customer Service, see chapter 13.1 "Reflex Customer Service" on page 21

### 5.1 Technical data




| | |
|---|---|
| Housing | Plastic housing |
| Width (W): | 340 mm |
| Height (H): | 233.6 mm |
| Depth (D): | 77 mm |
| Weight: | 2.0 kg |
| Permissible operating temperature: | -5 °C – 55 °C |
| Permissible storage temperature: | -40 °C – 70 °C |
| Degree of protection IP: | IP 64 |
| Power supply: | 230 V AC, 50 – 60 Hz (IEC 38) |
| Fuse (primary): | 0.16 A time-lag |

| Input/output |
|---|
| • 6 floating relay outputs (changeover)<br>• 3 digital inputs 230 V AC<br>• 3 digital inputs 24 V AC<br>• 2 analogue outputs, to be set using jumpers<br>  • 0 V – 1 V or 2 V – 10 V<br>  • 0 mA – 20 mA or 4 mA – 20 mA |

| Interfaces to the controller |
|---|
| • RS-485<br>• 19.2 kbit/s<br>• Floating<br>• connection with plug or screw terminals<br>  • RSI-specific protocol |

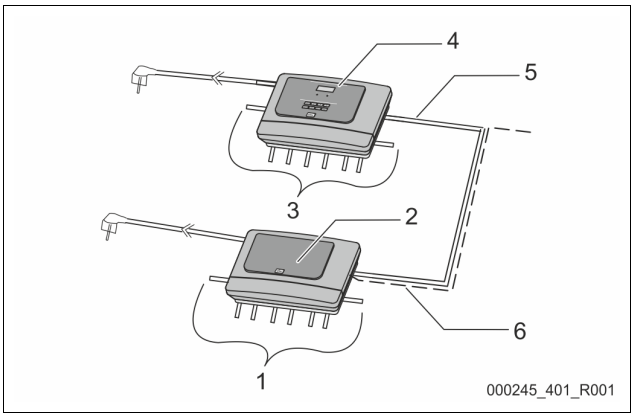
### 5.2 Settings

**GEFAHR**
Danger to life from electric shock!
Risk of serious injury or death due to electric shock. Some parts of the main board may still be at a voltage of 230 V even after the mains plug has been pulled out.
- Before you remove the covers, completely isolate the device controller from the power supply.
- Verify that the main circuit board is voltage-free.

#### 5.2.1 Terminator settings in RS-485 networks

Examples for the activation and deactivation of terminators in RS–485 networks.
- The main circuit board of the Control Basic provides either the DIP switches 1 and 2 or the jumper J3.
- Maximum length for an RS–485 connection is 1000 metres

**Device controller with I/O module**

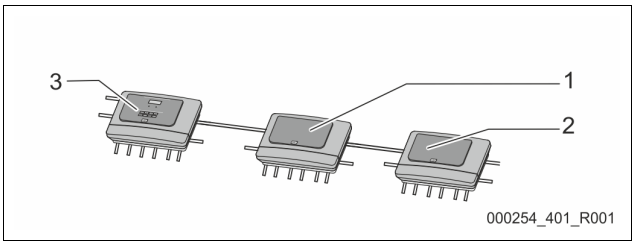



| | |
|---|---|
| 1 | Relay outputs of the I/O module<br>• 6 digital outputs<br>• 2 analogue outputs |
| 2 | I/O module |
| 3 | Connections of the I/ O conductors |

| | |
|---|---|
| 4 | "Control Basic" controller |
| 5 | RS-485 connection |
| 6 | Optional RS-485 connection<br>• Master - Slave<br>• Field bus |

| Terminator settings | | | |
|---|---|---|---|
| **Jumper / Switch** | Settings | I/O module | Control Basic |
| **Jumper J10 and J11** | Activated | X | --- |
| | Deactivated | --- | --- |
| **DIP switch 1 and 2** | Activated | --- | X |
| | Deactivated | --- | --- |
| **Jumper J3 1 and 2 as well as 3 and 4** | Activated | --- | X |
| | Deactivated | --- | --- |

**Device controller with I/O module and bus module**

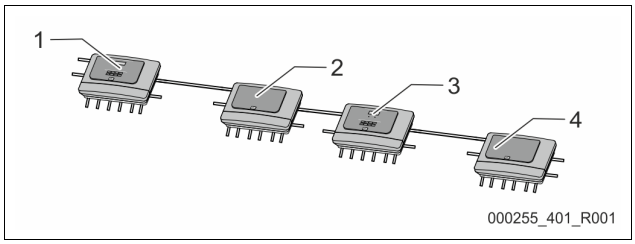



| | |
|---|---|
| 1 | I/O module |
| 2 | Bus module |

| | |
|---|---|
| 3 | "Control Basic" controller |

| Terminator settings | | | | |
|---|---|---|---|---|
| **Jumper / Switch** | Settings | I/O module | Control Basic | Bus module Lon Works Profibus DP Ethernet |
| **Jumper J10 and J11** | Activated | --- | --- | --- |
| | Deactivated | X | --- | --- |
| **DIP switch 1 and 2** | Activated | --- | X | --- |
| | Deactivated | --- | --- | --- |
| **Jumper J3 1 and 2 as well as 3 and 4** | Activated | --- | X | X |
| | Deactivated | --- | --- | --- |

**Device controllers and I/O module in Master-Slave function**




| | |
|---|---|
| 1 | Control Basic controller in Master function |
| 2 | I/O module for the Master function |

| | |
|---|---|
| 3 | Control Basic controller in Slave function |
| 4 | I/O module for the Slave function |

**Master function**

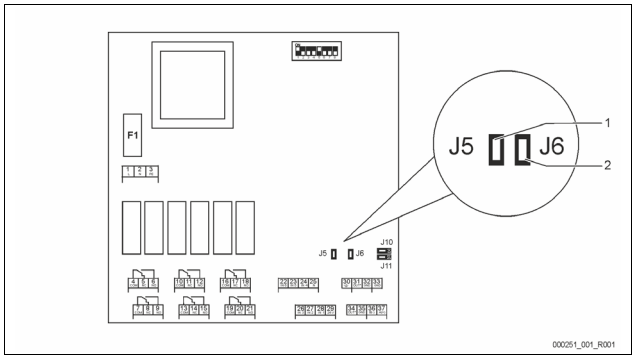
| Terminator settings | | | |
|---|---|---|---|
| **Jumper / Switch** | Settings | I/O module | Control Basic |
| **Jumper J10 and J11** | Activated | X | --- |
| | Deactivated | --- | --- |
| **DIP switch 1 and 2** | Activated | --- | X |
| | Deactivated | --- | --- |
| **Jumper J3 1 and 2 as well as 3 and 4** | Activated | --- | X |
| | Deactivated | --- | --- |

**Slave function**

| Terminator settings | | | | |
|---|---|---|---|---|
| **Jumper / Switch** | Settings | I/O module | I/O module for expansion | Control Basic |
| **Jumper J10 and J11** | Activated | --- | X | --- |
| | Deactivated | X | --- | --- |
| **DIP switch 1 and 2** | Activated | --- | --- | X |
| | Deactivated | --- | --- | --- |
| **Jumper J3 1 and 2 as well as 3 and 4** | Activated | --- | --- | X |
| | Deactivated | --- | --- | --- |

### 5.2.2 Setting the analogue outputs

Setting of the analogue outputs on the I/O module's main circuit board




| | |
|---|---|
| 1 | Jumper J5 |

| | |
|---|---|
| 2 | Jumper J6 |

Use the jumpers J5 and J6 to set both analogue outputs as current outputs.
Proceed as follows:

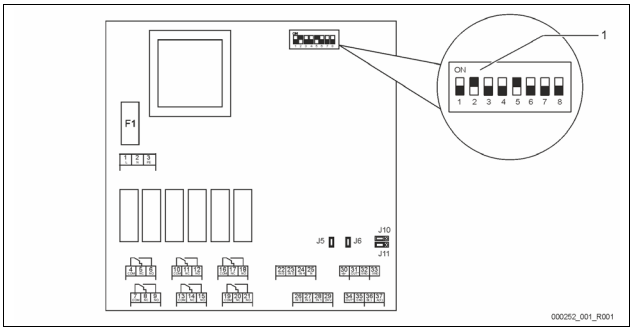
1. Pull out the mains plug of the I/O module.
2. Open the housing cover.
3. Plug the jumpers in the required position.

| Analogue outputs | Jumper settings | Current output* 0 – 20 mA or 4 – 20 mA | Voltage output 0 - 10 V or 2 - 10 V |
|---|---|---|---|
| Analogue output 1 | J5 is plugged | --- | X |
| | J5 is not plugged | X | --- |
| Analogue output 2 | J6 is plugged | --- | X |
| | J6 is not plugged | X | --- |

* Depending on the relevant setting in the device controllers

### 5.2.3 Module address setting

Setting of the module address on the I/O module's main circuit board




| | |
|---|---|
| 1 | DIP switch |

DIP-switch position

DIP switch 1 – 4:
- For setting the module address
- Variable setting to ON or OFF

DIP switch 5:
- Permanently to position ON

DIP switch 6 – 8:
- For internal testing
- To position OFF during operation

Use DIP switches 1 – 4 to set the module address.
Proceed as follows:

1. Pull out the mains plug of the I/O module.
2. Open the housing cover.
3. Set DIP switches 1 – 4 to position ON or OFF.

| Module address | DIP switch | | | | | | | | Used for the modules |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 2 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 3 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 4 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 4 |
| 5 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 5 |
| 6 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 6 |
| 7 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 7 |
| 8 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 8 |
| 9 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 9 |
| 10 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 10 |

### 5.2.4 I/O module default settings

The inputs and outputs of the I/O module each have default settings.
These default settings can be changed, if required, and adjusted to local conditions.
Responses by the inputs 1 – 6 of the I/O module are recorded and displayed in the device controller's fault memory.

