reflex
Thinking solutions.

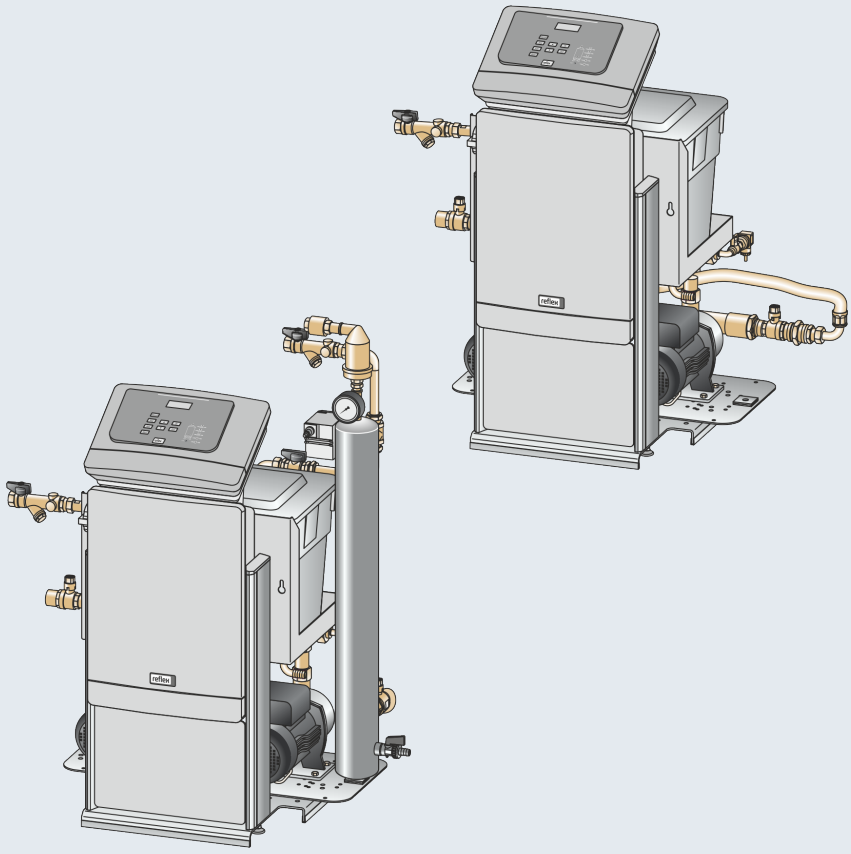
Fillcontrol Auto Make-up and degassing

Fillcontrol Auto 2P
Fillcontrol Auto 2PS

GB

Operating manual

Original operating manual



1 Notes on the operating manual

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

The operating manual will help you to:

- avoid any risks to personnel.
- become acquainted with the device.
- achieve optimal functioning.
- identify and rectify faults in good time.
- avoid any faults due to improper operation.
- cut down on repair costs and reduce the number of downtimes.
- improve the reliability and increase the service life of the device.
- avoid causing harm to the environment.

Reflex Winkelmann GmbH accepts no liability for any damage resulting from failure to observe the information in this operating manual. In addition to the requirements set out in this operating manual, national statutory regulations and provisions in the country of installation must also be complied with (concerning accident prevention, environment protection, safe and professional work practices, etc.).

This operating manual describes the device with basic equipment and interfaces for optional equipment with additional functions. For optional equipment and accessories, see chapter 4.6 "Optional equipment and accessories" on page 15 .

Note!

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

2 Liability and guarantee

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

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

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

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

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

Note!

Arrange for Reflex Customer Service to carry out commissioning and annual maintenance, see chapter 12.1 "Reflex Customer Service" on page 53 .

3 Safety

3.1 Explanation of symbols

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

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

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

3.3 Personal protective equipment

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

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

3.4 Intended use

The devices must be operated only in a facility system with static pressure maintenance. The devices may be used with the following water types:

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

3.4.1 Fillcontrol Auto 2P

The device is a pressure maintaining station for heating and cooling water systems. It combines these functions:

- Adding water from a make-up system.
- System separation between facility and make-up system.

3.4.2 Fillcontrol Auto 2PS

The device is a make-up and degassing station for heating and cooling water systems. It combines these functions:

- Adding water from a make-up system.
- Degassing water from the facility system.
- System separation between facility and make-up system.

3.5 Inadmissible operating conditions

The device is not suitable for the following applications:

- Pressure maintaining station for the facility system.
- Mobile system operation.
- Outdoor operation.
- Usage with these media:
  - Mineral oils
  - Flammable fluids
- Usage with these water types:
  - Distilled water
  - Additive water
  - Glycol-containing 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

The devices combine the functions makeup and degassing of water for the plant system. The system separator tank ensures the separation of the plant system from the mains water supply.

- Fillcontrol Auto 2P.
  - Makeup
  - System separation

- Fillcontrol Auto 2PS.
  - Makeup
  - Degassing with vacuum spray pipe.
  - System separation

These components regulate the device functions:

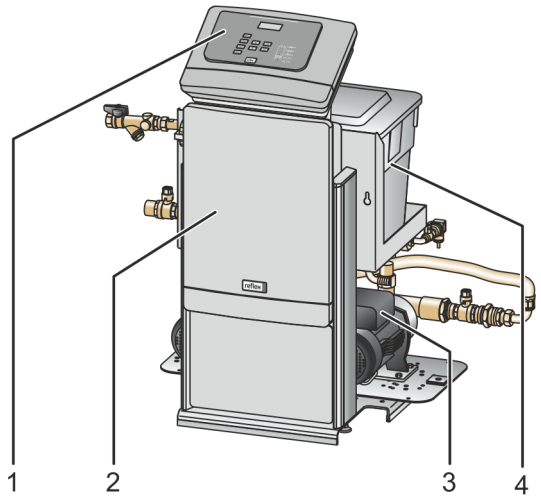
- Redundant pumps for makeup.
  - The pumps draw water from the water separator tank or the vacuum spray pipe and convey it into the plant system.
- System separator tank for makeup with water.
  - The system separator tank separates the makeup system from device. The float valve in the system separator tank ensures a water supply from the makeup system.
- Controller.
  - The controller regulates and monitors the functions.
- Vacuum spray pipe for degassing.
  - The dissolved gases are drawn from the water via a vacuum in the spray pipe and discharged through the automatic quick venting unit.
- Motor ball valve for feeding water into the vacuum spray pipe.
  - Water from the plant system or system separator tank.

The devices are designed for these plant systems:
- Heating water systems.
- Cooling water systems.
- Solar circuits.

Note!
An initial filling of the plant system with water is possible with the devices.

4.2 Overview

4.2.1 Fillcontrol Auto 2P



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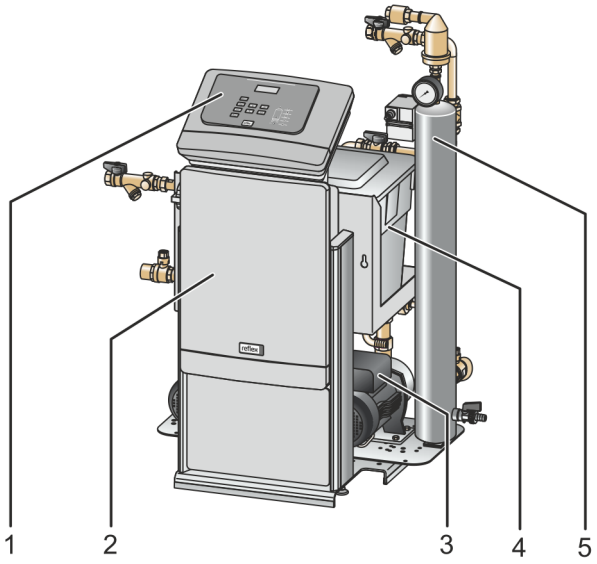
1	Operating unit
2	Control cabinet

3	Pump
4	System separator vessel

4.2.2 Fillcontrol Auto 2PS



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1	Operating unit
2	Control cabinet
3	Pump

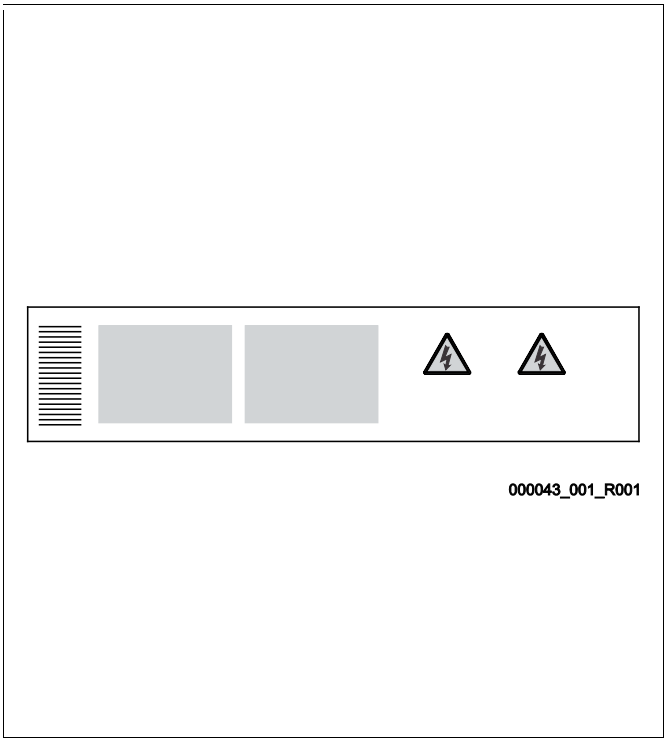
4	System separator vessel
5	Vacuum spray pipe

