



Flamco

ENA 5

Installation and operating instructions



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Installation and operating instructions

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Note: Appendix available

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**Installation and
operating instructions**

1 General

1.1 About this manual

This manual includes technical specifications, instructions and explanations that helps to use this automat safely. Read and understand all the instructions before you transport, install, commission, restart, operate or maintain the automat.

1.2 Other supplied documentation

General information of additional components, such as the compressor and the sensors, is included in this manual. If additional documentation is supplied, also follow the instructions in those.

1.3 Use of Flamco products

According to order or execution complementary documentations can be added. Follow the positions performed in the dispatch papers.

1.4 Further help and information

Contact your local supplier for additional services as:

- Training.
- Maintenance agreements.
- Service contracts.
- Repairs and improvements.

2 Safety

2.1 Intended use

The automat is designed for deaerating and feeding make-up water in closed heating and in cooling water systems. The automat is not designed for the initial filling or re-filling of systems.

2.2 Important information

The automat has safety devices intended to prevent injury and damage. Use the automat in the following way:

- Have the installation be carried out by qualified personnel.
- Comply with local legislation and guidelines.
- Do not make modifications to the automat without prior written permission of Flamco.
- Make sure that all automat covers and doors are closed when operating the automat.
- Do not touch live voltage. The sensor units and the capacity pressure sensors operate with extra low safety voltage.

Flamco shall not be liable for any losses arising from the non-observance of safety conditions or as a consequence of the disregard of standard precautionary measures when performing such services as transport, installation, commissioning, re-starting, operation, maintenance, testing and repair, even in the event that these are not expressly described in these instructions.

2.3 Signs in this manual



Identifies a hazard that could lead to personal injury including death/damage to the automat, damage to other equipment and/or environmental pollution.



Identifies an electric hazard that could lead to personal injury including death/damage to the automat, damage to other equipment and/or environmental pollution.



Earthing



Important information.

2.4 Specifications

The construction of the automat is designed in accordance with the norms DIN EN 1717 and DIN 1988.

2.5 Safety devices

The automat does not contain any safety components that prevent that the operation pressure and the operation temperature range are exceeded or go below a limit. Install components for the limitation of pressure and temperature in the system.

2.5.1 Avoiding excessive pressure

Appropriate safety valves that prevent that the maximum operation pressure is exceeded:

- Open not later than the maximum allowable working pressure is reached.
- Can conduct the occurring volume flow (including the maximum possible refilling volume) up to the 1.1-fold of the maximum operation pressure;
- Have a proven reliability or are certified.



Do not narrow the inlet or outlet piping of the safety valve.

2.5.2 Avoiding excessive temperature

Appropriate safety components:

- Guarantee that the operation temperature range is not exceeded at any point of the system;
- Are approved and tested on operation safety.

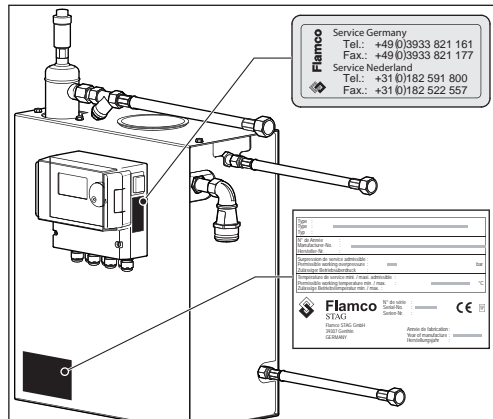


Activate the pressure and temperature safety devices and check them regular on proper working.



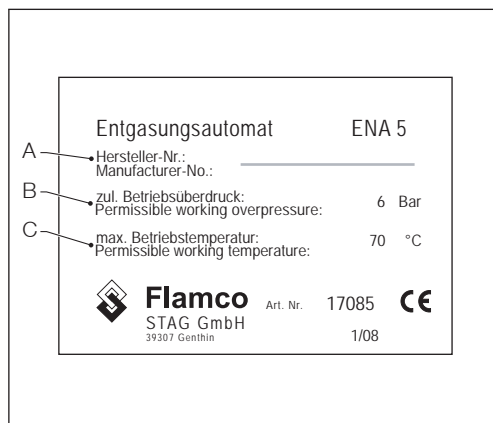
2.6 Signs on the automat

The signs on the automat are part of the safety provisions. Do not cover or remove the signs. Inspect regularly if the signs are present and legible. Replace or repair signs that are illegible or damaged.



On the automat the following product information can be found:

- A Type plate
- B Contact information



On the type plate the following product information can be found:

- A Automat serial number
- B Permissible working overpressure
- C Permissible working temperature



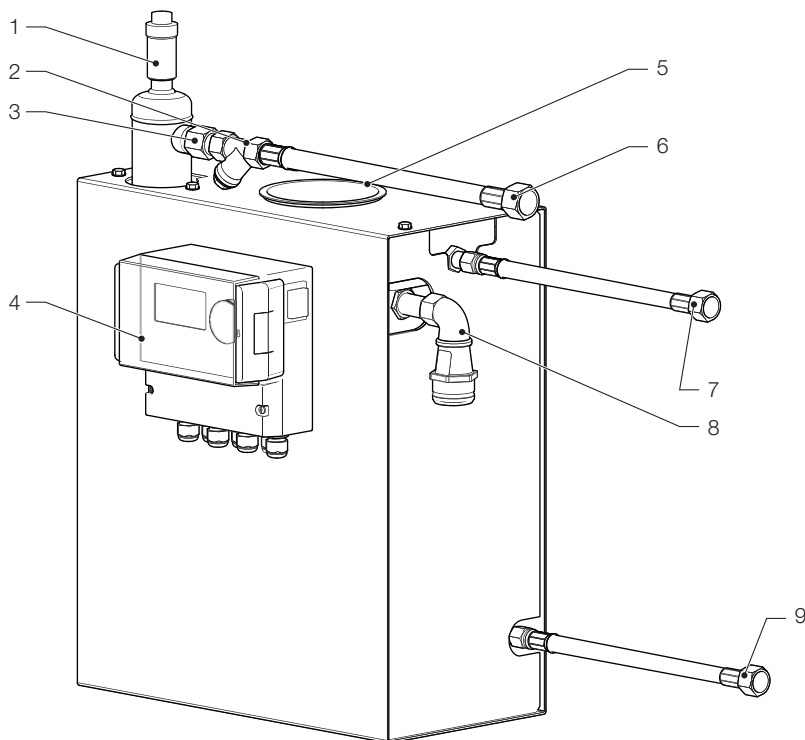
Do not use the automat when the specifications on the type plate differ from the order.