**Note!**
- Default settings apply to software version V1.10 and higher.
- All digital inputs and outputs can be set freely as option. The setting is carried out by Reflex Customer Service, see chapter 13.1 "Reflex Customer Service" on page 21

| Location | Signal evaluation | Message text | Fault memory entry | Priority | Signal on the input triggers the following action |
|---|---|---|---|---|---|
| **INPUTS** | | | | | |
| 1 | N.C. | External temperature monitoring | Yes | Yes | • Solenoid valves are closed.<br>  • Solenoid valve (2) in overflow line (1)<br>  • Solenoid valve (3) in overflow line (2)<br>• Output relay (1) is switched. |
| 2 | N.C. | External signal, Minimum pressure | Yes | No | • Solenoid valves are closed.<br>  • Solenoid valve (2) in overflow line (1)<br>  • Solenoid valve (3) in overflow line (2)<br>• Output relay (2) is switched. |
| 3 | N.C. | Manual make-up | Yes | Yes | • Solenoid valve (1) in make-up line is manually opened.<br>• Output relay (5) is switched. |
| 4 | N.O. | Emergency-Off | Yes | Yes | • Pumps (1) and (2) are switched off.<br>• Solenoid valves (2) and (3) in the overflow lines are closed.<br>• Solenoid valve (1) in the make-up line is closed.<br>• Switches "Group alarm" in the device controller. |
| 5 | N.O. | Manual pump 1 | Yes | Yes | • Pump (1) is manually switched on.<br>• Output relay (5) is switched. |
| 6 | N.O. | Manual OF-1 | Yes | Yes | Solenoid valve (1) is opened. |
| **OUTPUTS** | | | | | |
| 1 | Changeover contact | --- | --- | --- | See input 1 |
| 2 | Changeover contact | --- | --- | --- | See input 2 |
| 3 | Changeover contact | --- | --- | --- | • Below minimum pressure.<br>• "ER 01" message in the controller |
| 4 | Changeover contact | --- | --- | --- | • Maximum pressure exceeded<br>• "ER 10" message in the controller |
| 5 | Changeover contact | --- | --- | --- | Switches in manual mode<br>Switches in stop mode<br>Switches with inputs 3,5,6 active |

| Location | Signal evaluation | Message text | Fault memory entry | Priority | Signal on the input triggers the following action |
|---|---|---|---|---|---|
| 6 | Changeover contact | Make-up fault | --- | --- | • Make-up setting values exceeded.<br>• Switches the following messages in the device controller:<br>  • "ER 06", Make-up time<br>  • "ER 07", Make-up cycles<br>  • "ER 11", Make-up quantity<br>  • "ER 15", Make-up valve<br>  • "ER 20", Maximum make-up quantity |

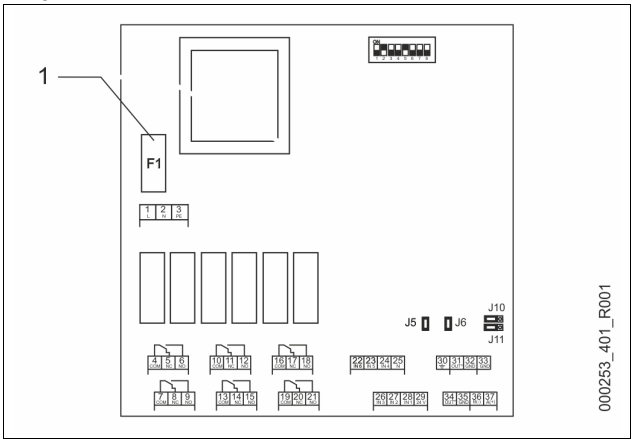
### 5.3 Replacing the fuses

**DANGER**

Risk of electric shock!
Risk of serious injury or death due to electric shock. Some parts of the main board may still carry 230 V voltage even with the device physically isolated from the 230 V power supply.

- Before you remove the covers, completely isolate the device controller from the power supply.
- Verify that the main circuit board is voltage-free.

Fusing is provided on the I/O module's main circuit board.




| | |
|---|---|
| 1 | Microfuse F1 (250 V, 0, 16 A slow) |

Proceed as follows:
1. Disconnect the I/O module from the power supply.
   - Pull the power plug from the bus module.
2. Open the terminal space cover.
3. Remove the housing cover.
4. Replace the defective fuse.
5. Re-attach the housing cover.
6. Close the terminal space cover.
7. Reconnect the power supply for the module.

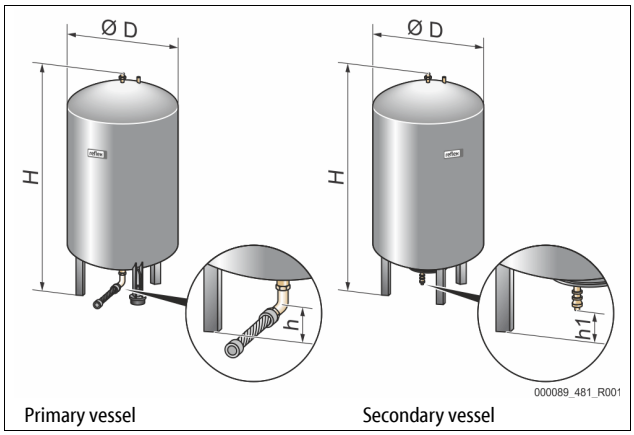
The fuse replacement is completed.

## 6 Technical data

### 6.1 Control unit

| | |
|---|---|
| Permissible ambient temperature | 0 – 45 °C |
| Degree of protection | IP 54 |
| Noise level | 72 dB |
| Electric output | 750 W |
| Power supply | 230 V / 50 Hz |
| Fusing | 3 A |
| Electrical voltage control unit | 230 V / 2 A |
| Number of RS-485 interfaces | 1 |
| Weight | 25 kg |
| Permissible operating temperature | 70 °C |
| Permissible flow temperature | 120 °C |
| I/O module | optional |

### 6.2 Tanks




Primary vessel Secondary vessel

**Note!**
The following values apply for all vessels:
– Operating pressure: 6 bar

| Type | Diameter Ø "D" (mm) | Weight (kg) | Connection (inches) | Height "H" (mm) | Height "h" (mm) | Height "h1" (mm) |
|---|---|---|---|---|---|---|
| 800 | 740 | 149 | R1 | 2185 | 100 | 140 |
| 1000 | 1000 | 156 | DN65 | 2025 | 195 | 305 |
| 1500 | 1200 | 465 | DN65 | 2025 | 185 | 305 |
| 2000 | 1200 | 565 | DN65 | 2480 | 185 | 305 |
| 3000 | 1500 | 795 | DN65 | 2480 | 220 | 334 |
| 4000 | 1500 | 1080 | DN65 | 3065 | 220 | 334 |
| 5000 | 1500 | 1115 | DN65 | 3590 | 220 | 334 |

## 7 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).

**⚠ 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.

## 7.1 Installation conditions

### 7.1.1 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.

## 7.2 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, see chapter 6 "Technical data" on page 8 .
- Use only approved transport and lifting equipment.
  – The load fastening points at the tanks must be used only as installation resources.

## 7.3 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.

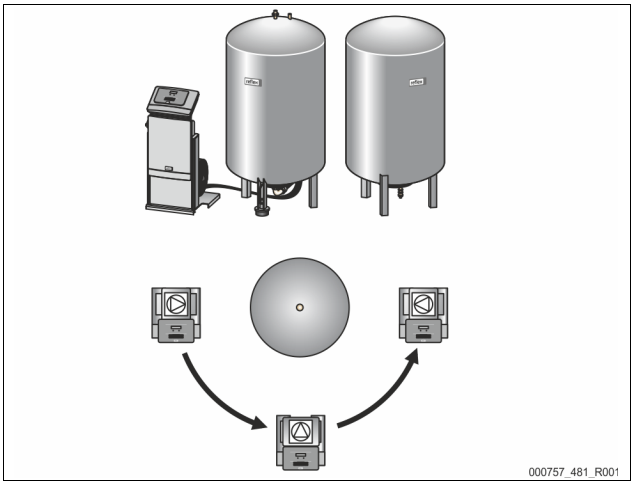
**Notice!**

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

### 7.3.1 Positioning

Determine the device position.

