
Techspan Ultrasonic Cleaning Units



OPERATING INSTRUCTIONS

Transsonic TI-H

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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 use of the unit and operate the electric 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 ultrasonic treatment of **items** and **samples of liquids** immersed in a cleaning bath.

It has not been designed for operation in areas with an explosive ambient atmosphere.

Check for damages

Check the unit and the mains cable for transport damages. Do not operate the unit if any damage is visible!

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 connections details, in particular those of the mains voltage and current connected value.

Placement

The unit must be placed at a dry workplace; the workplace must be sufficiently ventilated to allow the vapours from the cleaning liquid to be carried off. Keep workplace, housing and operating elements dry. Protect the unit from entering humidity!

Prevention of electrical accidents

The unit must be opened by authorized specialized personnel only:

For purposes of filling, 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

The present unit must be operated with aqueous cleaning liquids only.

Risk of fire and explosion! Do not use flammable liquids directly in the cleaning bath.

Hot surfaces and liquid

Risk of burning and scalding! Depending on the duration of operation, the surface of the unit, the cleaning liquid, the basket and the 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. This is particularly recommendable for 25 kHz operation without cover.
- Sound transmission through 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 and non-observance of the Operating Instructions. The operator is responsible for the instruction of the operating personnel.

3 **Functioning**

Today, cleaning by ultrasound is the latest fine cleaning method.

The electric high-frequency energy created by an ultrasonic generator is transformed into mechanical energy by piezoelectrical 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.



- Physical energy** Basically, the cleaning result is determined by four factors:
 - Ultrasonic energy is probably the most efficient mechanic factor in the cleaning process. This energy must be transmitted through a liquid medium to the surfaces which are to be cleaned.
 - Transsonic TI-H units are fitted with the innovative sweep technology: through electronic oscillation of the sound field (sweeping) the zones of low performance in the ultrasonic bath are reduced.
- Cleaning media** For saponification and removal of the dirt particles a suitable cleaning chemical is required. Elma has a large range of cleaning media on offer.

Cleaning chemicals are also necessary to reduce the surface tension of the liquid. This increases the efficiency of the ultrasonic activity considerably.
- Temperature** The effect of the cleaning medium is improved by the optimum temperature of the cleaning liquid.
- Cleaning period** The cleaning period depends on the degree and the kind of contamination, on the cleaning chemical, on the temperature and on the stage of the cleaning process.

4 Product description

4.1 Product features

Ultrasonic cleaning unit of industrial quality. Unit versions available: multi-frequency technology (25/45 kHz or 35/130kHz) or single frequency 35 kHz.

Further product features:

- transducer tank made of special cavitation-proof stainless steel
- housing made of stainless steel
- sandwich-type performance transducer systems
- ultrasonic frequency variable by hand (on multi-frequency units)
- Sweep function for a continuous shifting of the sound pressure maxima; guarantees a homogeneous sound field distribution in the bath,
on multi-frequency units the sweep function can be switched on and off;
on single-frequency units the sweep function is permanently switched on
- Degas function for the efficient degassing of the cleaning liquid and for special laboratory applications, can be switched on and off (only on multi-frequency units)
- manual stepless ultrasonic power regulation
- quick drain duct on the back of the unit
- temperature control
- dry run protected heating (TI-H 5 – TI-H 20)
- highly efficient direct heating (TI-H 25 – TI H 160)
- level monitoring on TI-H 25 – TI H 160 for the safety switch-off of ultrasound and heating
- connection sockets for the optional connection of external pump filter units (only on TI-H 25 – TI H 160)
- skimming ledge for the surface skimming of cleaning residues (only on TI-H 25 – TI H 160)

4.2 CE conformity

The TECHSPAN 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.

4.3 RFI declaration (European Union)

This is a product of class A.

For your information:

With a view to the radio interference elimination the present unit has been permitted for the use in commercial areas.

In residential areas the unit may cause radio interference radiations. In this case suitable measures for the elimination of the interfering radiation must be taken. Please contact your supplier or the manufacturer.

