

# Operating Instructions

## ***SONOREX TECHNIK***

High-performance ultrasonic and rinsing baths

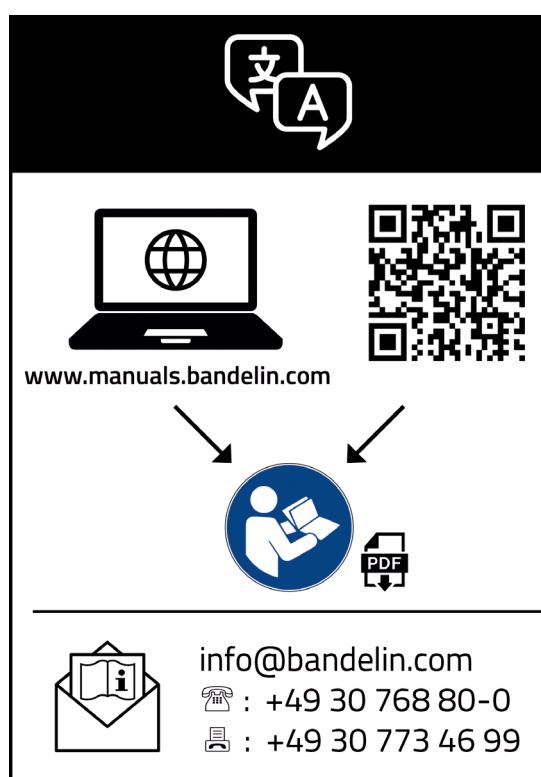


Valid for:

RM 110 U /H /UH

RM 180 U /H /UH

RM 210 U /H /UH



# Table of Contents

<b>1</b>	<b>About these operating instructions .....</b>	<b>5</b>
<b>2</b>	<b>Safety .....</b>	<b>6</b>
2.1	Use of the device .....	6
2.2	Keep out of reach of children .....	6
2.3	Danger of electric shock .....	6
2.4	Harmful to health due to ultrasound noise .....	7
2.5	Hazards due to high temperatures .....	7
2.6	Danger due to ultrasound .....	7
2.7	Danger due to agents used .....	8
2.8	Disposal of sonication fluid .....	8
2.9	Erosion of the oscillating tank .....	9
2.10	Preventing damage to the device .....	9
2.11	Interference with wireless communication .....	10
2.12	Safety stickers on the device .....	10
2.13	Do not overload accessories .....	10
<b>3</b>	<b>Design and function .....</b>	<b>11</b>
3.1	Structure .....	11
3.2	Control panel .....	12
3.3	Function .....	13
<b>4</b>	<b>Preparation for operation .....</b>	<b>14</b>
4.1	Installation site requirements .....	14
4.2	Installing ball valves .....	14
4.3	Performing a function test .....	15
4.4	Rinsing the tank .....	15

<b>5</b>	<b>Operation .....</b>	<b>16</b>
5.1	Ultrasonic operation .....	16
5.2	Sonication fluid .....	16
5.3	Sonication time .....	17
5.4	Filling with sonication fluid .....	17
5.5	Switching the sonication on and off .....	19
5.6	Switching the heater on and off .....	20
5.7	Degassing the sonication fluid .....	20
5.8	Inserting objects to be treated .....	21
5.9	Removing treated objects .....	21
5.10	Emptying the oscillating tank .....	22
5.11	Troubleshooting a malfunction .....	23
<b>6</b>	<b>Maintenance .....</b>	<b>24</b>
6.1	Cleaning and maintenance of the device .....	24
6.2	Tests .....	24
6.3	Repair .....	26
<b>7</b>	<b>Disposal .....</b>	<b>27</b>
<b>8</b>	<b>Device information .....</b>	<b>28</b>
8.1	Technical data .....	28
8.2	Ambient conditions .....	31
8.3	CE conformity .....	31
<b>9</b>	<b>Accessories .....</b>	<b>32</b>
<b>10</b>	<b>Appendix .....</b>	<b>35</b>

# 1 About these operating instructions

These operating instructions contain necessary and useful information on how to operate the device safely and efficiently.

- Read these operating instructions before using the device.
- Pay special attention to chapter **2 Safety**.
- If you pass this device on to others, please enclose these operating instructions.
- Contact your specialist dealer or BANDELIN if any of your questions are not answered in these operating instructions. Information on service can be found in chapter **6.3 Repair**.

Illustrations are provided as examples and are not to scale.

## 2 Safety

### 2.1 Use of the device

The devices are intended for the sonication of aqueous liquids. The sonication of non-aqueous or flammable liquids is not permitted. The devices work on the basis of low-frequency ultrasound and can be used in a variety of ways. Their main application is the gentle and intensive cleaning of objects of diverse shapes, types and sizes. A solution made from water and a special agent for ultrasonic applications is used as the sonication fluid. You will find information on the sonication fluid in chapter **5.2 Sonication fluid**.

Goods to be treated may not be placed on the bottom of the oscillating tank. They must be placed in the sonication fluid in an inset basket or another suitable container. An overview of suitable accessories can be found in chapter **9 Accessories**. Do not operate the device while unattended.

### 2.2 Keep out of reach of children

Children cannot identify hazards posed by the device. Therefore, keep the device out of the reach of children.

### 2.3 Danger of electric shock

The device is an electrical device. Failure to follow safety rules can result in a life-threatening electric shock.

- Protect the device from moisture and liquids. Keep the surface and controls clean and dry.
- Only transport the device when empty.
- Only drain the device once it has been switched off.
- Do not spray the device or expose it to splash water.
- Always disconnect the device from the mains before cleaning or maintenance.
- Only plug the device into a grounded mains socket that fits the ground contact on the device plug.
- If you notice a defect in the device, disconnect the mains plug immediately. Do not connect a defective device to the mains.
- Repairs should only be carried out by the manufacturer. See chapter **6.3 Repair**.
- Position the device so that it is easy to unplug the mains connection at any time and without difficulty.