- Control unit
- Primary vessel
- Optional secondary vessel




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

### 7.3.2 Tank installation

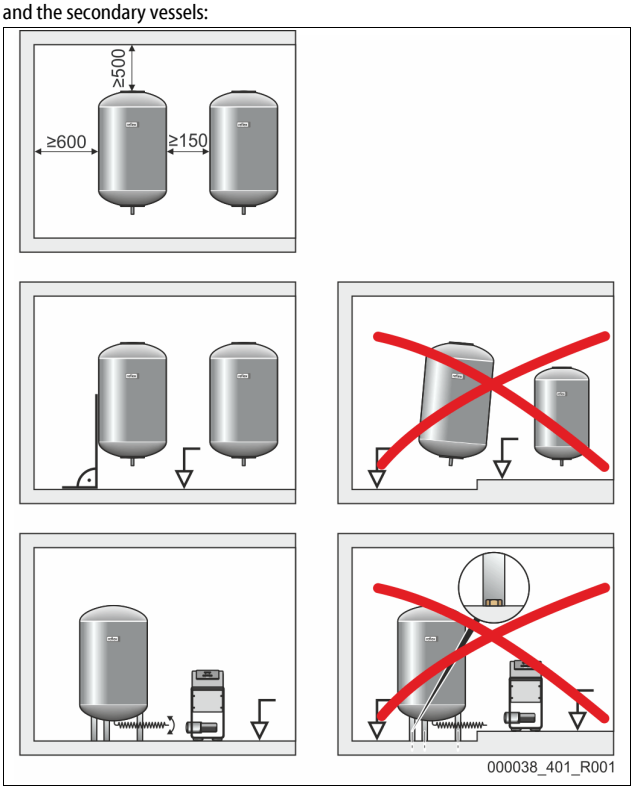
**ATTENTION**

**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.

Comply with the following notes regarding the installation of the primary vessel and the secondary vessels:



- All flange openings at the vessels are viewing and maintenance openings.
  – Place the vessels with sufficient distances to sides and ceiling.
- Install the vessels on a level surface.
- Ensure rectangular and free-standing position of the vessels.
- Use only vessels of the same type and dimensions when using secondary vessels.
- Ensure proper functioning of the "LIS" level sensor.
  **ATTENTION** Property damage caused by overpressure. Do not attach the vessels firmly to the floor.
- Install the control unit on the same level as the vessels.

### 7.3.3 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 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.

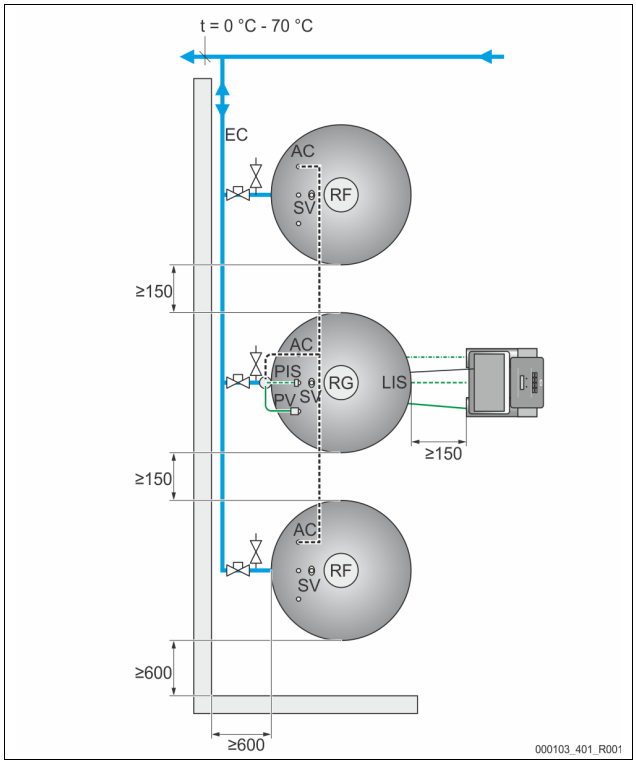
**ATTENTION**

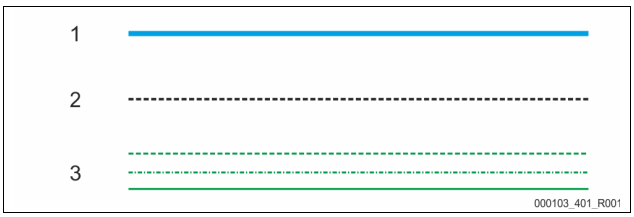
**Damage to cables and pipes**

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.

The following typical example describes the installation of the control unit upstream of the primary vessel and the connection of two secondary vessels. Proceed accordingly for other installation variants.




| | |
|---|---|
| 1 | Expansion pipe |
| 2 | Compressed air line |
| 3 | Data line |
| RF | Secondary vessel |
| RG | Primary vessel |

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

#### 7.3.3.1 Water-side connection

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

The "EC" expansion line provides secure locking and emptying for primary vessel and the optional secondary vessels. If more than one vessel is used, a collective line to the system is installed.

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

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

**Note!**

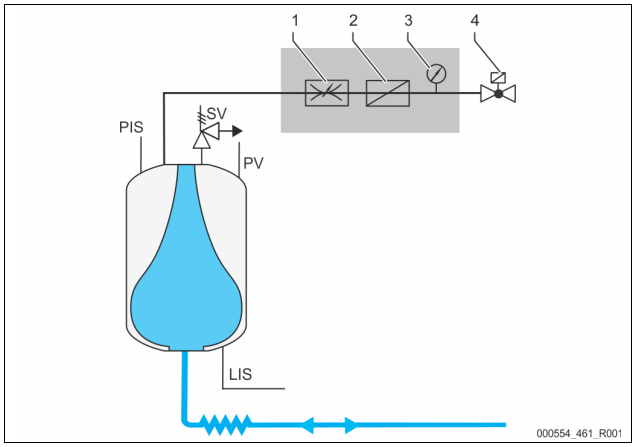
For details regarding the switching of Reflexomats or in-line vessels and the dimensions of the expansion lines, please see the planning documents. More information is also provided in the Reflex Planning Guide.

#### 7.3.3.2 Control unit connection

- The "PV" solenoid valve, the "PIS" pressure transducer and the corresponding cables are factory-installed on the primary vessel.
  – Run the cable through the assembly pipe on the rear of the primary vessel to the control unit.
- Subsequently install the level sensor at the primary vessel, see chapter 7.3.5 "Fitting the level sensor" on page 11 .
  – Attach the cable to the "LIS" pressure pick-up of the level sensor and run the cable to the control unit.
- The flexible compressed air hose is connected with the control unit. Run the compressed air hose through the assembly pipe as well.
  – If you install only the primary vessel, you must connect the compressed air hose directly to the "AC" compressed air connection of the primary vessel.
  – If you install secondary vessels, you install first the supplied distributor at the compressed air connection of the primary vessel.
    - Use the supplied connection sets to connect the secondary vessels.

### 7.3.4 Connection to an external compressed air line

An external pressure supply can optionally be connected to the Reflexomat. When doing so it must be ensured that a pressure reducer is fitted in the external pressure line. The minimum pressure to be set depends on the relevant pressure rating of the vessel.




| | |
|---|---|
| 1 | Pressure reducer, site attachment |
| 2 | Dirt trap, site attachment |
| 3 | Pressure gauge, site attachment |
| 4 | Solenoid valve, supplied by Reflex |

| | |
|---|---|
| PIS | Pressure sensor |
| SV | Safety valve |
| PV | Overflow solenoid valve |
| LIS | Level sensor |

Instead of the compressor, a solenoid valve is actuated in the external compressed air line, which releases the compressed air for the vessel. The solenoid valve is activated by the controller. The electrical connection of the solenoid valve is made via the terminal for the compressor in the respective controller.

Properties of the external compressed air:

- Quality
  - Fluid group 2 according to the Pressure Equipment Directive 2014 / 68 EU.
  - DIN ISO 8573-1 Class 1.
- Oil-free
  - **ATTENTION** Diaphragm damage caused by oil-containing compressed air. Keep the compressed air free of oil.
- Compressed air
  - **ATTENTION** Damage to the vessel. The compressed air must be reduced to the respective vessel pressure rating.

