

# Operating Instructions

english

## Elmasonic S

Ultrasonic cleaning unit



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# 1

## General

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

### Instructions for the use of the unit

<b>Intended use</b>	The present Elma ultrasonic cleaning unit has been designed for the treatment of <b>items</b> and <b>liquids</b> only.  No cleaning of living beings or plants!
<b>User</b>	Operation of the unit by authorized and instructed staff only. Observe the instructions given in the manual.
<b>Mains connection</b>	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.
<b>Prevention of electrical accidents</b>	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.
<b>Cleaning liquid</b>	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!
<b>Hot surfaces and liquids</b>	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.
<b>Noise emission</b>	Ultrasonic units can produce annoying sounds. Wear personal ear protection devices when working close to an ultrasonic unit which is operated without cover.
<b>Sound transmission at physical contact</b>	Do not reach inside the cleaning liquid or touch sound-carrying parts (tank, basket, cleaning items, etc.) during operation.
<b>Exclusion of liability</b>	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.
<b>Storage and transport conditions</b>	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 – 1060 hPa absolute
<b>Risk of splashing fluid when switching on the ultrasound</b>	There is a risk of splashing fluid when a unit filled with fluid is switched on. This means that drops of fluid may spray out of the tank.

## 2.3 Intended use as medical device

**Intended purpose** Ultrasonic pre-cleaning of

- surgical and medical instruments.

Only reusable medical devices that are approved for ultrasonic cleaning and authorised for the reprocessing are permitted to be cleaned (see information of the medical device manufacturer according to, e.g. EN ISO 17664).

The pre-cleaning of medical devices with Elmasonic S products does not replace the subsequent cleaning, disinfection or sterilisation in automated standard processes (e.g. cleaning and disinfection unit (CDU) or autoclave).

The user is responsible for checking the cleaning result.

**Intended use** Ultrasonic cleaning machines are exclusively intended for ultrasonic irradiation of objects and liquids. Thereby, no flammable liquids are permitted to be used directly in the cleaning tanks.

The machine is only permitted to be operated by trained personnel and not by children. Operation and placement must be performed in accordance with the conditions and media defined in the operating manual.

The service intervals and regional regulations for checking the equipment must be complied with.

## 2.4

### Safety instructions on the machine



Observe operating instructions!



Observe warnings and safety instructions given in the operating manual!



This symbol warns about the risk of injury from hot surfaces and liquids.



The unit cannot be disposed with household waste! Observe regional waste regulations!

## 2.5 Information for particular groups of people

- Pregnant woman** Ultrasonic energy emitted through the air is not hazardous to your health. However, high sonic emissions do arise during ultrasound operation that may, under circumstances, cause hearing damage to the foetus.
- We recommend pregnant people not to spend long periods of time near an ultrasonic cleaning device.
- People with active implants** Elma Schmidbauer products with the CE mark comply with the European EMC and Low Voltage Directive and adhere to the prescribed EMC limit values so that the electromagnetic radiation emitted by the devices is harmless to healthy people. A binding statement for people with implants, such as those with cardiac pacemakers or implanted defibrillators, can only be made at the specific occupational site and upon consulting the manufacturer of the implants.

## 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

  
**Mechanical energy**

Basically, the cleaning result depends on four factors:

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 Elmasonic 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. Elma has a large range of cleaning media on offer.

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.

For Elma cleaning products please observe the instructions given on the label or the product information leaflets.

**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 Elmasonic S 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 (from Elmasonic S 30)
- 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 (Elmasonic S 10 – S 300 H)
- Electronical turning knobs
- Display of both set values and actual values via LED settings (from Elmasonic S 15)
- Splash-water-proof operating panel
- Plastic carrying handles
- Automatic switch-off after 12 h operation to prevent unintended permanent operation

\* only models equipped with heating



## 4.2 **CE conformity**

This Elma ultrasonic cleaner meets the requirements for the CE marking based on the EU Low Voltage, Medical devices, Electromagnetic Compatibility (EMC) and RoHS Directives.

