

Heaty Racun 100 Heaty Racun 300

Filling devices



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1

Introduction

1.1 The device

The Heaty Racun filling device is intended for initial filling of heating and cooling systems (without inhibitors) with water and for continuous water treatment in heating and cooling systems (without inhibitors) in the bypass process.

The device can also be used to perform the following tasks:

- Leak monitoring
- Magnetic filtering
- Conductivity monitoring.
- Pressure-regulated backfeed (optional)

Improper use of the device may result in safety hazards or personal injury and low quality process results.

Please read this operating manual carefully and take note of the information on safety, operation and maintenance.

1.2 Conditions of use

Please observe the following instructions to ensure that the device is used properly:

- Before commencing work, ensure that the heating or cooling system complies with the recognised state of the art.
- Observe the regulations governing construction, commissioning, design, and filling of heating and cooling systems.
- When filling heating and cooling systems, operate the device with a flow pressure in the drinking water pipe of at least 1.5 bar.
- During water treatment or initial filling of a heating or cooling system without a bypass process, fully demineralised water (DI water) may remove any existing deposits. Any damage this may cause is due to the deposits that were already present.
- Always flush and clean the heating and cooling systems according to DIN EN 14336 if you are not using the device with a bypass process.

- The manufacturer provides no guarantee that the reference values will be maintained if there are additives such as glycols, acids, and cleaners or bacteria in the system.
- For mobile use, completely empty all remaining water from the device after finishing work in order to avoid frost damage.
- The installer is responsible for keeping a system log in accordance with VDI 2035 and SWKI 97.

1.3 Target group

This operating manual is intended for those working with or on the device:

- Operating personnel
- Maintenance and service personnel

Target group qualifications

The target group for this operating manual must have at the least the following qualifications:



- Operating personnel: Instructed individual
An instructed individual is one who has been
 - informed,
 - trained as necessary, and
 - instructed on the necessary safety devices and protective measures with respect to the assigned tasks and the possible hazards associated with improper conduct.
- Maintenance and service personnel: Specialist
A specialist is someone whose professional education, knowledge, experience, and familiarity with the applicable regulations allows him to assess and perform assigned work and recognise potential hazards.

1.4 Conventions

Warnings and other information

The instructions in the operating manual are weighted differently and marked with a pictogram.

Warnings are structured as follows:

Symbol	Signal word	Meaning
	DANGER	Warning message <i>Imminent danger. This will result in death or serious injury.</i>
	WARNING	Warning message <i>Potentially dangerous situation. This may result in death or serious injury.</i>
	CAUTION	Warning message <i>Potentially dangerous situation. This may result in slight or minor injuries.</i>
	NOTICE	Note <i>Information that must be observed for optimum results and safe system operation.</i>

- **Signal word**
Indicates the severity of the danger.
- **Type and source of danger**
Describes the danger being warned against and where it may occur.
- **Cause and effect**
Describes the cause of the hazard or damage and its effects.
- **Remedy**
Describes how to prevent the hazard from occurring.

Example warning:



DANGER

Risk of injury from improper use

Improper use of the device may result in risks to personnel and property.

– Only use the device for its intended purpose as described below.

Instructions

Instructions are numbered consecutively to indicate the sequence of the individual steps. Results of actions (where applicable) are given directly below the instructions.

Example:

1 This is the first step.

2 This is the second step.

→ This is the result of the second step.

Operating and control elements

Operating elements, such as buttons and switches, as well as control elements, such as buttons on the operating panel, are highlighted in **bold**.

Example: The **emergency stop button** is located on the control cabinet.

1.5 Manufacturer's address

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91610 Insingen

GERMANY

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2

Safety information

The Heaty Racun device was designed and manufactured in compliance with applicable legal regulations and in accordance with recognised safety regulations. It complies with the state of the art at the time of initial commissioning.

Nevertheless, hazards may still arise for the operator, for other people, for the device itself, or for other property.



NOTICE

To ensure safe use of the device, observe the safety instructions in this section and the warnings in other sections of this operating manual.

2.1 General information

The device may only be operated and maintained by specialists who have received safety training.

Personnel involved in the commissioning, operation, maintenance, repair, dismantling and disposal of the device must have read and understood the operating manual and in particular the safety instructions.

The operating manual must be stored carefully and always be available to anyone who works with or on the device.

2.2 Intended use

In order to use the unit as intended, it is necessary to be familiar with the operating manual and to observe all of the instructions and maintenance and inspection regulations contained therein.

**DANGER****Risk of death or serious injury**

There are mechanical and electrical hazards when operating the device. To prevent injuries due to these hazards, you may only use the device as intended.

The intended use of the device is as follows:

For initial filling of heating systems and cooling systems (without inhibitors) with water and for continuous water treatment in heating systems and cooling systems (without inhibitors) in the bypass process. The following specifications also apply:

• Heating and cooling systems

The device is intended for heating and cooling systems (without inhibitors) in large residential complexes and industrial buildings. Various device models are available, which should be selected as appropriate depending on the size of the complex or building (see Section 8, "Technical data", on page 45).

• Other tasks

In addition to initial filling and treatment, the device can also be used to perform the following tasks:

- Leak monitoring
- Magnetic filtering
- Conductivity monitoring.
- Pressure-regulated backfeed (optional)

• Filling

The device may only be filled with Vadion pH Control mixed-bed resin.

• Operation

The device may only be operated and maintained by personnel who are sufficiently qualified and authorised.

• Safety devices

The device may only be operated if the safety devices are undamaged. Safety devices must be checked regularly to ensure that they are functioning correctly and in good condition.

• Maintenance and servicing

General inspection and cleaning work must be performed by instructed personnel. Maintenance, servicing, and repairwork may only be performed by qualified specialists.

2.3 Improper use

The device may only be operated as described in Section 2.2, “Intended use”, on page 10 and 11. Any other use may endanger personnel and property and is prohibited.

Improper uses include:

- Use for purposes other than the initial filling of heating and cooling systems (without inhibitors) with water and for continuous water treatment in heating and cooling systems (without inhibitors)
- Operation in explosive areas as defined by the ATEX Directive
- Operation when safety devices are faulty or missing
- Maintenance and servicing when safety devices are missing and no enhanced safety measures have been taken
- Operation by personnel with insufficient or no qualifications

2.4 Hazards during transport and installation

2.4.1 Transport

Hazards may arise during transport and installation of the device due to heavy and falling parts. To avoid this, observe the following safety instructions:

- Do not subject the device to bumps or shocks when transporting it.
- Use suitable means to secure the device against tipping and falling over when transporting it. Wait until the device has been set up before removing any transport safety devices.

2.4.2 Installation

The device may only be installed by authorized, trained specialists. Improper installation may result in personal injury. To avoid this, observe the following safety instructions:

- Wear suitable personal protective equipment during installation (see Section 2.6, "Personal protective equipment" on page 16).
- Do not place any heavy objects on the device.
- Set the device up on a level surface with sufficient load-bearing capacity.
- When connecting the device to the mains power supply, ensure that the mains voltage corresponds to the voltage shown on the type plate.
- The device should be connected to the mains power supply and earthed by trained personnel qualified in accordance with national regulations.
- Use a multipole switch with a contact distance of at least 3 mm between the contacts to connect the device to the power supply.
- Install a high-sensitivity differential switch (0.03 A) to provide additional protection against electric shock.
- Lay the cables and hoses so that there is no risk of tripping.
- If tripping hazards cannot be avoided, clearly mark such hazards.
- Carry out adjustments or simple repairs in coordination with the manufacturer.
- Do not make any changes or modifications to the device or to the water pipes or power cables.
- Set the device up in such a way that the motor of the circulating pump has sufficient ventilation.

2.5 Hazards during operation and maintenance

2.5.1 Mechanical hazards

The device has moving and heavy components, which may cause personal injury. To avoid this, observe the following safety instructions:

- Exercise caution when replacing heavy parts:
 - Wear suitable safety shoes.
 - Secure the device against tipping and slipping.
- Observe the relevant documentation provided by the manufacturers when carrying out maintenance work on components from external suppliers.
- Never reach into rotating or moving parts of the device when it is in operation.

2.5.2 Hazards from hot surfaces

Parts of the device heat up during operation. There is a risk of burns if you come into direct contact with hot surfaces. To avoid this, observe the following safety instructions:

- Do not touch hot pipes or the circulating pump housing. Wait until the device has been switched off and cools off.
- Wear suitable safety gloves if you need to touch or perform work on hot parts.

2.5.3 Electrical hazards

The device is powered by electricity. Contact with live components may result in serious injury or death. To avoid this, observe the following safety instructions:

Disconnect the main power supply before working on electrical equipment

- Unplug the main power supply before working on electrical equipment.
- Make sure that the power cable is fitted with a lockout/tagout device to provide protection when performing maintenance work.

Liquids

- Take care when handling liquids. Liquids which enter the system may cause short circuits or electric shock.

Connection data

- Observe the electrical connection data (see Section 8, “Technical data”, on page 45).

