



Operating Instructions

SONOCOOL

High-performance ultrasonic baths



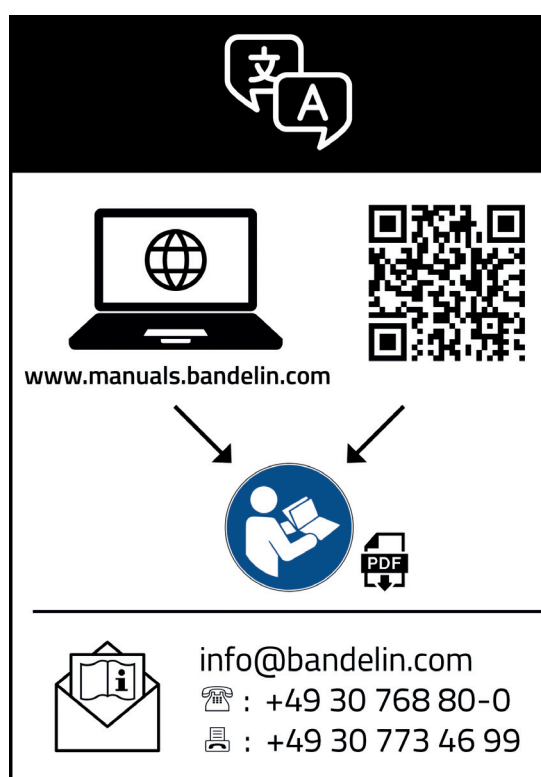


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1 About this operating manual

These instructions for use contain necessary and useful information on how to operate the ultrasound bath safely and efficiently.

- Read these instructions for use before using the ultrasound bath.
- Pay special attention to chapter **2 Safety**.
- If you pass this ultrasound bath on to others, please enclose these instructions for use.
- Contact your specialist dealer or BANDELIN if any of your questions are not answered in these instructions for use. Information on service can be found in chapter **6.4 Repair**.

Illustrations are provided as examples and are not to scale.

2 Safety

2.1 Use of the device

The device is intended for use in laboratories and facilities for industrial and scientific research. The device enables the catalytic effect of the ultrasound to be used for processes which require simultaneous cooling. Heat-sensitive samples are protected by the cooling function and process sequences can be designed to be faster and more effective than conventional procedures.

2.2 Keep out of reach of children

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

2.3 Danger of electric shock

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

- Protect the ultrasound bath from moisture and wetness. Keep the surface and controls clean and dry.
- Only transport the ultrasound bath in empty condition.
- Only drain the ultrasound bath when it is switched off.
- Do not spray or expose the ultrasound bath to splashing water.
- Always disconnect the ultrasound bath from the mains before cleaning or maintenance.
- Only connect the ultrasound bath to a power outlet with a grounded socket.
- If you notice a defect in the ultrasound bath, disconnect the mains plug immediately. Do not connect a defective ultrasound bath to the mains.
- Repairs should only be carried out by the manufacturer. See chapter **6.4 Repair**.
- Position the ultrasound bath 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 2 m for an extended period of time may cause damage to health.

- Wear suitable hearing protection.
- Use a lid to reduce noise. The ultrasound bath can also be used in a sound proof box.

2.5 Danger due to ultrasound

The strong ultrasound in the ultrasound bath destroys cell structures. If a body part is immersed in the sonication fluid during operation, this can lead not just to skin damage, but also to internal tissue damage. On fingers, the periosteum can become damaged.

- Do not touch the sonication fluid during operation.
- Never sonicate living beings.

2.6 Hazard due to refrigerant

The integrated cooling unit contains a combustible refrigerant.

If the refrigerant circuit is damaged, the mains plug must be disconnected immediately and the installation site must be ventilated well. Send the device to the manufacturer for repair. Observe the following instructions for proper operation:

- Refrigerant information:
R-290; quantity: 90 g, extremely flammable
- Never cover or close the incoming or outgoing air openings.
- In order to protect the cooling unit, the compressor will only start after a resting period of two minutes.

2.7 Danger due to agents used

Agents used in the device may be toxic or corrosive. They can irritate the eyes, skin and mucous membranes. Vapours and aerosols can also be dangerous.

- Wear gloves and safety goggles when handling hazardous agents.
- Do not ingest the agents or 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.
- In case of dangerous vapours, use a suction device.
- Observe the information on the label and in the safety data sheet of the agent.
- Keep the agents away from children and untrained persons.

Non-aqueous liquids can heat up many times faster than water. A possible flashpoint can be reached or exceeded after a very short sonication time. 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.
- You can indirectly sonicate small quantities of combustible liquids in sample vessels. Before sonication of flammable liquids, familiarise yourself with the necessary safety measures and applicable regulations for handling these liquids.

2.8 Disposal of sonication liquid

Dispose of the sonication liquid in accordance with the specifications of the manufacturer of the ultrasound medium used. The recommended ultrasound media 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 liquid must be neutralised before disposal.

Observe local wastewater 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 use of the ultrasound bath. The erosion leads to leakage in the oscillating tank. Bath liquid can thus penetrate into the interior of the ultrasound bath. Moisture on electrical components can cause an electric shock or fire.

