



Instruction manual

Translation of operating manual

SONOREX TECHNIK

Stainless-steel double tank L 220/L 320

for cleaning and rinsing in a device with

lifting device LB 220.3/LB 320.3 and

suspended heater H 220.3/H 320.3



Example **SONOREX TECHNIK** L 220 with lifting device LB 220.3 and suspended heater H 220.3



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1 About this instruction manual

This instruction manual contains both necessary and useful information for operating the device safely and efficiently.

- Read this instruction manual before using the device.
- Pay particular attention to chapter **2 Safety**.
- If you pass this device on to someone else, provide this instruction manual with it.
- Should this instruction manual leave any questions unanswered, please contact your specialist dealer or BANDELIN. Notes on service can be found in chapter **6.3 Repairs**.

In the event that the translation cannot be understood, the German original version of BANDELIN must be followed.

BANDELIN assumes no responsibility or liability for damage caused by improper handling or use.

Illustrations are exemplary and not to scale. Decorations not included with delivery.

2 Safety

2.1 Using the device

The SONOREX TECHNIK L devices can be used to clean and rinse long, narrow objects to be cleaned, such as blinds, slats, filters, lamp screens and reflectors, quickly and thoroughly.

The devices are exclusively intended for operation with aqueous cleaning agents. The use of non-aqueous or flammable agents is not permitted.

Thanks to a double-chamber design, cleaning and rinsing can be performed in the same device. The objects to be cleaned are subjected to ultrasound and cleaned in the ultrasound chamber (1), which is equipped with immersible transducers.

The rinsing is then carried out in the separate rinsing chamber (2).

A solution consisting of water and a special specimen for application with ultrasound is used as the sonication liquid. Refer to Chapter **5.2 Filling** for information on the sonication liquid. Sonication items must not be placed on the bottom of the oscillating tank. They must be placed in an insert basket or other suitable container in the sonication fluid. An overview of suitable accessories can be found in chapter **9 Accessories**.

Do not allow the device to run without supervision.

The cleaning process can optionally be supported with a lifting device and a suspended heater. A filtration FA can be connected to extend the lifespan of the cleaning agent. When using additional devices, the relevant operating instructions must be followed.

The device is controlled at the front. SONOREX TECHNIK L devices are intended as floor-standing devices.

2.2 Keep away from children

Children may not detect hazards emanating from the device. Therefore, keep the device away from children.

2.3 Risk of electric shock

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

- Never let the device become wet. Keep the surface and operating elements clean and dry.
- Only transport the device when it is empty.
- Only empty the device when it is switched off.
- Do not shower the device or expose it to splash water.
- Disconnect the device from the mains before any cleaning or maintenance.
- Only connect the device to a socket with an earthed protective contact that matches the protective contact of the mains connector.



WARNING

Note for unit with type E+F jack:

Combination with socket type K (especially common in Denmark) is not permitted.

- If you discover a defect in the device, unplug it immediately. Do not connect any defective device to the mains.
- Only have repairs carried out by qualified personnel or by the manufacturer. See Chapter **6.3 Repairs**.
- Position the device in such a way that it is possible to disconnect the mains connection at any time without difficulty.

2.4 Damage to health due to ultrasonic noise

The ultrasound noise typical of a procedure can be perceived as very unpleasant. If you stay within a radius of 5 m for a long period, you may suffer damage to your health.

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

2.5 Danger due to high temperatures

The device, the sonication fluid and the sonication items may become hot during operation. Touching them may cause burns. The temperature can be set at up to 80 °C.

Ultrasound heats the sonication fluid even without additional heating. Very high temperatures can occur during prolonged operation of ultrasound. In the case of a device that has heating, the set temperature can be significantly exceeded by the energy of the ultrasound.

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

In the case of liquids with high boiling points, the bath temperature can rise to over 120 °C due to the energy supplied by the ultrasound. This can cause severe burns.

- Do not use combustible, explosive or non-aqueous liquids (e.g., petrol, solvent) or mixtures containing combustible liquids (e.g., alcoholic solutions) directly in the stainless-steel oscillating tank.
- The cover used must not completely seal the oscillating tank – steam must be able to escape.

2.6 Danger due to ultrasound

The strong ultrasound in the unit destroys cell structures. If a body part is immersed in the sonication fluid during operation, this can lead to skin damage, but also to internal tissue damage. The fingers' periosteum can become damaged.

- Do not reach into the sonication fluid during operation.
- Never expose living things to ultrasound.

2.7 Danger due to the specimens used

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

- Wear gloves and goggles when handling hazardous specimens.
- Do not ingest the specimens and avoid bringing them into contact with eyes or skin. Avoid bending over very close to the device in order to avoid vapours coming into contact with your eyes or inhaling the vapours.
- Place a lid on the device during operation. In the event of dangerous vapours, use an extraction system.
- Observe the information on the label and in the safety data sheet of the specimen.
- Keep specimens away from children and untrained persons.

2.8 Disposing of sonication fluid

Dispose of the sonication fluid according to the instructions of the manufacturers of the ultrasonic specimens used. The recommended ultrasonic specimens of the TICKOPUR product series from 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, substances hazardous to water, e.g., oils or heavy metal compounds, may have been introduced into the sonication fluid during cleaning. If the limit values for these substances are exceeded, the sonication fluid must be treated or disposed of as hazardous waste.

Observe local sewage regulations.

2.9 Erosion of the immersible transducers

The surface of the immersible transducers is subject to erosion. How quickly this erosion takes place depends on how the device is used. The erosion leads to leakage in the immersible transducers. This means that bath liquid can enter the interior of the immersible transducers. Moisture on electrical components can cause an electric shock or fire.

- Do not use the device if you notice a leak. Disconnect the mains plug immediately. Empty the oscillating tank.

You can extend the lifespan by observing the following instructions:

- Replace the sonication fluid if it has visible contamination from particles.
- Only use demineralised water (aqua purificata) with an ultrasound-compatible specimen.
- Do not use chemicals that contain or release chloride ions in the ultrasonic oscillating tank. This is the case with some disinfectants, household cleaners and dishwashing detergents. Chloride ions cause corrosion on stainless steel.
- Only use the device with accessories that are suitable for the device and the objects to be sonicated, e.g., a basket. Do not place any objects to be sonicated directly on the immersible transducers.

The cover used must not completely seal the oscillating tank – steam must be able to escape.

An overview of suitable accessories can be found in Chapter **9 Accessories**.

