OPERATING INSTRUCTIONS

highea 3 highea 6 highea 9

Ultrasonic Cleaning Units
S30H - S60H - S100H

CE

□ english □

97050963(1) 2017-09

CONTENTS

1 General Information

The present Operating Instructions are part of the delivered equipment. They must be ready for use at any time and remain with the unit in case of resale.
We reserve the right to carry out technical modifications on the unit due to advanced development.
An operating manual cannot take account of every conceivable use. An operating manual cannot take account of every possible use. Contact your dealer or the manufacturer for further information or in the event of problems which are not covered or not sufficiently covered in this operating manual.

2 Important safety warnings

Please observe any additional national safety regulations that may apply.

2.1 Instructions for the use of the present manual

Carefully read the Operating Instructions before you operate the unit. Do not use the present electrical unit for any purpose other than described in the Operating Instructions.

Warning symbols used in the present manual

	This symbol warns of the risk of injury caused by electricity.
	This symbol warns of the risk of injury caused by explosion and/or deflagration.
	This symbol warns of the risk of injury caused by hot surfaces and liquids.
	This symbol warns of the risk of injury.
	This symbol warns of the risk of damage to the equipment.
	This symbol marks additional information.

Signal words used in the present manual

Danger	The signal word Danger warns of a potential risk of serious injury and danger to life.
Warning	The signal word Warning warns of the risk of serious injury and heavy damage to the equipment.
Caution	The signal word Caution warns of the risk of light injury or damage to the equipment.
Attention	The signal word Attention warns of the risk of damage to the equipment.

2.2 Intended Use

This ultrasonic cleaning device is only intended for the treatment of medical, surgical, invasive and non-invasive devices.

2.3 Instructions for the use of the unit

User
Operation of the unit by authorized and instructed staff only. Observe the instructions given in the manual.

Mains connection
For safety reasons, the present unit must be connected to a correctly grounded socket only. The technical details indicated on the nameplate must correspond with the available mains connection details, in particular those of the mains voltage and current connected value.

Prevention of electrical accidents
For purposes of maintenance and care of the unit, in case of suspected humidity inside the unit or in case of malfunctions and after operation pull the mains plug.
The unit must be opened by authorised specialised personnel only!

Cleaning liquid
Fill the unit with a sufficient quantity of cleaning liquid before switch-on. Flammable liquids must not be treated by ultrasound directly in the cleaning tank: risk of fire and explosion!

Hot surfaces and liquids
Risk of burning and scalding! Depending on the operational period of the unit, unit surfaces, cleaning liquid, basket and cleaning items can heat up considerably.

Noise emission
Ultrasonic units can produce annoying sounds.
Wear personal ear protection devices when working close to an ultrasonic unit which is operated without cover.

Sound transmission at physical contact
Do not reach inside the cleaning liquid or touch sound-carrying parts (tank, basket, cleaning items, etc.) during operation..

Exclusion of liability
The manufacturer cannot be held liable for damages on persons, equipment or cleaning items caused by improper use. The operator is responsible for the instruction of the operating staff.

Storage and transport conditions
Temperature during storage: +5 C (+ 41 F) to + 40 C (+ 104 F)
Temperature during transport: -15 C (+ 5 F) to +60 C (+ 140 F)
Humidity and air pressure during storage and transport:
10% - 80 % relative humidity; non-condensing
Pressure range 500 hPa – 1060 hPa absolute

3 Functioning

Today, cleaning by ultrasound is the most modern fine cleaning method.

The electric high-frequency energy created by an ultrasonic generator is transformed into mechanical energy by piezo-electrical transducer systems and is then transmitted into the bath.

This process creates millions of tiny vacuum bubbles which implode due to the variations of pressure caused by the ultrasonic activity. Highly energetic liquid jets are created. These jets remove dirt particles from surfaces and even from the smallest grooves and bores.

3.1 Ultrasonic cleaning factors

 Basically, the cleaning result depends on four factors:

Mechanical energy

Ultrasonic energy is probably the most important mechanical factor in the cleaning process. This energy must be transmitted through a liquid medium to the surfaces which are to be cleaned.

The present unit is fitted with the innovative sweep function device: electronic oscillation of the sound field (sweep function) prevents the formation of zones of low performance in the ultrasonic bath.

Cleaning media

For saponification and removal of the dirt particles a suitable cleaning agent is required. Cleaning chemicals are also necessary to reduce the surface tension. This increases considerably the efficiency of the ultrasonic activity.

Temperature

The effect of the cleaning medium is improved by the optimised temperature of the cleaning liquid.

Cleaning period

The cleaning period depends on the degree and the kind of contamination and on the correct selection of ultrasonic energy, cleaning agent and temperature.