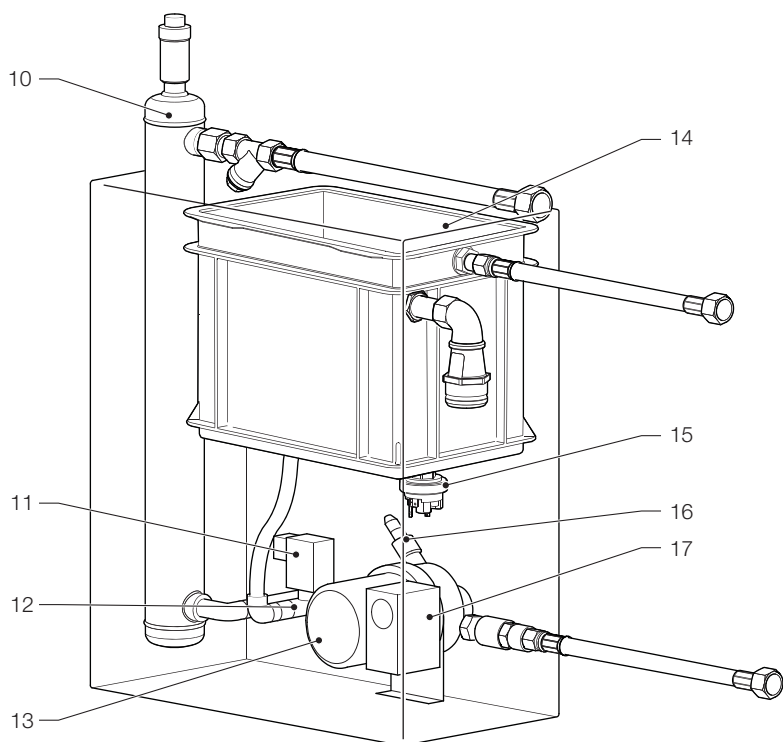
**Installation and
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3 Description

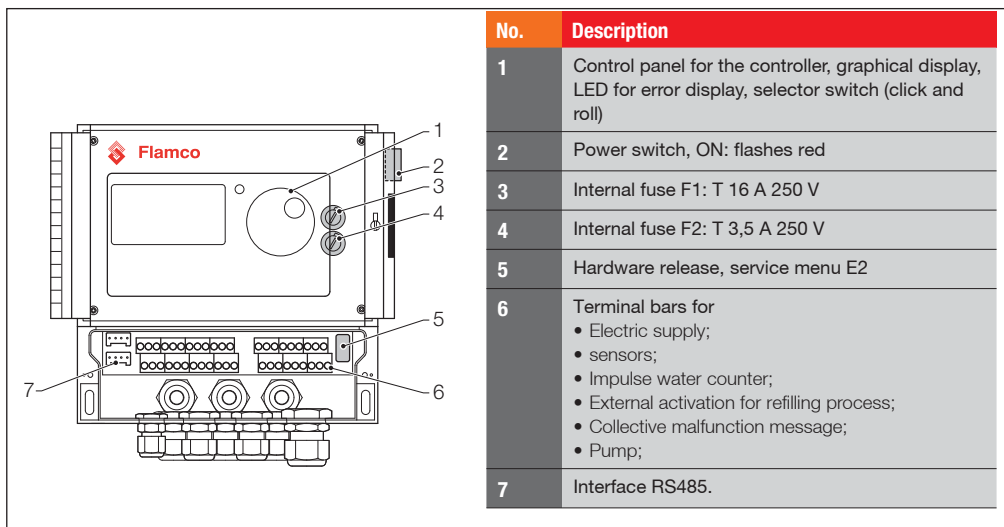
3.1 Component overview



No.	Description
1	Vent device
2	Strainer
3	Flow regulator
4	SCU controller
5	Opening for overflow tank
6	From system joint G1/2"
7	Make-up water joint G1/2"
8	Overflow joint DN40
9	Return system joint G1/2"
10	Deaeration tank
11	Solenoid valve
12	Check valve
13	Pump
14	System separation tank
15	Run-dry sensor
16	Pressure sensor
17	Terminal box pump

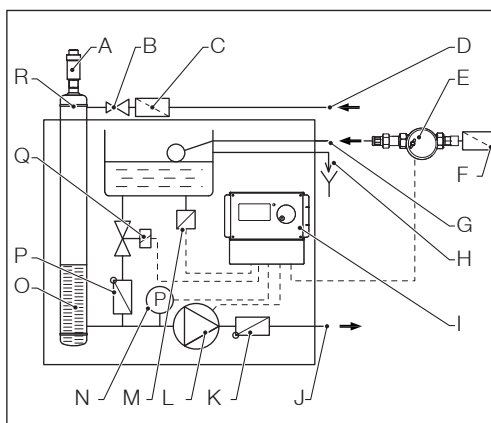


3.2 Controller SCU



3.3 Working principle

The automat serves primarily as an active deaerating device. In addition as a make-up device for re-filling the water losses in a system.



3.3.1 Deaeration

For deaerating the water, the system water is drawn in via a bypass from the return line of the system (D). The water is run through the strainer (C) and flow regulator (B) into the deaeration tank (R). It is subjected to a vacuum during the cyclic running of the pump (L) and passed through a ring packing (O). As a result of the lowered pressure, and the large surface of the ring packing, air dissolves from the water.

When the pump switches off, the replenishing medium flowing into the tank causes the pressure in the tank to increase to the level of the system pressure so that the air which has accumulated above the water level is discharged via the vent device (A). While the pump is running, the water quantity supplied into the tank is returned via a bypass line to the return branch (J) of the system.

Fast deaeration mode:

An interval during which the pump is running (vacuum is forming) alternates with an interval during which the air is discharged (pump is stopped).