2.10 Preventing damage to the device

- Only use aggressive specimens in inset beakers or insert tanks. When working with aggressive specimens, avoid splashing into the contact liquid or onto the stainless steel surface. Replace contaminated sonication fluid immediately. Clean surfaces and wipe them dry.
- When using strongly acidic specimens, the ball of the ball valve can be affected. The ball valve will start to leak. If the use of strongly acidic detergents cannot be avoided, use a stainless steel ball valve.
- Do not operate the device without sonication fluid in the oscillating tank. Make sure that the heating is switched off when the oscillating tank is empty. The fill level must be at or just above the filling level mark.

2.11 Interference with wireless communication

The device may interfere with other wireless communication devices in close proximity, such as:

- mobile phones;
- Wi-Fi devices
- Bluetooth devices

If a wireless device malfunctions, increase its distance from the device.

The device complies with the requirements for Class B devices according to EN 55011.

2.12 Safety stickers on the device

- Observe all safety stickers on the device.
- Keep the safety stickers in a readable state. Do not remove them. Replace them when they are no longer legible. Please contact our customer service for this. See Chapter 6.3 Repairs.

2.13 Not overloading accessories

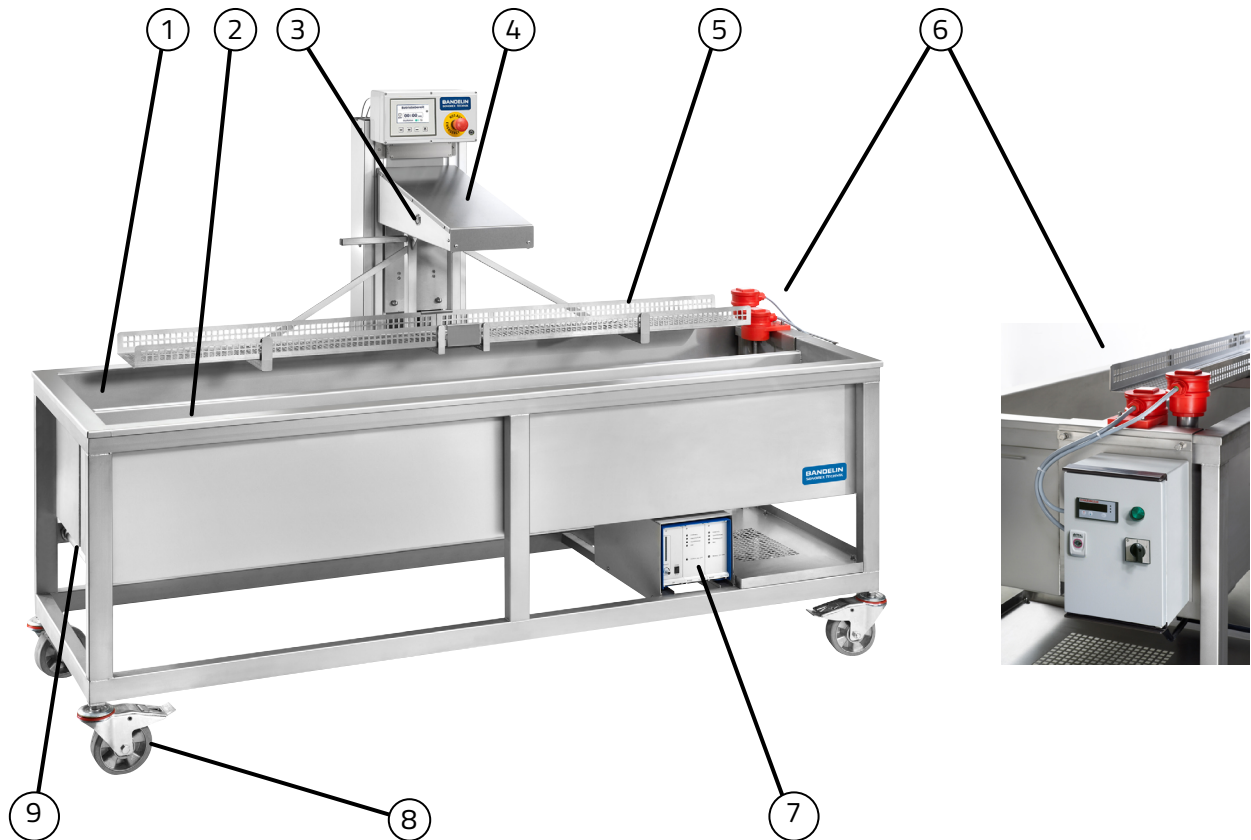
Observe the specified load capacity or load capacity of the respective accessory used.

- Accessories can be baskets and receptacles.
- The corresponding information can be found in the appendix or in the dimension sheet. If you do not have this information, please contact the manufacturer.

3 Construction and function

3.1 Construction

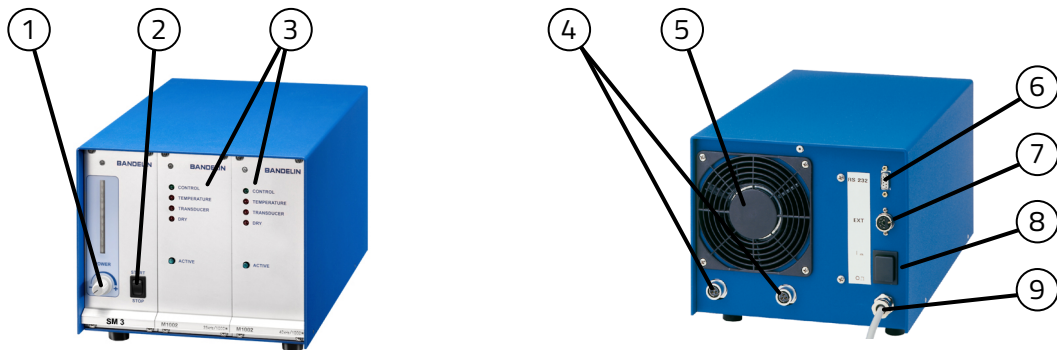
3.1.1 L 220/320 with lifting device LB and suspended heater H



- 1 Sonication chamber (1)
- 2 Rinsing chamber (2)
- 3 Pushbutton for two-handed operation (both sides)
- 4 Lifting device with oscillation and manual parallel displacement (optional)
- 5 Basket (part of the lifting device)
- 6 Suspended heater (optional)
- 7 LG generator
- 8 Lockable roller
- 9 Outlet (chamber 1 + 2 on the rear)