## 2.4 Harmful to health due to ultrasound noise

The ultrasound noise typical of the process can be perceived as very unpleasant. Remaining within a radius of 5 m for an extended period of time may cause damage to health.

- Wear suitable hearing protection.
- Use a lid to reduce noise.

## 2.5 Hazards due to high temperatures

The device, the sonication fluid and the sonication objects can become hot during operation. Contact with these products may cause burns. The temperature can be set at up to 80 °C. Ultrasound energy warms up the sonication fluid even without additional heater. Prolonged ultrasound operation can lead to very high temperatures. In a device with heater, the set temperature can be significantly exceeded by the energy of the ultrasound.

- Observe the treatment times recommended by the manufacturer of the ultrasound agent. Do not leave the ultrasound switched on for longer than necessary.
- Do not reach into the sonication fluid with your hand. Remove sonication objects with the insert basket or forceps.
- Allow the sonication objects to cool before touching them.
- When lifting from the handles, the hands may touch the edge of the tank which could be very hot.

In the case of high-boiling liquids, the bath temperature can rise to over 120 °C due to the energy input of the ultrasound. This can lead to fires and severe burns.

- Do not use combustible, explosive, non-aqueous liquids (e.g. petrol, solvents) or mixtures with combustible liquids (e.g. alcoholic solutions) directly in the stainless steel oscillating tank.

## 2.6 Danger due to ultrasound

The strong ultrasound in the device destroys cell structures. If part of the body is immersed in the sonication fluid during operation, this can cause damage to skin and also damage to internal tissue. The periosteum of finger bones can be damaged.

- Do not reach into the sonication fluid during operation.
- Never sonicate living creatures.

## 2.7 Danger due to agents used

Agents used in the device can be toxic or caustic. They can irritate the eyes, skin and mucous membranes. The vapours and aerosols can also be dangerous.

- Wear gloves and safety goggles when handling hazardous agents.
- Do not ingest the agents and do not allow them to come into contact with the eyes or skin. Do not lean over the device, in order to avoid vapours from coming into contact with the eyes or from being inhaled.
- Place a lid on the device during operation. Use an extraction system if there are dangerous vapours.
- Observe the information on the label and in the safety data sheet for the agent.
- Keep the agents away from children and untrained persons.

## 2.8 Disposal of sonication fluid

Dispose of the sonication fluid in accordance with the specifications of the manufacturer of the ultrasound agent used. The recommended ultrasound agents in the TICKOPUR product line by DR. H. STAMM GmbH are biodegradable in accordance with the provisions of Regulation (EC) No. 648/2004 (Detergents Regulation). If necessary, the sonication fluid must be neutralised before disposal.

Depending on the type of contamination involved, water-polluting substances like oils or heavy metal compounds may be introduced to the sonication liquid during cleaning. If the threshold values for these substances are exceeded, the sonication liquid must be processed or disposed of as special waste.

Observe local waste water regulations.



## 2.9 Erosion of the oscillating tank

The surface of the oscillating tank is subject to erosion. How quickly this erosion takes place depends on the usage of the device. The erosion leads to leaks in the oscillating tank. Bath liquid can thus leak into the interior of the device. Moisture on electrical components can lead to an electric shock or fire.

- Stop using the device if you notice a leak. Disconnect the mains plug immediately. Empty the oscillating tank.

You can extend the lifespan of the oscillating tank by observing the following instructions:

- Replace sonication fluid that is visibly contaminated by particles.
- Only use demineralised water (DI water) with an ultrasound-compatible agent.
- Do not use chemicals that contain or release chloride ions in the oscillating tank. This is the case with some disinfectants, household cleaners and dishwashing detergents. Chloride ions will corrode stainless steel.
- Only use the device with accessories that are suitable for the device and the objects to be treated, e.g. a basket. Do not place any objects to be treated directly on the bottom of the oscillating tank. An overview of suitable accessories can be found in chapter **9 Accessories**.

## 2.10 Preventing damage to the device

- Only use aggressive agents in inset beakers or insert tubs. When working with aggressive agents, avoid splashing in the contact liquid or on the stainless steel surface. Replace contaminated sonication fluid immediately. Clean surfaces and wipe them dry.
- The use of highly acidic agents can corrode the ball of the ball valve. The ball valve will leak. If the use of a strongly acidic detergent cannot be avoided, use a stainless steel ball valve.
- Do not operate the device without sonication fluid in the oscillating tank. Make especially sure that the heater is switched off when the oscillating tank is empty. The fill level must always be at or slightly above the filling level mark.

## 2.11 Interference with wireless communication

The device may interfere with other wireless communication devices in the immediate vicinity, such as:

- mobile phones,
- WLAN devices,
- Bluetooth devices.

If interference occurs with the operation of a wireless device, move it further away from the device.

The ultrasound bath meets the requirements for class B devices according to EN 55011.

## 2.12 Safety stickers on the device

- Observe all safety labels on the device.
- Keep the safety stickers in legible condition. Do not remove them. Replace them if they are no longer legible. To do so, please contact our Customer Service. See chapter **6.3 Repair**.

## 2.13 Do not overload accessories

Observe the specified load-bearing capacity or resilience of the accessory used.

- Accessories include baskets and holders.
- The relevant information can be found in the appendix or in the dimension sheet. If you do not have this data, contact the manufacturer.

