



Ultrasound Technology

Certified according to DIN EN ISO 9001

UP50H / UP100H Operating Manual

Ultrasonic processor for
Laboratories

Imprint

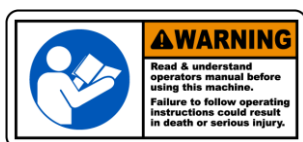
Operating manual Ultrasonic processors UP50H and UP100H

Ultrasonic processors for use in the laboratory

Purpose and use

This operating manual shows you the construction and operating of the UP50H and UP100H ultrasonic processors. The structure, areas of use and handling of both ultrasonic processors are practically the same, the respective power outputs differ.

Please ensure that you read the safety information particularly carefully and comply with it at all times.



Always keep the manual near the areas in which the UP50H and UP100H ultrasonic processors are used. The operating manual should always be to hand, to help you to solve any questions that may arise.

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The manual has been prepared with all due care, nevertheless errors and omissions cannot be fully precluded.

Hielscher Ultrasonics GmbH reserves the right to make changes to the technical data and specifications during the course of further development of the product, without giving prior notice.

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We do not accept any liability for damages, which result from failure to observe the information in this manual.

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List of Contents

1	Product Description	5
	1.1 Designations used in this manual	5
	1.2 Overall view	6
	1.3 Areas of use	6
	1.4 Equipment and accessories (extent of delivery).....	7
	1.5 Designation	7
	1.6 Technical data	8
	1.7 Available accessories	9
	1.8 Sonotrodes	9
2	Safety	12
	2.1 Symbols used	12
	2.2 Use as prescribed	13
	2.3 Safety information.....	14
3	Structure and Function	16
	3.1 Structure	16
	3.2 Functional principle	16
	3.3 Operating and display elements	17
	3.4 Electrical connection.....	18
	3.5 Sonotrodes	18
4	Commissioning	20
	4.1 Room requirements.....	20
	4.2 Mount and dismount the sonotrode.....	20
	4.3 Stand assembly.....	22
	4.4 Electric connection	23
5	Operating	24
	5.1 Manual mode – the correct hold.....	24
	5.2 Operation with a sound protective box SPB-L.....	25
	5.3 Switch the ultrasonic processor on and off.....	25
	5.4 Vary the working parameters.....	27
	5.5 Continuous sonication of samples.....	28
6	Discoloration of material and changes on the sonotrodes	29
7	Help With Faults	30
	7.1 Faults	30
	7.2 Service address.....	31
8	Servicing and Maintenance	32
9	Decommissioning and Transport.....	33
10	Waste disposal	34

11	Declaration of Conformity	35
12	Checklist	36
13	Figures and tables	37

1 Product Description

The UP50H and UP100H ultrasonic processors have been developed for use in the laboratory, the areas of use and operating of the two ultrasonic processors are the same.

The ultrasonic transducers use electric excitation to generate ultrasound, which is transferred to the liquid medium via various sonotrodes. Both ultrasonic processors are suitable for both manual modes as well as for assembly on a stand.

The difference between the UP50H and UP100H ultrasonic processors lies in their useful output power:

UP50H	50W
UP100H	100W

Outwardly, the two designs only differ in the various designations on the labels on their housings.

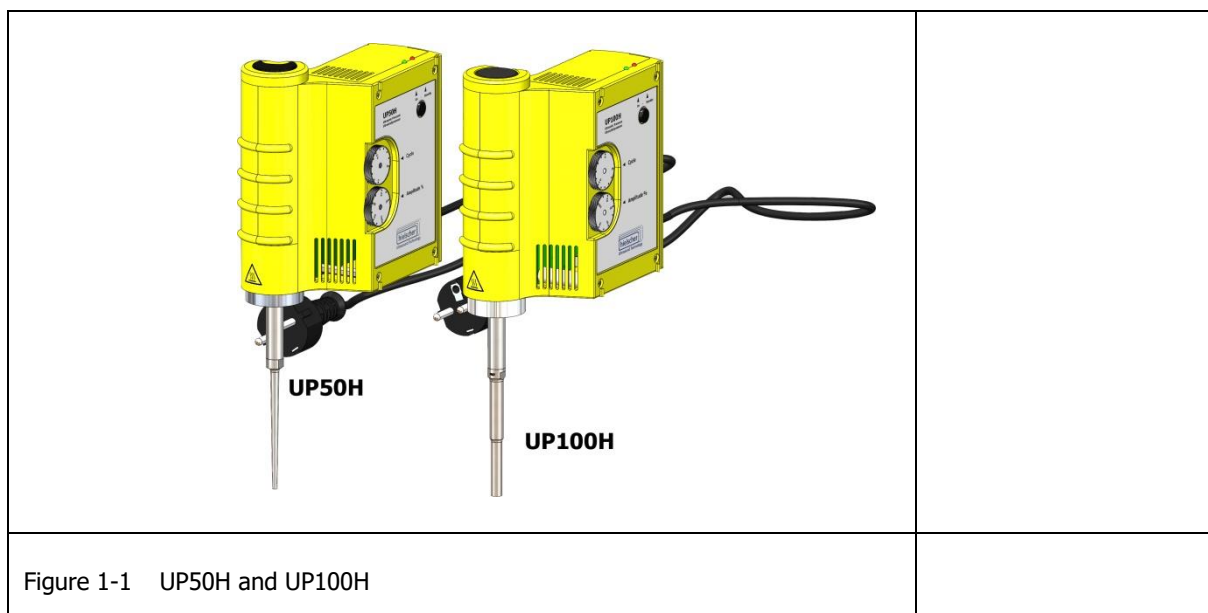


Figure 1-1 UP50H and UP100H

1.1 Designations used in this manual

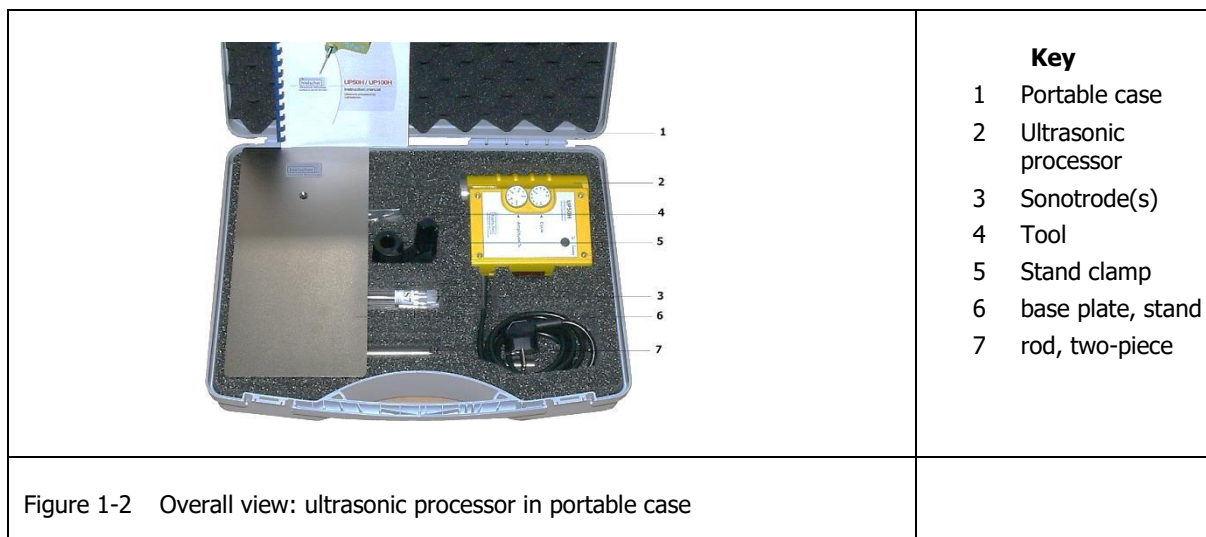
This Operating manual applies for the two UP50H and UP100H ultrasonic processors.

