



## Operating Instructions



## Ultrasonic Cleaning Units

**Transsonic**

• English •

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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.

Carefully read the Operating Instructions before using of the unit and operate the electrical appliance according to the instructions.

We reserve the right to carry out technical modifications on the unit due to advanced development.

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## 2



## Important safety warnings

### Read before initial operation!

#### Intended use

The present Elma ultrasonic cleaning unit has been designed for the treatment of **items** and **liquids** only.

No cleaning of living beings or plants!

#### User

The unit must be operated by instructed staff. Do not let children operate the unit.

#### 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

The unit must be opened by authorised specialised personnel only.

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.

#### 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.

## 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 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 CE conformity**

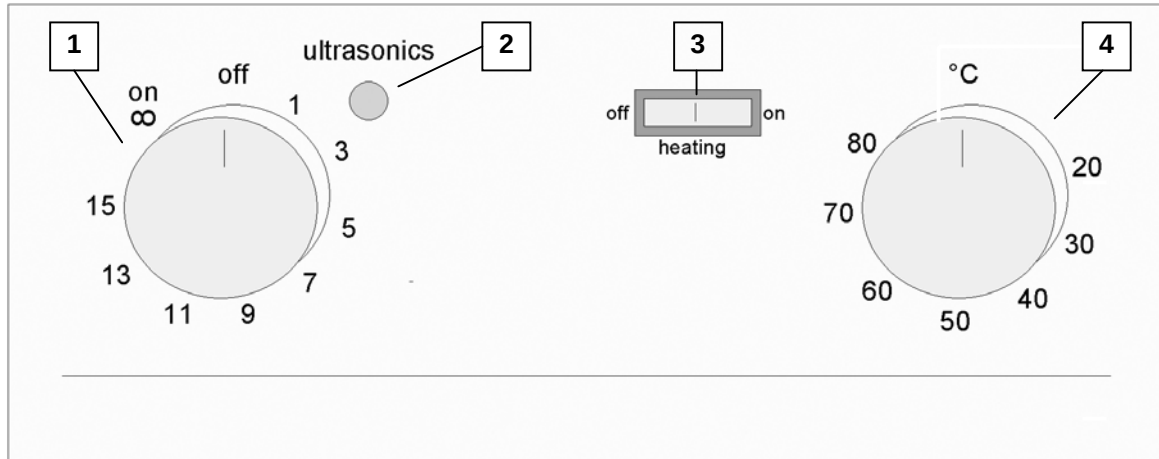
The present Elma ultrasonic unit is in compliance with the CE marking criteria according to the EMC directive 89/336/EEC, and the low voltage directive 73/23/EEC.

The declaration of conformity is available from the manufacturer.

### **4.2 Delivered equipment**

- Ultrasonic cleaning unit
- Operating Instructions

### 4.3 Description of operating elements Transsonic Analog



**Switch On/Off** You switch on the ultrasonic unit by setting the timer or turning the timer knob to the infinity position.

The green lamp (2) (not available on all units) indicates the operation of the unit.

#### Setting of the timer **Timer**

For cleaning periods of up to 15 minutes use the timer with automatic switch-off. The required cleaning period is set by turning the knob (1). After the set period the ultrasound is switched off automatically. If you need to switch off the unit before the set period is over turn the timer knob back to the OFF position.

#### **Permanent Operation**

If you require a cleaning period longer than 15 minutes turn the knob to the infinity position. In this operation mode the unit has to be switched off by hand.

