



Transsonic Ultrasonic Cleaning Units



Analogous unit



The ELMA ultrasonic cleaning baths are shielded and tested for electromagnetic compatibility and comply with the CE criteria concerning the low voltage directive and EMV.



Digital unit



Multi-frequency Units

Operating Instructions

These Operating Instructions are part of the delivered equipment. They must be ready for use at any time and remain with the equipment in case of resale.

These Operating Instructions are not automatically revised.

For the latest revised issue please contact the manufacturer.

We reserve the right to carry out modifications concerning the technology or the design of the unit.

Content

Content	Page 2
1. Safety Warnings	Page 3
2. Operation	Page 5
3. Analogous Ultrasonic Units	Page 5
4. Digital Ultrasonic Units	Page 6
5. Multi-frequency Units	Page 8
6. General	Page 11
7. Cleaning chemicals / Application	Page 11
8. Maintenance	Page 13
9. Technical Data / Regulations	Page 14
10. Contact	Page 16

1. Safety Warnings

CAUTION! Read carefully before use:

This ultrasonic cleaning device is designed exclusively for the acoustic irradiation of objects and liquids.

Check the housing, the operating elements and the transducer tank for possible shipping damage before connecting the unit to the power supply. In case of any shipping damage **do not** connect the unit to the mains. Contact your supplier and forwarder.

Put the unit on a dry and solid surface.

Check for correct voltage; the voltage required is indicated on the nameplate on the back of the unit.

The unit must be connected to an **earthed socket** only. Keep the work surface and the operating elements clean and dry to prevent accidents caused by electricity.

Fill the ultrasonic cleaning bath with liquid up to approx. 2/3 of its volume **before** use. **Do not** operate the unit **without liquid**.

If the unit is operated over longer periods check the filling level regularly. Any operation of the ultrasonic unit without liquid might cause damage to the transducer system.

Please note that so-called "start-up splashes" can occur. When the filled unit is started, some of the liquid can splash out.

The tank of a unit with heating, can heat up while operating

Do not touch the tank inside when the heating is on. Risk of burning!

Do not reach into the tank during the ultrasonic operation.

For your information: Cell membranes could get damaged by extended exposure to ultrasound.

Pull the mains plug before emptying the unit (by pouring out the liquid).

Please do not immerse the device in water under any circumstances. This would create a serious safety hazard for the user. Resulting injury to the person and/or damage to the electronics of the device cannot be excluded.

Warning in respect of inflammable liquids:

Under no circumstances may inflammable liquids, e.g. solvents, be used directly in the ultrasonic cleaning tank. There is a risk of fire and explosion!

For your information: The ultrasonics increase the evaporation of the liquids and form a fine mist which could ignite at any time through contact to a source of ignition.

Materials which present a risk of explosion and inflammable solvents

-in the risk groups according to VbF (fire regulations) A1, B, AII, AIII or marked with symbols and danger warnings in accordance with the EC regulations - E or R 1, R 2 or R 3 for combustible materials or

- F+, F or R 10, R 11 or R 12 for inflammable materials

may not be placed in the stainless steel tank of the ultrasonic device.

Only the ultrasonic devices which are specially marked with the symbols AI, All or AllI have been approved in accordance with VbF for correspondingly inflammable solvents of the same or a less dangerous risk groups.

Limited volumes of inflammable liquids, as defined in the general industrial safety regulations, can be acoustically irradiated with the assistance of the ultrasonic device under following conditions: If they are placed by sufficient external ventilation in an appropriate separate container (example beaker glass). This can get immersed into the stainless steel tank, which has been filled with non-inflammable liquid (water with a few droplets of interlacing agent).

Warning in respect of aqueous cleaning agents:

Do not use aqueous cleaning mediums directly in the ultrasonic vat which are in the acidity range (pH value lower than 7), to which fluoride (F⁻), chloride (Cl⁻) or bromide (Br⁻) ions will be introduced with the contamination of the parts or with the cleaning agent. These will destroy the stainless steel tank during ultrasonic operation in a very short time as a result of pitting corrosion.

Other agents which have a corrosive effect when used in high concentrations and/or at high temperatures during ultrasonic operation are, e.g. nitric acid, sulphuric acid, formic acid, hydrofluoric acid (even when diluted), potassium hydroxide solution (leads to stress corrosion cracking in the ultrasonic tank). This list is not necessarily conclusive.