Normal deaeration mode:

An additional pause is added between the end of the evacuation interval and the starting of the pump. This additional interval can be selected via a parameter within fixed limits. Upon expiry of the deaeration interval, the system changes to the normal deaeration mode, which then takes place continuously. The normal deaeration mode is interrupted by a selectable pause (by default 06.00 p.m. - 08.00 a.m.). The beginning of the next deaeration cycle taking place in the normal deaeration mode is indicated via a countdown in the Process menu.

3.3.2 Make-up operation

The make-up water is supplied in a pressure-controlled or level-controlled mode. The automat is set by default to pressure-controlled refilling (if a diaphragm expansion vessel is used).

Pressure-controlled supply:

The system is equipped with a pressure sensor (N) for sensing the pressure. The make-up activating pressure should be $P_{o^*} + 0.2$ bar. The make-up deactivating pressure must be at least 0.1 bar higher than the make-up activating pressure. The make-up water flow rate or feed time can be monitored, if the system is fitted with a litres counter (E). The pump (L) must be automatically stopped cyclically during pressure-controlled refilling, and the actual system pressure must be checked and, if necessary, additional water must be supplied until the make-up deactivating pressure is reached.

Level-controlled supply:

In this case, make-up water is supplied as long as the external make-up request is active and the flow-rate and time monitoring feature of the automat allows making up to take place.

It is possible to deactivate the make-up function. Refer to chapter 6.1.

* $P_{o^*} = P \text{ Static} + P \text{ Steam}$



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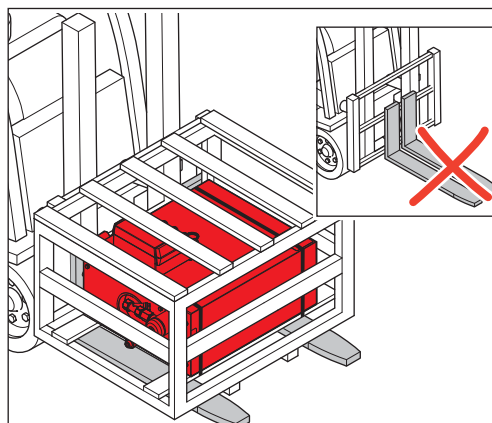
4 Transport and storage

4.1 Transport

The shipping papers list all the items, such as equipment and documentation. Ensure that the delivery is complete and not damaged. The automats are packed horizontally on disposable pallets and are fully assembled.



Identify the items that are missing or not correctly delivered. Read the general terms and conditions in the shipping papers.

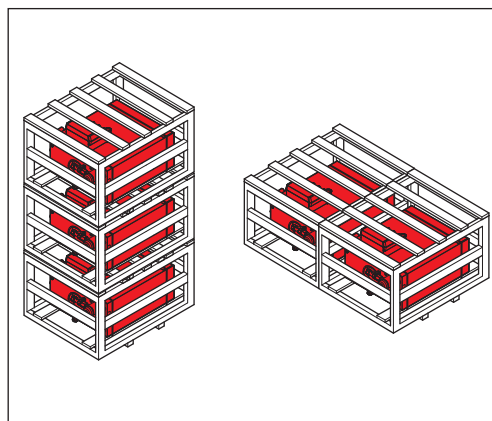


- Transport the pallets horizontally.
- Lift the automat just slightly.



Make sure that the lifting device can support the automat. For weight and dimensions, refer to chapter 9: Technical specifications.

4.2 Storage



Make sure that the storage space meets the ambient conditions. Refer to section 6.2.

- Take care for an even floor.
- The automats can be stacked up.



Do not stack up more than 3 automats.



5 Installation

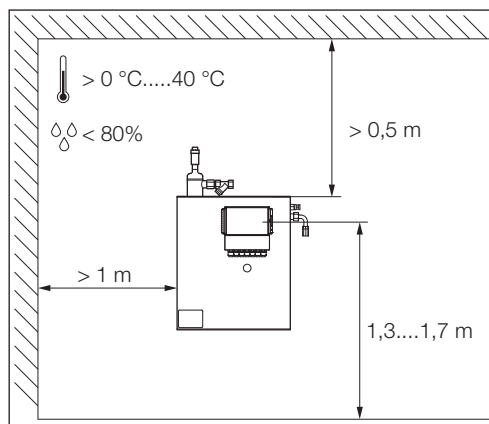
5.1 Prepare for installation



Make sure that the surface can support the maximum weight of the automat, including the water. Refer to chapter 9: Technical specifications.

- The automat is intended for wall-fastening.
- The automat may not be affected by external forces.
- No dirt may get into the automat and its accessories.
- The installation place must have a floor drain or there must be enough drain for the overflow of the automat.
- Install shut-off devices to the system and to the drinking water net on-site.
- Plan enough free space around the automat for maintenance work.
- Note the effective regulations regarding the use and the installation location and, if necessary, inform the responsible testing and certification bodies prior to the launch of the system.

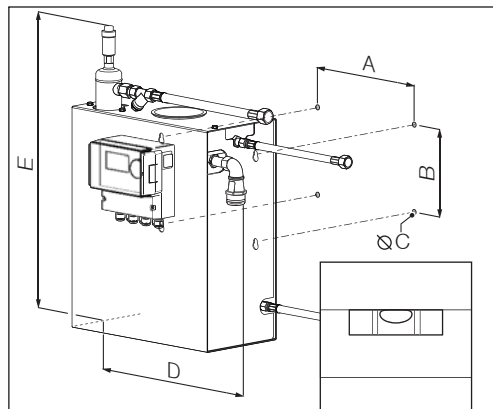
5.2 Ambient conditions



Make sure

- that the automat is installed in a closed, dry and frost-free room;
- to maintain the minimum distances as indicated;
- that the atmosphere does not contain electrically conducting gases or high concentrations of dust and vapors. Risk of explosion when there are combustible gases;
- that the vicinity is clean and well lit.
 - Relative humidity: not condensating.
 - Free of vibrations.
 - Free from heat- and solar radiation.
- that the automat is free from additional loads.