4 Product description

4.1 Product features

- Cleaning tank made of cavitation-resistant stainless steel.
- Casing made of stainless steel, hygienic and easy to clean.
- High performance sandwich transducer systems.
- Sweep function for an optimised sound field distribution in the cleaning liquid.
- Degas function for the efficient degassing of the cleaning liquid and for laboratory purposes.
- Auto degas function for automatic degassing cycles, i.e. with fresh cleaning liquids.
- Quick-drain valve on the back of the unit.
- Dry-run protected heating
- Temperature-controlled ultrasonic operation: the cleaning process starts automatically when the set temperature is reached; the cleaning liquid is regularly mixed during the heating up so that the cleaning liquid is evenly heated
- Automatic mixing during heating-up period.
- Plug-in mains supply.
- Electronical turning knobs.
- Display of both set values and actual values via LED settings.
- Splash-water-proof operating panel.
- Plastic carrying handles.
- Automatic switch-off after 12 h operation to prevent unintended permanent operation.

4.2 Relevant European Directives

The product described in this manual is manufactured in accordance with the highest safety standards and doesn't represent any danger for the operator if used according to the following instructions.

The product is in accordance with the following European Directives as applicable:

- 93/42/CEE, and subsequent amendments and additions, concerning medical devices.
- 2011/65/UE (Rohs II) on restriction of hazardous substances in electrical and electronic equipment.

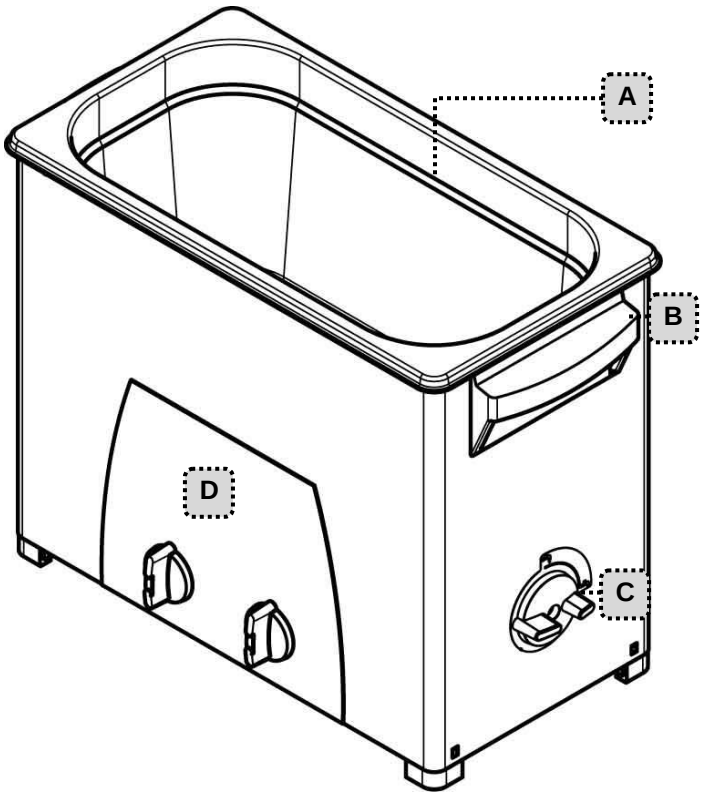
4.3 Classification

Class I (according to Directive 93/42/EEC and subsequent amendments)

4.4 Delivered equipment

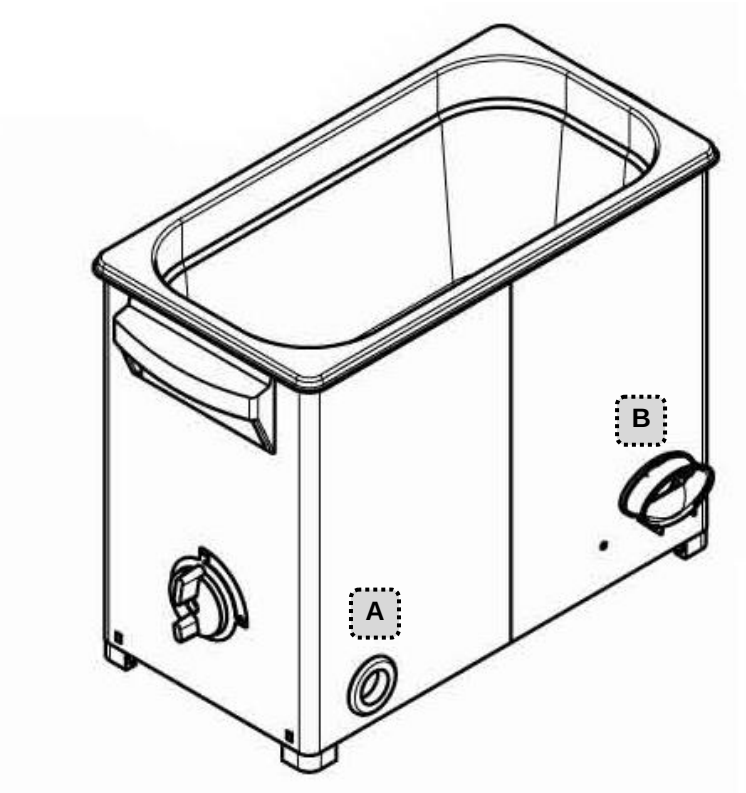
- Ultrasonic cleaning unit
- Mains cable
- Tube socket with tube clamp
- Operating Instructions
- N. 2 beaker
- Beaker holder
- Cover
- Cleaning basket