- Stop using the ultrasound bath 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 preparation.
- 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 ultrasound bath 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 ultrasound bath

- Use aggressive agents exclusively in inset beakers or insert tubs. When working with aggressive agents, do not allow them to splash into the sonication fluid or onto the stainless steel surface. Replace contaminated sonication fluid immediately. Clean surfaces and rub them dry.
- Do not operate the ultrasonic bath without sonication fluid in the ultrasonic oscillating tank. The filling level must be at or just over the filling level mark.

2.11 Disturbance of wireless communication

The ultrasound bath may interfere with other wireless communication ultrasound baths 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 ultrasound bath.

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

2.12 Safety stickers on the ultrasound bath

- Observe all safety labels on the ultrasound bath.
- 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 **6.4 Repair**.

3 Design and function

3.1 Structure

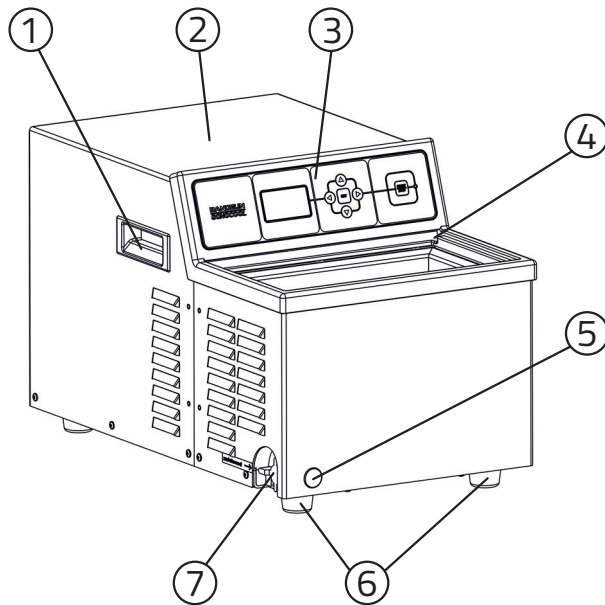


Fig. 1 Overview of the device

- 1 Handles
- 2 Housing
- 3 Control panel
- 4 Holder for glass lid
- 5 Protective cap (in front of emptying nozzle)
- 6 Device feet
- 7 Shut-off valve (labelled in closed position)

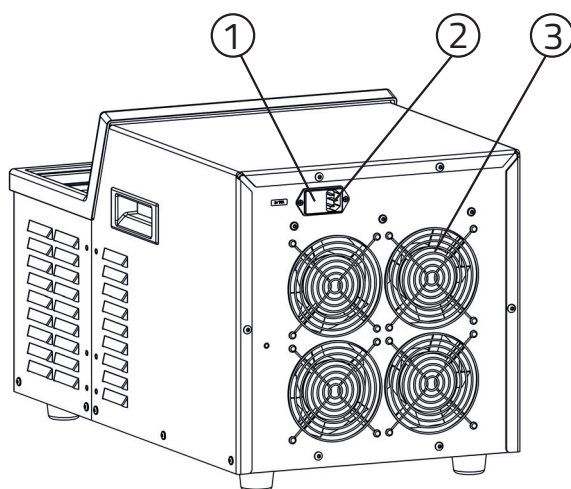


Fig. 2 Rear side

- 1 Mains switch
- 2 Cold device socket with fuse holder
- 3 Fan

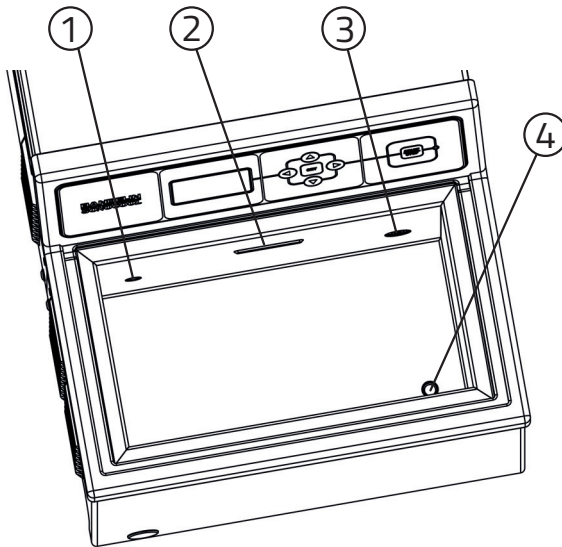


Fig. 3 Tank, interior

- 1 Inflow into the tank
- 2 Filling level mark
- 3 Electronic level sensor
- 4 Tank outlet

3.2 Control panel

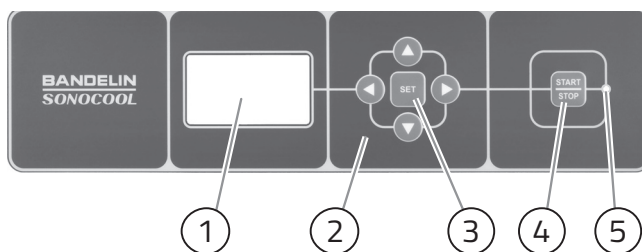


Fig. 4 Operating elements

- 1 LCD display
- 2 Arrow keys (up, down, left and right)
- 3 SET button
- 4 START/STOP button
- 5 LED status light
 - **GREEN:** the device is working without errors.
 - **YELLOW:** Warning. The device may still be operated, however.
 - **RED:** Error (error number). Device cannot be started.