5.3 Mounting dimensions



Use the mounting set supplied with the automat. For wall mounting the following dimension apply:

- A. 380 mm
- B. 180 mm
- C. $\varnothing 15$ mm
- D. 480 mm
- E. 700 mm

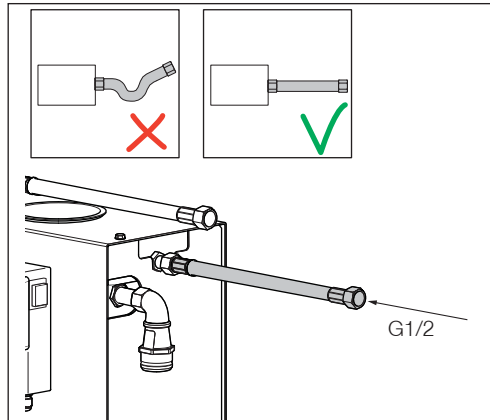


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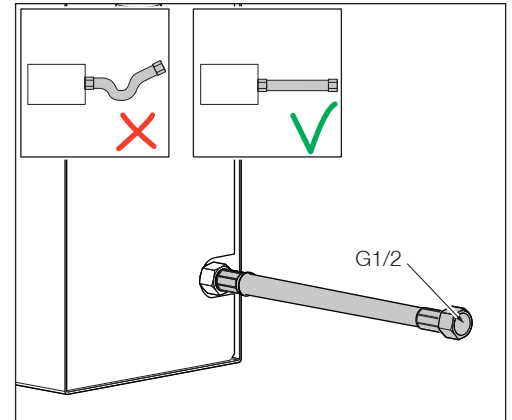
5.4 Hydraulic installation



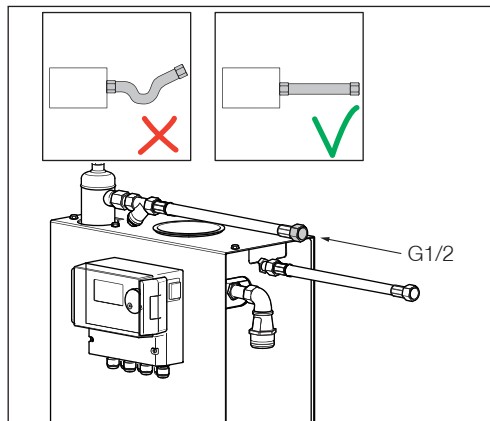
- Install the shut-off devices on-site in front of the tube joints.
- Only work on non-pressurised and cooled-down pressure joints.
- Use the installed pressure tubes.



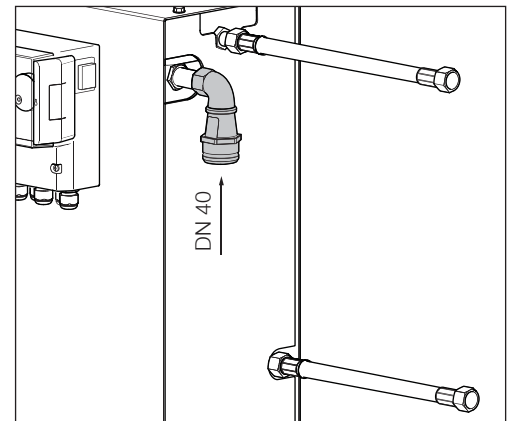
- Connect the supply line to the refilling supply.
- If necessary, install a dirt trap at the drinking water joint (0.2 mm).
- The minimum nominal diameter for the installation line of the system and the supply line is DN 15.



- Connect the return line of the system.



- Connect the supply line of the system.

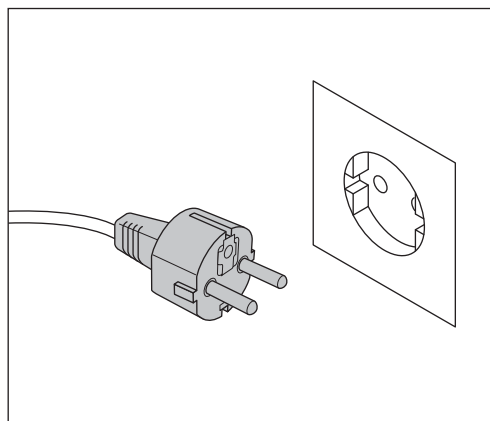


- Connect the drain/overflow.

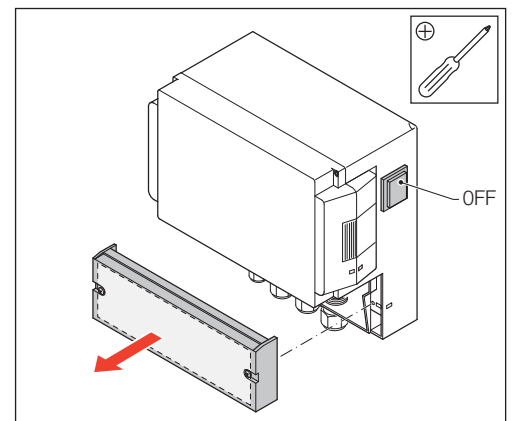
5.5 Electrical installation



There can be life voltage on the terminal bars even when the main power supply is disconnected. Make sure all external power supplies (e.g. external refill equipment) are also disconnected from the automat.



- Switch off the power switch on the controller SCU.
- Pull the power plug or switch off external separators and secure these against a restart.



- Unscrew the protective cover of the terminal box.
- The descriptions of the terminal bars are on the inside of the protective cover.