Covers on electrical components

- Do not open the covers while the device is switched on or in operation.
- Even if the device is switched off, do not remove the covers when work is being done on the cables or inspections are being performed.

2.5.4 Hazards when using the circulating pump

The device uses a circulating pump that poses various risks. Observe the following safety instructions to avoid property damage and injury:

- Only use the device as specified in the technical data (see Section 8, “Technical data” on page 45).
- Do not use the device to handle flammable or hazardous fluids.
- Do not leave the device unattended while it is in operation, or ensure that no unauthorised persons have access to the device.
- Before carrying out maintenance and servicing, switch the device off and unplug the power plug from the socket.
- Do not operate the device with closed ball valves at the device or cartridge inlet and outlet.
- Check the area around the device for leaks and wipe up any liquid that has leaked.
- Protect the circulating pump from environmental influences such as spray and dust.

2.5.5 Hazards from operating materials

The device contains mixed-bed resin that needs to be replaced regularly. Contact with the skin or eyes may cause irritation or even impaired vision. To avoid this, observe the following safety instructions:

- Observe the information in the safety data sheet.
- Wear suitable personal protective equipment to avoid contact of the resin with the skin and eyes while working:
 - Safety goggles
 - Safety gloves

2.6 Personal protective equipment

You must wear personal protective equipment in order to be able to work safely with the device. Information about the required personal protective equipment can be found in the list below and at the appropriate places in this manual.

The following personal protective equipment is necessary when working with the device:








- Safety gloves
- Safety goggles
- Safety shoes

2.7 Signs and warnings

Areas where a potential hazard exists under certain circumstances are marked with warnings and information signs.

- Do not remove the warnings and information signs.
- Replace damaged or missing warnings and information signs immediately.

The following warnings and information signs are located on the device:

Symbol	Meaning		
	Electrical voltage warning		Magnetic field warning
	Hot surfaces warning		Use hand protection
	Use foot protection		Use eye protection
	No access to people with pacemakers or implanted defibrillators		

3

Device description

The Heaty Racun filling device is intended for initial filling of heating and cooling systems (without inhibitors) with water and for continuous water treatment in heating and cooling systems (without inhibitors) in the bypass process.

The device can also be used to perform the following tasks:

- Leak monitoring
- Magnetic filtering
- Conductivity monitoring.
- Pressure-regulated backfeed (optional)

The device is intended for constant connection to a heating or cooling system and switches off automatically when treatment is complete or the set conductivity has been achieved.

The device is intended for use with heating or cooling systems in large residential complexes and industrial buildings. Various device models are available, designed for the following heating or cooling systems:

- Heaty Racun 100: for heating or cooling systems with a capacity of 10 - 60 m³
- Heaty Racun 300: for heating or cooling systems with a capacity of 60 - 200 m³



NOTICE

Device selection

The information on device selection is merely intended as a pre-selection aid; it does not represent any technical requirement or prerequisite. You can use a Heaty Racun 100 in a heating or cooling system with a capacity of 100 m³, for instance. In such cases, the mixed-bed resin would need to be changed more frequently.

The following section contains a description of the device, its components and operating elements.

3.1 The device at a glance

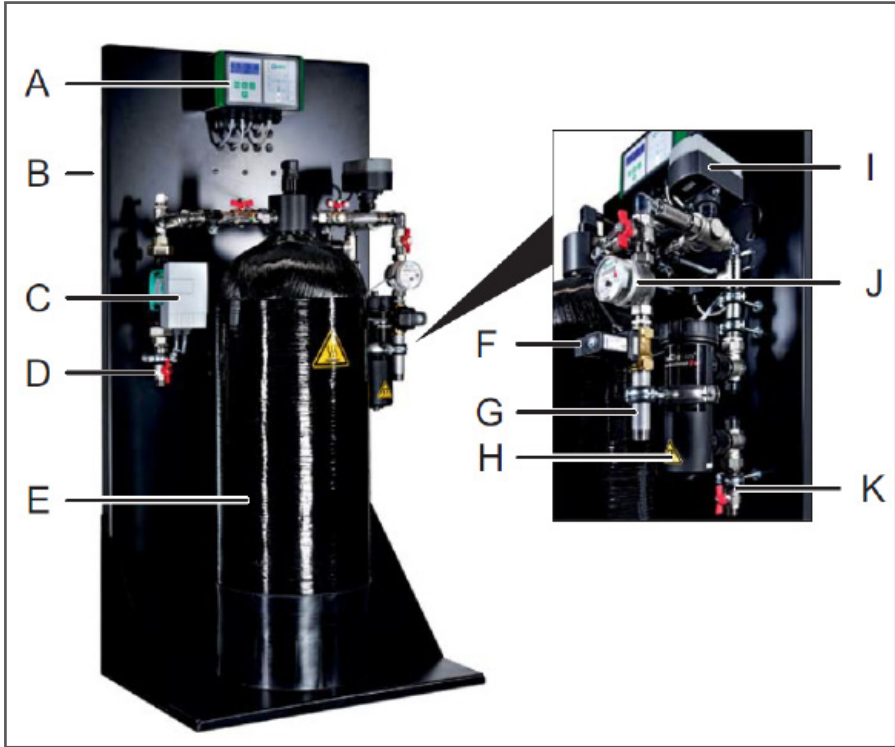


Image 3-1: Overview of Heaty Racun 300 components

- A Control unit
- B Power cable with power plug (covered on the back of the unit)
- C Circulating pump
- D Circulation water outlet
- E Cartridge
- F Solenoid valve
- G Filling/backfeed connection
- H Magnetic flux filter
- I Switch valve
- J Water metre
- K Circulation water inlet

The upper part of the device is arranged as follows:

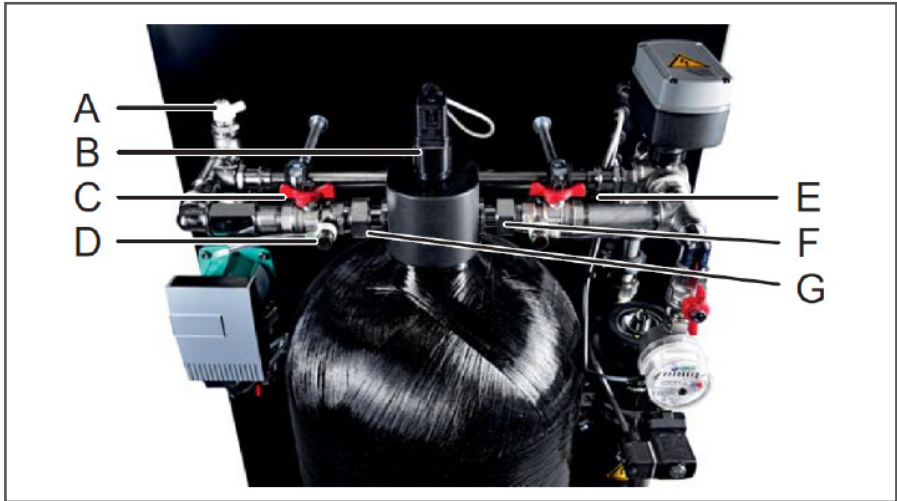


Image 3-2: Detailed view of the upper part (Heaty Racun 300)

- A Circulating pump vent (suction side)
- B LF2 probe
- C Cartridge shut-off valve (2)
- D Cartridges drain cock (2)
- E LF1 probe
- F Union nut, right
- G Union nut, left (with mesh gasket)



NOTICE

The Heaty Racun 100 and Heaty Racun 300 models are made of the same components. The two models differ in terms of their cartridge size, capacity and arrangement of the components.