## 3 Design and function

### 3.1 Structure

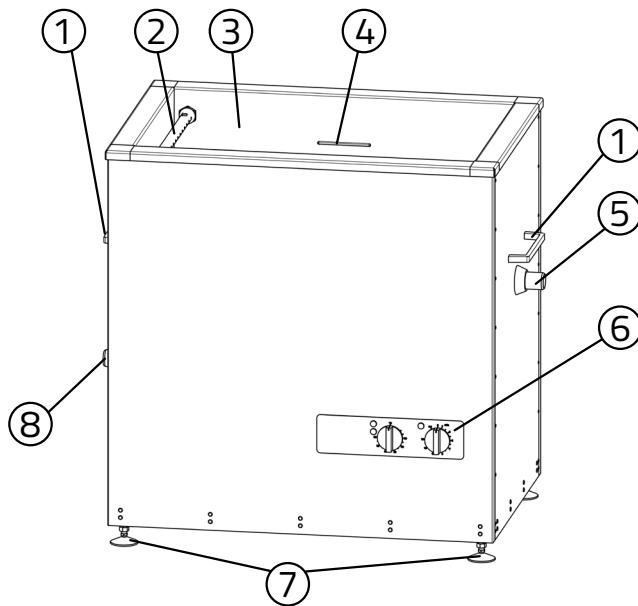


Fig. 1 Overview of the device

- 1 Handles
- 2 Sprinkle tube
- 3 Tank
- 4 Filling level mark
- 5 Connector socket – overflow
- 6 Control panel
- 7 Device feet
- 8 Connector socket – outlet

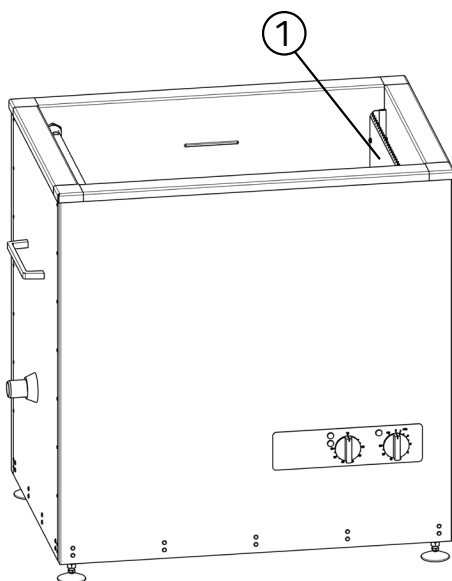


Fig. 2 Overview of the device

- 1 Overflow gutter

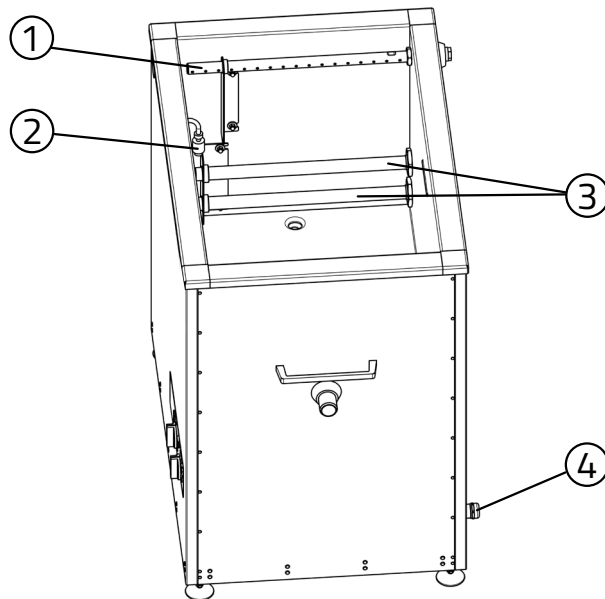


Fig. 3 Overview of the device

- 1 Sprinkle tube
- 2 Float switch
- 3 Heater cartridges
- 4 Mains cable connection

## 3.2 Control panel

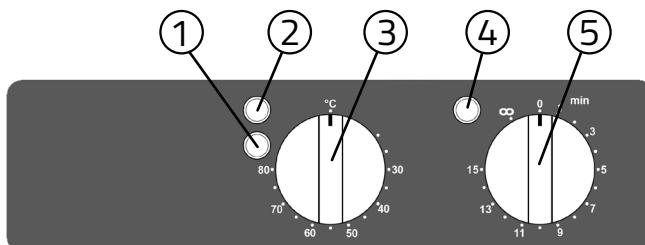


Fig. 4 Operating elements for all devices with ultrasound (U) and heater (H)



Fig. 5 Operating elements for all devices with ultrasound (U) only

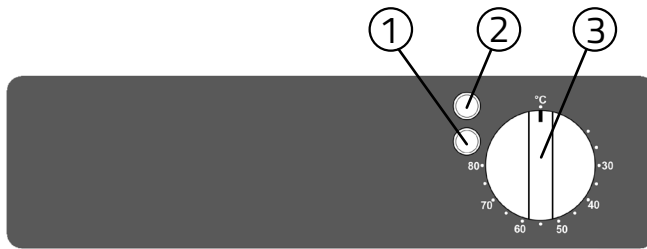


Fig. 6 Operating elements for all devices with heater (H) only

- 1 Yellow indicator light, on models with heater (H)  
When lit: heater is turned on
- 2 White indicator light, on models with heater (H)
  - When lit: heater is turned on
  - When lit: heater regulation active
- 3 Rotary knob to adjust the heater temperature
- 4 Green indicator light, on models with ultrasound (U)  
When lit: ultrasound is turned on
- 5 Rotary knob to set the ultrasound duration

### 3.3 Function

The device uses cavitation triggered by low-frequency ultrasound. Piezoelectric oscillating systems are located on the underside of the oscillating tank. The ultrasound generates strong pressure fluctuations in the sonication fluid. Cavitation bubbles are formed at the pressure minima. At higher ambient pressure around the bubbles, they collapse very quickly. This results in strong local microcurrents on the surfaces of the objects being treated. This removes dirt from the surface of the objects. Dirt particles are removed and fresh sonication fluid flows in.