4.3 Identification

4.3.1 Nameplate

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

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

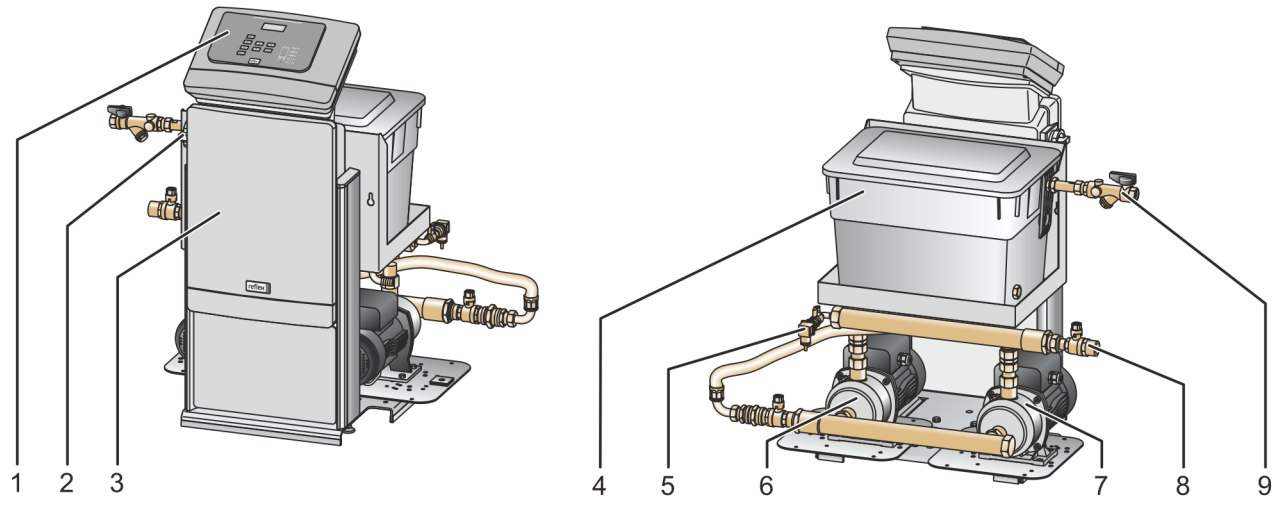


4.3.2 Type code

No.	Designation	Type code			
1	Device designation				
2	Number of pumps	Fillcontrol Auto	2P	S	
3	Degassing Yes/No	1	2	3	

4.4 Function

4.4.1 Fillcontrol Auto 2P



1	Operating unit
2	Main switch
3	Control cabinet
4	System separator vessel
5	Pressure transducer

6	Pump
7	Pump
8	System connection
9	Fresh-water system connection

The pressure transducer sends a signal to the controller if the pressure drops below the filling pressure of the facility system. The controller activates the pumps. Water is added to the facility system from the system separator vessel. The float valve in the system separator tank ensures a water supply from the make-up system.

To prevent potential dry-running, an insufficient water switch in the system separator tank will shut down the pumps, if required.

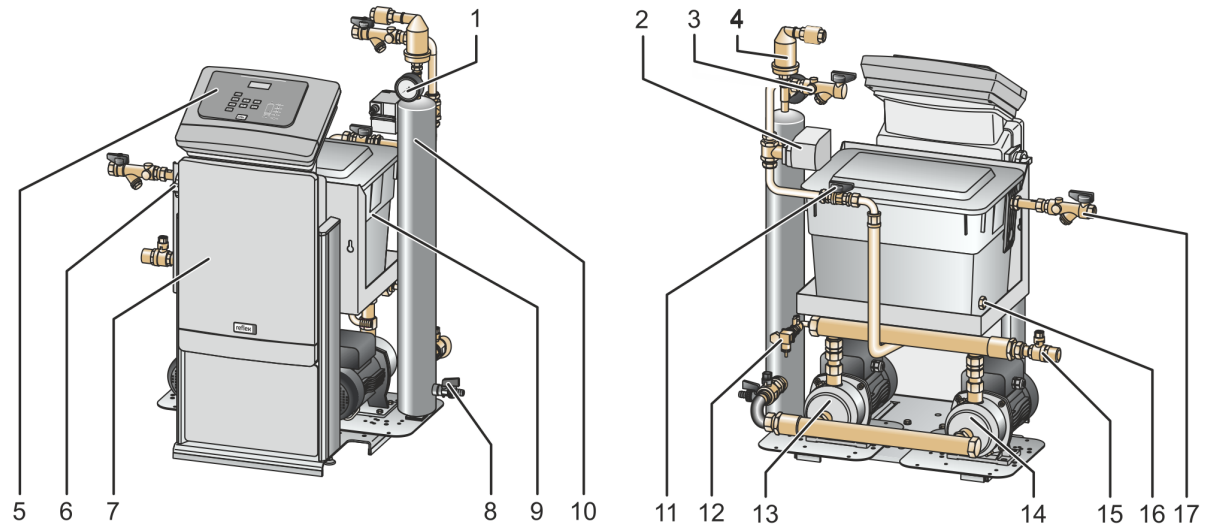
The device controller monitors the make-up with water in the facility system. These functions are monitored by the controller:

- Make-up time.
- Make-up cycles.
- Make-up quantity.
  - Only if an optional contact water meter is installed

The controller interrupts the make-up when the set make-up time or the number of make-up cycles is exceeded. Small leaks in the facility system are so detected.

The make-up quantity is controlled by the controller if an optional "FQIRA+“ water meter is installed. For the optional water meter, see chapter 4.6 "Optional equipment and accessories" on page 15 .

4.4.2 Fillcontrol Auto 2PS



1	Vacuum gauge
2	Motor ball valve
3	Connection of degassing line with dirt trap
4	Automatic quick venting unit
5	Operating unit
6	Main switch
7	Control cabinet
8	Drainage cock
9	System separator vessel

10	Vacuum spray tube
11	Ball valve
12	Pressure sensor
13	Pump
14	Pump
15	System connection
16	Insufficient water switch
17	Connection, fresh-water system with dirt trap

The pressure transducer sends a signal to the controller if the pressure drops below the filling pressure of the plant system. The controller activates the pumps. Water from the vacuum spray pipe is added to the plant system. The motor ball valve regulates the water inflow into the vacuum spray pipe. Either gas-enriched water from the plant system is degassed in the vacuum spray pipe or water from the system separator tank is added to the vacuum spray pipe. The float valve in the system separator tank ensures a water supply from the makeup system.

To prevent potential dry-running, the integrated insufficient water protection unit in the system separator tank and the vacuum spray pipe will shut down the pumps, if required.

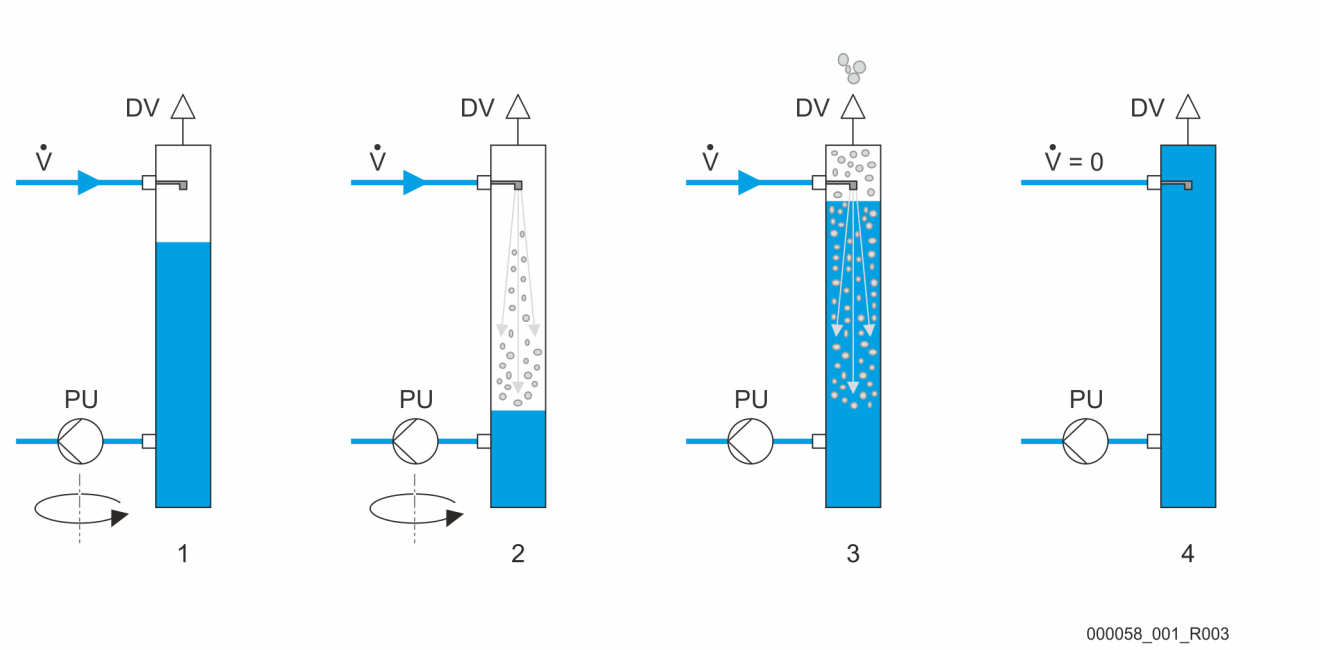
The device controller monitors water degassing and makeup in the plant system. These functions are monitored by the controller:

- Makeup time
- Makeup cycles
- Makeup quantity
- Degassing
  - Continuous degassing
  - Interval degassing

The controller interrupts the makeup when the set makeup time or the number of makeup cycles is exceeded. Small leaks in the plant system are detected in this way.

The makeup quantity is controlled by the controller if an optional "FQIRA+" water meter is installed. For the optional water meter, see chapter 4.6 "Optional equipment and accessories" on page 15 .

The degassing operation in the vacuum spray pipe uses timer-controlled cycles.



1	Vacuum is drawn
2	Injection
3	Discharge

4	Idling time
PU	Pump

A degassing cycle comprises the following phases:

1. Vacuum is drawn.
   - The pump draws a vacuum in the spray tube until the water saturation pressure is reached. For cold water, the vacuum gauge indicates a vacuum of - 1 bar.
2. Atomisation.
   - The inlet of gas-rich water to the vacuum spray pipe is opened via the motor ball valve. Gas-rich water from the plant system is atomised in the vacuum spray pipe. The large surface of the atomised water and the gas saturation headway to the vacuum result in a degassing of the water. The degassed water is returned from the vacuum spray tube to the plant system via the pumps. Here it is able to dissolve gases.
3. Discharge.
   - The pumps shut down. The system continues to inject and degas water in the vacuum spray tube. The water level rises. The gases separated from the water are discharged via the degassing valve.
4. Idling time
   – When the gas has been discharged, the device will remain in idle until the next cycle is started.

These degassing programmes can be selected in the controller:

- Continuous degassing.
  – For continued degassing over several hours or days in a sequence of degassing cycles without idling periods. This programme must be selected after commissioning and repairs.
- Interval degassing.
  – Interval degassing comprises a limited number of degassing cycles. There is a pause time between the intervals. This programme must be selected for continuous operation.

Note!

For setting the degassing programmes, see chapter 7.5 "Parametrising the controller in the Customer menu" on page 31 .

4.5 Scope of delivery

The scope of delivery is described in the shipping document and the content is shown on the packaging.
Proceed as follows:

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

Basic make-up equipment:

- The pre-wired device.
- Operating manual.