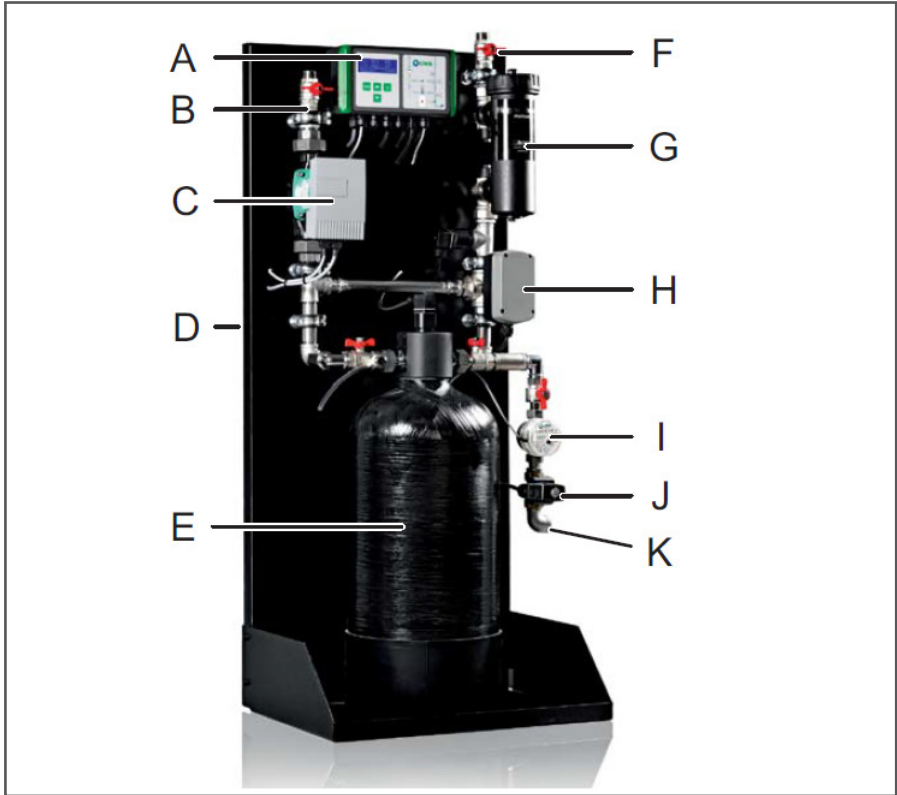


Image 3-3: Overview of Heaty Racun 100 components

- A Control unit
- B Circulation water outlet
- C Circulating pump
- D Power cable with power plug (covered on the back of the unit)
- E Cartridge
- F Circulation water inlet
- G Magnetic flux filter
- H Solenoid valve
- I Water metre
- J Switch valve
- K Filling/backfeed connection

3.2 Control unit

The control unit allows you to control the device. The control unit menus allow you to adjust the settings and enable or disable functions.

Further information can be found in Section 5.1, "Making adjustments to the control system", on page 30.

The control unit has the following components:



Image 3-4: Control unit components

- A Display for showing measurements and navigating through the control system menu
- B Flowchart with operating status display
- C Operating buttons

Control system menu

Use the operating buttons and the display to navigate through the control system menu and adjust settings or enable functions. The menu structure is as follows:

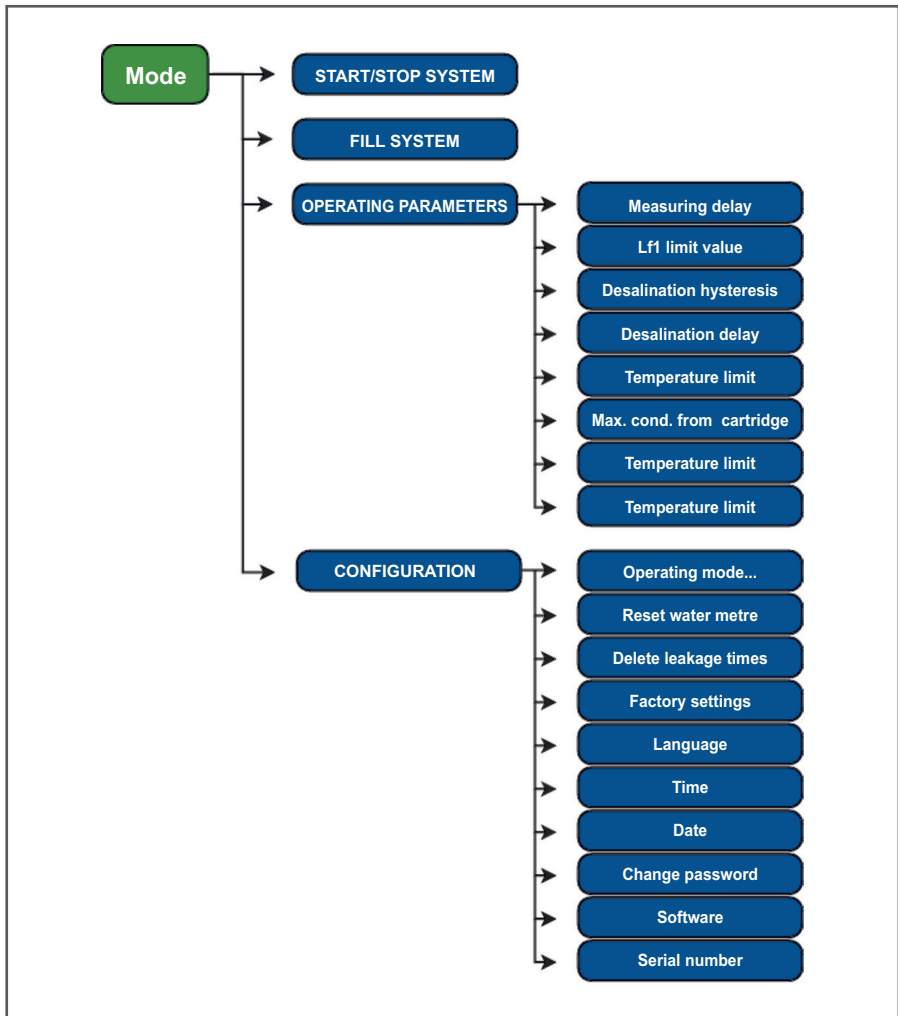


Image 3-5: Control system menu structure

Further information about individual functions and settings can be found in Section 5.1, "Making adjustments to the control system", on page 30.

Flowchart with status display

The flowchart with status display schematically represents the treatment process. The following status displays for monitoring the process are displayed at the appropriate points:

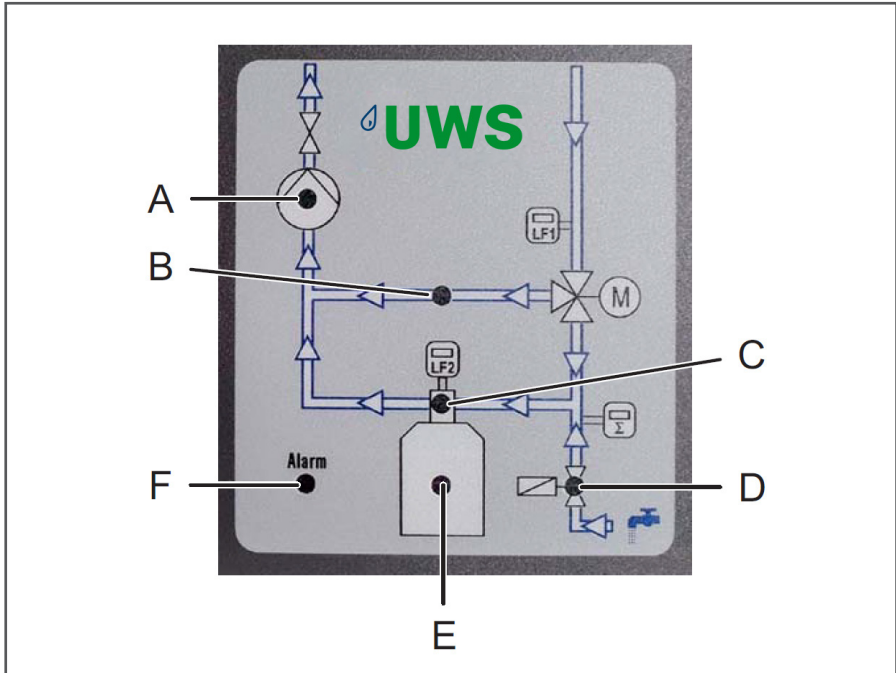


Image 3-6: Flowchart with status displays

- A "Pump on" indicator light
- B "Internal bypass active" indicator light
- C "Treatment active" indicator light
- D "Solenoid valve backfeed" indicator light
- E "Cartridge empty" indicator light
- F "Alarm" indicator light (cartridge empty, LF1/LF2 probe malfunction)

3.3 Circulating pump

The circulating pump pumps the water through the device. The line on the suction side of the circulating pump is fitted with ventilation.

3.4 Circulation water outlet

The heating or cooling system return line is connected to the circulation water outlet. The treated water is discharged from the device from the circulation water outlet into the heating or cooling system circuit.

3.5 Cartridge

The cartridge contains mixed-bed resin, in which water treatment takes place by means of chemical reactions until the mixed-bed resin's capacity is depleted. The cartridge can be flushed automatically at regular intervals to prevent it from contamination (see the "Cartridge protection" function in Section 5.1.3, "Operating parameters", on page 30).

Depending on the device model, the cartridge has the following capacities:



Image 3-7: Comparison of device models

A Heaty Racun 100 – cartridge capacity 23 l

B Heaty Racun 300 – cartridge capacity 63 l

3.6 Solenoid valve

The solenoid valve is closed when de-energised and switches off the drinking water supply during pressure-regulated backfeed if the set limit for maximum backfeed is exceeded.

3.7 Connecting filling/backfeed

The drinking water supply is connected to the filling/backfeed connection to fill the heating or cooling system.

3.8 Magnetic flux filter

The magnetic flux filter filters magnetic residues and coarse impurities such as iron oxide sludge out of the water. Further information about the magnetic flux filter can be found in Section 9.2, "Magnetic flux filter" on page 50.