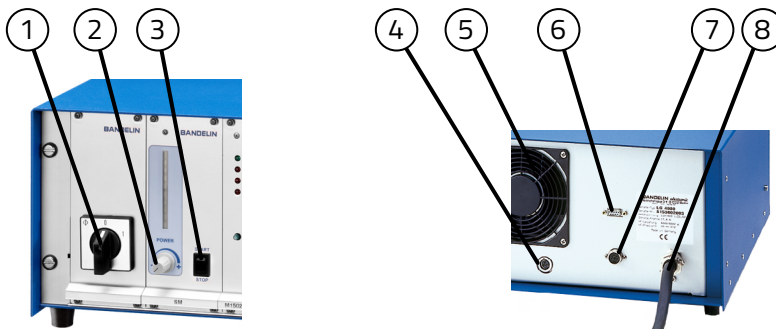
3.1.2 LG generator

L 220: LG 2002 T – front and back



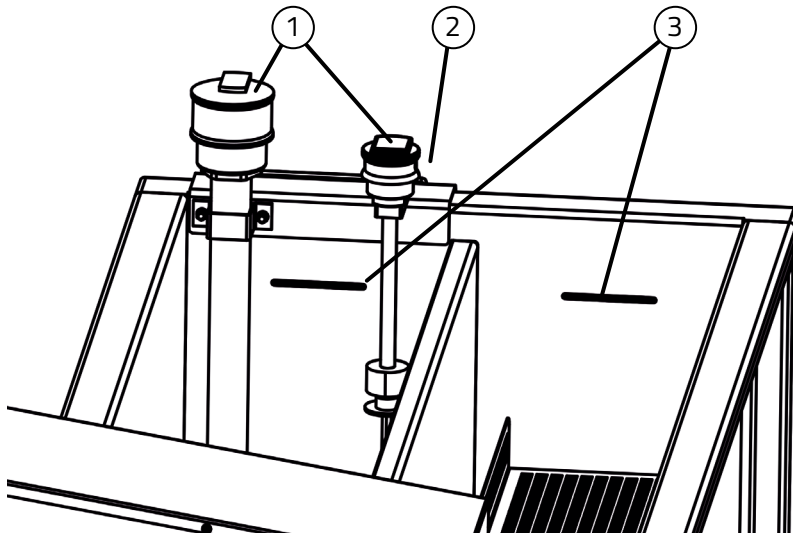
- 1 Control module with POWER control dial
- 2 HF switch
- 3 Power modules
- 4 HF connection
- 5 Fan
- 6 Serial interface RS 232
- 7 Remote control connection
- 8 Mains switch
- 9 Mains cable

L 320: LG 4004 F – front and back



- 1 Mains switch
- 2 Control module with POWER control dial
- 3 HF switch
- 4 HF connection
- 5 Fan
- 6 Serial interface RS 232
- 7 Remote control connection
- 8 Mains cable

3.1.3 Suspended heater H

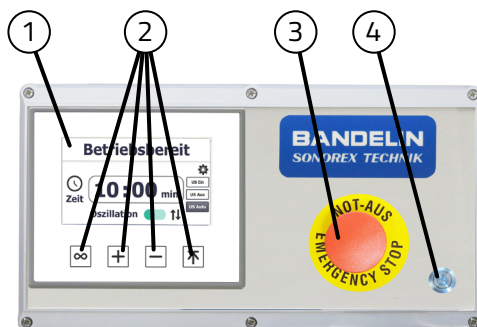


- 1 Suspended heater (left) with temperature sensor and float switch (right)
- 2 Control box for the heater
- 3 Embossed filling level mark (both sides)

3.2 Control panel

3.2.1 Control panel lifting device

Control console:



- 1 Display
- 2 Control buttons
- 3 EMERGENCY STOP switch
- 4 Main switch

Main switch

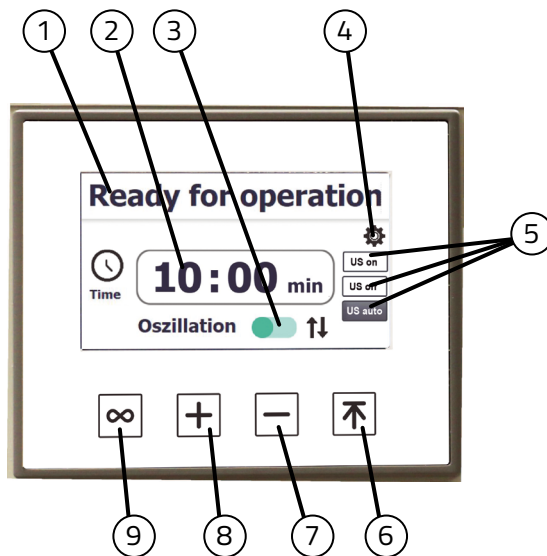
The lifting device is switched on by the main switch: for example, after having been switched off, or after the EMERGENCY STOP switch has been actuated.

The system takes about 30 seconds to start up.

After finishing work, switch off the lifting device using the main switch.

Touchscreen

The oscillation time is set via the control buttons on the display.



- 1 Operating status display
- 2 Duration
- 3 Oscillation (On/Off)
- 4 "Settings" button
- 5 "Ultrasound mode" buttons
- 6 "Drive-up" button
- 7 "Time setting" button (-)
- 8 "Time setting" button (+)
- 9 "Continuous operation" button

3.2.2 Heating control panel

Control box



- 1 Lock
- 2 Control panel
- 3 Toggle switch
- 4 Light (green)

The setpoint temperature of the heated tank can be set on the control panel (2); see chapter **5.4.1 Switching the heating on.**

The power supply of the heater can be activated or deactivated using the toggle switch (3). Light (4) will light up at the same time.

When a lifting device is used, the heating function is activated when the main switch on the lifting device is switched on and when the filling level in the tank is sufficient.

3.3 Function

The oscillating systems mounted in the immersible transducers convert electrical energy into mechanical oscillations. These cause the cleaning agent to vibrate at 40 kHz. This results in the formation of tiny vacuum bubbles, which implode. This process is called cavitation. Cavitation causes impurities to be removed from the objects to be cleaned quickly, thoroughly and down to a deep level, even in hard-to-reach areas, such as cavities, cracks, etc.



Information

In addition to the desired cleaning effect, cavitation also causes a hissing sound. To assess the cavitation noise typical of the process in ultrasonic cleaning devices, VDI guideline 2058, sheet 3 is applied. 85 dB AU is specified as the limit value for the noise level; dB AU means that the measurement is carried out with a filter in accordance with DIN IEC 1012. The cavitation noise is significantly reduced when the ultrasonic bath is covered with the appropriate lid. The following also have a noise-reducing effect:

- if necessary, move the items to a different position, e.g., rotate,
- change the immersion depth of the object to be cleaned; do not place anything on the sound-emitting surfaces,
- slightly change the fill level in the cleaning bath, possibly drain or top up some liquid; the fill level must not fall below the embossed filling level mark.

4 Preparation for operation

4.1 Installation site requirements

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

- The installation surface must be horizontal, firm and dry.
- Its load-bearing capacity must be sufficient for the device. For its weight, see Chapter 8.1 **Technical specifications for L 22 /L 320.**

4.2 Installation and connections

After removing the packaging, check the device and the additional equipment for any transport damage. Should you find any transport damage, do not connect the relevant devices to the mains, but report the damage immediately in writing to the shipping carrier and the supplier.

