Ultrasonics.Steam.Ultraclean.

Operating instructions

MF 200 – MF 1000

MF 2000 – MF 4000

MF 2000 – MF 4000

Elmasonic MF

Ultrasonic-generators

• english •

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

document ref. 106 4799

Contents

1 Important Information

CAUTION! Read before initial operation:

Unpacking

Check the unit for transport damages.

If any damages are found, do not put the unit into operation.

Mounting

The ultrasonic equipment (ultrasound generator and transducer system) must be mounted by authorized specialised personnel only.

Safety instructions

Strictly observe the local regulations on accident prevention and on electrical and mechanical equipment.

Mains connection

For reasons of safety, the generator must be connected to a correctly grounded socket only. The technical specifications given on the nameplate must comply with the available connection conditions; in particular mains voltage and connected load.

Positioning

The generator must be installed in a dry and sufficiently ventilated place. Keep dry! Keep working area and operating elements clean and dry to prevent any electricity-related accidents.

Filling of Tank

The transducer elements (and the heating, if available) must be completely covered in liquid. Dry-running can damage or destroy the transducer system! The manufacturer refuses all warranty claims for these damages. Ensure that the cleaning tank is always correctly filled during operation.

Cleaning Chemicals

Do not use flammable cleaning chemicals in the tank. **Risk of explosion!** (see also chapter 8)

For information on the use of aqueous cleaning chemicals please see chapter 8.

Intended Purpose

This Elma ultrasonic equipment is intended for the exposure to ultrasonic waves of items and liquids only.

Contact during Operation

Do not reach inside the tank during operation; do not touch ultrasound-carrying parts (tank, items to be cleaned).

Caution: Cellular membranes can be damaged by ultrasound.

The contacts of the HF jack carry high voltage during operation!

Ear protection

The wearing of ear protection equipment is required for 25KHz operation with open tank cover.

Maintenance / Repair

Maintenance and Repair works must be carried out by specialised personnel authorised by ELMA only. Separate the unit from the mains before opening the generator.

2 Product Description

Powerful ultrasound generator of innovative technology for premium quality cleaning.

The electric high-frequency energy produced by the generator is transformed into mechanic ultrasonic energy by specially designed transducer systems. These work with piezoelectric transducers of the latest technology which transmit the ultrasonic energy into the cleaning bath at a high efficiency rate.

This modern ELMA ultrasound equipment consists of a high-performance generator secured against open circuit and short circuit, and the connected ultrasound transducers (immersion transducers, transducer plates, tank fitted with transducers).