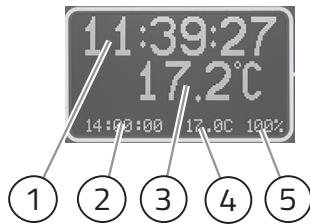


Fig. 5 Display

- 1 Runtime: Current (remaining) runtime for ultrasound operation. If [START/STOP] has not yet been pressed, the time will correspond to the target runtime.
- 2 Target runtime: Specified value for the duration of the ultrasound operation, in hh:mm:ss format
- 3 Actual temperature: Actual temperature in the oscillating tank
- 4 Target temperature: Specified value for the temperature in the oscillating tank in °C
- 5 Power specification: Specified value for the ultrasonic power during sonication in %

3.3 Function

Piezoelectric oscillating systems are located on the underside of the oscillating tank. The ultrasound generates strong pressure fluctuations in the sonication liquid. 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.

The device uses SweepTec®, a technology in which the ultrasonic frequency often fluctuates around the operating frequency. The optimal operating frequency depends on the load, filling level, temperature and type of sonication liquid. The operating frequency can deviate significantly from the nominal frequency. SweepTec® creates an especially homogeneous ultrasonic field in the bath volume for consistently optimal results.

4 Preparation for operation

4.1 Scope of delivery

Set for pathology (order no.: 3500031), comprising:

Device with integrated cooling unit (order no.: 350003)

- 1 Sample holder PH 255-11
- 1 Lid D 255 G
- 20 Inset beaker SD 01.2
- 1 Drain hose $\frac{1}{4}$ "
- 1 Mains cable
- 1 TICKOPUR TR 3
- 1 Operating Instructions

Additional accessories depending on order - see delivery note.

Set for laboratory (order no.: 3500032), comprising:

Device with integrated cooling unit (order no.: 350003)

- 1 Inset basket K 5 C
- 1 Lid D 255 G
- 1 Drain hose $\frac{1}{4}$ "
- 1 Mains cable
- 1 TICKOPUR TR 3
- 1 Operating Instructions

Additional accessories depending on order - see delivery note.

4.2 Installation site requirements

The installation location of the ultrasound bath 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 the sonication liquid. 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 must not be obstructed.
- Observe the minimum distances for the incoming and outgoing air. At least 5 cm on the side and at least 10 cm on the rear.
- A water connection should be available nearby to fill the device. A basin must be available to drain or pour out the sonication liquid.

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. Connect the mains cable to the device at the rear and then plug the mains plug into a grounded socket.
2. Press the toggle switch on the rear of the device to position I, to switch on the device.
3. Switch the ultrasound on briefly. Do this by pressing the start/stop button. After 1 to 2 seconds, press the start/stop button again to switch off the ultrasound.

Result

- » A noticeable noise can be heard when the ultrasound is switched on.

4.4 Rinsing out the oscillating tank

Thoroughly rinse the ultrasound bath's oscillating 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 ultrasound bath is put into service, this preservative must be removed with a suitable cleaning agent.

5 Operation

5.1 Sonication

Sonicate samples indirectly in inset beakers or in other sample vessels, depending on application. Position the samples using sample holders or secure them in the K 5 SC inset basket using spring clamps.

5.2 Contact or sonication liquid

Use a solution of water and a special ultrasound agent as contact or sonication liquid. 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 product range by DR. H. STAMM GmbH.

- Telephone advice: +49 30 76880-280
- Internet: www.dr-stamm.de

Follow the dosing instructions provided by the manufacturer of the ultrasound agent. You can calculate the quantities yourself, analogously to the following example.

5 l ready-to-use solution, 2%.

Calculation of agent:

$$\frac{5 \text{ l} \times 2 \%}{100 \%} = 0,1 \text{ l}$$

Calculation of water volume:

$$5 \text{ l} - 0,1 \text{ l} = 4,9 \text{ l}$$

5.3 Pour in sonication liquid

ATTENTION

Damage due to condensation in the device

At high air humidity, condensation forms inside the device when filled with cold water.

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

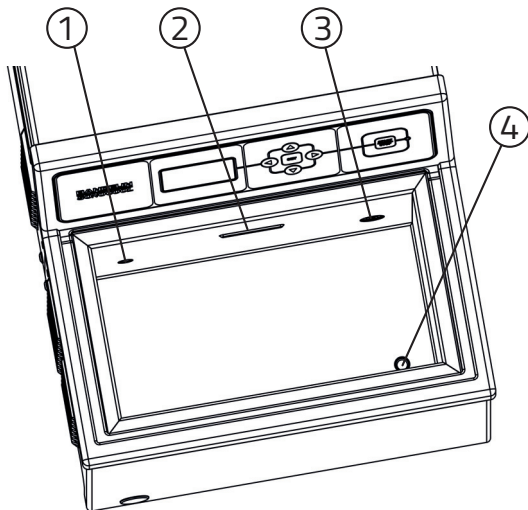


Fig. 6 Tank, interior

- 1 Inflow into the tank
- 2 Filling level mark
- 3 Electronic level sensor
- 4 Tank outlet

Requirements

- The shut-off valve must be closed.
- The ultrasound must be turned off.