4.4 Delivered equipment

- Ultrasonic cleaning unit
- Operating Instructions

4.5 Additional accessories

- stainless-steel cover
- stainless-steel cleaning basket
- noise protections cover (TI-H 5 – TI-H 20)
- pump filter aggregate (connection socket available on TI-H 5 – TI-H 160)

4.6 Technical details

| | Max. tank volume (approx. liter) | Tank service volume (approx. liter) | Tank inner dimensions W x D x H (approx. mm) | Unit outer dimensions W x D x H (approx. mm) | Basket inner dimensions W x D x H (approx. mm) | Weight (approx. kg) |
|-----------------|----------------------------------|-------------------------------------|--|--|--|---------------------|
| TI-H 5 | 4.7 | 3.5 | 240x130x150 | 340x300x370 | 200x100x90 | 10,5 |
| TI-H 10 | 10.8 | 8.6 | 300x240x150 | 400x415x370 | 260x210x85 | 14,8 |
| TI-H 15 | 14.4 | 12.2 | 300x240x200 | 400x415x420 | 260x210x130 | 16 |
| TI-H 20 | 19.8 | 16.8 | 330x300x200 | 430x470x420 | 290x270x130 | 20 |
| TI-H 25 | 25.5 | 19.8 | 330x300x230 | 615x690x570 | 290x270x140 | 32 |
| TI-H 55 | 57.8 | 45 | 500x300x350 | 620x850x570 | 255x460x210 | 35 |
| TI-H 80 | 82.5 | 67.5 | 500x300x500 | 620x850x720 | 255x460x290 | 60 |
| TI-H 115 | 115.5 | 90 | 600x500x350 | 840x1000x570 | 450x545x205 | 100 |
| TI-H 160 | 160 | 135 | 600x500x500 | 840x1000x720 | 440x540x350 | 140 |

| | Mains connections | Ultrasonic frequency (kHz) | Power consumption total (W) | Ultrasonic power effective (W) | Ultrasonic peak max* (W) | Heating power (W) |
|-----------------|--|--|-----------------------------|--------------------------------|--------------------------|-------------------|
| TI-H 5 | 100-120V or 200-240V 1 phase 1 N 1 PE earthing contact | SF1 35 kHz or MF2 25/45 kHz | 500 | 100 | 400 | 400 |
| TI-H 10 | | | 1000 | 200 | 800 | 800 |
| TI-H 15 | | | 1200 | 200 | 800 | 1000 |
| TI-H 20 | | | 1650 | 250 | 1000 | 1400 |
| TI-H 25 | | | 1300 | 300 | 1200 | 1000 |
| TI-H 55 | 200-208V or 380-400V 3 phasen 1 N 1 PE earthing contact | or MF3 35/130 kHz | 3600 | 600 | 2400 | 3000 |
| TI-H 80 | | | 4900 | 900 | 3600 | 4000 |
| TI-H 115 | | | 7400 | 1400 | 5600 | 6000 |
| TI-H 160 | | | 7600 | 1600 | 6400 | 6000 |

* Due to the form of the signal the value of the ultrasonic peak maximum is four times higher

4.7

Description of unit features – front view



Illustration 4.7. TI-H 15

- A Stainless-steel transducer tank**
- B Maximum filling level marking** indicates the recommended filling level maximum. This filling level should not be exceeded even with the cleaning items immersed.
- C Plastic carrying handles** for the safe transportation of the unit even if the housing is hot.
- D Operating panel** for the control of the unit functions
Description *see section 4.10.*

4.8

Description transducer tank

The transducer tank is made of a special highly cavitation-proof stainless steel, double welded at the edges (both on the inside and on the outside).

In addition to the drain opening there are other openings in the transducer tank (TI-H 25 – TI-H 160) that can be used for

- bottom scouring (drain) and supply to the circulating system of the cleaning liquid, e.g. through a pump filter unit,
- for the installation of a cooling device in the cleaning liquid.

On the standard unit these openings are closed by screwed caps.

The ultrasonic transducers are fitted under the transducer tank, the heating is fitted to the side wall.