Refer to the EU Declaration of Conformity that can be obtained from the manufacturer for details.

## 4.3 **RFI Statement (European Union)**

This is a Class A product.

Please note:

This equipment has been approved for business purposes with regard to electromagnetic interference.

In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures. For this please contact your supplier or the manufacturer of the unit.

## 4.4 **Delivered equipment**

- Ultrasonic cleaning unit
- Mains cable
- Tube socket with tube clamp (from Elmasonic S 30)
- Operating instructions

## 4.5

## Unit front view / side view



Illustration 4.4 Front view / side view Elma Schmidbauer S 30 H

- A Filling line** indicates the recommended maximum filling level. This level should not be exceeded even with cleaning items inside. (Not available on Elma Schmidbauer S 10 / S 10 H)
- B Plastic carrying handles** (from Elma Schmidbauer S 30) for the safe transportation of the unit even with hot casing.
- C Turning knob for the draining of the tank** (from Elma Schmidbauer S 30) functional description see *section 4.7*.
- D Operating panel** for the control of the operating functions. Description see *section 4.8 and 4.9*.

## 4.6

### Unit back view



Illustration 4.5 Unit back view (as delivered)

- A Liquid drain duct** for draining the tank (up from Elmasonic S 30)
- 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 (from S 30)

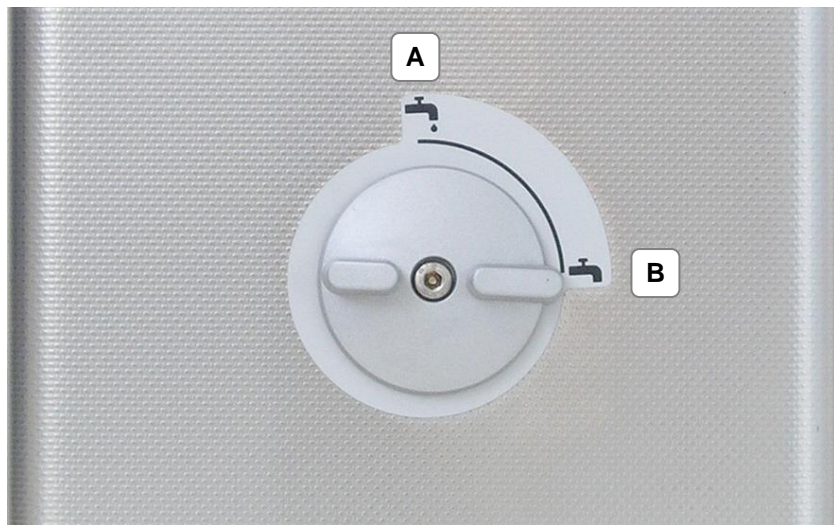


Illustration 4.6 View turning knob for draining the tank

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

## 4.8

## Description of operating elements S 15 - S 900 H

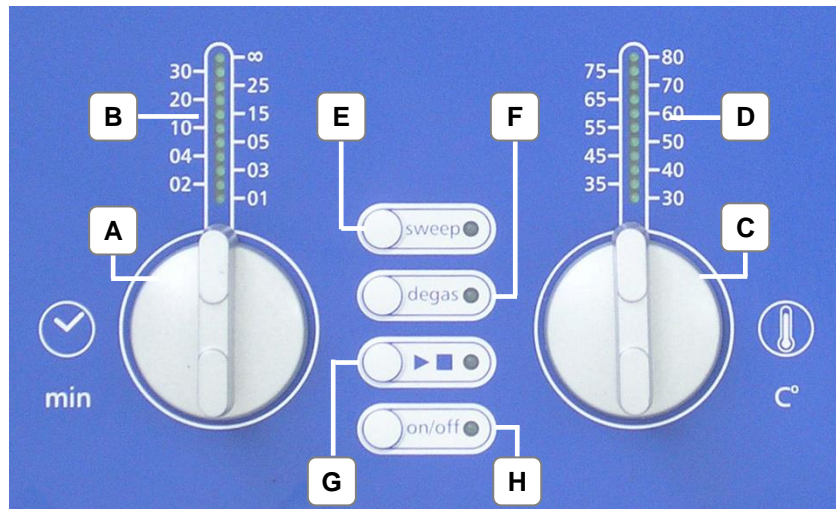


Illustration 4.7 View operating elements (unit with heating)