**Note!**
See chapter "Terminal plan" for the solenoid valve electrical connection.

### 7.3.5 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 vessel has been placed at its final position, see chapter 7.3.2 "Tank installation" on page 9 . Comply with the following instructions:

- Remove the transport securing device (squared timber) at the vessel base of the primary vessel.
- Replace this transport securing device with the pressure load cell.
  - In the case of a vessel 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 vessel.
- Avoid shock-type loading of the pressure load cell by, for example, subsequent alignment of the vessel.
- Use flexible hoses to connect the primary vessel and the first secondary vessel.
  - Use only the supplied connection sets, see chapter 7.3.2 "Tank installation" on page 9 .
- Perform a null balancing of the filling level when the primary vessel is aligned and fully emptied, see chapter 10.2 "Configuring settings in the controller" on page 15 .

**Standard values for level measurements:**

| Primary vessel | Measuring range |
|---|---|
| 800 – 1000 l | 0 – 25 bar |
| 1500 – 2000 l | 0 – 60 bar |
| 3000 – 5000 l | 0 – 100 bar |

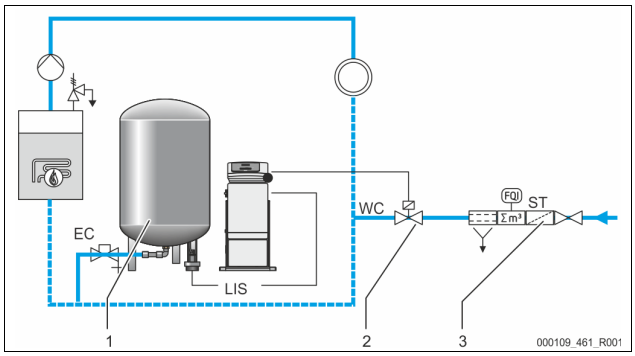
## 7.4 Make-up and degassing variants

### 7.4.1 Function

The filling level is recorded in the primary tank by the "LIS" level sensor and evaluated in the controller. When the water level falls below the value specified in the controller's customer menu, the external make-up is activated.

#### 7.4.1.1 Make-up without pump

Reflexomat Basic with solenoid valve and ball valve.



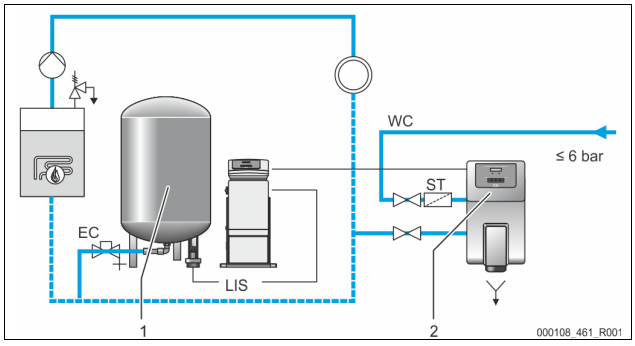

| | |
|---|---|
| 1 | Reflexomat Basic |
| 2 | Solenoid valve "Fillvalve" with ball valve |
| 3 | Reflex Fillset |
| ST | Dirt trap |

| | |
|---|---|
| WC | Make-up pipe |
| LIS | Level sensor |
| EC | Expansion pipe |

Preferably, you should use the Reflex Fillset with integrated system separator when using drinking water for make-up. If you don't use a Reflex Fillset, you must use an "ST" dirt trap with a mesh size ≥ 0.25 mm for the make-up.

#### 7.4.1.2 Make-up with pump

Reflexomat Basic with Reflex Fillcontrol Auto



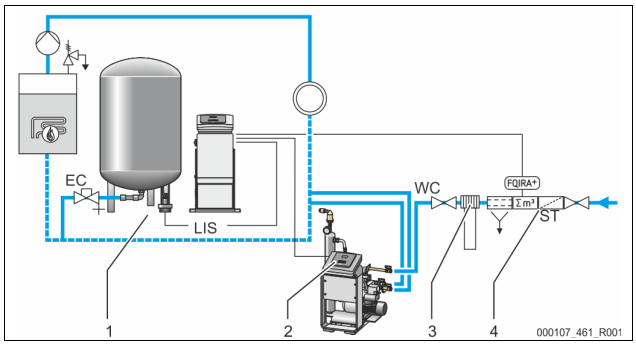

| | |
|---|---|
| 1 | Reflexomat Basic |
| 2 | Fillcontrol Auto |
| WC | Make-up pipe |

| | |
|---|---|
| ST | Dirt trap |
| EC | Expansion pipe |
| LIS | Level sensor |

Water make-up with Fillcontrol Auto is suitable for make-up at high system pressures of up to 8.5 bar. The "ST" dirt trap is part of the deliverables.

#### 7.4.1.3 Make-up with softening and degassing

Reflexomat Basic and Reflex Servitec.




| | | | |
|---|---|---|---|
| 1 | Reflexomat Basic | ST | Dirt trap |
| 2 | Reflex Servitec | WC | Make-up pipe |
| 3 | Reflex Fillsoft | LIS | Level sensor |
| 4 | Reflex Fillset Impulse | EC | Expansion pipe |

The Reflex Servitec degassing and make-up station degasses the water from the facility system and the make-up water. The automatic water make-up for the facility system is controlled by the pressurisation system. Reflex Fillsoft additionally softens the make-up water.

- Reflex Servitec degassing and make-up station, see chapter 4.6 "Optional equipment and accessories" on page 5 .
- Reflex Fillsoft softening systems and Reflex Fillset Impulse, see chapter 4.6 "Optional equipment and accessories" on page 5 .

**Note!**

When using Reflex Fillsoft softening systems, always install the Reflex Fillset Impulse.

– The controller evaluates the make-up quantities and signals a required replacement of the softening cartridges.

## 7.5 Electrical connection

**DANGER**

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

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

- Ensure that the system is voltage-free before installing the device.
- Ensure that the system is secured and cannot be reactivated by other persons.
- Ensure that installation work for the electric connection of the device is carried out by an electrician, and in compliance with electrical engineering regulations.

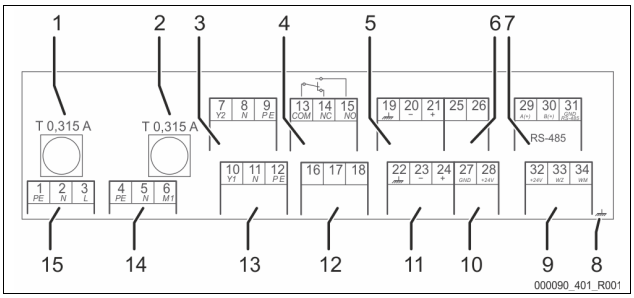
The following descriptions apply to standard systems and are limited to the necessary user-provided connections.

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

   **DANGER** Risk of serious injury or death due to electric shock. Some parts of the device's circuit board may still be live with 230 V even after the device has been physically isolated from the power supply by pulling out of the mains plug. Before you remove the covers, completely isolate the device controller from the power supply. Verify that the main circuit board is voltage-free.
3. Install a screwed cable gland suitable for the respective cable. M16 or M20, for example.
4. Thread all cables to be connected through the cable gland.
5. Connect all cables as shown in the terminal diagram.
   – For installer supplied fusing, comply with the connected loads of the device , see chapter 6 "Technical data" on page 8 .
6. Install the cover.
7. Connect the mains plug to the 230 V power supply.
8. Activate the system.

The electrical connection is completed.

### 7.5.1 Terminal diagram




| | |
|---|---|
| 1 | "L" fuse for electronics and solenoid valves |
| 2 | "N" fuse for solenoid valves |
| 3 | Overflow valve (not for motor ball valve) |
| 4 | Group message |
| 5 | Optional for second pressure value |
| 6 | Motor ball valve (control connection) |
| 7 | RS-485 interface |
| 8 | Shielding |
| 9 | Digital inputs<br>• Water meter<br>• Insufficient water |
| 10 | Motor ball valve (energy connection) |
| 11 | Pressure analogue input |
| 12 | External make-up request |
| 13 | Make-up valve |
| 14 | "CO" compressor |
| 15 | Mains supply |