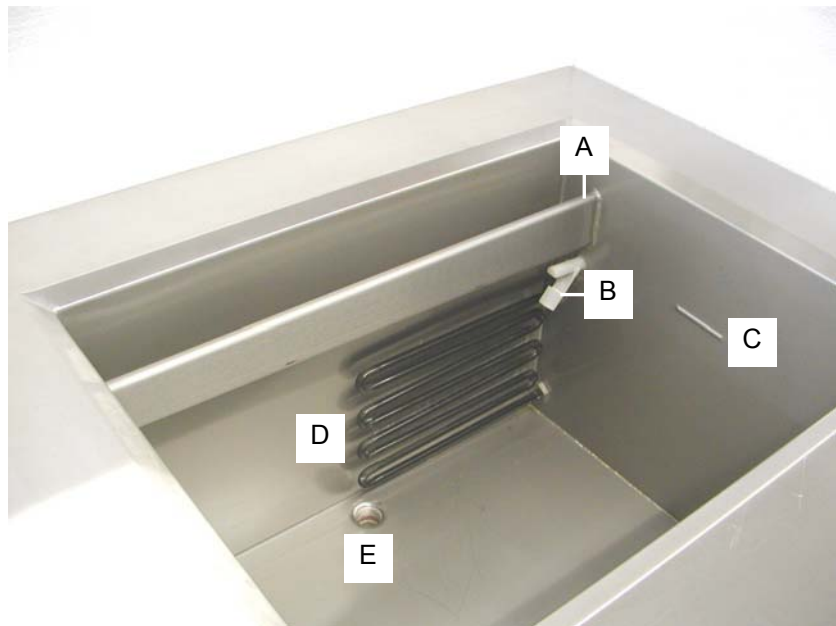


Illustration 4.8 View tank TI-H 25

- A** Overflow (TI-H 25 – TI-H 160)
- B** Level switch (TI-H 25 – TI-H 160)
- C** Filling level marking for minimum level
- D** Heating element inside the tank (TI-H 25 – TI-H 160)
- E** Drain opening

4.9

Description of unit features – back side



Illustration 4.9.1 back view unit types TI-H 5 - TI-H 20

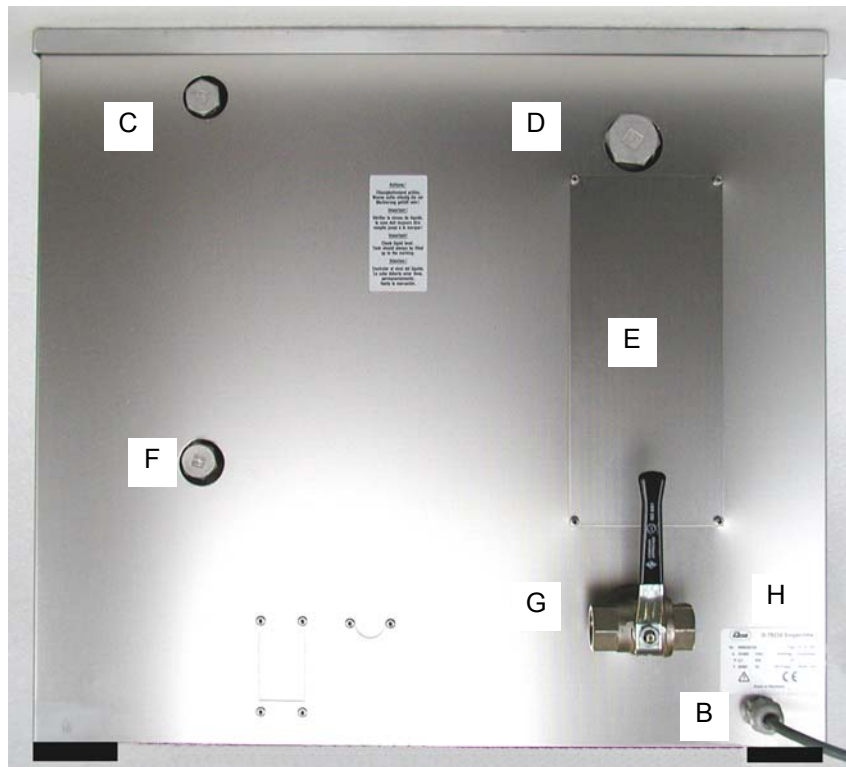


Illustration 4.9.2 back view unit types TI-H 25 - TI-H 160

- A** 2-way ball valve 1/2" (TI-H 5 – TI-H 25)
- B** Mains supply cable:
 - 1 phase earthing contact (TI-H 5 – TI-H 25)
 - 3 phases threephase current (TI-H 55 – TI-H 160)
- C** Connection for supply surface skimming (TI-H 25 – TI-H 160)
- D** Connection drain overflow to a pump filter unit (TI-H 25 – TI-H 160)
- E** Cover plate (maintenance opening) for heating and float switch (TI-H 25 – TI-H 160)
- F** Connection supply for bottom scouring (TI-H 25 – TI-H 160)
- G** 3-way ball valve for drain / supply (TI-H 25 – TI-H 160)
- H** Nameplate