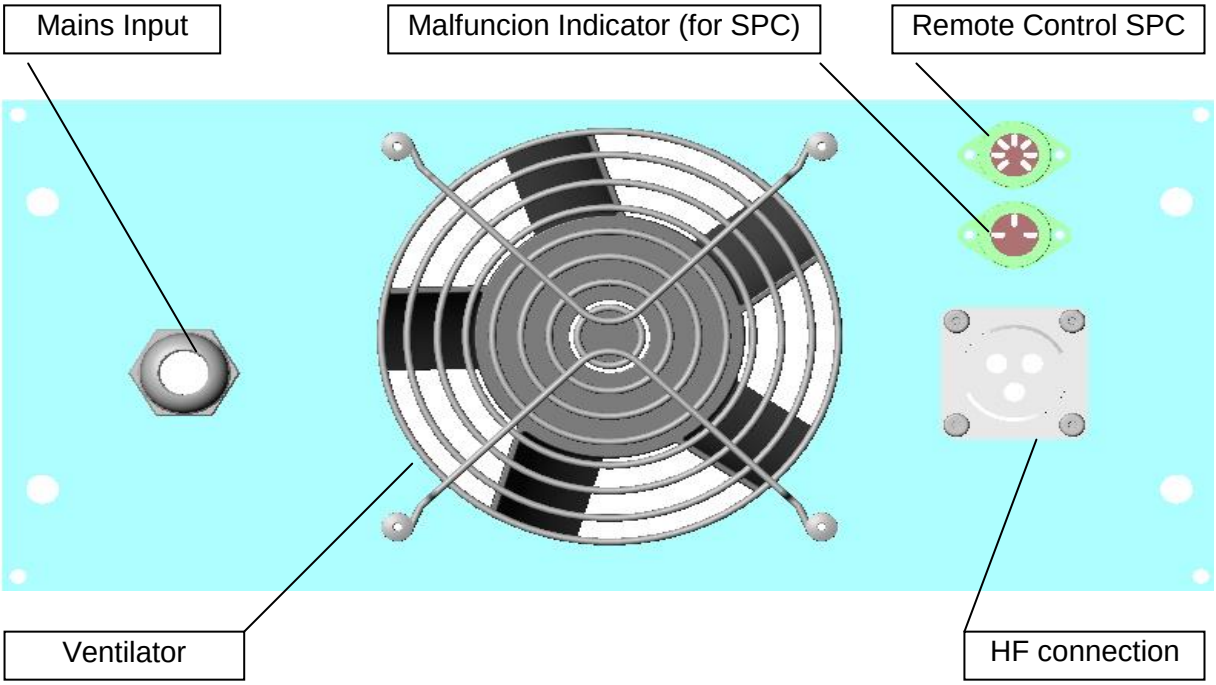
State-of-the-art technology

- Two different ultrasound frequencies available in one unit for the intensive and gentle cleaning.
- Power stepless variable between 10 and 100%. Individual power adjustment according to degree of contamination and surface material.
- Degas function for the efficient degasing of the cleaning liquid. Instantly ready for use and perfect cavitation in the cleaning bath.
- Sweep function for the continued shifting of the sound pressure maxima for an even sound field distribution.
- Remote control jack (the remote control is an optional accessory)
- SPC interface (from MF 600)

3 Connections

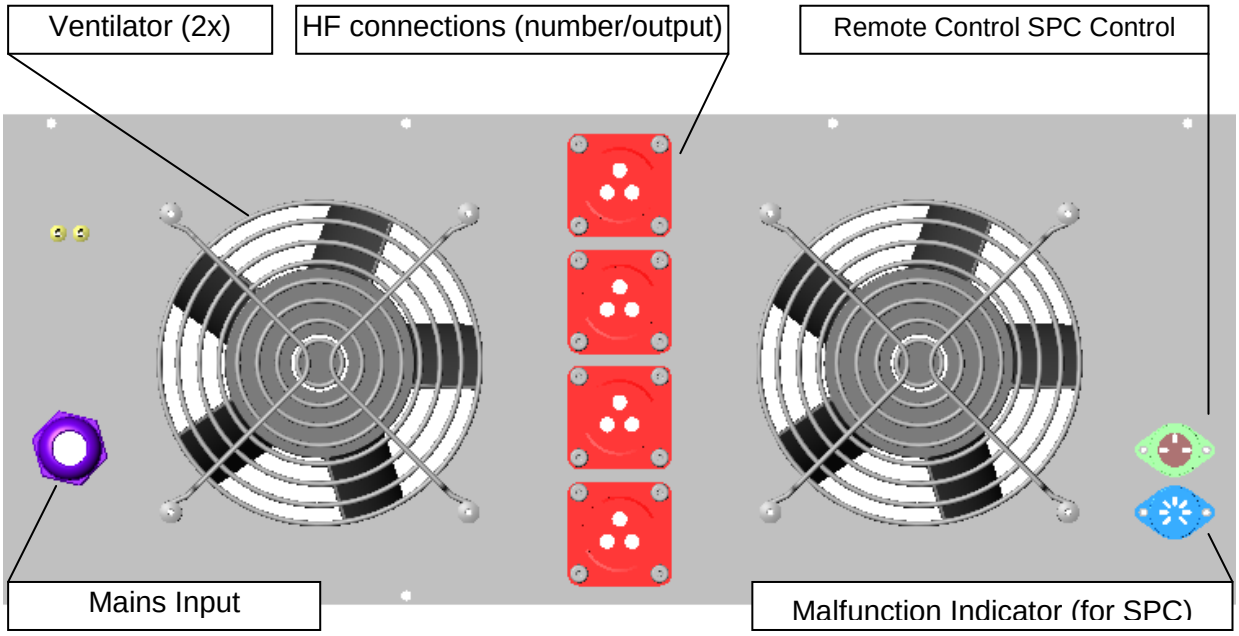
3.1 Available connections on the back of the unit

MF 200 – MF 1000



3.2 Available connections on the back of the unit

MF 2000 – MF 4000



4 Initial Operating

Check unit

Carefully check the generator housing, the ultrasound transducer and the connecting plugs and cable for possible transport damages before putting the unit into operation.

In case of any visible damage, **do not** connect the unit to the mains.

Please contact your supplier and your forwarder.

Positioning

The generator must be installed in a dry and sufficiently ventilated place. Keep dry!

Keep working area and operating elements clean and dry to prevent any electricity-related accidents.

Ensure sufficient ventilation.

Filling of Tank

Fill the cleaning tank before switching on the ultrasound.

Caution! The ultrasound equipment must be operated with sufficiently filled cleaning tank only. The sound-giving surface of the transducer must constantly be covered by liquid!

Any dry-running of the transducer elements causes overheating and can destroy them.

It is important to keep a sufficient filling level throughout the operation, e.g. by means of a level control device. The level control prevents operation of the unit with an insufficient quantity of liquid in the tank. Experience has proved the release of the generator (remote control) through a level switch (float switch, capacitive sensor, etc.) to be highly efficient.