**Heating** The heating is switched on and off by the green button (3).

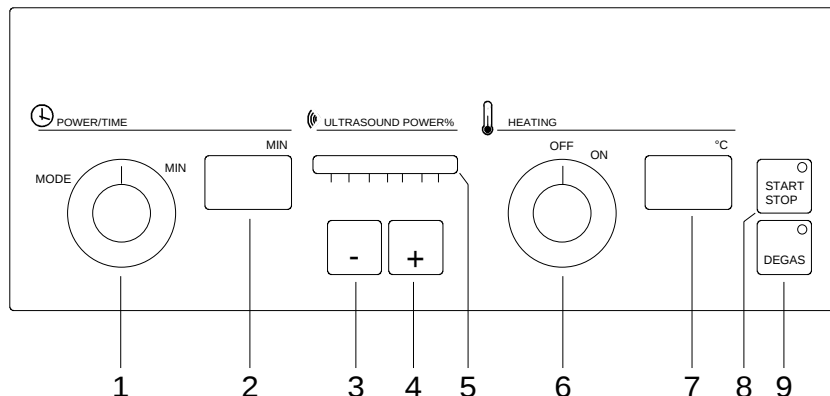
Ensure that the filling level in the tank is correct before switching on the heating. This prevents overheating of the tank at the spot where the heating is fixed.

Select the required cleaning temperature by turning the temperature knob (4).

Heating and ultrasound can be operated separately. Higher temperatures usually shorten the cleaning period considerably.

## 4.4

## Description of operating elements Transsonic Digital



### Switch On/Off

Switch on the unit by turning the knob (1) clockwise. Switch it off by turning the knob anti-clockwise to the 0 position.

### Setting of the Timer for Ultrasound

Set the required time by turning the knob (1). When the unit is switched on it works in long-term mode. You can choose periods between 2 and 95 minutes or set the unit to infinity operation (position mode).

When the unit is switched to infinity operation mode, the indicator (2) shows „00“ or „0.0“. After turning the knob (1) clockwise until it stops at the “mode” position, the unit switches automatically to the short-term mode. By turning back the knob you can now set a period between 0.2 and 9.5 minutes. Turning the knob again to the “mode” position puts the unit back into the long-term mode.

### Ultrasonic Power Regulation

The buttons „-“ (3) and „+“ (4) regulate the required cleaning power.

When the unit is switched on the power is set and indicated (5) at 100 %.

### Temperature regulation

The knob (6) switches on heating regulation and temperature indicator (7). The indicator (7) always shows the actual temperature in the cleaning bath. Turn the knob clockwise and set the required temperature (scale). If the required temperature (scale) is higher than the actual temperature (indicator 7) the cleaning liquid will be heated up. During the heating up period the right decimal point of the indicator (7) flashes. As soon as the required temperature is reached the decimal point stops flashing and the heating switches off.

**ATTENTION:** The temperature indication may deviate from the actual temperature by up to  $\pm 2^{\circ}\text{C}$ . Note that the ultrasonic activity creates heat which may cause the temperature to rise above the set value. Low temperatures cannot be kept with permanent ultrasonic activity.

**Degas** The Degas device is activated by the button (9).

When the Degas function is switched on the green indicator illuminates and the cleaning liquid is degassed very quickly. This process increases the cleaning effect of the medium and shortens the overall cleaning period. The Degas device is particularly useful when the bath has been newly filled. In addition, the Degas function allows various applications in the sono-chemical sector, e.g. degassing of high-polymer solvents.

**Start/Stop** The ultrasound is switched on by the button Start/Stop (8); the indicator flashes. When the ultrasound is switched on the set cleaning period starts and the remaining cleaning period is constantly indicated. Pressing the button again stops the ultrasound. The remaining cleaning period is still indicated and continues to run down when the Start/Stop button (8) is pressed again.

When the set cleaning period is over the ultrasound is automatically switched off and the indicator (2) shows the originally set period.

If you want to set the cleaning period back to its original value during operation you do not need to turn the knob (1) again. Just press the Start/Stop button (8) and keep it pressed for 3 seconds.

**Special Features** All settings can be changed during ultrasonic operation.

**Period**

Set the new required period by means of knob (1). Ultrasound and temperature indicator stop for 2 seconds. Then the unit starts operating again for the newly set period.

**Power**

Set the new power by pressing the buttons „-“ (3) or „+“ (4).

**Heating**

The set temperature can be changed during ultrasonic operation.