4.6 Optional equipment and accessories

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

- "FQIRA+" contact water meter.
- Softening with Reflex Fillsoft.
- Expansions for Reflex Basic controllers:
  - I/O modules
  - Bus modules:
    - Lonworks Digital
    - Lonworks
    - Profibus DP
    - Ethernet

Note!
Separate operating instructions are supplied with accessories.

5 Technical data

Note!

The following values apply for all systems:

- Permissible ambient temperature: >0 °C – 45 °C
- Degree of protection: IP 54
- Noise level: 55 dB

5.1 Electrical system

Type	Power output (W)	Power supply (V / Hz)	Fusing (A)	Number of RS-485 interfaces	I/O module
Fillcontrol Auto 2P	500	230 / 50	10	2	Optional
Fillcontrol Auto 2PS	500	230 / 50	10	2	Optional

5.2 Dimensions and connections

Type	Weight (kg)	Height (mm)	Width (mm)	Depth (mm)	Device connection	System connection	Overflow connection
Fillcontrol Auto 2P	47	930	500	560	RP ½	G 1	–
Fillcontrol Auto 2PS	55	1030	500	580	RP ½	G 1	–

5.3 Operation

Type	Make-up capacity (l/h)	Maximum feed pressure (bar)	Maximum delivery pressure (bar)	Permissible operating gauge pressure (bar)	Operating temperature (°C)
Fillcontrol Auto 2P	≤ 4200	10	≤ 8.5	6	70
Fillcontrol Auto 2PS	≤ 4200	10	≤ 8.5	6	70

6 Installation

⚠ DANGER

Risk of serious injury or death due to electric shock.

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

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

⚠ CAUTION

Risk of injury due to pressurised liquid

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

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

⚠ CAUTION

Risk of burns on hot surfaces

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

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

⚠ CAUTION

Risk of injury due to falls or bumps

Bruising from falls or bumps on system components during installation.

- Wear personal protective equipment (helmet, protective clothing, gloves, safety boots).

▶ **Note!**

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

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

6.1 Installation conditions

6.1.1 Incoming inspection

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

Proceed as follows:

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

6.2 Preparatory work

Preparing the device installation:

- Frost-free, well-ventilated room.
  - Room temperature range: 0 °C to 45 °C.
- Filling connection.
  - If necessary, provide a DN 15 filling connection according to DIN 1988 T 4.
- Electric connection: 230 V~, 50 Hz, 16 A with upstream ELCB: Tripping current 0.03 A.

6.3 Execution

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 stresses being induced.
- If necessary, provide support structures for the pipes or equipment.

Note!

Starting up of the pump causes vibration in the device. This transfers loud noises into the system pipes.

– Connect the pipes to the device using flexible connections.

In systems with a diaphragm expansion tank, the device must be installed in the vicinity of the tank. To ensure that the required filling pressure for water make-up is recorded by the pressure transducer in the device. The filling pressure depends on the minimum operating pressure of the facility system. For calculating the minimum operating pressure,see chapter 7.2 "Determining the P_0 minimum operating pressure for the controller" on page 29 .

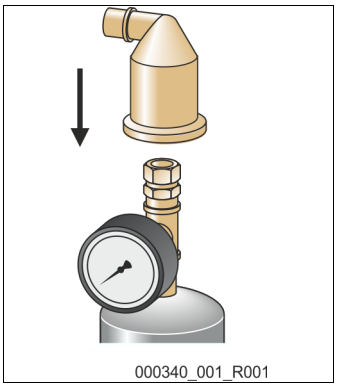
Proceed as follows for the installation:

1. Position the device.
2. Create the water-side connections of the device to the system.
   – Use connections with the same dimensions at the device for all lines.
3. If required, create the interfaces according to the terminal plan.

6.3.1 Fitting the add-on components

Install the automatic quick-venting unit on the vacuum spray pipe.

- Fillcontrol Auto 2PS

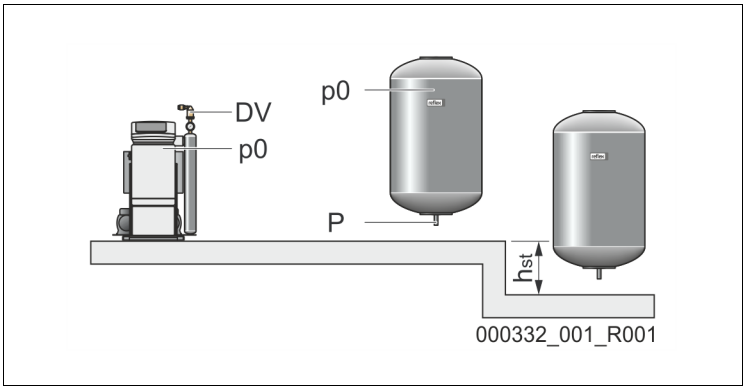


6.3.2 Floor mounting

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

Comply with the following instructions:

- The device is installed sufficiently close to the diaphragm expansion tank.
  - You ensure so that the pressure sensor is able to measure the filling pressure.
- The fixtures can be operated.
- Ensure sufficient space for installing the connection lines.



Note!

The "h_{st}" static height is required to determine the minimum operating pressure of the plant system.

6.3.3 Hydraulic connection

6.3.3.1 Connection to the facility system

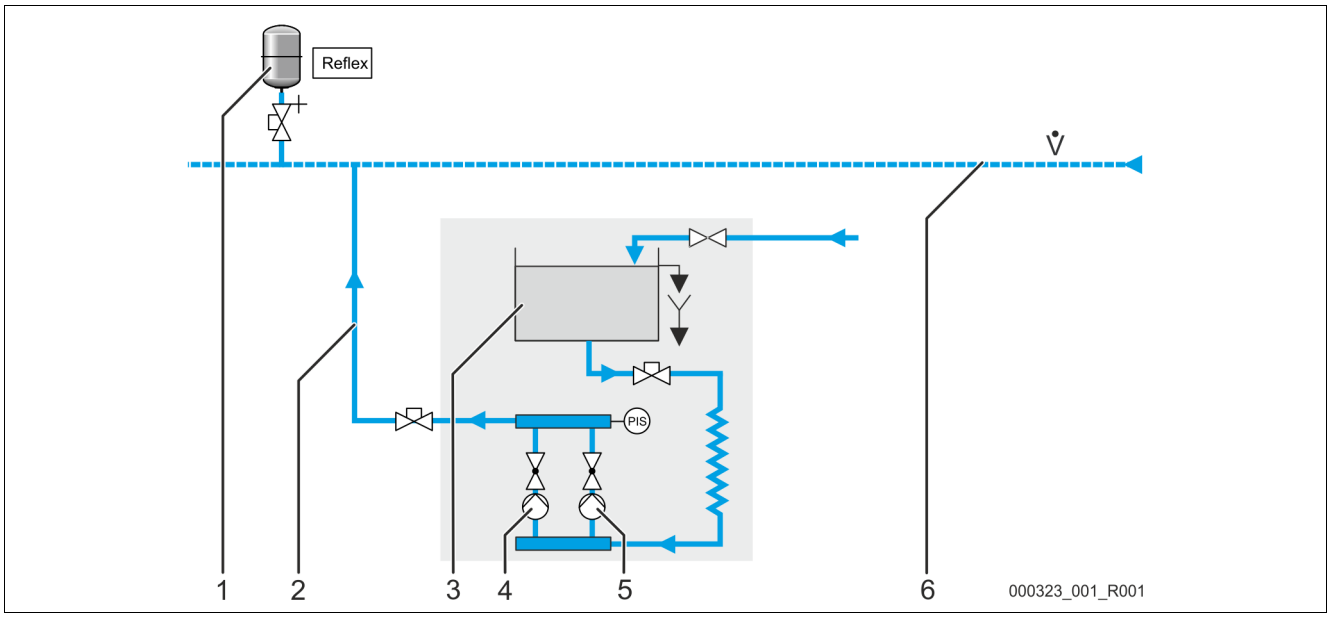
Note!

Starting up of the pump causes vibration in the device. This transfers loud noises into the system pipes.

– Connect the pipes to the device using flexible connections.

6.3.4 Fillcontrol Auto 2P

The device within a heating system with static pressure maintenance via a diaphragm expansion tank.



1	Diaphragm expansion tank
2	Make-up line
3	System separator vessel
4	Pump

5	Pump
6	Main volume flow of the facility system • Return flow
PIS	Pressure transducer

In facility systems with static pressure maintenance, the pressure transducer in the device monitors the filling level of the diaphragm expansion tank. When the required filling pressure for the facility system drops below the minimum value, the pressure transducer sends a signal to the device controller. The controller activates the pumps. Water from the system separator tank is supplied via the make-up line into the facility system.

- Connect the make-up line in the return and near the connection to the diaphragm expansion tank.
  – You ensure so that the pressure sensor is able to measure the required filling pressure.
  – For Filling pressure,see chapter 9.2.2 "Service menu" on page 44 .
- For make-up lines with > 10 metres length, use a DN 32 diameter.
  – You will avoid an undesired cycling of the make-up.

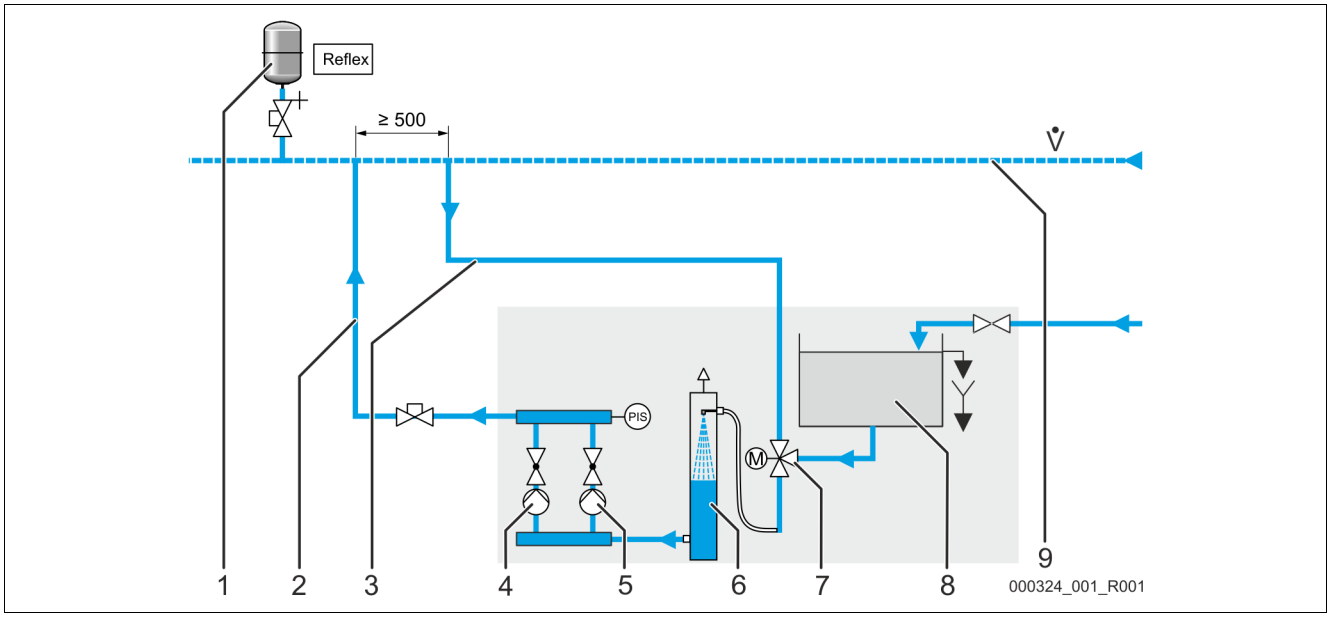
Note!