4.10 Description operating elements

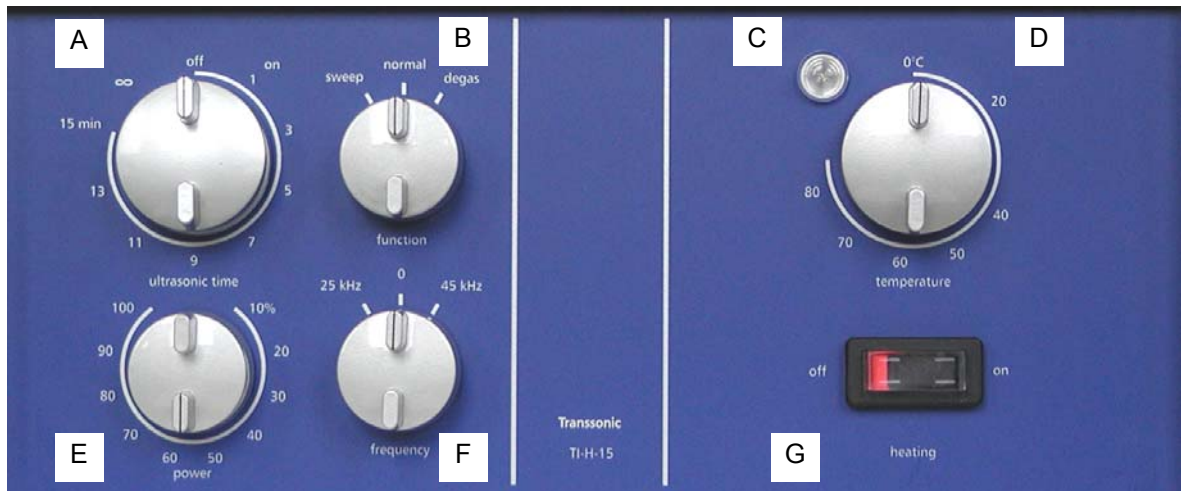


Illustration 4.10.1 Operating panel multi-frequency unit

- A Turning knob „ultrasonic time“** for the preselection of the period of ultrasonic operation.
Available settings: 1-15 min for short period operation
permanent operation ∞ (switch-off by hand required)
- B Turning knob „function“** for the selection of the ultrasonic mode
(available on multi-frequency units only)
Sweep – continuous shifting of the sound pressure maxima, allowing more homogeneous distribution of the sound field in the liquid.
Degas – for degassing of fresh mixed cleaning liquids (single half wave operation).
Normal – standard operation; the transducer system is operated in double half wave mode.
- C Pilot lamp heating**
Indicates operation of the heating system.
- D Turing knob „temperature“** for the preselection of the required temperature of the liquid. Stepless regulation of the temperature preselection for the heating of the cleaning liquid.
- E Turning knob „power“** for the stepless setting of the required ultrasonic power: setting range 10 – 100 %.
- F Turning knob „frequency“** for the setting of the required ultrasonic frequency (on multi-frequency units only)
Preselection of the required cleaning frequency (25 / 45 kHz or 35 / 130 kHz). This switch cannot be found on single frequency units (SF 35 kHz).
- G Switch „heating“** (on / off) for switching the heating on and off. Plastic cover class IP65 to protect against entering moisture.