The restrictions on the use of the ultrasonic tank listed above also apply when the chemical compounds cited above are introduced to the tank which is filled with an aqueous medium (in particular also for distilled water) as contamination or in the form of carry-over.

In addition, this restriction also applies to customary cleaning agents and disinfectants, should they contain the compounds mentioned above.

Be certain to also heed the safety precautions provided by the manufacturer of the chemicals (e.g. glasses, gloves, caution and safety tips).

We, therefore, recommend that you use the cleaning agent specially adapted for use in the ultrasonic bath developed and manufactured by ELMA. (Page 9, Cleaning Agents. Areas of Use)

Maintenance and repairs

Any repair, maintenance or alignment works on the connected and opened unit must be carried out by authorised personnel only.

Pull the mains plug before opening the unit for any repair and alignment works. Any faulty parts must be replaced by **original spares only** in order to keep in compliance with the strict safety regulations.

Please consult the manufacturer regarding any damage claims.

2. Operation

Fill the unit with liquid before connecting it to the power supply. If you use water as contact medium we recommend the use of the suitable ELMA Clean cleaning solution to be added to the water. The ELMA Clean chemicals contain tensides that reduce the surface tension and are specially designed for the use in an ultrasonic bath. Switch on the ultrasonic unit and let the liquid degas for a few minutes. Degassed liquids allow better cavitation. Furthermore, special degas-improving substances contained in the ELMA Clean chemicals accelerate the cavitation process. The use of the cleaning chemicals guarantee a long service life of the TRANSSONIC ultrasonic unit.

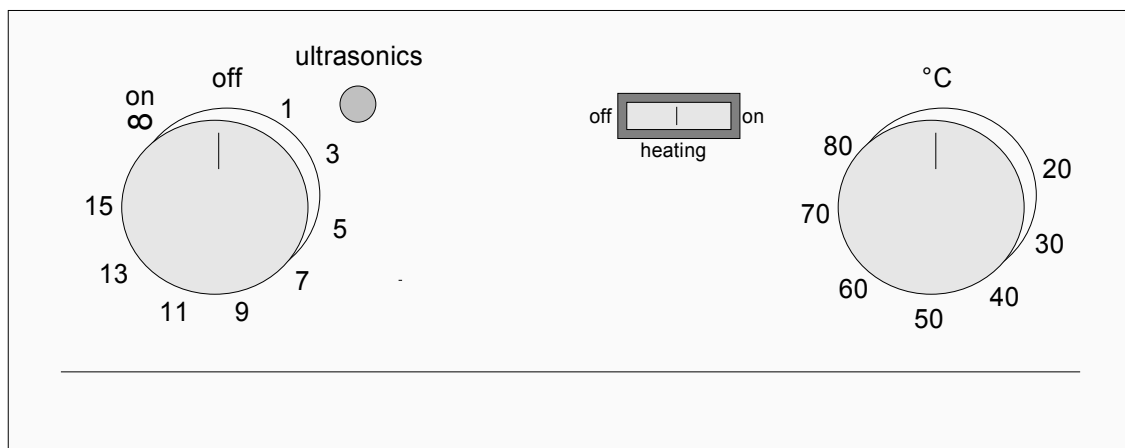
The optimum temperature for your specific cleaning task is indicated on the label of the used ELMA Clean solution along with the mixing concentration and the recommended cleaning time.

If you use pulverised or granulated cleaning media by other suppliers ensure that the pulver or granulates dissolve completely. Any residue and particles on the tank floor may cause contact corrosion and create pinholes in the material.

The items to be cleaned must be covered completely by the cleaning liquid. We recommend to put the items in/on a holder basket to protect the stainless-steel tank. Do not put the items directly on the tank floor. These measures considerably prolong the service life of the stainless-steel tanks.

If you use aggressive chemicals (e.g. acids, alkalines) we recommend the use of plastic tubs (acid-resistant tubs; see Elma catalogue Accessories).