- 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  $\infty$  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. (Not available on Elmasonic S 10 / S 10 H.)
- 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.  
(Not available on Elmasonic S 10 / S 10 H.)
- E Key Sweep function** for an optimised sound field distribution in the cleaning liquid; Sweep LED.
- F Key Degas function** (manual and Auto-Degas – see *chart 4.10*)  
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  
(Not available on Elmasonic S 10 / S 10 H.)
- 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 Description of operating elements S 10/ S 10 H

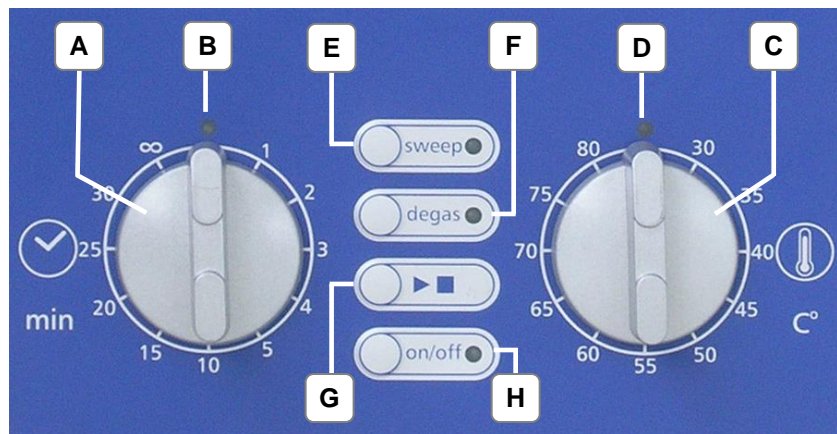


Illustration 4.8 View operating elements S 10 H

Functions as on Elmasonic S 30 – S 900 H (see section 4.8) with the following exceptions:

- B Ultrasound LED** indicates ultrasonic operation
- D Temperature LED** (applies only for units with heating) indicates heating operation

## 4.10 Operating and display functions

Please note: specific displays of unit types S 10 / S 10 H and S 15 – 900 H are marked separately.

Action	Setting	Result	Display
switch on unit	press <i>on/off</i> key	unit is ready for operation	on/off LED is on
switch off the unit	press <i>on/off</i> 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  <b>S 15 - S 900 H:</b> set period LED is on  remaining period LED blinks (only in timer operation)

Action	Setting	Result	Display
<p>start ultrasound - temperature-controlled*; with mixing of cleaning liquid –</p> <p>* if set temperature &gt; actual temperature; applies only for units with heating</p>	<p>set period</p> <p>set temperature by turning knob for temperature</p> <p>keep key ►■ pressed for &gt; 2 s</p>	<p>heating operates</p> <p>ultrasound is started automatically after reaching the set temperature</p> <p>set period ultrasound runs down</p>	<p>ultrasound LED blinks</p> <p><b>S 10 H:</b> ultrasound LED blinks until the set temperature is reached; the LED is on as soon as the ultrasound is activated</p> <p><b>S 15 H - S 900 H:</b> set period LED blinks</p> <p>as soon as the set temperature is reached the ultrasound LED is on</p> <p>set period LED is on</p> <p>remaining period LED blinks</p>
<p>stop ultrasound before end of set period</p>	<p>turn set period to 0 or</p> <p>press key ►■</p>	<p>ultrasound switched off</p>	<p>ultrasound LED is off</p> <p><b>S 15 - S 900 H:</b> set period LED is on</p>
<p>switch on heating* * applies only for units with heating</p>	<p>select set temperature</p>	<p>heating operates</p>	<p><b>S 10 H:</b> temperature LED is on; it moves out when the set temperature is reached</p> <p><b>S 15 - S 900 H:</b> set temperature LED is on</p> <p>actual temperature LED blinks and goes towards set temp.</p> <p>as soon as actual temp. = set temp., only the set temp. LED is on</p> <p>if actual temperature &gt; set temperature, the temperature LED starts blinking again</p>

