

Operating Instructions



Modular Cleaning System SW60 / 150 / 240 MOD

• english •

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1 General

The present Operating Instruction is part of the delivered equipment. It must be ready for use at any time and remain with the unit in case of resale.

This Operation Instructions is subject to technical modifications on the unit due to advanced development.

2 Important safety warnings

Read the present Operating Instructions carefully and operate the electric unit in compliance with the instructions only.

Please observe any additional national safety regulations that may apply.

The manufacturer cannot be held liable for any damages on persons, equipment or cleaning items caused by improper use against the instructions given in the present manual.

The operator is responsible for the correct instruction of the operating staff.

2.1 Instructions for the use of the present manual

Warning symbols used in this manual:



This symbol warns of the risk of injury caused by electricity.



This symbol warns of the risk of injury caused by explosion and/or deflagration.



This symbol warns of the risk of injury caused by hot surfaces and liquids.



This symbol warns of the risk of light injuries and damage to the equipment.



This symbol marks additional information.

Signal words used in the present manual:

- | | |
|------------------|--|
| Danger | The signal word danger warns of a potential risk of serious injury and danger to life. |
| Warning | The signal word warning warns of the risk of serious injury and heavy damage to the equipment. |
| Caution | The signal word caution warns of the risk of light injury or damage to the equipment. |
| Attention | The signal word attention warns of the risk of damage to the equipment. |

2.2 Safety instructions for the use of the unit

This ultrasonic cleaning system has been designed for the ultrasonic treatment of items and liquids only.

It is not intended for the use in areas with potentially explosive atmosphere.

Operation of the unit by authorized and instructed staff only. Observe the instructions given in the manual.

Check the unit and its mains cable for transport damages. Do not operate the unit in case of visible damages!

For safety reasons, the present unit must be connected to a correctly grounded socket only. The technical details indicated on the nameplate must correspond with the available mains connection details, in particular those of the mains voltage and current connected value.

Place the unit on a dry surface. The work area must be sufficiently ventilated to allow any vapours arising from the cleaning liquid to be carried off. Keep work surface, housing and operating elements dry.

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.

The unit must be opened by authorised specialised personnel only.

The unit must be operated with aqueous cleaning liquids only. Risk of fire and explosion! Do not treat any flammable liquids with ultrasound or high temperature directly in the cleaning or rinsing tank.

Risk of burning and scalding! Depending on the operational period of the unit, unit surfaces, cleaning or rinsing liquid, basket and cleaning items can heat up considerably.

During operation with high temperatures inside the cleaning, rinsing or drying tanks, open the unit with care: hot steam can emerge when the cover is lifted.

Ultrasonic units can produce annoying sounds.

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

The use of personal ear protection devices is particularly recommended for operating the unit at 28 kHz without cover.

Do not reach inside the cleaning liquid or touch sound-carrying parts (tank, basket, cleaning items, etc.) during operation.

3 Facts of interests about Ultrasonic Cleaning

3.1 Functioning

Today, cleaning by ultrasound is the most modern fine cleaning method.

The electric high-frequency energy created by an ultrasonic generator is transformed into mechanical energy by piezo-electrical transducer systems and is then transmitted into the bath. This process creates millions of tiny vacuum bubbles which implode due to the variations of pressure caused by the ultrasonic activity. Highly energetic liquid jets are created. These jets remove dirt particles from surfaces and even from the smallest grooves and bores.



Basically, the cleaning result depends on four factors:

- Mechanical energy** Ultrasonic energy is probably the most important mechanical factor in the cleaning process. This energy must be transmitted through a liquid medium to the surfaces which are to be cleaned.
The present Sonoswiss unit is fitted with the innovative sweep function device: electronic oscillation of the sound field (sweep function) prevents the formation of zones of low performance in the ultrasonic bath.
- Cleaning media** For saponification and removal of the dirt particles a suitable cleaning agent is required. We have a large range of cleaning media on offer.
- Temperature** The effect of the cleaning medium is improved by the optimised temperature of the cleaning liquid.
- Cleaning period** The cleaning period depends on the degree and the kind of contamination and on the correct selection of ultrasonic energy, cleaning agent and temperature.