3. Analogous Ultrasonic Units



a) 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 (not available on all units) indicates the operation of the unit.

b) 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. 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.

c) Heating

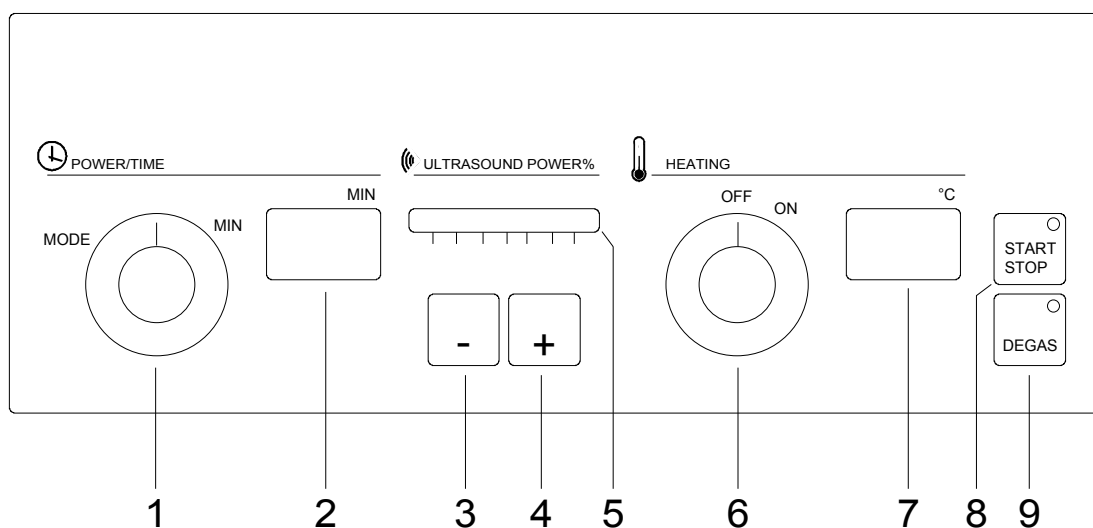
The heating is switched on and off by the green button (fig. 1). Ensure that the filling level in the tank is correct before switching on the heating. This prevents overheating of the tank at the spot where the heating is fixed.

Please note that the liquid will heat up by ultrasonic activity alone without heating. This effect is even stronger when a cover is used.

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

As ultrasonic activity additionally heats up the cleaning liquid do not set the temperature too high when operating the unit over longer periods.

4. Digital Ultrasonic Units



a) 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.

b) 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.

c) 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 %.

d) 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 +/- 2°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.

e) Degas

The Degas device is activated by the button (9). When the Degas function is switched on the green indicator flashes 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.

f) 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.

g) Special Features

All settings can be changed during ultrasonic operation.

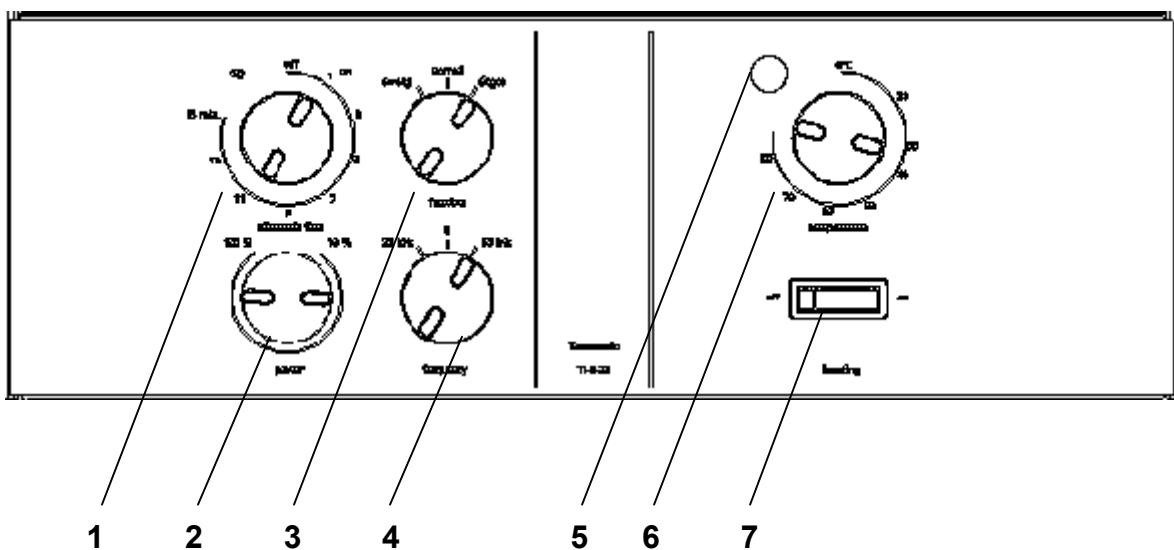
Period: Set the new required period by means of knob (1). Ultrasound and temperature indicator stop for 2 seconds. Then the unit starts operating again for the newly set period.