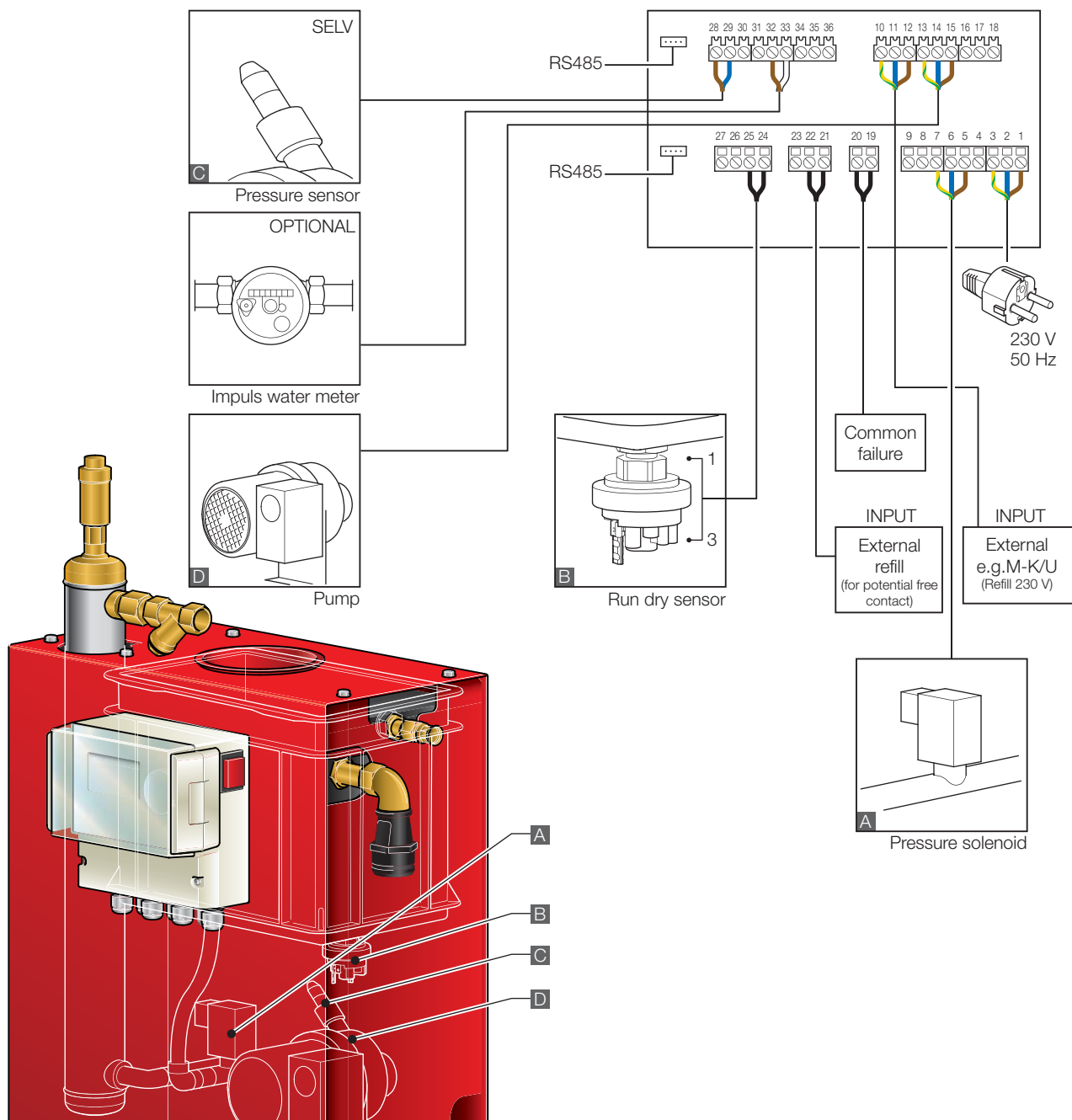
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5.6 Basic electrical connections

		Nominal current [A] unit	Fuse wiring connector [A]*
Nominal voltage	Protection type		
230 V: +6%; -10%	IP54 (pressure sensor IP65)	3	10
50 Hz: +1%; -1%			

SELV: Safety Extra Low Voltage
 * Recommended value; Line safety switch (C).

Never connect terminal 11+12 and 21+22 at the same time. It will destruct the refill the SCU controller or the pressure holding control.

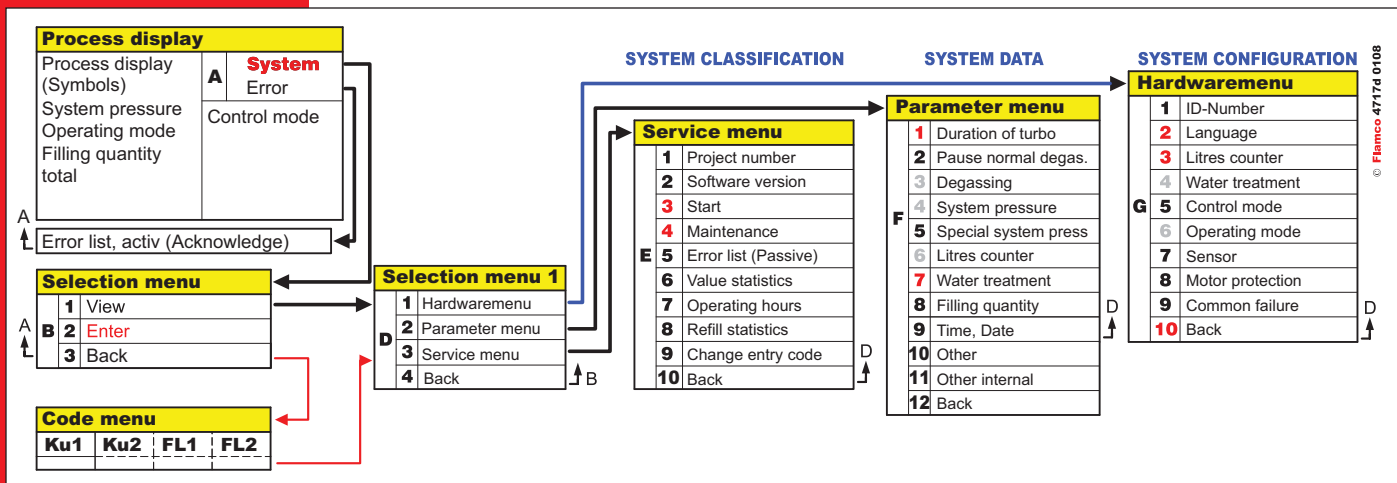




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6 Startup controller

6.1 Controller menu structure

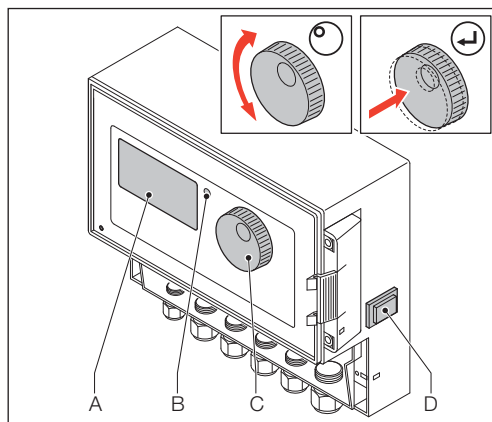


6.2 Menu symbols

	No ID number available. Controller not configured.		Pump
	Denied, not installed. Outside parameter limits.		Entry confirmed.
	Refill is pressure controlled.		Programming mode, enter.
	Code required.		Test mode.
	Refill is level controlled.		Warning.
	Solenoid valve.		Save error. Settings not saved.
	No intervention possible.		Wait.
	Operating mode, view only.		External refill signal is connected (level controlled operation only).
	Vacuum switch.		