Procedure

1. Fill 1/4 of the oscillating tank with water. The maximum filling temperature of 25 °C should not be exceeded.
2. Dose the agent for the contact liquid into the oscillating tank.
3. Fill with water up to the filling level mark. Take into account the displacement caused by the inset beaker or sample vessel, and avoid foam formation.
4. Make sure that the inset beakers or sample containers are sufficiently filled (risk of floating).

Result

- » The device is ready to switch on.

5.4 Switching the device on and off

Switch on device

Allow the device to stand for 2 hours at its operating location before switching it on so that it can adapt to the climatic conditions.

Switch on the device using the toggle switch on the rear.

- » The LCD display begins to light up. Initialisation occurs automatically.
- » Next, the device will be on stand-by mode and ready for operation.
- » The status LED will be lit and the default values for runtime, temperature and ultrasonic power that were most recently set will be displayed.
(Values when activated for the first time: Target temperature 17 °C, target runtime 00:10:00 hh:mm:ss, target power 100 %).

Switch off device

Turn off the device using the toggle switch on the rear.

5.5 Setting parameters

Press the SET button to activate the editing mode.

Press the left or right arrow keys to move between parameters. The setting values can be changed by pressing the up or down arrow keys. Each of the editable parameter positions is displayed inversely. Changes made become active immediately.

Different operating parameters can be changed depending on the operating mode from which you are accessing the editing mode:

Stand-by mode: Target runtime, target temperature and target power

Active mode: Target temperature and target power

Pause mode: Remaining runtime (without changing the target runtime!), target temperature and target power

5.5.1 Operating modes

Standby mode – basic state of the device

The runtime (shown inverted) and the current temperature are displayed in the upper part of the display. The target values for the time, temperature and power are displayed in the bottom part. The cooling is activated, the ultrasound is turned off.

Editing mode – Menu to change the operating parameters

The selected parameter and the current value are shown on the top portion of the display. All valid target values are shown on the bottom rows.

Active mode – ultrasound is activated

The residual runtime (remaining runtime) is shown in non-inverted format and runs as a second-by-second countdown. Below it, the actual temperature is displayed. All valid target values are shown on the bottom rows.

Pause mode – interruption of active mode

The remaining runtime is shown in inverted form (dark text on a light background). The process can be continued thereafter. The display is similar to the one for stand-by mode; however, the message “p-a-u-s-e” appears in the penultimate line.

5.5.2 Temperature setting

You can change the temperature to a value between 4 and 40 °C at any time in editing mode.

Notes:

- If the actual temperature exceeds the value of the target temperature by more than 1 K, the device will shut off the ultrasound for safety reasons (ultrasound energy heats up the liquid). If the limit value is exceeded before the start, it will not be possible to activate the ultrasound. The status LED flashes red.
- The device will independently activate the ultrasound once the actual temperature is once again within the specified tolerance range.
- The set time will only continue to be counted during active ultrasound emission.
- If the target value for the temperature is higher than the actual temperature, only a warning will be issued and the ultrasound may be started. The status LED lights up yellow.
- If the target temperature is below 15 °C, the ultrasound may be switched off temporarily under normal ambient conditions starting at approx. 20 °C. This can be prevented by reducing the ultrasound power setting.

5.5.3 Time setting

The target runtime can only be edited from stand-by mode. It cannot be edited while in ongoing operation (active mode), since the ultrasound continues to be active while in editing mode.

From the pause mode, only the remaining runtime can be edited. This setting, however, does not change the runtime specification (saved value in stand-by mode).

Setting limits: 00:00:10 – 99:59:59 [hh:mm:ss]

5.5.4 Power setting

The power can be changed at any time in editing mode.
Setting values: 25%, 50%, 75% and 100%

5.5.5 Activating / deactivating the ultrasound

Press the START/STOP button to switch on the ultrasound. The display shows a countdown of the remaining runtime.

Pressing the START/STOP button once again interrupts the ultrasound emission (pause mode).

Ultrasound operation is resumed by pressing the START/STOP button again. By pressing the SET button for 2 seconds, the procedure can be interrupted from pause mode and the display values can be reset (return to stand-by mode).

The device will stop once the set time has elapsed. The time display will show "00:00:00" and a short audible signal will be emitted. The device is back in standby mode.

5.6 Degas the sonication fluid

Freshly-filled sonication fluid or fluid 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.