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. Multi-frequency Units



a.) 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 (not available on all units) indicates the operation of the unit.

b) Setting of the 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. 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.

c.) Power regulation

The ultrasonic power is variable from 10 to 100% and is regulated by knob (2). Turning the knob clockwise increases the power. The power is automatically kept at the set level.

d.) Operation modes

You can choose between the operation modes sweep, standard and degas by means of knob (3).

Sweep: The frequency varies permanently within a defined range. This shifts the minima and maxima of the sound field within the bath. It also allows a more even load of the ultrasound transformer. The cleaning effect is more homogeneously distributed in the bath than during standard operation.

Standard: The frequency is regulated against the mechanical resonance of the ultrasound transformer. This optimises the performance in the distributed maxima.

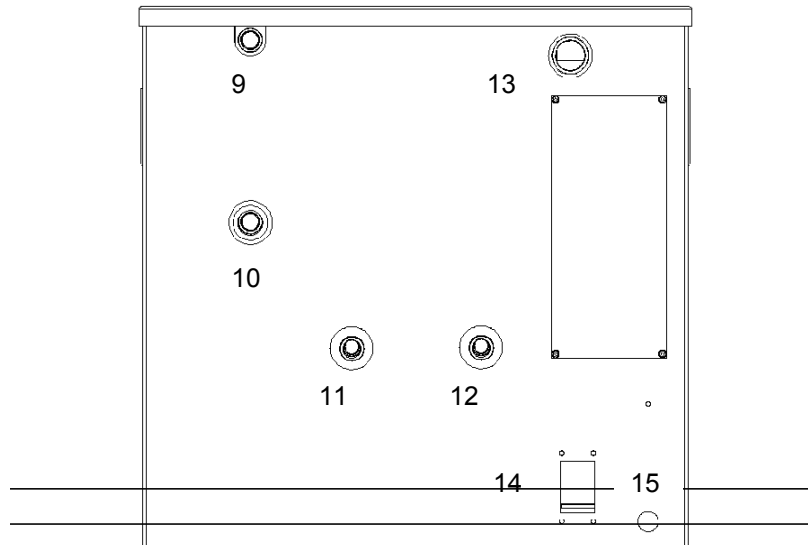
Degas: The set power is interrupted for a short period so that the bubbles are not retained by the ultrasonic forces. The degassing effect is stronger with high ultrasonic frequencies than with lower frequencies due to the directional diffusion. We recommend this operation mode particularly for newly filled baths. The operation modes can be changed during operation.

e.) Setting of frequency

On multi-frequency units you can choose between a low and a high ultrasonic frequency by means of knob (4). When the knob is in neutral position 0, the ultrasonic activity is switched off. The frequency can be changed during operation.

f.) Heating

The heating is switched on and off by means of push button (8). Set the required temperature by turning knob (7). The scale indicates the temperature in centigrade. As soon as the set temperature is reached the control lamp (6) switches off.



g.) Surface skimming (optional, TI-H-25 and larger)

Using the supply duct (9) and the discharge of the overflow device (13) a current on the surface of the bath can be created. This allows the skimming of floating particles (e.g. oil).

h.) Floor scouring (optional, TI-H-25 and larger)

Particles settling on the tank floor can be washed away by means of the scouring function. For this connect both supply (10) and discharge (11) to the external pumping/filtering unit.

i.) Remote control (optional, TI-H-25 and larger)

The ultrasound unit can be operated by remote control from a central control unit. The remote control is connected to socket (14).

j.) Filling level control (optional, TI-H-25 and larger)

The filling level control switches off heating and ultrasound as soon as the level falls below a certain limit. Approx. 5 seconds after refilling the tank heating and ultrasound are switched on again.

Position	Device
1	Timer ultrasound
2	Power regulation
3	Regulator operation modes Sweep, Standard, Degas
4	Regulator frequency
6	Control lamp heating
7	Temperature control
8	Heating control
9	Skimming supply (optional)
10	Floor scouring supply (optional)
11	Floor scouring discharge (optional)
12	Discharge
13	Skimming discharge (optional)
14	Remote control (optional)
15	Mains cable

6. General

The ultrasonic cleaning process:

The ultrasonic transducers mounted under the tank floor turn electric energy into mechanic vibrations. The cleaning liquid in the stainless-steel tank starts vibrating, too. During this process, tiny vacuum bubbles are produced that implode. This is called cavitation. The cavitation removes dirt from every spot that the cleaning liquid reaches.