The original packing must be retained.

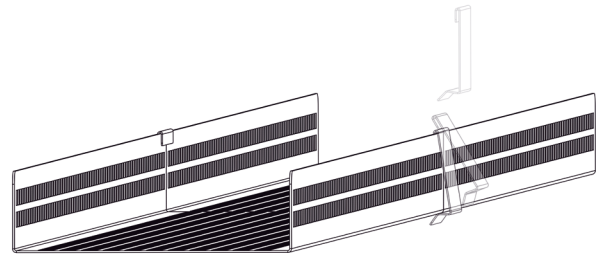
- ① Set up the cleaning device in a dry room and secure the device with the lockable rollers.
- ② Install the supplied ball valves, hose sockets and hoses at the outlet of the tank in accordance with the enclosed installation instructions.
- ② Place the storage racks on the bottom of the sonication and rinsing chamber.
- ② Check the switch positions on the LG generator.
The mains switch and the HF switch must be in the "OFF" position:
LG 2002 T → Mains switch to "0", HF switch to "STOP"
LG 4004 T → Mains switch to "0" and HF switch to "STOP"
- ⑤ Check the connections of the immersible transducers:
HF cable → If the jacks are not correctly inserted and engaged, this can lead to failure of the connection (burning through) or of the LG generator.
- ⑥ Connect the LG generator to the mains supply switch (grounded socket):
LG 2002 T → 230 V~ (± 10 %) 50/60 Hz
LG 4004 F → 400 V~ (± 10 %) 3NPE 50/60 Hz

4.2.1 Device with lifting device

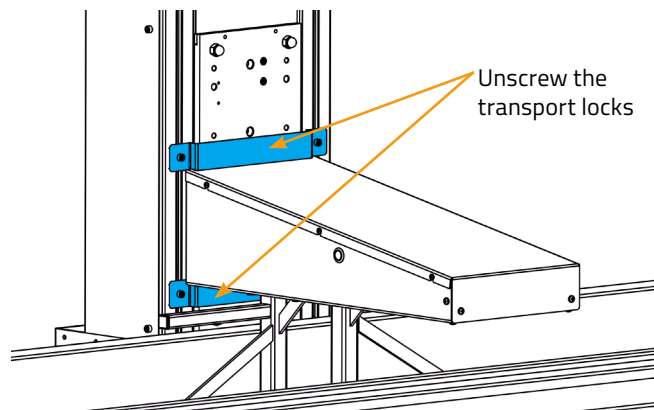
When operating with a lifting device, place the basket for the objects to be cleaned on the basket holder of the lifting device.

Assembly of multi-part basket:

Position the basket trays next to each other and clip the supplied clamps in at the connection point (see figure).



- Unscrew the transport locks on the lifting device.



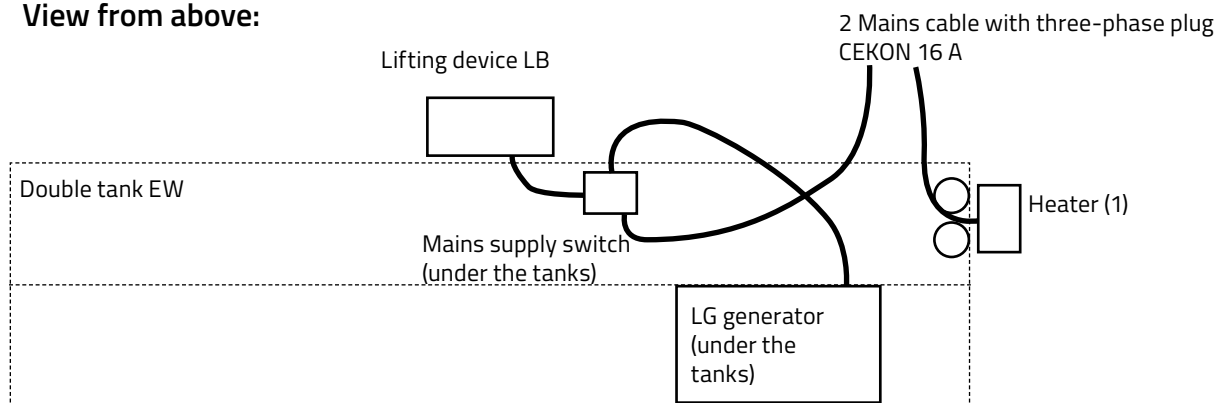
Connect the mains plug of the LG generator to the integrated grounded socket of the lifting device.

Check that the connection of the remote control is correctly connected to the LG generator. Only then connect the mains supply switch (lifting device)

- LB 220.3 to a grounded socket with 230 V~ ($\pm 10\%$) 50/60 Hz
- LB 320.3 to 400 V~ ($\pm 10\%$) 3NPE 50/60 Hz

Power supply

View from above:

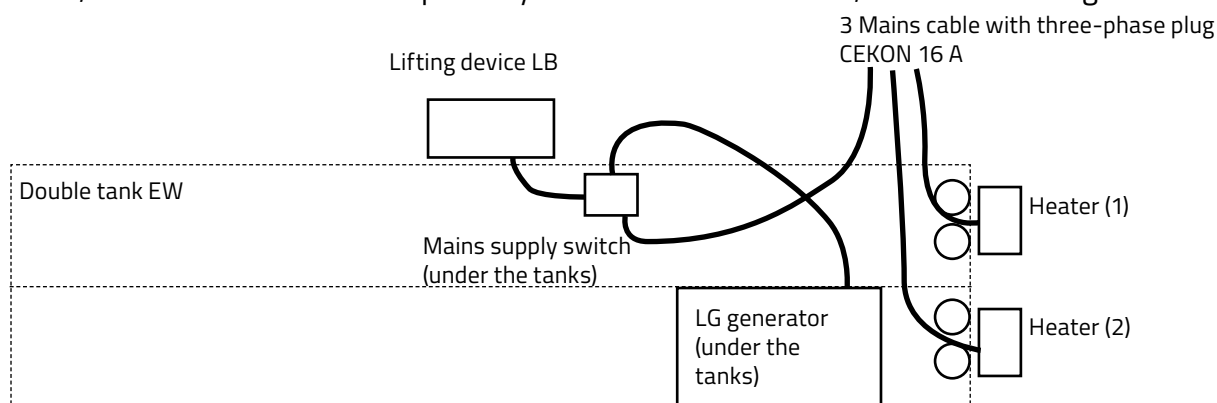


Before putting into service, check that all power supply connections are correctly plugged in; see the above sketch.