- Remove all accessories from the oscillating tank.
- Cover the oscillating tank with the lid.
- Start the ultrasound.
 - The internal pump starts operating
 - The cooling will automatically cool according to the set target temperature
- The contact liquid must visibly flow into the tank through the (tank) inlet.
- Set the degassing time (10 min) and activate the ultrasound.



Information

If cooling is not desired, it can be temporarily deactivated by adjusting the target temperature, e.g. by setting the temperature to 30 °C. The ultrasound is switched on separately.



Information

The ultrasound noise becomes quieter during degassing. This means that the ultrasound effect increases.

5.7 Insert objects to be treated

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

- Check to make sure that the contact liquid is not contaminated before each round of sonication. If contamination is visible, replace the contact liquid.
- The contact liquid must be degassed.
- Use suitable accessories, such as inset beakers or a basket. Do not place anything directly on the tank bottom.
- The ultrasound must be switched off while inserting objects.
- Check the fill level. Inset beakers or sample vessels for indirect sonication must be immersed in the contact liquid to a depth of at least 2 cm.
- Remove any air bubbles underneath the inset beakers. The ultrasound process will only be effective in places where the liquid comes into contact with the object undergoing sonication or the inset beaker.

5.8 Remove treated objects

Switch off the ultrasound before removing the inset beakers or sample vessels.

5.9 Empty the oscillating tank

Contamination on the bottom of the oscillating tank reduces the ultrasonic output. Empty and clean the oscillating tank if the contact fluid is visibly contaminated.

Replace used sonication fluid completely. Do not freshen the fluid by topping it up.

Procedure

1. Switch off the ultrasound.
2. Connect the drain hose to the drain outlet.
3. Hold the drain hose in a suitable container or in the outlet.
4. Open the shut-off valve by turning it clockwise to the upper position.
5. Rinse the oscillating tank thoroughly.
6. Wipe the device dry with a soft cloth.
7. If necessary, disinfect the device with a suitable surface disinfectant.

5.9.1 Refresh / replace the contact liquid



DANGER

Damage to the internal cooling unit

High pressure can damage the hose connections and the internal tubing in the cooling unit.

- Do not blow compressed air through the hose conduits.

To replace the contact liquid, empty the device as described below and then refill it. After filling, switch on the device for approx. 5 minutes (without ultrasound). The integrated pump starts working automatically and thoroughly flushes the device.

Repeat the emptying, filling and flushing process two or three times.

Procedure

1. Switch off the device.
2. Pull off the cap of the emptying nozzle and push the ¼" drain hose supplied onto the emptying nozzle.
3. Place the drain hose in a suitable container or in the outlet.
4. Open the shut-off valve by turning it clockwise to the upper position.
5. Drain the device as much as possible. To do this, slightly tilt the device over its long side in the direction of the emptying nozzle.
6. After emptying, close the shut-off valve once again. If necessary, pull the hose and cover the emptying nozzle with the cap.
7. To maintain the device in hygienic condition, rinse the oscillating tank thoroughly after emptying.
8. Wipe the device dry with a soft cloth.
9. If necessary, disinfect the device with a suitable surface disinfectant.



Information

- The device must be emptied as much as possible for transport. After emptying, close the shut-off valve to avoid unwanted leakage of liquid.
- It is not possible to empty the device completely. A small amount of contact liquid always remains in the built-in ultrasonic bath.

5.10 Troubleshooting a malfunction

Overview of error messages shown on the display:

Error number	Troubleshooting
002	Temperature sensor "Contact liquid" is defective. The device interrupts all activities; the ultrasound can no longer be started. The status LED lights up red. Contact the manufacturer.
003	Temperature sensor "Coolant" is defective. The device interrupts all activities; the ultrasound can no longer be started. The status LED lights up red. Contact the manufacturer.
004	Temperature sensor "Oscillating tank" is defective. The device interrupts all activities; the ultrasound can no longer be started. The status LED lights up red. Contact the manufacturer.
010	The temperature of the liquid is too low. No error. The liquid is additionally heated by the ultrasound input.
011	The liquid temperature is too high, the ultrasound cannot be started and/or the device turns off for safety reasons. Wait until the cooling has sufficiently cooled the liquid (tolerance range target temperature + 1 K).
012	The coolant temperature is critically elevated. The device interrupts all activities until the temperature is once again within the normal range. The status LED lights up red. Wait. Next, the last action conducted is automatically resumed.
013	<ol style="list-style-type: none"> 1. Tank temperature is critical. The device interrupts all activities until the temperature is once again within the normal range. The status LED lights up red. Wait. 2. After filling, an air bubble may form in the device, hindering the cooling circuit. Empty and refill.
014	Fill level critically below the filling level mark or distilled water without additives has been used as the liquid. The device interrupts all activities; the ultrasound can no longer be started. The status LED lights up red. Fill the liquid (water + concentrate in prescribed quantities) up to the filling level mark and resume function with the START/STOP button.
027	An error message appears after the device is switched on. The device may be further used, but only with an ultrasonic output of 100%. Switch the device off and back on. If the error occurs repeatedly, contact the manufacturer.