4 Product description

4.1 SW 60/150/240 Modular Cleaning System – Product features

- ultrasonic tank made of extremely cavitation-proof stainless steel (V4A)
- inclined tank floor to facilitate the draining of the cleaning liquid
- skimming ledge for the optional surface skimming, e.g. of oil
- bottom scouring of removed sediments (optional)
- sandwich-type performance transducer systems
- two ultrasonic frequencies, switchable in one unit (28 kHz/48 kHz for either intensive or gentle cleaning)
- activatable *sweep* mode for a continuous shifting of sound field maxima, guarantees a more homogeneous sound field distribution in the bath
- activatable *boost* mode for an increase of the ultrasonic power for persistent contamination
- activatable *degas* mode for the efficient degassing of the cleaning liquid and for special laboratory cleaning tasks
- heating with temperature control (30°C – 80°C)
- automatic safety switch-off after 12 h operation to prevent unintended permanent operation
- automatic safety switch-off at 90 °C to protect the cleaning items against excess temperatures
- level monitoring with integrated automatic safety switch-off in case of too low liquid level
- housing made of V2A stainless steel
- drain duct made of V2A stainless steel, mounted to the unit rear
- connection ducts for the optional connection of peripheric equipment (e.g. filter-pump system, oil separator)

4.2 CE conformity

The present ultrasonic cleaning unit complies with the CE marking criteria with regard to the EMC directive 2004/108/EG, and to the low voltage directive 2006/95/EG.

The declaration of conformity is available from the manufacturer.

4.3 RFI Statement (European Union)

This is a Class A product.

Please note:

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

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

4.4 Delivered equipment

- Ultrasonic cleaning unit
- Rinsing tank with heating (optional)
- Hot Air Dryer (optional)
- Operating Instructions

4.5 Optional accessories

- Stainless-steel basket (suitable for small-size items only to a limited degree)
- Mesh (for heavy pieces)
- Removable stainless-steel cover
- Hinged noise-protection cover, (not upgradeable)
- Oscillation
- Filtration-system
- Oil separator

4.6 Technical Data

	SW60MOD Ultrasonic-cleaner	SW150MOD Ultrasonic-cleaner	SW240MOD Ultrasonic-cleaner
Tank service capacity (L)	60	150	240
Tank internal dimensions W/D/H (ca. mm)	510 x 350 x 350	620 x 545 x 450	820 x 545 x 550
Basket (accessory) internal dimensions W/D/H (ca. mm)	460 x 275 x 190	555 x 460 x 260	770 x 470 x 380
Loading capacity Basket max. (ca. kg)	30	45	90
Ball valve (")	1 "	1 "	1 "
Mains voltage (Vac)	400V	400V	400V
Ultrasonic frequency (kHz)	28 / 48	28 / 48	28 / 48
Power consumption total (W)	12.300	12.300	12.300
Ultrasonic power effective (W)	800 bottom sound	1.000 bottom sound	2.000 bottom sound
	1.200 bottom and one side sound	1.500 bottom and one side sound	3.000 bottom and one side sound
Ultrasonic peak power max (W)	3.200 bottom sound	4.000 bottom sound	8.000 bottom sound
	4.800 bottom and one side sound	6.000 bottom and one side sound	12.000 bottom and one side sound
Heating power (W)	1.700	4.500	9.000
Sound pressure level (L_{pAU}) *	87 dB	87 dB	87 dB
Sound pressure level (L_{pAU}) **	< 70 dB	< 70 dB	< 70 dB
Ultrasonic level (L_{pZ}) **	< 110 dB	< 110 dB	< 110 dB