6.3 Working principle controller

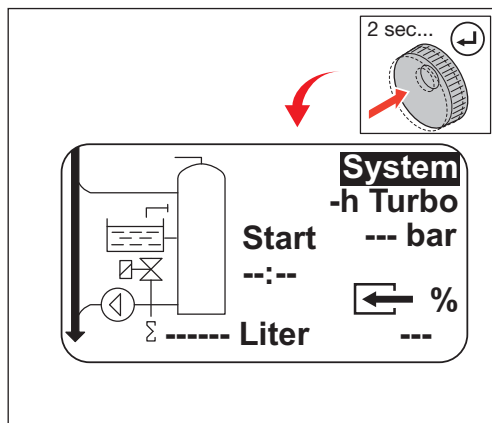


Start up

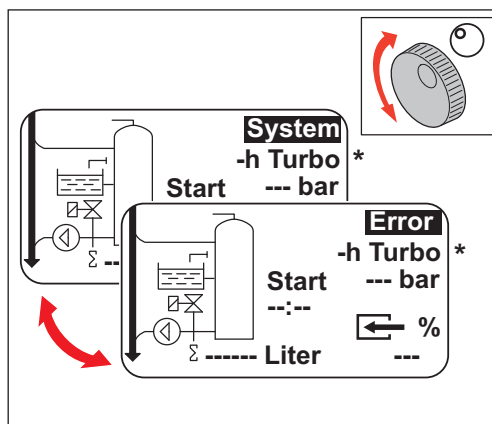
- Switch off an installed refill equipment. Close the inflow valves.
- Switch on the controller (D).

- A Display
- B Error LED
- C Navigation wheel
- D ON/OFF switch controller

Use the navigation wheel (C) to navigate through the menus and to confirm the input. The display (A) shows the menus. In case of errors the error LED (B) is on.



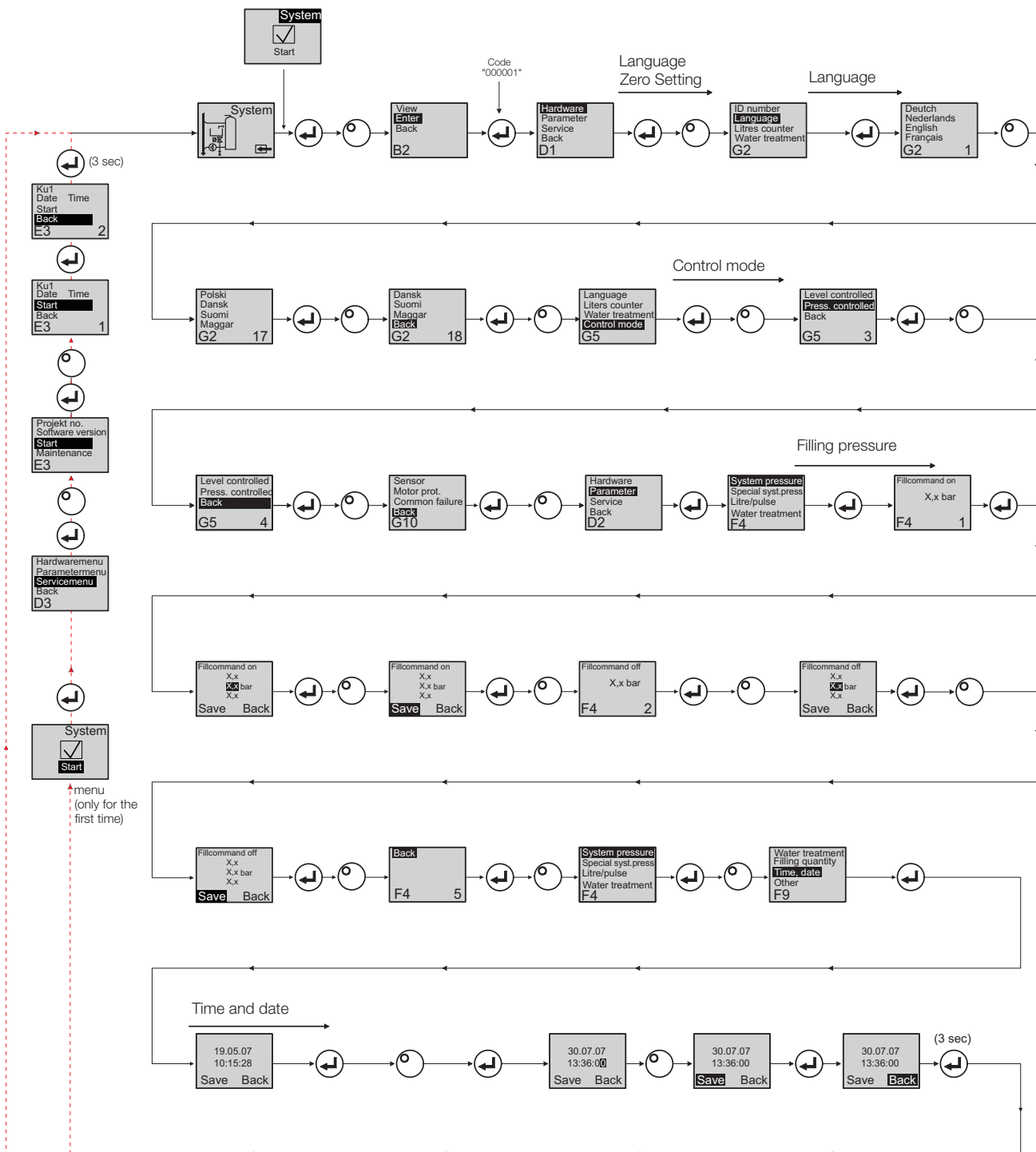
- Hold down the navigation wheel for two seconds to go to the process display, whatever the cursor position.