Action	Setting	Result	Display
switch off heating by hand	turn set temperature to position „0“	heating switched off	<b>S 10 H:</b> temperature LED is off <b>S 15 - S 900 H:</b> 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 <i>sweep</i>	ultrasound operates in Sweep mode	sweep LED is on ultrasound LED is on <b>S 15 - S 900 H:</b> set period LED is on remaining period LED blinks
switch off Sweep function	press key <i>sweep</i>	Sweep function is switched off ultrasound continues in standard operating mode	sweep LED is off ultrasound LED is on <b>S 15 - S 900 H:</b> 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 <i>degas</i>	ultrasound operates in Degas mode	degas LED is on ultrasound LED is on <b>S 15 - S 900 H:</b> set period LED is on remaining period LED blinks
switch off Degas function	Press key <i>degas</i>	Degas function is switched off ultrasound continues in standard operating mode	degas LED is off ultrasound LED is on <b>S 15 – S 900 H:</b> 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 <i>degas</i> key pressed > 2 s	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). The machine must only be sent in the original packaging for transport (e.g. in the case of service).

**Check for transport damages** Check the Elmasonic S 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 - + 40 °C
  - Allowed relative humidity of air during operation: max. 80 %
  - In-door operation only

### 5.1 Set up of the liquid drain (S 30 - S 900 H)

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.

- Proceed as follows**
1. Unscrew (clockwise) the plastic screw cap (*see illustration 5.1*)
  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 (*see illustration 5.2*).  
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.



- 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.

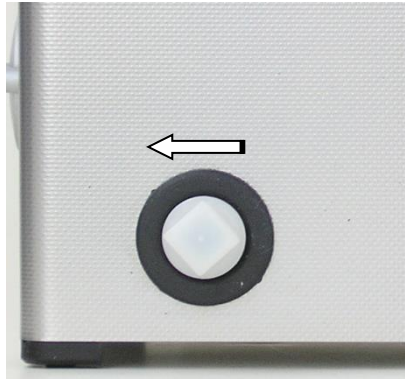


Illustration 5.1  
Drain with plastic screw cap

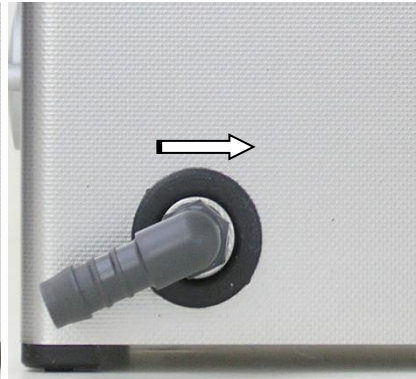


Illustration 5.2  
Drain fitted with standard tube

## 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.

**Elmasonic S 450 H / S 900 H in countries with 120 V mains:**  
2 phases (120 V); 1 N; 1 PE protective earth.

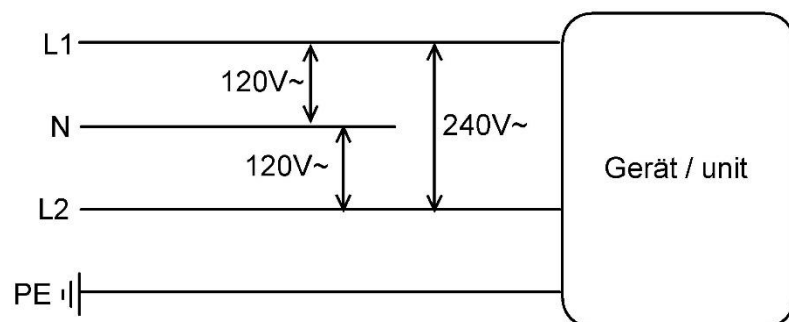


Diagram: required mains conditions for S 450 H / S 900 H in 120 V mains.