* Max. sound pressure level measured in 1 m distance, without basket and cover

** Ultrasonic level measured in 1 m distance, with basket and cover

4.7 Description of Ultrasonic Cleaning System

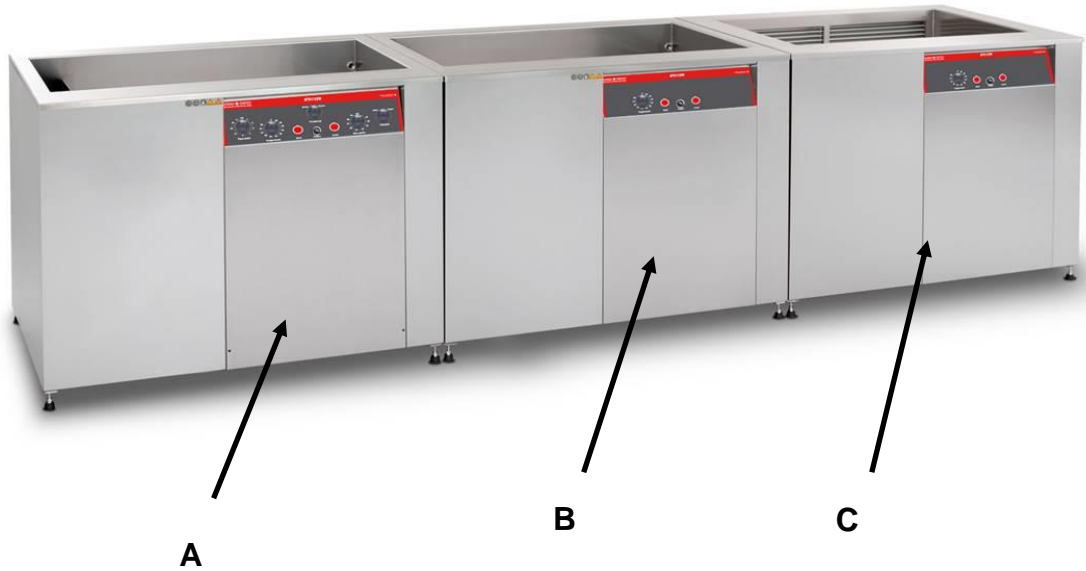


Image 4.7.1 Frontview of Cleaning Line (here SW240MOD)

- A** Ultrasonic cleaning unit SW 240 Cleaner B.
- B** Rinsing unit SW 240 Rinser H (optional)
- C** Dryer SW 240 (optional)

4.8 Description of Ultrasonic Cleaning Unit SW60 / 150 / 240 MOD

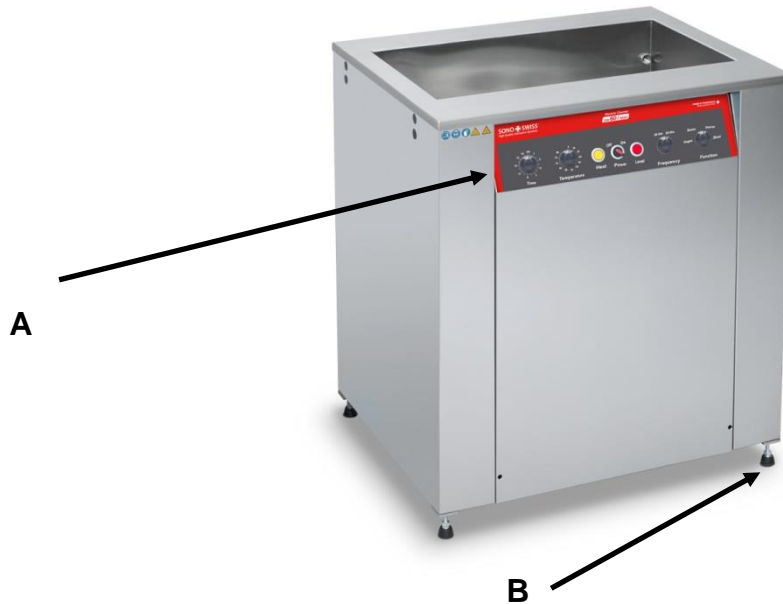


Image 4.8.1 Frontview Ultrasonic Cleaner (here SW60MOD)

A Operating panel to control all unit functions
Descriptions see Section 4.13.

