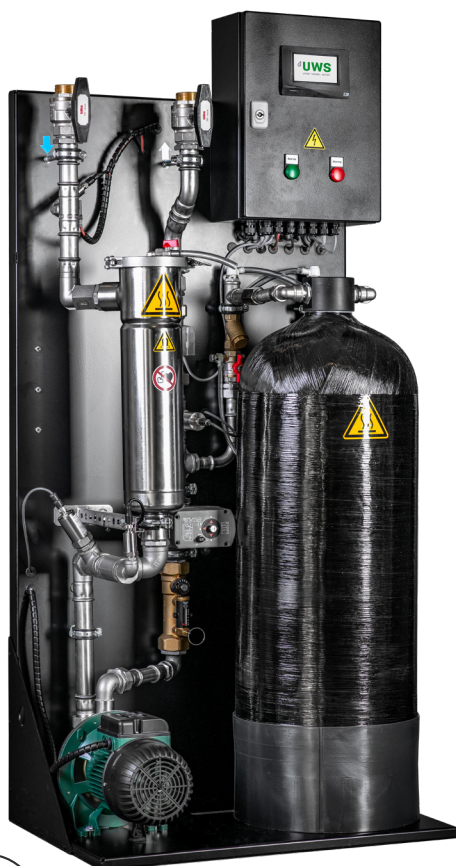


Heaty Racun 300 Advanced Plus

water treatment for heating and cooling circuits
for permanent installation



இ
ஐ
ஒ
ஊ
×

1	Introduction	6
1.1	The device	6
1.2	Terms of Use	6
1.3	Target group	7
1.4	Conventions	8
1.5	Manufacturer address	9
2	Safety instructions	10
2.1	General instructions	10
2.2	Intended Use	10
2.3	Improper use	12
2.4	Dangers during transport and installation	12
2.4.1	Transportation	12
2.4.2	Installation	12
2.5	Dangers during operation and maintenance	13
2.5.1	Mechanical hazards	13
2.5.2	Dangers from hot surfaces	14
2.5.3	Dangers from electricity	14
2.5.4	Dangers when handling the circulation pump	15
2.5.5	Dangers from operating materials	15
2.6	Personal protective equipment	16
2.7	Warning and information signs	16
3	Device description	17
3.1	The device at a glance	18
3.2	Circulation water inlet	20
3.3	Differential pressure detection	20
3.4	MAGella twister	20
3.5	Recirculation pump	20
3.6	Outlet circulating water	20
3.7	Touch display	20
3.8	Cartridge	22
3.9	Dual filter	22
3.10	Switching valve	23
3.11	Adjustable volume flow meter	23

3.12	Output filter cartridge	25
3.13	Magnetic valve	25
3.14	Connection filling/refilling	25
4	Transport, installation and commissioning	26
4.1	Transportation	26
4.2	Installation and commissioning	26
5	Operation	30
5.1	Make settings in the control system	30
5.1.1	Start system	30
5.1.2	Filling the system	31
5.1.3	Settings	34
5.1.4	Configuration	35
5.2	Operate the device	43
5.3	Turn off the device in an emergency	46
5.4	Turn off the device	46
6	Maintenance and repair	47
6.1	Maintenance schedule	47
6.2	Maintenance work	49
6.2.1	Changing the mixed bed resin	49
6.2.2	Cleaning the MAGella twister	51
6.2.3	Changing the dual filter	51
6.3	Regular internal audit	52
6.4	Spare parts and accessories	52
7	Dismantling and disposal	53
7.1	Specialist personnel	53
7.2	Removal	54
7.3	Disposal	54
8	Technical data	55
8.1	General data	55
8.2	Components	56
8.2.1	MAGella twister	56
8.2.2	Recirculation pump	56

9	Applicable Documents	57
9.1	Measured values and conversion tables	57
9.1.1	Corrosion rate	57
9.1.2	Lime content and water hardness	58
9.2	MAGella twister10	60
9.2.1	Drawings	60
9.2.2	Characteristic curve	61
9.3	Modbus address tree	62
10	List of figures	64

1

Introduction

1.1 The device

The Heaty Racun 300 Advanced Plus treatment unit for permanent installation is a device for initial filling with water and for the permanent treatment of water in the bypass process of heating and cooling systems (without inhibitors).

The device also performs the following tasks:

- leak monitoring
- magnetic filtration
- sludge or dual filtration
- monitoring of conductivity
- pressure-controlled make-up (optional)

Improper use of the device may compromise personal safety and result in poor quality process results.

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

1.2 Terms of use

To use the device properly, please observe the following instructions:

- Before starting work, make sure that the heating or cooling system complies with the recognized state of the art.
- Observe the regulations regarding the construction, commissioning, design and filling of heating and cooling systems.
- Operate the device when filling heating and cooling systems with a flow pressure of 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, existing deposits can be removed by using demineralized water (DE water). Any resulting damage is due to the deposits already present.
- Make sure that an additional shut-off device is provided at both the inlet and outlet of the circulating water.

- Always flush and clean heating and cooling systems in accordance with DIN EN 14336 if you are not using the device in the bypass process.
- The manufacturer does not guarantee compliance with the guide values if the system contains additives such as glycols, acids and cleaning agents or bacteria .
- If there is a risk of frost, empty the remaining water completely after work the device to protect it from damage.
- The installer is responsible for preparing and handing over the documentation in accordance with the relevant country-specific guidelines (e.g. VDI 2035, Ö-Norm H 5195-1 or SWKI BT 102-1). Maintaining documentation is the responsibility of the operator.
- If the temperature difference between room temperature and cooling water in cooling systems is too large (condensate), insulation must be provided on site.

1.3 Target group

This operating manual is intended for persons who work with or on the device:

- Operating personnel
- Maintenance and repair personnel

Qualifications of the target group

The target group of the operating instructions must have at least the following qualifications:



- Operating personnel: **Instructed person**
A trained person is someone who is informed about the assigned tasks and the possible dangers of improper conduct
 - taught,
 - trained if necessary and
 - was instructed about the necessary safety equipment and protective measures.
- Maintenance and repair personnel: **Professional**
A skilled worker is someone who, based on professional training, knowledge and experience as well as knowledge of the relevant regulations, can assess the assigned work and recognise possible hazards.

1.4 Conventions

Warnings and other information

In the operating instructions, notes are given different weightings and marked with a pictogram marked.

Warnings are structured as follows:

Symbol	Signal word	Meaning
	DANGER	Warning: Imminent danger. Death or very serious injuries <u>are</u> the result.
	WARNING	Warning: Potentially dangerous situation. Death or serious injury <u>may</u> result.
	CAUTION	Warning: Potentially dangerous situation. Can result in slight or minor injuries. <u>can</u> be the result.
	NOTE	Note: Instructions that must be taken into account for optimal results and safe operation of the system.

- **Signal word**
Indicates the severity of the danger.
- **Nature and source of danger**
Indicates which danger is being warned about and where it may occur.
- **cause and effect**
Describes what caused the danger or damage and its impact.
- **remedy**
Describes how the danger can be prevented from occurring.

Example of a warning



DANGER

Risk of injury if used improperly

Improper use of the Heaty Racun may result in danger to persons and property.

- Use the device only for its intended purpose as described below.

Instructions for action

Instructions are numbered to indicate the order of the individual steps. Results of actions (if any) are shown directly below.

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 control console, are marked **in bold**.

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

1.5 Manufacturer address

UWS Technologie GmbH

Sudetenstrasse 6
91610 Insingen
GERMANY

Internet : www.uws-technologie.de

e-mail : info@uws-technologie.de

phone : +49 9869 91910-0

fax : +49 9869 91910-99

2

Safety instructions

The Heaty Racun 300 Advanced Plus device was designed and manufactured in compliance with applicable legal regulations and recognized safety rules. The device corresponds to the state of the art at the time of its initial commissioning. However, dangers may arise for the operator, for other persons, for the device itself and for other material assets.



NOTE

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

2.1 General instructions

The device may only be installed, operated and maintained by qualified personnel who have received safety training.

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

The operating instructions must be kept carefully and be available at all times to persons working with or on the device.

2.2 Intended Use

In order to use the device as intended, it is necessary to be familiar with the operating instructions and to comply with all the information, maintenance and inspection regulations contained therein.



DANGER

Danger to life or risk of serious injury

Mechanical and electrical hazards occur when operating the device. To prevent personal injury due to these hazards, you must only use the device as intended.

The device may only be used as intended as follows:

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

- **Heating and cooling systems**

The device is intended for heating and cooling systems (without inhibitors) in larger residential complexes and industrial buildings. Different device types are available, which must be selected depending on the system size (see section "8 Technical data" on page 55).

- **Other tasks**

In addition to initial filling and preparation, the device performs the following additional tasks:

- leak monitoring
- magnetic filtration
- sludge or dual filtration
- monitoring of conductivity and pressure conditions
- pressure-controlled make-up (optional)

- **Filling**

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

- **Operation**

The device may only be operated and maintained by persons who are sufficiently qualified and authorized.

- **Safety devices**

The device may only be operated with intact safety devices. Safety devices must be checked regularly to ensure they are in correct condition and functioning properly.

- **Maintenance and repair**

General inspection and cleaning work must be carried out by trained persons. Maintenance, servicing and repair work may only be carried out by qualified specialists.

2.3 Improper use

The device may only be used in the manner described in section "2.2 Intended use" on page 10. Any use other than that specified may result in danger to persons and property and is prohibited.

Improper uses include:

- Use for purposes other than initial filling with water and the treatment of water in heating systems and cooling systems (without inhibitors)
- Operation in potentially explosive areas in accordance with the ATEX Directive
- Operation with defective or missing safety devices
- Maintenance and repair in the absence of safety equipment without increased safety measures
- Operation by unqualified or insufficiently qualified personnel

2.4 Dangers during transport and installation

2.4.1 Transport

During transport and installation of the device, dangers may arise from heavy and tipping parts. To avoid this, please observe the following safety instructions:

- Transport the device without impact or shock.
- During transport, secure the device using suitable means to prevent it from tipping over or falling over. Do not remove any transport safety devices until after installation.

2.4.2 Installation

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

- Wear suitable personal protective equipment while working (see section "2.6 Personal protective equipment" on page 16).