The following designations are used:

Ultrasonic processor	generic designation is used in all sections, which apply for both variants.
UP50H	all information, which only concerns the UP50H, will be denoted with this product title.
UP100H	all information, which only concerns the UP100H, will be denoted with this product title.

1.2 Overall view

The ultrasonic processor is supplied in a portable case, which also contains all accessories and the required tools.



1.3 Areas of use

The UP50H and UP100H ultrasonic processors have a large range of applications for use in biology, medicine, chemistry and engineering, whereby the UP50H and UP100H provide different useful output powers (see Section 1.6 "Technical data").

Because their high efficiency the ultrasonic processors don't have to be artificially cooled and are suitable for continuous operating. The amplitude of the oscillatory system can be steplessly adjusted between 20% and 100% the set value remains constant under all operating conditions. This means that even continuous operating in air is possible.

The sonotrodes are power-adjusted and can therefore be run without amplitude limitation.

You can expose temperature-sensitive samples to high intensity ultrasonic waves in pulse control mode. The pulse mode factor between non-operating and acoustic irradiation can be continuously varied between 10% and 100%.

The UP50H and UP100H ultrasonic processors are used for the following tasks:

Sonochemistry

The ultrasonic processors can be used in Sonochemistry in the standard laboratory vessels. Prerequisite for this is choice of laboratory vessels according to the media to be acoustically irradiated and the sonotrode size.

Biology, medicine and chemistry laboratories

The UP50H and UP100H ultrasonic processors can be used in laboratories, for example to carry out the following works:

- Disintegration or homogenization of liquids
- Fine screening granular substances

- Intensive cleaning of flat substrates
- FIA in biochemistry

Engineering

- Thermoplastic deformation
- Removing protective coats

Further areas of use

Further areas of use are feasible and depend on the sonotrodes available. In case of doubt, please contact the customer service department of Hielscher Ultrasonics GmbH. The address and telephone number are given in Section 7.2.

1.4 Equipment and accessories (extent of delivery)

The extent of delivery is determined by the order. In particular, the sonotrodes supplied with the ultrasonic processor depend on the planned use.

The electrical connections are specified by Hielscher Ultrasonics GmbH before delivery, typical for the country of use according to the customer's order (see Section 1.6 "Technical data"). The electrical connections must not be changed by the user of the ultrasonic processor!

Basic equipment, standard extent of delivery

The portable case with foam inner lining contains:

- Ultrasonic processor (UP50H or UP100H, depending on the order)
- Adjustable face spanner, Size 3
- Open jawed spanner SW 9
- Operating manuals
- Accessories according to the order

Special equipment

Please note any enclosed separate documentation on the use and installation of the accessories.

1.5 Designation

Manufacturer	Hielscher Ultrasonics GmbH
Title	UP50H or UP100H
Conformity	CE mark (for verifications; please see the "Conformity declaration")
Year of construction	See rating plate

1.6 Technical data

Technical specification

Ultrasonic processors	UP50H or UP100H
Efficiency	> 90 %
Working frequency	30 kHz
Control range	±1 kHz
Maximum amplitude	125 - 220µm (PK-PK) depending on the sonotrode
Maximum energy density	125 - 600W/cm ² depending on the sonotrode
Output control	20% - 100%, steplessly adjusted
Pulse-pulse mode factor	10% - 100% per second, steplessly adjusted
Test certificates	see the "Declaration of Conformity "

Electrical data

Connected loads	200 - 240V AC, 50/60Hz alternatively (typical for country of use) 100 - 130V AC, 50/60Hz
Mains fluctuations	±10%
Surge category	2
Fuses	UP50H/ 230V/ 0.63A UP100H/ 230V/ 1A UP50H/ 110V/ 1A UP100H/ 110V/ 2A
Useable /nominal output	UP50H: 50W (in liquids 45W) UP100H: 100W (in liquids 90W)

Operating safety

Protection class	1, earthed device
Overvoltage category	I
Degree of pollution	2
Degree of protection	IP20

Permissible ambient conditions

Temperature range	+5 ... +40°C
Relative air humidity	10 - 90%, non-condensing
Tolerated corrosives	none
Ambient air pressure	700hPa - 1200hPa
Maximum rate of ambient pressure air change:	100hPa/hr
Maximum installation altitude	<2000m

Device parameters

Dimensions	(Length x Width x Height) 180mm × 130mm × 50mm
Mass	approx. 0.75 kg

1.7 Available accessories

The following accessories are available as standard products. Please ensure you note the time this Operating manual was issued, if necessary please ask the customer service department of Hielscher Ultrasonics GmbH for any new additions to the accessories available.

1.8 Sonotrodes

Standard sonotrodes are used for the UP50H and UP100H ultrasonic processors, depending on their dimensions and acoustic power.

! Please note! The amplitude values listed in the following tables are measured as **Peak-Peak (Pk-Pk) values**.

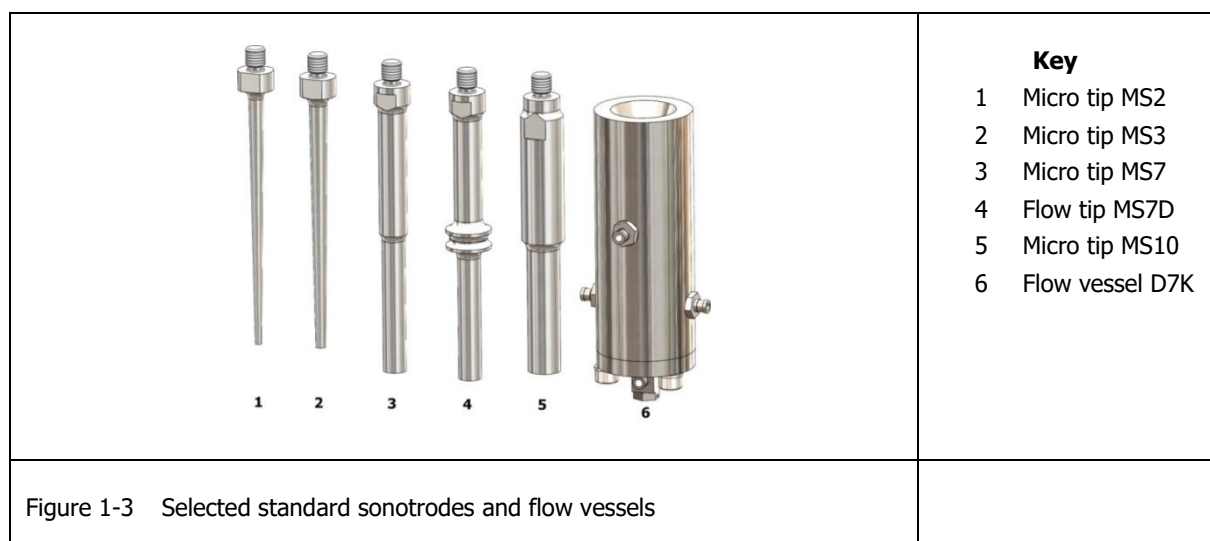


Table 1-1 Standard sonotrodes" shows the performance data of the standard sonotrodes for both ultrasonic processors.