Connect transducer system with the generator

The HF connecting cables are plugged between the ultrasound transducers and the generator. The required jacks are on the back of the generator.

Connect generator to the mains

Make sure that the **mains voltage** is correct and corresponds with the voltage indicated on the nameplate on the back of the unit.

The unit must be connected to a **grounded socket** only.

Putting into operation

As soon as the cleaning bath is filled, the transducer system is connected to the generator and the generator is plugged to the mains, the unit can be put into operation.

Switch-on

The ultrasound is switched on by the timer switch on the generator, by remote control (optional) or by SPC control.

For further information on the operation and cleaning process please refer to the relevant chapters.

Please note

When the filled unit is switched on, so-called start-up splashes may occur, i.e. drops of water can splash out of the tank.

This causes a risk if caustic or otherwise dangerous cleaning chemicals are used.

Operation of a unit with heating produces high temperatures in the tank. Caution: Risk of burning.

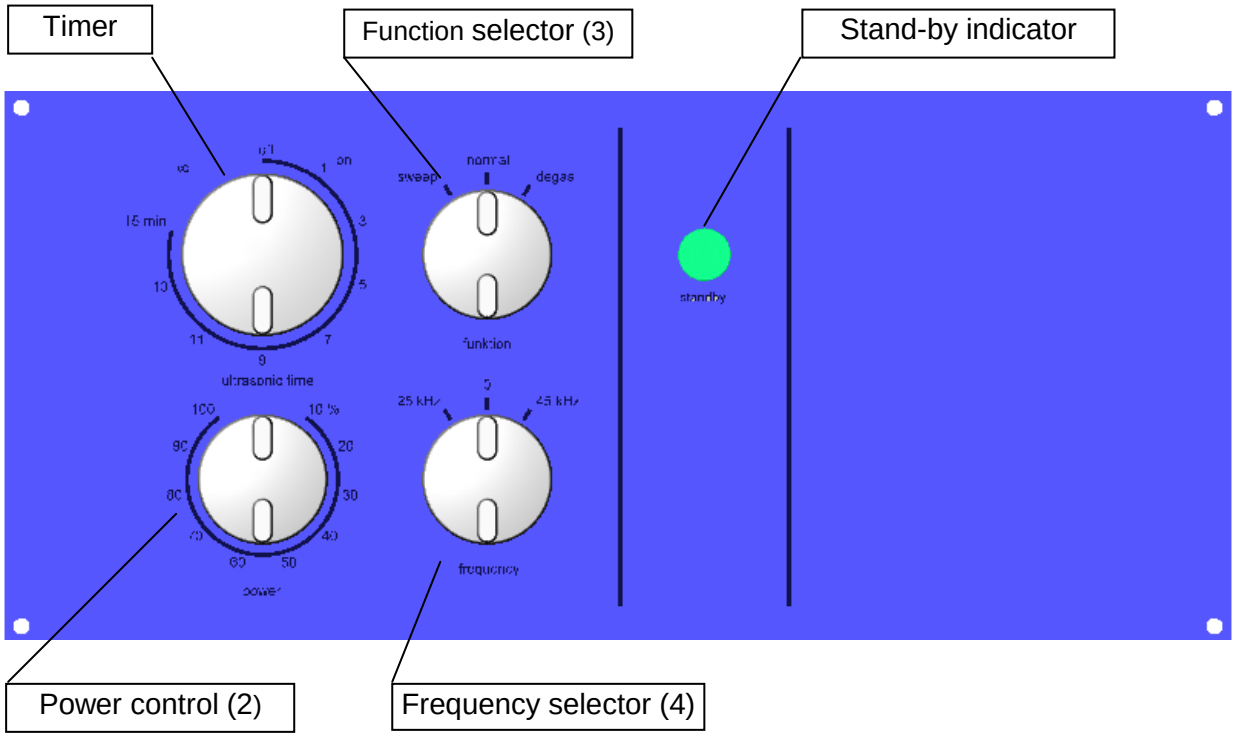
Do not reach inside the tank during ultrasonic operation.

Caution: Cellular membranes will be damaged by prolonged exposure to ultrasonic activity.

For prolonged periods in the working area, wear suitable ear protection, in particular at 25KHz operation.

5 Operation

5.1 Operating elements



5.2 Functions

5.2.1 Switch on/off ultrasound (1)

The ultrasonic activity is switched on and off by means of the timer (1) on the operating panel of the generator or by remote control (optional), or by SPC control (from MF 600).
Available operating modes are permanent operation and operation for a selected period.

In limited period operation (1-15 min), the timer automatically switches off the ultrasound; permanent operation can only be switched off manually.