You must determine the minimum operating pressure for the required filling pressure.

– For Minimum operating pressure,see chapter 7.2 "Determining the P_0 minimum operating pressure for the controller" on page 29 .

6.3.5 Fillcontrol Auto 2PS

The device within a heating system with static pressure maintenance via a diaphragm expansion tank.



1	Diaphragm expansion tank
2	Make-up line
3	Degassing line
4	Pump
5	Pump

6	Vacuum spray pipe
7	Motor ball valve
8	System separator vessel
9	Main volume flow • Return flow
PIS	Pressure transducer

The device requires a make-up and a degassing line to the facility:

- One make-up line for degassed water from the device to the facility.
- One line for gas-rich water from the system back to the device.

Shut-offs for these lines are pre-installed at the device. The connections of the lines must be made within the main flow volume of the overall system.

The integration of the degassing lines into the facility system must be realised in the vicinity of the make-up line connection. This ensures stable pressure conditions.

In facility systems with static pressure maintenance, the pressure transducer in the device monitors the water make-up into the facility system. When the filling pressure for the facility system drops below the minimum value, the pressure transducer sends a signal to the device controller. The controller activates the pumps. Water from the vacuum spray pipe is supplied via the make-up line into the facility system.

Either gas-rich water from the facility system or water from the system separator tank is supplied via the motor ball valve into the vacuum spray pipe.

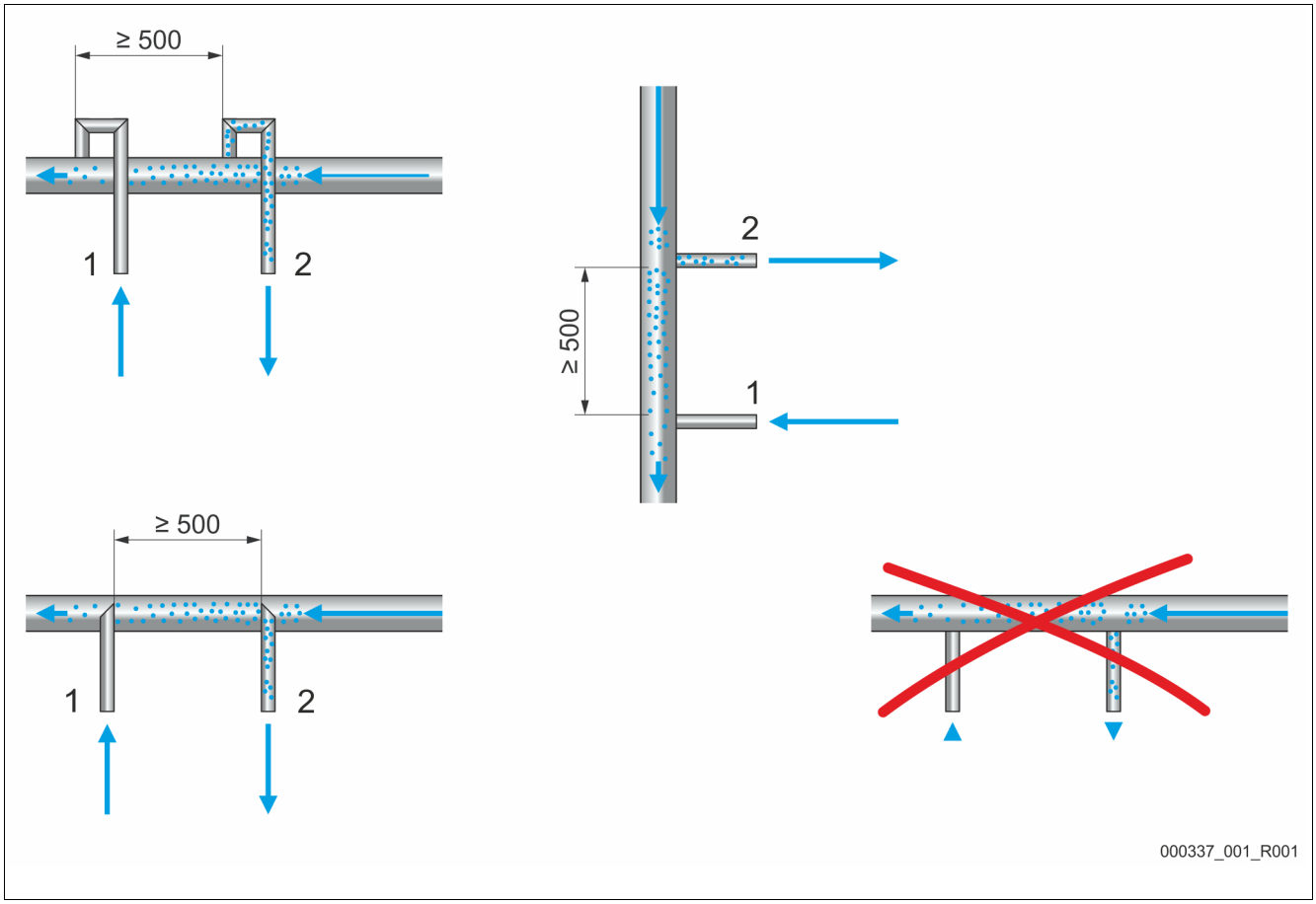
- Connect the make-up line in the return and near the connection to the diaphragm expansion tank.
  - This ensures that the pressure transducer detects the filling pressure required for make-up.
  - For Filling pressure, see chapter 9.2.2 "Service menu" on page 44 .
- For make-up lines with > 10 metres length, use a DN 32 diameter.
  - You will avoid an undesired cycling of the make-up.

Note!

You must determine the minimum operating pressure for the required filling pressure.

- For Minimum operating pressure,see chapter 7.2 "Determining the P_0 minimum operating pressure for the controller" on page 29 .

Hydraulic connection, with Fillcontrol Auto 2PS as example.



1	Make-up line • Fillcontrol Auto 2PS • Fillcontrol Auto 2P
2	Degassing line • Fillcontrol Auto 2PS

Device connection to the facility system:

- Fillcontrol Auto 2PS.
  - Make-up line "1" for degassed water from the device to the facility system.
  - Make-up line "2" for gas-rich water from the facility system to the device.
- Fillcontrol Auto 2P.
  - Make-up line "1" to the facility system.

Proceed as follows:

1. Ensure the permissible water temperature at the connection to the facility system.
2. For the connection, note the direction of flow of the main volume flow.
3. Connect the degassing line from the make-up line to the facility system.
4. Ensure a minimum distance of 500 mm.
   - When connecting the degassing lines for Fillcontrol Auto 2PS
5. Ensure a torque-free (stress-free) installation of the pipes.
6. After installation, flush the pipes to remove dirt particles.

Note!

For Fillcontrol Auto 2P, the connection of the degassing line is not required.

6.4 Electrical connection

⚠ DANGER

Risk of serious injury or death due to electric shock.

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

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

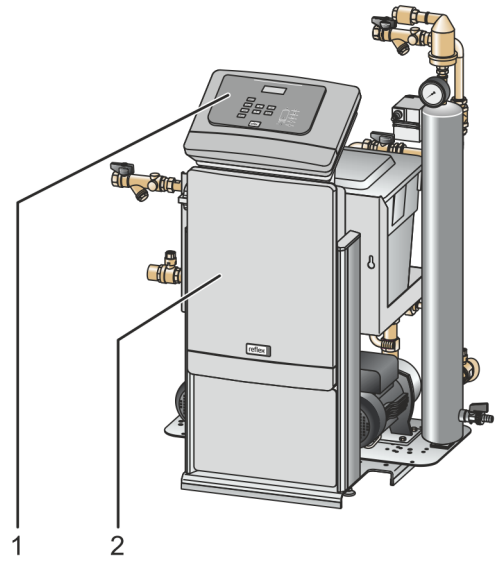
⚠ DANGER

Risk of serious injury or death due to electric shock

Some parts of the device's circuit board may still carry 230 V voltage even with the device physically isolated from the power supply.

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

For the electrical connection, you must differentiate between an operating unit and a control cabinet.



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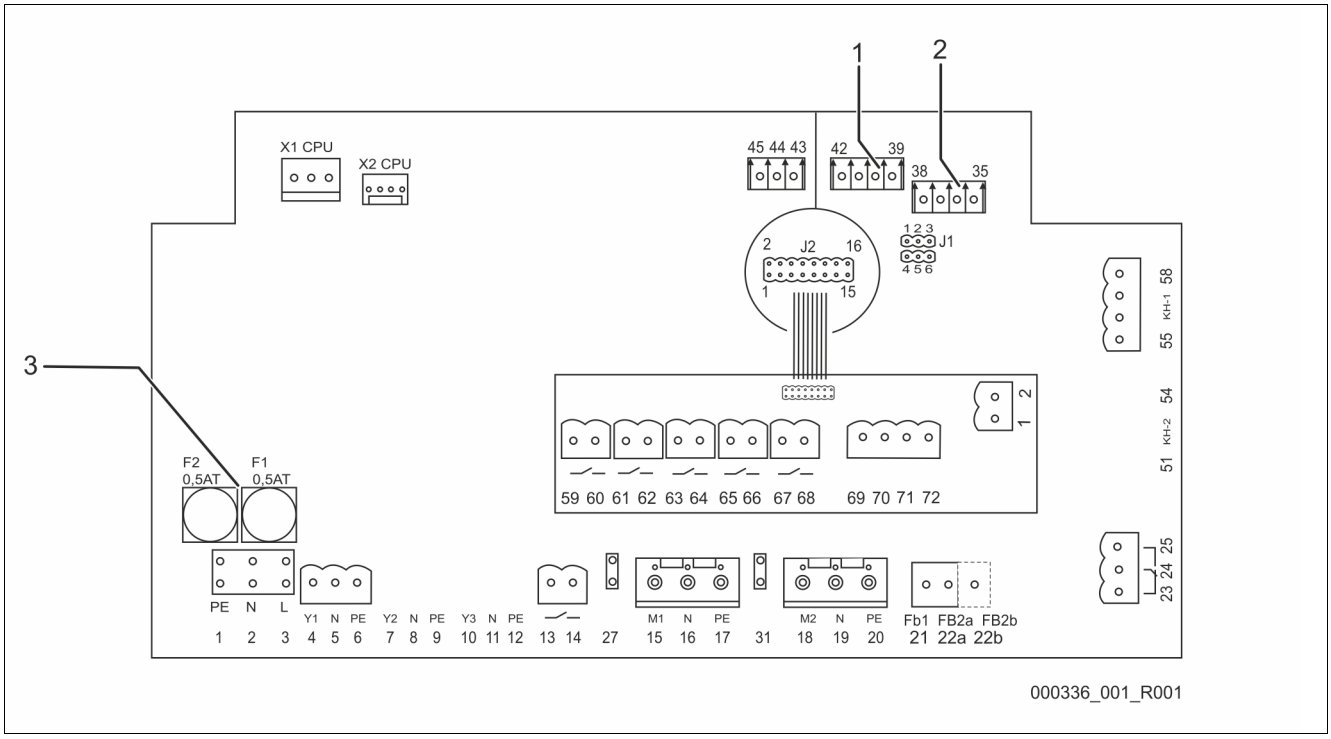
1	Covers of the operating unit (folding) • RS-485 interfaces • Pressure output