4.5 Unit front view / side view



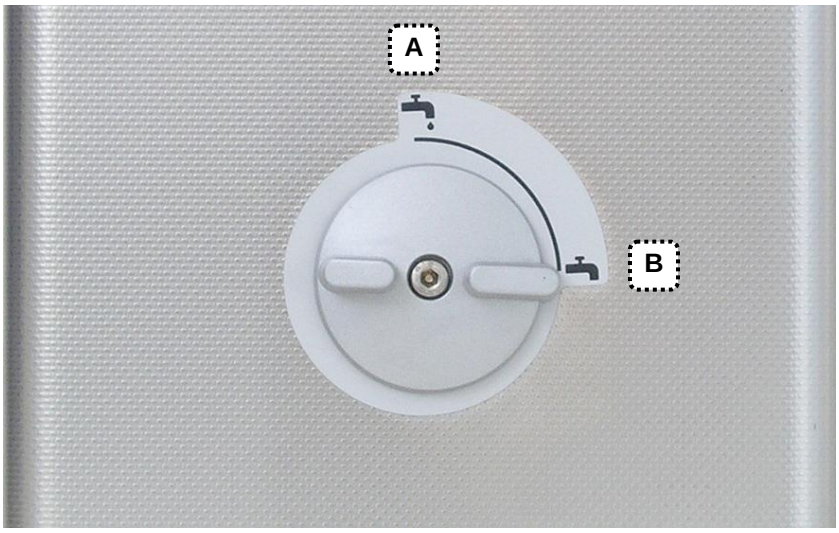
A	Filling line indicates the recommended maximum filling level. This level should not be exceeded even with cleaning items inside.
B	Plastic carrying handles for the safe transportation of the unit even with hot casing.
C	Turning knob for the draining of the tank functional description see section *"Turning knob for draining the tank".*
D	Operating panel for the control of the operating functions. Description see section *"Description of operating elements".*

4.6 Unit back view



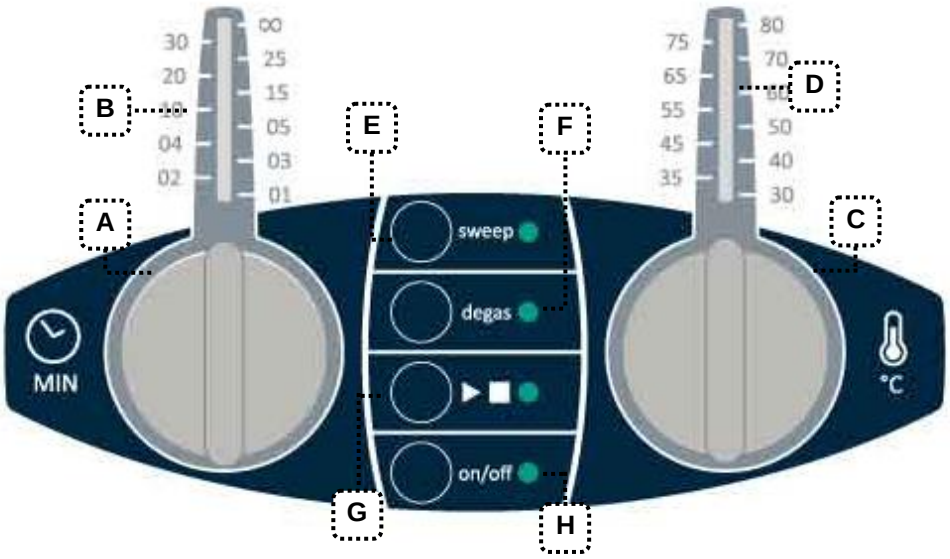
A	Liquid drain duct for draining the tank.
B	Mains supply socket for quick and easy removal of the mains cable e.g. for transportation purposes.

4.7 Turning knob for draining the tank



A	Vertical position: drain open
B	Horizontal position: drain shut

4.8 Description of operating elements



A	Turning knob cleaning period Setting options for short-period operation: 1; 2; 3; 4; 5; 10; 15; 20; 25; 30 min (with automatic switch-off). Permanent position ∞ for continued operation. Here the unit must be switched off by hand. For safety reasons the unit is automatically switched off after 12h permanent operation.
B	LED display cleaning period indication of set period and remaining period.
C	Turning knob temperature * (applies only for units with heating) temperature range variable in 5°C steps from 30° up to 80°C.
D	LED display temperature (applies only for units with heating) indication of set value and actual value of liquid temperature.
E	Key sweep function for an optimised sound field distribution in the cleaning liquid; Sweep LED.
F	Key degas function (manual and auto degas) for the efficient degassing of fresh cleaning liquid and for special applications in the laboratory. Degas LED.
G	Key start/stop for ultrasonic operation and temperature-controlled operation. Ultrasonic LED.
H	Key on/off for switching the unit on and off; on/off LED

(*) for setting the value: turn knob clockwise*

for resetting the value: turn knob anti-clockwise.