B Height-adjustable feet

4.9 Description Ultrasonic Cleaning Tank SW 60 / 150 / 240 MOD

4.10

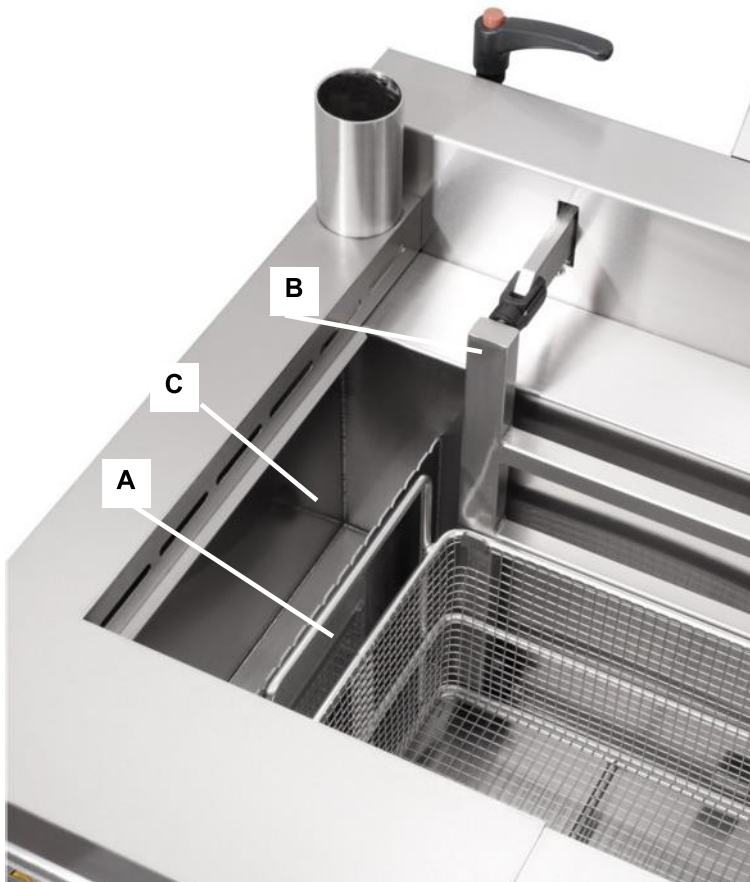


Fig. 4.9.1 View Ultrasonic cleaning tank SW 60

- A Ultrasonic tank** made of cavitation-proof stainless steel (V4A). The transducers are mounted underneath the tank bottom or as an option additionally at one side. The tank bottom is inclined towards the drain.
- B Basket holder (optional)** for holding the basket at position of cleaning or draining
- C Overflow basin** to collect skimmed oil etc. from the surface; connection of optional peripheric equipment possible (e.g. filtration-system, oil separator); the upper edge of the overflow chamber is also the recommended filling level.

4.11 Description Ultrasonic Cleaning and Rinsing Tank SW 60 (optional)

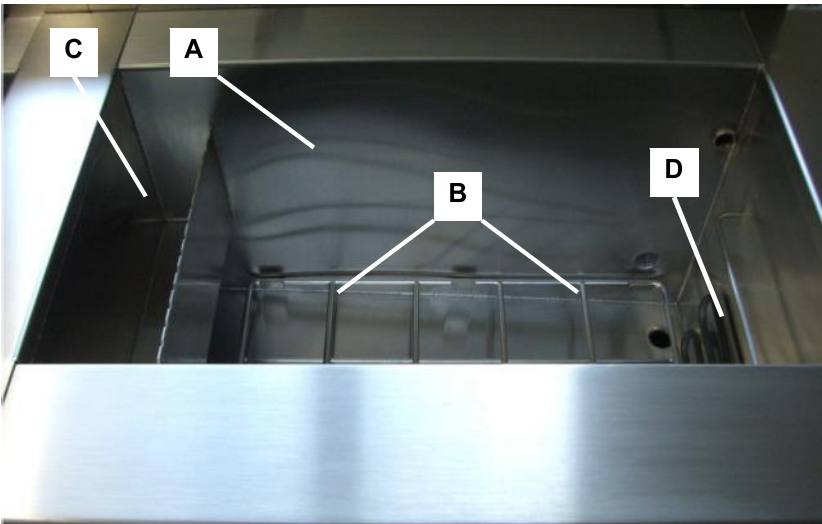


Fig. 4.10.1 View Rinsing tank SW 60

A Rinsing tank made of cavitation-proof stainless steel (V4A).

B Mesh (optional)