2	Covers of the control cabinet (folding) • Supply and fusing • Floating contacts • Pump connection

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 covers.
3. Insert a suitable screwed cable gland for the cable bushings at the rear of the control cabinet. M16 or M20, for example.
4. Thread all cables to be connected through the cable glands.
5. Connect all cables as shown in the terminal diagrams.
   - Control cabinet, see chapter 6.4.1 "Control cabinet terminal plan" on page 25 .
   - Operating unit, see chapter 6.4.2 "Terminal plan, operating unit" on page 27 ..
   - Note the device connection capacity for the fusing provided by the user, see chapter 5 "Technical data" on page 16 ..

6.4.1 Control cabinet terminal plan



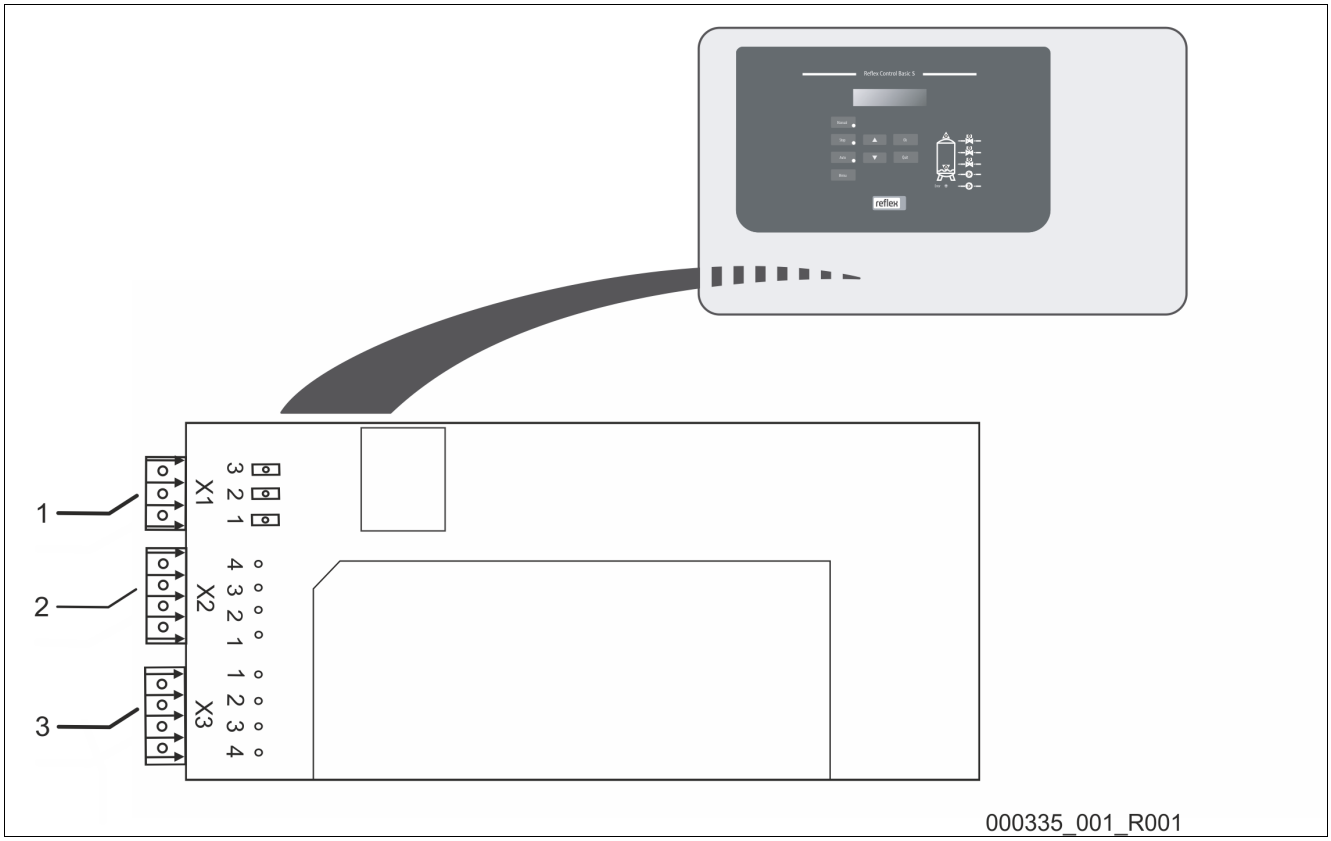
1	Pressure
2	Level

3	Fuses

Terminal	Designation	Signal	Notes
X0/ 1	Supply (230 V)	L	User supplied • Wiring at the terminal block next to the fuses
X0/ 2		N	
X0/ 3		PE	
4	Makeup (230 V)	Y1	Is installed • Fillcontrol Auto 2PS
5		N	
6		PE	
13	Floating signal contact 1		User supplied, optional
14			
23	Group message (floating)	NC	User supplied, optional
24		COM	
25		NO	
69	Contact water meter (system separator tank)	+24 V DC	Factory
70		E2	
43	Contact water meter (option)	+24 V DC	Is installed • Fillcontrol Auto 2PS
44		E1	
39	Pressure transducer	+18 V	Is installed
40		GND	
41		AE	
42		PE (shield)	
15	Pump 1 (230 V)	M1	Is installed
16		N	
17		PE	

Terminal	Designation	Signal	Notes
18	Pump 2 (230 V)	M2	Is installed
19		N	
20		PE	
55	Expansion circuit board	GND	Voltage supply • Fillcontrol 2P
56		+24 V	
13	Relay (N.O.) 1	COM	Optional relay output
14		A1	
59	Relay (N.O.) 2	COM	Optional relay output
60		A2	
61	Relay (N.O.) 3	COM	Optional relay output
62		A3	
63	Relay (N.O.) 4	COM	Optional relay output
64		A4	
65	Relay (N.O.) 5	COM	Optional relay output
66		A5	
67	Relay (N.O.) 6	COM	Optional relay output
68		A6	

6.4.2 Terminal plan, operating unit



1	Supply
2	I/O interface

3	RS-485 interface

Terminal number	Signal	Function	Wiring
X1			
1	10 V AC	10 V supply	Factory
2			
3	FE		
X2			
1	GND	I/O interface • Interface to the main circuit board	Factory
2	T x D		
3	R x D		
4	+5 V		
X3			
1	GND	RS-485 interface	User supplied
2	A		
3	B		
4	Shielding		

6.5 Installation and commissioning certificate

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

This device has been installed and commissioned in accordance to the instructions provided in the Operating Manual. The settings in the controller match the local conditions.

Note!

When any factory-set values of the device are changed, you must enter this information in the Maintenance certificate, see chapter 10.5 "Maintenance certificate " on page 51 .

For the installation

Place, date	Company	Signature

For the commissioning

Place, date	Company	Signature

7 Commissioning

Note!

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

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

7.1 Requirements for initial commissioning

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

- The device is fully connected to the facility.
  - Fillcontrol Auto 2P
    - Make-up line to the system
  - Fillcontrol Auto 2PS
    - Make-up and degassing lines to the facility system.
- Water make-up supply from the fresh-water system is created.
- The connection lines of the device have been flushed and cleaned of welding residue and dirt, if required, before commissioning.
- The facility system is filled with water and roughly gas-vented.
  - The circulation through the ensure facility system is ensured.
- The electrical connection has been created according to applicable national and local regulations.

7.2 Determining the P_0 minimum operating pressure for the controller

Calculate the "P_0" minimum operating pressure. During the start routine of the controller, enter the value for the minimum operating pressure. The controller uses the minimum operating pressure to calculate the required filling pressure for water make-up into the facility system.

The value for the minimum operating pressure depends on the hydrostatic pressure "p_{st}" and the static height in the facility system. The static height "h_{st}" is the difference (in metres) from the highest point of the facility system to the connection of the diaphragm expansion tank.

Value examples:

- Heating system: Static height h_{st} = 18 m, flow temperature 70 °C, safety temperature 100 °C.
- Boiling pressure p_D = 0 bar (at a safety temperature of 100 °C
  - For safety temperatures 110 °C p_D = 0.5 bar
- *Addition of 0.2 bar recommended, no addition in extreme cases

Calculating the "P_0" minimum operating pressure:

1. Calculate the hydrostatic pressure "p_{st}" from the static height "h_{st} of the facility system.

   $\mathbf{p_{st}} = \frac{h_{st}}{10} = \frac{18\ m}{10} = 1.8$ bar

2. Use the hydrostatic pressure to calculate the minimum operating pressure "P_0" for the facility system.

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

   $P_0 = 1.8$ bar + 0 bar + 0.2 bar = 2.0 bar

3. During the start routine of the controller, enter the value for the minimum operating pressure "P_0", see chapter 7.4 "Modifying the controller's start routine" on page 31 .

7.3 Filling the device with water

⚠ CAUTION

Risk of injury due to pump start-up

Hand injuries may occur when the pump starts up if you turn the pump motor at the impeller using a screwdriver.

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

ATTENTION

Device damage due to pump start-up

Pump damage may occur when the pump starts up if you turn the pump motor at the impeller using a screwdriver.

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

Fill the system separator tank with water from the mains supply. Check the proper closing of the float valve in the system separator vessel. Water must not flow from the device overflow.