- Do not place heavy objects on the device.
- Place the device on a level and sufficiently stable surface.
- When connecting the device to the power supply, make sure that the mains voltage corresponds to the information on the type plate.
- Have the device connected to the power supply and earthed by qualified personnel in accordance with national regulations.
- Use an omnipolar switch with a gap of at least 3mm between the contacts to connect the device to the power supply.
- Install a high-sensitivity differential switch (0.03 A) for additional protection against electric shock.
- Lay cables and hoses so that they do not pose a tripping hazard.
- If tripping hazards cannot be avoided, mark them clearly.
- Carry out adjustments or simple repairs in consultation with the manufacturer.
- Do not make any modifications to the appliance or to the water and electricity lines.
- Position the device so that the circulation pump motor is sufficiently ventilated.

2.5 Hazards during operation and maintenance

2.5.1 Mechanical hazards

The device consists of moving or heavy components.

Persons may be injured as a result. To avoid this, please observe the following safety instructions:

- Be careful when replacing heavy parts:
 - Wear suitable safety shoes.
 - Secure the device against tipping or slipping.
- When carrying out maintenance work on supplied components, please observe the relevant documentation from the relevant manufacturers.
- Do not place your hands on rotating or moving parts of the device while it is in operation.

2.5.2 Dangers from hot surfaces

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

- Do not touch hot pipes or the housing of the circulation pump when the device is switched on. Do not do so until it has been switched off and cooled down.
- Wear suitable protective gloves when touching or working on hot parts.

2.5.3 Dangers from electricity

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

Disconnect the main power supply before working on electrical equipment

- Disconnect the main power supply before working on electrical equipment.
- Make sure that the power cable is equipped with an appropriate locking device for maintenance purposes (lockout-tagout).

Liquids

- Be careful when handling liquids. Penetrating liquids can cause a short circuit or an electric shock.

Connection data

- Observe the specified electrical connection data (see section "8 Technical data" on page 55).

Covers of electrical components

- Do not open the covers while the device is switched on or in operation.
- Do not remove covers when wiring or checking, even when the power is turned off.

2.5.4 Dangers when handling the circulation pump

The device uses a circulation pump, which poses various hazards. Around To avoid property damage and injury, observe the following safety instructions:

- Use the device only in accordance with the technical data (see section "8 Technical data" on page 55).
- Do not use the device to transport flammable or dangerous liquids.
- Do not leave the device unattended during operation or ensure that unauthorized persons do not have access to the device.
- Before carrying out any maintenance or servicing work, switch off the device and unplug it from the power socket.
- Do not operate the device with the ball valves at the inlet and outlet of the device or the composite container closed.
- Check the area around the device for leaks and remove any leaking fluids.
- Protect the pump from environmental influences such as splash water or dust.

2.5.5 Dangers from operating materials

The device contains a mixed bed resin that must be replaced regularly. Contact with skin or eyes may cause irritation and even visual disturbances. To avoid this, please observe the following safety instructions:

- Please note the information in the safety data sheet.
- Wear appropriate personal protective equipment when working to avoid skin and eye contact with the mixed bed resin:
 - safety goggles
 - Protective gloves

2.6 Personal protective equipment

To work safely with the device, you must wear various personal protective equipment. In the following list and at the corresponding points in the document you will find information on the required personal protective equipment. The following personal protective equipment is necessary when working with the device:

- Protective gloves
- safety goggles
- Safety shoes







2.7 Warning and information signs

Places where there is a potential danger under certain conditions are marked with warning and information signs.

- Do not remove warning and information signs.
- Replace any damaged or removed warning and information signs immediately.

The following warning and information labels are located on the device:

Sign	Meaning	Sign	Meaning
	Warning of electrical voltage		Magnetic Field Warning
	Warning of hot surface		No access for persons with pacemakers or implanted defibrillators

3 Device description

The Heaty Racun 300 Advanced Plus treatment device for permanent installation is a device for initial filling with water and for permanent treatment of water using the bypass process in heating and cooling systems (without inhibitors).

The device also performs the following tasks:

- leak monitoring
- magnetic filtration
- sludge or dual filtration
- monitoring of conductivity and pressure conditions
- pressure-controlled make-up (optional)

The device is designed for permanent connection to a heating or cooling system and switches off automatically when treatment is complete or the set conductivity is reached.

The device is intended for use in heating or cooling systems in larger residential complexes and industrial buildings.

The following section describes the device, its components and controls.

3.1 The device at a glance

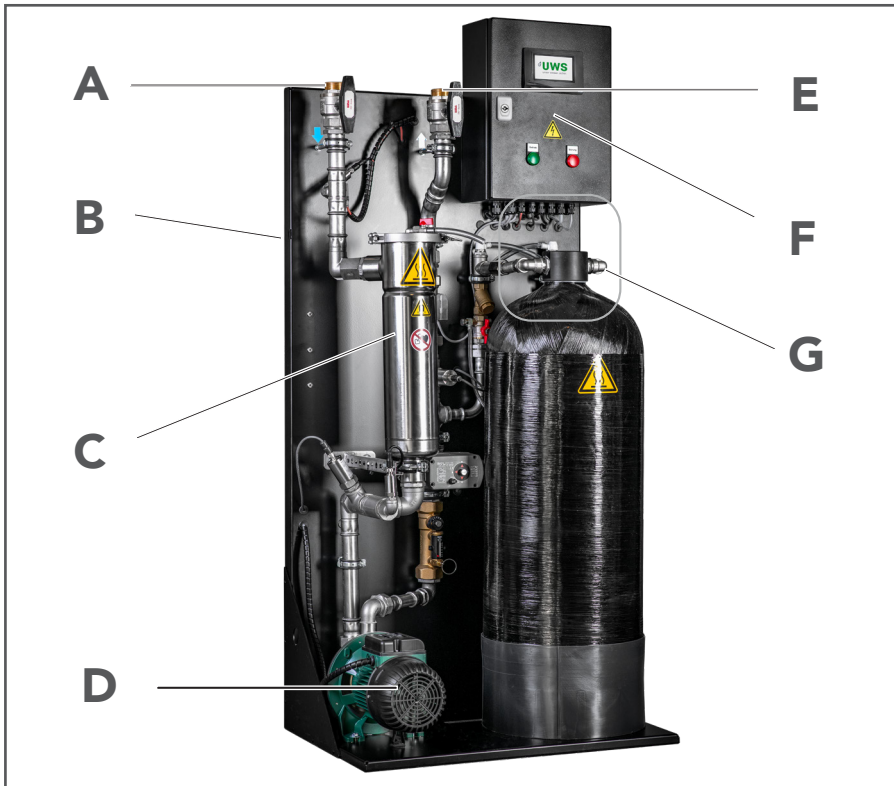


Figure 3-1: Overview of the components of the device

- A Circulation water inlet
- B Power cord
- C Dualfilter MAGella twister10
- D recirculation pump
- E Outlet circulating water
- F control with touch display
- G cartridge connection

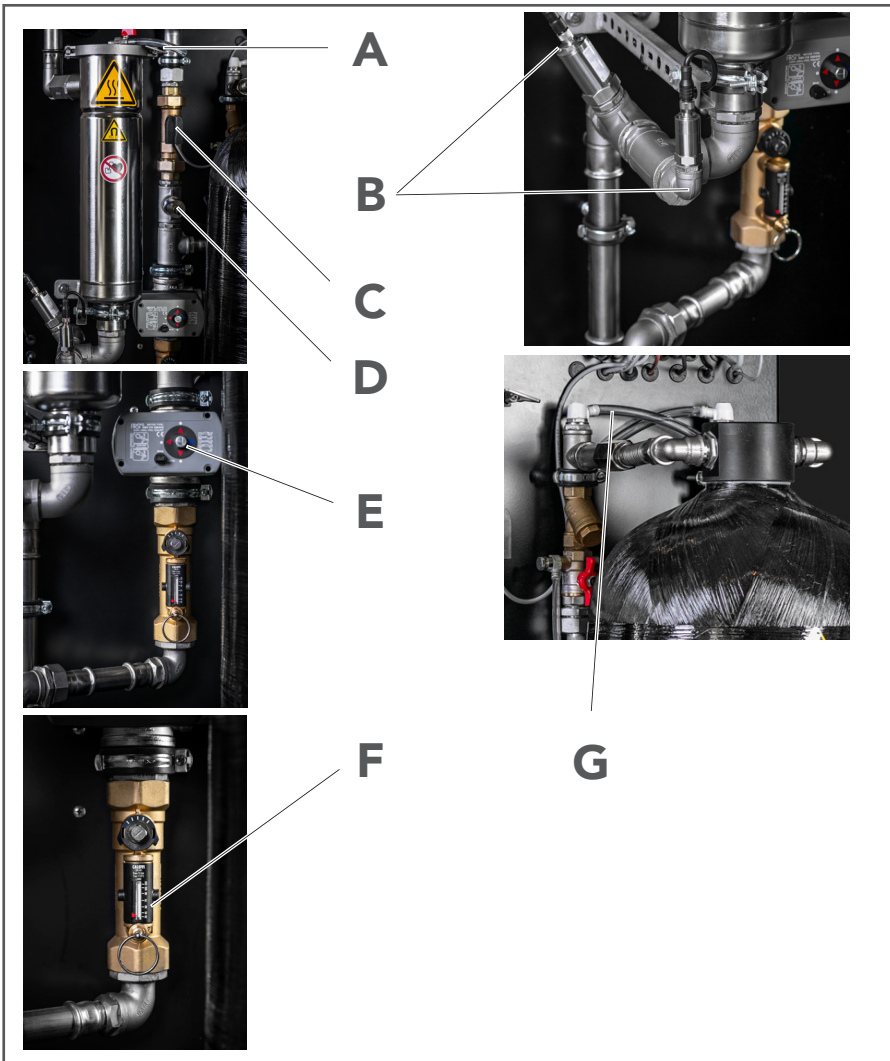


Figure 3-2: Detailed views

- | | | | |
|---|--------------------------|---|--|
| A | Filter deaeration | E | switching valve |
| B | LF 1 and pressure sensor | F | Adjustable volume flow meter |
| C | flow meter | G | Cartridge connection with venting and relief |
| D | LF 2 after cartridge | | |

3.2 Circulation water inlet

The return flow of the heating or cooling system is connected to the circulating water inlet. The circulating water of the system, whether heating or cooling system, is transported through the device and mixed back into a distant return line.

3.3 Differential pressure gauge

The differential pressure gauge is used to measure the degree of contamination of the dual filter. It switches off at a differential pressure of 1.75 bar to protect the dual filter.

3.4 Dual filter (magnetite and fine filter)

The dual filter MAGella twister10 is a unique, highly efficient system filter for magnetic and non-magnetic contaminants in heating systems. It includes an absolute fine filter down to 1 µm and a magnetraw with 11 x 12,000 Gauss. For further information on the MAGella twister10, please see page 51 and page 56.