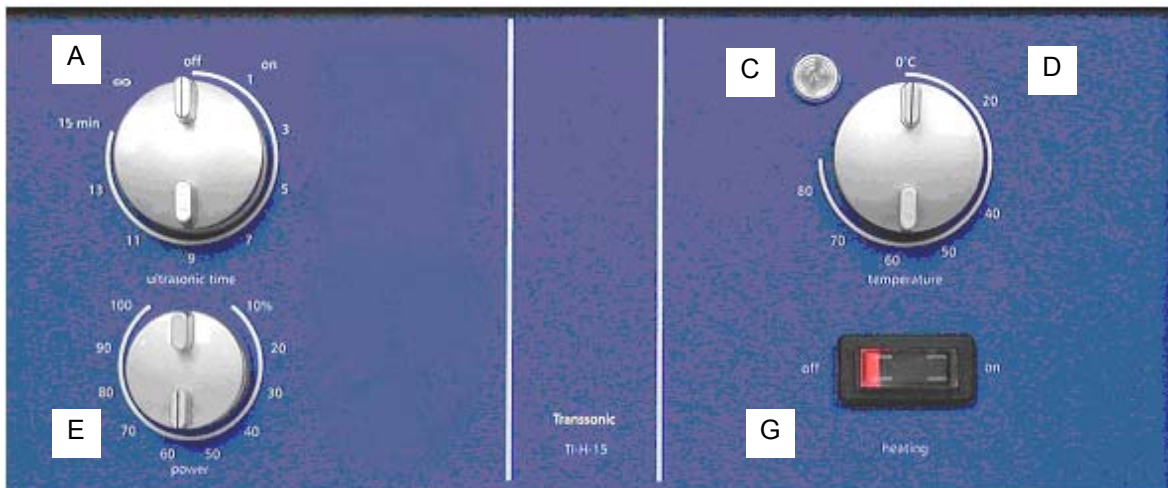


Illustration 4.10.2 Operating panel single-frequency unit

4.11 Safety devices

- TI-H 5 – TI-H 20** These units are fitted with heatings safe to run dry
- TI-H 25 – TI-H 160** These units are fitted with a level switch, which switches off ultrasound and heating as soon as the liquid level goes below the switch.

5 Before initial operation

5.1 Unpacking and placement

Packing material If possible keep the original packing material for service purposes.
Disposal must be in compliance with the valid regulations. You can also return the packing material to the manufacturer or supplier.

Check for transport damages Check the unit for possible transport damages before initial operation. In cas of visible damage do not operate the unit. Contact your supplier and forwarding agent.

Placement Place the unit on a solid, even and dry surface which is resistant to possibly leaking cleaning liquid. Ensure that the workplace is sufficiently ventilated!



CAUTION

Risk of electrocution due to humidity inside the unit!
Protect the unit from entering humidity.

The unit inside is splashwater-proof.

Keep workplace and housing dry in order to prevent electrical accidents and damages on the unit.

Ambient conditions For safe operation of the unit the following preconditions must be guaranteed:

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

5.2 Connect the unit to the mains

Required mains conditions **TI-H 5 – TI-H 25:** 1 phase (100 – 120 V or 220-240 V);
1 N; 1 PE protective earth.

TI-H 25 – TI-H 160: (200 – 208 V or 380 – 400 V)
3 phases 1 N; 1 PE protective earth.

Connect mains cable Connect the unit to a grounded shockproof socket or a control intended for this purpose.

Ensure that the values indicated on the nameplate of the unit must correspond with the available connecting conditions.

6 Putting into operation

6.1 Filling of the unit with cleaning liquid

Pull the mains plug **Caution!** For reasons of safety pull the mains plug when filling the unit with cleaning liquid.

Shut the drain Shut the drain duct before filling the tank.

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

TI-H 5 – TI H 20: Use the filling level marking inside the tank to find the correct filling level.

TI-H 25 – TI H 160: The level switch must be covered with liquid.



The optimum filling level is indicated by the upper edge of the overflow.

If the cleaning liquid goes below a certain level the unit is automatically switched off by the level switch. This prevents the unit from running dry which might cause damage to the material.

Allowed cleaning media Use aqueous cleaning liquids only: ensure that the chosen cleaning chemical is suitable for treatment in an ultrasonic bath and observe the instructions on dosage and the compatibility of the material.

Prohibited cleaning media All flammable cleaning media with a flash point lower than indicated on page 1 of these Operating Instructions (see flash point) must not be used in an ultrasonic bath. Observe the safety warnings in section 8 (Cleaning liquids).



CAUTION

Risk of fire and explosion!

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

Use the cleaning media listed in section 8.3.



Ultrasonic activity increases the vapourization 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 chemicals (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 media 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 the limitations of use given in section 8.2.

For queries please contact the manufacturer or your supplier.