- Fillcontrol Auto 2P
- Fillcontrol Auto 2PS

Fillcontrol Auto 2P:

1. Fill the system separator tank with water via the mains water pipe connection.
2. Slowly open the shut-off valve in the intake line to the pump.
   – The collector and the pumps are filled with water from the system separator tank via the intake line.

Fillcontrol Auto 2PS:

1. Fill the system separator tank with water via the mains water pipe connection.
2. Connect a hose at the feed and drain cock of the vacuum spray tube.
   – The feed and drain cock is located at the lower end of the spray tube.
3. Fill the vacuum spray tube with water.
   – Air escapes via the degassing valve of the vacuum spray tube and the water pressure can be read at the vacuum gauge.
4. Fill the vacuum spray tube with water until the minimum operating pressure is displayed at the vacuum gauge.
5. Slowly open the shut-off valve in the intake line to the pump.
   – The collector and the pumps are filled with water from the vacuum spray tube via the intake line.

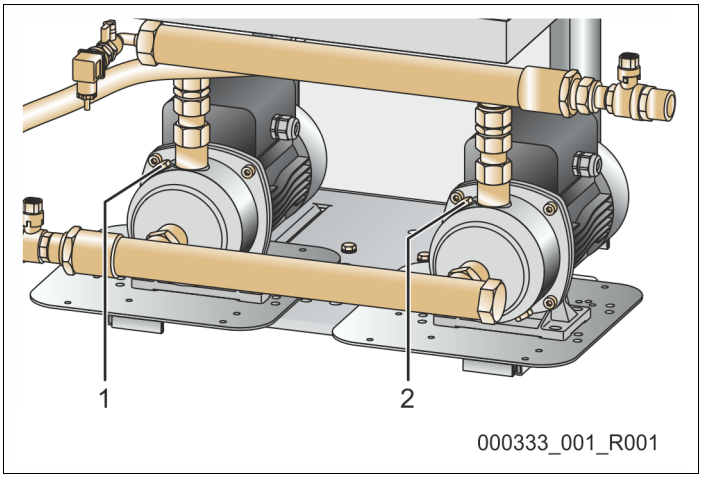
Vent the pumps:

- Fillcontrol Auto 2P
- Fillcontrol Auto 2PS

Proceed as follows:

1. Undo each venting screw (1) and (2) at the pumps.
2. Turn the pumps using a screwdriver at the fan wheel until bubble-free water escapes.
3. Tighten the venting screws.
4. Check the venting screws for leaks.

The device is filled with water.



7.4 Modifying the controller's start routine

The start routine is used to set the required parameters for the device commissioning. It commences with the first activation of the controller and can be run only once. Parameters can be changed or checked in the customer menu after the start routine has terminated, see chapter 9.2.1 "Customer menu" on page 43 .

1. Establish a 230 V power supply by plugging the power plug into a corresponding outlet.
2. Press "Stop" on the controller's operator panel.
   – You are in Stop mode. The "Auto" LED on the operator panel has extinguished.

Device name

Fillcontrol Auto xxx

Standard software in various languages.

Language

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

Read the operating manual!

2. Enter the value for the minimum operating pressure "P_0".
   – For calculating the minimum operating pressure, see chapter 7.2 "Determining the P_0 minimum operating pressure for the controller" on page 29 .

Min. op. pressure

3. Enter the value for the release pressure of the safety valve.
   – This value may be the same as the release pressure of the facility system safety valve.

Safety valve pressure

4. Change the flashing display items for "Hour", "Minute", and "Seconds" to the current time.
   • The time of an alarm will be stored in the fault memory of the controller.

Time

5. Change the flashing display items for "Day", "Month", and "Year" to the current date.
   • The date of an alarm will be stored in the fault memory of the controller.

Date

The system displays this message after a successfully completed start routine:
6. Select either "Yes" or "No" and confirm with "OK" on the controller operator panel.

Terminate routine?
YES

   – YES: The start routine is terminated, the device switches to Stop mode.
   – NO: The start routine restarts.

The pressure is displayed.

2.0 bar
STOP

Note!

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

7.5 Parametrising the controller in the Customer menu

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

– For adjusting the default settings, see chapter 9.2 "Configuring settings in the controller" on page 40 .
– For information about controller operation, see chapter 9.1 "Operator panel" on page 39 .

7.6 Function test

7.6.1 Vacuum test

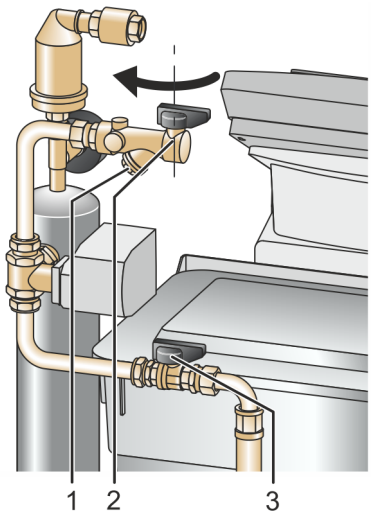
Perform a vacuum test only for Fillcontrol Auto 2PS.

Proceed as follows:

1 Close the ball valve (2) with the dirt trap (1) of the degassing line. The second ball valve (3) remains open.

2 Generate a vacuum with the manual mode of the controller.
- Press "Manual" on the controller's operator panel.
- Use the "Back" toggle button to select "SE" system degassing at the operator panel.
  – The pump will start after a time delay of approximately 50 seconds.

3 Use the "Back" toggle button to switch off "SE" system degassing after the pump runs for 10 seconds.
- Record the vacuum value displayed at the vacuum gauge.



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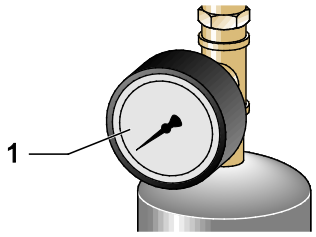
4 Observe the vacuum gauge (1) for approximately 10 minutes. The pressure must not change. If the pressure has increased, check the device for leaks.
- Check all screw fittings at the vacuum spray tube for leaks.
- Check the venting screws at the pumps for leaks.
- Check the degassing valve at the vacuum spray tube for leaks.



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5 After the vacuum test has been concluded successfully, open the ball valve of the degassing line.

6 If the controller displays the "Insufficient water" error message, confirm this error message with "Quit".

The vacuum test is completed.

Note!

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

Note!

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

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

7.6.2 Pump test

At the device, execute a function test for the pumps. Set the device controller to manual mode. In manual mode, you manually activate and deactivate the pumps.

- Press "Manual" on the controller's operator panel.
  - The "Manual" LED at the operator panel illuminates to visually indicate that Manual mode is active.

Select the required pump:

- Pump 1 "P1"
- Pump 2 "P2"

			2.0 bar
P1!	P2	U1	NS

*U1 = no function
*NS = motor ball valve

Proceed as follows:

1. Press "Manual" on the controller's operator panel.
   - Use the arrow keys at the operator panel to select "P1" or "P2" on the display. The selected indicator "P1" or "P2" flashes to visually indicate the selected pump.

2. Press "OK" on the controller's operator panel.
   - The selected pump is switched on and the displays shows "P1!" or "P2!".
   - The display must show values of ≥ 3 bar for the pressure for the activated pump.

3. Press "OK" on the controller's operator panel.
   - The selected pump is switched off and the corresponding "P1" or "P2" indicator flashes.

4. Slowly open the ball valve in the expansion line.

The function test for the pump is completed.

Note!

If the pressure does not rise when the pump is activated:

- Shut down the pump.
- Vent the pump, see chapter 7.3 "Filling the device with water" on page 30 .

7.7 Use the device to fill the facility system with water

Use the unit for filling the facility system with water.

Proceed as follows:

1. Open the shut-off valves.
   - In the expansion and degassing lines.
   - Shut-off devices up- and downstream of the system separator tank.
2. Switch the controller to Manual mode.
   – For Manual mode, see chapter 8.1.2 "Manual mode" on page 36 .
3. Touch "Open" in Manual mode.
   – The controller calculates the required filling pressure. The system is filled with water. As soon as the filling pressure has been attained, the controller automatically stops the filling process.

If the maximum filling time (10 hours by default) is exceeded, the system aborts the filling process of the system with an error message. Upon remedying the cause of the fault message, press "OK" on the controller's operator panel to acknowledge the fault message. Upon eliminating the fault, continue with filling the system. After filling, vent the system to ensure proper circulation.

Note!

Monitor the system for the entire automatic filling process.

Note!

Fault messages, see chapter 9.3 "Messages" on page 45 .

7.8 Starting Automatic mode

Automatic operation can be started after initial commissioning. The following prerequisites must be met for automatic operation:

- "P_0" minimum working pressure is entered in the controller.
- The device is filled with water.
- All required parameters are defined in the controller.
- The function test has been concluded.

Start the automatic mode at the operator panel of the controller:

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

Note!

For Fillcontrol Auto 2PS, during commissioning, continuous degassing is automatically activated to remove any residual free or dissolved gases from the system. The time for continuous degassing can be set in the Customer menu as required by the system conditions. The default setting is 24 hours. Subsequent to the continuous degassing, the device automatically switches to interval degassing.

Note!

The commissioning process is now concluded.

Notice!

The "ST" dirt trap in the "DC" degassing line must be cleaned after the expiry of the continuous degassing time at the latest, see chapter 10.2 "Cleaning the dirt trap" on page 49 .

8 Operation

8.1 Operating modes

8.1.1 Automatic mode

Automatic mode is the operating mode for continuous device operation. In Automatic mode, the controller monitors and activates or deactivates the device functions. Faults are displayed and evaluated.

The following functions are active in Automatic mode:

- Fillcontrol Auto 2P
  - Make-up with fresh water for the facility system.
- Fillcontrol Auto 2PS
  - Make-up with fresh water for the facility system.
  - Degassing of water from the facility system and the make-up system.

To start the automatic operation, proceed as follows:

- Press "Auto" on the controller's operator panel.
  - The "Auto" LED at the operator panel illuminates to visually signal continuous operation. The controller monitors the Automatic mode functions.

Note!

For Fillcontrol Auto 2PS, during commissioning, continuous degassing is automatically activated to remove any residual free or dissolved gases from the system. The time for continuous degassing can be set in the Customer menu as required by the system conditions. The default setting is 24 hours. Subsequent to the continuous degassing, the device automatically switches to interval degassing.

8.1.2 Manual mode

8.1.2.1 Fillcontrol Auto 2P

Manual mode is used to test the functions during commissioning and to service the device.

The following function can be selected manually:

- Activation and deactivation of the "PU1" and "PU2" pumps.