4.9 Operating and display functions

Action	Setting	Result	Display
switch on unit	press on/off key	unit is ready for operation	on/off LED is on
switch off the unit	press on/off key	unit is switched off	all displays are off
start ultrasound - now -	select period by turning knob for cleaning period press key ►■ (ultra-sound)	ultrasound is operating	ultrasound LED is on set period LED is on remaining period LED blinks (only in timer operation)
start ultrasound - temperature-controlled*; with mixing of cleaning liquid – * if set temperature > actual temperature; applies only for units with heating	set period set temperature by turning knob for temperature keep key ►■ pressed for > 2 sec	heating operates ultrasound is started automatically after reaching the set temperature set period ultrasound runs down	ultrasound LED blinks ultrasound LED blinks until the set temperature is reached; the LED is on as soon as the ultrasound is activated set period LED blinks as soon as the set temperature is reached the ultrasound LED is on set period LED is on remaining period LED blinks
stop ultrasound before end of set period	turn set period to 0 or press key ►■	ultrasound switched off	ultrasound LED is off set period LED is on

Action	Setting	Result	Display
switch on heating* * applies only for units with heating	select set temperature	heating operates	temperature LED is on; it moves out when the set temperature is reached set temperature LED is on actual temperature LED blinks and goes towards set temp. as soon as actual temp. = set temp., only the set temp. LED is on if actual temperature > set temperature, the temperature LED starts blinking again
switch off heating by hand	turn set temperature to position „0“	heating switched off	temperature LED is off set temperature LED blinks
switch on sweep function* * sweep and degas cannot be operated at the same time	select set period press key ►■ press key sweep	ultrasound operates in sweep mode	sweep LED is on ultrasound LED is on set period LED is on remaining period LED blinks
switch off sweep function	press key sweep	sweep function is switched off ultrasound continues in standard operating mode	sweep LED is off ultrasound LED is on set period LED is on remaining period LED blinks
switch on degas function* * sweep and degas cannot be operated at the same time	select set period press key ►■ press key degas	ultrasound operates in degas mode	degas LED is on ultrasound LED is on set period LED is on remaining period LED blinks

Action	Setting	Result	Display
switch off degas function	Press key degas	degas function is switched off ultrasound continues in standard operating mode	degas LED is off ultrasound LED is on set period LED is on remaining period LED blinks
switch on auto degas function* * sweep and degas cannot be operated at the same time	keep degas key pressed > 2 sec	ultrasound operates in auto degas mode for 10 minutes and then switches off	degas LED blinks ultrasound LED is on

5 Initial operation

Packing
Please keep the original packing or dispose of it according to the relevant waste disposal regulations. You can also return the packing to the manufacturer free destination (to your account).

Check for transport damages
Check the unit for possible transport damages before initial operation. In case of visible damage do not connect the unit to the mains. Contact your supplier and forwarding agent.

Placement
For operation, place the unit on a dry and solid surface. Ensure that the workplace is sufficiently ventilated!
Do not use a soft surface (e.g. a carpet) as this may impede the ventilation of the unit

 **DANGER**

Risk of electrocution due to humidity inside the unit!

Protect the unit from entering humidity.

The unit inside is splash-water-proof. Keep workplace and casing dry in order to prevent electrical accidents and damages on the unit.

Ambient conditions

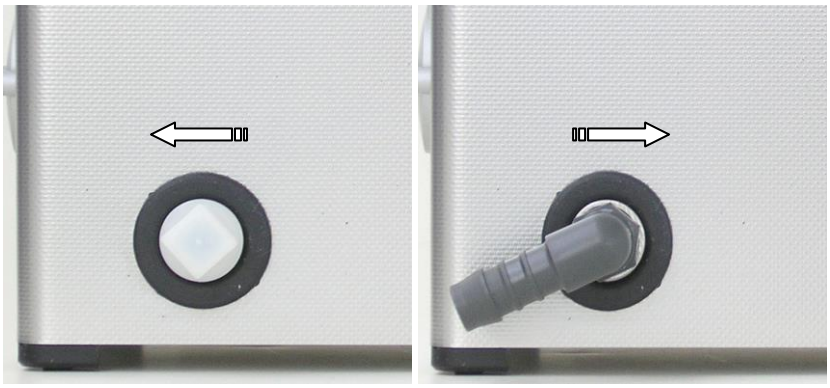
- Allowed ambient temperature during operation: +5°C - +40°C
- Allowed relative humidity of air during operation: max. 80%
- In-door operation only

5.1 Set up of the liquid drain

On the delivered unit, the drain duct for the cleaning liquid is closed off with a plastic screw cap.

For setting up the liquid drain fix the delivered tube socket to the drain duct.