3.9 Switch valve

The switch valve is driven by an electric motor-driven ball valve and switches the internal bypass depending on conductivity. If the LF1 probe detects a deviation from the set conductivity, the water is passed through the cartridge. Once the set conductivity is achieved, the switch valve switches over and the water only flows through the magnetic flux filter.

3.10 Circulation water inlet

The heating or cooling system return line is connected to the circulation water inlet. At the circulation water inlet, the water is fed out of the heating or cooling system circuit and through the device.

4

Transport, installation and commissioning

4.1 Transport

Use lifting equipment such as a crane or forklift truck to transport the device. The lifting equipment must be suitable, tested, and approved. Observe the following instructions when transporting the device:

- Use suitable means to secure the device against slipping and falling over.
- Only apply loads to the device at suitable points when transporting it.
- Remove the transport devices after transportation.

4.2 Installation and commissioning

Observe the following instructions to avoid damage to the device or personal injury during installation and commissioning:

- Installation and commissioning may only be performed by instructed specialists from a recognised sanitary, heating, and air-conditioning company, observing the necessary safety measures.
- Examine the device for transport damage and to ensure that it is complete before commencing installation. The scope of delivery includes:
 - The device as ordered, pre-assembled
 - Operating manual
 - Optional: Maintenance contract
 - Magnetic flux filter maintenance key
- Set the device up on a solid, level surface.
- Do not install the device in a location where there is a risk of frost.
- When selecting a location for the device, observe the required clearances needed to perform maintenance work (replacing the mixed-bed resin, cleaning the magnetic flux filter, etc.).
- Lay the cables and pipes so that they do not pose a tripping hazard. Mark any tripping hazards that cannot be avoided.
- Connect the device to the power supply properly, observing the electrical connection data (see Section 8, “Technical data”, on page 45).

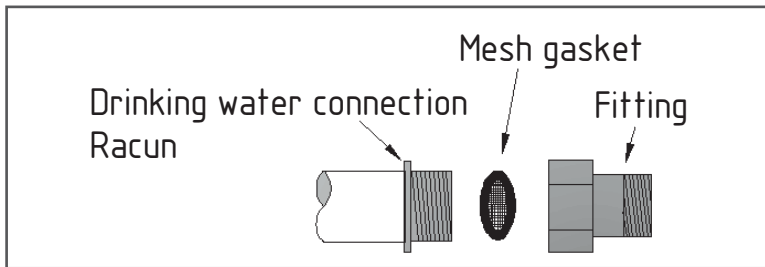
- If the device is to be connected to the building control system, the work must be done by a qualified electrician. Observe the terminal diagram (see Section 9.4, "Control system terminal diagram", on page 55).

The device is intended to be installed permanently in a heating or cooling system. Observe the following instructions during installation:

- Familiarise yourself with the specific design of the heating or cooling system before installing the device. Contact the manufacturer if you need assistance.
- Select the points for integrating the device into the heating or cooling system return so that they are far enough apart. Short circuits must be avoided.
- Install a 3/4" connection at each point in the heating or cooling system return line.
- Lay the pipes from the appropriate connections to the circulation water inlet and circulation water outlet of the device.



- Connect the filling/backfeed to the drinking water pipe. Use the mesh gasket provided to avoid switch valve malfunction:



- Use a filling combination from the manufacturer to connect to the drinking water pipe (see Section 6.4, "Replacement parts and accessories", on page 42).
- The temperature of the drinking water must exceed 25 °C and it must be free of suspended particles. Connect an upstream filter system if necessary.
- While filling the heating or cooling system, the flow pressure in the drinking water pipe must be at least 1.5 bar.
- The filling combination reduces the pressure to approx. 1 bar. Use a suitable pressure boosting system if the system pressure needs to be higher than the flow pressure in the drinking water pipe.
- Ensure that the installation work is performed properly and that the results comply with the relevant rules and regulations.

The figure below shows an example of the device connected in the bypass process:

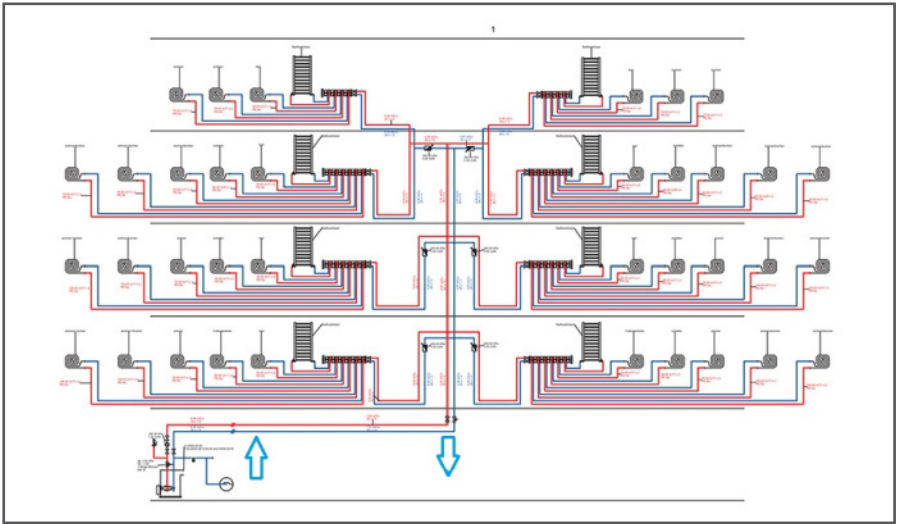


Image 4-8: Bypass process connection diagram

5

Operation

The following section provides information on how to operate the device.



NOTICE

Operating controls

The operating controls referred to in the text are explained in Section 3, "Device description" on page 17.

5.1 Adjusting control system settings

The control unit (see 3.2, "Control unit", on page 21) allows you to control the device. The control system menu allows you to adjust the following settings and enable and disable functions:

5.1.1 Starting/stopping the system

The Start/Stop function stops the device no matter what operating mode it is in.

5.1.2 Filling the system

The Fill function specifies one of the two filling parameters that cause the device to be switched off automatically when it is reached. The following filling parameters can be selected:

- Heating or cooling system volume (filling quantity in litres)
- Filling duration (time in minutes)

5.1.3 Operating parameters

Measuring delay

The Measuring delay function sets a measuring delay for long connections between the device and the heating or cooling system. This function allows for the quantity of water in a long pipe from the device to the system.

LF1 limit value

The LF1 limit value function specifies the conductivity limit between 30-500 μS .

Desalination hysteresis

The **Desalination hysteresis** function sets the tolerance for the LF1 limit value in the 1-95 μS range to prevent treatment from constantly stopping and starting.

Example: Given a set LF1 limit of 100 μS and a hysteresis of 20 μS , treatment is activated at a conductivity of 120 μS and deactivated again at 80 μS .

Desalination delay

The **Desalination delay** is dependent on cartridge size and is pre-set by the manufacturer.

Temperature limit

The Temperature limit function specifies a water temperature limit (no higher than 80 °C) at which the device is switched off.

Maximum conductivity from the cartridge

The **Maximum conductivity from the cartridge** function sets a limit for cartridge usage, controlling treatment. Recommendation: Factory setting of 60 μS

Maximum backfeed

The **Maximum backfeed** function sets a limit for backfeed in litres/week. Exceeding this limit can indicate a pipe break, leaks, or similar problems and results in the solenoid valve shutting off the backfeed. If the limit is exceeded, there will be an alarm on the flowchart with status display (see Section 3.2, "Control unit", on page 21), and the building control system will also be notified.

Cartridge protection

The **Cartridge protection** function activates or deactivates automatic cartridge flushing and sets the interval (1-30 days) for flushing.

5.1.4 Configuration

Operating mode

The **Operating mode** function toggles between continuous operation and normal operation.

Reset water metre

The Reset water metre function resets the internal water metre, and measurement is restarted.

Delete leakage times

The Delete leakage times function resets the internal maximum backfeed metre, and measurement is restarted.

Factory settings

The Factory settings function restores the default factory settings. All manual settings are lost.

Language

The Language function toggles the user interface language between English (EN) and German (DE).

Time

The Time function is used to set the system time.

Date

The Date function is used to set the system date.

Change password

The Change password function can be used to create or change a password to protect the settings.



NOTICE

Factory settings

Upon delivery, the device settings are not password-protected.

Software

The Software function displays the software version.

Serial number

The Serial number function displays the control system serial number.

5.2 Operating the device



NOTICE

Checking the heating or cooling system before initial filling

Before using the device to fill the heating or cooling system for the first time, perform the following steps:

- Rinse and clean the heating or cooling system according to DIN EN 14336 and log the rinsing and cleaning.
- Measure the raw water conductivity and hardness and enter the values in the system log.
- If the raw water has been softened, measure the conductivity and use the conversion tables to estimate the device capacity (see Section 9, “Other applicable documents”, on page 47).
- Note that using a water softening system can lead to increased drinking water conductivity.
- When filling a heating or cooling system, ensure that the flow pressure in the drinking water pipe is at least 1.5 bar. Failure to reach this flow pressure can have a negative impact on device capacity.
- The drinking water must be free of suspended particles. Connect an upstream filter system if necessary.
- Follow the instructions for reducing conductivity during operation.
- Ensure that a filling combination is installed on the device before it is connected to the filling/backfeed. Comply with the regulations issued by the responsible water utility.
- Using a backflow preventer can cause the pressure to drop by about 1 bar. Use a suitable pressure boosting system if the system pressure needs to be higher than the flow pressure in the drinking water pipe.