Type	maximum immersion depth (mm)	Tip diameter (mm)	maximum amplitude (µm)	Acoustic power density (W/cm ²)
MS0,5 Micro tip 0.5	5	0.5	140	125
MS1 Micro tip 1	5	1	140	125
MS2 Micro tip 2	30	2	220	600
MS3 Micro tip 3	30	3	180	460
MS7 Micro tip 7	30	7	125	130
MS7D Flow tip 7	30	7	125	130
MS10 Micro tip 10 (only for UP100H)	30	10	70	90
Table 1-1 Standard sonotrodes				

Hielscher Ultrasonics GmbH also develops special sonotrode designs for special applications.

Further components

Stand clamp ST1-16	Suitable for all stands with a pole diameter 16mm
Sound protective box SPB-L	Protective box for reducing sound, reduces the continuous sound pressure level by 20dB The box has an adjustable plate inside as a standing area for the acoustic irradiation container.
Stand ST1 with footplate	Stand made of stainless steel stand plate 300mm x 150mm Pole diameter 16mm
Timer T1	Electronic timer for controlling the duration of acoustic irradiation from 1s to 99min Connection via the interface
Flow vessel D7	Usable with flow tip MS7D (see Figure 1-3 Selected standard sonotrodes and flow vessels) stainless steel, autoclavable, without cooling
Flow vessel D7K	Usable with flow tip MS7D (see Figure 1-3 Selected standard sonotrodes and flow vessels) stainless steel, autoclavable, with cooling

Interface and software**UPC-L**

PC connection (own interface) for recording output (sonotrode amplitude, acoustic power)
extent of delivery: interface converter, connection cable, and software

UPCT-L
















PC connection (own interface) for recording output and temperature (sonotrode amplitude, acoustic power, temperature in liquid medium)
Extent of delivery: interface converter, connection cable, sensor, and software.


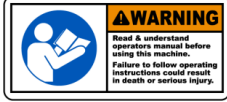

2 Safety

The symbols listed in the manual are described in the following section.




2.1 Symbols used

Symbols in the manual

IEC		ANSI
	Warns for immediate danger to life and limb (risk of severe injury and death).	
	Warning for a possibly dangerous situation that may lead to body lesions.	
	Warning for possible damage to objects without risk to persons.	
	Electric current!	
	Warning of possible feedback voltage when opening the plug - connection between the generator and transducer!	
	Explosion hazard!	
	Hot surface! Do not touch!	
	Wear protective gloves!	
	Eye and ear protection!	

	<p>Read the Manual!</p>	 
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Symbols on the device

	<p>CE conformity mark</p>
	<p>Hot surface! Do not touch!</p>
	<p>Warning of possibly dangerous situation with the result of injuries.</p>

2.2 Use as prescribed

The UP50H and UP100H ultrasonic processors exclusively serve the acoustic irradiation of liquid media or solid media in a liquid bath (each with submerged sonotrode tip or from the air) for the



- Disintegration or homogenization of liquids
- Thermoplastic deformation
- Intensive cleaning of flat substrates
- FIA.

The ultrasonic processors may only be used so that the sonotrode tip withers stands a few millimeters above the liquid or submerged in the liquid according to the maximum submerged depth of the respective sonotrode type at the most.

Any other use than the one described here is outside the specification and can lead to hazardous conditions. Any use not described here is impermissible and not covered by the warranty arrangements and obligations between Hielscher Ultrasonics GmbH and other parties. Hielscher Ultrasonics GmbH refuses to accept any responsibility for damage, losses and/or injuries or death, which results from use deviating from the information given in this Operating manual.


2.3 Safety information

It will be explicitly pointed out, that only original replacement and accessory parts are to be allowed to use. In case of non-compliance the warranty expires. The operating safety of the devices can be endangered when using other parts.

Safety!	
<i>Please use original replacement and accessory parts, only!</i>	
Warning! California Residents Prop 65 Information	
<i>This product can expose you to chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm. For more information go to „P65Warnings.ca.gov“.</i>	

General information

- Check your ultrasonic processor for damage before each use!
- Install the cable so that it cannot be stepped on or trip people up.
- Do not cover the ventilation slits in the housing. Do not allow any liquids to get into the housing!


Disconnecting device (mains plug)	
<i>The ultrasonic processor must be set up in such a way that, in an emergency, the processor can be safely disconnected from the mains with the aid of the disconnecting device (mains plug).</i> <i>The socket (mains plug) must be freely accessible!</i>	

Risk of burns

- Do not touch the horn and sonotrode during operating, you risk being burned! Leave the ultrasonic processor to cool after lengthy operating, before touching it. In case of continuous operating lasting several hours, the horn in particular can heat up to 100°C.

Hazards due to electric current

- Ensure that the supply voltage complies with the specifications; see the rating plate of the ultrasonic processor.

Please note the connected loads	 WARNING POSSIBLE DAMAGE OF THE DEVICE Observe the correct mains voltage, which is indicated on the bottom of the power supply unit.
<i>When connecting the ultrasonic processor, consider the specified connected loads!</i> <i>See type plate on the device.</i>	

- Do not open the housing of the ultrasonic processor, risk of an electric shock!

- Do not carry any devices or parts by their cables!
- Protect all electric cables against heat, oil, solvents and sharp edges.

Hazards caused by sonic waves

- Never point the ultrasonic processor at people!
- When working for a lengthy period, wear suitable ear protection or run the ultrasonic processor in the sound protective box SPB-L.
- Avoid running the ultrasonic processor in the presence of animals. Animals have an extended audible frequency range compared with humans.

Handling hazardous substances

- The owner/operator is responsible for defining the procedures for handling hazardous substances, including cleaning the sonotrodes and specification of the permissible cleaning agents (and separately according to working with hazardous or non-hazardous substances).
- The owner/operator of the ultrasonic system must make these procedures known in a suitable way and ensure compliance.