Overview of additional error messages:

Error	Possible causes	Troubleshooting
Device cannot be switched on (display remains dark)	Is device plugged in to power supply?	Connect the device to the power supply.
	Mains switch correctly activated?	Check that the mains switch is in position "I".
	Fuses defective?	Replacing fuses
No activity on the display, although the device is switched on?	Defective display?	Contact the manufacturer.
Flashing warning signs	Error message?	See the list of error messages on the display.
Keys do not react	Keys not pressed correctly?	Control option: Audible signal when pressing key.
	Maximum or minimum set value reached?	Setting of parameters only within the specified parameter limits.
	Key defective?	Contact the manufacturer.
Recurring error message Error 013	Is flow-through in the oscillating tank blocked?	Check inlet and outlet and remove blockage/blockage. If necessary, the device must be flushed.
	Circulation pump defective?	Check to see if the water in the bath is circulating. If not, contact the manufacturer.
Unsatisfactory results	Degassing not conducted?	Always conduct degassing during preparation.
	Inadequate sample reagent used?	Use suitable reagent.
	Wrong ultrasonic power set?	Increase power.
	Ultrasound generator faulty?	Control option: After pressing the START/STOP button, no crackling noise can be heard, but the time runs continuously. Contact the manufacturer.
	Sonication not performed long enough?	Resume/repeat procedure.

Error	Possible causes	Troubleshooting
Ultrasonic bath oscillates weakly, unevenly or noise is too loud	Degassing not conducted?	Always conduct degassing during preparation.
	Irregular sounds?	No error. Slightly revise the fill level; if needed, remove a few samples.
Slight erosion visible on the tank bottom	Natural wear	Device OK.
Set temperature not reached	Is device being externally heated (e. g. by direct sunlight)?	Set up the device separately.
	Room temperature too high?	Observe the ambient conditions of the device
	Cooling unit defective?	Contact the manufacturer.
Low or no flow	Obstruction within the device due to residue?	Thoroughly flush the inside of the tubing system. If the desired results are not obtained or if the pump does not run, the device must be sent in for repair.

6 Maintenance

6.1 Cleaning and maintaining the ultrasound bath

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 care 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

ATTENTION

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 **6.4 Repair**.

Check LCD display

Check the operation of the indicator lights.

- Switch on the device.
- Check that the display is lit.

Cleaning the cooling system

The integrated cooling unit and pump must be flushed at regular intervals to prevent possible deposits resulting from the circulating contact liquid. To do so, check whether the flow is at approx. 3.5 l/min.

TICKOPUR TR 13 is recommended in 5% dosage for subsequent rinsing.

Procedure

1. Connect the hose to the emptying nozzle.
2. Place an empty bucket under the outlet.
3. Fill the bucket with contact liquid and get another one ready for refilling.
4. Switch on the device.
 - The pump must always be running during the inspection, the fill level of the tank must be above the inlet and the level sensor and must always be refilled.
5. Open the shut-off valve for 1 minute and refill the liquid continuously so that the level sensor is always covered in liquid.
6. Close the shut-off valve.
7. Check the liquid in the empty bucket provided after 1 minute.
 - » Bucket content at approx. 3.5 l after 1 minute -> no rinsing necessary.
 - » Bucket content well below 3 l after 1 minute -> rinse urgently.

Perform flush

Procedure

1. Drain the contact liquid.
2. Fill a bucket with 4.75 l lukewarm water and 250 ml TICKOPUR TR 13.
3. Close the shut-off valve and add the prepared rinsing fluid.
 - The oscillating tank can be filled past the filling level mark, the rinsing liquid may not fit completely in the tank due to the remaining contact liquid.
4. Set the bath temperature to 40 °C and allow the device to run for at least 1 h to allow the liquid to warm up.
5. Drain the rinsing fluid.
6. Close the shut-off valve.
7. Fill several times with clear water.
8. Put the device in operation for 5 minutes (with or without cooling).
9. Drain the liquid
10. Fill the device with the appropriate contact liquid if it will be put back into service.
 - » If impurities continue to come out of the hose system during rinsing, additional flushing is recommended.
 - » If the flow continues to be well below 3 l/min after several rinses, send in the device for maintenance ahead of schedule.

Monitoring the ultrasound

Procedure

1. Insert a standard commercial wattmeter between the mains plug of the device and the power outlet.
2. Fill the device with liquid.
3. Switch on the device.
4. Switch off the cooling
 - Set the target temperature to 40 °C (maximum)
5. Switch on the ultrasound.
6. Compare the measured value displayed on the wattmeter with the technical data (tolerance +/- 20%).
7. Switch off the ultrasound.
8. Switch on the cooling.
 - Setting of the target temperature must be at least 1 Kelvin below the actual temperature
9. Switch off the device.

Check the cooling

Procedure

1. Insert a standard commercial wattmeter between the mains plug of the device and the power outlet.
2. Fill the device with liquid.
3. Switch on the device while leaving the ultrasound switched off.
4. Switch on the cooling.
 - The target temperature must be set at least 1 Kelvin below the actual temperature.
5. Read off the measured value that is displayed on the wattmeter and note it down.
6. Wait until the cooling unit restart time of 2 minutes has elapsed.
7. Read off the measured value that is displayed on the wattmeter and note it down.
8. Calculate the difference between the two measured values.
9. Switch off the device.
 - » The measured value read when the cooling is switched on must be approx. 100-200 W greater than the measured value read when the cooling is switched off.