To operate the device, proceed as follows:

Requirements

- The device is installed properly as described in Section 4.2, “Installation and commissioning”, on page 26.
- The magnetic flux filter has been checked or cleaned as necessary (see Section 6, “Maintenance and servicing”, on page 37).

Method

- 1 Turn on the drinking water supply that is connected to filling/backfeed.



NOTICE

Flow rate and temperature

The flow rate through the device is limited by the integrated flow rate restrictor. You can turn the drinking water supply on full.

- 2 Plug the power plug into the socket.



NOTICE

Observe the electrical connection data (see Section 8, "Technical data", on page 45).

- 3 Use the control unit to make the desired adjustments to the control system:
 - Select the operating mode (continuous or normal operation – Operating mode function)
 - Specify the filling parameters (Fill system function)
 - Specify the desired conductivity (LF1 limit function)Adjust the other operating parameters as necessary.



NOTICE

Operating mode selection

The Operating mode function allows you to toggle between the following operating modes:

- Normal operation: Treatment is suspended when the set limit is reached; the device goes into standby mode once the conductivity has been constant for two hours
- Continuous operation: Continuous treatment (for heating or cooling systems with high magnetite or wet sludge content)

- 4 Ensure that the heating or cooling system temperature is no higher than 80 °C.
- 5 Ensure that the circulating pump vent is closed.
- 6 Open the valves on the heating or cooling system connections.
→ Part of the heating or cooling system flow now passes through the device.
- 7 Use the control unit's Start/Stop function to start the device.
→ The device begins to treat the circulation water.

The circulation water flows through the device and, as necessary, is passed through the cartridge. The measurements serve the following purposes:

- LF1 probe: Measures the conductivity before treatment in bypass
- LF2 probe: Measures the conductivity after the cartridge to monitor capacity

Device function in normal operation

If the conductivity is too high before treatment (LF1 probe), the switch valve switches to cartridge pass-through. If the set conductivity limit is reached, the switch valve switches to internal bypass. Water no longer flows through the cartridge. The LF1 probe continuously measures the conductivity. If there are any deviations, the switch valve switches back to cartridge pass-through until the set conductivity limit is reached.

If the conductivity remains constant for two hours, the device goes into standby mode.

In standby mode, the device checks the conductivity daily at a wake-up time that can be set. If there are any deviations, treatment is restarted.

Given pressure-regulated backfeed, the device records the backfed water quantity and stops backfeed when the maximum backfeed limit is reached.

5.3 Switching the device off in an emergency

To switch the device off in an emergency, proceed as follows:

- 1 Unplug the power plug from the socket.
→ The device is switched off.
- 2 Correct all issues that caused the device to be shut down.

To switch the device back on in an emergency, proceed as described in Section 5.2, "Operating the device", on page 33.

5.4 Switching the device off

To switch the device off after treatment has been completed, proceed as follows:

- 1 Use the control unit's Start/Stop function to stop the device.
- 2 Unplug the power plug from the socket.
- 3 Allow the device to cool down.
- 4 Close the valves on the heating or cooling system so that none of the flow passes through the device.
→ The device is now switched off.



Maintenance and servicing

To ensure trouble-free operation, the device must be kept in a clean, functional condition. Regular visual inspections and functional checks must be carried out in order to identify and repair any damage that may occur at an early stage.



WARNING

Risk of injury due to improper servicing

The device may only be maintained by specialists who have received safety training.

Perform the following steps before carrying out any maintenance and servicing work:

- Switch the device off.
- Disconnect the device from the power supply.
- Take appropriate measures to ensure that the device is not switched on again.
- Follow the safety instructions in the “Safety information” section on page 10.

6.1 Maintenance schedule



NOTICE

Varying intervals in continuous operation

If the device is in continuous operation, shorter maintenance intervals may be necessary. Agree the intervals with a specialist, taking the usage conditions into consideration.

The following table provides an overview of maintenance work that must be carried out regularly:

Interval	Activity	Responsibility
Before installation in a heating or cooling system	Check the magnetic flux filter and replace it (depending on the degree of contamination)	Operating personnel
	Check the suction lance nozzles for damage and clogging and clean or replace them as necessary	Operating personnel
	Check the flow restrictor for clogging	Operating personnel
Monthly	Check the pipes for leaks and replace them if necessary	Operating personnel
Six-monthly	Check the fastening and stability of the device as well as the welded and screwed connections	Operating personnel
Annually	Check the warnings and markings on the device	Operating personnel
	Check the mesh gasket (left union nut) and replace it if necessary	Operating personnel
During the annual inspection, please do the following:	Check the conductivity probes for contamination and clean them if necessary.	Technician

6.2 Maintenance work

6.2.1 Replacing the mixed-bed resin



NOTICE

Performing the replacement

For the Heaty Racun 100, we recommend that the mixed-bed resin should be replaced by the operator's staff.

For the Heaty Racun 300, we recommend that the mixed-bed resin should be replaced by the manufacturer's service personnel. Cartridges can be obtained on loan from the manufacturer (including delivery and collection service) upon request.



NOTICE

Handling mixed-bed resin

When handling mixed-bed resin, observe the following:

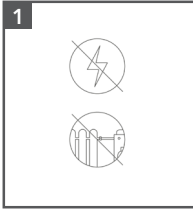
- Do not store the mixed-bed resin in an open container, since this can reduce its capacity.
- Use the refill pack's outer packaging to dispose of the depleted mixed-bed resin.
- Replace the mixed-bed resin over a drain so that the water that separates from the depleted mixed-bed resin can run off.
 - Wear suitable personal protective equipment (gloves, safety goggles).

Once the mixed-bed resin is depleted, proceed as follows:

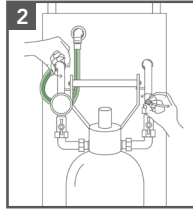


NOTICE

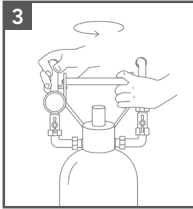
The resin can be replaced anywhere, meaning that filling can continue immediately.



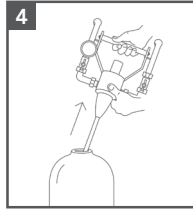
1. Ensure that the device is switched off and disconnected from the power supply and the heating or cooling system.



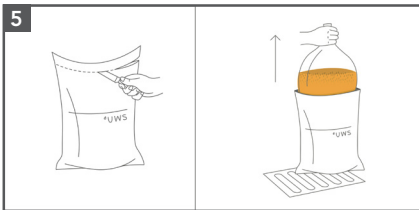
2. Remove the hoses from the device and open all valves to empty the device.



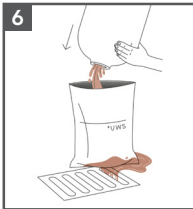
3. Use the grip to turn the three-axis head anti-clockwise, loosening it.



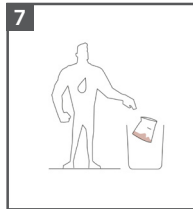
4. Pull the three-axis head with the suction lance out of the composite container.



5. Remove the refill pack with mixed-bed resin from the outer packaging and place the outer packaging over a drain.



6. Empty the depleted mixed-bed resin from the composite container into the outer packaging.

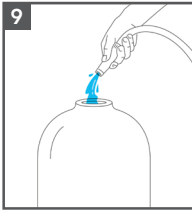


7. Dispose of the mixed-bed resin and empty the rest of the water into a drain.

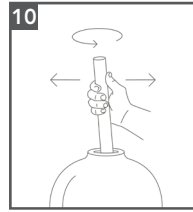
► The depleted mixed-bed resin is held back by the outer packaging while the water flows into the drain.



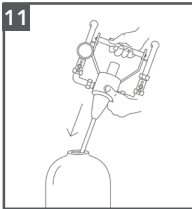
8. Open the refill pack of mixed-bed resin and use a funnel to pour it into the composite container. Shake or swirl the composite container as necessary to help the mixed-bed resin settle.



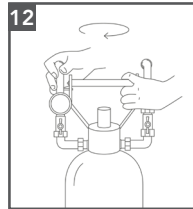
9. Fill the composite container with water to about 2 cm below the threads.



10. Mix the mixed-bed resin with a tube or other suitable tool so that the three-axis head with the suction lance can be inserted more easily.



11. Re-insert the three-axis head with the suction lance into the composite container.



12. Tighten the three-axis head finger-tight by turning it clockwise.



Video instructions for resin replacement

► Replacement of the mixed-bed resin has now been completed and the filling device is ready to operate at full capacity again.