**Degas**

The Degas function can be switched on and off during ultrasonic operation.

## 5 Initial operation

|                                                                                                                 |                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Packing</b>                                                                                                  | 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).                                                          |
| <b>Check for transport damages</b>                                                                              | Check the Transsonic 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.                                                                |
| <b>Placement</b>                                                                                                | <p>For operation, place the unit on a dry and solid surface. Ensure that the workplace is sufficiently ventilated!</p> <p>Do not use a soft surface (e.g. a carpet) as this may impede the ventilation of the unit.</p>                                  |
| <div><br/><b>CAUTION</b></div> | <p>Risk of electrocution due to humidity inside the unit!<br/>Protect the unit from entering humidity.</p> <p>The unit inside is splash-water-proof. Keep workplace and casing dry in order to prevent electrical accidents and damages on the unit.</p> |
| <b>Ambient conditions</b>                                                                                       | <ul style="list-style-type: none"><li>• Allowed ambient temperature during operation: +5°C - +40°C</li><li>• Allowed relative humidity of air during operation: max. 80%</li><li>• In-door operation only</li></ul>                                      |

### 5.1 Connecting the unit to the mains

|                                  |                                                                                      |
|----------------------------------|--------------------------------------------------------------------------------------|
| <b>Required mains conditions</b> | Earth grounded socket:<br>1 phase (220-240 or 100-120V); 1 N; 1 PE protective earth. |
|----------------------------------|--------------------------------------------------------------------------------------|

## 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 Fehler! Verweisquelle konnte nicht gefunden werden.*).

**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 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*.

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



CAUTION

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*.



NOTE

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.

## 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!



NOTE

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**

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 (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.

## 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.

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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!



**NOTE**

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.

## 7.2

### After the cleaning

#### Follow-up treatment of cleaning items

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.

## 8

## 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

**Caution!** 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 interlacing agent).

## 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: 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.

### **Environment – friendly products**

The organic detergents contained in the elma clean cleaning concentrates are biodegradable. Product informations and safety data sheets are available from the manufacturer.

### **8.3.1 Dental**

- elma clean 10** Universal cleaning concentrate for the cleaning of instruments and laboratory equipment made of plastic, ceramic, stainless steel, rubber and glass.
- elma clean 25** Ready-to-use cleaner for impression spoons: removes dental plaster and alginates. Ready-for-use cleaning bath.
- elma clean 35** Cleaning concentrate for prostheses with activated oxygen for the cleaning of dental prostheses made of metal, ceramics and plastic. The released oxygen refreshes the prosthesis hygienically.
- elma clean 40** Chemical cleaning concentrate for the removal of cement and carbonate (lime). For the cleaning of precious metals, ceramics, plastics, glass and rubber. Removes metal oxide, cement, fluxing media, etc.
- elma clean 55d** Aldehyde-free, ready-to-use drill cleaner for instruments made of stainless steel. For the hygienical removal of amalgam remains, blood, tissue, etc.; with anti-corrosion effect.
- elma clean 60** Acid cleaning concentrate for instruments made of stainless steel, glass and plastic. Removes corrosion, rust films and mineral deposits.

### **8.3.2 Medical**

- elma clean 10** Universal cleaning concentrate for the cleaning of instruments and laboratory equipment made of plastic, ceramic, stainless steel, rubber and glass.
- elma clean 60** Acid cleaning concentrate for instruments made of stainless steel, glass and plastic. Removes corrosion, rust films and mineral deposits.

### **8.3.3 Optics**

- elma opto clean** Cleaning concentrate for glasses, frames, optical lenses and components. Also suitable for plastics.

### 8.3.4 Laboratory

- elma clean 60** Acid cleaning concentrate for instruments made of stainless steel, glass and plastic. Removes corrosion, rust films and mineral deposits.
- elma clean 65** Neutral laboratory and universal cleaning concentrate for glass, plastic, metals and rubber.
- elma clean 70** Alkaline laboratory cleaning concentrate for equipment made of glass, metal, alkali-proof plastics, rubber and ceramics. Removes dust, grease, oil, soot, etc.
- elma clean 75** Ammoniacal cleaning concentrate with brightening effect for precious and nonferrous heavy metals; for the removal of abrasive and polishing pastes.