5.2.2 Setting of ultrasonic operating period

Timer operation

For cleaning periods of up to 15 minutes the unit can be operated by means of the automatic timer. The required cleaning period is selected by turning the knob. When the selected period is terminated, the unit switches off automatically. If the unit must be switched off before the end of the selected period, the knob of the timer can be turned into "off" position by hand.

Permanent operation

For all cleaning periods exceeding 15 minutes, turn the knob to the left into "infinite" position. CAUTION: The unit must be switched off by hand after termination of the cleaning process ("off" position).

5.2.3 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.

5.2.4 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

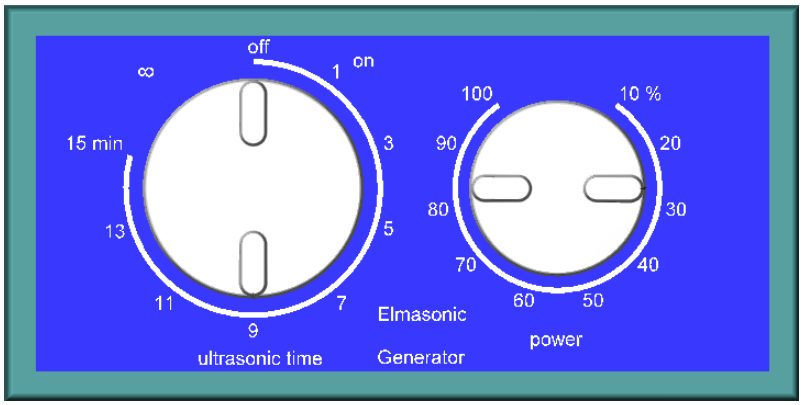
5.2.5 Setting of frequency

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.

6 Remote Control (Optional)

A remote control is available on request for all generators of the MF series.

MF 200 – MF 400



Operating panel of remote control

Operating options

Timer and power control (please see also chapter Operation)

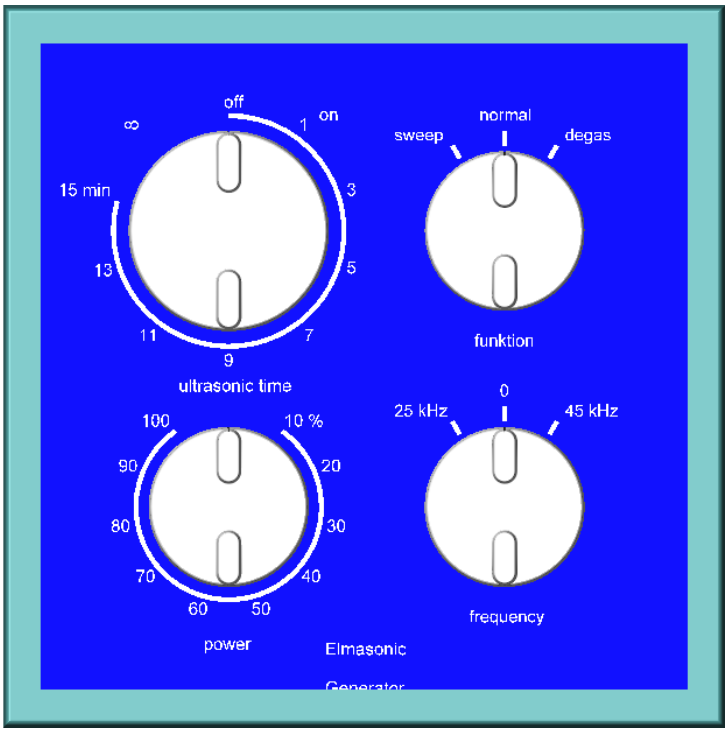
Connection of remote control to generator: please see chapter Connections

Order Numbers Remote Control

Frequency	MF 600 - 1000	MF 2000 - 4000
25/45 KHz	131000268	131000274
35/130KHz	131000277	131000279

Please note: The remote control MF200 – MF 400 must be ordered with the generator. Retrofitting with a remote control at a later date is not possible.

MF 600 – MF 4000



Operating panel of remote control

Operating options:

Timer, power control, selection of ultrasound mode (sweep – normal – degas), selection of frequency. (For detailed information of the functions please see chapter Operation.)

For operation by SPC, the available operating options are the same.

7 Cleaning Process and Cleaning Chemicals

7.1 Ultrasonic cleaning effect

The ultrasound transducer fitted below the tank bottom transforms electric energy into mechanic vibrations. The vibrations are equally transmitted into the cleaning liquid in the tank. This process creates tiny vacuum bubbles in the liquid, which implode immediately. This is called cavitation. The cavitation process allows removal of all kinds of contamination from those spots where the cleaning liquid can reach.