#### 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!

## 6 Putting unit into operation

### 6.1 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 (*see section 4.7*).

**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 (not available on Elmasonic S 10 / S 10 H) indicates the recommended filling level with cleaning items in the bath (*see also section 4 Illustration 4.4*).

**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.

We recommend the use of the cleaning agents listed in *section 8.3*.



**WARNING**

Risk of splashing fluid when switching on the ultrasound!

There is a risk of splashing fluid when a unit filled with fluid is switched on.

This means that drops of fluid may spray out of the tank.

Please take this into account when using corrosive or other dangerous cleaning agents.

Move away from the unit and wear the appropriate protective equipment as specified in the safety data sheet for the cleaning agent in use.

**Prohibited cleaning agents**

Flammable products are generally not allowed for use in an ultrasonic bath. Observe the safety warnings given in *section 8.1*.



**DANGER**

Risk of fire and explosion!

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

Use the cleaning chemicals listed in *section 8.3*.



Ultrasonic activity increases the vaporisation of liquids and creates a very fine mist which can catch fire on any ignition source. Observe the instructions on limitations of use given in *section 8.1*.



**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.

Use the cleaning chemicals listed in *section 8.3*.



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. Observe the instructions on limitations of use given in *section 8.2*. For queries please contact the manufacturer or your supplier.

**CAUTION**

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

## 6.2

### Placement of cleaning items

**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.

**No cleaning items on the bottom of the tank**  
**Use cleaning basket**

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

Place the cleaning items into the stainless steel cleaning basket (accessory equipment).

**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.

## 6.3

### 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 fresh cleaning liquid for approx. 5 - 10 minutes. For switch-on and switch-off press the *degas* key.

**Auto degas**

The Elmasonic S 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 4.10*.

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

**7****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.

---



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!

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Ultrasonic units can produce annoying sounds.

Wear personal ear protection devices when working close to an ultrasonic unit which is operated without cover.

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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 activity for a suitable period only.

If in doubt check the cleaning progress regularly and observe the state of the surface material.

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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.

---

## 7.1

## Heating up of the cleaning liquid (units with heating)

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 (optional accessory equipment).



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.

For the recommended cleaning temperature please observe the product information of the used elma clean cleaner.



**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 Heating control by turning temperature knob

Press the *on/off* key to start the unit.

Select the required cleaning temperature by turning the temperature knob.

S 10 H: LED display is on and indicates heating operation.  
S 15 H - S 900 H: The set temperature is indicated by the permanently lighting LED.

The heating is operated until the set temperature is reached.

S 15 H - S 900 H: The LED display also indicates the actual temperature by a blinking light (not on S 10 H).

As soon as the actual temperature is equal to or higher than the set temperature, the heating switches off.

S 10 H: LED display off.

S 15 H - S 900 H: the corresponding LED lights permanently.

## 7.2 Temperature-controlled cleaning (units with heating)

**Functioning** Elmasonic S 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 ►■ key pressed > 2 s  
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.

## 7.3 Automatic mixing of the liquid during heating up (units with heating)

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.

Elmasonic S 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 s  
(see chart 4.10)



Operation only when set temperature > actual temperature

## 7.4 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.

S 10: LED display is off.

S 15 - S 900 H: 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.

S 10: LED display is on.

S 15 - S 900 H: 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 Elmasonic S 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.

## 7.5 Sweep function

Elmasonic S units are equipped with an optional 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.