## 4 Preparation for operation

### 4.1 Installation site requirements

The installation location of the device must meet the following conditions:

- The installation surface must be horizontal, firm and dry.
- The load-bearing capacity must be sufficient for the device with sonication fluid.  
For weight and work content, see chapter **8.1 Technical data**.
- Adequate ventilation must be ensured. The air supply under the bottom of the device may not be obstructed.
- A water connection should be available nearby to fill the device. A basin must be available to drain or pour out the sonication fluid.

#### Procedure

1. Remove all transport aids, such as pallets and transport locks.
2. Install the supplied height-adjustable feet on the bottom of the device.
3. Level the device by adjusting the height-adjustable feet.

#### Results

» The device is set up.

### 4.2 Installing ball valves

Install the supplied ball valves, hose connectors and hoses according to the enclosed installation instructions:

- 3-way ball valve at the outlet
- Ball valve on the overflow

## 4.3 Performing a function test

### Requirement

- The device has adapted to the climatic conditions at the setup location for at least 2 hours.

### Procedure

1. Make sure that the device is switched off.  
If present, the rotary knob to set the ultrasound duration must be set to "0". If present, the rotary knob to set the heater temperature must be set to "°C".
2. Only plug the mains cable into an earthed mains socket compatible with the earthing contact on the device plug.
3. Briefly switch on the ultrasound. To do this, turn the rotary knob to the right for the ultrasound duration.
4. Lift the float switch for max. 1 to 2 seconds – ultrasound is switched on.
5. Turn the knob to "0".

### Results

- » A distinct noise can be heard when the float switch is actuated and the ultrasound is switched on.

Contact our service department if you cannot hear any noise.

## 4.4 Rinsing the tank

Thoroughly rinse the device's tank with water before first use.

In order to protect the surface during transport and storage, the ultrasound bath is covered with an oily preservative. Before the device is put into service, this preservative must be removed with a suitable cleaning agent.

## 5 Operation

### 5.1 Ultrasonic operation

The objects to be treated are introduced in the oscillating tank with suitable accessories such as an insert basket. There they have direct contact with the sonication fluid.

For suitable accessories for sonication, see chapter **9 Accessories**.

### 5.2 Sonication fluid

A solution made from water and a special ultrasound agent is used as the sonication fluid.

Drinking water or demineralised water can be used for the water.

Water without any additives is unsuitable for sonication. Use of demineralised water

without an ultrasound agent leads to increased erosion of the ultrasonic oscillating tank.

The ultrasound agent used must foster cavitation and be biodegradable, easy to dispose of, material-compatible and long-lasting. BANDELIN recommends ultrasound agents from the TICKOPUR, TICKOMED and STAMMOPUR product ranges from DR. H. STAMM GmbH, see chapter **10 Appendix**.

- Telephone consultation: +49 30 76880-280
- Internet: [www.dr-stamm.de](http://www.dr-stamm.de)

Observe the information on dosing provided by the ultrasound agent manufacturer.

You can calculate the required quantities of ultrasound agent and water yourself:

160 l ready-to-use solution, 2%

Calculation of agent:

$$\frac{160 \text{ l} \times 2 \%}{100 \%} = 3,2 \text{ l}$$

Calculation of water volume:

$$160 \text{ l} - 3,2 \text{ l} = 156,8 \text{ l}$$



## 5.3 Sonication time

### NOTICE

#### Risk of damage to the objects to be treated

Prolonged sonication can damage the surface of sonication objects.

- Select the shortest possible sonication time.

The optimum sonication time depends on a number of factors:

- type and concentration of the agent,
- temperature of the sonication fluid,
- type of contamination,
- type of objects to be treated, in particular the materials.

Observe the specifications of the agent manufacturer regarding the recommended sonication time.

To protect the objects to be treated and the oscillating tank, select at the start the shortest possible sonication time. Check the result. Extend the sonication time if the result is inadequate.

## 5.4 Filling with sonication fluid



### CAUTION

#### Risk of scalding

- Do not pour hot water into the oscillating tank.
- Maximum filling temperature: 50 °C.

### NOTICE

#### Damage due to condensation in the device

At high humidity, condensation forms inside the device if you fill it with cold water.

- Do not pour cold water into the oscillating tank when humidity is high.

### NOTICE

If you use an agent in powder form, do not pour it directly into the ultrasonic oscillating tank.

- Mix agents in powder form in another container before pouring them into the oscillating tank.
- Only pour the agent into the oscillating tank when it has dissolved completely.

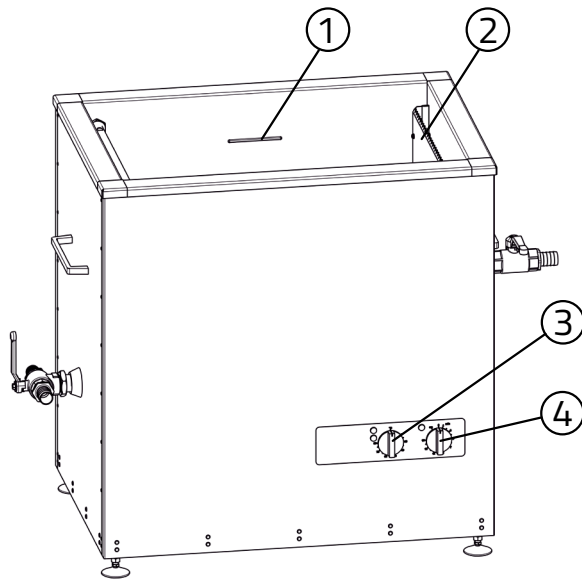


Fig. 7 Filling the oscillating tank

- 1 Filling level mark
- 2 Overflow gutter
- 3 Rotary knob to adjust the heater temperature
- 4 Rotary knob to set the ultrasound duration

## Requirements

- The 3-way ball valve must be closed
- The ball valve on the overflow must be shut.
- Ultrasound and heater must be turned off.