### 8.3.5 Jewellery

- elma clean 75** Ammoniacal cleaning concentrate with brightening effect for precious and nonferrous heavy metals; for the removal of abrasive and polishing pastes. Not suitable for soft stones, pearls or corals.
- elma clean 85** Gentle, neutral cleaning concentrate for the jewellery workshop. Suitable for soft stones and fancy jewellery.
- elma noble clean** Cleaning and brightening of gold, silver and platinum jewellery within seconds. Not suitable for soft stones, pearls or corals. Ready-to-use cleaner.
- elma ultra clean** Extra gentle, mild alkaline cleaning concentrate for precious metal jewellery, in particular gold and gold-alloys will be given a new shine, with stones. Clean soft stones without ultrasound.
- elma super clean** Ammoniacal cleaning concentrate for jewellery made of precious metals, with brightening effect. Clean soft stones without ultrasound.

### 8.3.6 Watches

- elma chrono clean 1:20** Neutral concentrate for the aqueous cleaning of disassembled watches / clocks; removes resin residues and rust.
- elma cleaning-concentrate 1:9** Ammoniacal aqueous cleaning concentrate for disassembled watches / clocks with brightening effect on non-ferrous parts.

### 8.3.7 Industry and workshop

- |                          |                                                                                                                                                                                                                  |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>elma tec clean A1</b> | Cleaning concentrate (alkaline) for electronics and fine optics: removes light oils, grease, fluxing agents, dust, finger prints, etc.                                                                           |
| <b>elma tec clean A2</b> | Intensive cleaner (ammoniacal) with brightening effect for nonferrous and precious metals: removes grinding, polishing and lapping media, grease, oil, etc.                                                      |
| <b>elma tec clean A3</b> | Cleaning concentrate (alkaline) for iron, steel, stainless steel and precious metals: removes punching oil, drawing grease, soot, forge, grinding and polishing media, high-performance cooling lubricants, etc. |
| <b>elma tec clean A4</b> | Universal cleaning concentrate (alkaline): removes oil, grease, soot, coking, forge, dust, finger prints, etc.                                                                                                   |
| <b>elma tec clean A5</b> | Powerful cleaner (alkaline) in powder form for iron and light metals: removes forged and gummed oil and grease, grinding and polishing media, lacquer and paint remnants, wax, etc.                              |
| <b>elma tec clean N1</b> | Neutral cleaning concentrate: removes oil, grease, grinding, lapping and polishing media, dust, sweat, finger prints, etc.                                                                                       |
| <b>elma tec clean S1</b> | Mild acid cleaning concentrate: removes rust, lime, oxide films (e.g. verdigirs), grease, oil, etc.                                                                                                              |
| <b>elma tec clean S2</b> | Strong acid cleaning concentrate: removes mineral contaminations such as lime, rust and other oxides, films that can be removed with corrosives, etc.                                                            |

## 9 Maintenance

### 9.1 Maintenance / Care



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

#### Electrical security

The present Transsonic 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.

Elma already uses a highly cavitation-resistant special steel. 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*).
- 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**



**CAUTION**

Repair and maintenance works 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.