3.5 Recirculation pump

The circulation pump pumps the water through the device.

3.6 Outlet circulating water

The return flow of the heating or cooling system is connected to the circulating water outlet. The treated water from the device is transported into the circuit of the heating or cooling system through the circuit water outlet.

3.7 Touch display

You can access the device controls using the touch display. Settings can be made and functions activated or deactivated in the touch display menus. For further information, see section "5.1 Making settings in the control system" on page 30.

The display has the following controls:

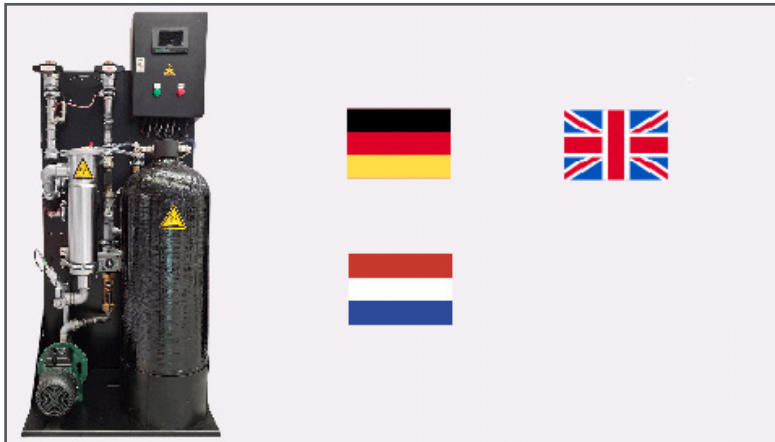


Figure 3-3: Start
When you start the device, the language selection appears:
German, English, Dutch

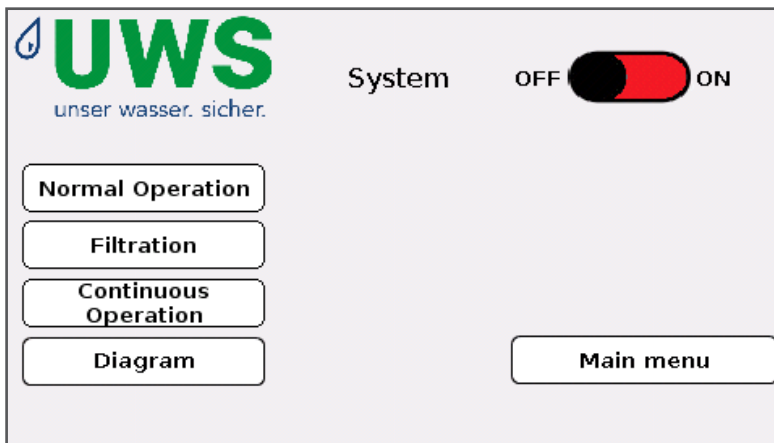


Figure 3-4: Switching on and off The slider is used to switch on and off.
By touching the slider the status can be changed

3.8 Cartridge

In the mixed bed resin of the cartridge, water treatment takes place through ion exchange until the capacity of the mixed bed resin is exhausted. The cartridge can be automatically rinsed at regular intervals to prevent contamination of the cartridge (see "Cartridge protection" function in section "5.1.3 Settings" on page 32).

3.9 Dual filter

The dual filter of the MAGella twister series is a unique, highly efficient system filter for magnetic and non-magnetic contaminants in heating systems. It includes an absolute dual filter down to $1\ \mu$ and one of the most powerful magnetite filters on the market.

The dual filter with pressure spring frees the heating system from even the finest dirt particles. With a flow rate of 5 or 10 m³/h it is also ideally suited for very large heating systems. The twister insert permanently ensures a distribution of the volume flow and offers a holding barrier for heavy magnetite particles. The stainless steel housing provides additional shielding against the high magnetic flux strength.

The dual filter is constructed as follows:



Figure 3-7: The dual filter in disassembled state

- A *clamping ring*
- B *stainless steel case*
- C *filter bags*
- D *filter basket*
- E *magnetic rod*

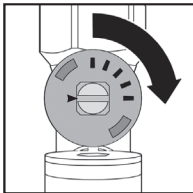
3.10 Switching valve

The changeover valve is an electric motor-operated ball valve that switches the internal bypass depending on the conductivity. If the LF1 measuring probe detects a deviation from the set conductivity, the water is passed through the cartridge. When the set conductivity is reached, the changeover valve switches and the water only flows through the magnetic flux filter.

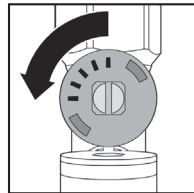
3.11 Adjustable volume flow meter

The adjustable volume flow meter is a valve for the precise adjustment of the flow rate of a heating or cooling system. The regulation of the hydraulic lines ensures that the heating or cooling system functions properly.

The volume flow meter is equipped with a flow meter for directly measuring and reading the set flow rate. The flow meter is installed in the bypass and can be switched off during operation. It is located on the housing of the volume flow meter and enables regulation without the aid of pressure gauges and diagrams.



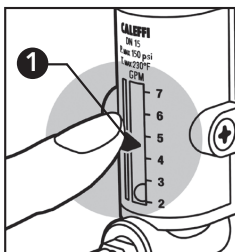
Close



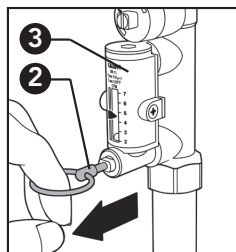
Open

To regulate the flow rate, proceed as follows:

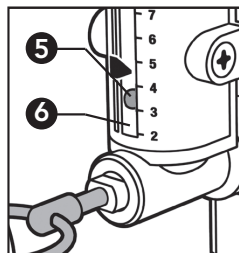
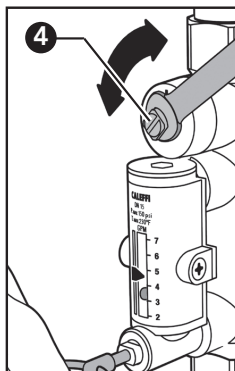
1. Use the display (1) to draft flow rate to which the valve is should be provided.



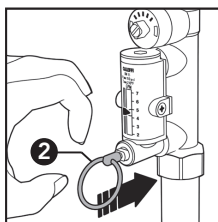
2. Use the ring (2) to slide open, which under normal conditions the flow of the medium through the passage flow meter (3) prevented.



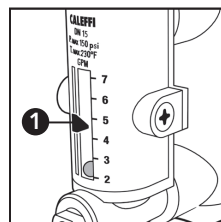
3. Keep the slider open and make the setting on the valve control spindle (4) with a 9 mm spanner for sizes from 1/2" to 1 1/4" or with a 12 mm spanner for sizes from 1 1/2" to 2". The set flow rate is indicated by the metal ball (5) in a transparent guide (6), next to which there is a scale on which the value can be read in litres per minute.



4. After adjustment, release the ring (2) of the flow meter slide; a built-in spring causes it to automatically return to the closed position.



5. The display (1) can be used to note the setting made for later checks.



Safety instructions

If the adjustable volumetric flow meters with built-in flow meter are not correctly installed, commissioned and maintained as described in this manual, they may not function correctly and may pose a danger to the user.

Clean the pipes of any deposits, rust, incrustations, welding residues and other contaminants.

As with any hydraulic circuit, special attention must be paid to cleaning the entire system. Check the tightness of all connection fittings. For optimal operation, the air contained in the medium must be released.

For safety reasons, leak tests using compressed air on the entire system and especially on the valves are not recommended due to the high compressibility of air.

When designing the hydraulic connections, make sure that the thread of the valve body is not mechanically overstressed.

Over time, damage may occur, resulting in leaks and property damage and/or personal injury.

Water temperatures above 50°C can cause severe scalding. During installation, commissioning and maintenance of the valve, the necessary precautions must be taken to ensure that these temperatures do not endanger persons.

Any use other than that intended is prohibited.

3.12 Output filter cartridge

The output filter cartridge serves to protect against damage to the suction lance and head nozzle in the cartridge to avoid resin leakage.

3.13 Solenoid valve

The solenoid valve is closed when de-energized and switches off the drinking water supply during pressure-controlled make-up if the set limit for the maximum make-up is exceeded.

3.14 Filling/refilling connection

The drinking water pipe is connected to the filling/refill connection in order to fill a heating or cooling system.

4

Transport, installation and commissioning

4.1 Transport

Use lifting equipment such as a crane or forklift to transport the device. The lifting equipment must be suitable, tested and approved.

Please note the following instructions during transport:

- Use suitable tools to secure the device against slipping or tipping over.
- When transporting the device, only place loads on suitable points.
- Remove the transport devices after transport.

4.2 Installation and commissioning

To avoid damage to the device or injury to persons, please observe

The following notes apply during installation and commissioning:

- Installation and commissioning may only be carried out by trained specialists from a recognized specialist trade company in the SHK sector, taking the necessary safety measures into account.
- Before starting the installation, check the device for completeness and possible transport damage. The following components are included in the delivery:
 - Device as ordered, pre-assembled
 - Operating instructions
 - Maintenance key Dualfilter MAGella twister
- Place the device on a firm and level surface.
- Do not install the device in areas subject to frost.
- When choosing the installation location, take into account the space required for carrying out maintenance work (e.g. changing the mixed bed resin, cleaning the dual filter).
- Lay cables and pipes so that they do not pose a tripping hazard. Mark unavoidable tripping hazards.
- Connect the device to the power supply correctly, observing the electrical connection data (see section "8 Technical data" on page 55).

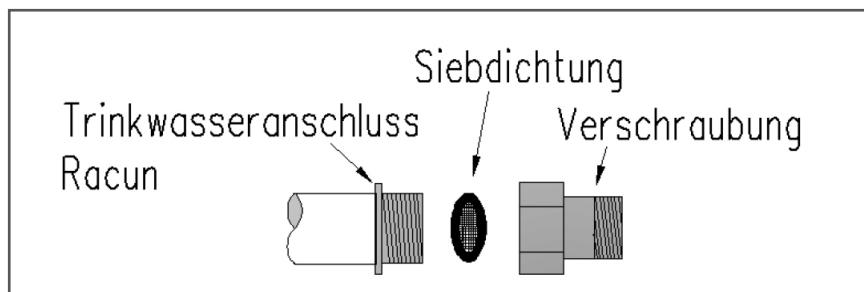
- If a connection to the building management system is planned, this work must be carried out by a qualified electrician. Please note the terminal plan (see section "9.4 Modbus address tree" from page 64).