C Overflow basin

D Heating element

4.12 Description Hot Air Dryer (optional)

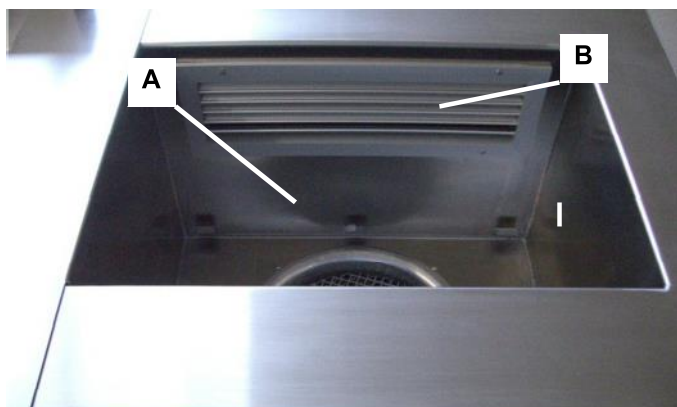


Fig. 4.11.1 View Hot Air Dryer SW 60

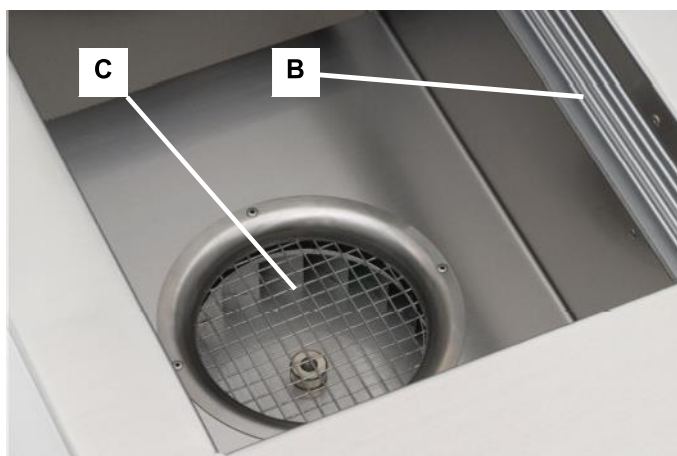


Abb. 4.11.2 View Hot Air Dryer SW 60

- A Hot Air Dryer** Stainless steel (V2A).
- B Lamella** for Hot Air feeding
- C Fan motor** for air intake

4.13 Description of loading basket (optional accessory)

The especially designed basket can be hold in 2 positions.

Position for cleaning

The basket will be hanged into the two hooks. (see fig. 4.12.1).

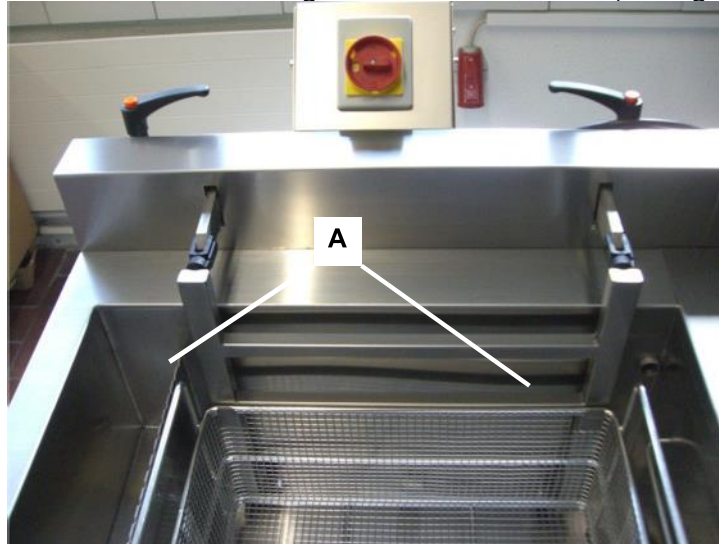


Fig. 4.12.1 Loading basket in position for cleaning

Draining position

The loading basket will be hanged into the 2 hooks.