6.3 Maintenance

6.3.1 Maintenance by the manufacturer or qualified personnel

ATTENTION

Damage to the device

- Maintenance may only be carried out by the manufacturer or qualified personnel.

The device must be serviced every 2 years by the manufacturer or qualified personnel. Full functionality and safety-relevant properties are checked during maintenance. If maintenance is carried out by the manufacturer, this will include, in particular, a calibration of the performance parameters, replacement of internal components such as hoses, and the technical safety checks.

Maintenance kit/Scope of delivery

Maintenance kit (order no. 350003100):

- 1 T-hose connector
- 3 L-hose connector
- 1 Cooling water elbow
- 1 Insulating hose 12/9 mm, 2 m long (to be cut to length by the customer)
- 2 Hose clamps
- 1 Insulating hose 22/9 mm, 0.3 m long
- 35 Cable ties
- 1 TICKOPUR TR 13, 2 litres
- 1 TICKOMED 1, 1 litre

Documents supplied

- TICKOPUR TR 13 safety data sheet
- TICKOMED 1 safety data sheet
- TICKOPUR TR 13 product information
- TICKOMED 1 product information

Auxiliary material required

- Supplied maintenance kit
- Cross-recessed screwdriver
- Disposable gloves
- Hose cutting pliers, or a knife
- Side cutting nipper

Customer Service/Manufacturer

Before starting maintenance, the scope of delivery must be checked. If anything is unclear, please contact the manufacturer.

Carrying out maintenance

Disinfect the device before each maintenance. This consists of at least a surface disinfection with disinfectant wipes, but can also be performed extensively through a disinfecting rinse using a VAH-listed instrument disinfectant (observe the manufacturer's specifications).
Wear protective clothing until disinfection is completed (e.g. disposable gloves).

Focus of disinfection

- Oscillating tank
- Pump
- Cooling unit
- Outlet
- Interior of hoses

If you replace any components during maintenance, please note that individual parts and assemblies already used in the device, e.g. hoses, seals, pump parts, may potentially be contaminated and must therefore be disposed of after maintenance work is completed.

6.3.2 Visual test

Visually inspect the device for damage.

Visually inspect the following parts:

- Inspect the casing, plastic frame and generator for dents, cracks, damaged rivets, screws, or other damage.
- Check the mains cable for damage to the insulation or chafe marks.
- Check the display and front label for scratches and chipping.
- Check the device for dents, cavitation damage and the condition of the filling level mark.
- Check the outlet for any noticeable traces of fluid.

If the device is defective or damaged, send it to the manufacturer.

6.3.3 Functional check

Operate the device without accessories to check the function of all components. If the pump is defective, replace it if necessary and order this item separately. (Order no.: 3500160).

6.3.4 Pre-cleaning

- Clean the device with TICKOPUR TR 13 (10 % = 4.5 l water + 500 ml TR 13).
- Switch on the device.
- Operate the device without cooling for 1 hour (set target temperature to 40 °C, cooling cannot be switched off otherwise).
- Empty the device and rinse it with clear water.



Information

Flow-through test

While draining the liquid, a flow-through test can be performed by collecting the outgoing liquid for 1 minute while the pump is running. If necessary, the device should be refilled with fresh water so that the sensor is always covered by liquid. A container with a capacity of at least 5 l should be used to collect the liquid. After 1 minute there should be at least 3.5 l of liquid in the container.

6.3.5 Replace components

- Replace all hoses, incl. the moulded hose of the internal flushing circuit.
- Disassemble the functional pump according to the manufacturer's instructions and clean it thoroughly. If the pump is defective, install a new pump.

Cleaning the pump

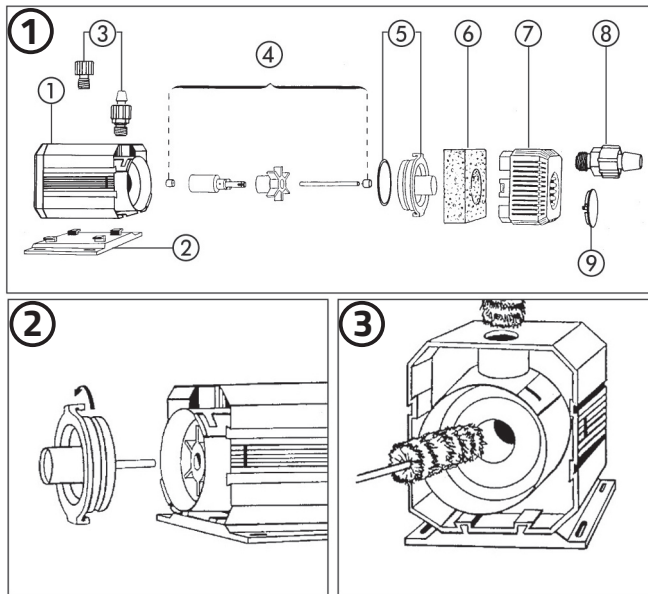


DANGER

Crushing hazard

During maintenance work, there is a risk of fingers being crushed due to high magnetic forces.