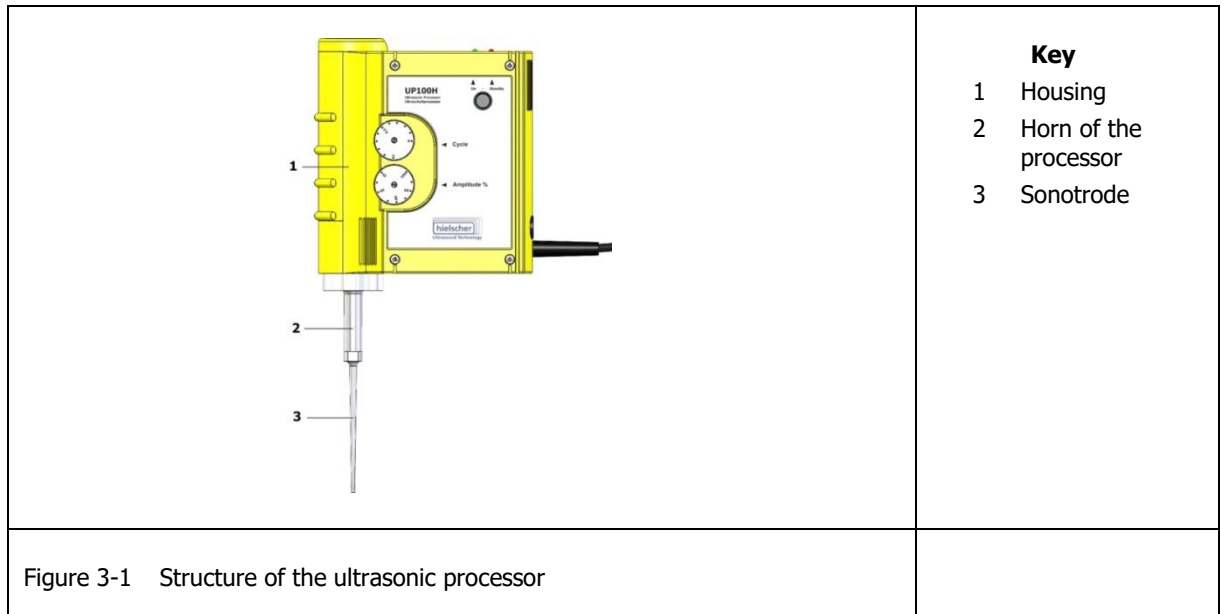
Danger during sonification of media

- Please note that the ultrasonic leads to an energy transmission into the medium. As a result of that the medium is warming up.
- Please note that vessels can burst, especially in the case of glass, clay and ceramics.
- Please note that the ultrasonic input can lead to splashing, spraying (aerosol formation) or foaming of liquids.

3 Structure and Function

3.1 Structure

The ultrasonic transducer is integrated in a housing, which has been ergonomically matched to the human hand. The sonotrode is coupled to the ultrasonic processor via the horn.



3.2 Functional principle

The ultrasonic processor generates longitudinal mechanical vibrations by means of electric excitation (reversed piezoelectric effect) with a frequency of 30 kHz. The power output of the processor can be steplessly adjusted between 20% and 100% of the maximum output (see Section 1.6 "Technical data").

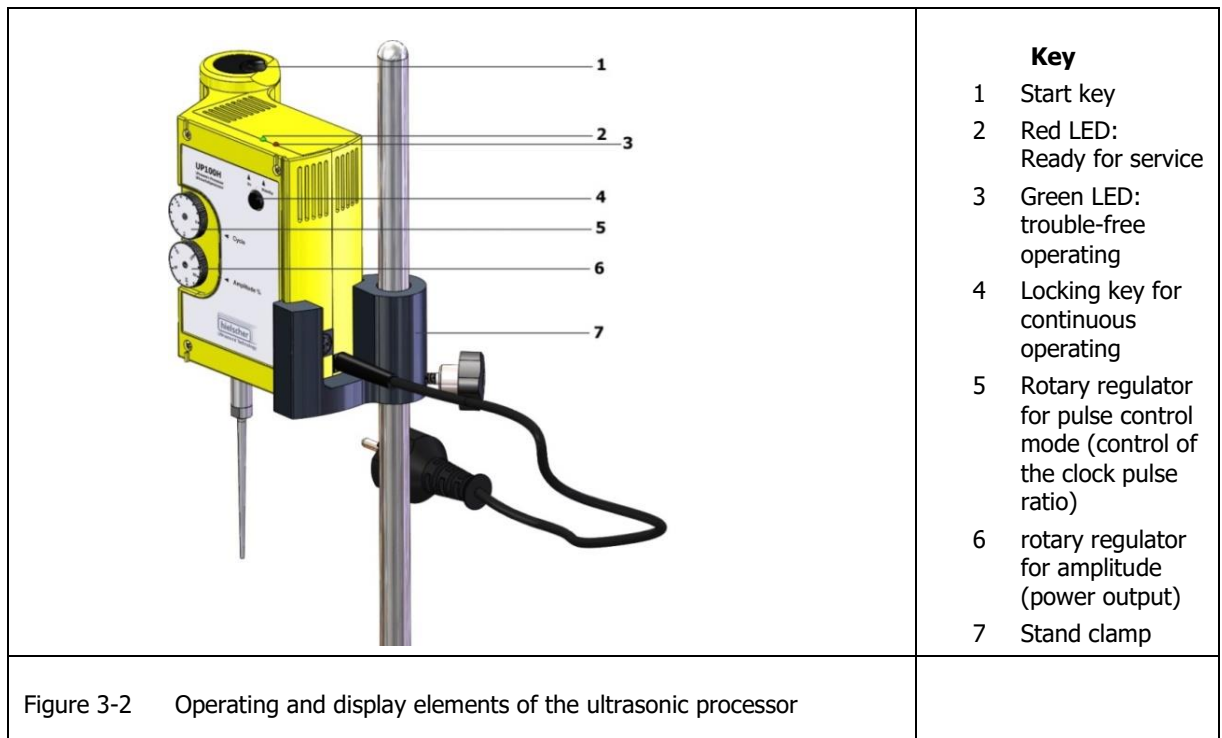
The vibrations are amplified by the sonotrode fitted to the horn and formed as a $\lambda/2$ vibrator and transferred via its end face to the medium to be sonically irradiated. When using the UP50H or UP100H ultrasonic processor, the medium to be sonically irradiated is always a liquid.

The ultrasound causes cavitation in the liquid, which can be used for various purposes (see Section 1.3 "Areas of use"). Solid bodies are placed in a liquid for acoustic irradiation, here the liquid transfers the ultrasound to the surface of the material (e.g. for removing layers of paint). The transferred acoustic power density depends on the form of sonotrode and the size of the sonotrode end face.

The various sonotrodes available provide an optimum selection for solving different tasks.

An integrated PC interface with special control enables the PC aided monitoring and control of all the important parameters of the ultrasonic processor and the connection of additional sets (e.g. temperature probes).

3.3 Operating and display elements



The individual elements have the following functions:

Red LED readiness for service

This LED lights up if the mains voltage is applied to the ultrasonic processor (stand-by).

Green LED Operating

When the ultrasonic processor is switched on, indicates problem-free operating.

Start switch

Switch the ultrasonic processor on/off.

- Keep depressed for the duration of the acoustic irradiation.
- Release to switch off.

Locking key for continuous operating

Switch over the already switched on ultrasonic processor to continuous operating.

- Switch on continuous operating: Press the start key and keep depressed, briefly press the locking key briefly.
- Switch off: press the start key again.

Rotary regulator for pulse control mode (Cycle)

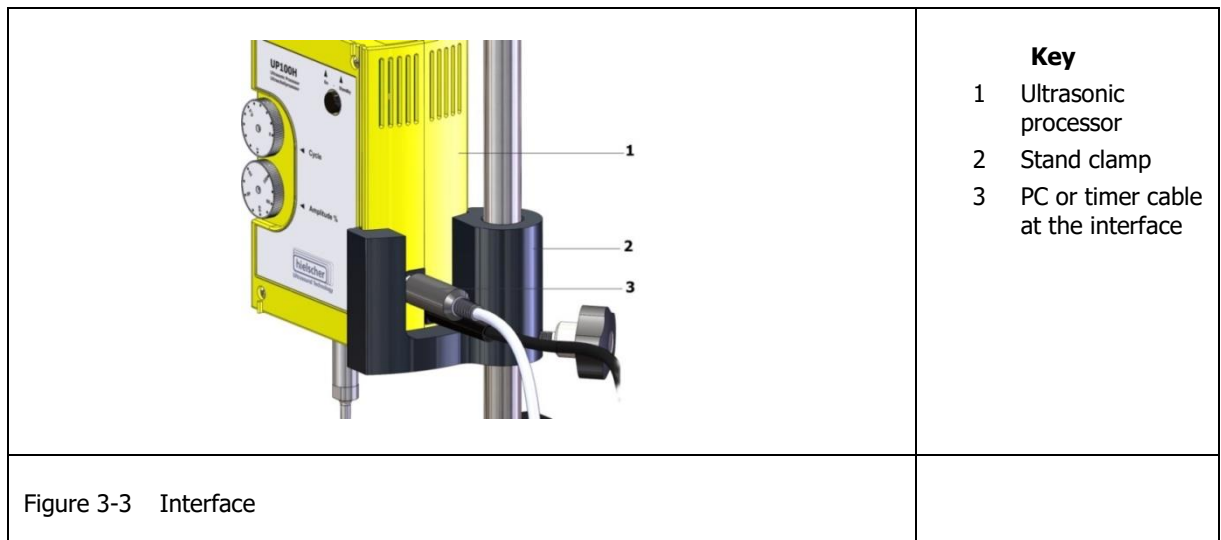
Adjust the pulse mode factor for pulse control mode (Switch On-/off times for the ultrasonic processor).