Fig. 4.12.2 Loading basket in draining position

4.14 Operation panel Ultrasonic Cleaner

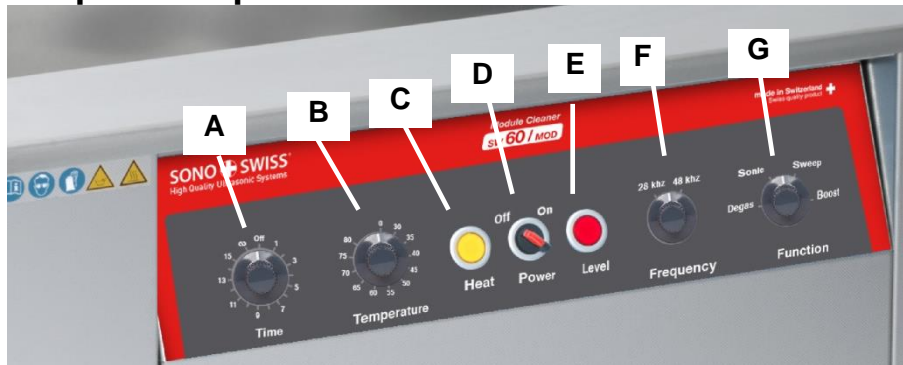


Fig. 4.13.1 Operation panel ultrasonic cleaner

- A Turning knob “time”** for preselecting the duration of cleaning
Possible Adjustments: 1 - 15 min (in steps of 1 minute; automatic shutdown).
Continuous operation ∞ for infinite operation. Shutdown has to be done manually.
- B Turning knob** for switching on the heating and selecting the temperature.
Temperature range from 30°C to 80°C
- C LED “heat”** flashes yellow when heater is being activated by the turning knob „temperature“.
- D Switch “on/off”** for switching the unit on or off. At position “on” a blue LED is flashing.
- E LED „level“** Level sensor for cleaning media. Switches the unit off when level of cleaning media is below the minimum level. LED flashes red.
- F Turning knob „frequency“** for selecting the ultrasonic frequency at either 28 kHz or 48 kHz
- G Turning knob „function“** for selecting between various ultrasonic modes (degas, sonic, sweep, boost)

4.15 Operation panel Rinsing Unit with heating (optional)



Fig. 4.14.1 Operation panel rinsing unit

- A Turning knob** for switching on the heating and selecting the temperature.
Temperature range from 30°C to 80°C
- B LED “heat”** flashes yellow when heater is being activated by the turning knob „temperature“.
- C Switch “on/off”** for switching the unit on or off. At position “on” a blue LED is flashing.
- D LED „level”** Level sensor for rinsing media. Switches the unit off when level of rinsing media is below the minimum level. LED flashes red.

5.1 Operation panel Hot Air Dryer

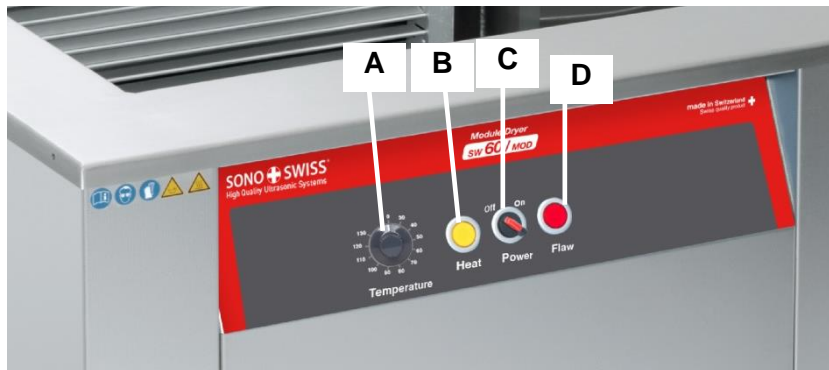


Fig. 4.15.1 Operation panel

- A** Turning knob „temperature“ to adjust the heating temperature in a range of 30°C - 130°C
- B** LED “heat” flashes yellow when heater is being activated by the turning knob „temperature“.
- C** Switch “on/off“ for switching the unit on or off. At position “on” a blue LED is flashing.
- D** LED „flaw“ flashes red and unit shuts off automatically when there is an electrical or mechanical fault.

6 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 cleaning liquid in the tank heat up during ultrasonic operation even with the heating switched off.

During permanent operation with cover temperatures exceeding 60°C can be reached.

During permanent operation with cover and heating temperatures exceeding 80°C can be reached.

Do not reach inside the bath.

If necessary touch unit and basket with protecting gloves!



CAUTION

Ultrasonic units can produce annoying sounds.

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



ATTENTION

Sensitive surfaces may be adversely affected by ultrasound during prolonged periods of ultrasonic treatment, in particular at lower ultrasonic frequencies.

Ensure that sensitive surfaces are exposed to ultrasonic activity for a suitable period only.

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



CAUTION

Ultrasonic energy is physically transformed into heat.

The unit and the cleaning medium in the tank heat up during ultrasonic operation even with the heating switched off.

During permanent operation with cover temperatures exceeding 60°C can be reached.

For the cleaning of temperature-sensitive items please take into consideration the heating-up of the cleaning medium.

The operator is responsible for the inspection of the cleaning result and for the continuous inspection of the cleaning items during ultrasonic treatment to prevent damages from the cleaning items.

6.1 Cleaning process SW 60 / 150 / 240 Ultrasonic cleaner

Today, cleaning by ultrasound is the most modern fine cleaning method.

The electric high-frequency energy created by an ultrasonic generator is transformed into mechanical energy by piezo-electrical transducer systems and is then transmitted into the bath.

This process creates millions of tiny vacuum bubbles which implode due to the variations of pressure caused by the ultrasonic activity. Highly energetic liquid jets are created. These jets remove dirt particles from surfaces and even from the smallest grooves and bores.