7.2 Cleaning chemicals

When choosing a cleaning chemical please ensure that the chemical is suitable for the use in ultrasonic cleaning baths to prevent damages of the transducer tank. Flammable products are not allowed (see safety warnings). The chemicals must not contain halogenide ions or salt, as these may cause crevice corrosion of the stainless steel. The same applies to acids, such as hydrochloric acid, sulphuric acid or nitric acid.

ELMA has a wide range of cleaning chemicals on offer developed and made in our own laboratory. The application of these chemicals help to prolong the service life of the ultrasonic unit. Please ask for our brochures.

If other chemicals are used, observe the instructions given on the label, particularly in connection with the use in ultrasonic cleaning baths.

Should you use pulverised or granulated cleaning media by other suppliers, make sure that these media are fully dissolved in the cleaning liquid. Possible residues of undissolved particles can cause contact corrosion and lead to pinholes in the tank bottom.

7.3 Degassing of the liquid

The cleaning results are optimised if the ultrasonic unit is operated over a period of approx. 15 – 20 minutes before cleaning, in order do degas the liquid in the bath. Fresh cleaning liquids are generally saturated with air. Air in the cleaning liquid, however, has a dampening effect on the ultrasonic waves and so diminishes the cleaning effect, particularly if a fresh cleaning liquid is used or after longer idle periods. The duration of the degassing process depends on various conditions (e.g. temperature, volume).

7.4 Cleaning

Make sure that the items to be cleaned are completely immersed in the cleaning liquid.

- Place the items in the basket.
- Put heavily contaminated items/side of the items bottommost.
- Do not pile up the items as this will absorb the ultrasonic waves.
- Do not touch sensitive items such as surgical instruments. We recommend the use of so-called silicon mats available from your supplier. The silicon mats prevent direct contact between the individual cleaning items.

Note: Even without heating, the cleaning liquid heats up over prolonged cleaning periods; this must be considered particularly for the cleaning of temperature-sensitive items.

The optimum temperature for your cleaning task, the recommended concentration of the cleaning chemical and the required cleaning period are indicated on the label of the used *elma clean* chemical.

If you use water as contact liquid, we recommend to add the indicated quantity of an *elma clean* chemical. These chemicals contain tensides which reduce the surface tension of the water and are specially designed for various cleaning tasks.

They also contain special cavitation-assisting substances which speed up the cavitation process. *Elma clean* products do not damage the stainless steel surface of the tank or the immersion transducer and so help to prolong the service life of the unit.

The use of a basket or support for the cleaning items protects both the items and the tank. Do not put the items directly on the tank bottom.

(These measures increase the service life of the stainless steel tanks considerably.)

8 Restrictions and Safety Warnings on Cleaning Chemicals

8.1 Warning in respect of inflammable liquids:

Flammable

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) AI, 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, AII or AIII 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).

8.2 Warning in respect of aqueous cleaning agents

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)

Examples (list not complete):

- treatment with hydrochloric acid or hydrofluoric acid; or with salts of acid solutions
- removal of fluxing agents containing fluoride, chloride or tetrafluoroborate from soldered metal items or electronic elements
- decalcifying of medico-technical systems contaminated e.g. with physiological salt solution in a citric acid solution
- ultrasonic rinsing of items which have been treated with hydrofluoric acid or ammonium bifluoride.

Corrosion damages due to such misuse are not covered by the warranty of the manufacturer.

For the application of aggressive chemicals (e.g. acids, alkalines) we recommend the use of plastic tank inserts (Elma accessories).

Read and follow the safety instructions on the chemicals as given by the manufacturer (e.g. goggles, gloves, R and S phrases).

In case of any uncertainties concerning the compatibility of the cleaning chemical and the stainless steel tank, please contact the manufacturer of the ultrasonic unit.

9 Maintenance

Caution: Always separate the generator from the mains supply, or switch off the unit, before carrying out any maintenance or repair works.

Generator

Clean the ventilation grid on the back of the generator at regular intervals to guarantee sufficient cooling of the electronics.

All other components of the generator do not require any maintenance measures.

Cables

The HF cables are maintenance-free. Check the mains cable and the transducer connection cable regularly for damages due to wear and tear. Immediately replace damaged cables to guarantee proper operation of the ultrasonic equipment.

Ultrasonic transducers – Immersion transducers/ transducer plates

During operation the transducers are exposed to extreme loads and must be checked for any damages at regular intervals (monthly).

Possible marks and damages due to wear and tear are:

- tears/deformation on the stainless steel tube, on the ducts or the transducer housing (applies to immersion transducers/transducer plates only)
- cavitation marks (visible material abrasion on the sound-giving surfaces) are normal marks of wear caused by the physical process. The transducers/the tank should be replaced before any leaks occur which might cause further damage
- loose screws

Strong mechanical impacts (e.g. blows, shock) can destroy the transducers and must be strictly avoided.