Examples for settings:

Setting	Significance
1	Continuously switched on
0,6	Power discharge 0.6 seconds, pause 0.4 seconds

Rotary regulator for the amplitude (ultrasonic output)

Control the amplitude/ultrasonic setting of the fitted sonotrode. The setting can be steplessly adjusted between 20% and 100%.



Interface

Special interface for connecting a PC or other components (timer); suitable converter and software are required.

3.4 Electrical connection

The ultrasonic processor is electrically connected to the appropriate socket via a earthing pin plug. The connection values are country-specific; see the rating plate on the ultrasonic processor housing.

<p>Note the electrical connected loads</p>	
<p><i>When making the electric connection of the ultrasonic processor please note the specific connected loads! See rating plate on the device.</i></p>	
<p>WARNING POSSIBLE DAMAGE OF THE DEVICE Observe the correct mains voltage, which is indicated on the bottom of the power supply unit.</p>	

3.5 Sonotrodes

Always select the sonotrode according to the following criteria:

- The task to be solved
- The volume to be acoustically irradiated
- The penetration depth required.

Sonotrodes are differentiated according to the acoustic power or acoustic power density they transfer.

Note:


The smaller the end face area A of the sonotrode, the lower the acoustic power P introduced ($P_{\text{sonic}} \sim A_{\text{end face}}$).

The amplitude s and acoustic power density N on the other hand increase as the end face area reduces and the cavitation intensity at the sonotrode tip increases ($s, N_{\text{sonic}} \sim 1/A_{\text{end face}}$).

4 Commissioning

4.1 Room requirements

The ultrasonic processor is designed for normal laboratory rooms or workshops with conditions similar to those in laboratories.

<p>Use in potentially explosive environments</p>	
<p><i>Do not use the ultrasonic processor in potentially explosive areas! There is a risk of an explosion and thus a high risk of injury!</i></p>	


4.2 Mount and dismantle the sonotrode

Prerequisites

To install or dismantle a sonotrode you will require:

- face spanner size3
- open jawed spanner SW 9

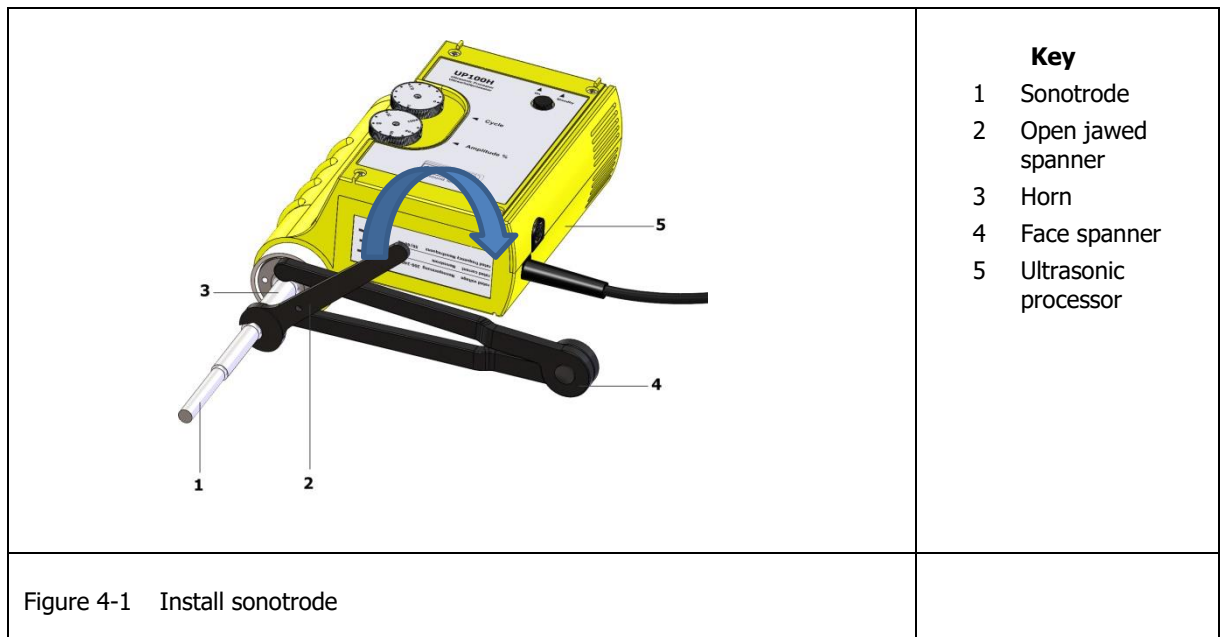
Both tools are part of the extent of delivery.

<p>Soiled or damaged contact areas</p>	
<p><i>The contact areas of the sonotrode and horn must be clean, free of grease, dry and undamaged. Screw the sonotrode very tightly onto the horn of the ultrasonic processor.</i></p> <p><i>Otherwise the power transmission from the ultrasonic processor to the sonotrode will be disrupted and the processor automatically changes to pulse control mode.</i></p>	

Mount sonotrode

The sonotrode must be very firmly connected with the horn of the ultrasonic processor. Mount the sonotrode to the ultrasonic processor as follows:

1. Turn the sonotrode hand-tight in the tapped hole of the horn.
2. Spread out the face spanner and place against two opposite drill holes in the horn.