- The jack of the LG generator must be plugged into the mains supply switch.
- The jack of the mains supply switch must be connected to the mains.
- The jack of the heater must also be connected to the mains.

Optionally, up to 2 heaters can be mounted on an EW double tank

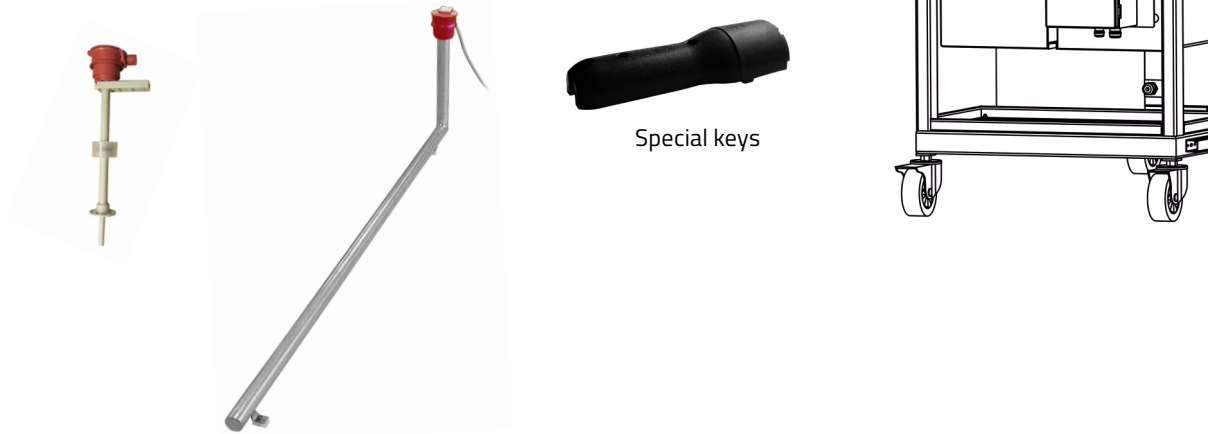
Here, the 2nd heater is also separately connected to the mains; see the following sketch



- The jack of the LG generator must be plugged into the mains supply switch.
- The jack of the mains supply switch must be connected to the mains.
- The jacks of the heaters must also be connected to the mains.

4.2.2 Suspended heater

If not pre-assembled, the suspended heater is suspended over the narrow side of the sonication and/or rinsing chamber (see Figure) and secured with two screws – to the left and right of the control box.



The suspended heater is already completely wired with a temperature controller, float switch and control box.

The setpoint and the actual temperature display can only be set via the operating panel of the heater controller.

Connect the suspended heater H 220.3/320.3 to 400 V~ ($\pm 10\%$) 3NPE 50/60 Hz.

4.2.3 Filtration

⇒ follow separate operating instructions.

Before connecting, check that each device is switched off.

Connect filtration FA 220/320, together with the attached connection material, to the sonication chamber, and then to a 230 V~ ($\pm 10\%$) 50/60 Hz grounded socket.

5 Operation

5.1 Putting into service

Requirements

- The mains plug is plugged into a grounded socket.
- The outlet has been closed with the mounted ball valve.
- All peripheral devices have been connected.
- When operated together with the lifting device, the SONOREX TECHNIK L device is controlled on the control console of the lifting device.
The main switch has been actuated.
The display lights up.

Procedure

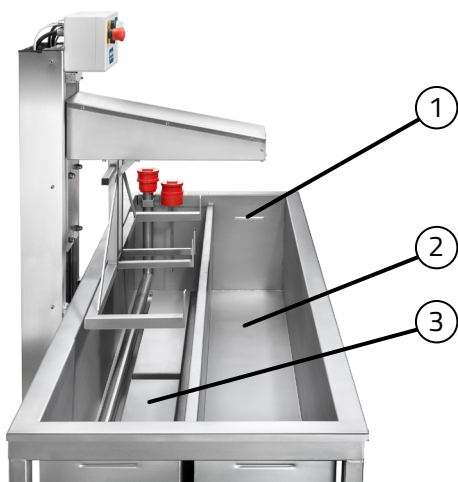
1. Fill the ultrasonic device with cleaning agent.
2. Preheat the cleaning agent.
3. Place objects to be cleaned either on the storage rack or in the basket of the lifting device, then position them over the relevant chamber.

5.2 Filling

Fill the sonication chamber (1) with water and a cleaner suitable for the cleaning purpose, up to the filling level mark.

Fill the rinsing chamber (2) with water up to the filling level mark.

Illustration with heater and lifting device without basket



- 1 Filling level mark (in each case, on both sides)
- 2 Rinsing chamber (2), without immersible transducer
- 3 Sonication chamber (1)

i Information

- The liquid must not fall below the filling level mark, in order to protect the device from irreparable damage caused by dry running of the immersible transducers.
-

Temperature/heating

i Information

- The suspended heater must be switched on separately.
 - When preheating the cleaning agent, the liquid must be briefly stirred at least every 15 minutes or the ultrasound must be switched on for 5 minutes (retardation of boiling!). Depending on the working filling volume, the liquid heats up by about 20 °C per hour.
 - Ultrasound heats the cleaning agent in the sonication chamber even without additional heating.
 - During continuous operation, and when the device is covered, the temperature of the cleaning agent can rise above the set value.
 - Cover the device during continuous operation so that not too much cleaning agent evaporates.
 - For safety reasons, the device should be covered when not in use to prevent operating or other personnel from accidentally reaching into the cleaning or rinsing agent and injuring themselves while the liquids are still hot.
 - The heater is equipped with a float switch. If the filling level is too low, the heating is switched off.
-

5.3 Degassing

Degassing the cleaning agent increases the impact of the cleaning.

Cleaning agents contain dissolved gases (e.g., oxygen) that reduce the ultrasound effect.

Therefore, degas any cleaning agent that has been freshly poured in, or which has remained in the sonication chamber (1) for a long time, for approx. 30 minutes before use.

During degassing, the cavitation noise will change; loud degassing noises will stop at the end of the degassing process, and the device will seem to work more quietly. A low noise level does not mean a decrease in the ultrasonic power, but the end of the degassing process and an improvement in the cleaning effect.

5.3.1 Degassing without a lifting device

- Switch on the LG generator:
LG 2002 T → Mains switch to "I";
LG 4004 F → Mains switch to "I"
- Switch on the ultrasound for 30 minutes: HF switch on the LG generator to "START".

5.3.2 Degassing with a lifting device

- Switch on the LG generator:
LG 2002 T → Mains switch to "I";
LG 4004 F → Mains switch to "I"
- HF switch on the LG generator to "START".

Controlling then only on the lifting device:

- Press the main switch.
- After start-up, the selection "US On" must be selected.
The ultrasound will be started.