7. Cleaning chemicals / Application

The cleaning chemical to be used must be suitable for the use in an ultrasonic bath to prevent damage to the transducer tank. Do not use flammable products (see chapter Safety Warnings). Do not use chemicals containing halogenide ions or salt as they may cause pitting corrosion in the tank. Acids such as hydrochloric acid, sulphuric acid or nitric acid destroy the unit in very short time. In particular acid cleaners (e.g. for derusting or the removal of mineral dirt such as lime) must be used only when specially designed for this purpose.

We offer our own range of ELMA cleaning chemicals specially developed and made for the use in ultrasonic cleaners which guarantees a long service life of our ultrasonic baths. The following table shows the most frequently used of our ELMA chemicals. If you use cleaning chemicals by other suppliers observe the instructions given on the label, in particular the instructions concerning the use in ultrasonic baths. Contact your supplier for these cleaning chemicals.

Dental:

- ELMA Clean 10 Highly efficient alkaline universal cleaner for the cleaning of instruments and laboratory equipment.
- ELMA Clean 25 Removes plaster and alginate.
- ELMA Clean 35 Cleans prostheses with activated oxygen.
- ELMA Clean 40 Removes cement and carbonate (lime).
- ELMA Clean 50d Burr bath and disinfectant.
- ELMA Clean 60 Acid cleaner for instruments.

Medical:

- ELMA Clean 10 Highly efficient alkaline universal cleaner for the cleaning of instruments and laboratory equipment.
- ELMA Clean 60 Acid cleaner for instruments.

Laboratory and Technical Cleaning:

- ELMA Clean 60 Acid laboratory cleaner (derusting, stain and lime removal).
- ELMA Clean 65 Neutral universal and laboratory cleaner.
- ELMA Clean 70 Mild alkaline laboratory cleaner.
- ELMA Clean 75 Ammoniacal cleaner with brightening effect for metals; cleaner for jewellery.

Jewellery:

- ELMA Clean 75 Ammoniacal cleaner with brightening effect for metals; cleaner for jewellery.
- ELMA Clean 85 Alkali-free, acid-free cleaner for workshop and jewellery manufacture.
- Elma Noble Clean Cleaning and brightening of gold, silver and platinum; acts within seconds; not suitable for soft stones.
- ELMA Clean 80 Very mild cleaning concentrate for jewellery; suitable for precious metals with stones.
- ELMA Super Clean For cleaning and brightening, suitable for soft stones (not suitable for the use in ultrasonic baths).

Watches/Optics

- ELMA 1 : 9 Cleaner for disassembled watches.
- ELMA Optoclean Cleaner for the ultrasonic cleaning of glasses.

Notes on the Cleaning of Items:

- Place the items to be cleaned in a basket.
- Put the dirtiest items lowest.
- Do not place the items one on another as this will absorb the ultrasound.
- Sensitive items such as surgical instruments should not come into contact with each other. We recommend the use of silicon mats available from your supplier. These prevent the direct contact among the single items.

Attention! The cleaning liquid heats up during prolonged ultrasonic operation.

Take this into consideration when cleaning temperature-sensitive items.

8. Maintenance

The following measures will considerably prolong the service life of your ultrasonic bath. We recommend removal of the cleaning liquid and any residues from the tank after use. Wipe the tank clean.

Clean the tank carefully and remove all residues such as small metal particles or any other kind of dirt before changing the cleaning liquid. Small particles in the ultrasonic tank will eventually destroy the stainless-steel tank.

Do not place the items to be cleaned on the tank floor. Use a rack or a cleaning basket (see paragraph Notes on the Cleaning of Items).

Do not use any scraping tools. A plain and clean metallic surface prolongs the service life of the ultrasonic tank. Should there be any lime deposits fill the tank with ELMA Clean 60 or ELMA Clean 115 in the recommended concentration and operate the unit for approx. 1 minute to improve the cleaning effect. Then empty the bath and wipe it out.

If neither ELMA Clean 60 nor ELMA Clean 115 is at hand use any lime remover on phosphoric acid base. The use of such a lime remover is possible as long as it does not contain any chloride ions.

We recommend the use of chemicals specially designed for application in a TRANSSONIC ultrasonic bath.