| Terminal number | Signal | Function | Wiring |
|---|---|---|---|
| 1 | PE | 230 V power supply via mains cable and plug. | Factory |
| 2 | N | | |
| 3 | L | | |
| 4 | PE | Compressor for maintaining the pressure. | Factory |
| 5N | N | | |
| 6 M1 | M 1 | | |
| 7 | Y2 | Overflow solenoid valve.<br>• For controlling pressurisation in the overflow line. | Factory |
| 8 | N | | |
| 9 | PE | | |
| 10 | Y 1 | 230 V output for water make-up.<br>• To control a Reflex Fillcontrol, for example. | User, optional |
| 11 | N | | |
| 12 | PE | | |
| 13 | COM | Group message (floating). | User, optional |
| 14 | NC | | |
| 15 | NO | | |
| 16 | Not assigned | External make-up request.<br>• Not used with the Reflexomat. | --- |
| 17 | Make-up (230 V) | | |
| 18 | Make-up (230 V) | | |
| 19 | PE shield | Level analogue input.<br>• Display at the controller.<br>• Activation of the make-up. | Factory prepared, sensor plug must be inserted on site |
| 20 | - Level (signal) | | |
| 21 | + Level (+ 18 V) | | |
| 22 | PE (shield) | Pressure analogue input.<br>• Display at the controller.<br>• Control of pressurisation. | Factory |
| 23 | - Pressure (signal) | | |
| 24 | + Pressure (+ 18 V) | | |

| Terminal number | Signal | Function | Wiring |
|---|---|---|---|
| 25 | 0 – 10 V (correcting variable) | Motor ball valve<br>• Not used with the Reflexomat. | --- |
| 26 | 0 – 10 V (feedback) | | |
| 27 | GND | | |
| 28 | + 24 V (supply) | | |
| 29 | A | RS-485 interface. | User, optional |
| 30 | B | | |
| 31 | GND | | |
| 32 | + 24 V (supply) E1 | Supply for E1 and E2. | Factory |
| 33 | E1 | Contact water meter (in Fillset, for example), see chapter 4.6 "Optional equipment and accessories" on page 5 .<br>• Evaluation of the make-up. If contact 32/33 is closed = meter pulse. | User, optional |
| 34 | E2 | Insufficient water switch.<br>• Not used with the Reflexomat.<br>If contact 32/34 is closed = OK. | --- |

#### 7.5.2 RS-485 interface

This interface is used to retrieve all controller data and to enable the communication with control centres or other devices.
The following data can be requested:
– Pressure and level.
– Compressor operating states.
– Operating states of the ball valve in the overflow line.
– Operating states of make-up via solenoid valve.
– Aggregate volume of the FQIRA + contact water meter.
– All messages, see chapter 10.2.2 "Messages" on page 17 .
– All entries in the fault memory.

**Note!**
If required, please contact the Reflex Customer Service for the protocol of the RS-485 interface, details of the connections and information about the accessories offered.

##### 7.5.2.1 Connecting the RS-485 interface

- Use a shielded cable to connect the interface to terminals 1 – 6 of the main board in the control cabinet.
  – For connecting the interface, see chapter 7.5 "Electrical connection" on page 12 .
- When using the device with a control centre not supporting an RS-485 interface (RS-232, for example), you must use a corresponding adapter.

**Note!**
- For connecting the interface use only a cable with these properties.
  – LJYCY (TP), 4 × 2 × 0.8, maximum overall bus length 1000 m.

### 7.6 Installation and commissioning certificate

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

## 8 Commissioning

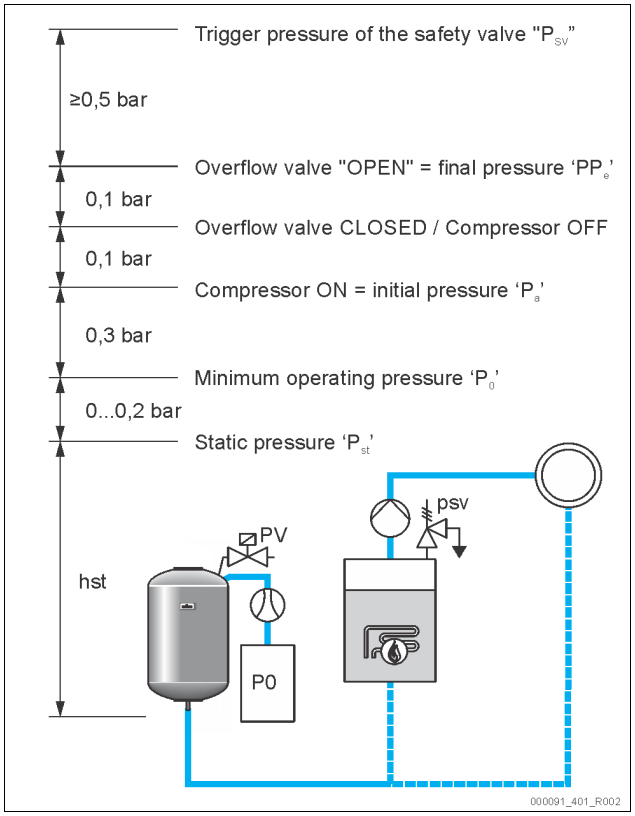
**Note!**
Confirm that installation and start-up have been carried out correctly using the installation and commissioning certificate. This action is a prerequisite for the making of warranty claims.
– Have the Reflex Customer Service carry out commissioning and the annual maintenance.

### 8.1 Checking the requirements for commissioning

The device is ready for commissioning when the tasks described in Chapter Installation have been concluded. Comply with the following instructions for 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 facility system is filled with water and gas-vented.
- The electrical connection has been created according to applicable national and local regulations.

### 8.2 Reflexomat switching points

The "$P_0$" minimum operating pressure is determined by the location of the pressurisation. 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, see chapter 8.3 "Modifying the controller's start routine" on page 14 . |
| $P_{st} = h_{st}/10$ | $h_{st}$ 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

**Note!**
Avoid dropping below the "$P_0$"minimum operating pressure. Vacuum, vaporisation and cavitation are thus excluded.

## 8.3 Modifying the controller's start routine

**Note!**
During commissioning, you must once execute the start routine.
- For information about controller operation, see chapter 10.1 "Operator panel" on page 15 .

The start routine is used to set the required parameters for the device commissioning. It commences with the first activation of the controller and can be run only once. Parameter changes or checks are possible after the start routine in the customer menu is exited, see chapter 10.2 "Configuring settings in the controller" on page 15 .

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

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

| Indication on the display | Meaning |
|---|---|
| **Reflexomat** | Device name |
| Language | Standard software in various languages. |
| Read the operating manual | Prior to commissioning, read the entire operating manual and verify the proper assembly. |
| Min. op. pressure | Enter the value for the minimum operating pressure.<br>• Calculation of the minimum operating pressure, see chapter 8.2 "Reflexomat switching points" on page 13 . |
| Time | Change the flashing display items for "Hour", "Minute", and "Seconds" to the current time.<br>• The time of an alarm will be stored in the fault memory. |
| Date | Change the flashing display items for "Day", "Month", and "Year" to the current date.<br>• The date of an alarm will be stored in the fault memory. |
| 00800 l / 740 mm<br>GB = 0093 kg | Select the size of the "VG" primary vessel.<br>• For the primary vessel data, see the type plate or, see chapter 6 "Technical data" on page 8 . |
| 1 % / 1.7 bar<br>Null balancing! | Null balancing of the level sensor.<br>• The controller checks whether the level measuring signal matches the dimensional data of the "VG" primary vessel. The primary vessel must be fully emptied, see, see chapter 7.3.5 "Fitting the level sensor" on page 11 . |
| 0 % / 1.0 bar<br>Null balancing concluded successfully! | Upon successful conclusion of the null balancing, confirm with "OK" on the controller operator panel. |
| Cancel null balancing?<br>No | Select "Yes" or "No" on the controller display and confirm with "OK" on the controller operator panel.<br>• **Yes**: The "VG" primary vessel is fully emptied and the device is installed as per the instructions.<br>– Null balancing is still not possible, confirm with "**Yes**". The start routine is terminated. Use the customer menu to repeat the null balancing, see chapter 10.2 "Configuring settings in the controller" on page 15 .<br>– Contact Reflex Customer Service, see chapter 13.1 "Reflex Customer Service" on page 21 .<br>• **No**: The start routine restarts.<br>– Check the prerequisites for the commissioning, see chapter 8.1 "Checking the requirements for commissioning" on page 13 . |
| Terminate routine?<br>No | This message appears on the display only after null balancing has been successful.<br>Select "Yes" or "No" on the controller display and confirm with "OK" on the controller operator panel.<br>• **Yes**: The start routine is terminated, the device automatically switches to Stop mode.<br>• **No**: The start routine restarts. |
| 0 % / 2.0 bar<br>STOP | The level indication is at 0 %. |

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

## 8.4 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).

Upon completion of the start routine, you must vent the primary vessel and the secondary vessels, if applicable.
- Open the vessels' discharge ports to permit the air to escape.
- Select Automatic mode on the controller's operator panel, see chapter 9.1.1 "Automatic mode" on page 15 .

The "CO" compressor builds up the pressure required venting. This pressure is 0.4 bar above the set minimum operating pressure. The vessels' diaphragms are pressurised to this level and the water side in the vessels is vented. Close the discharge ports of all vessels after the compressor has automatically shut down.