- In case of errors the process display switches from [SYSTEM] to [ERROR] and the LED is on.
- The error messages, minimum water level, minimum pressure alarm are consistent by the first start of operation.
- It is possible to turn the wheel to switch between [SYSTEM] and [ERROR].
- When [ERROR] is displayed press the wheel to go to the error list. In case of more than one error, scroll through the errors. All errors are shown in accordance of appearance.
- When [SYSTEM] is displayed, press the wheel to go to the option menu.

* Turbo means Fast

6.4 Controller inputs



- When entering the program mode, the control for pressure maintenance is active.
- The code will be active 5 minutes after latest input.
- Remove all unpermitted loads, supported objects or lateral loads from the basic automat.
- When the programming procedure is completed, the electrical parts of the compression expansion automat are ready for operation.
- When ready, a value for level and pressure is shown in the display.

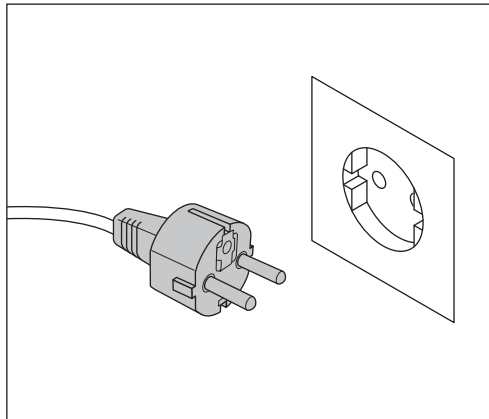


7 Maintenance and troubleshooting

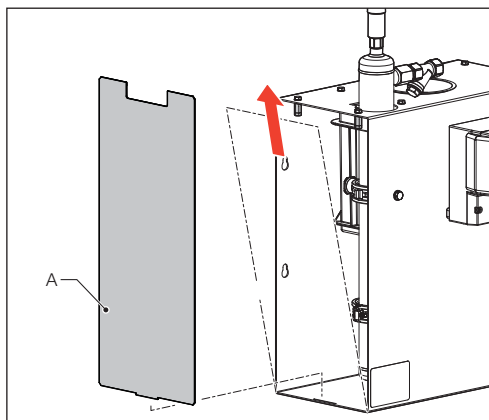


- The water and the contact surfaces can be 70 °C or more.
- Wear the required protective clothing.
- The floor can be wet or greasy. Wear protective shoes.

7.1 Before maintenance



There can be life voltage on the terminal bars even when the main power supply is disconnected. Make sure all external power supplies (e.g. external refill equipment) are also disconnected from the automat.



Remove the side cover (A) to gain access to the internal parts. Both left and right covers can be removed.

Release the pressure of the gas compartment and the water compartment before maintenance.

7.2 After a power failure

The programmed parameters of the controller do not change after a power failure.



- Check the condition of the automat for integrity after a power failure.

7.3 Maintenance interval

Confirm maintenance in the service menu.

Interval	Component	Activity
Annually	ENA 5	Check leak tightness of joints, pumps and screw connections. If necessary, seal or tighten the screw connections.
Every year before the peak period	On-site dirt trap in the feed line	Clean the guards

7.4 Change the automat for water treatment

- Switch off water treatment in the equipment menu and change the module.
- Adjust the capacity in the parameter menu.
- Switch on "water treatment" in the equipment menu.



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7.5 Error messages

Nr.	Message	Description	Reset	Possible cause	Troubleshooting
1	pressure too low	System pressure too low, is outside working pressure range	B	<ul style="list-style-type: none"> Leakage Pressure-holding value wrongly set Wrong admission pressure Filling pressure too low 	<ul style="list-style-type: none"> Eliminate leakage Set correct pressure-holding value Increase filling pressure up to working pressure range
2	pressure too high	System pressure too high, is outside working pressure range	B	<ul style="list-style-type: none"> Pump does not switch off Diaphragm expansion vessel too small/ wrong admission pressure Filling pressure too high 	<ul style="list-style-type: none"> Check control Check admission pressure / use larger diaphragm expansion vessel Lower filling pressure to working pressure range
3	entrycap. too low	Litres counter does not supply water after make-up request	A	<ul style="list-style-type: none"> No pulses sent from litres counter, because: <ul style="list-style-type: none"> litres counter defective cable not connected setting value too low for litres counter response time 	<ul style="list-style-type: none"> Replace litres counter Connect cable Use higher setting value for response time
4	solenoid does not open	During filling, pressure drops below -0.2 bar	A	<ul style="list-style-type: none"> No clamping Solenoid valve defective/does not open 	<ul style="list-style-type: none"> Check clamping Clean/exchange solenoid valve
5	Cycle interval	Make-up cycle interval too short	A	<ul style="list-style-type: none"> Leakage in system 	<ul style="list-style-type: none"> Eliminate leakage
6	nr. of cycles	Maximum number of cycles within time window exceeded	A	<ul style="list-style-type: none"> Leakage in system 	<ul style="list-style-type: none"> Eliminate leakage
7	fill error	Filling without request (litres counter sends signal without filling)	A	<ul style="list-style-type: none"> Leakage at system separation tank 	<ul style="list-style-type: none"> Eliminate leakage
8	Quantity limit	Maximum quantity in a make-up cycle exceeded	A	<ul style="list-style-type: none"> Leakage Setting value for flow rate reduction too low 	<ul style="list-style-type: none"> Eliminate leakage Correct the setting value
9	Runtime protection	Maximum time of make-up cycle exceeded	A	<ul style="list-style-type: none"> Leakage Setting value for flow rate reduction too low 	<ul style="list-style-type: none"> Eliminate leakage Correct the setting value
10	exchange module	Softening module exhausted	A	<ul style="list-style-type: none"> Module capacity (water treatment) exhausted 	<ul style="list-style-type: none"> Replace module
11	low mA P-sensor	Interruption of current loop of pressure sensor	A	<ul style="list-style-type: none"> Sensor defective Terminal/cable defective 	<ul style="list-style-type: none"> Replace sensor Check/exchange terminal/ cabling
12	high mA P-sensor	Short-circuit in current loop of pressure sensor	A	<ul style="list-style-type: none"> Sensor defective Terminal/cable defective Short circuit 	<ul style="list-style-type: none"> Replace sensor Check/exchange terminal/ cabling
13	vacuum error	3 times in succession insufficient vacuum for deaeration	A	<ul style="list-style-type: none"> Temperature in return branch higher than 70 °C Pump does not operate continuously Leakage in ENA 5 	<ul style="list-style-type: none"> Take steps for ensuring return temperatures below 70°C! Replace pump Locate leakage in ENA 5
15	evacuation time	Pressure not within working range at end of evacuation time	A	<ul style="list-style-type: none"> Pressure in deaeration tank has not yet been restored to system pressure level (working pressure range) 	<ul style="list-style-type: none"> Clean strainer at deaeration tank Is shut-off valve completely open?
16	Dryrun protection 1	Dry-running sensor supplies signal hazard of dry-running	B	<ul style="list-style-type: none"> System separation tank empty Cable not connected to sensor 	<ul style="list-style-type: none"> Check inlet flow Connect sensor
18	next maintenance	Next maintenance due	A	<ul style="list-style-type: none"> Maintenance date reached 	<ul style="list-style-type: none"> Carry out maintenance and enter „Maintenance done“ (Service menu)
19	voltage sensor	Sensor voltage too low	B	<ul style="list-style-type: none"> Printed circuit board defective 	<ul style="list-style-type: none"> Replace control unit
20	no date/time	RTC has no valid time information	A	<ul style="list-style-type: none"> Time setting has got lost after prolonged disconnection from power supply 	<ul style="list-style-type: none"> Enter time and date anew
21	flash error	Read error Flash	B	<ul style="list-style-type: none"> Hardware/software problem 	<ul style="list-style-type: none"> Get in contact with service department
22	flash error	Write error Flash	B	<ul style="list-style-type: none"> Hardware/software problem 	<ul style="list-style-type: none"> Get in contact with service department
23	flash error	Reprogramming error Flash	B	<ul style="list-style-type: none"> Hardware/software problem 	<ul style="list-style-type: none"> Get in contact with service department