## Procedure

1. Fill the oscillating tank one third full with water.
2. Dose the agent into the oscillating tank.
3. Fill the tank with water up to the filling level mark while avoiding foam formation.

## Results

- » The device is ready to switch on.

## 5.5 Switching the sonication on and off

### Requirements

- The oscillating tank is filled.
- The mains plug is plugged into a power outlet with an earthed socket.

### Procedure

1. Place the lid (if present) on the device.
2. Rotate the rotary knob for the ultrasound duration to the desired sonication time or to the  $\infty$  symbol for continuous operation.
  - » The ultrasound is switched on. You will hear the ultrasound noise.
  - » The green indicator lamp lights up
  - » If the rotary knob is not set to  $\infty$ , it will slowly move counter-clockwise, indicating the remaining sonication time. As soon as it is set to "0", the ultrasound switches off.
3. To switch off the sonication, rotate the rotary knob to "0" for the ultrasound duration.
  - » The green indicator light goes out.



### Information

- You can turn the knob in both directions.
- You can extend, shorten or switch off the sonication at any time.
- The timer only works if mains voltage is present. Without mains voltage, the locking of the rotary knob can hardly be felt.

## 5.6 Switching the heater on and off



### WARNING

#### Risk of scalding

During heating, vapour bubbles can rise explosively under certain conditions (retardation of boiling).

- Stir the sonication liquid occasionally during heating or switch on the ultrasound.

Heated sonication fluid intensifies the effect of the ultrasound. Experience has shown that the best results are obtained with a temperature of 50 to 60 °C. This can reduce the sonication time. At higher working temperatures, the effect of the ultrasound decreases again.

Ultrasound also heats the sonication fluid. During continuous operation, the working temperature of the sonication fluid can rise above the set value – particularly if the oscillating tank is covered. Therefore, check the working temperature when processing temperature-sensitive objects.

- Please heed the specifications of the agent manufacturer on optimum temperature.
- Pre-heating during degassing of the sonication fluid is ideal.  
See chapter **5.7 Degassing the sonication fluid**.
- Before pre-heating, remove the basket or other accessories from the oscillating tank. Cover the ultrasonic oscillating tank with the lid if available.

Turn on the heater by turning the rotary knob to the desired temperature.

- The yellow and white indicator lights will light up.
- When the target temperature is reached, the yellow indicator light goes out.

## 5.7 Degassing the sonication fluid

Freshly-filled sonication fluid or liquid that has remained in the oscillating tank for a long period of time must be degassed prior to use. Degassing of the sonication fluid increases the ultrasound effect.

- Cover the ultrasonic oscillating tank with the lid if available.
- For degassing, switch on the ultrasound. The degassing time is 30 minutes.



### Information

During degassing, the ultrasound noise becomes quieter. This means that the ultrasound effect increases.

## 5.8 Inserting objects to be treated



### **WARNING**

#### **Overloading**

Do not overload baskets or accessories. Moving heavy baskets can cause physical injury.

To achieve good results, observe the following instructions when inserting objects for sonication:

- Before each round of sonication, check that the sonication fluid is not contaminated. If contamination is visible, replace the sonication fluid.
- The sonication fluid must be degassed. See chapter **5.7 Degassing the sonication fluid**.
- The sonication fluid must be pre-heated to the desired temperature before objects are inserted.
- Use suitable accessories, e.g., a basket. Do not place objects directly on the bottom of the oscillating tank. See chapter **9 Accessories**.
- Distribute the objects evenly. Do not stack them. Make sure that delicate objects do not touch other objects.
- The ultrasound must be switched off while objects are inserted.
- Check the fill level. Make sure the liquid completely covers all objects undergoing sonication.
- Remove air bubbles from cavities. Rotate the objects accordingly. The ultrasound process will only be effective in places where the liquid comes into contact with the object undergoing sonication.
- Place the more heavily soiled side facing down. Place objects with joints (e.g. scissors, forceps) into the container open so that the sonication fluid reaches the entire surface optimally.

## 5.9 Removing treated objects



### **WARNING**

#### **Risk of burns**

The sonication fluid, objects to be treated, the surface of the device and accessories may be very hot.

- Do not touch the surface of the device or accessories such as the lid.  
Do not reach into the sonication fluid.
- Allow the sonication objects to cool before touching them.

Switch off the ultrasound before removing the treated objects.

Do not remove sonication objects by hand. Carefully remove e.g. the insert basket with the sonication objects and place it on a level surface.

Rinse sonication objects with clean water.  
Do not leave sonication objects in the sonication fluid for too long.  
This can damage the objects.

## 5.10 Emptying the oscillating tank



### WARNING

#### Danger of electric shock

- Make sure that no liquid can get into the housing.



### CAUTION

#### Hot sonication fluid and oscillating tank

There is a risk of burns when lifting the device to empty it.

- Allow the device to cool down before lifting it.

Contamination on the bottom of the oscillating tank reduces the ultrasonic output.  
Empty and clean the oscillating tank if the sonication fluid is visibly contaminated.  
Also, observe the specifications of the manufacturer of the agent regarding the service life of the sonication fluid.  
Replace used sonication fluid completely. Do not freshen the fluid by topping it up.

#### Procedure

1. Switch off the ultrasound. Switch off the heater (if applicable). If you need to move the ultrasonic bath to empty it, disconnect the mains plug.
2. Open the 3-way ball valve and empty the oscillating tank.
3. Rinse the oscillating tank thoroughly.
4. Wipe the ultrasonic bath dry with a soft cloth.
5. If necessary, disinfect the ultrasonic bath with a suitable surface disinfectant.