6.2

Setting of the required cleaning liquid temperature

Depending on the degree and kind of contamination and in order to assist the cleaning effect 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 put a cover on the tank.

The heating up process can be further accelerated by switching on the ultrasound.



The ultrasonic energy is physically transformed into heat. Low set temperature values can be exceeded during ultrasonic operation.

In order to prevent the temperature to exceed the required temperature accidentally due to the added ultrasonic energy, set the temperature only to the value which is absolutely necessary for the cleaning process.



CAUTION

High temperatures! Risk of burning and scalding!

Cleaning bath, transducer tank, cover, basket and cleaning items can heat up considerably depending on the temperature of the liquid.

Do not reach inside the bath!

Wear protective gloves when touching unit and basket!

- How to proceed**
1. Turn the „heating“ switch to „on“ (*Illustration 4.10.1/2 G*)
 2. Set the required cleaning temperature at the turning knob „temperature“ (*Illustration 4.10.1/2 D*). If the set temperature is above the actual temperature, the heating operates. This is indicated by the heating pilot lamp (*Illustration 4.10.1/2 D*).
 3. As soon as the set temperature is reached the heating automatically switches off, the pilot lamp is turned off.



In order to obtain an equally heated cleaning liquid it is necessary to switch on the ultrasound or to stir the liquid from time to time.

Without revolution of the liquid the created heat will only rise to the surface. This would create big temperature differences in the cleaning tank which lead to deviations of the actual temperature from the set temperature of the cleaning bath.

6.3

Degassing of cleaning media

(multi-frequency units only)

Fresh mixed cleaning media are saturated with air depending on the used chemical. This impedes the cleaning effect of the ultrasound. By operating the degas function over a period of several minutes before starting the cleaning process these tiny inclusions of air can be removed from the cleaning medium.

Observe the safety warnings given in section 7 „Ultrasonic cleaning process“ before switching on the ultrasound.

- How to proceed**
1. Turn the knob „function“ into „degas“ position (*Illustration 4.10.1/2 D*).
 2. Set the temperature control to approx. 10 minutes.
The ultrasonic operation is started in the degas mode for the set period of time.



We recommend to degas in 25 kHz or 35 kHz mode.

Degassing of the cleaning liquid can also be operated in standard ultrasonic mode. The degas mode, however, is quicker than the standard ultrasonic operation mode.

6.4

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 except when safely possible!



To not reach inside the tank during ultrasonic operation!

Cell walls, in particular in the skeletal and in joints, can be damaged by prolonged ultrasonic activity.

No cleaning items on the tank bottom

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

Use cleaning basket

Place the cleaning items in a stainless-steel cleaning basket (accessory).

Acid-resistant tank

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

The transducer tank is filled with an aqueous surface-active agent in which the additional tank is inserted so that the liquid in the tank operates as coupling medium for the ultrasonic activity.

7

Ultrasonic cleaning process

Please observe the following instructions before starting the ultrasonic cleaning process.



CAUTION

Risk of scalding by hot surfaces and cleaning liquid!

Ultrasonic energy is physically transformed into heat.

The unit and the 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.

Wear protective gloves when touching unit and basket!



NOTE

Ultrasonic units can produce annoying sounds.

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



NOTE

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 the heating up of the cleaning liquid into consideration.



NOTE

Sensitive surfaces can be damaged when exposed to ultrasound over prolonged periods.

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.

The operator is responsible for the inspection of the cleaning result and the regular checking for possible damages on the cleaning items during the cleaning process.

7.1 Setting of ultrasonic cleaning process

The ultrasonic activity is switched on by the turning knob „ultrasonic time“ (*Illustration 4.10.1/2 A*).

Timer operation mode For short period operation turn the knob to timer operation (1-15 min). The timer starts the ultrasonic operation and switches it off after the set period of time has run down. If necessary, this process can be repeated as often as required or be interrupted before the set period has run down (turn to “off”).

Permanent operation mode For longer ultrasonic treatment periods turn the knob to the left into the permanent operation position (∞). In this mode there is no automatic switch-off. The operator must switch off the ultrasonic operation by hand (turn to „off“).



Caution! The ultrasonic activity can heat up the medium during permanent operation even without heating; in this process temperatures exceeding the set temperature can be reached.