A: Necessary, reset possible within normal use (control restarts after resetting).
 B: No duty, automatic reset within normal use.

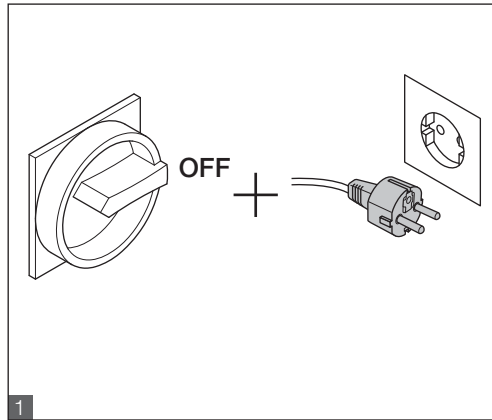


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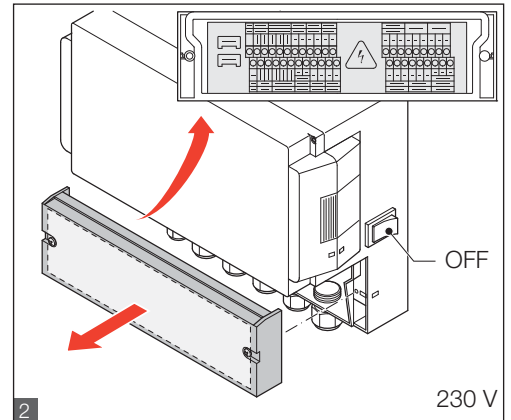
8 Disposal



Comply with local legislations.



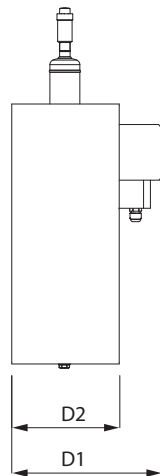
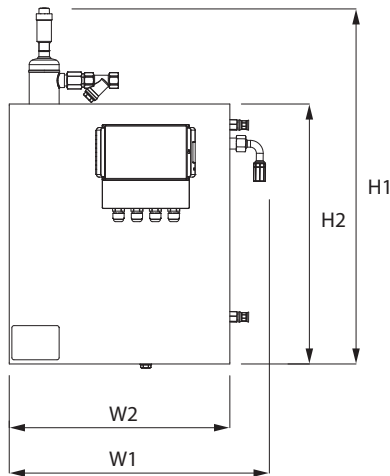
- Make sure the system power switch is OFF.
- Disconnect the power supply.



- Make sure the main power switch is OFF.
- Drain the water.



9 Technical specifications



Main dimensions (nominal)	
H1	700 mm
H2	495 mm
W1	490 mm
W2	420 mm
D1	320 mm
D2	215 mm

Nominal diameter	Maximum line length system installation
DN15	10 m
DN20	20 m
DN25	30 m

General	
Type of protection	IP 54
Weight	ca. 25 kg
System installation	G 1/2"
Feed joint at the impulse water counter	G 1/2"
Pipe joint drain/overflow	DN40
Volume system separation box	12 litre
System data	
Supply flow pressure	1 – 10 bar
System pressure	1 – 2,5 bar
Volume flow	ca. 18 Litres/h
Temperature range supply	> 0 °C – 70 °C (system port deaeration) (max. flow temperature 90 °C) > 0 °C – 30 °C (flow port drinking water)
Electrical data	
Supply voltage	230 V, 50 Hz
Power input	0,11 kW max.
Mains fuse	230 V, 10 A (slow)
Load capacity collective malfunction message	230 VAC, 3 A
Influencing variables	
Environmental temperature	> 0 °C – 40 °C during operation, -20 °C – 65 °C when transported and stored.
Relative humidity	< 80% during operation, when transported and stored -> non-condensing.