## 7.6

### Follow-up treatment of cleaning items Drain the unit

## After the cleaning

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

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 4.10*).

## 8



WARNING

## Cleaning media

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. Use the recommended cleaners mentioned in *section 8.3*. Observe the restrictions to cleaners containing solvents and aqueous cleaners mentioned *in sections 8.1 and 8.2*.

For queries please contact the manufacturer or your supplier.

### Exclusion of liability

Damages caused by non-compliance with the instructions given in *sections 8.1 and 8.2* will not be covered by the manufacturer's warranty!

## 8.1

## 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).



## 8.2

### Limitations on aqueous cleaners

Do not use aqueous cleaning media with pH values in the acid range ( $\text{pH} < 7$ ) directly in the ultrasonic tank if fluoride ( $\text{F}^-$ ), chloride ( $\text{Cl}^-$ ) or bromide ( $\text{Br}^-$ ) 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.

#### Acid-resistant tank

For the ultrasonic treatment with the above mentioned media use an acid-resistant tank (available as accessory equipment).

#### 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.

## 8.3

### List of recommended cleaning media

Elma has a large range of suitable cleaning products on offer developed by chemical engineers in the Elma laboratory. Please contact your supplier to find the most suitable cleaning chemical for your application.

Product information and safety data sheets are available from the manufacturer ([www.elma-ultrasonic.com/produkte/reinigungsmittel](http://www.elma-ultrasonic.com/produkte/reinigungsmittel)).

## 9 Maintenance

### 9.1 Maintenance / Care



ATTENTION

**Pull the mains plug before carrying out any maintenance works!**

#### Electrical security

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

#### Care of transducer tank

Lime deposits on the stainless-steel tank can be cleaned gently e.g. with Elma Clean 40 or Elma Clean 115C (operate the unit with concentrate + water).

#### Grid of air fan

Check regularly the grid of the air fan at the bottom of the unit (not existent in all units).

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).

### 9.2

#### 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 (see instructions *section 8.2*).
- 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.

### 9.3

### Repair

**Opening by authorised  
specialised personnel  
only**



**DANGER**

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

---

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.

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

## 10 Technical details

	Tank max. volume (l)	Tank effective volume (l)	Tank internal dimensions W/D/H (mm)	Unit external dimensions W/D/H (mm)	Basket internal dimensions W/D/H (mm)	Weight (kg)
<b>S 10</b> <b>S 10 H</b>	0.8	0.7	190/85/60	206/116/178	177/73/30	2.0
<b>S 15</b> <b>S 15 H</b>	1.75	1.20	151/137/100	175/180/212	112/103/50	2.1
<b>S 30</b> <b>S 30H</b>	2.75	1.9	240/137/100	300/179/214	198/106/50	3.3
<b>S 40</b> <b>S 40 H</b>	4.25	3.2	240/137/150	300/179/264	190/105/75	4.0
<b>S 60</b> <b>S 60 H</b>	5.75	4.3	300/151/150	365/186/264	255/115/75	5.1
<b>S 70</b> <b>S 70 H</b>	6.9	5.2	505/137/100	568/179/214	465/106/50	5.6
<b>S 80</b> <b>S 80 H</b>	9.4	7.3	505/137/150	568/179/264	455/106/75	6.4
<b>S 90 H</b>	8.3	7.0	335/140/180	400/180/295	289/124/75	5.3
<b>S 100</b> <b>S 100 H</b>	9.5	7.5	300/240/150	365/278/264	255/200/75	5.9
<b>S 120</b> <b>S 120 H</b>	12.75	9.0	300/240/200	365/278/321	250/190/115	7.5
<b>S 130 H</b>	13.6	11.3	335/230/180	400/275/295	296/200/75	8.0
<b>S 150</b>	14.0	10.0	505/300/100	568/340/224	-	10.0
<b>S 180</b> <b>S 180 H</b>	18.0	12.9	327/300/200	390/340/321	280/250/115	8.5
<b>S 300</b> <b>S 300 H</b>	28.0	20.6	505/300/200	568/340/321	455/250/115	11.0
<b>S 450 H</b>	45.0	35.0	500/300/300	615/370/467	455/270/194	25.0
<b>S 900 H</b>	90.0	75.0	600/500/300	715/570/467	545/450/190	42.0