Basically, the cleaning result depends on four factors:



Mechanical energy	Ultrasonic energy is probably the most important mechanical factor in the cleaning process. This energy must be transmitted through a liquid medium to the surfaces which are to be cleaned. The present Sonoswiss units are equipped with the innovative sweep-technology: electronic oscillation of the sound field (sweep function) prevents the formation of zones of low performance in the ultrasonic bath.
Cleaning media	For saponification and removal of the dirt particles a suitable cleaning agent is required. We have a large range of cleaning media on offer.
Temperature	The effect of the cleaning medium is improved by the optimised temperature of the cleaning liquid.
Cleaning period	The cleaning period depends on the degree and the kind of contamination and on the correct selection of ultrasonic energy, cleaning agent and temperature.

6.2 Rinsing process SW 60 / 150 / 240 Rinser

By inserting the parts into the rinsing tank, the chemical residues will be rinsed. Thus, an optimal cleaning result is guaranteed. The duration of the rinsing operation depends on the amount and the mass of chemical residues on or in the parts and on the temperature of the water medium.

6.3 Drying process SW 60 / 150 / 240 Dryer

By inserting the parts into the drying tank, the still adhering moisture at the parts after cleaning resp. rinsing will be evaporated by a stream of hot air.

The duration of the drying process is determined by the amount of moisture on or in the parts and their mass and on the temperature of the airflow.

The moist warm air will be dissipated from the dryer tank, so that dry air will re-flow into the dryer tank.

6.4 Placement of the items to be cleaned

Caution! Ultrasonic units are intended for the treatment of liquids and items immersed therein. Do not treat living beings or plants in an ultrasonic unit, unless there is a substantial reason to do so!



NOTE

Do not reach inside the tank during ultrasonic operation!

Cell walls may be damaged by prolonged exposure to ultrasonic activity; this applies particularly to the cells of the skeleton and joints.

No cleaning items on the bottom of the tank Do not place any cleaning items directly onto the floor of the ultrasonic tank as this may cause damage to the ultrasonic cleaning unit and/or of the cleaning items.

Use cleaning basket Place the cleaning items in the stainless-steel cleaning basket or on the mesh (accessory).

6.5 Ultrasonic cleaning process

Switch on the unit(s) Set the switch “on/off” on all devices at “on”. The LED of the switch flashes blue and each devices is ready to work.

Ultrasonic operation To activate the ultrasound, set the desired cleaning time at the turning knob „time“. Now, you can select the desired mode of *sweep*, *degas*, *sonic* or *boost* and the desired temperature as well as the ultrasound frequency of 28 or 48 kHz.

Rinsing operation After the cleaning process it is necessary to rinse the cleaned parts to make sure that there are no more residues of chemicals or particles.

Drying operation To achieve optimum cleaning results it is important to dry the parts thoroughly. By setting the required drying temperature (30°C-130°C) the motor is activated. By inserting the parts into the drying tank the drying phase is started. Depending on the application, the drying is completed after 5 min to 10 min.



CAUTION! In continuous operation the ultrasound can heat up the medium above the set temperature even without heater is in operation.



To avoid unnecessary heating of the cleaning medium by the ultrasound, especially at pre-selected low temperatures, please turn on the ultrasound only during the cleaning phase (apart from degassing and circulation of the medium during the heating).

7 Cleaning media

When selecting the cleaning medium please ensure that the selected medium is suitable for use in an ultrasonic cleaning bath; unsuitable media may cause damage to the ultrasonic tank, or may even lead to injuries to the operating staff.

7.1 Limitations of use of cleaners containing solvents



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

DANGER

Observe the warnings in *Section 6.2*.



Ultrasound increases the volume of vaporisation of liquids and creates a very fine mist that can catch fire on any ignition source at any time.

Do **not** fill potentially explosive substances and flammable solvents

- marked in compliance with the EEC directives by symbols and safety warnings R 1 to R 9
- or E, F+, F, O or R 10, R 11 or R 12 for flammable substances

into the stainless steel tank for ultrasonic treatment.

Exception

In compliance with the general regulations on the protection of labour, certain limited volumes of flammable liquids (max. 1 litre) can be used in an ultrasonic cleaning unit under the following conditions: these liquids must be filled into a suitable separate vessel (e.g. beaker) with sufficient ventilation; this vessel (beaker) can then be put into the stainless steel tank which is filled with non-flammable liquid (water with a few drops of interlacing agent).