1. Unscrew (clockwise) the plastic screw cap
2. Screw the tube socket (included in delivery) onto the inside thread of the drain duct (clockwise).
3. Turn the tube socket into the required drain position.
   The plastic thread is self-sealing when the socket has been screwed in by hand as far as possible.
   Note: Unscrewing the tube socket (anti-clockwise) can cause a leak of the thread.
4. The drain duct is now ready for connection to a customer-provided discharge system. Use a standard tube (dia 1/2"). Push the tube onto the socket and fix it with the clamp included in the delivery.



5.2 Connecting the unit to the mains

Required mains conditions
Earth grounded socket:
1 phase (220-240 V); 1 N; 1 PE protective earth.
The power supply must be protected by an earth leakage circuit breaker.

Connect mains cable
Use the plug-in mains cable delivered with the unit. Connect the unit to a grounded shockproof socket only. Ensure that the values indicated on the nameplate of the unit correspond with the available connecting conditions.
The mains plug must be connected to an easily accessible socket only, as it serves as interrupted device.

5.3 Filling of the unit

Shut the drain
Shut the drain duct before filling the tank. (Turning knob for draining of the tank into horizontal position.

Observe filling level
Fill the cleaning tank with a sufficient quantity of a suitable cleaning liquid before switch-on.

The optimum filling level is approx. 2/3 of the tank volume. The marked maximum filling level of the tank indicates the recommended filling level with cleaning items in the bath.

Suitable cleaning agents
Ensure that the chosen cleaning agent is suitable for treatment in an ultrasonic bath and observe the instructions on dosage and the compatibility of the material.

Prohibited cleaning agents
Flammable products are generally not allowed for use in an ultrasonic bath.

DANGER

Risk of fire and explosion!

Never use flammable liquids or solvents directly in an ultrasonic cleaning bath.

Ultrasonic activity increases the vaporisation of liquids and creates a very fine mist which can catch fire on any ignition source.

CAUTION

Risk of damage to the transducer tank!

Do not use any acid cleaning agents (pH value < 7) directly in the stainless steel tank if the cleaning items or the contamination of the cleaning items contain halogenides (fluorides, chlorides or bromides). The same applies to NaCl solutions.

The stainless steel tank can be destroyed by crevice corrosion in a very short time. Substances that cause crevice corrosion can be contained in household cleaners.
For queries please contact the manufacturer or your supplier.

5.4 Placement of cleaning items

CAUTION

Caution! The ultrasonic bath has been designed for the ultrasonic treatment of items and liquids only. Do not clean living beings or plants!

CAUTION

Do not reach inside the tank during ultrasonic operation.
Cell walls can be damaged by prolonged exposure to ultrasonic activity.
For placing and taking out the cleaning items always switch off the unit..

CAUTION

Danger of damage to the transducer system!
Fill no liquid > 60°C and < 10°C in the ultrasonic tank.

No cleaning items on the bottom of the tank

Do not place the cleaning items directly onto the bottom of the cleaning tank, as this might lead to damages to the unit.

Use cleaning basket
Place the cleaning items into the stainless steel cleaning basket.

Acid tank
For the use of cleaning chemicals which might destroy or damage the stainless steel tank use a separate container. For the special plastic cleaner tank for acid chemicals please contact your supplier.

5.5 Degassing of liquid

Freshly mixed cleaning liquids are saturated with air which lessens the cleaning effect of the ultrasonic activity. By sonification of the liquid over a period of several minutes before the cleaning process the tiny air bubbles in the liquid are eliminated.

Degas key
Degas the fesh cleaning liquid for approx. 5 - 10 minutes. For switch-on and switch-off press the degas key.

Auto-Degas

The units are equipped with an auto degas option.
When the programmed period has finished, the degas function is automatically switched off (10 min).

How to proceed

See chart "Operating and display functions".

Degas and sweep functions cannot be operated at the same time.

6 Ultrasonic cleaning process

Please observe the following instructions before starting the ultrasonic cleaning process.
It is the user's responsibility to check the cleaning results.

 **CAUTION**

Risk of scalding by hot surfaces and cleaning liquid!
Ultrasonic energy is physically transformed into heat.
The unit and the cleaning liquid in the tank heat up during ultrasonic operation even with the heating switched off.
During permanent operation (∞) with cover temperatures exceeding 60°C can be reached.
During permanent operation with cover and heating temperatures exceeding 80°C can be reached.
Do not reach inside the bath.
If necessary touch unit and basket with protecting gloves!

 **CAUTION**

Ultrasonic units can produce annoying sounds.
Wear personal ear protection devices when working close to an ultrasonic unit which is operated without cover.

 **ATTENTION**

Sensitive surfaces can be damaged when exposed to ultrasound over prolonged periods, particularly at low cleaning frequencies.
Ensure that sensitive surfaces are exposed to ultrasonic acitivity for a suitable period only.
If in doubt check the cleaning progress regularly and observe the state of the surface material.