NOTICE
Close the packaging

Storing resin in an open container greatly reduces its capacity!



NOTICE
Checking the mesh gasket

Replacing mixed-bed resin is a good opportunity to check the mesh gasket. To check the mesh gasket, loosen the left union nut from the head with the suction lance. Replace the mesh gasket if necessary.

6.2.2 Cleaning the magnetic flux filter

Detailed instructions on cleaning the magnetic flux filter can be found in Section 9.2, "Magnetic flux filter" on page 50.

6.3 Regular in-house inspection

Certain parts of the device must also be checked and maintained at regular intervals:

- Circulating pump

The operator must coordinate the inspection dates.

6.4 Replacement parts and accessories

The following replacement parts for the device are available from the manufacturer:

Part No.	Designation	Part No.	Designation
100012	Three-axis head for the cartridge	100012-10	Three-axis head seal
100013-10	Cartridge foot	100013-12	Suction lance with nozzle
100041	Funnel	101016	Heaty 100 HW cartridge without three-axis head
120515	1" mesh gasket		



NOTICE

Manufacturer service

Other components are usually connected firmly to the device, and must not be replaced by the customer. If there are faults or malfunctions, contact the manufacturer's customer service.

The following replacement parts for the device are available from the manufacturer:

Part No.	Designation	Part No.	Designation
100055	Vadion pH Control mixed-bed resin refill pack: – 1× 23 l for Heaty Racun 100 – 3× 23 l for Heaty Racun 300	100047-1	"PROFI" measuring kit
300900	1/2" UWS filling combination including backflow preventer		

7

Dismantling and disposal**CAUTION**

The device may be dismantled only by authorized, qualified personnel who are familiar with the risks.

**NOTICE****Regulations and laws**

Comply with the local regulations and laws for disposal of environmentally harmful substances.

- The device may only be dismantled by authorized specialists.
- Observe the safety information in Section 2, "Safety information", on page 10 of the operating manual.
- Do not touch any live components.
- Wear suitable personal protective equipment.
- Only use suitable and tested lifting equipment.

Injuries may be caused by:

- Live components
- Heavy components falling after being detached
- Sharp edges

7.1 Specialists

The specialists must take the following points into consideration:

- Adhere to the safety instructions in this operating manual.
- Wear suitable personal protective equipment.
- Only use suitable and tested lifting equipment.
- Use suitable means of transport and keep transport routes clear.
- Before starting work, switch the device off and disconnect it from the power supply.

7.2 Dismantling

To dismantle the device, proceed as follows:

- 1 Switch the device off and disconnect the power supply from the mains as described in Section 5.4, "Switching the device off", on page 36.
- 2 Discharge any energy storage systems such as springs or capacitors.
- 3 Ensure any residual pressure has been released by opening the drain cocks.
- 4 Disconnect the device's pipe from the heating or cooling system.
- 5 Empty the remaining liquid into a drain.
- 6 If you intend to decommission the device or put it into storage, empty it completely.
- 7 If you intend to dispose of the device, use suitable tools to dismantle it into its constituent parts.

7.3 Disposal

Dispose of assemblies and operating materials in a proper and environmentally-friendly manner, in compliance with with the applicable legal and operational regulations.



Technical data

This section contains general technical data about the device and describes its uses and components.

8.1 General data

Part No.	Heaty Racun 100	Heaty Racun 300
Item No.	100471-SL	100473-SL
Height × Width × Depth (approximate)	1,230 × 520 × 410 mm	1,410 × 710 × 500 mm
Weight (without mixed-bed resin)	approx. 40 kg	approx. 62 kg
Recommended system volume	10-60 m ³	60-200 m ³
Power supply	230 V – 50/60 Hz	230 V – 50/60 Hz
Maximum operating pressure	6 bar	6 bar
Maximum operating temperature	80 °C	80 °C
Drinking water pipe flow pressure	1.5-6 bar	1.5-6 bar
Maximum filling rate for direct filling	1,200 l/h	2,400 l/h
Average filling rate for the bypass process	approx. 800 l/h	approx. 2,000 l/h
Filling capacity Composite container	23 l	63 l
Capacity at 420 µS/cm for <100	3,420 l	9,360 l

8.2 Components

8.2.1 Magnetic flux filter

Manufacturer	ADEY Professional Heating Solutions, Cheltenham (UK)
Model	MagnaClean® Professional 2XP
Maximum flow rate	80 l/min
Absorption capacity (approximate)	500 g
Maximum operating pressure	6 bar
Maximum operating temperature	80 °C

Further information about the magnetic flux filter can be found in Section 9.2, “Magnetic flux filter” on page 50.

8.2.2 Circulating pump

Manufacturer	WILO SE, Dortmund
Model	Stratos PARA
Power supply	230 V – 50/60 Hz



Other applicable documents

This operating manual is valid together with the following documents:

- Vadion pH-Control safety data sheet
- Capacity calculator for the filling device, see manufacturer's website:
<http://heaty.de/services/berechnungstool/>
- Measurements and conversion tables,
see 9.1, "Measurements and conversion tables" on page 47
- For information about the magnetic flux filter,
see 9.2, "Magnetic flux filter", on page 50.
- For the switch valve quick reference guide,
see 9.3, "Switch valve quick reference guide" on page 53
- For the control system terminal diagram,
see "9.4 Control system terminal diagram" on page 55
- For the probe terminal diagram,
see "9.5 LF1/LF2 probe terminal diagram" on page 55

9.1 Measurements and conversion tables

9.1.1 Corrosion rate

Oxygen, acids, and dissolved salt cause corrosion to the heating or cooling system. The rate of corrosion depends on the quantity of the substances dissolved in the water, and this can be determined from the conductivity.

The following reference values can be used to estimate the corrosion rate on the basis of the conductivity, :

Conductivity [$\mu\text{S}/\text{cm}$]	Corrosion rate
0-100	Inhibited
100-350	Very slow
350-500	Slow
500-1,000	Accelerated
1,000-2,000	Greatly accelerated
> 2,000	Extremely accelerated

9.1.2 Lime content and water hardness

Conductivity measurements can be used to roughly estimate the lime content and water hardness. The following table shows the relationships:

Conductivity [$\mu\text{S}/\text{cm}$]	Lime content [$\text{g}/1,000 \text{ l}$]	Water hardness allocation
<100	<35	Desalinated
100	50	Very soft
200-300	100-150	Soft
400-500	200-250	Moderately hard
600-800	300-400	Hard
900-1,000	450-500	Very hard

The following table can be used to determine the water hardness precisely:



NOTICE

This conversion can only be used if the water has not been softened and contains no chemical additives. Softened water requires measurement using the hardening drop procedure. Hand-held measuring devices do not provide reliable values for softened water.

Conductivity [$\mu\text{S}/\text{cm}$]	Hardness [dGH]	Hardness [$^{\circ}\text{fH}$]	Lime content [g/1,000 l]	Conductivity [$\mu\text{S}/\text{cm}$]	Hardness [dGH]	Hardness [$^{\circ}\text{fH}$]	Lime content [g/1,000 l]
<100	<1	<2	<35	1,120	32	57	560
105	2	5	53	1,155	33	59	578
140	4	7	70	1,190	34	61	595
175	5	9	88	1,225	35	62	613
210	6	11	105	1,260	36	64	630
245	7	12	123	1,295	37	66	648
280	8	14	140	1,330	38	68	665
315	9	16	158	1,365	39	69	683
350	10	18	175	1,400	40	71	700
385	11	20	193	1,435	41	73	718
420	12	21	210	1,470	42	75	735
455	13	23	228	1,505	43	77	753
490	14	25	245	1,540	44	78	770
525	15	27	263	1,575	45	80	788
560	16	28	280	1,610	46	82	805
595	17	30	298	1,645	47	84	823
630	18	32	315	1,680	48	85	840
665	19	34	333	1,715	49	87	858
700	20	36	350	1,750	50	89	875
735	21	37	368	1,785	51	91	893
770	22	39	385	1,820	52	93	910
805	23	41	403	1,855	53	94	928
840	24	43	420	1,890	54	96	945
875	25	45	438	1,925	55	98	963
910	26	46	455	0.1960	56	100	980
945	27	48	473	1,995	57	10	998
980	28	50	490	2,030	58	103	1,015
1,015	29	52	508	2,065	59	105	1,033
1,050	30	53	525	2,100	60	107	1,050
1,085	31	55	543	2,100	60	107	1,050

9.2 Magnetic flux filter

This section contains figures and the characteristic curve for the magnetic flux filter installed in the device.