---

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

## 10 Technical details

|                              | Tank max.<br>volume<br>(approx.<br>litre) | Tank<br>effective<br>volume<br>(approx.<br>litre) | Tank<br>internal<br>dimensions<br>W x D x H<br>(approx. mm) | Unit<br>external<br>dimensions<br>W x D x H<br>(approx. mm) | Basket<br>internal<br>dimensions<br>W x D x H<br>(approx. mm) | Weight<br>(approx.<br>kg) |
|------------------------------|-------------------------------------------|---------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|---------------------------------------------------------------|---------------------------|
| <b>T310</b><br><b>T310 H</b> | 0,8                                       | 0,7                                               | 190x85 x 60                                                 | 206x116x178                                                 | 177x73x30                                                     | 2,0                       |
| <b>T420</b><br><b>T420 H</b> | 1,75                                      | 1,20                                              | 151x137x100                                                 | 175x180x212                                                 | 112x103x50                                                    | 2,1                       |
| <b>T460</b><br><b>T460 H</b> | 2,75                                      | 1,90                                              | 240x137x100                                                 | 300x179x214                                                 | 198x106x50                                                    | 3,3                       |
| <b>T570</b><br><b>T570 H</b> | 4,25                                      | 3,20                                              | 240x137x150                                                 | 300x179x264                                                 | 190x105x75                                                    | 4,0                       |
| <b>T660 H</b>                | 5,75                                      | 4,3                                               | 300x151x150                                                 | 365x186x264                                                 | 255x115x75                                                    | 5,1                       |
| <b>TP690</b>                 | 6,90                                      | 5,2                                               | 505x137x100                                                 | 568x179x214                                                 | 465x106x50                                                    | 5,6                       |
| <b>TP695H</b>                | 9,4                                       | 7,3                                               | 505x137x150                                                 | 568x179x264                                                 | 455x106x75                                                    | 6,4                       |
| <b>T700</b><br><b>T700 H</b> | 9,50                                      | 7,50                                              | 300x240x150                                                 | 365x278x264                                                 | 255x200x80                                                    | 5,9                       |
| <b>T780</b><br><b>T780 H</b> | 12,75                                     | 9,00                                              | 300x240x200                                                 | 365x278x321                                                 | 250x190x115                                                   | 7,5                       |
| <b>T820 H</b>                | 18,00                                     | 12,90                                             | 327x300x200                                                 | 390x340x321                                                 | 280x250x115                                                   | 8,5                       |
| <b>T890</b><br><b>T890 H</b> | 28,00                                     | 20,60                                             | 505x300x200                                                 | 568x340x321                                                 | 455x250x115                                                   | 11,0                      |
| <b>T1040 H</b>               | 45,00                                     | 35,00                                             | 500x300x300                                                 | 615x370x467                                                 | 455x270x194                                                   | 25,0                      |
| <b>T1060 H</b>               | 90,00                                     | 75,00                                             | 600x500x300                                                 | 715x570x467                                                 | 545x450x250                                                   | 42,0                      |
| <b>T490 DH</b>               | 2,75                                      | 1,90                                              | 240x137x100                                                 | 300x179x214                                                 | 198x106x50                                                    | 3,3                       |
| <b>TP680</b><br><b>DH</b>    | 6,90                                      | 5,2                                               | 505x137x100                                                 | 568x179x214                                                 | 465x106x50                                                    | 5,6                       |
| <b>T710 DH</b>               | 9,50                                      | 7,50                                              | 300x240x150                                                 | 365x278x264                                                 | 255x200x80                                                    | 5,9                       |
| <b>T760 DH</b>               | 12,75                                     | 9,00                                              | 300x240x200                                                 | 365x278x321                                                 | 250x190x115                                                   | 7,5                       |
| <b>T840 DH</b>               | 18,00                                     | 12,90                                             | 327x300x200                                                 | 390x340x321                                                 | 280x250x115                                                   | 8,5                       |
| <b>T910 DH</b>               | 28,00                                     | 20,60                                             | 505x300x200                                                 | 568x340x321                                                 | 455x250x115                                                   | 11,0                      |