Flanged transducer plates: Retighten all screw connections after the first 100 operating hours; then check all screw connections every 500 operating hours. The correct torque is 30 Nm.

Tank

Clean the tanks and baths and the transducer surfaces on a regular basis.

Remove chips and tenacious incrustations and residues to prolong the service life of the unit. Do not use any scraping instruments.

Remove furring with *elma clean 60* or elmaclean *115 C* :

Put the chemical in the cleaning bath at the recommended concentration. Then operate the unit to increase the cleaning effect. Empty the unit and wipe out the tank.

(Also suitable: other anti-liming media on citric acid or phosphorous acid basis.)

10 Technical Data, Approval and Norms

Ambient condition requirements

- allowed ambient temperature: +5°C to +40°C
- allowed relative humidity of air up to 30°C: 80%
- allowed relative humidity of air up to 40°C: 50%
- avoid condensation

Required external fuse

- 16 A
- For reasons of safety, the units must be connected to correctly grounded sockets only.
- Further documentation (circuit diagrams, spare parts lists, etc.) are available from the manufacturer.

EMV approval and CE marking of ELMA generators

The appliances comply with the following EC directives

- EC EMV Directive 89/336/EWG
- EC Low Voltage Directive 73/23/EWG

A declaration of conformity is available on request.

Technical Data

Technical Data ELMASONIC Generators																							
Generator Type	SF/MF-200			SF/MF-400			SF/MF-600			SF/MF-1000			SF/MF-2000			SF/MF-3000			SF/MF-4000		
Structural Dimensions WxDxH	320x360x180			320x360x180			320x360x180			320x360x180			530x540x230			530x540x230			530x540x230		
Space Requirements WxDxH	320x440x180			320x440x180			320x440x180			320x440x180			530x620x230			530x620x230			530x620x230		
Mains Voltage V 50/60Hz	100	115	230	100	115	230	200	208	230	200	208	230	200	208	230	200	208	230	200	208	400		
Current Consumption A	2.5	2	1	5	4	2	3.2	3	2.7	5.2	5	4.4	10.3	9.9	8.8	15.5	14.9	14	Output 4200W				
HF Output eff.	400 W						600 W			1000 W			2000 W			3000 W			4000 W				
HF frequency kHz	25/45 - 35/130			25/45 - 35/130			25/45 - 35/130			25/45 - 35/130			25/45 - 35/130			25/45 - 35/130			25/45 - 35/130		
Power Control	10 -100%			10 -100%			10 -100%			10 -100%			10 -100%			10 -100%			10 - 100%		
Sweep available	yes			yes			yes			yes			yes			yes			yes				
Degas available	yes			yes			yes			yes			yes			yes			yes				
Frequency Switch-Over	yes			yes			yes			yes			yes			yes			yes				
SPC Connection	no			no			yes			yes			yes			yes			yes				
SPC Functions							Start/Stop US Frequency switch-over Power control Sweep Degas			Start/Stop US Frequency switch-over Power control Sweep Degas			Start/Stop US Frequency switch-over Power control Sweep Degas			Start/Stop US Frequency switch-over Power control Sweep Degas			Start/Stop US Frequency switch-over Power control Sweep Degas				
Remote Control	yes			yes			yes			yes			yes			yes			yes				
Remote Control Functions	Start/Stop US Power control			Start/Stop US Power control			Start/Stop US Frequency switch-over Power control Sweep Degas			Start/Stop US Frequency switch-over Power control Sweep Degas			Start/Stop US Frequency switch-over Power control Sweep Degas			Start/Stop US Frequency switch-over Power control Sweep Degas			Start/Stop US Frequency switch-over Power control Sweep Degas				

11 Trouble Shooting

- In case of damage please contact the manufacturer.
- Repair and maintenance works on the connected and opened unit must be carried out by **specialised and ELMA-authorised personnel** only.
- Separate the unit from the mains supply before opening it.
- Faulty parts must be replaced by **original spare parts only** to guarantee the valid safety norms.

Damage on the operating elements

The **knob shells** of the operating elements can be replaced from outside without opening the unit.

Operating elements (timer; control; switch): to replace, remove the four screws from the front panel and carefully take off the front panel.

No ultrasound

Possible causes:

- no voltage supply to the unit
- mains cable damaged (interrupt)
- frequency selector switch in 0 position
- timer in off position
- HF cable not connected
- HF cable / plug damaged
- ultrasonic power module(s) faulty
- fault in the transducer system

In case of more than one module and transducer system connections they can be interchanged to check their functioning and to find the fault

- faulty remote control
- faulty SPC

In order to eliminate any fault on these components, remove them for the functional check-up of the generator.