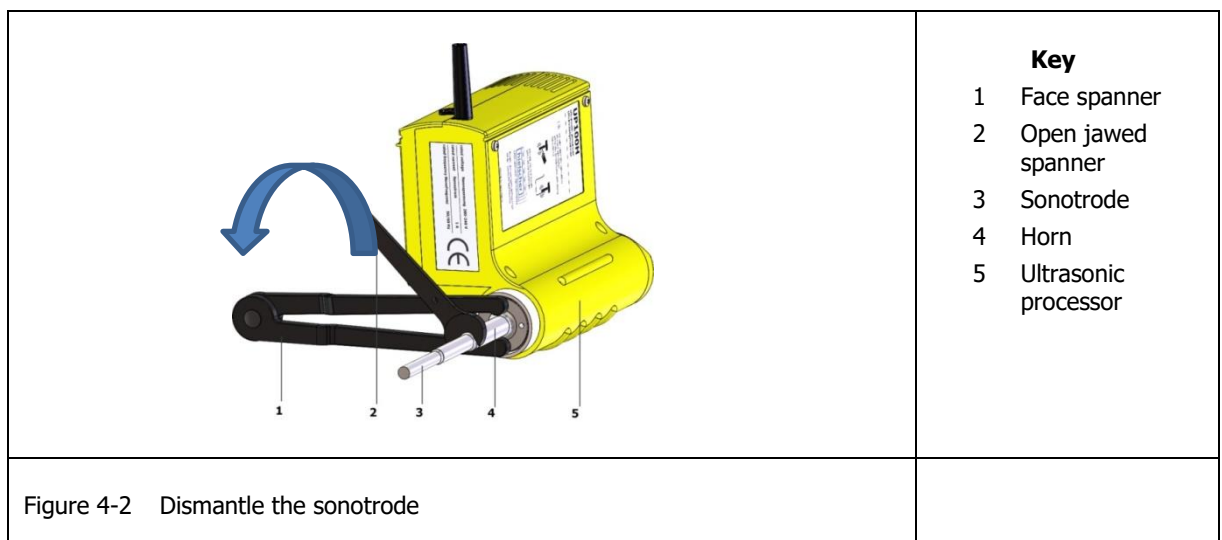


3. Place the ultrasonic processor on a firm base (table) (Figure 4-1 Install sonotrode), so that the face spanner also sits on the base and serves as a support.
4. Set the open jawed spanner on the key surfaces of the sonotrode.
5. Press down the open jawed spanner in the direction of the base and thus tighten the sonotrode (approx. **30 Nm**).

Dismount sonotrode

The sonotrode is dismantled in the reverse order and direction.

1. Place the ultrasonic processor on the base so that the firm base forms the support for the face spanner, while you press down the open jawed spanner (Figure 4-2 Dismantle the sonotrode)




2. Loosen the sonotrode
3. Completely unscrew the sonotrode from the horn by hand.

4.3 Stand assembly

To fit the ultrasonic processor on a stand you will require the stand clamp STH (see Section 1.7 "Available accessories"). This clamp fits each stand with a pole diameter of 1/2 inch. The pole should be at least 300mm long.

How to fit the ultrasonic processor onto the stand:

1. Fix the stand clamp at the required height on the stand pole
2. Set the ultrasonic processor with fitted sonotrode in the stand clamp (Figure 4-3 Ultrasonic processor on the stand)
3. Loosen the stand clamp and slide the ultrasonic processor towards the acoustic irradiation vessel at the optimum working height for the fitted sonotrode.

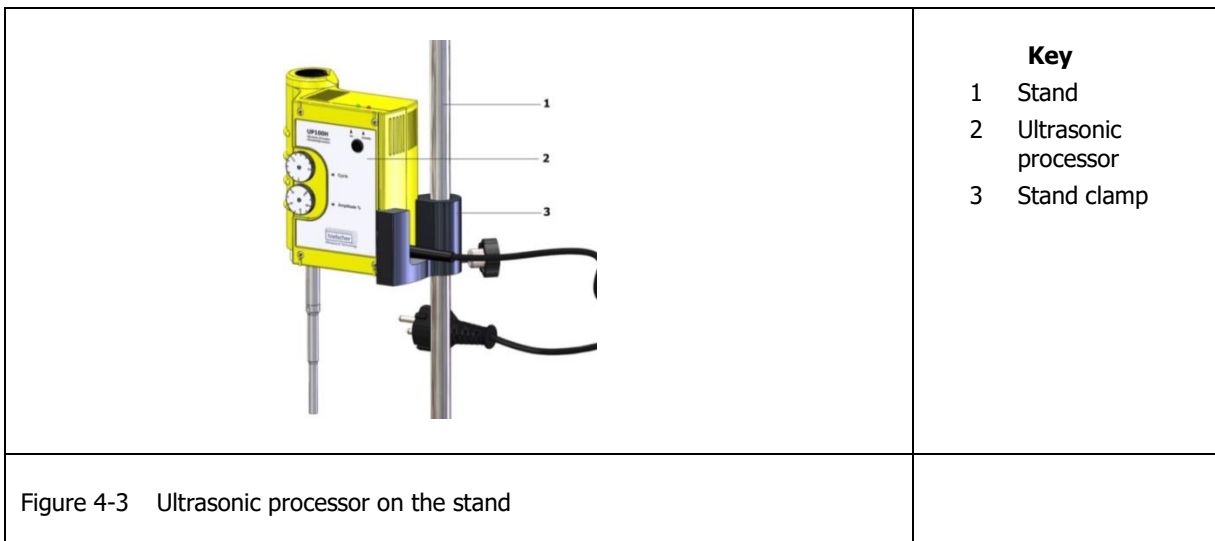
<p>Note the maximum submerged depth</p> <p><i>The sonotrode must not be submerged by more than its maximum submerged depth in the medium to be acoustically irradiated!</i></p> <p><i>Maximum submerged depth of the sonotrode - See Table 1-1 Standard sonotrodes.</i></p>	
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The submerged depth of the sonotrode can vary depending on the task. All depths less than the maximum submerged depth are possible, including acoustic irradiation above the surface of the liquid for example to atomize liquids or to enrich the sample with air.


The maximum submerged depth of the sonotrode is given in Table 1-1 Standard sonotrodes.

4. Screw the stand clamp tight.

You can remove the ultrasonic processor from the fitted stand clamp at any time and reproducibly attach it to the same working position.



4.4 Electric connection

<p>Note the electric connected loads!</p>	 <p>WARNING POSSIBLE DAMAGE OF THE DEVICE Observe the correct mains voltage, which is indicated on the bottom of the power supply unit.</p>
<p><i>Ensure that the electric connection matches the required connection data of the ultrasonic processor!</i></p> <p><i>For the connection data, see the rating plate on the equipment housing or Section 1.6 "Technical data" of this Operating manual.</i></p>	

The electric connected loads for your device are given on the rating plate on the ultrasonic processor housing.

	
<p>Figure 4-4 Rating plate of an ultrasonic processor UP100H (electric connected loads are country-typical)</p>	

Insert the mains plug of the ultrasonic processor in a socket outlet with earthing contact.

The red LED readiness for service lights up and thus indicates the readiness for service (stand-by-mode) of the ultrasonic processor.