 **ATTENTION**

Ultrasonic energy is physically transformed into heat.
The unit and the cleaning liquid in the tank heat up during ultrasonic operation even with the heating switched off.
During permanent operation with cover temperatures exceeding 60°C can be reached.
For the cleaning of temperature-sensitive items please take into consideration the heating-up of the cleaning liquid.
Please observe that the temperature of the cleaning media remains below 42°C when cleaning parts contaminated with fresh protein or blood.

6.1 Heating up of the cleaning liquid

Depending of the degree and kind of contamination and on the cleaning medium used it might be required to heat up the cleaning liquid. For a quick heating-up process and in order to prevent unnecessary energy losses we recommend to use a cover.

The ultrasonic energy is transformed physically into heat. Low set temperatures can be exceeded during ultrasonic operation.
The cleaning effect through ultrasonic cavitation is reduced when cleaning with high temperatures. We recommend not to exceed a temperature of 80°C inside the tank.

CAUTION

High temperatures! Risk of burning and scalding!
Cleaning liquid, cleaning tank, casing, lid, basket and cleaning items can heat up considerably.
Do not reach inside the bath.
If necessary wear protective gloves when touching unit and basket!

Cleaning temperature recommendations in the medical sector:
Please observe that the temperature of the cleaning media remains below 42°C when cleaning parts contaminated with fresh protein or blood.
Please observe the temperature even when using low or no heating..

How to proceed
Press the on/off key to start the unit.

Heating control by turning temperature knob
Select the required cleaning temperature by turning the temperature knob.
LED display is on and indicates heating operation.
The set temperature is indicated by the permanently lighting LED.
The heating is operated until the set temperature is reached.
The LED display also indicates the actual temperature by a blinking light.
As soon as the actual temperature is equal to or higher than the set temperature, the heating switches off.
LED display off.
The corresponding LED lights permanently.

6.2 Temperature-controlled cleaning

Functioning

Units are equipped with an additional temperature-controlled cleaning function. The cleaning process is automatically started as soon as the required bath temperature is reached.

How to proceed

1. press the on/off key to start the unit.
2. select the required temperature.
3. set the required ultrasonic cleaning period.
4. keep the start/stop key pressed > 2 sec:
   The unit starts heating up.
   During the heating-up process the ultrasound is regularly activated to mix the liquid.
   When the set temperature is reached the ultrasound is switched on for the duration of the set cleaning period.

When the set cleaning period has run down, the ultrasonic activity switches off automatically. The heating continues operating at the set temperature.

6.3 Automatic mixing of the liquid during heating up

Without mixing of the liquid the generated heat will rise to the surface of the bath. This will cause a strong gradient of temperature inside the cleaning tank. In order to ensure an even heating-up of the cleaning liquid, it makes sense to mix the liquid from time to time, e.g. by means of ultrasound. Units are equipped with an additional mixing device which guarantees the optimum mixing of the cleaning liquid during the heating up process.

Functioning

The ultrasound is activated for operating periods of approx. 5 seconds each with one-minute breaks in between.

How to proceed

1. Press the on/off key to start the unit.
2. Select the required cleaning period (set period).
3. Set the required temperature.
4. to start keep the ►■ key pressed for > 2 sec.

Operation only when set temperature > actual temperature.

6.4 Starting the cleaning process manually

Press the on/off key to start the unit.

Select the cleaning period
Set the required cleaning period with the turning knob.
The LED display indicates the set period.

Short period operation
For short period operation set the required cleaning period at the turning knob.
Press the ►■ key to start the ultrasonic operation.
The unit starts the ultrasonic cleaning process.
LED display is on.
The remaining period is indicated in the blinking LED display.
The ultrasound is automatically switched off when the set period has run down.

Permanent operation

For permanent operation turn the turning knob clockwise into (∞) position. In this operating mode there is no automatic switch-off. The ultrasonic activity must be switched off by hand after the cleaning process has been finished; press the ►■ key to switch of. Alternatively, turn the turning knob back into “0” position.
Caution: Turn the turning knob only anti-clockwise into “0” position!

In order to avoid unintended permanent operation, the units are equipped with a safety switch-off automatically. The unit switches off completely after 12 h permanent operation. In case you wish to continue operation start the unit again.

6.5 Sweep function

Units are equipped with a sweep function.

Functioning
A more homogeneous sounding of the cleaning bath is achieved by the continued displacement of the sound pressure maxima in the cleaning liquid.
Particularly for large cleaning items it may be useful to switch on the sweep function.

How to proceed
Press the sweep key to switch on or off.

Sweep and degas functions cannot be operated at the same time.

6.6 After the cleaning

When the cleaning process is finished rinse the cleaning items, e.g. under the tap..

Drain the unit

Drain the liquid as soon as it is dirty or when the unit is not operated over a prolonged period of time. Certain residues and types of contamination may destroy or damage the stainless steel tank.
Use the quick-drain duct to drain the cleaning tank (*see section „Turning knob for draining the tank“*).

7 Cleaning media

WARNING

The cleaning chemical to be used must be suitable for the use in an ultrasonic bath to prevent damage to the tank or injuries to the user.
For queries please contact the manufacturer or your supplier.