9. Technical Data / Regulations

Model	Internal tank dimensions	Power Consumpt. Watts	Max. volume liter	Ultrasonic Frequency kHz	CE 73/23/EWG 89/336/EWG	CE 93/42/EWG
Analogous units						
T 310	190x85x60	30	0,8	35	√	√
T 310/H	190x85x60	100	0,8	35	√	√
T 310 – 25kHz	190x85x60	60	0,8	25	√	√
T 420	151x137x100	50	1,75	35	√	√
T 460	240x137x100	85	2,75	35	√	√
T 460/H	240x137x100	285	2,75	35	√	√
T 470/H	240x137x100	285	2,75	35	√	√
TS 540	∅ 230x130	160	5,4	35	√	√
T 570	240x137x150	160	4,25	35	√	√
T 570/H	240x137x150	360	4,25	35	√	√
T 660/H	300x151x150	360	5,75	35	√	√
TP 690	505x137x100	160	6,9	35	√	√
T 700	300x240x150	160	9,5	35	√	√
T 700/H	300x240x150	560	9,5	35	√	√
T 95/HL	300x240x150	560	9,5	35	√	
T 780	300x240x200	320	12,75	35	√	√
T 780/H	300x240x200	720	12,75	35	√	√
T 820/H	327x300x200	1120	18	35	√	√
T 890	505x300x200	320	28	35	√	√
T 890/H	505x300x200	1120	28	35	√	√
TP 1000/H	1000x200x200	1950	40	40	√	√
T 1040/H	500x300x300	1950	45	40	√	
T 1060/H	600x500x300	2800	90	40	√	
Tray-Dent Tischgerät	320x148x200 320x240x200	320	9,5 15,4	40	√	√
LC 20/H	151x137x100	100	1,75	35	√	√
LC 30	240x137x100	40	2,75	35	√	√
LC 30/H	240x137x100	240	2,75	35	√	√
LC 60/H	300x151x150	285	5,75	35	√	√
LC 130/H	300x240x200	560	12,75	35	√	√
Multi-frequency Units						
TI-H-5	240x130x150	500	4,7 / 3,7	25 u 45 35 u 130	√	
TI-H-10	300x240x150	1050	10,8 / 8,6	25 u 45 35 u 130	√	
TI-H-15	300x240x200	1250	14,4 / 12,2	25 u 45 35 u 130	√	
TI-H-20	330x300x200	1700	19,8 / 16,8	25 u 45 35 u 130	√	

Model	Internal tank dimensions	Power Consumpt. Watts	Max. volume liter	Ultrasonic Frequency kHz	CE 73/23/EWG 89/336/EWG	CE 93/42/EWG
TI-H-25	330x300x230	1300	25,5 / 19,8	25 u 45 35 u 130	√	
TI-H-55	500x300x350	3600	57,8 / 45	25 u 45 35 u 130	√	
TI-H-80	500x300x500	4900	82,5 / 67,5	25 u 45 35 u 130	√	
TI-H-115	600x500x350	7200	115,5 / 90	25 u 45 35 u 130	√	
TI-H-160	600x500x500	7600	180 / 135	25 u 45 35 u 130	√	
Digital units						
T 490 DH	240x137x100	350	2,75	40	√	√
TP 680DH	505x137x100	600	6,9	40	√	√
T 710DH	300x240x150	600	9,5	40	√	√
T 760DH	300x240x200	700	12,75	40	√	√
T 840DH	327x300x200	1100	18	40	√	√
T 910DH	505x300x200	1200	28	40	√	√

The units are designed for use in the following ambience conditions:

- Electronic voltage: 220-240 Vac 50/60Hz or 100-240Vac 50/60Hz (except T1060/H)

TI-H55 – TI-H160: 380 – 400Vac 50/60Hz or 200 – 208Vac 50/60Hz

- Max. ext. Fuse protection: 16A
- Allowed ambient temperature +5°C to +40°C
Allowed relative air humidity below 30°C : 80%
Allowed relative air humidity below 40°C : 50%
- Protect the units from heavy variations in temperature. (Risk of condensation)
- The units are subject to strict safety regulations. Therefore, faulty parts must be replaced by **original spare parts** only.
- For safety reasons, the units must be connected to correctly earthed sockets only.
- The ELMA units are in compliance with the following EC regulations:
 - EC EMV Regulation 89/336/EWG
 - EC Low Voltage Regulation 73/23/EWG
 - EC Regulation on Medical Products 93/42/EWG (see table)
A declaration of conformity is available on request.

10. Contact

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