9.2.1 Drawings

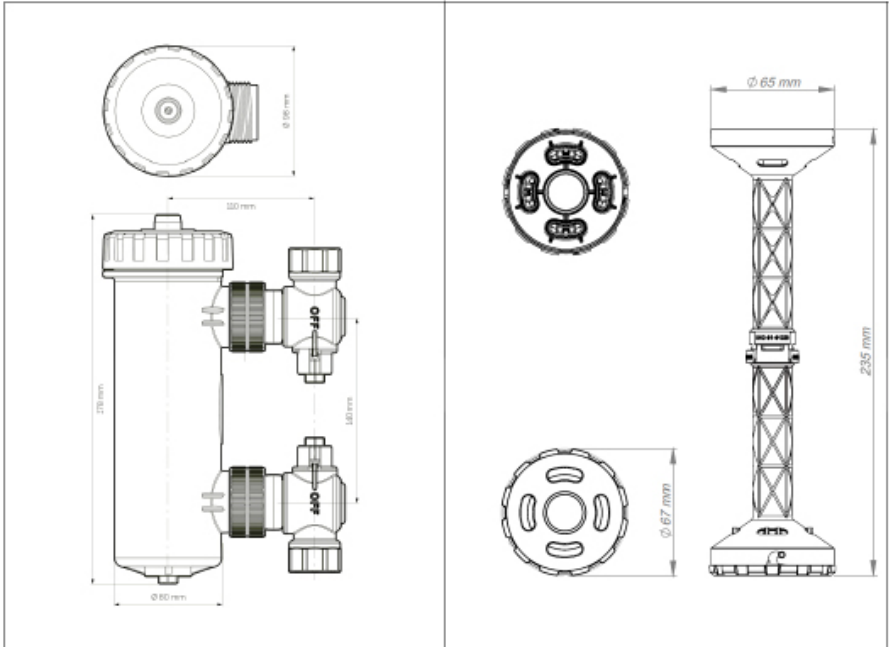


Image 9-9: View of magnetic flux filter with inlet and drain valve

Image 9-10: Magnetic flux filter interior view

9.2.2 Characteristic curve

The magnetic flux filter's flow resistance diagram shows the following characteristic curve:

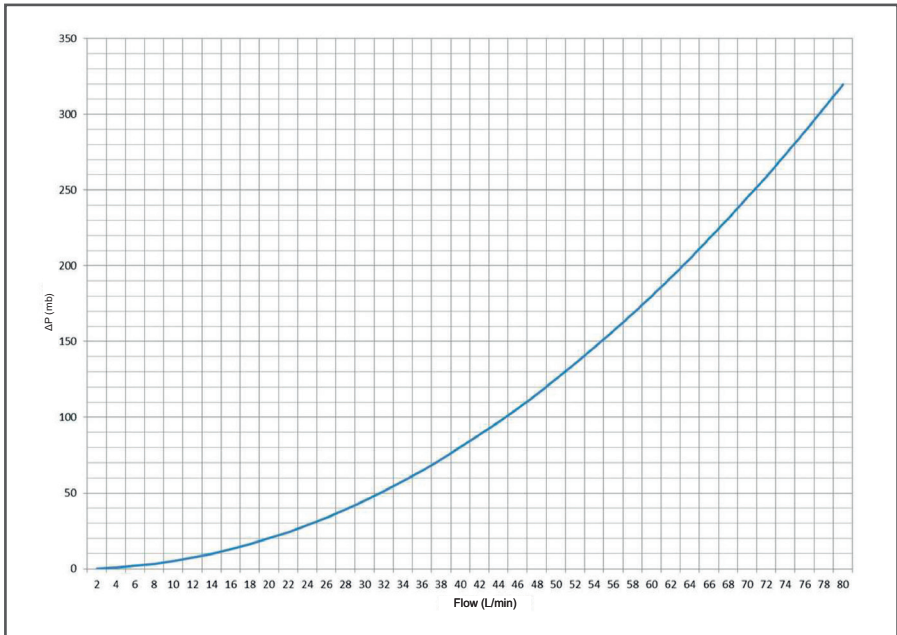
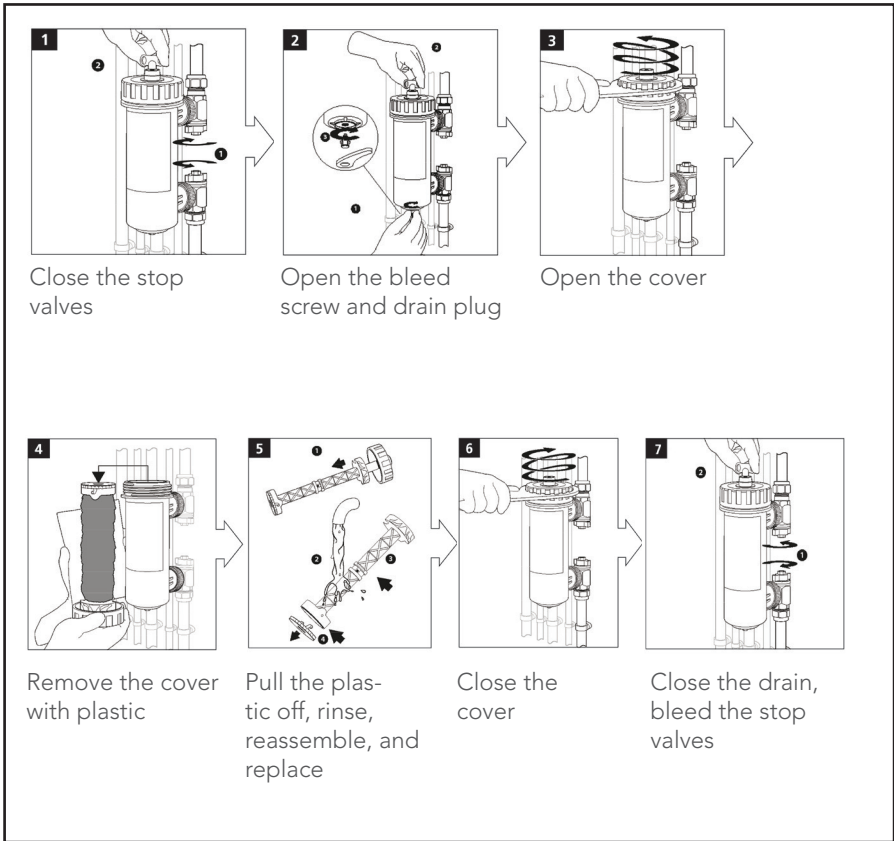


Image 9-11: Magnetic flux filter characteristic curve

9.2.3 Cleaning

To clean the magnetic flux filter, proceed as follows:



9.3 Switch valve quick reference guide

GB ELECTRIC MOTOR ACTUATED BALL VALVE
D KUGELHAHN MIT ELEKTROMOTORISCHEM ANTRIEB
 EMV 110..
 SERIES 830

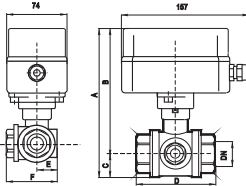


FIRST®

INSTALLATION INSTRUCTION AND USER'S MANUAL
 MONTAGEANWEISUNG UND BEDIENUNGSANLEITUNG

Installation should be carried out only by a qualified person!
 Die Montage darf nur vom Fachmann ausgeführt werden!

**DIMENSIONS
 ABMESSUNGEN**



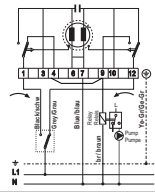
G	DN	A	B	C	D	E	F	kv	Δ
3/4"	20	164	38	24	83	39	73	5.5	1.7
1"	25	172	44	27	114	51	89	8.2	2.4

Actuators can not be connected in parallel!
 Antriebe können nicht parallel angeschlossen werden!

Output signal-phase / Ausgangssignal-Phase:
 max 1(1A, 230V~, 50Hz
 To control the pump use a relay!
 Für Pumpe Steuerung der Relais zu verwenden!

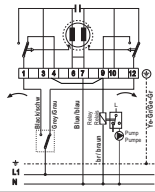
**ELECTRICAL CONNECTION
 ELEKTRISCHER ANSCHLUSS**

EMV110..590 - 25ø/90°

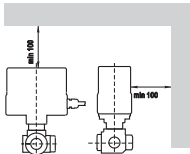


*** EMV110..570 - 50ø/180°**

OPTIONAL VERSION / SONDER VERSION



**BUILD-IN ROOM
 EINBAURAU**

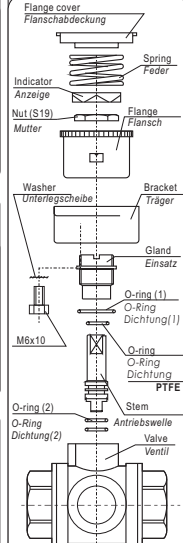


**TECHNICAL DATA
 TECHNISCHE DATEN**

Main connection Nennspannung 230 V, 50 Hz
 Option: 24 V, 50 Hz
 Power consumption Nennleistung 3.5 W max
 Rotation time Rotationszeit 25ø/90°, 50ø/180°
 Microswitch rating Belastung der Mikroschalter 1(1)A, 250 VAC
 Actuator protection class Antriebsschutzart IP 55
 Terminals Anschlussklemmen 0.5 ... 1 mm²
 Cable length Kabellänge 1500 mm
 Ambient temperature Umgebungstemperatur 0 °C... 55 °C
 Humidity Luftfeuchtigkeit RH0% - 80% NON CONDESED
 Fluid temperature Temperatur des Mediums 0 °C... 110°C max

Fluids and gases (water, nonagressive media) up to 16 bar.
 Flüssige und gasförmige Medien (Wasser, nicht aggressive Medien) bis zu 16 bar.