Check-up of the transducer system by means of an ohmmeter.

Caution: The contacts carry **high capacitive loads** even after disconnecting the transducer connection cable. These must be unloaded by short-circuiting them before measuring and touching them.

How to proceed:

1. switch off the generator
2. loosen the HF connection cable from the generator (back of the unit)
3. short-circuit HF pole and mass at the HF plug of the cable; this **unloads** the transducer
4. use the ohmmeter to measure the resistance between HF pole and mass

The measured value should be infinitely high and be at least in the mega-ohm range. Otherwise, there is a fault.

12 Malfunction of the generator Troubleshooting

12.1 (MF2000 – MF 4000 only)

Display

Generator without SPS control

Normal operation of the generator is indicated by 2, 3 or 4 green lamps in the display (small LED G1 – G4), depending on the type of generator (MF 2000, 3000, 4000).

If one module of the generator is faulty, the GREEN lamp turns RED.

The generator is shut down completely, the remaining lamps (indicating the functioning modules) go out. In order to operate the generator with the remaining modules, the faulty module/s must be switched off.

How to proceed

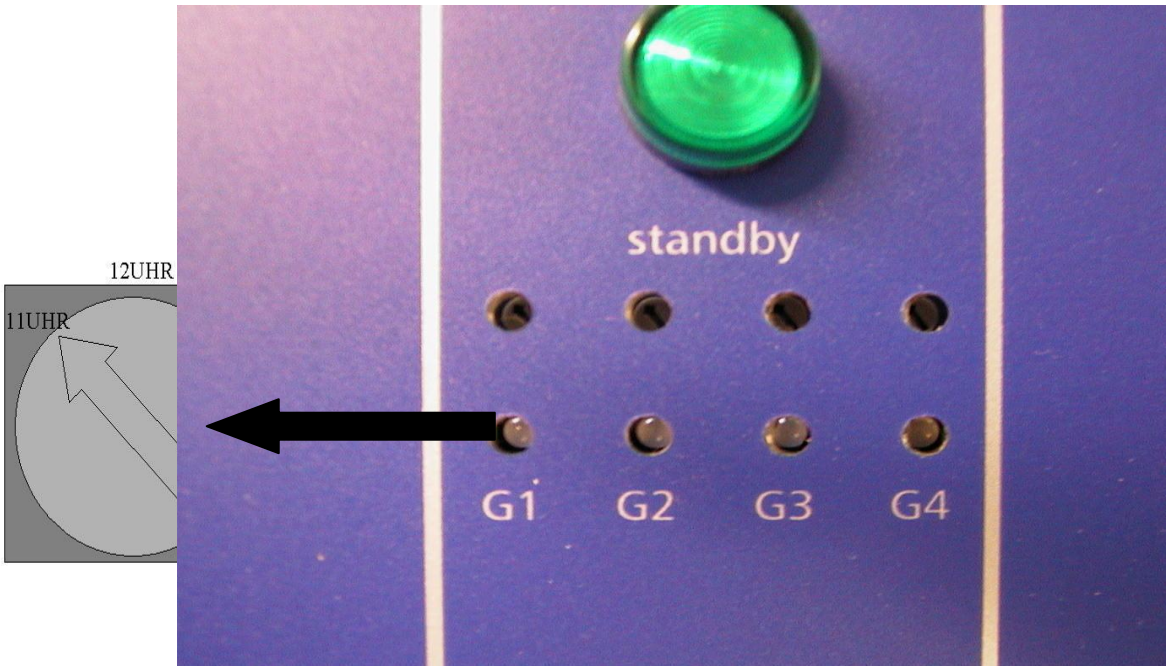
1. Switch on the generator/keep the generator switched on, turn the frequency switch to „0“ (centre).
2. Use a small screw driver to turn the switch above the RED lamp (or the lamp that had been RED) from 11 o'clock to 12 o'clock. The RED lamp goes out, the green lamps indicating the remaining functioning modules go on again.
3. Switch off the generator using the timer and switch it on again after 5 seconds. The green lamps for the remaining modules go on. The lamp indicating the switched-off module remains out. The generator can now be operated with the remaining functioning modules.

12.2 MF 2000 – MF 4000 Generator with SPS control

At SPS-controlled generators, the lamps indicating the individual modules are RED when the generator is switched off (timer at "0" position). If one module breaks down during operation, the fault is indicated as described above.