In order to avoid unnecessary heating of the cleaning medium, in particular with low set temperatures, switch on the ultrasound only during the cleaning stage (other than for degassing and for revolution of the bath during heating up).

7.2 Setting of ultrasonic intensity

For the treatment of sensitive surfaces the ultrasonic intensity can be reduced. If in doubt, we recommend to carry out trial cleaning processes with reduced ultrasonic activity.

The ultrasonic intensity can be controlled in a range between 10 – 100 % at the turning knob „power“ (*Illustration 4.10.1/2 E*).



The ultrasonic intensity can be changed during ultrasonic operation.

7.3 Setting of ultrasonic frequency (only on multi-frequency units)

The present unit can be operated with two different ultrasonic frequencies.

The ultrasonic frequency can be set at the knob „frequency“ (*Illustration 4.10.1 F*). The following frequencies are available:

25 kHz for the removal of coarse and tenacious contaminations and for the precleaning of robust surfaces

45 kHz for the fine cleaning and removal of contaminations from sensitive surfaces



The frequency can be changed during ultrasonic operation.

7.4

Setting ultrasonic mode

(on multi-frequency units only)

In addition to the degas mode for the degassing of cleaning liquids, other ultrasonic operating modes can be selected:

Standard Use the standard mode if the cleaning basket containing the cleaning items as connected to a manual or automatic oscillation device.

Operation in standard mode is selected at the turning knob „function“ (*Illustration 4.10.1 B*).

Sweep This ultrasonic mode ensures a continuous shifting of the sound pressure maxima and so guarantees a more homogeneous sound field distribution in the bath.

Use this mode if the cleaning basket containing the cleaning items is not connected to a manual or automatic oscillation device.

Operation in sweep mode is selected at the turning knob „function“ (*Illustration 4.10.1 B*).



The turning knob „function“ can be switched during ultrasonic operation.

7.5 **After the cleaning**

- Follow-up treatment of cleaning items** As a rule the cleaned items must be rinsed and dried after the cleaning process.
- The choice of the rinsing medium or media depends on the used cleaning media and on the cleanness requirements for the cleaned items. It might be useful to rinse the items with ultrasound.
- Empty the unit** Drain the liquid as soon as it is dirty or if the unit has not been operated over a prolonged period of time (certain residues and contaminations can damage the stainless-steel tank).
- Use the quick-drain duct to empty the tank.. The bottom of the transducer tank is inclined towards the drain to accelerate the draining process.
- Cleaning of the transducer tank** For instructions on the cleaning of the transducer tank after draining please see *section 9.1, Maintenance and care*.

8 Cleaning media

When choosing the cleaning chemicals ensure that the product is suitable for use in an ultrasonic bath; products that are not suitable can cause damage to the transducer tank and injure the operating staff.

Elma has a large range of suitable cleaning chemicals for various applications, developed and produced in our own laboratory. Please contact your supplier for suitable cleaning media.

Environment-friendly chemicals

The organic detergents in the elma clean products are biodegradable. Product data sheets and safety data sheets are available from the manufacturer.

8.1 Limitations concerning solvent-containing cleaners

Caution! Never use flammable liquids, or solvents, directly in an ultrasonic cleaning tank. Risk of fire and explosion!

Observe the safety warnings in section 6.1.



Ultrasound increases the volume of vapourization 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

- of the classes of hazard according to the Ordinance Regulating Flammable Liquids. A1, B, AII, AIII
 - or marked in compliance with the EEC directives by symbols and safety warnings E or R1, R2
 - or R3 for potentially explosive substances
 - or F+, F 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 can then be put into the stainless-steel tank which is filled with non-flammable liquid (water with a few drops of interlacing agent).

In case of queries please contact the manufacturer or your supplier.

8.2

Limitations concerning aqueous cleaners

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

Acids and alkaline solutions

Other media which can destroy the stainless-steel tank when used in high concentrations or with high temperatures during ultrasonic operation are: nitric acid, sulphuric acid, formic acid, hydrofluoric acid (even diluted). (List is not guaranteed to be complete.)

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.

Potassium hydroxide KOH

Potassium hydroxide solution can cause stress corrosion cracking of the ultrasonic tank.