To start the manual operation, proceed as follows:

- Press "Manual" on the controller's operator panel.
  - The "Manual" LED at the operator panel illuminates to visually indicate that Manual mode is active.
  - For selecting the pumps, see chapter 7.6.2 "Pump test" on page 33 .

8.1.2.2 Fillcontrol Auto 2PS

Manual mode is used to test the functions during commissioning and to service the device.

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

- "PU1" or "PU2" pumps.
  - For switching the pumps on and off.
- "NS" motor ball valve for degassing the facility and the make-up water.
  - Manual actuator for opening or closing.

Proceed as follows:

1. Press "Manual" on the controller's operator panel.
   - Use the arrow keys at the operator panel to select "P1" or "P2" or "NS" on the display.
   - The selected indicator flashes at the display as a visual signal of the selection.

2. Press "OK" on the controller's operator panel.
   - The pumps or the motor ball valve are switched on and the displays shows "P1!" or "P2!" or "NS".
   - The display must show values of ≥ 3 bar for the pressure for the activated pump.

3. Press "OK" on the controller's operator panel.
   - The pumps or the motor ball valve are switched off and "P1!" or "P2!" or "NS" flashes as visual signal.

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

			2.0 bar
P1!	P2	U1	NS

*U1 = no function

8.1.3 Stop mode

Use Stop mode to shut the device down. The controller does not monitor the functions. Except for the display of information, the device is non-functional in Stop mode.

To execute the Stop mode, proceed as follows:

- Press "Stop" on the controller's operator panel.
  - The "Stop" LED at the operator panel illuminates to visually indicate that Stop mode is active.

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.

Note!

Select Stop mode for device commissioning.

8.1.4 Summer operation

The make-up with fresh water must be ensured even outside of the operation of the heating and cooling systems. Do not shut down the device when the pressure maintaining systems of the heating and cooling systems are in operation.

8.1.5 Restarting

⚠ CAUTION

Risk of injury due to pump start-up

Hand injuries may occur when the pump starts up if you turn the pump motor at the impeller using a screwdriver.

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

ATTENTION

Device damage due to pump start-up

Pump damage may occur when the pump starts up if you turn the pump motor at the impeller using a screwdriver.

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

After an extended standstill time (the device is de-energised or in Stop mode), the "PU" pump may jam.

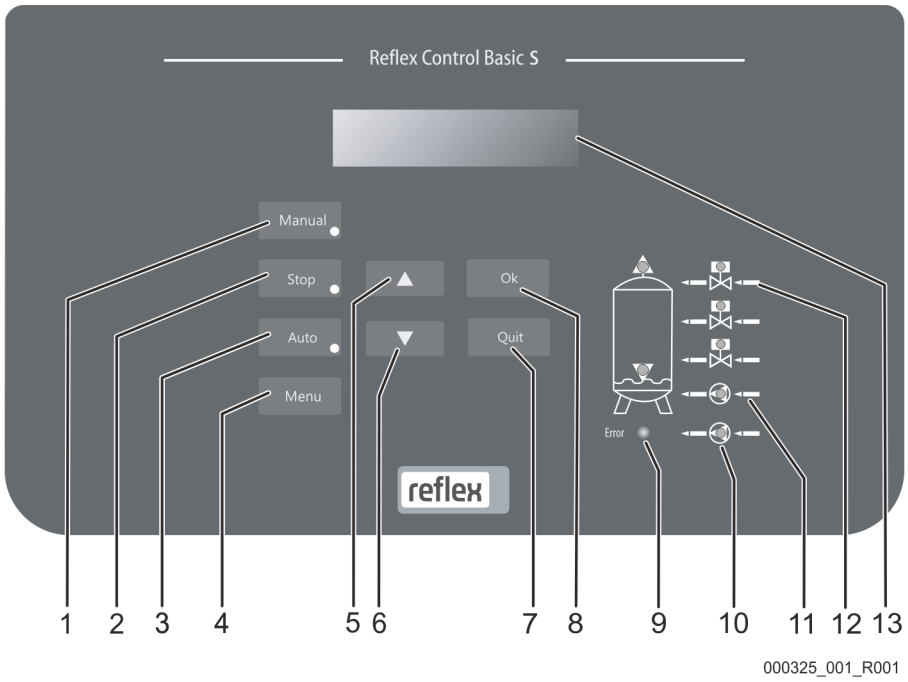
- Use a screwdriver to rotate the pump at the fan wheel of the pump motor before restarting.

Note!

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

9 Controller

9.1 Operator panel



1	Manual • For tests and maintenance tasks • The Manual LED illuminates green in manual mode
2	Stop • For commissioning and entry of new values in the controller • The Stop LED illuminates green in stop mode
3	Auto (continuous operation) • The Auto LED illuminates green in Automatic mode • The Auto LED flashes green in Manual mode • The Auto LED is not illuminated when the system is stopped
4	Menu • Call up the Customer menu
5	"Forward" to the next menu
6	"Back" to the previous menu
7	Quit • Acknowledge messages

8	OK • Confirm actions
9	Error LED • The Error LED illuminates in the event of a fault
10	Pump • The Pump LED illuminates green during pump operation
11	Pump • The Pump LED illuminates green during pump operation
12	Motor ball valve • The motor ball valve LED illuminates during adjustment
13	Display • Two lines

Selecting and changing parameters

1. Use "OK" (8) to select the parameter.
2. Use the arrow buttons (5) or (6) to change the parameter value.
3. Use "OK" (8) to confirm the parameter.
4. Use the arrow buttons (5) or (6) to change the menu option.
5. Use "Quit" (7) to switch to a different menu level.

9.2 Configuring settings in the controller

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

For a description of the operation, see chapter 9.1 "Operator panel" on page 39 .

Proceed as follows:

All grey marked menu items must be reviewed during commissioning.

Press "Manual" to switch to manual operation.

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

Switch to the next main menu option.	Customer menu
Standard software in various languages.	Language
Adjust the "Hour", "Minute", and "Second" display when each begins to flash. This time is used for entries in the fault memory.	Time:
This date is used for entries in the fault memory. Adjust the "Day", "Month", and "Year" display when each begins to flash.	Date:
Berechnung P_0, see chapter 7.2 "Determining the P_0 minimum operating pressure for the controller" on page 29 .	Min. op. pressure
Specify the tripping pressure of the applicable safety valve for the device protection. This is usually the safety valve at the system heat generator.	Safety valve pressure

Note!

The following degassing settings apply only to Fillcontrol Auto 2PS.

– Degassing settings are not required for Fillcontrol Auto 2P.

Switch to the "Degassing" sub-menu.	Degassing
Switch to the next list item.	Degassing
Select from 2 degassing programmes: •Continuous degassing •Interval degassing	Degassing programme
Time setting for Continuous degassing. – Depends on the facility volume and the glycol content, if required.	Time Continuous. degas.

Note!
The following settings apply to Fillcontrol Auto 2P and Fillcontrol Auto 2PS.

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

Switch to the next list item. — Make-up

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

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

With water meter

yes: Kontaktwasserzähler FQIRA+ ist installiert, see chapter 4.6 "Optional equipment and accessories" on page 15 .
This is a prerequisite for make-up quantity monitoring.

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

Only displayed if "YES" has been set in the "With water meter" menu option. — Make-up quantity

OK Delete meter:

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

no: The displayed water quantity is retained.

Only displayed if "YES" has been set in the "With water meter" menu option. — Max. make-up qty.

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

Recommended maintenance message. — Next maintenance

Off: Without maintenance recommendation.

001 – 060: Maintenance recommendation in months.

Ausgabe von Meldungen auf den potenzialfreien Störkontakt, see chapter 9.3 "Messages" on page 45 . — Floating contact

yes: Output of all messages.

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

Acoustic signal (horn) at fault contact — Horn at fault contact

yes: Acoustic signal is output with the fault contact

no: No acoustic signal with fault contact

Use "Quit" (acknowledge) to deactivate the acoustic signal for the fault contact.

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

Fault memory

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

ER 01…xx

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

Parameter memory

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

P0 = xx.x bar

Information about the software version.

V0.60

9.2.1 Customer menu

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

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

PM code	Parameter	Setting	Remarks
	Language	EN	Display language
	Time	hh:mm:ss	Time
	Date	dd:MM:yy	Date
005	Minimum working pressure P_0	1.8 bar	see chapter 7.2 "Determining the P_0 minimum operating pressure for the controller" on page 29
006	Safety valve, pressure	3.0 bar	Tripping pressure for the safety valve at the heat generator in the system
Degassing, active only in Fillcontrol Auto 2PS			
011	Degassing programme	Continuous degassing	
	Continuous degassing time	24 h	
Makeup			
020	Maximum makeup time	20 minutes	
021	Maximum makeup cycles	3 cycles within 2 hours	3x makeup within 2 hours for maximum 20 minutes each
022	Water meter	NO	Optional contact water meter
023	Makeup quantity	0 Litres	Only if controller with "With water meter YES"
024	Maximum makeup quantity		
	Next maintenance	18 months	Time left to the next due maintenance
	Floating alarm contact	NO	Only the messages marked in the "Messages" list
	Horn	NO	Acoustic signal is output with the fault contact
	Fault memory		History of all messages
	Parameter memory		History of parameter input
	Software version	V0.60	

9.2.2 Service menu

The Service menu is password-protected. Only Reflex service technicians are able to access this menu, see chapter 12.1 "Reflex Customer Service" on page 53 .

Parameter	Setting	Remarks
Pressurisation		
Pump "ON"	P_0 + 0.3 bar	Differential pressured added to the "P_0" minimum operating pressure
Pump "OFF"	P_0 + 0.4 bar	Differential pressured added to the "P_0" minimum operating pressure
Forced start of the pumps	24 h	If the pumps are standing still for 24 hours, they are forced to run for 3 seconds
"Pump run time exceeded" message	30 minutes	The message is displayed after the pumps run for 30 minutes
Maximum pressure	6 bar	
Degassing, active only in Fillcontrol Auto 2PS		
Degassing	P_0 + 0.4 bar	Differential pressured added to the "P_0" minimum operating pressure
Degassing time of interval degassing mode	90 seconds	
Idling time of interval degassing mode	120 minutes	
Interval degassing start	08:00 h	
Interval degassing end	18:00 h	

9.3 Messages

Messages with ER codes are displayed at the controller.

- Use the arrow keys at the controller operating panel to select the messages.
- By selecting the "Fault memory" main menu in the Customer menu, you display the last 20 alarms.
- Alarm causes can be eliminated by the operator or a specialist workshop.
- If required, please 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 7.5 "Parametrising the controller in the Customer menu" on page 31 .