Information

- The device does not switch off automatically.
If further cleaning processes are planned subsequently, the main switch does not have to be actuated.

5.4 Cleaning

The cleaning is carried out in the sonication chamber (1).

Before the device is switched on, the objects to be cleaned must be placed on the storage racks or, during operation with the lifting device, in the basket – not on the immersible transducers at the bottom of the sonication chamber.

Place the more soiled side downwards, and do not stack too many parts on top of each other; ultrasound will be absorbed.

Check the filling level, especially after prolonged periods of non-use or prolonged operation.

5.4.1 Switching the heating on



- 1 "Up" button
- 2 "Down" button
- 3 "SET" button
- 4 LEDs 1 to 3

Status of LEDs 1 to 3

- LED 1: Lights up red when heater is heating
- LED 2: Lights up red when the minimum filling level has been reached.
- LED 3: Always stays off.

- The temperature controller is set to 40 °C on delivery.
- To change the setpoint, the "SET" button must be pressed and held. Set the target temperature at the same time using the "up" and "down" buttons. The setpoint is automatically saved by releasing the "SET" button.

NOTICE

Device damage

- Never operate the heater without liquid.
- To operate the heater, the minimum filling level must be observed. If the filling level is too low, the ultrasound and heating are switched off.

**CAUTION****Risk of scalding**

- During prolonged operation with ultrasound, the cleaning agent heats up. When cleaning temperature-sensitive parts, therefore, check the temperature.
- When preheating the cleaning agent, the liquid must be briefly stirred at least every 15 minutes or the ultrasound must be switched on for 5 minutes to rule out retardation of boiling.

5.4.1.1 Control without a lifting device

Control is carried out directly on the control box

5.4.1.2 Control with a lifting device

The heating can be activated or deactivated via the toggle switch on the control box.

If the liquid is to be preheated, the central lifting device and the toggle switch on the heating control must be switched on before the start of cleaning.

- To operate the heater, the entire unit must be switched on, and the minimum filling level must be observed.
To switch on the unit, the main switch of the lifting device must be switched on.
The EMERGENCY STOP switch must not be pressed.
- The light on the control box will light up green when voltage is applied.
Once the tank has been filled and the main switch on the lifting device has been switched on, as well as the toggle switch on the heating control box, the actual value for the temperature will be displayed.

5.4.2 Cleaning without a lifting device

- Switch on the LG generator:
LG 2002 T → Mains switch to "I",
LG 4004 F → Mains switch to "I"
- Switch on the ultrasound: HF switch on the LG generator to "START"; if necessary, set the desired cleaning time on the timer of the remote control FS 15 L (accessory).
- After the ultrasonic cleaning, rinse the objects to be cleaned manually in the rinsing chamber (2).

NOTICE

If not used for a long time, switch off the LG generator

- LG 2002 T Mains switch to "0",
- LG 4004 F Mains switch to "0"

5.4.3 Cleaning with a lifting device

- Push the basket holder with the objects to be cleaned over the sonication chamber (1) (rear position, up to the stop – see Chapter 5.4.3.5 Locking the parallel displacement).
- Turn the LG generator on:
LG 2002 T → Mains switch to "I",
LG 4004 F → Mains switch to "I"
HF switch on the LG generator to "START".

Controlling then only on the lifting device:

- Press the main switch.
- After start-up, the selection "US Auto" must be selected.
- Set the desired cleaning time – see Chapter 5.4.3.2 Timed operation.
- To start the programme, press the two pushbuttons of the two-hand control until the basket is lowered below the top of the tank.
- The ultrasound will be switched on automatically.
- Once the set time has elapsed, the basket will automatically lift back to the starting position and the ultrasound will be switched off.



Information

- The device does not switch off automatically.

i Information

- If not used for a long time, the device must be switched off using the main switch.

EMERGENCY STOP switch

If there is a danger, press the red EMERGENCY STOP switch. This will put the lifting device out of operation. The basket will not be returned to the starting position.

It is released by turning the knob to the left.

The oscillation will remain stopped despite the release of the EMERGENCY STOP switch.

Only when the main switch is pressed will the oscillation be continued, or the lifting cart will be moved to the top end position.

⚠ WARNING

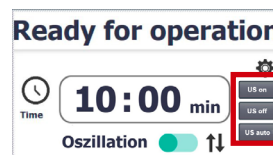
The device has several switch-on devices.

- The EMERGENCY STOP switch deactivates the lifting device, the ultrasound of the sonication chamber (1), and the heater (if there is one).
- However, the heater control can only be switched off by switching off the heater toggle switch.
- Optional peripheral devices are not deactivated by the EMERGENCY STOP switch.

5.4.3.1 Selection – Ultrasound mode (US)

The Ultrasound mode selection allows you to determine when and whether the ultrasound will be switched on.

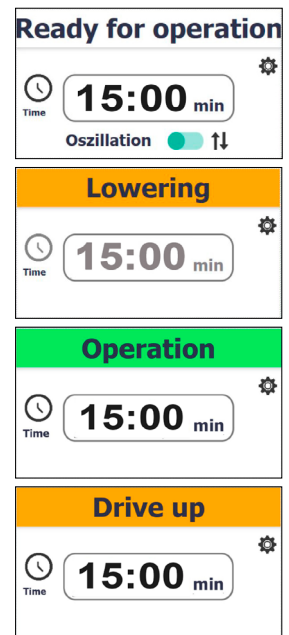
- "US On"
Ultrasound will be switched on.
- "US Off"
Ultrasound will be switched off.
- "US Auto"
Ultrasound will be switched on automatically during lowering and oscillation and will be switched off after start-up.



5.4.3.2 Timed operation

The duration is set with the control buttons on the display.

- Set the target time in minutes using the control buttons (+ and -).
 - Press and hold the two-hand control for 3 seconds.
 - The further process will take place automatically. The set time in the display will run downwards.
 - Once the time has elapsed, the lifting cart will move upwards and back into the starting position.
 - Re-actuating the two-hand control will cause the same process to be repeated.
- Pressing any button of the two-hand control once will lead to termination of the time programme.
 - The lifting cart will move upwards, back into the starting position.



Continuous operation:

- Set by pressing the "Continuous operation" button
 - An abort can be carried out at any time by pressing any button of the two-hand control.
- Continuous operation is switched off by pressing the "Continuous operation" control button for a long time

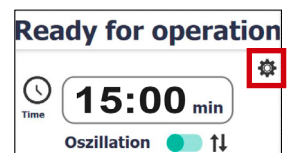


Information

- When switched off, the lifting device can remain connected to the mains. The mains is disconnected by pulling the mains plug.