Examples:

- treatment with hydrochloric acid or hydrofluoric acid, or salts of acid solutions
- removal of fluoride, chloride or tetrafluoroborate-containing fluxing agents from soldered metal items or electronic components
- decalcifying of medical systems, which are contaminated with physiological salt solution, in solution containing citric acid
- ultrasound-assisted rinsing of items which have been etched with hydrofluoric acid or ammonium bifluoride.

Entrainment of chemical substances

The above limitations for the use of chemicals in an ultrasonic bath also apply for the entering of the mentioned chemicals into the 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. Please contact your supplier for the available 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.

Exclusion of liability

The manufacturer cannot be held liable for any damages caused by non-observance of the limitations mentioned in sections 8.1 and 8.2!

9 Maintenance

9.1 Maintenance / Care



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

- Electrical security** The present ultrasonic cleaning unit is generally maintenance-free.
- Check the housing and the mains cable regularly for damage in order to prevent electrical accidents.
- Also check the transducer tank for leaks:
- Check transducer tank for leaks** In case of visible leaks in the transducer tank, e.g.
- if there are residues/stains of cleaning liquid under the unit or beside the unit that have no known other reason
 - or if there are losses of unheated liquid from the tank which are not caused by vapourization
- separate the unit from the mains.
- Contact and inform your supplier or the manufacturer of the unit about the leak and the cleaning liquid used. The unit must be returned for inspection and, if required, for repair.
- Care of transducer tank** Check the transducer tank regularly for residues, in particular on the bottom. Remove any residues found. Lime deposits in the stainless-steel tank can be gently removed e.g. with aqueous cleaning media such as elma clean 40 or elma clean 115C (operate the unit with water + concentrate).
- 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 housing** Residues of cleaning media can be wiped away as described above depending on the kind of contamination.
- Do not put the unit under water!**
- Disinfection** If the unit is used for medical and sanitary purposes it is necessary to disinfect the transducer tank regularly (standard surface disinfectants).

9.2 Check the safety switch-off (on TI-H 25 and bigger)

Check the functioning of the safety switch-off of heating and ultrasound by the level switch monthly.

Level monitoring

To carry out this check the filling level must be reduced below the position of the level switch. It is recommended to check the unit when it is filled, ready for operation and heating up.

How to proceed:

1. Switch on ultrasound and heating.
2. Reduce the filling level by draining some of the liquid.
3. When the position of the level switch is approx. 1 -2 cm above the liquid level, switch off ultrasound and heating after approx. 10 seconds.



In order to avoid repeated switching on and off of ultrasound and heating in the limit range of the level switch, the level switch is fitted with a switch hysteresis of approx. 10 seconds.

In case of a malfunction please contact your supplier or the manufacturer. If the unit is kept on operating in case of a malfunction it must be under permanent observation.

9.3 Service life of the transducer tank

The transducer tank and particularly the sound-giving surfaces are wear parts. The changes on the surfaces that occur after a certain operating period are visible first as gray areas and later on as material abrasions, the so-called cavitation erosion. The Elma units are made of special highly cavitation-proof stainless steel. In order to prolong the service life of the transducer tank of your unit we recommend to observe the following instructions:

- Regularly remove any cleaning residues, in particular metal particles and rust films (gently wipe, rinse, etc.).
- Use suitable cleaning chemicals, with particular caution concerning the kind of removed contamination (see *section 8, Cleaning media, 2. Note on Risk of damages on the transducer tank!* and information thereon).
- Exchange the cleaning medium before it is too heavily contaminated.

Do not operate the ultrasound unnecessarily; switch off after the cleaning process.

9.4

Repair

Opening by authorized specialized personnel only

Repair and maintenance works which require the unit to be connected and opened must be carried out by authorized and specialized 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 liable for any damage caused by unauthorized maintenance or repair works on the unit.

In case of a breakdown of the unit please contact your supplier or the manufacturer.

10

Putting out of action and waste disposal



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

11

Service & Support

TECHSPAN GROUP

P O Box 15-262, New Lynn, Auckland, NZ

Phone +64 9 827 6567

Fax +64 9 827 6596

e-mail: sales@techspanonline.com

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

www.techspanonline.com

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

Please contact us, we will be glad to assist:

Technical Support

Phone +64 9 827 6567

Fax +64 9 827 6596

e-mail: sales@techspanonline.com

Notes