	Mains voltage unit variants (V~)	Ultrasound frequency (kHz)	Power consumption total (W)	Ultrasonic power RMS (W)	Ultrasonic maximum peak power* (W)	Heating power (W)	
<b>S 10</b>	100-120 220-240	37	30	30	240	0	
<b>S 10 H</b>			90			60	
<b>S 15</b>			35	35		280	0
<b>S 15 H</b>			95				60
<b>S 30</b>	115-120 220-240		80	80	320	0	
<b>S 30 H</b>			280			200	
<b>S 40</b>			140	140	560	0	
<b>S 40 H</b>			340			200	
<b>S 60</b>			115-120 220-240	150	150	600	0
<b>S 60 H</b>				550			400
<b>S 70</b>				150	150	600	0
<b>S 70 H</b>				750			600
<b>S 80</b>	220-240		150	150	600	0	
<b>S 80 H</b>			750			600	
<b>S 90 H</b>	220-240		550	150	600	400	
<b>S 100</b>	115-120 220-240		150	150	600	0	
<b>S 100 H</b>			550			400	
<b>S 120</b>			200	200	800	0	
<b>S 120 H</b>			1000			800	
<b>S 130 H</b>	220-240		1100	300	1200	800	
<b>S 150</b>	115-120 220-240	300	300	1200	0		
<b>S 180</b>		200	200	800	0		
<b>S 180 H</b>		1000			800		
<b>S 300</b>		300	300	1200	0		
<b>S 300 H</b>		1500			1200		
<b>S 450 H</b>	220-240	2000	400	1600	1600		
<b>S 900 H</b>	220-240	2950	950	3800	2000		

\* S 10 – S 15 H: impulse wave form; S 30 – S 900 H: standard sine-wave modulation

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	<ul style="list-style-type: none"> <li>• damage by third party, transport damage</li> </ul>	<ul style="list-style-type: none"> <li>• return unit to supplier or manufacturer</li> </ul>
mains cable damaged	<ul style="list-style-type: none"> <li>• damage by third party, transport damage</li> </ul>	<ul style="list-style-type: none"> <li>• obtain original spare mains cable from manufacturer or supplier</li> </ul>
no operating functions; all LEDs dark	<ul style="list-style-type: none"> <li>• mains cable not plugged in</li> </ul>	<ul style="list-style-type: none"> <li>• plug in mains cable</li> </ul>
	<ul style="list-style-type: none"> <li>• socket dead</li> </ul>	<ul style="list-style-type: none"> <li>• check socket/fuse</li> </ul>
	<ul style="list-style-type: none"> <li>• mains cable damaged/interrupted</li> </ul>	<ul style="list-style-type: none"> <li>• replace mains cable</li> </ul>
	<ul style="list-style-type: none"> <li>• fault of electronics</li> </ul>	<ul style="list-style-type: none"> <li>• return unit to supplier or manufacturer</li> </ul>
no ultrasonic function; LED ultrasound dark	<ul style="list-style-type: none"> <li>• turning knob for ultrasonic operation in „0“ position</li> </ul>	<ul style="list-style-type: none"> <li>• switch on the turning knob for ultrasonic operation</li> </ul>
	<ul style="list-style-type: none"> <li>• unit is switched off</li> </ul>	<ul style="list-style-type: none"> <li>• switch on the unit at key <i>on/off</i></li> </ul>
	<ul style="list-style-type: none"> <li>• key ►■ (ultrasound) not pressed</li> </ul>	<ul style="list-style-type: none"> <li>• press key ►■</li> </ul>
	<ul style="list-style-type: none"> <li>• fault of electronics</li> </ul>	<ul style="list-style-type: none"> <li>• return unit to supplier or manufacturer</li> </ul>
no ultrasonic operation; LEDs of LED cleaning period blink alternately ("running light") = fault indication ultrasound	<ul style="list-style-type: none"> <li>• fault of electronics</li> </ul>	<ul style="list-style-type: none"> <li>• switch unit off and on if fault is indicated again: return unit to supplier or manufacturer</li> </ul>
unsatisfactory cleaning results	<ul style="list-style-type: none"> <li>• no or unsuitable cleaning medium used</li> </ul>	<ul style="list-style-type: none"> <li>• use suitable cleaning medium</li> </ul>
	<ul style="list-style-type: none"> <li>• cleaning temperature not sufficient</li> </ul>	<ul style="list-style-type: none"> <li>• heat up cleaning liquid</li> </ul>
	<ul style="list-style-type: none"> <li>• cleaning period too short</li> </ul>	<ul style="list-style-type: none"> <li>• repeat cleaning interval</li> </ul>