**Note!**
Inspect all compressed air connections between the control unit and the vessels for leaks. Subsequently, slowly open all cap valves at the vessels to create the water-side connection to the facility system.

## 8.5 Filling the tanks with water

Prerequisite for fault-free filling is a make-up pressure at least 1.3 bar above the set minimum pressure "$P_0$".
- Without automatic make-up:
  – Use the discharge ports or the facility system to manually fill the individual tank to approximately 30 % of the tank volume, see chapter 7.4 "Make-up and degassing variants" on page 11 .
- With automatic make-up:
  – The tanks are automatically filled to approximately 12 % of the tank volume, see chapter 7.4 "Make-up and degassing variants" on page 11 .

## 8.6 Starting Automatic mode

Automatic operation can be set after initial commissioning. Start the automatic mode at the operator panel of the controller.
The following prerequisites must be met for automatic operation:
- The device is filled with compressed air and water.
- All required parameters are defined in the controller.

Press "Auto" for automatic mode at the controller operator panel.
- The "Auto" LED at the operator panel illuminates to visually signal automatic mode.

**Note!**
Initial commissioning is completed and the device is in continuous operation.

# 9 Operation

## 9.1 Operating modes

### 9.1.1 Automatic mode

**Use:**
After initial commissioning has been successfully completed

**Start:**
Press "AUTO".

**Functions:**
- Automatic mode is suitable for continuous device operation and the controller monitors the following functions:
  - Pressurisation
  - Expansion volume compensation
  - Automatic make-up.
- The "CO" compressor and the "PV1" solenoid valve are regulated by the controller so that the pressure remains constant in a regulation range of ± 0.1 bar.
- Faults are indicated and evaluated in the display.

### 9.1.2 Manual mode

**Use:**
For testing and maintenance tasks.

**Start:**
Press "Manual" on the controller. The Auto LED at the operator panel flashes to visually indicate that Manual mode is active.

**Functions:**
Manual mode allows you to select the following functions and to perform a test run:
- "CO" compressor.
- "PV1" overflow solenoid valve.
- The solenoid valve of the "WV1" make-up.

You can switch several functions after each other and test them at the same time.

| |
|---|
| 30 % 2.5 bar<br><br>CO1!* PV1 WV1 |

- Use the "Switch up/down" keys to select the function.
  - "CO1" = compressor
  - "PV1" = Solenoid valve in the overflow line
  - "WV1" = solenoid valve make-up
    (* selected and active units are marked with "!").

- Press "OK".
  - Confirm the selection or shut-down of the individual functions.
- "Quit" button
  - Shut-down of the individual functions in reverse order.
  - Press "Quit" for the last time and the system moves in Stop mode.
- "Auto" button
  - Return to Automatic mode.

**Note!**
Manual operations cannot be performed if safety-relevant parameters would be exceeded. Switching is then disabled.

### 9.1.3 Stop mode

**Use:**
For device commissioning.

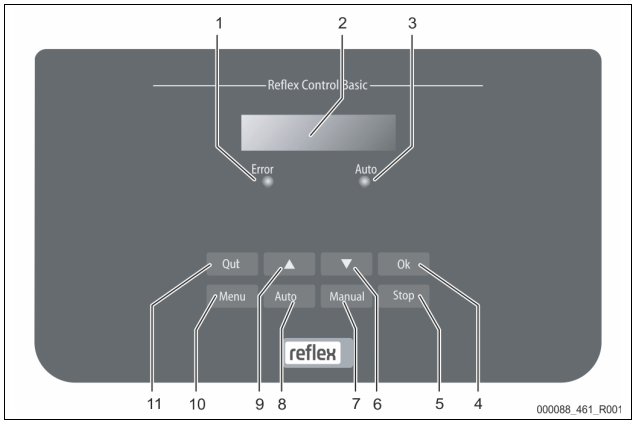
**Start:**
Press "Stop" on the controller. The Auto LED at the operator panel extinguishes.

**Functions:**
Except for the display of information, the device is non-functional in Stop mode. Function monitoring is stopped.
The following functions are deactivated:
- The "CO" compressor is switched off.
- The solenoid valve in the "PV" overflow line is closed.
- The solenoid valve in the "WV" make-up line is closed.

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

# 10 Controller

## 10.1 Operator panel




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

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

## 10.2 Configuring settings in the controller

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

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

**Note!**
For a description of the operation, see chapter 10.1 "Operator panel" on page 15 .

All grey marked menu items must be reviewed during commissioning.

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

| Indication on the display | Meaning |
|---|---|
| Customer menu | Switch to the next main menu option. |
| Language | Standard software in various languages. |
| Time: | Adjust the "Hour", "Minute", and "Second" display when each begins to flash.<br>This time is used for entries in the fault memory. |
| Date: | Adjust the "Day", "Month", and "Year" display when each begins to flash.<br>This date is used for entries in the fault memory. |
| 1 % / 1.7 bar<br>Null balancing? | The controller checks whether the level sensor signal matches the value entered for the "RG" primary vessel in the controller, see chapter 8.3 "Modifying the controller's start routine" on page 14 .<br>▶ **Note!**<br>The "RG" primary vessel must be completely empty. |
| 0 % / 0 bar<br>Null balancing successfully concluded! | One of the following messages appears on the display:<br>• Null balancing concluded successfully<br>Confirm with the "▼" button.<br>• Empty vessel and repeat the process<br>Confirm with "OK". |
| 0 % / 0 bar<br>Cancel null balancing?<br>No | This message appears when null balancing has failed.<br>Select "Yes" or "No" on the display.<br>• **YES:** The "RG" primary vessel is empty and the device is installed as per the instructions. If null balancing is still not possible, cancel with "Yes". Contact your Reflex Customer Service.<br>• **NO:** Check the prerequisites for the commissioning, see chapter 8.1 "Checking the requirements for commissioning" on page 13 .<br>The controller's start routine has been restarted.<br>Confirm the selection of "yes" or "no" with "OK". |
| Min.op.pressure<br>01.8 bar | Enter the value for the minimum operating pressure.<br>▶ **Note!**<br>Calculation of minimum operating pressure, see chapter 8.2 "Reflexomat switching points" on page 13 . |
| Make-up | Switch to the "Make-up" main menu.<br>• Press "OK" to open the menu.<br>• Use the "▼▲" buttons to open the sub-menu. |
| Make-up: ON<br>at: 08 % | If the water content is below the specified vessel size, add water, see chapter 8.3 "Modifying the controller's start routine" on page 14 .<br>• If an automatic make-up device (Fillcontrol for example) is installed, make-up will be actuated automatically; otherwise the make-up must be manually activated. |
| Make-up: OFF<br>at: 12 % | Terminate the water make-up when the specified vessel size is exceeded.<br>• If an automatic make-up device is installed, make-up will be shut off automatically; otherwise the make-up must be manually deactivated.<br>• If you have selected "No" for automatic make-up, the system will not return any further queries about the make-up. |
| Max. make-up time<br>010 min. | Pre-selected time for a make-up cycle. Upon expiry of this set time, the system interrupts the make-up and returns the "Make-up time" fault message. |
| Max. make-up cycles<br>003 / 2 h | If the set number of make-up cycles is exceeded within two hours, the system interrupts the make-up and returns the "Make-up cycles" fault message. |

| Indication on the display | Meaning |
|---|---|
| With water meter.<br>YES | • **YES:** FQIRA+ contact water meter is installed, see chapter 4.6 "Optional equipment and accessories" on page 5 .<br>This is the prerequisite for the make-up volume monitoring and the operation of a softening system.<br>• **NO:** A contact water meter is not installed (standard model). |
| Make-up volume<br>000020 l | Only displayed if "YES" has been set in the "With water meter" menu option.<br>• Use "OK" to delete the counter.<br>– Press "**YES**" to reset the value displayed to "0".<br>– Press "**NO**" to retain the displayed value. |
| Max. make-up volume<br>000100 l | This value is only displayed if "YES" has been set in the "With water meter" menu option.<br>• When the set volume is exceeded, the system interrupts the make-up process and returns the error message "Max. make-up volume exceeded". |
| With softening<br>YES | This value is only displayed if "YES" has been set in the "With water meter" menu option.<br>• **YES**: Further queries follow about softening.<br>• **NEIN**: The system does not offer more queries regarding the softening process. |
| Disable make-up?<br>YES | This value is only displayed if "YES" has been set in the "With softening" menu option.<br>• **YES**: The system stops the make-up process when the set soft water capacity is exceeded.<br>• **NEIN**: The system does not stop the make-up process. The system displays the "Softening" message. |
| Hardness reduction<br>10 °dH | This value is only displayed if "YES" has been set in the "With softening" menu option.<br>• Hardness reduction is calculated from the difference of the overall water hardness $GH_{actual}$ and the target water hardness $GH_{target}$.<br>Hardness reduction = $GH_{actual}$-$GH_{target}$l °dH<br>Enter the value in the controller. Consult the manufacturer information for third-party products. |
| Cap. soft water<br>05000 l | This value is only displayed if "YES" has been set in the "With softening" menu option.<br>The attainable soft water capacity is calculated from the type of softening used and the specified hardness reduction.<br>• Fillsoft I, soft water capacity ≤ 6000/hardness red. l<br>• Fillsoft II, soft water capacity ≤ 12000/hardness red. l<br>Enter the value in the controller. Consult the manufacturer information for the values of third-party products. |
| Remaining cap. soft w.<br>000020 l | This value is only displayed if "YES" has been set in the "With softening" menu option.<br>• Available soft water capacity. |
| Replacement<br>18 months | This value is only displayed if "YES" has been set in the "With softening" menu option.<br>• Manufacturer specification for the replacement interval of the softening cartridges, regardless of the calculated soft water capacity. The system displays the "Softening" message. |
| Next maintenance<br>012 months | Recommended maintenance messages.<br>• Off: Without maintenance recommendation.<br>• 001 – 060: Maintenance recommendation in months. |
| Floating fault contact<br>YES | For the output of messages to the floating contact, see chapter 10.2.2 "Messages" on page 17 .<br>• **YES**: Output of all messages.<br>• **NEIN**: Output of all messages identified with "xxx" ("01", for example). |