1. Disassemble the pump.
2. Unlock the pump cover (Fig. 2 – following diagram) and remove the pump parts according to the drawing (Fig. 1 – following diagram).
3. Clean the pump (Fig. 3 – following diagram) with a cleaning brush under running water.
4. Then reassemble the pump.
5. Check the function and delivery rate of the pump. If the pump delivery rate is less than 3.5 l/min, clean the pump or replace it (order no. 3500160).



- Rinse the device with TICKOMED 1 (3 % = 4.85 l water + 150 ml TICKOMED 1).
- Switch on the device.
- Run the device for 1 h without cooling (set the target temperature to 40 °C so that the cooling is not activated).
- Empty the device and rinse it with clear water.
- Repeat the cleaning process until no more impurities are visible and the liquid remains clear.
- Empty the device and rinse it thoroughly with clear water while the pump is active, so that the hoses are also flushed with water and any particles in the circuit are removed.

6.3.6 Replacing fuses

The device is protected by 2 electrical microfuses that will activate in the event of fault or overload. If one or both fuses blow, the device will stop functioning (the LCD display will remain dark). This generally means that the device is defective and must be sent to the manufacturer for repair.

The device does not need to be opened in order to replace the fuses. The fuses (2 units 5 × 20 mm, T4A) are housed in a plug-in module in the mains socket, which is located on the rear side of the device.

6.3.7 Determine software version and report data

The system data is exclusively used for service purposes. It must be communicated, when required, to authorised technical personnel or to the manufacturer.

Procedure

1. In standby mode, press and hold the up arrow button. A sub-menu will appear with various current temperature values for the device (Service menu).
2. Press the up arrow once to open another submenu with system data (e. g. serial number and software version).
3. Press the up arrow button once again to open a third sub-menu with the setting data of the ultrasonic generator (FH1).

The service menu may be exited at any time by pressing the START/STOP button.

6.4 Repair



WARNING

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" form here:

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

Fill out the form and attach it to the outside of the packing so that it is clearly visible. Acceptance will be refused 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

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.

Do not drain the refrigerant in areas where there is a risk of an explosive gas/air mixture forming.

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

8 Device information

8.1 Technical data

Elektrische Daten, allgemein

Type:	SC 255.2
Oscillating tank, interior:	280 × 150 × 150 mm (L × W × H)
External dimensions:	360 × 605 × 385 mm (L × W × H)
Housing:	Coated aluminium
Oscillating tank:	Stainless steel (1.4404), 2 mm welded
Working fill capacity:	5 litres (contact liquid ~4 litres in the tank + 1 litre in the cooling unit)
Adjustable bath temperature:	4 ... 40 °C (in a 20 °C environment)
Refrigerant	R-290
Refrigerant quantity:	0.09 kg
Cooling capacity:	200 W
Ultrasound output:	180 W, adjustable to 4 levels
Power setting	25%, 50%, 75%, 100%
Ultrasonic frequency:	35 kHz
Countdown operation:	up to 100 h
Emptying:	front left, concealed
Current consumption:	1.9 A
Nominal voltage:	230 V~ (± 10 %), 50 Hz
Protection class:	Class I
Weight (net):	29 kg
Degree of protection:	IP 2X according to IEC 60529

8.2 Ambient conditions

Overvoltage category:	II
Degree of contamination:	2
Permissible ambient temperature:	5 ... 35 °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	



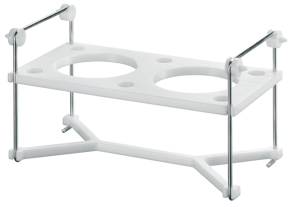




8.3 CE conformity

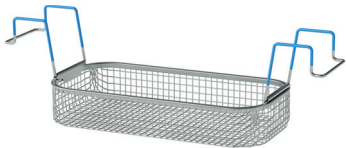

The device satisfies the CE-marking criteria of the European Union:

- 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

	Lid D 255 G, code no. 3515
	Sample holder PH 255-1 – code no. 3519
	Sample holder PH 255-2 – code no. 3518
	Sample holder PH 255-11 – code no. 3512
	Inset beaker SD 01.2 – code no. 3517 PU = 10 pieces
	Implant box IB 18 – code no. 3283 PU = 5 units
	Glass beaker SD 06 – code no. 330 with lid PU = 1 piece

	<p>Inset basket K 5 SC – code no. 302701 made of stainless steel</p>
	<p>Spring clamps EK ..., made of stainless steel, for laboratory flasks. Prevents them from floating. For screwing into inset baskets.</p> <ul style="list-style-type: none"> EK 10 – 10 ml, max. Ø 31 mm EK 25 – 25 ml, max. Ø 42 mm EK 50 – 50 ml, max. Ø 52 mm EK 100 – 100 ml, max. Ø 65 mm EK 250 – 250 ml, max. Ø 85 mm

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