### Information

- Rinsing tanks with heater can also become hot.

## 5.11 Troubleshooting a malfunction

Problem	Possible causes	Troubleshooting
Insufficient ultrasound effect, loud noises	<ul style="list-style-type: none"> <li>▪ Sonication fluid contains gases.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Degas the sonication fluid. See chapter <b>5.7 Degassing the sonication fluid</b>.</li> </ul>
	<ul style="list-style-type: none"> <li>▪ There are too many sonication objects in the oscillating tank.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reduce the number of objects to be treated.</li> </ul>
Uneven noises (wobbling)	<ul style="list-style-type: none"> <li>▪ Inadequate fill level in the oscillating tank.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Slightly change the fill level of the sonication fluid in the oscillating tank. In doing so, observe the minimum fill level and correct dosing of the agent.</li> </ul>
		<ul style="list-style-type: none"> <li>▪ Reposition the objects to be treated.</li> </ul>
Heating is not working	<ul style="list-style-type: none"> <li>▪ The heater is defective.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Repair heater or return to manufacturer for repair.</li> </ul>
Ultrasound and heater do not function	<ul style="list-style-type: none"> <li>▪ Float switch is defective.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Check float switch, see chapter <b>6.2 Tests</b>.</li> </ul>

## 6 Maintenance

### 6.1 Cleaning and maintenance of the device

#### Cleaning the housing

- Wipe the housing with a damp cloth. Wipe dry with a soft cloth.
- Do not use abrasive cleaning agents, only care products without scouring additives.
- If necessary, disinfect the housing with a suitable surface disinfectant.

#### Care of the oscillating tank

Impurities in the oscillating tank accelerate the tank's wear, can lead to corrosion and reduce the ultrasound effect. Therefore, please observe the following instructions:

- Rinse the oscillating tank thoroughly with water after each use. Wipe dry with a soft cloth.
- Clean edges and remove residues with a stainless steel cleaning product without abrasive additives.
- Do not use steel wool, scrapers or shavers to clean the oscillating tank.
- Metal parts and rust particles in the oscillating tank cause corrosion. Therefore, do not leave any metal parts in the oscillating tank. If rust stains are visible, remove them immediately with a soft cloth and a stainless steel cleaning product without abrasive additives.

### 6.2 Tests

#### NOTICE

##### Damage to the device

- Only perform the checks listed in the following section on the device when it is full.

If one of the checks does not lead to the desired result, contact our service department. See chapter **6.3 Repair**.



### Checking indicator lights

Check the operation of the indicator lights.

- Briefly switch on the ultrasound.
  - » The green indicator light will remain lit as long as the ultrasound is switched on.
- Switch on the heater briefly with the rotary knob set to above 30 °C.
  - » The white and yellow indicator lights will remain lit as long as the heater is switched on.

### Checking the output of the ultrasound and the heater

The output can be checked with a wattmeter between the device mains plug and the socket.

#### Procedure

1. Fill the tank with water.
2. Switch the ultrasound and, if present, the heater on and off, one after the other.  
Read the output.
3. Compare the readings with the technical data. See chapter **8.1 Technical data**.

The measured values may deviate from the values in the technical data by a maximum of  $\pm 20\%$ .

### Checking the float switch

The float switch is situated in the tank and is therefore a wear part. The function and tightness of the float switch must be inspected at regular intervals.

When the tank is full, the float must float up to the top stop (top ring).

A check can be carried out in the empty tank as follows:

#### Procedure

1. Fill a sufficiently large cup with water.
2. Slide the cup over the float from below.

#### Results

- » The float floats up – part OK.
- » The float sticks to the lower stop ring – part must be replaced.  
Contact the manufacturer.

## 6.3 Repair



### WARNING

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#### Health risk due to contaminated device

- Decontaminate the device before shipping if it has come into contact with hazardous substances.
- 

If the device needs to be repaired, send it to the manufacturer.

Clean and decontaminate the device and accessories before shipping.

The "Certificate of Decontamination" is intended to protect the occupational health and safety of our employees pursuant to the German Protection against Infection Act and the trade association accident prevention regulations.

Before sending the device back to us for inspection/repair, the device and accessories must be cleaned pursuant to current laws and regulations and, if necessary, must also be disinfected with a surface disinfection agent listed by the VAH (Alliance for Applied Hygiene). Please understand that we cannot start work until this Certificate is completed in full and submitted. Download the "Certificate of Decontamination" from:

<https://www.bandelin.com/downloads>

Fill out the form and attach it to the outside of the packing so that it is clearly visible. We will refuse acceptance without a completed form.



Send the device to the following address:

BANDELIN electronic GmbH & Co. KG  
Heinrichstr. 3–4  
12207 Berlin  
Germany

+49 30 76880-13  
[service@bandelin.com](mailto:service@bandelin.com)

## 7 Disposal



### WARNING

#### Health risk due to contaminated device

- Decontaminate the device before disposal if it has come into contact with hazardous substances.
- Also decontaminate accessories before disposal.

Dispose of the device appropriately as electronic waste if it can no longer be used. Do not dispose of the device with household waste. Observe the locally applicable regulations for the disposal of electronic waste.

The vibrating elements contain sintered ceramics made of lead titanium zirconium oxide.

- EC No. 235-727-4
- CAS No. 12626-81-2



This use is authorised in accordance with RoHS Directive 2011/65/EU, Annex III, exception 7c. I.

Dispose of accessories as scrap metal or as plastic waste, depending on the material used.