The device is intended for permanent installation in a heating or cooling system. Please note the following instructions during installation:

- **Before installing the device, familiarize yourself with the specific structure of the heating or cooling system. For proper integration, contact the manufacturer. The integration is determined based on a schematic drawing.**
- Choose the points for integrating the device into the return flow of the heating or cooling system so that they are far enough apart. A short circuit must be avoided. Please pay attention to the flow direction so that the treated water can no longer enter the measuring area.
- Install an 1 ½" connection piece with shut-off at each point in the return flow of the heating or cooling system.
- Lay pipes from the connection nozzles to the circulating water inlet and the circulating water outlet of the device:



- Connect the **filling/refill** connection to the drinking water pipe. Use the supplied sieve seal to avoid malfunctions of the changeover valve:



- When connecting to the drinking water pipe, use a filling combination provided by the manufacturer (see section "6.4 Spare parts and accessories" on page 52).
- The drinking water must not exceed a temperature of 25° C and must be free of suspended matter. Install an appropriate filter system if necessary.
- The drinking water pipe must have a flow pressure of at least 1.5 bar when filling heating or cooling systems. The filling combination causes a pressure loss of approx. 1 bar. Use a suitable pressure booster system if the system pressure must be higher than the flow pressure of the drinking water pipe.
- Make sure that the installation work is carried out professionally and that the result complies with the relevant rules and regulations.

The following figure shows an example of connecting the device using the bypass method:

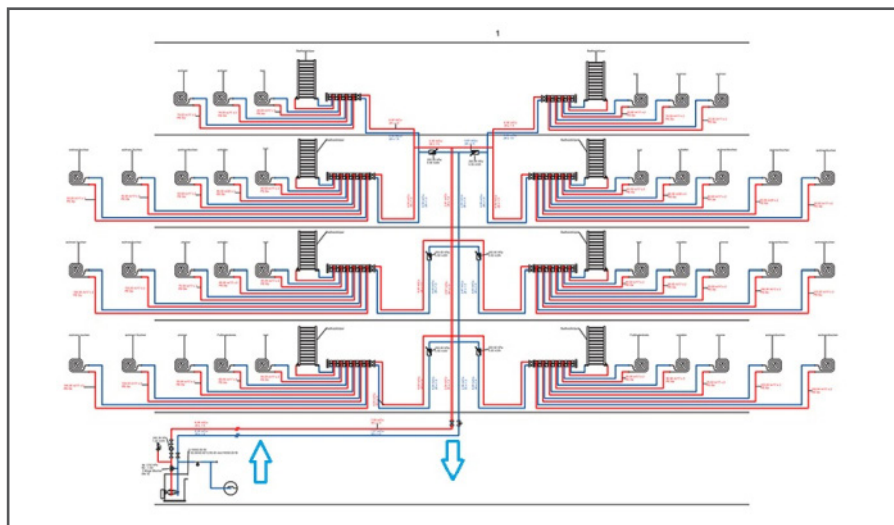


Figure 4-8: Connection diagram for bypass method

5

Operation

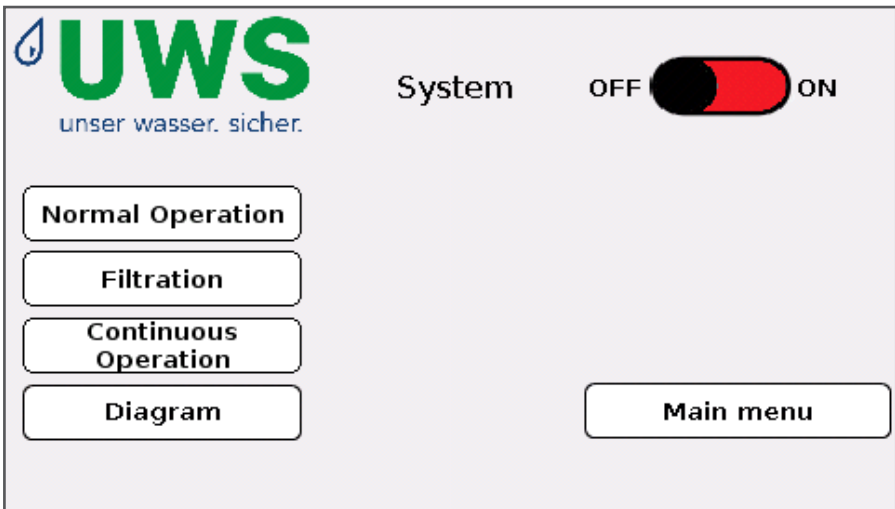
In the following section you will find instructions on how to operate the device.



NOTE

controls

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



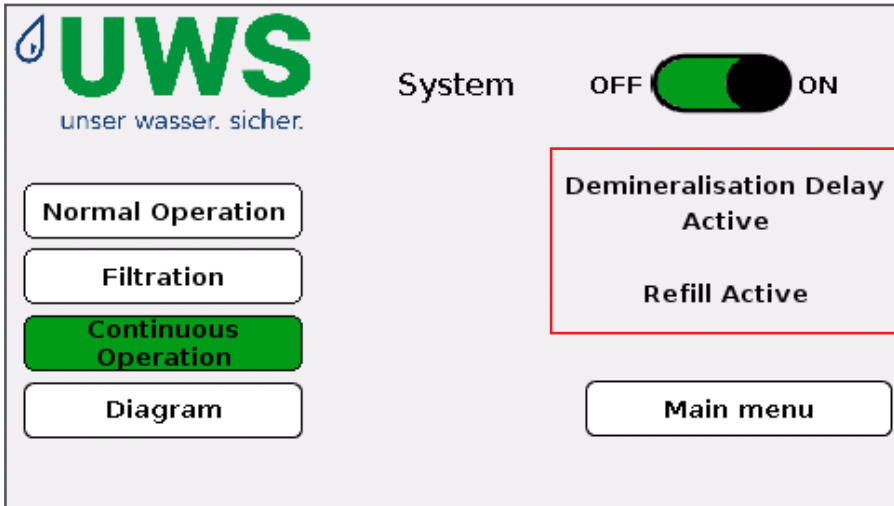
5.1 Make settings in the control system

The touch display (see "3.7 Touch display" on page 20) gives you access to the control of the device. In the control menu you can make the following settings and activate or deactivate functions:

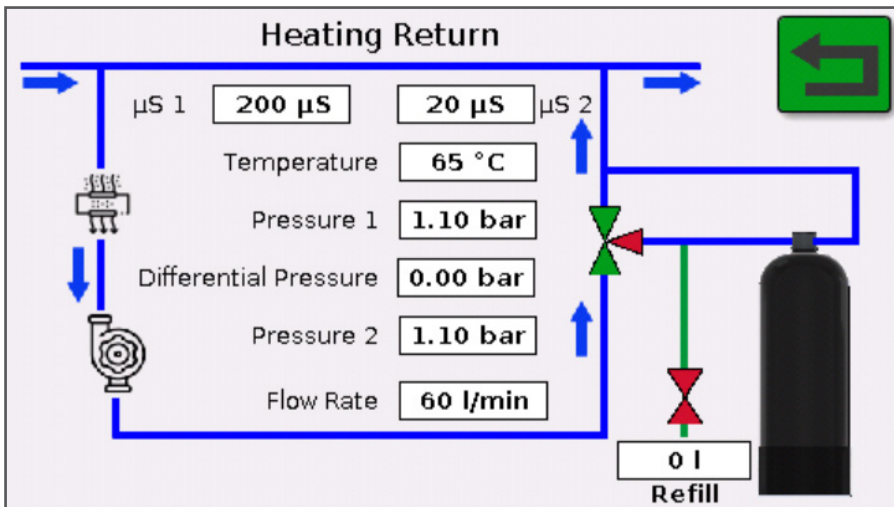
5.1.1 Starting the system

The **System ON** function starts or stops the device regardless of the operating mode.

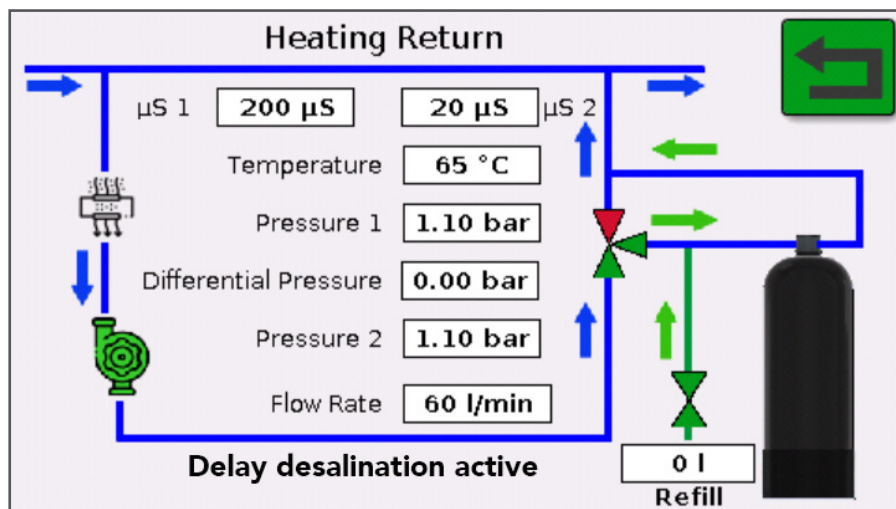
5.1.2 Filling the system



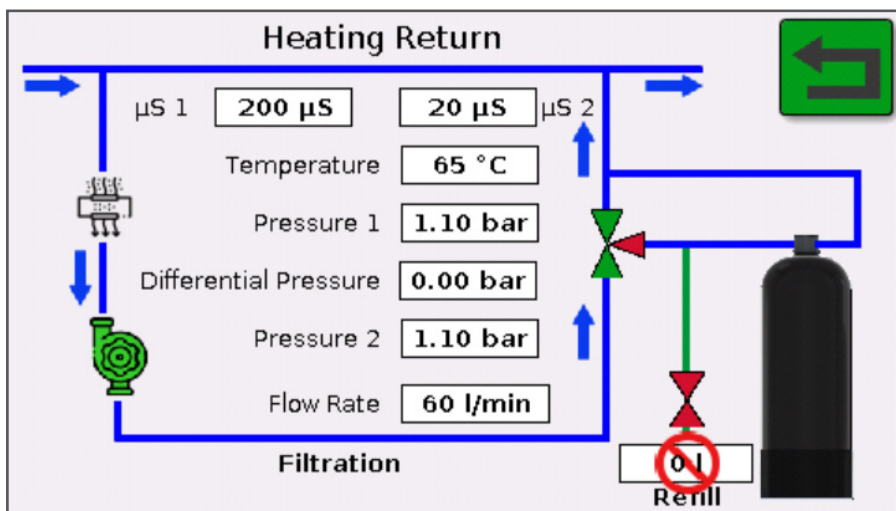
All active modes are highlighted in green. The information field (marked in red) shows the current status of the device.