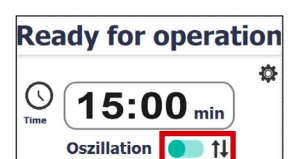
5.4.3.3 Additional settings

Pressing the "Settings" button allows another language to be set and the operating hours display to be called up.
Possible settings: German, English, French



It is possible to switch the oscillation on or off in the display.

- When oscillation is activated, the lifting device moves downwards after lowering and then oscillates in the ultrasound bath or rinsing bath for the duration of the operating time.
- If oscillation is switched off, the lifting device will only move into the lower position after it has been lowered down, and it will move upwards again after the time has elapsed.

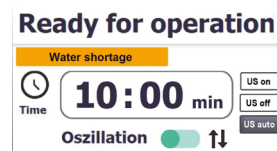


5.4.3.4 Warning – Water shortage

If the fill level is too low, the float switch will detect a water shortage. As a result, the heating and the ultrasound will be switched off. The warning message "Water shortage" will appear on the display.

Important:

The filling level in the rinsing chamber (2) is not documented on the touchscreen, even if the device is equipped with 2 heaters.



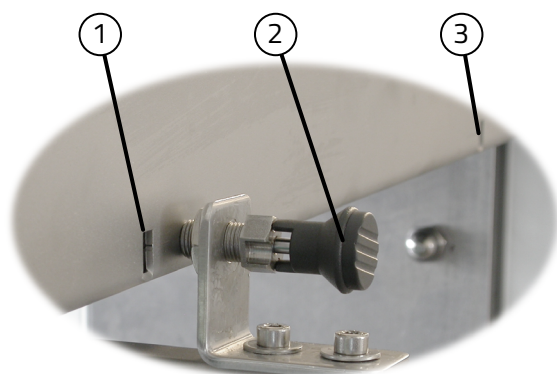
5.4.3.5 Locking the parallel displacement

The lock is located on the right side of the lifting device.

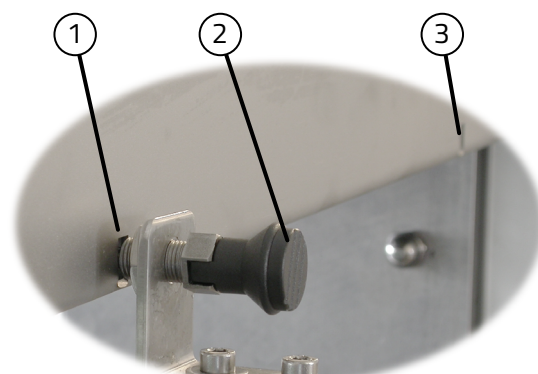
By pulling out the locking device and then turning it (90°), you can release it, and the basket can be pushed manually over the sonication chamber (1) or over the rinsing chamber (2). The correct position of the basket is reached once it is at the front or rear stop, as the case may be.

Secure the locking device by turning it (90°) and snapping it into the recess.

Locking device open



Locking device engaged



- 1 Front recess (rinsing chamber)
- 2 Lock
- 3 Rear recess (soundproofing chamber)



Information

- Oscillation of the lifting device can only be switched on if the lock is correctly engaged.

5.5 Rinsing

Rinsing is carried out in the rinsing chamber (2), after the cleaning.

5.5.1 Rinsing without a lifting device

To rinse, lay or place the objects to be cleaned on the storage racks in the rinsing chamber (2).

5.5.2 Rinsing with a lifting device

- Pull the basket holder with the objects to be cleaned over the rinsing chamber (2) (front position, up to the stop – see Chapter **5.4.3.5 Locking the parallel displacement**).

Control only on the lifting device:

- Press the main switch.
- After start-up, the selection "US Auto" must be selected.
- Set the desired duration – see Chapter **5.4.3.2 Timed operation**.
- To start the programme, press the two pushbuttons of the two-hand control until the basket is lowered below the top of the tank.
- Once the set time has elapsed, the basket will automatically lift back to the starting position.



Information

- The device does not switch off automatically.

5.6 Emptying

Before the chambers are emptied, especially the sonication chamber (1), it is necessary to check that the ultrasound and the heating are switched off.

5.6.1 Emptying without a lifting device

- Switch off the ultrasound: HF switch on the LG generator to "STOP"
- Switch off the LG generator:
LG 2002 T → Mains switch to "0",
LG 4004 F → Mains switch to "0"
- Open the ball valve of the relevant chamber, or both ball valves.

5.6.2 Emptying with a lifting device

- Switch off the ultrasound: HF switch on the LG generator to "STOP"
- Open the ball valve of the relevant chamber, or both ball valves.

6 Maintenance

6.1 Servicing

Guide rails

- The vertical guide rails (lifting device LB) are hard chromium plated. To extend their lifespan, they must be cleaned at regular intervals with an oily cloth.

6.2 Cleaning and caring for the device

- Do not use abrasive cleaning agents; only use commercially available care products without abrasive additives.
- Only wipe the device from the outside; use a suitable surface disinfectant if necessary, then let it dry or rub it dry.
- Replace any cleaning agents used in the sonication chamber (1); do not refresh them by subsequent dosing.
- Layers of contamination on the sound-emitting surface of the immersion transducers reduce the performance and must therefore be removed. To do this, drain liquid from the chamber and clean the immersible transducers with a soft cloth and a commercially available stainless-steel care product without abrasive additives; do not use steel wool or scrapers.
- If rims remain on the stainless steel surface of the chambers after prolonged use, they must be removed with a commercially available stainless-steel care product without abrasive additives.
- Observe the maintenance and care instructions for any connected filtration, based on its operating instructions.
- In the event of a malfunction of the LG generator, observe the instructions in the separate operating instructions.

6.3 Repairs

During the warranty period, contact your specialist dealer or the manufacturer.
Only have repairs carried out by qualified personnel or by the manufacturer.
The manufacturer assumes no liability for unauthorised interventions on the device.



WARNING

Health hazard 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 the accessories before shipment.
The "Certificate of decontamination" serves the occupational safety and health of our employees in accordance with the German "Infection Protection Act" (Infektionsschutzgesetz) and the Accident Insurance Regulations (UVV) of the employers' liability insurance associations.
Before being returned for inspection/repair, the device and accessories must be cleaned in accordance with the applicable laws and regulations and, if necessary, disinfected with a surface disinfectant that is listed by the VAH (Association of Applied Hygiene).
Please understand that we can only start the work if this certificate is completed in full.
Download the "Certificate of decontamination" form here:

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

Fill out the form and attach it so as to be clearly visible on the outside of the packaging. Acceptance will be refused without a completed form.



Send the unit to the following address:

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

+49 30 76880-2674
service@bandelin.com

7 Disposal



WARNING

Health hazard 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 properly as electrical waste if it can no longer be used. Do not dispose of the device in the household waste. Observe local regulations for the disposal of electrical waste.