**INDEXING BRACKET
 EINSTELLBARER TRÄGER**

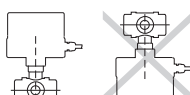


**BUILD-IN POSITION
 EINBAULAGE**

PRIORITY / VORRANGIGE EINBAULAGE

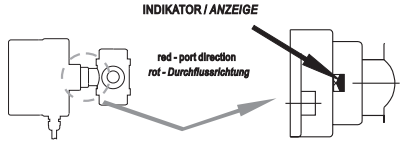


ALLOWED / MÖGLICHE LAGE
 NOT ALLOWED / UNERLAUBTE LAGE!



Nur für Verwendung in Innenräumen!
 For indoor use only!

**POSITION VALVE INDICATOR
 ZEIGER DER VENTILLAGE**



**MANUAL OPERATION
 HANDSTEUERUNG**

1. Depress the actuator towards the valve
 Den Antrieb in Richtung des Kugelhahns drücken
2. Rotate the actuator
 Den Antrieb drehen
3. The spring returns and snaps the actuator
 Die Druckfeder bringt den Antrieb wieder zurück und schnappt in die eingestellte Lage

FOR AUTOMATIC MOTOR OPERATION, RETURN THE ACTUATOR INTO ITS ORIGINAL POSITION!
 NACH HANDSTEUERUNG BRINGEN SIE DEN ANTRIEB IN DIE ANFANGSLAGE ZURÜCK!

O-rings / O-Ring Dichtungen		
	1/2"	3/4" & 1"
1	14x1.78	15.8x1.78
2	8.73x1.78	9.25x1.78
Material: VITON (FPM)		

CEB-3314-EMV110na-170323_v2.ecp

FIRST d.o.o., Koroška cesta 56, SI-3320 Velenje, Slovenija
 tel. +386 3 898 35 00, fax. +386 3 898 35 35, e-mail: info@first.si, http://www.first.si

Image 9-12: Switch valve quick reference guide, page 1

FLOW SCHEMES DURCHFLUSS RICHTUNGEN

1.) STANDARD VERSION EMV 110 830/590

MAN - manual operation
handbetrieb

0°

AUTO - 25s/90°

90°

**FACTORY DEFAULT
FABRIKEINSTELLUNG**

**2.) OPTIONAL VERSION: EMV 110 830/570 - BY SPECIAL REQUEST
SONDER VERSION: EMV 110 830/570 - AUF ANFRAGE!**

MAN - manual operating
handbetrieb

0°

AUTO - 50s/180°

180°

Markings on the valve axis
Bezeichnung auf der Spindel

Position of the actuator
Antriebslage

Ball valve
Kugelhahn

Markings of flow
Durchflussrichtung Bezeichnung
RED/ROT: open/Offen
BLUE/BLAU: close/Geschlossen

**HYDRAULIC INSTALLATION: recommended installation of the electric actuated ball valve
SCHEMA DER MASCHINENINSTALLATION: Empfohlener Einbau des Kugelhahnes mit Elektromotorantrieb**

flow direction
Durchflussrichtung

1 manual stop valve /
Manuelle Absperrvorrichtung

2 strainer with the mesh width 0,65 mm /
Reinigungsfilter Y (für detaillierte
Informationen bitte rufen Sie uns an
lieferbar in Abmessungen von 1¼" bis 2"

3 motor actuated ball valve series
EMV 110...
Elektromotorantrieb mit Kugelventil
EMV 110...

IMPORTANT!
To extend the long term performance of the motorised ball valve it is recommended that a strainer is situated prior to the valve. By installation must be observed to according to relevant local standards.

WICHTIG!
Um die Lebensdauer des Ventils zu erhöhen und Beschädigung der Dichtungen durch mechanische Teile in der Installation zu verhindern, wird der Einbau eines Reinigungsfilters empfohlen. Die einschlägigen VDE+TUV - Vorschriften sind zu beachten.

RELAY MODULE BUILD-IN INSTRUCTION (ONLY FOR 230 V, 50 Hz) / RELAIS-EINBAU (NUR FÜR 230 V, 50 Hz)

RELAY MODULE RM 24 / RELAIS MODUL RM 24

- Unscrew cover screws
Die Schrauben des Antriebdeckel herausdrehen
- Disconnect connection cord
Anschlusskabel abklemmen
- Insert a relay module
Relais Modul einsetzen
- Connect a relay module according to scheme
Relais Modul anschliessen
- Return the cover
Abdeckung anschrauben

Code Nr. / Art. Nr: 10024 - 230 VAC
100049 - 24 VAC

ELECTRICAL CONNECTION / ELEKTRISCHER ANSCHLUSS

different directions of rotation
unterschiedliche Drehrichtungen

EMV 110.290	EMV 110.270

Output signal-phase /
Ausgangssignal-Phase:
max 1(A), 230V~, 50Hz
To control the pump use a relay! /
Für Pumps Steuerung der Relais
zu verwenden!

Actuators can be connected in
parallel / Antriebe können
parallel angeschlossen werden!

Data subject to change without notice. / Technische Änderungen vorbehalten.

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EC Declaration of Conformity, Heaty Racun 100



EC Declaration of Conformity

in accordance with Annex II A of Directive 2006/42/EC of 17 May 2006 on machinery

We hereby declare that the following machine, by virtue of its design and construction and in the configuration placed on the market by us, satisfies the basic health and safety requirements of Directive 2006/42/EC.

This declaration loses its validity upon modification of the machine without our prior consent.

Manufacturer:

UWS Technologie Hans-Georg Breitmoser
Sudetenstraße 6
91610 Innsingen / GERMANY
Phone: +49 (0) 9869 919100
Email: info@heaty.de

Description of the machine:

- Purpose: Hot water filling device
- Model: Heaty Racun 100
- Article No.: 100471-SL
- Mass: 46 kg
- Year of manufacture: 2018
- Power supply: 230 V, 0.5 kW, 50/60 Hz

We furthermore declare conformity with the following directives/provisions, which are also applicable to the product:

- EMC Directive (2014/30/EU) of 26 February 2014
- RoHS Directive (2011/65/EU) of 8 June 2011
- Low Voltage Directive (2014/35/EU) of 26 February 2014

The following harmonised standards have been applied:

- DIN EN ISO 12100 Safety of machinery – General principles for design. Risk assessment and risk reduction
- DIN EN 349 Safety of machinery - Minimum gaps to avoid crushing of parts of the human body
- DIN EN 809 Pumps and pump units for liquids – Common safety requirements
- DIN EN 1037 Safety of machinery – Prevention of unexpected start-up
- DIN EN ISO 13849-1 Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design
- DIN EN ISO 13857 Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs
- DIN EN ISO 14120 Safety of machinery – Guards – General requirements for the design and construction of fixed and movable guards
- DIN EN 60335-1 Household and similar electrical appliances – Safety. Part 1: General requirements

Authorised representative for the compilation of the technical documentation:

Steffen Breitmoser, see manufacturer's address

Signed in on .../.../...:

Authorised signatory:
Hans-Georg Breitmoser, CEO

Signature:

EC Declaration of Conformity, Heaty Racun 300



EC Declaration of Conformity

in accordance with Annex II A of Directive 2006/42/EC of 17 May 2006 on machinery

We hereby declare that the following machine, by virtue of its design and construction and in the configuration placed on the market by us, satisfies the basic health and safety requirements of Directive 2006/42/EC.

This declaration loses its validity upon modification of the machine without our prior consent.

Manufacturer:

UWS Technologie Hans-Georg Breitmoser
Sudetenstraße 6
91610 Innsingen / GERMANY
Phone: +49 (0) 9869 919100
Email: info@heaty.de

Description of the machine:

- Purpose: Hot water filling device
- Model: Heaty Racun 300
- Article No.: 100473-SL
- Mass: 80 kg
- Year of manufacture: 2018
- Power supply: 230 V, 0.5 kW, 50/60 Hz

We furthermore declare conformity with the following directives/provisions, which are also applicable to the product:

- EMC Directive (2014/30/EU) of 26 February 2014
- RoHS Directive (2011/65/EU) of 8 June 2011
- Low Voltage Directive (2014/35/EU) of 26 February 2014

The following harmonised standards have been applied:

- DIN EN ISO 12100 Safety of machinery – General principles for design. Risk assessment and risk reduction
- DIN EN 349 Safety of machinery - Minimum gaps to avoid crushing of parts of the human body
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Authorised representative for the compilation of the technical documentation:

Steffen Breitmoser, see manufacturer's address

Signed in on .../.../...:

Authorised signatory:

Hans-Georg Breitmoser, CEO

Signature:

our water. safe.

Contact:

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