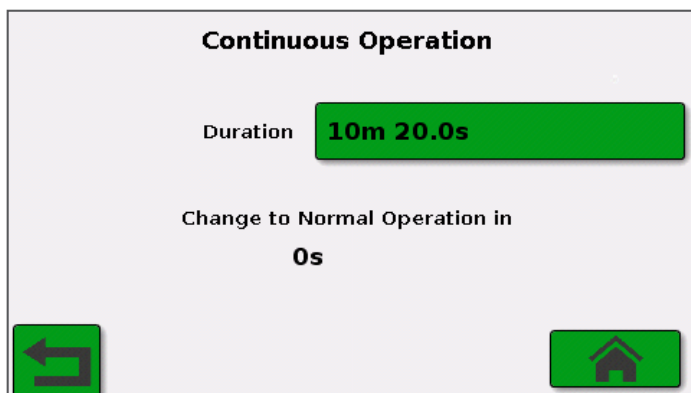
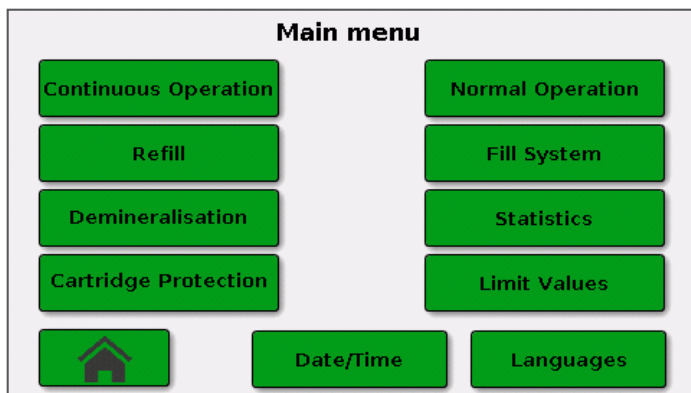
If the pump is running, it is highlighted in green. 3-way valve: If the right triangle is red, only filtration is active. If the upper triangle is red, the water is additionally treated via the cartridge. 2-way valve: If the symbol is red, the make-up is closed. make-up is closed. If the symbol is green, the make-up is open.



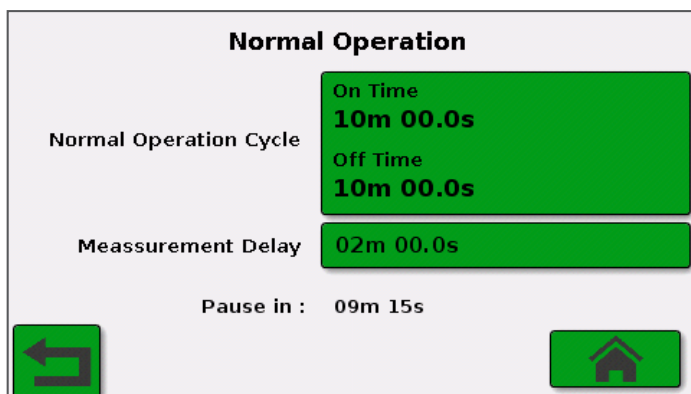
If the treatment and/or the refilling is active, this is indicated by green arrows.



In the settings you can select whether a water make-up is connected or not. If it is selected that no make-up is connected, the symbol  appears on the make-up.



The field: 'Time until the system switches to normal mode' displays the time until the system switches to normal operation.



5.1.3 Settings

Measurement delay

The measurement delay function is used to set the measurement delay when there is a long connection line between the device and the heating or cooling system. This function takes into account the amount of water in a long pipe from the device.

Start desalination

The Start Desalination function sets the limit value for conductivity in the range of 30-500 μS .

Hysteresis desalination

The desalination hysteresis function is used to set the tolerance for the desalination start in the range of 1-95 μS to prevent the treatment from constantly starting and stopping.

Example: With a set start desalination of 100 μS and a hysteresis of 20 μS , the treatment will only be reactivated when the conductivity reaches 120 μS or deactivated when the conductivity reaches 80 μS .

Delay desalination

The desalination delay depends on the size of the cartridge and is preset by the manufacturer.

Limit temperature

The temperature limit function specifies a water temperature limit (max. 80°C) upon which the device is switched off.

Maximum conductivity from cartridge

With the Maximum Conductivity from Cartridge function, a limit for the consumption of the cartridge can be set and thus the treatment can be controlled. Recommendation: Factory setting of 60 μS .

Maximum replenishment

The Maximum Make-Up function specifies a limit for the make-up in litres/week. Exceeding this limit may indicate a pipe break, leak or similar and will result in the solenoid valve shutting off the water make-up. If the limit value is exceeded, an alarm is signaled on the flow chart with status display (see section "3.7 Touch display" on page 20) and, if necessary, transmitted to the building management system.

Cartridge protection

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

5.1.4 Configuration

Operating mode

The operating mode function can be used to select between continuous operation, normal operation and filtration modes.

Differential pressure

The differential pressure function displays the differential pressure for the degree of contamination of the dual filter.

Reset water meter

The reset water meter function resets the internal water meter to start a new measurement.

Delete make-up counter reading

The Delete make-up counter reading function resets the counter for the maximum make-up in order to start a new measurement.

Factory settings

The basic settings are made during commissioning. These will remain until a change occurs.

Language

Currently only German is available.

Interface communication

Fault messages can be forwarded via a potential-free contact. The connection via Modbus is optional.

Parameter Actual States

The current status can be queried at any time by scrolling through the screen. In this program step the cartridge protection can also be reset.

Fault indication

If the set values are outside the tolerances, an error message appears on the screen and indicates the respective error.


Set password

Service password: available on request


Settings: the last 4 digits of the serial number (on label) - without spaces.

Refill

Refill	<input checked="" type="checkbox"/>	connected
Start Refill at:		1.2 bar
Stop Refill at:		1.5 bar
max. Duration / Refill		10m 30s
max. Liters / Day		50 l
max. Attempts / Day		24 mal



Counter




Here you can select whether a make-up supply is connected or not

Refill Counter

Daily Counter	0 l
Weekly Counter	0 l
Monthly Counter	0 l
Yearly Counter	0 l
Total Counter	0 l



Clear Counter



Fill system



Target pressure	<input type="button" value="1.50 bar"/>	Is	1.10 bar
Filling volume	<input type="button" value="max. 1800 l"/>	Is	0 l
Filling duration	<input type="button" value="max. 30m 00s"/>	Is	0s

Filling menu settings: If filling is started via the top button, the button is highlighted in green (system must be 'ON').

Demineralisation

Start Demineralisation at	<input type="button" value="100 <math>\mu</math>S"/>
Demineralisation Hysteresis	<input type="button" value="von 10 bis -10 <math>\mu</math>S"/>
Demineralisation Delay	<input type="button" value="02m 00.0s"/>
max. Conductivity Cartridge	<input type="button" value="60 <math>\mu</math>S"/>
	<input type="button" value="Resin Replaced"/>



Statistics		
	demineralised	filtered
Daily Amount	0 m ³	0 m ³
Weekly Amount	0 m ³	0 m ³
Monthly Amount	0 m ³	0 m ³
Yearly Amount	0 m ³	0 m ³
Total Amount	0 m³	0 m³

On the statistics page, under “treated”, you can see what amount of water has been treated using the fine and magnetite filters + additionally using cartridges.

Under “filtered” the amount of water that has been filtered purely through the fine and magnetite filter is displayed.

Cartridge Protection	
Activate after:	720 h
Duration:	04m 00.0s
Cartridge Protection starts in: 719 h	

Limit Values

Temperature Limit

78 °C

Minimum Pressure

1.00 bar

Maximum Pressure

2.50 bar

Desired System Pressure

1.00 bar

Flow Rate min/max

20 l/min

250 l/min



Date/Time

Time

14:31

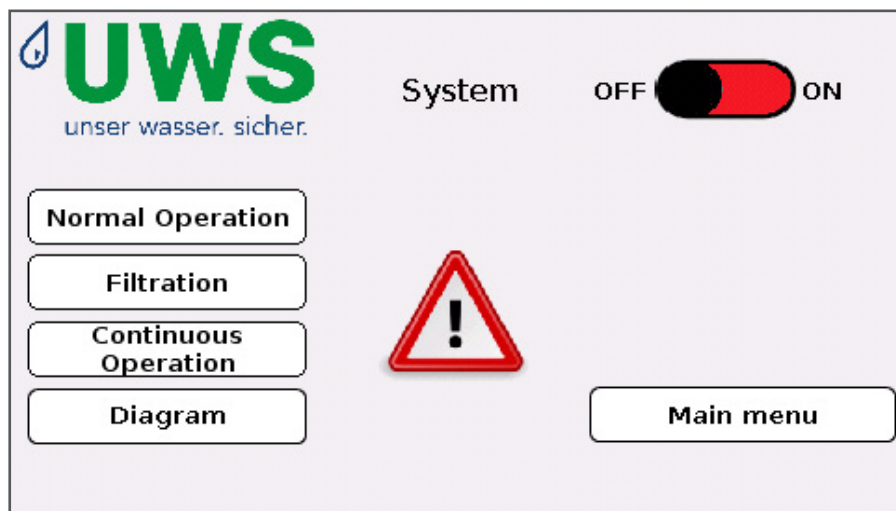
Date

31.03.2025

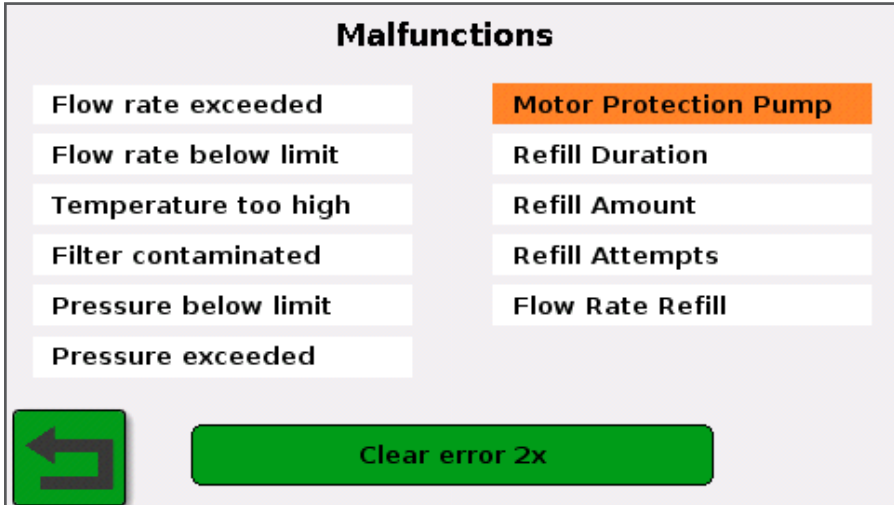




On this page you can select the languages or return directly to the start page.