Fault	Possible cause	Remedy
unit does not heat up; LED temperature dark	<ul style="list-style-type: none"> <li>turning knob temperature in „0“ position</li> </ul>	<ul style="list-style-type: none"> <li>switch on turning knob temperature</li> </ul>
	<ul style="list-style-type: none"> <li>unit is switched off</li> </ul>	<ul style="list-style-type: none"> <li>switch on unit with key on/off</li> </ul>
	<ul style="list-style-type: none"> <li>fault of electronics</li> </ul>	<ul style="list-style-type: none"> <li>return unit to supplier or manufacturer</li> </ul>
no heating function; LEDs of LED temperature blink alternately ("running light") = fault indication heating	<ul style="list-style-type: none"> <li>fault of electronics</li> </ul>	<ul style="list-style-type: none"> <li>switch unit off and on if fault is indicated again: return unit to supplier or manufacturer</li> </ul>
unsatisfactory heating-up period	<ul style="list-style-type: none"> <li>loss of heating energy</li> </ul>	<ul style="list-style-type: none"> <li>use cover (optional accessory equipment)</li> </ul>
	<ul style="list-style-type: none"> <li>no mixing of cleaning liquid</li> </ul>	<ul style="list-style-type: none"> <li>e.g. switch on ultrasound (see section 7.2)</li> </ul>
unit produces boiling noise during heating-up	<ul style="list-style-type: none"> <li>no mixing of cleaning liquid</li> </ul>	<ul style="list-style-type: none"> <li>e.g. switch on ultrasound (see section 7.2)</li> </ul>
set temperature is exceeded	<ul style="list-style-type: none"> <li>temperature sensor does not measure the average temperature (no revolution)</li> </ul>	<ul style="list-style-type: none"> <li>mix liquid manually or by means of ultrasound</li> </ul>
	<ul style="list-style-type: none"> <li>set temperature too low, ultrasonic energy heats up the liquid more than required (physical process)</li> </ul>	<ul style="list-style-type: none"> <li>for low set temperatures do not switch on heating</li> </ul>
		<ul style="list-style-type: none"> <li>switch on ultrasound for short periods only</li> </ul>
no operational functions; LEDs of LED ultrasound and LED temperature blink alternately ("running light") = fault indication programme control	<ul style="list-style-type: none"> <li>fault of electronics</li> </ul>	<ul style="list-style-type: none"> <li>switch unit off and on if fault is again indicated: return unit to supplier or manufacturer</li> </ul>

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## **Putting out of action and waste disposal**



The unit can be taken to metal and electronics recycling stations or returned to the manufacturer.

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## **Manufacturer's contact address**

### **Elma Schmidbauer GmbH**

Gottlieb-Daimler-Str. 17  
78224 Singen (Germany)  
[www.elma-ultrasonic.com](http://www.elma-ultrasonic.com)

### **Technical Support**

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