Exclusion of liability

Damages caused by non-compliance with the instructions given in *section "Limitations on aqueous cleaners"* will not be covered by the manufacturer's warranty.

7.1 Limitations of use of cleaners containing solvents

DANGER

Never use flammable liquids or solvents directly in an ultrasonic cleaning tank.

Risk of fire and explosion!

Ultrasound increases the volume of vaporisation of liquids and creates a very fine mist that can catch fire on any ignition source at any time.
Do not fill potentially explosive substances and flammable solvents

- marked in compliance with the EEC directives by symbols and safety warnings R 1 to R 9
- or E, F+, F, O or R 10, R 11 or R 12 for flammable substances

into the stainless steel tank for ultrasonic treatment.

Exception

In compliance with the general regulations on the protection of labour, certain limited volumes of flammable liquids (max. 1 litre) can be used in an ultrasonic cleaning unit under the following conditions: these liquids must be filled into a suitable separate vessel (e.g. beaker) with sufficient ventilation; this vessel (beaker) can then be put into the stainless steel tank which is filled with non-flammable liquid (water with a few drops of surfactant)
For queries please contact the manufacturer or your supplier.

7.2 Limitations on aqueous cleaners

Do not use aqueous cleaning media with pH values in the acid range (pH < 7) directly in the ultrasonic tank if fluoride (F^-), chloride (Cl^-) or bromide (Br^-) ions can be taken in by the removed dirt or through the cleaning chemical. These can destroy the stainless-steel tank by crevice corrosion within a very short period of ultrasonic operation.

Acids and alkaline solutions

Other media which can destroy the stainless-steel tanks when used in high concentrations or with high temperatures during ultrasonic operation are: hydrochloric acid, nitric acid, sulphuric acid, formic acid, hydrofluoric acid (even diluted). (Completeness of list not guaranteed.)

Risk of damage to the unit: do not use cleaning solutions containing more than 0.5 mass % alkali (KOH and/or NaOH) in an ultrasonic cleaning tank.

Entrainment of chemical substances

The above limitations for the use of chemicals in an ultrasonic bath also apply for the aforementioned chemicals when these are brought into an aqueous (particularly distilled water) bath through entrainment or from the removed dirt.

Disinfectants

The limitations of use also apply to the standard cleaners and disinfectants if these contain the above mentioned compounds.

Safety regulations

Observe the safety warnings indicated by the manufacturer of the chemicals (e.g. goggles, gloves, R and S phrases).
For queries please contact the manufacturer or your supplier.

8 Maintenance

ATTENTION

Pull the mains plug before carrying out any maintenance works.

8.1 Maintenance / Care

Electrical security
The present unit is maintenance-free.
Check the casing and the mains cable for damage regularly in order to prevent electrical accidents.

Grid of air fan
Check regularly the grid of the air fan at the bottom of the unit.
Remove dirt if necessary to allow sufficient ventilation inside the unit.

Care of casing
Residues of cleaning media can be wiped away with a household cleaner or decalcifier depending on the kind of contamination. Do not put the unit in or under water!

Disinfection
If the unit is used for medical and sanitary purposes it is necessary to disinfect the transducer tank and the surfaces regularly (standard surface disinfectants)..

8.2 Service life of the transducer tank

The transducer tank and particularly the ultrasound transmitting surfaces are wear parts. The changes on the surfaces that occur after a certain operating period are visible first as grey areas and later on as material abrasions, the so-called cavitation erosion.

To prolong the service life of your ultrasonic unit even more we recommend to observe the following instructions:

- Regularly remove any cleaning residues, in particular metal particles and rust films.
- Use suitable cleaning chemicals, with particular caution concerning the kind of removed contamination.
- Abrasive particles from removed contaminations (e.g. polishing pastes) must be drained and removed from the cleaning tank as frequently as possible (exchange the cleaning bath).
- Exchange the cleaning medium before it is too heavily contaminated.
- Do not operate the ultrasound unnecessarily; switch off after the cleaning process.

8.3 Repair

Opening by authorised specialised personnel only

Repair and maintenance works which require the unit to be connected and opened must be carried out by authorised and specialised personnel only.

DANGER

Risk of electrocution due to live parts inside the unit!

Pull the mains plug before opening the unit!

The manufacturer cannot be held responsible for any damage caused by unauthorised maintenance or repair works on the unit..

In case of a break-down of the unit please contact the manufacturer or your supplier.

9 Guarantee

The manufacturer guarantees this appliance for a period of 24 MONTHS against defects in material and/or workmanship.
Should be appliance need to be repaired, it should be returned to the Authorized Service Dealer or Distributor.
Authorized service Dealers and Distributors are the only people to be entrusted with any kind of repair within the period of guarantee.