## 8 Device information

### 8.1 Technical data

#### Electrical data, general

Operating voltage	400 V 3N~ (±10%) 50/60 Hz
Protection class:	I
Degree of protection:	IP 32
Ultrasonic frequency:	40 kHz (optionally 25 kHz)

#### Electrical data and weights for bath size RM 110

Type	Ultrasonic peak power/ultrasonic nominal power	Heating output	Heater fuse	Generator fuse	Weight
	[W]	[W]			[kg]
RM 110 UH	4000/1000	4800	T12A	T6A	72
RM 110 H	–	4800	T12A	–	60
RM 110 U	4000/1000	–	–	T6A	67
RM 110	–	–	–	–	55

#### Dimensions for bath size RM 110

Type	Interior dimensions (L × W × H)	Content	Filling volume	Operating volume	Inlet and outlet / sprinkle tube	Outlet overflow gutter
	[mm]	[l]	[l]	[l]		
RM 110 UH	600 × 450 × 450	135	125	110	G 1/G 1/2	G 1
RM 110 H	600 × 450 × 450	135	125	110	G 1/G 1/2	G 1
RM 110 U	600 × 450 × 450	135	125	110	G 1/G 1/2	G 1
RM 110	600 × 450 × 450	135	125	110	G 1/G 1/2	G 1

### Electrical data and weights for bath size RM 180

Type	Ultrasonic peak power/ultrasonic nominal power	Heating output	Heater fuse	Generator fuse	Weight
	[W]	[W]			[kg]
RM 180 UH	2× 4000/2× 1000	7200	T12A	T6A	105
RM 180 H	–	7200	T12A	–	85
RM 180 U	2× 4000/2× 1000	–	–	T6A	98
RM 180	–	–	–	–	78

### Dimensions for bath size RM 180

Type	Interior dimensions (L × W × H)	Content	Filling volume	Operating volume	Inlet and outlet / sprinkle tube	Outlet overflow gutter
	[mm]	[l]	[l]	[l]		
RM 180 UH	1000 × 500 × 400	215	190	160	G 1/G 1/2	G 1
RM 180 H	1000 × 500 × 400	215	190	160	G 1/G 1/2	G 1
RM 180 U	1000 × 500 × 400	215	190	160	G 1/G 1/2	G 1
RM 180	1000 × 500 × 400	215	190	160	G 1/G 1/2	G 1

**Electrical data and weights for bath size RM 210**

Type	Ultrasonic peak power/ultrasonic nominal power	Heating output	Heater fuse	Generator fuse	Weight
	[W]	[W]			[kg]
RM 210 UH	2× 4000/2× 1000	7200	T12A	T6A	110
RM 210 H	–	7200	T12A	–	90
RM 210 U	2× 4000/2× 1000	–	–	T6A	102
RM 210	–	–	–	–	82

**Dimensions for bath size RM 210**

Type	Interior dimensions (L × W × H)	Content	Filling volume	Operating volume	Inlet and outlet / sprinkle tube	Outlet overflow gutter
	[mm]	[l]	[l]	[l]		
RM 210 UH	750 × 650 × 500	270	245	210	G 1/G 1/2	G 1
RM 210 H	750 × 650 × 500	270	245	210	G 1/G 1/2	G 1
RM 210 U	750 × 650 × 500	270	245	210	G 1/G 1/2	G 1
RM 210	750 × 650 × 500	270	245	210	G 1/G 1/2	G 1

## 8.2 Ambient conditions

Overvoltage category:	II
Degree of contamination:	1
Permissible ambient temperature:	5–40 °C
Permissible relative humidity up to 31 °C:	80% (non-condensing)
Permissible relative humidity up to 40 °C:	50% (non-condensing)
Altitude	< 2000 m above sea level
For indoor operation only	

## 8.3 CE conformity

The device satisfies the CE-marking criteria of the European Union:

- 2014 / 35 / EU – Low Voltage Directive
- 2014 / 30 / EU – EMC Guideline
- 2011 / 65 / EU – RoHS Directive





A declaration of conformity can be requested from the manufacturer by providing the serial number.

## 9 Accessories




	<b>Insert baskets MK ...</b> made of stainless steel Maximum load up to 20 kg
	<b>Insert baskets MK ... B</b> made of stainless steel Maximum load up to 20 kg  For use with lifting device MB
	<b>Insert baskets MK ... S</b> made of stainless steel Maximum load up to 40 kg
	<b>Insert baskets MK ... BS</b> made of stainless steel Maximum load up to 40 kg  For use with lifting device MB
	<b>Lid MD ...</b> made of stainless steel
	<b>Drop plate TB ...</b> made of stainless steel between 2 tanks



## Additional equipment

	<p><b>Lifting device MB ...</b> for one device, stationary</p> <p>The electrically-driven lifting device with oscillator facilitates the lifting and lowering of the workpiece basket. The cleaning efficiency is increased and loosened dirt particles are rinsed off.</p>
	<p><b>Lifting device MB ... B</b> for 2 to 4 devices, for moving</p> <p>The electrically-driven lifting device with oscillator facilitates the lifting and lowering of the workpiece basket. The cleaning efficiency is increased and loosened dirt particles are rinsed off.</p>
	<p><b>Tank rack WG ...</b></p> <p>Tank racks for positioning the lifting device are designed for 2 to 4 tanks.</p>
	<p><b>Cascade pipes KV ...</b></p> <p>To improve the rinsing process, two rinsing tanks are connected to each other with the cascade piping.</p>

**Peripheral devices**

 A vertical stainless steel unit with a blue filter canister on top, a pump, and various hoses and connections.	<p><b>Filtration FA ...</b> Continuous filtering of the loosened particles extends the lifetime of the bath and preserves the cleaning power.</p>
 A compact stainless steel unit with a black motor on top and a blue filter canister on the side.	<p><b>Oil separator OX ...</b> Impurities that rise to the surface of the bath are led via the weir into the oil separator, where they are separated by gravity.</p>
 A large, rectangular stainless steel unit with a flat top surface and a control panel on the front.	<p><b>Trough dryer TO ...</b> The cleaning objects are dried after rinsing to quickly remove any residual moisture.</p>

## 10 Appendix

### Recommended agents

The selection of one of the following concentrates depends on the cleaning task and degree of soiling.