|                 | Mains voltage unit variants (Vac) | Ultrasound frequency (kHz) | Power consumption total (W) | Ultrasonic power RMS (W) | Ultrasonic maximum peak power* (W) | Heating power (W) |
|-----------------|-----------------------------------|----------------------------|-----------------------------|--------------------------|------------------------------------|-------------------|
| <b>T310</b>     | 100-120                           | 35                         | 35                          | 35                       | 240                                | 0                 |
| <b>T310 H</b>   | 220-240                           |                            | 95                          |                          |                                    | 60                |
| <b>T 420</b>    | 100-120                           | 35                         | 35                          | 35                       | 240                                | 0                 |
| <b>T 420 H</b>  | 220-240                           |                            | 95                          |                          |                                    | 60                |
| <b>T 460</b>    | 100-120                           | 35                         | 85                          | 85                       | 340                                | 0                 |
| <b>T 460 H</b>  | 220-240                           |                            | 285                         |                          |                                    | 200               |
| <b>T 470 H</b>  | 100-120<br>220-240                | 35                         | 285                         | 285                      | 1140                               | 200               |
| <b>TS 540</b>   | 100-120<br>220-240                | 35                         | 160                         | 160                      | 640                                | 160               |
| <b>T 570</b>    | 100-120                           | 35                         | 160                         | 160                      | 640                                | 0                 |
| <b>T 570 H</b>  | 220-240                           |                            | 360                         |                          |                                    | 200               |
| <b>T 660 H</b>  | 100-120<br>220-240                | 35                         | 360                         | 160                      | 640                                | 200               |
| <b>TP 690</b>   | 100-120<br>220-240                | 35                         | 160                         | 160                      | 640                                | 0                 |
| <b>TP 695H</b>  | 100-120<br>220-240                | 35                         | 760                         | 160                      | 640                                | 600               |
| <b>T 700</b>    | 100-120                           | 35                         | 160                         | 160                      | 640                                | 0                 |
| <b>T 700 H</b>  | 220-240                           |                            | 560                         |                          |                                    | 400               |
| <b>T 780</b>    | 100-120                           | 35                         | 250                         | 250                      | 1000                               | 0                 |
| <b>T 780 H</b>  | 220-240                           |                            | 650                         |                          |                                    | 400               |
| <b>T 820 H</b>  | 100-120<br>220-240                | 35                         | 1050                        | 250                      | 1000                               | 800               |
| <b>T 890</b>    | 100-120                           | 35                         | 300                         | 300                      | 1200                               | 0                 |
| <b>T 890 H</b>  | 220-240                           |                            | 1100                        |                          |                                    | 800               |
| <b>T 1040 H</b> | 100-120<br>220-240                | 35                         | 2000                        | 400                      | 1600                               | 1600              |
| <b>T 1060 H</b> | 100-120<br>220-240                | 35                         | 2800                        | 800                      | 3200                               | 2000              |
| <b>T 490DH</b>  | 200-240                           | 40                         | 330                         | 110 (100%)<br>130 (140%) | 520                                | 200               |
| <b>TP680 DH</b> | 200-240                           | 40                         | 780                         | 130 (100%)<br>180 (140%) | 720                                | 600               |
| <b>T 710DH</b>  | 200-240                           | 40                         | 580                         | 130(100%)<br>180(140%)   | 720                                | 400               |
| <b>T 760DH</b>  | 200-240                           | 40                         | 650                         | 210 (100%)<br>250 (140%) | 1000                               | 400               |
| <b>T 840DH</b>  | 200-240                           | 40                         | 1050                        | 210 (100%)<br>250 (140%) | 1000                               | 800               |
| <b>T 910DH</b>  | 200-240                           | 40                         | 1110                        | 270 (100%)<br>310 (140%) | 1240                               | 800               |

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

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

**12****Manufacturer's contact address****Elma Hans Schmidbauer GmbH & Co. KG**

Kolpingstr. 1-7, D-78224 Singen

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Please visit our homepage. You will find helpful information and descriptions on our large product range:

**[www.elma-ultrasonic.com](http://www.elma-ultrasonic.com)**

Do you have any queries or suggestions concerning the present unit, its operation or the Operating Instructions?

Please contact us, we will be glad to assist:

**Technical Support**

Phone +49 (0) 7731 / 882-280

Fax +49 (0) 7731 / 882-253

e-mail: [support@elma-ultrasonic.com](mailto:support@elma-ultrasonic.com)

## Notes