A warning symbol appears on the home page when a fault is active.
If you touch the warning symbol, you will be taken to the error message page.



It is important that if an error is displayed, it is **deleted twice**, otherwise there will be problems in later operation.

The **first time you delete it**, the message on the display will be deleted.

The **second deletion** deletes the error in the control system.

Serial number

The serial number is located on the front of the device.



DANGER

Danger of electric shock

There is electrical voltage at the control unit. Only open the control element when the power is off.



NOTE

unplug the power cord

Unplug the power cord from the socket before carrying out any work on electrical components or in the control cabinet.

5.2 Operate the device



CAUTION

Checking the heating or cooling system before initial filling

Before you initially fill a heating or cooling system with the device, please note the following instructions:

- Flush and clean the heating or cooling system in accordance with EN 14336 and record the flushing and cleaning.
- Measure the conductivity and water hardness of the raw water and enter the values in the plant log.
- If the raw water is softened, measure the conductivity and use the conversion tables to estimate the capacity of the device (see section "9 Other applicable documents" on page 57).
- Please note that the use of a water softener can lead to an increased conductivity of the drinking water.
- Make sure that the drinking water pipe has a flow pressure of at least 1.5 bar when filling heating or cooling systems. If this value is exceeded, the capacity of the device may be affected.
- The drinking water must be free of suspended matter. Install an appropriate filter system if necessary.
- Please note the instructions for reducing conductivity during operation.
- Make sure that a filling combination is installed on the device before connecting the filling/refill connection. Please observe the regulations of the responsible water supply companies.
- The use of a filling combination can lead to a pressure loss of approx. 1 bar. Use a suitable pressure booster system if the system pressure must be higher than the flow pressure of the drinking water pipe.

To operate the device, proceed as follows:

Requirements

- The device is installed correctly as described in section "4.2 Installation and commissioning" on page 26.
- The MAGella twister dual filter has been checked and, if necessary, replaced or cleaned (see section "6 Maintenance and servicing" on page 47).

Approach

- 1 Open the drinking water pipe to which the connection **filling/refilling feeding** is connected.



NOTE

The volume flow through the device is limited by the integrated flow limiter. You can turn the drinking water pipe fully on.

- 2 Insert the power plug into the socket.



NOTE

When connecting, observe the electrical connection data (see section "8 Technical data" on page 55).

- 3 Use the touch display to make the desired settings on the control unit:
 - Selection of operating mode (continuous or normal operation – Function **operating mode**)
 - Determination of the filling parameters (function **Fill system**)
 - Determination of the desired conductivity (function **start desalination**)



NOTE

choice of operating mode

Under the **Operating Mode** function you can choose between the following operating modes:

- Normal operation: Treatment pauses when the set limit is reached, after 2 hours of constant conductivity the device goes into standby mode
 - Continuous operation: Continuous treatment (suitable for heating or cooling systems heavily contaminated with magnetite or wet sludge)
 - Filtration: Pure filtration of magnetite and particles up to 1 µm
-

Adjust other operating parameters if necessary.

- 4 Make sure that the system temperature of the heating or cooling system is a maximum of 80 °C.
- 5 Make sure the **circulation pump vent** is closed.
- 6 Open the fittings on the heating or cooling system.
 - ➔ A partial volume flow of the heating or cooling system flows through the device.
- 7 Use the **Start/Stop** function of the touch display to start.
 - ➔ The device begins treating the circulating water.

The circulating water flows through the device and is passed through the cartridge when necessary. The following measurements are used for this purpose:

- Measuring probe LF1: Measurement of conductivity before treatment in the bypass
- Measuring probe LF2: Measurement of conductivity after the cartridge for capacity monitoring

Function of the device in normal operation

If the conductivity before treatment (measuring probe LF1) is too high, the changeover valve switches to pass through to the cartridge. When the set conductivity limit is reached, the changeover valve switches to internal bypass. The water no longer flows through the cartridge. The conductivity is continuously measured by the LF1 measuring probe. In case of deviations, the changeover valve switches back to flow to the cartridge until the set conductivity limit is reached.

If the conductivity remains constant for a period of 2 hours, the device will go into standby mode.

During standby mode, the device checks the conductivity daily at an adjustable wake-up time. If there are any deviations, the processing is started again.

With pressure-controlled water refilling, the device records the amount of water refilled and stops the refilling when the maximum refill is reached.

5.3 Turn off the device in an emergency

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

- 1 Unplug the power cord from the socket.
 - ▶ The device is switched off.
- 2 Eliminate all reasons that led to the device turning off.

To switch the device back on after an emergency, proceed as described in section "5.2 Operating the device" on page 43.

5.4 Turn off the device

To switch off the device after processing is complete, proceed as follows:

- 1 Use the **Start/Stop** function of the touch display to stop.
- 2 Unplug the power cord from the socket.
- 3 Allow the device to cool down.
- 4 Close the valves on the heating or cooling system so that no partial volume flow runs through the device anymore.
 - ➔ The device is switched off.



Maintenance and repair

To ensure trouble-free operation of the device, the device must be kept clean and in working order. Furthermore, regular visual and functional checks must be carried out in order to detect and remedy any damage at an early stage.



WARNING

Risk of injury due to improperly performed maintenance work

The device may only be serviced by qualified personnel who have received safety training.

Before performing any maintenance or servicing, perform the following steps:

- Turn off the device.
- Disconnect the device from the power supply.
- Take appropriate measures to protect the device against being switched on again.
- Please also note the safety instructions in section "2 Safety instructions" on page 10.

6.1 Maintenance schedule



NOTE

Deviating intervals in continuous operation

If the device is operated continuously, shorter maintenance intervals may be necessary. Coordinate the intervals with a specialist, taking into account the operating conditions.

The following table provides an overview of the maintenance work to be carried out regularly:

interval	activity	Jurisdiction
Before installation in a heating or cooling system	Check the dual filter and change the fine filter depending on the degree of contamination	Operating personnel
	Check suction lance nozzles for damage and blockages and clean or replace if necessary	Operating personnel
	Check flow restrictor for blockage	Operating personnel
Monthly	Check pipes for leaks and replace if necessary	Operating personnel
Biannually	Fastening and position of the device as well as welded and screwed connections check	Operating personnel
Annually	Check warnings and markings on the device	Operating personnel
	Clean measuring probes LF 1 and LF 2	Operating personnel

6.2 Maintenance work

6.2.1 Changing the mixed bed resin



NOTE

Implementation of the change

For the Heaty Racun 300 Advanced Plus device type, it is recommended that the mixed bed resin be changed by the manufacturer's service personnel. Rental of cartridges by the manufacturer including delivery and collection service is available on request.



NOTE

Handling Mixed Bed Resin

When handling the mixed bed resin, please note the following points:

- Do not store the mixed bed resin openly, otherwise it will lose capacity.
 - Please do not store below 0 °C or above 50 °C!
 - Use the outer packaging of the refill pack to dispose of the replaced mixed bed resin.
 - Change the mixed bed resin over a drain so that the water separated from the replaced mixed bed resin can drain away.
 - Wear appropriate personal protective equipment (safety glasses, gloves).
-

To change the mixed-bed resin in the composite resin tank when the LED display gives a corresponding signal-
change the container, proceed as follows:

- 1** Make sure that the device is **switched off** and disconnected from **Power supply** .
- 2** Close the **cartridge shut-off valve** to the left and right of the cartridge.
- 3** Open the **emptying cartridge** left and right of the cartridge to vent the cartridge.
- 4** Open the **union nuts** and remove the cartridge.

- 5** Turn the head counterclockwise to loosen the head.



- 6** Pull the head with the suction lance out of the cartridge.



- 7** Remove the refill pack with mixed bed resin from the outer packaging and bring the outer packaging in a sufficiently large container.
- 8** Empty the exhausted mixed bed resin from the composite container into the container with the outer packaging:
- The mixed bed resin is retained by the outer packaging and the water collects in the container.
- 9** Dispose of the mixed bed resin and empty the water into a drain.
- 10** Open the refill pack with mixed bed resin and fill it with using a funnel, pour the liquid into the cartridge. Compact the mixed bed resin if necessary, shake or rotate the cartridge.

- 11 Fill the cartridge to a height of approximately 2 cm below the thread with water.
- 12 Stir the mixed bed resin with a pipe or other suitable tool to insert the head with suction lance more easily.
- 13 Reinsert the head with suction lance into the cartridge.
- 14 Turn the head clockwise until hand-tight.
 - ➔ The mixed bed resin has been changed and the cartridge is working again at full capacity.

6.2.2 MAGella twister maintenance

Technical information on the MAGella twister can be found in section "9.2 MAGella twister" on page 60.

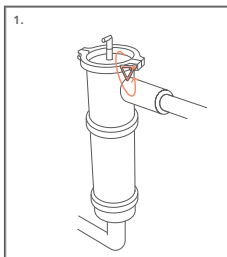
6.2.3 Change dual filter and clean Magnetraw



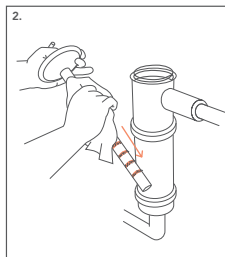
NOTE

The dual filter must be checked and, if necessary, replaced before the device is installed in a heating or cooling system.

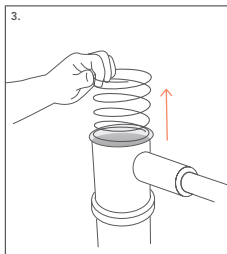
At the latest after the processing of 1,100 m³ Water the dual filter must be changed.



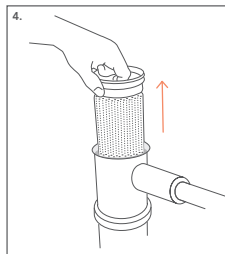
1. Close the inlet and outlet valves. Open the fill and drain valve to release the pressure. Then open the vent tap on top of the filter. Turn the wing nut and remove the cap



2. Remove the magnetic rod and clean it, for example with a cloth.



3. Then remove the compression spring and clean with water it if necessary.



4. Now you can remove and replace the basket with the dual filter bag (spare part number 100454)

The assembly takes place in reverse order.