If in doubt and for any queries please contact the manufacturer or your supplier.

7.2 Limitations on aqueous cleaners

Do not use aqueous cleaning media with pH values in the acid range ($\text{pH} < 7$) directly in the ultrasonic tank if fluoride (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 by crevice corrosion within a very short period of ultrasonic operation.

Acids Other media which can destroy the stainless-steel tanks when used in high concentrations or with high temperatures during ultrasonic operation are: nitric acid, sulphuric acid, formic acid, hydrofluoric acid (even diluted). (Completeness of list not guaranteed.)

Examples:

- Treatment with hydrochloric acid or hydrofluoric acid, or acid solution salts
- Removal of fluxing agents containing fluoride, chloride or tetrafluoroborate from soldered metal parts or electronic components
- Decalcification, in a solution containing citric acid, of medical systems which are contaminated by physiological saline

Alkaline solutions 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.

KOH Potassium hydroxide solution will cause stress cracks in the ultrasonic tank.

Entrainment of chemical substances The above limitations for the use of chemicals in an ultrasonic bath also apply for the aforementioned chemicals when these are brought into an aqueous (particularly distilled water) bath through entrainment or from the removed dirt.

Examples:

- Ultrasound-aided rinsing of items which have been etched by hydrofluoric acid or ammoniumbifluoride.

Disinfectants The limitations of use also apply to the standard cleaners and disinfectants if these contain the above mentioned compounds.

Acid-resistant tank For the ultrasonic treatment with the above mentioned media use an acid-resistant tank.
Please contact your supplier for available accessory equipment.

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 No liability can be accepted for any damage caused by non-observance of the instructions and limitations stated in Sections 8.1 and 8.2!

8 Maintenance

8.1 Maintenance and care



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

ATTENTION

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

Check the ultrasonic tank for leaks:

Check the ultrasonic tank for leaks Immediately separate the unit from the mains in case of visible leaks in the ultrasonic tank, e.g.

- if there are any inexplicable stains or residues of cleaning liquid under or next to the unit
- if there is a high loss of liquid from the filled unheated tank which is not due to vaporization

Inform your supplier or the manufacturer of the unit on the leak and the cleaning medium used. Return the unit to the manufacturer or to your supplier for inspection and repair.

Maintenance of the ultrasonic tank Check the ultrasonic tank regularly for residues, in particular on the tank floor. Remove any residues.

Ventilation slots on the side Regularly check the ventilation slots on the side of the unit for dirt particles.

If necessary remove any contaminations, possibly by means of a vacuum cleaner to guarantee sufficient ventilation inside the unit.

Maintenance of the casing Any residues of cleaning liquids can be removed depending on the type of cleaning medium used. Wipe off the cleaning liquid with a cloth.

8.2 Life cycle of the ultrasonic cleaner



The ultrasonic tank and particularly the ultrasound transmitting surfaces are wear parts. The changes on the surfaces that occur after a certain operating period are visible first as grey areas and later on as material abrasions, the so-called cavitation erosion.

In order to slow down the wear and tear as far as possible we make the tanks of a special highly cavitation-proof stainless steel.

To prolong the service life of your ultrasonic unit even more we recommend to observe the following instructions:

- Gently clean the surfaces from any residues of removed contamination, in particular of polishing pastes, metal particles, and flash rust (wipe, rinse, etc.). Any abrasive particles from removed contaminations (e.g. polishing pastes) must be cleared away as often and as thoroughly as possible (replace the cleaning bath).
- Use suitable cleaning chemicals, with particular caution concerning the kind of removed contamination (see instructions *Section 6.2 Note on Risk of damage to the ultrasonic tank!* and information thereon).
- Abrasive particles from removed contaminations (e.g. polishing pastes) must be drained and removed from the cleaning tank as frequently as possible (exchange the cleaning bath).
- Exchange the cleaning liquid regularly.
- Do not operate the ultrasound unnecessarily; switch off after the cleaning process.

8.3 Repair

**Opening by
authorised
specialised
personnel only**

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



DANGER

Risk of electric shock due to live parts inside the unit!

Pull the mains plug before opening the unit!

The manufacturer cannot be held responsible for any damage caused by unauthorised maintenance or repair works on the unit.

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

9 Putting out of action and waste disposal



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

10 Manufacturer's contact address

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CH-8262 Ramsen

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