| Indication on the display | Meaning |
|---|---|
| Fault memory> | Switch to the "Fault memory" sub-menu.<br>• Press "OK" to open the menu.<br>• Use the "▼▲" buttons to open the sub-menu. |
| ER 01…xx | The last 20 alarms are stored with fault type, date, time, and fault code.<br>See the chapter "Messages" for more information about the ER... messages. |
| Parameter memory> | Switch to the "Parameter memory" sub-menu.<br>• Press "OK" to open the menu.<br>• Use the "▼▲" buttons to open the sub-menu. |
| P0 = xx.x bar<br>Date \| Time | The last 10 entries of the minimum working pressure are stored with date and time. |
| Vessel info<br>00800 l | The system displays the values for the volume and the diameter of the "RG" primary vessel.<br>• If you identify differences to the information provided on the primary vessel's nameplate, please contact the Reflex Customer Service. |
| **Reflexomat**<br>V1.00 | Information about the software version |

### 10.2.1 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 | Comment |
|---|---|---|
| Language | DE | Display language. |
| Minimum operating pressure "$P_0$" | 1.8 bar | see chapter 8.2 "Reflexomat switching points" on page 13 . |
| Next maintenance | 12 months | Time left to the next due maintenance. |
| Volt-free contact | YES | see chapter 10.2.2 "Messages" on page 17 . |
| Make-up | | |
| Make-up "ON" | 8 % | |
| Make-up "OFF" | 12 % | |
| Maximum make-up volume | 0 Litres | Only if make-up has been selected in the customer menu with "With water meter Yes". |
| Maximum make-up time | 30 minutes | |
| Maximum make-up cycles | 6 cycles within 2 hours | |
| Softening (Only if "With softening Yes") | | |
| Shut off make-up | No | In the case of soft water residual capacity = 0 |
| Hardness reduction | 8°dH | = Target – Actual |
| Maximum make-up volume | 0 Litres | |
| Soft water capacity | 0 Litres | |
| Cartridge replacement | 18 months | Replace cartridge. |

**Service menu**

| Parameter | Setting | Comment |
|---|---|---|
| | | |
| Pressurisation | | |
| 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 | 240 minutes | The message is displayed after the compressor runs for 240 minutes. |
| Overflow line "CLOSED" | $P_0$ + 0.4 bar | Differential pressured added to the "$P_0$" minimum operating pressure. |
| Overflow line "OPEN" | $P_0$ + 0.5 bar | Differential pressured added to the "$P_0$" minimum operating pressure. |
| Maximum pressure | $P_0$ + 3 bar | Differential pressured added to the "$P_0$" minimum operating pressure. |
| Filling levels | | |
| Insufficient water "ON" | 5 % | |
| Insufficient water "OFF" | 12 % | |
| Solenoid valve in overflow line "CLOSED" | 90 % | |

### 10.2.2 Messages

The display provides alarms in plain text and the ER codes shown in the list. Use the arrow buttons to scroll through multiple alarms displayed at the same time.
The fault memory stores the last 20 alarms for review, see chapter 10.2 "Configuring settings in the controller" on page 15 .
Alarm causes can be eliminated by the operator or a specialist workshop. If this is not possible, contact the Reflex Customer Service.

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

**Note!**
Floating contacts, setting in the Customer menu, see chapter 10.2 "Configuring settings in the controller" on page 15 .

| ER Code | Alarm | Floating contact | Causes | Remedy | Alarm reset |
|---|---|---|---|---|---|
| 01 | Minimum pressure | YES | • Set value not reached.<br>• Water loss in the system.<br>• Compressor fault.<br>• Controller in Manual mode. | • Check set value in the Customer or Service menu.<br>• Check water level.<br>• Check compressor.<br>• Set the controller to Automatic mode. | "Quit" |
| 02.1 | Insufficient water | - | • Set value not reached.<br>• Make-up disabled.<br>• Air in the system.<br>• Dirt trap clogged. | • Check set value in the Customer or Service menu.<br>• Clean the dirt trap.<br>• Check functioning of the "PV1" solenoid valve.<br>• If necessary, manually add water. | - |

| ER Code | Alarm | Floating contact | Causes | Remedy | Alarm reset |
|---|---|---|---|---|---|
| 03 | High water | YES | • Set value exceeded.<br>• Make-up disabled.<br>• Water intake through a leak in a thermal transfer medium of the user.<br>• "RG" and "RG" vessels too small. | • Check set value in the Customer or Service menu.<br>• Check functioning of the "WV1" solenoid valve.<br>• Drain water from the "VG" vessel.<br>• Check site heat transfer medium for leaks. | - |
| 04.1 | Compressor | YES | • Compressor disabled.<br>• Fuse defective. | • Check set values in the Customer or Service menu.<br>• Replace the fuse. | "Quit" |
| 05 | Compressor run time | - | • Set value exceeded.<br>• Severe water loss in the system.<br>• Air lines leaking.<br>• Solenoid valve in the overflow line does not close. | • Check set value in the Customer or Service menu.<br>• Check the water loss and correct, if necessary.<br>• Seal any leak in the air system.<br>• Check functioning of the "PV1" solenoid valve. | - |
| 06 | Make-up time | - | • Set value exceeded.<br>• Water loss in the system.<br>• Make-up line not connected.<br>• Make-up rate insufficient.<br>• Make-up hysteresis too low. | • Check set value in the Customer or Service menu.<br>• Check water level.<br>• Connect make-up pipe | "Quit" |
| 07 | Make-up cycles | - | Set value exceeded. | • Check set value in the Customer or Service menu.<br>• Seal any leak in the system. | "Quit" |
| 08 | Pressure measurement | YES | Controller receives incorrect signal. | • Connect the plug.<br>• Check functioning of the pressure sensor.<br>• Check the cable for damage.<br>• Check the pressure sensor. | "Quit" |
| 09 | Level sensor | YES | Controller receives incorrect signal. | • Check functioning of the load cell.<br>• Check the cable for damage.<br>• Connect the plug. | "Quit" |
| 10 | Maximum pressure | - | • Set value exceeded.<br>• Pressure relief pipe not functioning.<br>• Dirt trap clogged. | • Check set value in the Customer or Service menu.<br>• Check functioning of the pressure relief pipe.<br>• Clean the dirt trap. | "Quit" |
| 11 | Make-up volume | - | "With water meter" must be activated in the Customer menu.<br>• Set value exceeded.<br>• Severe water loss in the system. | • Check set value in the Customer or Service menu.<br>• Check water loss in the system and repair, if necessary. | "Quit" |
| 15 | Make-up valve | - | Contact water meter measures without make-up request. | Check the make-up valve for leaks. | "Quit" |
| 16 | Power failure | - | No power. | Connect to power supply. | - |
| 19 | Stop > 4 hours | - | Device is in Stop mode for more than 4 hours. | Set the controller to Automatic mode. | - |
| 20 | Max. make-up volume | - | Set value exceeded. | Reset the "Make-up volume" meter in the Customer menu. | "Quit" |
| 21 | Maintenance recommended | - | Set value exceeded. | Perform maintenance and reset the maintenance counter upon completion. | "Quit" |
| 24 | Softening | - | • Set value for soft water capacity exceeded.<br>• Time interval for replacement of the softening cartridge exceeded. | Replace the softening cartridges. | "Quit" |
| 30 | I/O module fault | - | • I/O module defective.<br>• Connection between option card and controller faulty.<br>• Option card defective. | Inform Reflex Customer Service. | - |
| 31 | EEPROM defective | YES | • EEPROM defective.<br>• Internal calculation error. | Inform Reflex Customer Service. | "Quit" |
| 32 | Undervoltage | YES | Supply voltage not achieved. | Check power supply. | - |
| 33 | Adjustment parameter faulty | - | EEPROM parameter memory defective. | Inform Reflex Customer Service. | - |
| 34 | Communication Main board faulty | - | • Connecting cable defective.<br>• Main board defective. | Inform Reflex Customer Service. | - |
| 35 | Digital input voltage faulty | - | Short-circuit of input voltage. | Check the wiring at the digital inputs (water meter, for example). | - |
| 36 | Analogue input voltage faulty | - | Short-circuit of input voltage. | Check the wiring at the analogue inputs (pressure/level). | - |

# 11 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.

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 "Quit" to acknowledge the "Maintenance recommended" message. Reset the maintenance counter in the Customer menu.