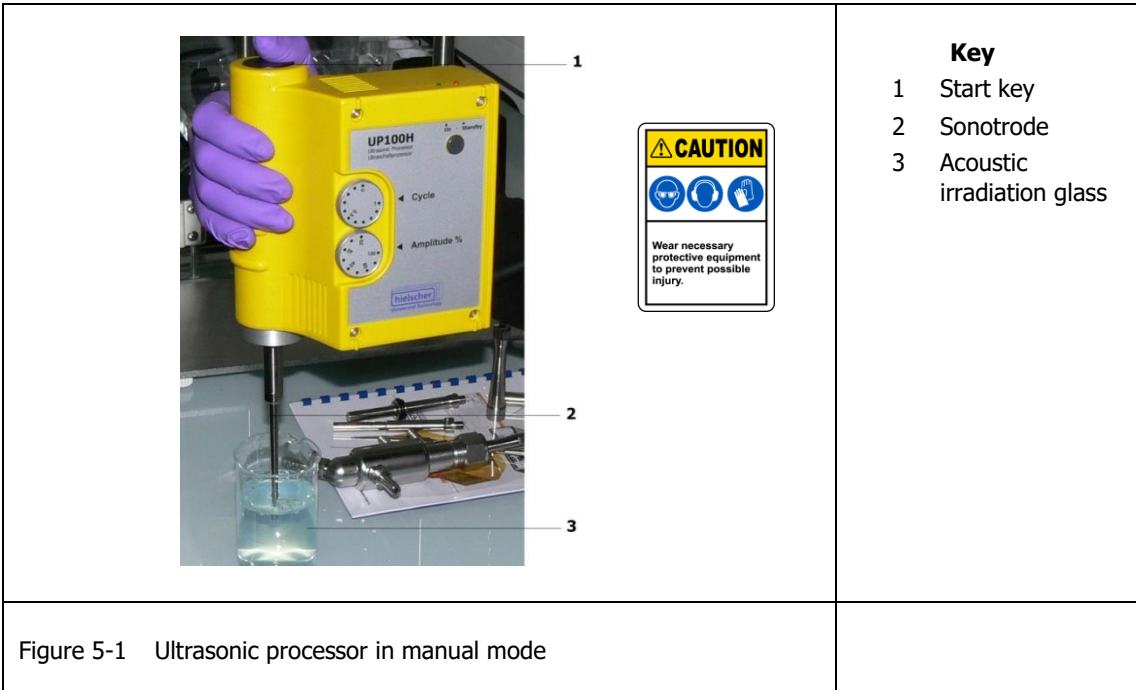
5 Operating

Depending on the planned acoustic irradiation time for the sample, select manual mode (see Section 5.1 "Manual mode – the correct hold") or stand assembly (see Section 4.3 "Stand assembly") of the ultrasonic processor.

5.1 Manual mode – the correct hold

The housing of the ultrasonic processor, especially the handle, is ergonomically matched to the human hand. The shaped thumb channel to the start key provides additional lateral grip.

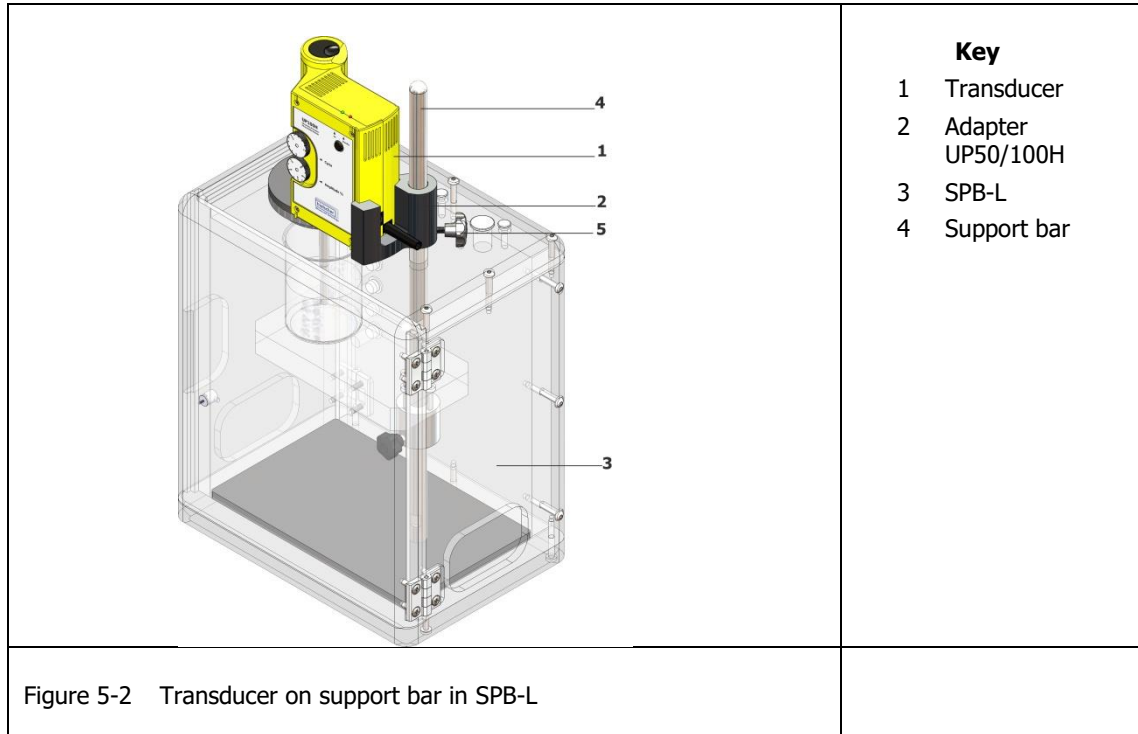
Hold the ultrasonic processor in your right hand as shown in Figure 5-1 Ultrasonic processor in manual mode. In this way you always have all the operating elements in view.



<p>Wear ear protection!</p> <p><i>When working with the ultrasonic processor for lengthy periods, you should always wear suitable ear protection or run the ultrasonic processor in the sound control box SPB-L.</i></p> <p><i>Otherwise you could suffer lasting damaged hearing.</i></p>	
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5.2 Operation with a sound protective box SPB-L

For continuous operation over a longer period of time, it is recommended to use a sound protective box.



5.3 Switch the ultrasonic processor on and off

Before switching on the ultrasonic processor, prepare your sample(s).








<p>Switching on with the minimum power</p>	
<p><i>Always switch on the ultrasonic processor at the lowest power setting. Do not adjust the working parameters for the acoustic irradiation (amplitude, pulse mode factor) to a higher value until the device is running. In this way, you avoid accidental foaming or splashing of the sample liquid.</i></p>	

Prerequisites for switching on

- The samples to be acoustically irradiated have been prepared
- The ultrasonic processor is electrically connected (mains plug in the socket)
- The red LED "readiness for service" is lit up.

Switching on and off

When running the ultrasonic processor, please note the following:

<p>Risk of injury due to glass splinters</p>	 
<p><i>Do not touch glass acoustic irradiation vessels with the vibrating sonotrode!</i></p> <p><i>Pressure and cavitation can cause the glass to splinter and lead to injuries!</i></p>	
<p>Risk of explosion</p>	 
<p><i>Only acoustically irradiate easily flammable samples with adequate ventilation under a switched on extraction hood!</i></p> <p><i>Otherwise there is a risk of explosion!</i></p>	
<p>Risk of burns from hot sonotrode</p>	 
<p><i>Do not touch the sonotrode and horn during operating! The sonotrode and horn can heat up to 100°C.</i></p> <p><i>There is a risk of injury due to the hot surfaces!</i></p>	
<p>Wear ear protection!</p>	
<p><i>When working with the ultrasonic processor for lengthy periods, you should always wear suitable ear protection!</i></p> <p><i>Otherwise lasting damaged hearing can be the consequence.</i></p>	

1. Set the amplitude at the rotary regulator to 20% (minimum) (see Figure 3-2 Operating and display elements of the ultrasonic processor)

This way you avoid accidental foaming or splashing of the sample.

2. Submerge the sonotrode in the medium to be acoustically irradiated

Ensure that the maximum submerged depth for your sonotrode is not exceeded (see Table 1-1 Standard sonotrodes). Press the start key on the ultrasonic processor for as long as the medium is to be exposed to the sonic waves.

The green LED lights up if the ultrasonic processor is working problem free.

3. Vary the working parameters according to Section 5.4 Vary the working parameters.
4. Release the start key, if you want to switch off the ultrasonic processor.

Switch during continuous operating

5. Simultaneously press the start key for and the electronic locking key at the ultrasonic processor for a short time (see Figure 3-2 Operating and display elements of the ultrasonic processor).