For switching off one of the modules through the status indication, please observe the following:

- switch off the generator (timer to "0" position)
  pull the SPS plug
- switch on the generator, turn the frequency switch to "0" (centre).
- proceed as described in section 2. and 3. above
- plug in the SPS plug



13 Spare Parts

	MF 200 MF 400	MF 600-	MF 1000	MF 2000 MF 3000 MF 4000
Generator kpl. 25/45KHz 230V Generator cpl. 25/45 KHz 230V Générateur cpl. 25/45KHz 230V	**1301000253**	**1301000249**	**1301000214**	**1301000246**
Generator kpl. 25/45KHz 115V Generator cpl. 25/45KHz 115V Générateur cpl. 25/45KHz 115V	**1301000290**	**-**	**-**	**-**
Generator kpl. 25/45KHz 100V Generator cpl. 25/45 KHz 100V Générateur cpl.. 25/45KHz 100V	**1301000289**	**-**	**-**	**-**
Generator kpl. 25/45KHz 200V / 208V Generator cpl. 25/45 KHz 200V / 208V Générateur cpl. 25/45KHz 200V / 208V	**-**	**1301000319**	**1301000321**	**1301000318**
Generator kpl. 35/130KHz 230V Generator cpl. 35/130 KHz 230V Générateur cpl. 35/130KHz 230V	**1301000232**	**1301000251**	**1301000250**	**1301000252**
Generator kpl. 35/130KHz 115V Generator cpl. 35/130 KHz 115V Générateur cpl. 35/130KHz 115V	**1301000292**	**-**	**-**	**-**
Generator kpl. 35/130KHz 100V Generator cpl. 35/130 KHz 100V Générateur cpl. 35/130KHz 100V	**1301000291**	**-**	**-**	**-**

Generator kpl. 35/130KH 200V / 208V Generator cpl. 35/130 KHz 200V / 208V Générateur cpl. 35/130KHz 200V / 208V	**-**	**1301000320**	**1301000322**	**1301000317**
Generator Mounting-clip Generator Clip de montage générateur	**2000001187**	**2000001187**	**2000001187**	**2000001187**
Isolierschlauch Transistor Isolating tube Transistor Tube isolant pour transistor	**2000000415**	**2000000415**	**2000000415**	**2000000415**
Isolierschlauch MOS-FET Isolating tube MOS-FET Tube isolant MOS-FET	**8000003564**	**8000003564**	**8000003564**	**2000003564**
Entstörfilter 230V RFI-Filter 230V Filtre antiparasite 230V	**2000001098**	**2000001098**	**2000001098**	**2000001098**
Entstörfilter 100/115V RFI-Filter 100/115V Filtre antiparasite 100/115V	**2000001098**	**2000001098**	**2000001098**	**2000001098**
Axialgebläse 230V 50/60Hz Ventilator 230V 50/60Hz Ventilateur 230V 50/60Hz	**2000005305**	**2000005305**	**2000005305**	**2000005305**
Axialgebläse 100/115V 50/60Hz Ventilator 100/115V 50/60Hz Ventilateur 100/115V 50/60Hz	**3000010008**	**3000010008**	**3000010008**	**3000010008**

Netzkabel 230V Mains cord 230V Câble de réseau 230V	**2000000990**	**2000000990**	**2000000990**	**2000000990** (only MF 2000)
Netzkabel 115V USA Mains cord 115V USA Câble de réseau 115V USA	**2000000052**	-	-	-
CEKON Netzstecker 400V 16A CEKON mains plug 400V 16A Prise réseau CEKON 400V 16A	-	-	-	**1000011549** **(**Only for MF 2000)
Zeitschaltuhr Timer Minuterie	**2000005114**	**2000005114**	**2000005114**	**2000005114**
Drehknopf für Zeitschaltuhr Knob for timer Bouton pour minuterie	**2000000947**	**2000000947**	**2000000947**	**2000000947**
Potentiometer Power Potentiometer Power Potentiomètre Power	**2000000914**	**2000000914**	**2000000914**	**2000000914**
Schalter Frequenz / Funktion Switch frequency / function Interrupt. fréquence/Fonction	**2000000913**	**2000000913**	**2000000913**	**2000000913**
Drehknopf Frequenz/Funktion Knob frequency-/ function-switch Bouton fréquence/Fonction	**2000000947**	**2000000947**	**2000000947**	**2000000947**

For any spare parts orders please quote type of unit and serial number of the generator.

14 Waste Disposal

The components can be recycled (metal recycling; electronics recycling).

The waste unit can also be returned to the manufacturer.

15 Manufacturer Contact

Elma Schmidbauer GmbH

Kolpingstr. 1-7, D-78224 Singen

Phone +49 (0) 7731 / 882-0

Fax +49 (0) 7731 / 882-266

Homepage: **www.elma-ultrasonic.com**

Technical Support:

Phone +49 (0) 7731 / 882-280

Fax +49 (0) 7731 / 882-253

e-mail: support@elma-ultrasonic.com

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