10 Technical details

	Tank max. volume (approx. litre)	Tank effective volume (approx. litre)	Tank internal dimensions W x D x H (approx. mm)	Unit external dimensions W x D x H (approx. mm)	Basket internal dimensions W x D x H (approx. mm)	Weight (approx. kg)
S30H	2,75	1,90	240x137x100	300x179x214	198x106x50	3,3
S60H	5,75	4,3	300x151x150	365x186x264	255x115x75	5,1
S100H	9,50	7,50	300x240x150	365x278x264	255x200x75	5,9

	Mains voltage unit variants (Vac)	Ultrasound frequency (kHz)	Power consumption total (W)	Ultrasonic power RMS (W)	Ultrasonic maximum peak power* (W)	Heating power (W)
S30H	220-240	37	280	80	320	200
S60H	220-240	37	550	150	600	400
S100H	220-240	37	550	150	600	400

** The choice of the waveform has been matched to the relevant tank size. The signal form of the wave results in a factor 4 or 8 for the ultrasonic peak max., depending on the modulation of the wave.*

11 Trouble shooting

Fault	Possible cause	Remedy
Casing damaged	damage by third party, transport damage	return unit to supplier or manufacturer
Mains cable damaged	• damage by third party, transport damage	• obtain original spare mains cable from manufacturer or supplier
No operating functions; all LEDs dark	• mains cable not plugged in	• plug in mains cable
	• socket dead	• check socket/fuse
	• mains cable damaged/interrupted	• replace mains cable
	• fault of electronics	• return unit to supplier or manufacturer
No ultrasonic function; LED ultrasound dark	• turning knob for ultrasonic operation in „0“ position	• switch on the turning knob for ultrasonic operation
	• unit is switched off	• switch on the unit at key on/off
	• key ►■ (ultrasound) not pressed	• press key ►■
	• fault of electronics	• return unit to supplier or manufacturer
No ultrasonic operation; LEDs of LED cleaning period blink alternately ("running light") = fault indication ultrasound	• fault of electronics	• switch unit off and on if fault is indicated again: return unit to supplier or manufacturer
Unsatisfactory cleaning results	• no or unsuitable cleaning medium used	• use suitable cleaning medium
	• cleaning temperature not sufficient	• heat up cleaning liquid
	• cleaning period too short	• repeat cleaning interval
Unit does not heat up; LED temperature dark	• turning knob temperature in „0“ position	• switch on turning knob temperature
	• unit is switched off	• switch on unit with key on/off
	• fault of electronics	• return unit to supplier or manufacturer
No heating function; LEDs of LED temperature blink alternately ("running light") = fault indication	• fault of electronics	• switch unit off and on if fault is indicated again: return unit to supplier or manufacturer

Fault	Possible cause	Remedy
heating		
Unsatisfactory heating-up period	• loss of heating energy	• use cover
	• no mixing of cleaning liquid	• e.g. switch on ultrasound
Unit produces boiling noise during heating-up	• no mixing of cleaning liquid	• e.g. switch on ultrasound
Set temperature is exceeded	• temperature sensor does not measure the average temperature (no revolution)	• mix liquid manually or by means of ultrasound
	• set temperature too low, ultrasonic energy heats up the liquid more than required (physical process)	• for low set temperatures do not switch on heating
		• switch on ultrasound for short periods only
No operational functions; LEDs of LED ultrasound and LED temperature blink alternately ("running light") = fault indication programme control	• fault of electronics	• switch unit off and on if fault is again indicated: return unit to supplier or manufacturer

12 Putting out of action and waste disposal

In compliance with Directives (2011/65/EU) ROHS II and 2012/19/EU regarding restriction of the use of certain hazardous substances in electrical and electronic equipment along with waste electrical and electronic equipment, it is forbidden to dispose of this equipment in the municipal waste stream as unsorted municipal waste. When purchasing a new, equivalent piece of equipment, the old piece of equipment that has reached its end-of-life must be handed over to the reseller for proper disposal. As regards reuse, recycling and other forms of recovery of waste electrical and electronic equipment, the manufacturer carries out the functions set forth by laws and regulations currently in force in the individual countries.
The proper collection and separation of such equipment for recycling, treatment and disposal helps avoid any possible negative effects on the environment and health and facilitates the recycling of the materials of which the equipment is made. The symbol indicating separate collection for electrical and electronic equipment consists of the crossed out bin marked on the equipment.

IMPROPER DISPOSAL OF THE PRODUCT MAY RESULT IN THE APPLICATION OF SANCTIONS WHICH ARE DEFINED BY INDIVIDUAL NATIONAL LAWS.

13 Manufacturer's contact address

Elma Schmidbauer GmbH
Gottlieb-Daimler-Str. 17, D-78224 Singen
Tel. +49 (0) 7731 / 882-0
Fax +49 (0) 7731 / 882-266
info@elma-ultrasonic.com
www.elma-ultrasonic.com

14 Information and After-Sales Service

For any request for technical service for the product, whether in or out of warranty, directly contact the technical support department of the dealer or reseller that supplied the product.

Technical Support

Tel.: +39 051 6326255
Fax: +39 051 700949
Email: service.sterilization@cefla.it

Tel. +39 0542 653566
Fax +39 0542 653596
Email: service.dental@cefla.it