ER Code	Alarm	Floating contact	Cause	Remedy	Alarm reset
01	Minimum pressure	Yes	• Set value not reached • Water loss in the system • Pump fault • Expansion tank defective	• Check set value in the Customer or Service menu • Check water level • Check pump • Check expansion tank	-
02.1	Insufficient water	-	Insufficient water switch has actuated for too long	• Open the degassing line • Clean the dirt trap • Replace the degassing valve	Quit
02.2	Insufficient water	-	Insufficient water switch triggered	• Check the supply line from the fresh-water system to the system separator tank • Check the function of the float valve in the system separator tank	Quit
04.1 04.2	Pump1 Pump2	Yes	Pumps disabled • Pumps jammed • Pump motor defective • Pump motor protector (Klixon) tripped • Fuse defective	• Rotate the pumps with screwdriver • Replace the pump motor • Electrically test the pump motor • Replace the 10 A fuse	Quit
06	Makeup time	-	• Set value exceeded • Water loss in the system • Makeup line not connected • Makeup rate insufficient • Makeup hysteresis too low	• Check set value in the Customer or Service menu • Check water level • Connect makeup line	Quit

ER Code	Alarm	Floating contact	Cause	Remedy	Alarm reset
07	Makeup cycles	-	Set value exceeded	• Check set value in the Customer or Service menu • Seal the leak in the system	Quit
08	Pressure measurement	-	Controller receives incorrect signal	• Connect the plug • Check the cable for damage • Check the pressure transducer	Quit
10	Maximum pressure	-	Set value exceeded	• Check set value in the Customer or Service menu • Set the tripping pressure of the safety valve	-
11	Back-up volume	-	"With water meter" must be activated in the Customer menu • Set value exceeded • Severe water loss in the system	• Check set value in the Customer or Service menu • Check the water loss in the plant system	Quit
15	Makeup valve	-	Contact water meter measures without makeup request	Check the motor ball valve for leaks	Quit
16	Power failure	-	No power	Connect to power	-
19	Stop > 4 hours	-	Device is in Stop mode for more than 4 hours	Set the controller to Automatic mode	-
20	Maximum makeup quantity	-	Set value exceeded	Reset the "Makeup quantity" meter in the Customer menu	Quit
21	Maintenance recommendation	-	Set value exceeded	Carry out maintenance	Quit
30	I/O module fault	-	• I/O module defective • Connection between option card and controller faulty • Option card defective	• Replace the I/O module • Check the connection between option card and controller • Replace the option card	-

ER Code	Alarm	Floating contact	Cause	Remedy	Alarm reset
31	EEPROM defective	Yes	• EEPROM defective • Internal calculation error	Contact the Reflex Customer Service	Quit
32	Undervoltage	Yes	Supply voltage not achieved	Check power supply	-
33	Adjustment parameter faulty	-	EPROM parameter memory defective	Contact the Reflex Customer Service	Quit
34	Main board communication faulty	-	• Connecting cable defective • Main circuit board defective	Contact the Reflex Customer Service	Quit
35	Digital input voltage faulty	-	Short-circuit of input voltage	Check the wiring at the digital inputs (water meter, for example)	-
36	Analogue input voltage faulty	-	Short-circuit of input voltage	Check the wiring at the analogue inputs (pressure/level)	-
37	No input voltage for the 3-ways motor ball valve	-	Short-circuit of input voltage	Check the wiring of the motor ball valve	-

10 Maintenance

⚠ CAUTION

Risk of burns

Escaping hot medium can cause burns.

- Maintain a sufficient distance from the escaping medium.
- Wear suitable personal protective equipment (safety gloves and goggles).

⚠ DANGER

Risk of serious injury or death due to electric shock.

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

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

⚠ CAUTION

Risk of injury due to pressurised liquid

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

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

▶ **Note!**

Ensure that maintenance is carried out annually.

- In specific cases, the maintenance intervals depend on the operational conditions.

▶ **Note!**

The annual maintenance is displayed upon expiry of the set operating time.

- Use the "Quit" button to confirm the "Maintenance received" message.
- Reset the maintenance counter in the Customer menu.

▶ **Note!**

Maintenance tasks must be carried out only by specialist personnel or the Reflex Customer Service.

- Confirm the maintenance tasks, see chapter 10.5 "Maintenance certificate " on page 51 .

10.1 Maintenance schedule

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

Maintenance task	Conditions			Interval
▲ = Check, ■ = Service, ● = Clean				
Check for leaks. • Pumps • Screw connections • Degassing valve – Fillcontrol Auto 2PS	▲	■		Annually
Clean the dirt trap. • see chapter 10.2 "Cleaning the dirt trap" on page 49	▲	■	●	Depending on the operating conditions
Check the controller settings.	▲			Annually
Only Fillcontrol Auto 2PS:				
Vacuum function test. • see chapter 7.6.1 "Vacuum test" on page 32	▲			Annually
Function test. • "SE" system degassing. – see chapter 10.3 "System degassing inspection " on page 50	▲			Annually

Note!

Compare the minimum working pressure with the initial pressure in the diaphragm expansion tank.

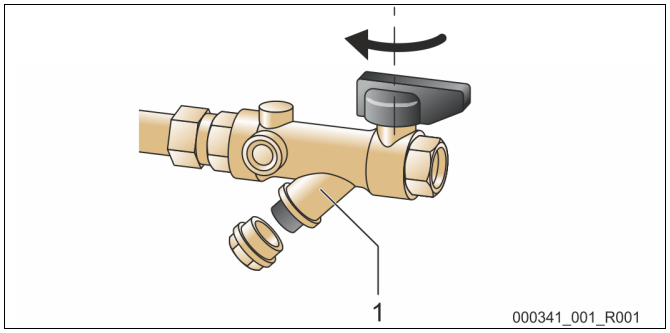
– If necessary, adjust the initial pressure in the diaphragm expansion tank.

10.2 Cleaning the dirt trap

The dirt trap in the degassing pipe must be cleaned no later than after the expiry of the continuous degassing time. Check the dirt traps after every filling action or extended operation.

Proceed as follows:

1. Press "Stop" on the controller's operator panel.
   – The device is non-functioning and the pumps are shut down.
2. Close the ball valve upstream of the dirt trap (1).
3. Slowly unscrew the cup with the mesh from the dirt trap's housing.
   – The residual pressure in the pipe segment is released.
4. Pull the mesh from the cap and rinse it with clear water.
5. Use a soft brush to clean the sieve.
6. Check the cap seal for damage.
7. Reinsert the cleaned mesh into the cap.
8. Screw the cap with the mesh into the dirt trap's housing (1).
9. Open the ball valve upstream of the dirt trap (1).



10. Press "Auto" on the controller's operator panel.
    – The device is switched on and the pumps are in operation.

The dirt trap has been cleaned.

10.3 System degassing inspection

Inspect the "SE" system degassing unit (only with Fillcontrol Auto 2PS).

Proceed as follows:

1. Press "Manual" at the controller to switch to manual mode.
   - The Auto LED at the operator panel flashes to visually indicate that manual mode is active.
   - In manual mode, you manually activate and deactivate the "SE" system degassing unit.
2. Run 10 cycles in "SE" mode.
   - The gas must be eliminated before the next cycle starts.
3. Subsequently, check the following conditions:
   - With cold water, the vacuum gauge must eventually show a value of approx. -1 bar.
   - The "Insufficient water" message must not be displayed at the controller.
4. After the inspection is completed, reset the device to Automatic mode.

- "Next" and "Back" buttons
  - Select "SE" system degassing
- "OK" button
  - Starts system degassing
- "Auto" button
  - Return to Automatic mode

* Flashing "SE▲" mode is active

10.4 Inspection of pressure-carrying components

Comply with all applicable national regulations for the operation of pressure equipment. De-pressurise all pressurised components prior to inspection (see disassembly information).

10.5 Maintenance certificate

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

Date	Service organisation	Signature	Remarks

11 Disassembly

⚠ DANGER

Risk of serious injury or death due to electric shock.

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

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

⚠ DANGER

Risk of serious injury or death due to electric shock

Some parts of the device's circuit board may still carry 230 V voltage even with the device physically isolated from the power supply.

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

⚠ CAUTION

Risk of burns

Escaping hot medium can cause burns.

- Maintain a sufficient distance from the escaping medium.
- Wear suitable personal protective equipment (safety gloves and goggles).

⚠ CAUTION

Risk of burns on hot surfaces

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

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

⚠ CAUTION

Risk of injury due to pressurised liquid

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

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

Prior to the disassembly, shut off the lines from the system to the device and de-pressurise the device. Then disconnect the device from all electrical power sources.

Proceed as follows:

1. Disconnect the device from all electrical power sources.
2. Secure the facility against unintended reactivation.
3. Shut off the make-up line.
4. Shut off the degassing line.
   – Fillcontrol Auto 2PS
5. Disconnect the power cable of the device from the power supply.
6. Disconnect all cables from the facility to the device controller.
7. Open the drain cock at the spray tube of the device until the spray tube no longer contains any water.
   – Fillcontrol Auto 2PS
8. If necessary, physically remove the device from the system.

The dismantling process is completed.

12 Annex

12.1 Reflex Customer Service

Central customer service

Central telephone number: +49 (0)2382 7069 - 0
Customer Service extension: +49 (0)2382 7069 - 9505
Fax: +49 (0)2382 7069 - 9588
E-mail: service@reflex.de

Technical Hotline

For questions about our products
Telephone number: +49 (0)2382 7069-9546
Monday to Friday 8:00 to 16:30

12.2 Guarantee

The respective statutory guarantee regulations apply.

12.3 Conformity and standards

Declaration of conformity for electrical installations in the pressure maintaining, makeup. or degassing systems		
1.	We hereby confirm that the products meet the essential protection requirements as established in the Council Directive to approximate the laws of the Member States relating to electromagnetic compatibility (2014/30/EU). The following Standards have been applied to assess the products:	Deutsches Institut für Normung, European Standard 61326 – 1:2013-07
2.	We hereby confirm that the control cabinets meet the essential requirements of the Low-voltage Directive (2014/35/EU). The following Standards have been applied to assess the products:	Deutsches Institut für Normung, European Standard 61010 – 1:2011-07, BGV A2
The signatory is authorised to collate the technical documentation and undertakes to provide this documentation in a suitable format, if required by the competent authority.		
Manufacturer **Reflex Winkelmann GmbH** Gersteinstraße 19 59227 Ahlen - Germany Telephone: +49 (0)2382 7069-0 Fax: +49 (0)2382 7069-9588 E-mail: info@reflex.de	The manufacturer declares that the pressure equipment (the assembly) complies with the requirements of Directive 2014/68/EU. Norbert Hülsmann Volker Mauel Members of the Board of Directors	

SI1667enB / 9126331 / 02-18

Thinking solutions.

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