#### **TICKOPUR R 33**

**Universal detergent with corrosion protection for Service, Industry, Technology and Laboratories, gentle to materials, mildly alkaline, pH 9.9 (1%), application 3-5%**

Removes general soiling, drilling, grinding, polishing and lapping residues, oil- and grease-based residues, soot, ink, etc.

From metal, glass, ceramics, plastics, rubber, windows, goggles, E-filters, respiratory masks (EXAM certificate No.: 5734/06), etc. Caution with tin and zinc.

#### **TICKOPUR R 30**

**Neutral cleaner with corrosion protection, gentle to materials, neutral, pH 7 application 1-5%**

Removes light drilling, grinding, polishing and lapping residues, dust, soot, oil- and grease-based contaminants, etc.

From metal, glass, ceramics, plastics, rubber, etc.

#### **TICKOPUR TR 3**

**Special cleaner based on citric acid, gentle to materials, phosphate-free, with corrosion protection, slightly acidic, pH 3.0 (1%), application 5%**

Removes mineral residue, flash rust, grease, oils, waxes, pigments; drilling, grinding, polishing and lapping residues, etc.

From metal, glass, ceramics, plastics, rubber, etc.

#### **TICKOPUR R27**

**Special cleaner based on phosphoric acid, for decalcification and rust removal with corrosion protection, acidic, pH 1.9 (1%) application 5%**

Removes heavy mineral residue (limescale, silicates, phosphates, cements, etc.), rust, temper colours, metal oxides, grease and oil films, etc.

From steel, stainless steel, precious metals, glass, ceramics, plastics, rubber. Not for light or non-ferrous metals, tin, zinc.

**TICKOPUR TR 2**

**Special cleaner, demulsifying, based on phosphoric acid, gentle to materials, with corrosion protection, slightly acidic, pH 3.6 (1%) application 0.1-5%**

Removes mineral residue, flash rust, grease, oils, waxes, pigments; drilling, grinding, polishing and lapping residues, etc.

From metal, glass, ceramics, plastics, rubber, etc. Be careful with light metals, tin and zinc.

**TICKOPUR TR 14**

**Flux remover, surfactant-free, non-foaming, gentle to materials, phosphate-free, alkaline, pH 10.7 (1%), application 10%**

Removes resinous flux, soldering pastes, ionic and non-ionic residue; drilling, grinding, polishing and lapping residues, fingerprints, grease, oils, etc.

From non-ferrous and light metals, steel, stainless steel, glass, ceramics, plastics, rubber, assembled and unassembled PC boards, soldered frames, electronic components, modular components, etc.

**TICKOPUR R 32**

**Special cleaner, free of complexing agents, gentle to materials, with corrosion protection, mildly alkaline, pH 11.1 (1% in DI water), application 0.25-5%**

Removes distillation residue, organic and inorganic residues, oil- and grease-based contaminants, etc.

From metals including burnished metals, glass, ceramics, plastics, rubber, etc. Especially for galvanic, laser and analytical applications. Dilute with DI water.

**TICKOPUR R 36**

**Special cleaner, tenside-free, for analytical and technical laser applications, for the cleaning of blinds, gentle to materials, non-foaming, mildly alkaline, pH 10 (1%), application 0.25-5%**

Removes general soiling, oils, greases, distillation residues, organic and inorganic residues.

From steel, light and precious metals, ceramics, plastics, rubber, glass, optical glasses, vertical and horizontal blinds. Caution with tin and zinc.

**TICKOPUR TR 7**

**Universal cleaner, demulsifying, for fast separation of oil and grease, mildly alkaline, pH 8.9 (1%), application 0.1-5%**

Removes oils, greases, waxes, pigments, flux, soldering pastes, drilling, grinding, polishing and lapping residues.

From steel, stainless steel, non-ferrous, precious and light metals, glass, ceramics, plastics, rubber, soldered frames.

**TICKOPUR TR 13**

**Intensive cleaner, demulsifying for stubborn soiling, phosphate- and silicate-free, alkaline, pH 11.9 (1%), application 0.1-10%**

Removes gumming, coking residue, soot, oils, grease, waxes, pigments, coatings; drilling, grinding, polishing and lapping residues, etc.

From steel, stainless steel, glass, ceramics, plastics, rubber. Not for light alloys, tin, zinc. Non-ferrous heavy metals may become corroded.

**TICKOPUR RW 77**

**Special cleaner with ammonia, phosphate-free, mildly alkaline, pH 9.9 (1%), application 5-10%**

Removes gumming, soot, fats, oils, waxes, pigments, coatings, silicone oils, flux, oxide on non-ferrous and precious metals.

From non-ferrous and precious metals, iron, steel, glass, ceramics, plastics, rubber, test sieves, circuit boards for service. Caution with light metals.

**TICKOPUR R 60**

**Intensive cleaner, phosphate-free, strongly alkaline, pH 12.3 (1%), application 2-20%**

Removes coking residue, gumming, soot, pigments, greases, oils, waxes, silicone oil, coatings; drilling, grinding, polishing and lapping residues, etc.

From steel, stainless steel, glass, ceramics, plastics, rubber. Not for light alloys, tin, zinc.

**TICKOPUR KS 1**

**Universal corrosion protection for all ferrous metals, solvent-free, neutral, pH 7.4 (1%), application 0.2-2%**

Suitable for all ferrous metals such as cast irons, unprotected steels of diverse alloys.

Effective corrosion protection for indoor storage after cleaning with TICKOPUR agents and subsequent rinsing with water. No formation of oily or greasy films.

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