**Note!**

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

## 11.1 Maintenance schedule

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

| Activity | Check | Wait | Clean | Interval |
|---|---|---|---|---|
| Check for leaks.<br>• "CO" compressor.<br>• Screw connections of the compressed air connections. | x | x | | Annually |
| Check switching points.<br>• Switch on pressure "CO" compressor.<br>• Insufficient water.<br>• Make-up with water. | x | | | Annually |
| Clean "ST" dirt trap.<br>– see chapter 11.3.2 "Cleaning the dirt trap" on page 20 . | x | x | x | Depending on the operating conditions |
| Remove condensate from the primary vessel and the secondary vessels, if applicable.<br>– see chapter 11.3.1 "Cleaning the tanks" on page 20 . | x | x | x | Annually |

## 11.2 Checking switching points

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

- Minimum operating pressure $P_0$, see chapter 8.2 "Reflexomat switching points" on page 13 .
- Level sensor at the primary vessel.

Preparation

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

Check cut-in pressure

5. Check the cut-in and cut-out pressure of the "CO" compressor.
   – 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 value displayed at the controller.
   – The automatic make-up is activated at a level display of 8 %.

Checking Insufficient water "On"

7. Switch off the water make-up and continue to drain the water from the vessels.
8. Check the displayed value for the "Insufficient water" filling level message.
   – Insufficient water "On" is displayed at the controller at a minimum filling level of 5 %.
9. Switch to Stop mode.
10. Switch off the main switch.

Cleaning the vessels

If necessary, remove condensate from the vessels, see chapter 11.3.1 "Cleaning the tanks" on page 20 .

Activating the device

11. Switch on the main switch.
12. Switch to Automatic mode.
    – Depending on the filling level and pressure, the "CO" compressor and the automatic make-up will be switched on.
13. Slowly open the cap valves upstream of the vessels and secure them against unintended closing.

Checking Insufficient water "Off"

14. Check the displayed value for the Insufficient water "OFF" filling level message.
    – Insufficient water "Off" is displayed at the controller at a minimum filling level of 8 %.

Check make-up "Off"

15. If necessary, check the make-up value displayed at the controller.
    – The automatic make-up is deactivated at a level display of 12 %.

Maintenance is completed.

**Note!**

If no automatic make-up is connected, manually fill the vessels with water up to the noted level.

**Note!**

The setting values for pressurisation, filling levels and make-up can be found in the chapter Default settings, see chapter 10.2.1 "Default settings" on page 17 .

## 11.3 Cleaning

### 11.3.1 Cleaning the tanks

**CAUTION**

**Risk of injury due to pressurised liquid**

Injuries can occur during maintenance work if the connections have been installed incorrectly because condensate under pressure can suddenly escape.

- Ensure proper connections for the draining of condensate.
- Wear suitable personal protective equipment (safety gloves and safety goggles, for example).

Regularly clean the vessels to remove condensate. The cleaning intervals depend on the local operational conditions.

**Vessels with permanently installed diaphragm**

1 Record the level value displayed at the controller.
2. Press "Manual" at the operator panel to switch the controller into Manual mode.
3. Remove the silencer from the "PV" overflow solenoid valve.
4. Install a suitable hose in the "PV" overflow solenoid valve to drain condensate.

   **CAUTION** – Risk of injury caused by escaping pressurised liquid. Injuries can occur during maintenance work if the connections have been installed incorrectly because condensate under pressure can suddenly escape. Ensure proper connections for condensate draining. Wear suitable personal protective equipment (safety glasses and safety gloves, for example).
5. Slowly open the "PV" overflow solenoid valve.
   – Manually add water if the pressure in the system drops significantly.
   – If the "PV" overflow solenoid valve discharges more than 5 litres of water or condensate, you must check the diaphragm for rupture.
     - The vessel must be replaced if the diaphragm has ruptured.
6. Close the "PV" overflow solenoid valve if the display indicates a 100% level.
7. Start the "CO" compressor to build up pressure.
   – If you had to add water during draining the condensate, you must monitor the pressure build up. At excessive pressure rise, drain water from the system accordingly.
8. Switch the controller into Automatic mode when the recorded level is displayed at the controller.
9. Remove the hose from the "PV" overflow solenoid valve and fit the silencer.
10. Maintenance is completed.

Regularly clean the primary vessel and the secondary vessels to remove condensate. The cleaning intervals depend on the local operational conditions.

**Vessels with replaceable diaphragm**

1. Close the cap valve in front of the vessels.
2. Record the displayed level value at the controller and empty the vessel of water and compressed air.
3. Switch off the main switch and withdraw the mains plug.
4. Open the drain taps at the vessels and drain the condensate.
   – If more than 5 litres of water or condensate are discharged, you must check the vessel.
     - Check the diaphragm for rupture.
     - Check the vessel interior walls for corrosion damage.

   **CAUTION** – Risk of injury caused by escaping pressurised liquid. Injuries can occur during maintenance work if the connections have been installed incorrectly because condensate under pressure can suddenly escape.
5. Close the vessels' drain taps.
6. Connect the mains plug and switch on the main switch.
7. Open the cap valve of the vessels and secure against unauthorised "closing".
8. Fill water and compressed air into the vessels until the recorded level value is reached.

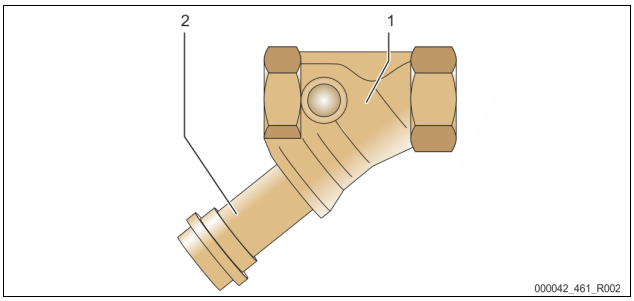
Maintenance is completed.

**Note!**

Check the installation location of the vessels for sufficient ventilation if the vessel interior wall are damaged by corrosion, see chapter 7.2 "Preparatory work" on page 9 .

### 11.3.2 Cleaning the dirt trap

Regularly clean the "ST" dirt trap. The cleaning intervals depend on the local operational conditions.




| 1 | "ST" dirt trap | 2 | Dirt trap insert |
|---|---|---|---|

1. Switch to Stop mode.
   – Press "Stop" on the controller's operator panel.
2. Close the ball valves upstream and downstream of the "ST" (1) dirt trap.
3. Slowly unscrew the dirt trap insert (2) from the dirt trap in order for the residual pressure to escape from the pipeline segment.
4. Pull the mesh from the dirt trap insert and rinse it with clear water. Use a soft brush for cleaning.
5. Re-insert the mesh into the dirt trap insert, check the gasket for damage, and screw the dirt trap insert back into the housing of the "ST" (1) dirt trap.
6. Re-open the ball valves upstream and downstream of the "ST" (1) dirt trap.
7. Switch to Automatic mode.
   – Press "Auto" on the controller's operator panel.

**Note!**

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

## 11.4 Inspection

### 11.4.1 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).

### 11.4.2 Inspection prior to commissioning

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

### 11.4.3 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.

# 12 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 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 dismantling, 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 cable of the device from the power supply.
3. Disconnect and remove all cables from the terminals of the device controller.

   ⚠ **DANGER** – Risk of serious injury or death due to electric shock. Some parts of the device's circuit board may still 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.
4. Disconnect the secondary vessel (if provided) on the water side from the system and the primary vessel.
5. Open the discharge ports at the vessels until water and compressed air are completely removed.
6. Undo all hose and pipe connections to the vessels and the control unit of the device to the system and remove them completely.
7. If necessary, remove the vessels and the control unit from the system area.

# 13 Annex

## 13.1 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

## 13.2 Conformity and standards

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

Alternatively, scan the QR code:

## 13.3 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. | |

| | | |
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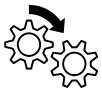

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