The oscillating elements contain sintered ceramics made of lead zirconium titanate.

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



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

Dispose of accessories as metal scrap or as plastic waste according to the material used.

8 Information about the device

8.1 Technical specifications for L 22 /L 320

Device	L 220	L 320
Double tank with support	EW 220	EW 320
Internal dimensions per chamber (L × W × D) in mm	2200 × 300 × 300/370*	3200 × 300 × 300/370*
Internal dimensions per chamber with installed heater (L × W × D) in mm	2130 × 300 × 300/370*	3130 × 300 × 300/370*
Operating volume in l	185/205*	270/295*
Material of the chambers	Stainless steel 1.4404, 2 mm	
Outlet per chamber	G 1	
External dimensions (L × W × H) in mm	2320 × 750 × 850	3320 × 750 × 850
Overall external dimensions with lifting device LB (L × W × H) in mm	2320 × 1040 × 1770	3320 × 1040 × 1770
Overall external dimensions with lifting device LB and suspended heater H (L × W × H) in mm	2520 × 1040 × 1770	3520 × 1040 × 1770
Fuse in A (with lifting device)	16	3 × 16
Net weight in kg	260	330

Device	L 220	L 320
Immersible transducers		
Ultrasonic power/immersion transducer	2000 W/2 × T 4024 AB	4000 W/4 × T 4020 AB
HF frequency	40 kHz	
Material	Stainless steel 1.4404, 2 mm	

* Sonication/rinsing chamber

8.2 Technical specifications for LG generator

For control, see separate operating instructions.

Mains supply:

LG 2002 T	230 V~ (± 10%) 50/60 Hz, mains cable length 2 m
LG 4004 F	400 V~ 3NPE 50/60 Hz, mains cable length 3 m

Ultrasonic frequency: 40 kHz

Power consumption:

LG 2002 T	2.5 kW
LG 4004 F	4.5 kW

Degree of protection IP 20

Environmental conditions according to EN 61 010-1

Overvoltage category:	II
Degree of contamination:	1
Permissible ambient temperature:	5 to 40 °C
Permissible relative humidity to 31 °C:	80%
Permissible relative humidity to 40 °C:	50%
No dewing.	
For indoor operation only.	

8.3 Technical specifications for lifting device LB 220.3/LB 320.3

Mains connection:

- LB 220.3 230 V~ ($\pm 10\%$) 50/60 Hz, mains cable length 5 m
- LB 320.3 400 V~ 3NPE 50/60 Hz, mains cable length 5 m

Load: max. 40 kg

Travel speed: 1.4 – 4.3 m/min

Oscillation height: 40 – 430 mm

Degree of protection IP 20

Environmental conditions according to EN 61 010-1

Degree of contamination: 1 according to IEC 60664-1

Overvoltage category: II

Permissible ambient temperature: 5 to 40 °C

Permissible relative humidity to 31 °C: 80%

Permissible relative humidity to 40 °C: 50%

No dewing.

For indoor operation only.

8.4 Technical specifications for suspended heater

Suspended heater	H 220.3	H 320.3
Immersion pipe: Ø × length	45 × 1750 mm	45 × 2200 mm
Power rating:	6.3 kW	7.0 kW

Mains voltage:	400 V~ 3NPE 50/60 Hz
Mains cable length	3 m
Temperature controller – permissible control range:	0 ... 80 °C
Temperature sensor dimensions:	Ø 11 × 300 mm
Switching difference:	6 K
Minimum immersion depth:	100 mm
Degree of protection:	IP 64

Environmental conditions according to EN 61 010-1

Degree of contamination:	1 according to IEC 60664-1
Overvoltage category:	II
Permissible ambient temperature:	5 to 40 °C
Permissible relative humidity to 31 °C:	80%
Permissible relative humidity to 40 °C:	50%
No dewing.	
For indoor operation only.	

8.5 CE conformity

The devices meet the CE marking criteria of the following European directives:

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

The declaration of conformity can be requested from the manufacturer.

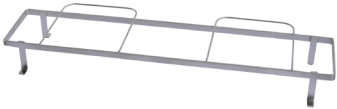
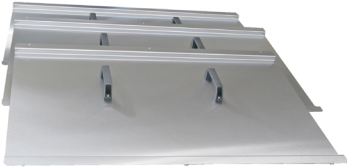

The lifting devices SONOREX TECHNIK LB 220.3 or LB 320.3 additionally meet the following requirements:

- 2006/42/EC – Machinery Directive




The declaration of conformity is supplied with the device.

9 Accessories



9.1 Optional

	<p>Storage rack per chamber</p> <p>Dimensions L x W x H: 1000 x 285 x 110 mm</p> <p>LR 220, two-piece</p> <p>LR 320, three-piece</p>
	<p>Cover with handles</p> <p>D 220, two-piece</p> <p>D 320, three-piece</p>
	<p>Cover with handles (for device with heater)</p> <p>D 220 H, two-piece</p> <p>D 320 H, three-piece</p>

9.2 Additional equipment

	<p>Lifting device with oscillation and parallel displacement over the basin, including the basket (open at the narrow sides) Dimensions L × W × H approx. LB 220.3 950 × 215 × 60 mm LB 320.3 1440 × 215 × 60 mm</p>
	<p>Suspended heater with temperature controller H 220.3 6.3 kW H 320.3 7 kW</p>
	<p>Filtration with pre- and main filter, incl. set of connections By continuously filtering out the cleaned particles, the bath service life is extended, and the cleaning power is retained. FA 220 FA 320</p>

9.3 Additional equipment for the LG generator

	<p>Remote control with timer 1 to 15 min/continuous operation, cable length 7 m FS 15 L</p>
	<p>Remote control cable with 7-m cable length, with a jack on one side FS 7</p>



Information

The additional equipment for the LG generator is only useful when operating without lifting device LB. When operating with lifting device LB, remote control of the generator via the control panel is already provided ex works.

10 Annex

Recommended specimens

The choice of one of the following concentrates will depend on the cleaning task in question and the degree of soiling contamination.



TICKOPUR R 33

Universal cleaner with corrosion protection for the service, industry, technology and laboratory sectors, material protecting, mildly alkaline, pH 9.9 (1%), application 3–5%

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

From metal, glass, ceramic, plastic, rubber, windows, glasses, e-filters, respiratory masks (EXAM report no 5734/06), etc. Caution with tin and zinc.

TICKOPUR R 36

Special cleaner, surfactant-free, for analysis and laser technology, for cleaning lamellae, material-protecting, non-foaming, mildly alkaline, pH 10 (1%), application 0.25–5%

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

From steel, precious and light metal, ceramic, plastic, rubber, glass, optical glasses, vertical and horizontal lamellae. Caution with tin and zinc.

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