The twister insert on the magnetic rod should be directed towards the entrance to achieve the highest capacity.

6.3 Regular internal audit

Certain parts of the device are additionally checked at regular intervals and maintained:

- recirculation pump
- measuring probes LF 1 and LF 2
- output filter cartridge
- flow meter
- Pressure sensors for differential pressure measurement of filtration

The inspection dates must be coordinated by the operator.



NOTE manufacturer's service

The components are usually firmly connected to the device and may not be replaced by the customer themselves. In case of errors or malfunctions, please contact the manufacturer's customer service.

6.4 Spare parts and accessories

The following spare parts and accessories are available for the device from the manufacturer:

Item No.	designation
100041	funnel
100047-1	measuring case "PROFI"
100055	Refill pack 23 l mixed bed resin (Vadion pH Control, 3 pieces required for complete refill)
300900	UWS filling combination 1/2" including system separator
100519	Composite container Heaty 300 without head / empty hot water
100462-1	mechanical seal for pump
100462-2	seal set for pump hydraulics
100462-4	Pump set UWS Heaty Racun 300 Advanced / Advanced Plus
100481	Replacement filter for UWS Heaty Racun 300 Advanced / Advanced Plus (2 pcs.)
100481-1	2-way head UWS Heaty Racun 300 Advanced / Advanced Plus
100481-2	Connection UWS Heaty Racun 300 / Advanced / Advanced Plus

7

Dismantling and disposal



CAUTION

The device may only be dismantled by authorized and qualified personnel who are familiar with the hazards involved.



NOTE

Regulations and laws

Observe local regulations and laws regarding the disposal of environmentally harmful substances.

- The device may only be dismantled by authorized personnel.
- Please observe the safety instructions in the operating instructions in section "2 Safety instructions" on page 10.
- Do not touch any live components.
- Wear appropriate personal protective equipment.
- Only use suitable and tested lifting equipment.

Injuries can be caused by:

- Live components
- Heavy components that fall down after being loosened
- Sharp edges

7.1 Specialist personnel

The specialist staff must take the following points into account:

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

7.2 Removal

To disassemble the device, proceed as follows:

- 1** Turn off the device and disconnect the power supply from the mains, as described in section "5.4 Switching off the device" on page 46.
- 2** Discharge energy storage devices such as springs or capacitors when available.
- 3** Make sure that any residual pressure has been released.
To do this, open the drain taps.
- 4** Disconnect the appliance's pipes from the heating or cooling system.
- 5** Empty the remaining amounts into a drain.
- 6** If you want to store the device or take it out of service, empty the device completely.
- 7** If you want to dispose of the device, disassemble the device using suitable tools in its assemblies.

7.3 Disposal

Dispose of components and operating materials properly and in an environmentally friendly manner.

Please observe the legal and company regulations.

8 Technical data

In this section you will find technical data about the device in general as well as about the applications and components used.

8.1 General data

Heaty Racun 300 Advanced Plus	
Article number	100481-SL
Max. filling capacity*	3,000 l/h
Max. operating pressure	6 bar
Ø Circulation capacity in the bypass for magnetite separation & filtration	Adjustable from 1,800 to 7,200 l/h
Ø Circulation capacity in the bypass during treatment and filtration	approx. 2,400 l/h
Capacity at 420 µS/cm to < 100 µS/cm**	9.360 l
Power supply	230 V / 50/60 Hz
Weight (including mixed bed resin filling)	approx. 143 kg
Contents Vadion pH-Control	63 l
Suitable for hot water up to 80 °C	✓
Bypass capable	✓

8.2 Components

8.2.1 MAGella twister10

MAGella twister10	twister10
Item No.	100101
High gloss filter housing made of stainless steel V4A	Stainless steel V4A
Filter basket with seal to increase dual filtration	✓
Pressure spring to increase dual filtration	D2
Flow rate max.	10m ³ /H
Magnetic field strength (gauss)	11x12.000
Barriers (included in delivery)	2 x 1 1/2"
Connections	1 1/2"
KFE drain valve (included in delivery)	1/2"
Filter holders (included)	✓
Vent shut-off with hose	1/4"
Max. temperature	80°C
Max. operating pressure	10 bar

For further information about the MAGella twister, please see the section "9.2 MAGella twister" on page 60.

8.2.2 Circulation pump

Maximum operating pressure	8 bar
Ambient temperature	-20 °C to 40 °C
Maximum media temperature	95 °C
Maximum relative humidity	95 %
Maximum throughput	7.2 m ³ /h



Applicable Documents

This operating manual applies together with the following documents:

- Safety Data Sheet Vadion pH-Control
- Capacity calculator for filling devices, see QR code in app or manufacturer's homepage: <https://uws-technologie.de/en/calculation-tools/>
- Measured values and conversion tables, see "9.1 Measured values and conversion tables" on pages 57-59
- For information on the dual filter, see "9.2 MAGella twister10" on page 60
- Quick guide for changeover valve, see "9.3 Quick guide for changeover valve" on page 62
- Control terminal diagram, see "9.4 Modbus address tree" from page 64

9.1 measured values and conversion tables

9.1.1 corrosion rate

Oxygen, acids and dissolved salts cause corrosion in the heating or cooling system. The rate of corrosion depends on the amount of substances dissolved in the water, which can be assessed by measuring the conductivity.

The following guidelines apply to the assessment of the corrosion rate using conductivity:

conductivity [$\mu\text{S}/\text{cm}$]	corrosion rate
0–100	slowed down, as required in VDI2035
100–350	very slowly
350–500	slowly
500–1.000	accelerated
1.000–2.000	accelerated sharply
>2,000	accelerated very strongly

9.1.2 lime content and water hardness

By measuring the conductivity, the lime content and water hardness can be roughly estimate. The following table illustrates the relationships:

conductivity [$\mu\text{S}/\text{cm}$]	lime content [$\text{g}/1,000 \text{ l}$]	classification water hardness
<100	<35	desalinated
100	50	very soft
200–300	100-150	soft
400–500	200-250	medium hard
600–800	300-400	hard
900–1.000	450-500	very hard

The following table is used to determine the exact water hardness:



NOTE

This conversion is only applicable if the water is not softened and does not contain any chemical additives.
For softened water, measurement using the hardness drop method is necessary. Handheld measuring devices do not provide meaningful values for softened water.

conducti- vity [µS/ cm]	hard- ness [°dH]	hard- ness [°fH]	lime con- tent [g/1.000 l]	conducti- vity [µS/ cm]	hard- ness [°dH]	hard- ness [°fH]	lime con- tent [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	1.960	56	100	980
945	27	48	473	1.995	57	101	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 MAGella twister10

In this section you will find illustrations and the characteristic curve of the installed MAGella twister10.

9.2.1 Drawings

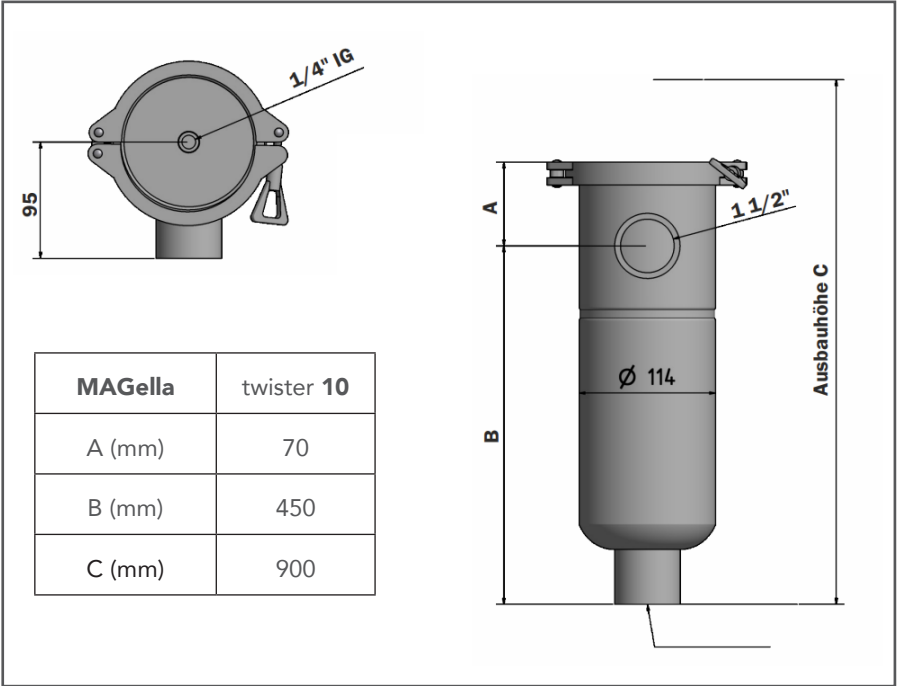


Figure 9-9: Dimensions MAGella twister10

9.2.2 characteristic curve

The flow resistance diagram of the MAGella twister10 shows the following characteristic curve:

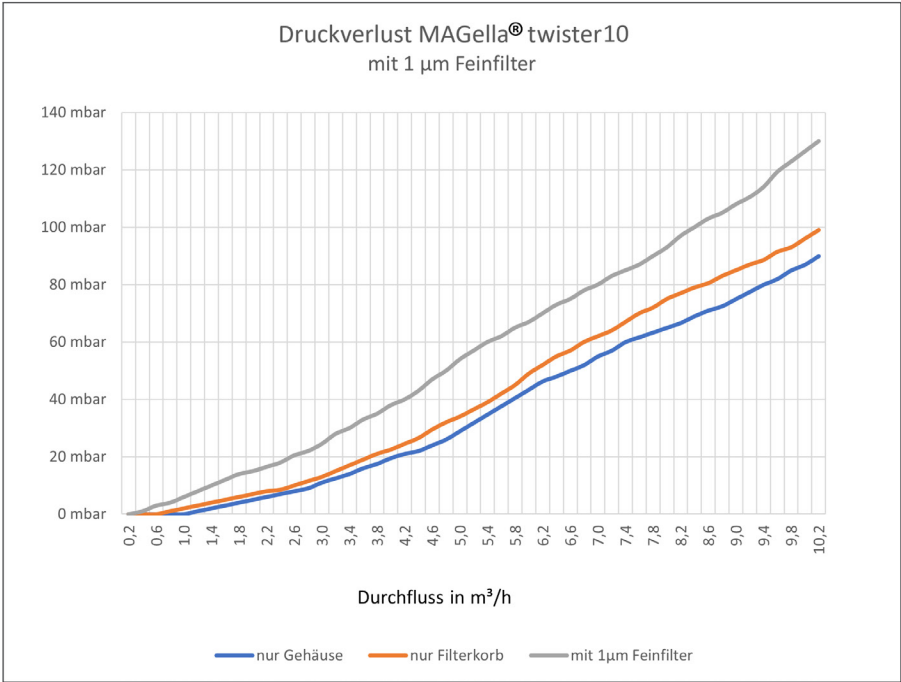


Figure 9-10: Dual filter characteristic curve

9.3 Modbus address tree

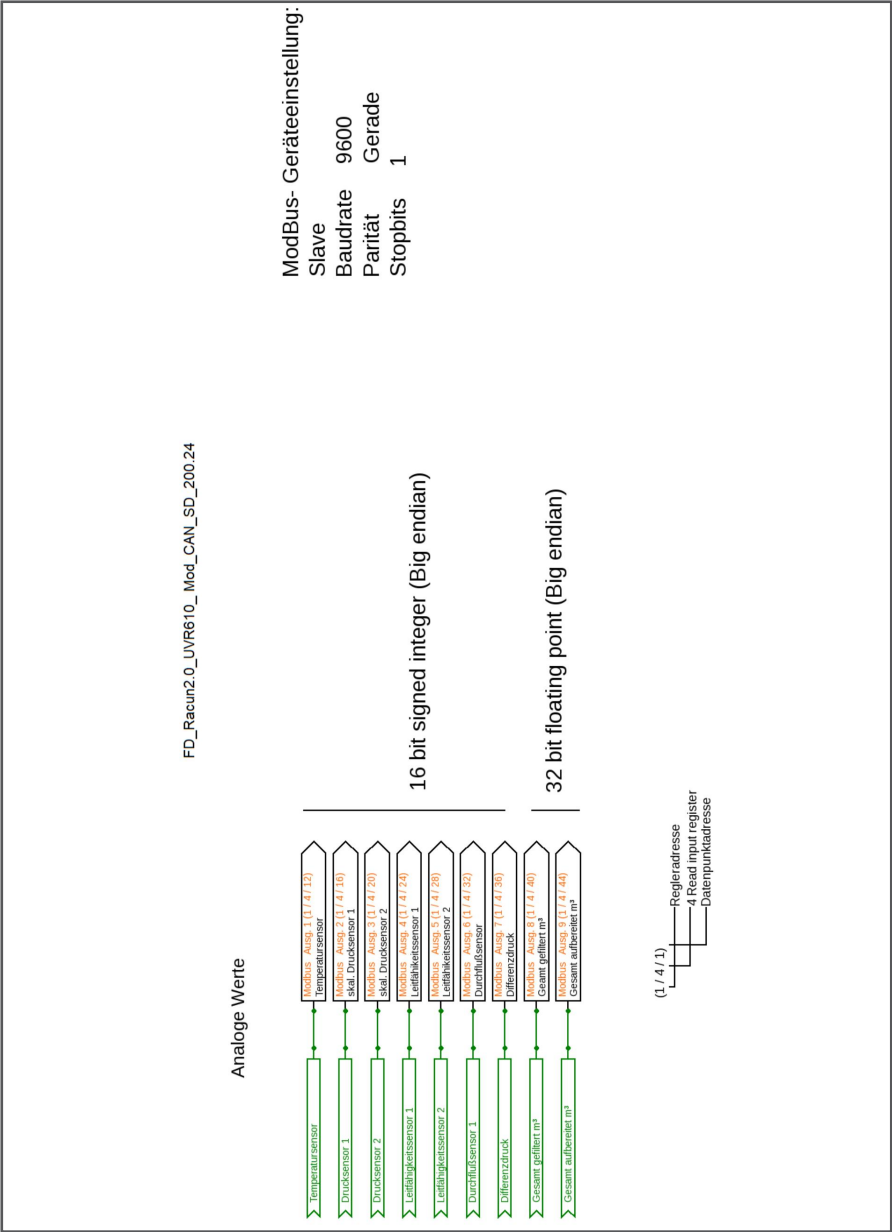


Figure 9-11: Analog Modbus values

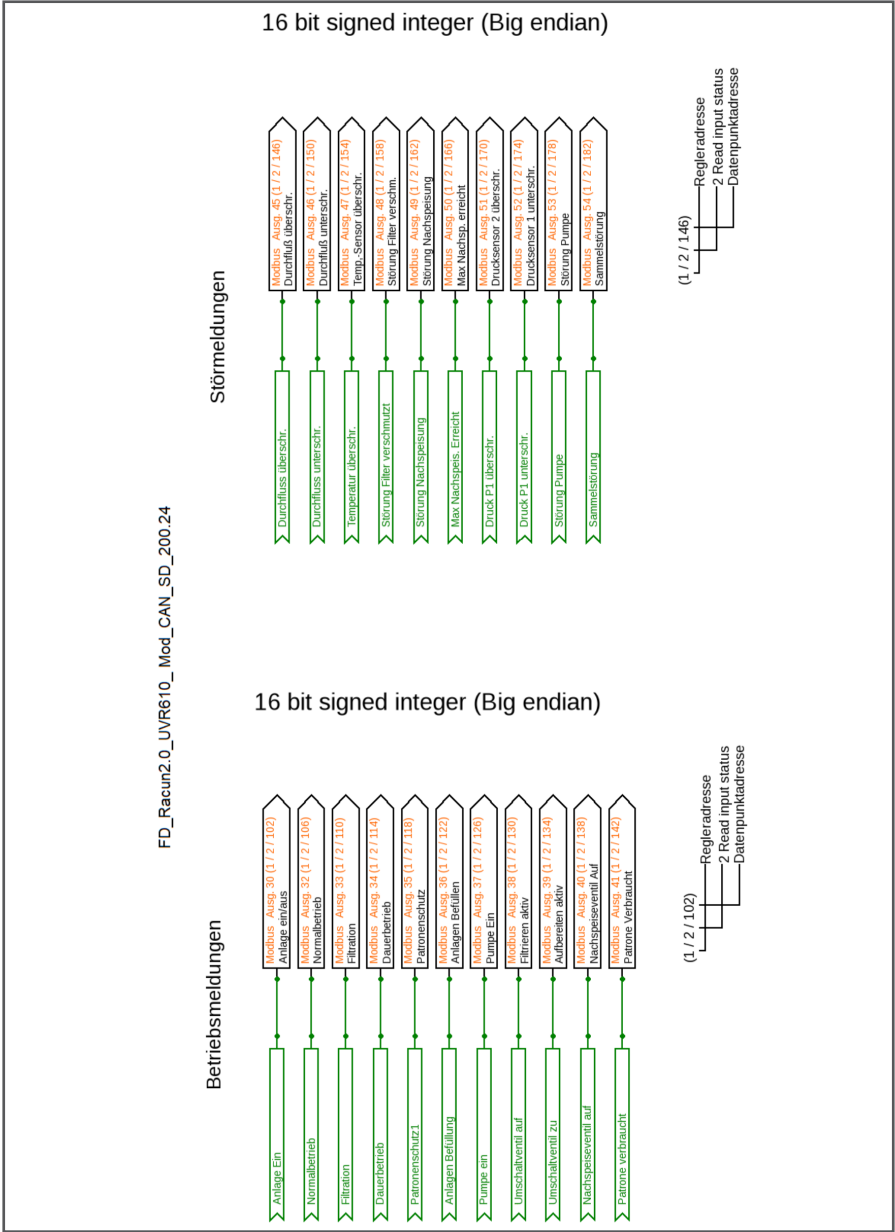


Figure 9-12: Operating/fault messages

10

list of figures

Fig. 3-1: Overview of the components of the device	18
Fig. 3-2: Detailed views	19
Fig. 3-3: Begin	21
Fig. 3-4: Switching on and off	21
Fig. 3-7: The dual filter in disassembled state	22
Fig. 4-8: Connection diagram bypass method	29
Fig. 9-9: Dimensions MAGella twister10	60
Fig. 9-10: Dual filter characteristic curve	61
Fig. 9-11: Analog Modbus values	62
Fig. 9-12: operating/fault messages	63

Enter the date of commissioning here: ____ / ____ / ____

Name of the installer:

Telephone number of the installer

EC Declaration of Conformity



EG-Konformitätserklärung



Hiermit erklären wir, dass die nachstehend bezeichnete Maschine in ihrer Konzeption und Bauart sowie in der von uns in Verkehr gebrachten Ausführung den grundlegenden Sicherheits- und Gesundheitsanforderungen der **EG-Richtlinie 2006/42/EG** vom 17. Mai 2006 entspricht. Bei einer mit uns nicht abgestimmten Änderung des Gerätes verliert diese Erklärung ihre Gültigkeit.

Gegenstand der Erklärung:	Heizwasserfüllgerät Heaty Racun 300 Advanced Plus
Artikelnummer:	100474-SL
Baujahr:	2022
Hersteller:	UWS Technologie GmbH Sudetenstraße 6 91610 Insing

Der oben beschriebene Gegenstand der Erklärung entspricht den Anforderungen weiterer einschlägiger Harmonisierungsrechtsvorschriften:

EMV-Richtlinie (2014/30/EU) vom 26. Februar 2014
RoHS-Richtlinie (2011/65/EU) vom 8. Juni 2011

Die folgenden harmonisierten Normen und technischen Spezifikationen wurden angewandt:

EN ISO 12100: 2010	Sicherheit von Maschinen – Allgemeine Gestaltungsleitsätze – Risikobeurteilung und Risikominderung
EN 809: 1998 + A1: 2009 + AC: 2010	Pumpen und Pumpenaggregate für Flüssigkeiten – Allgemeine sicherheitstechnische Anforderungen
EN 60335-1: 2012 + AC: 2014 + A11: 2014 + A13: 2017 + A1: 2019 + A2: 2019 + A14: 2019	Sicherheit elektrischer Geräte für den Hausgebrauch und ähnliche Zwecke – Teil 1: Allgemeine Anforderungen

Bevollmächtigte Person für die Zusammenstellung der Technischen Dokumentation:
Mario Milković, siehe Herstelleradresse

Insing, 24.09.2021
Ort, Datum

Steffen Breitmoser
(Geschäftsführung)

**our
water.
safe.**

YOUR CONTACT PERSON



Technical changes and innovations are reserved. Images may vary. UWS Technologie GmbH assumes no liability for the accuracy of technical information. Liability is excluded. Reproduction and distribution to third parties only with the express permission of UWS Technologie GmbH.

version 2.2