To switch the ultrasonic processor back off, press the start key again.

5.4 Vary the working parameters

Vary the amplitude / ultrasonic output

1. The oscillation amplitude (and thus the ultrasonic output) is controlled at the rotary regulator for amplitudes between 20% and 100% (see Section 3.3 "Operating and display elements", Figure 3-2 Operating and display elements of the ultrasonic processor).

The maximum oscillation amplitude (100%) of a sonotrode depends on its design. Please refer to this value for your sonotrode in Table 1-1 Standard sonotrodes in Section 1.7 "Available accessories".

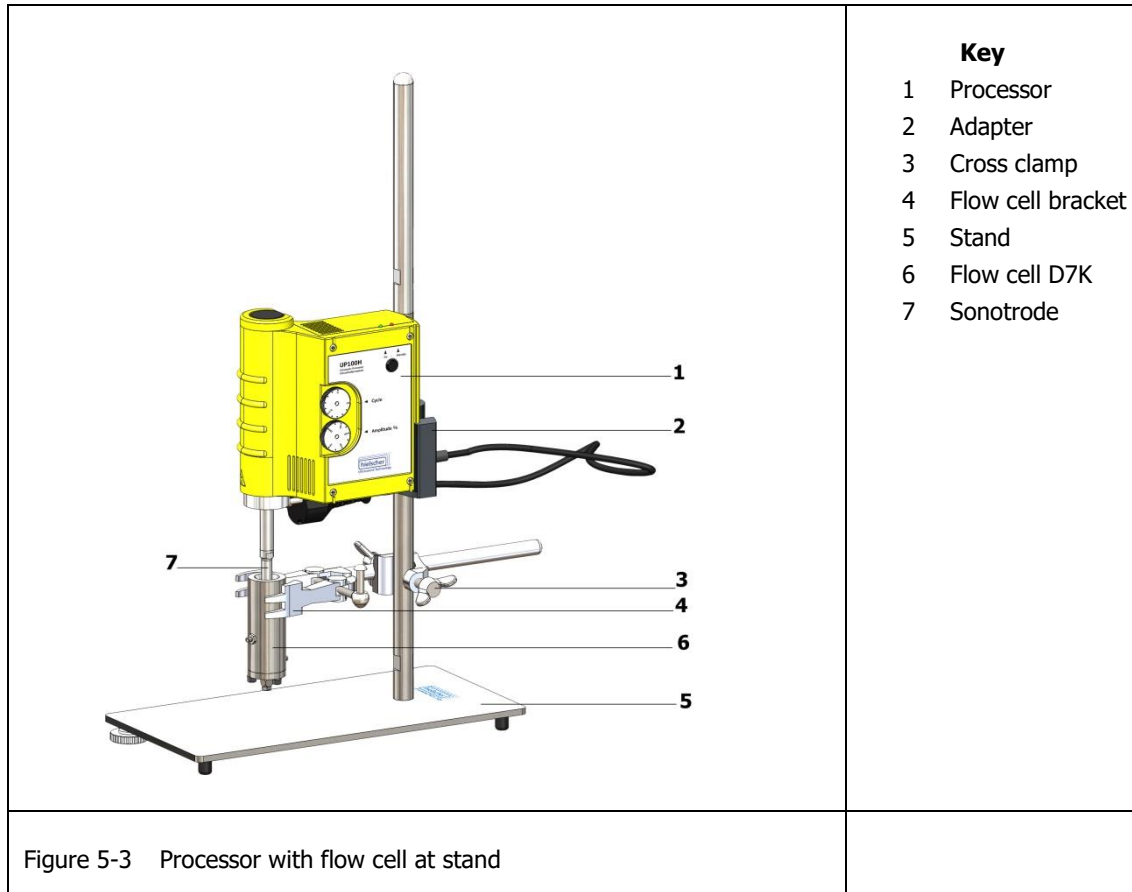
Adjust pulse control mode

2. Adjust the pulse mode in pulse control mode using the rotary regulator cycle (Figure 3-2 Operating and display elements of the ultrasonic processor).

For permanent acoustic irradiation, turn the controller to "1"; each other setting means shorter sonic radiation times with corresponding breaks (see Section 3.3 "Operating and display elements").

5.5 Continuous sonication of samples

For the continuous sonication of samples it is possible to work with a flow cell. In this case the medium is pumped through the cell by means of a pump. Excessive heating of the medium prevents the integrated cooling cells.



6 Discoloration of material and changes on the sonotrodes

During the operating of the sonotrodes in the liquid, with or without using flow cells, changes on the surface of the sonotrodes will raise up.

Such changes could be discolorations or small holes. The reason therefore is the generation of cavitation on the surface area of the sonotrode, which cause erodes of very small particles, which is passing over into the liquid to be sonicated.

This process leads consequently to a wearing of the Sonotrode. The resulting operating time of a Sonotrode will be mainly determined by the size of the mechanical amplitude, by the chemical and physical properties of the liquid to be sonicated and by other sonication parameters, like pressure and temperature. The changes on the sonotrodes within the operating time have no influence on their function. Thus these changes are no defects in terms of warranty.



7 Help With Faults

The UP50H and UP100H ultrasonic processors are internally secured against the usual operating overload situations. If you still encounter problems the following overview can help you solve them.

7.1 Faults

Case A The ultrasonic processor automatically switches into pulse control mode.

Question Is the sonotrode securely screwed onto the ultrasonic processor?

Solution Undo the connection and reinstate. The sonotrode must sit very firmly on the ultrasonic processor. See Section 4.2 "Install and dismantle the sonotrode".

Question Are the contact surfaces between the ultrasonic processor and the sonotrode really clean, grease free and undamaged?

Solution Undo the connection, check the contact areas and clean if necessary, then reinstate the connection. If a surface is damaged, please call our service department (see Section 7.2 "Service address").

Question Is the sonotrode tip worn by cavitation?

Solution Replace the worn sonotrode, because excessive material wear can no longer be compensated for by the control electronics. Contact our service telephone – we will quickly supply a replacement sonotrode.

Case B The ultrasonic processor cannot be switched on, although the plug is in the mains.

Question Is the mains voltage the same as the specification?

Solution Check the mains voltage, ensure that the connected load against the information on the rating plate of the ultrasonic processor or against the values given in Section 1.6 "Technical data "of this Operating manual.

Question Has liquid penetrated the housing?

Solution Send the ultrasonic processor to our customer service department with as detailed a description as possible of the faults. Please call our service department first.

Question You still can't switch the device on?

Solution Call our service department. Our service telephone number and address are given in Section 7.2 "Service address".

7.2 Service address

In case of complications our team can be reached during office hours Mo. – Fri. from 08.30am to 05.30pm at the service telephone.

Hielscher Ultrasonics GmbH	Telephone +49 (0) 33 28 / 437 3 Fax +49 (0) 33 28 / 437 444 Mail service@hielscher.com
Oderstrasse 53	
D-14513 Teltow Germany	

8 Servicing and Maintenance

The UP50H and UP100H ultrasonic processors are maintenance free, the sonotrodes are wearing parts.

Cleaning

Clean the ultrasonic processor and the sonotrode as needed using a damp cloth. You can add a mild washing up agent to the water.

Depending on the media in which it is used, the sonotrode can also be cleaned using a cloth moistened with alcohol.



Ensure that no water or other liquid gets into the ultrasonic processor housing!

Replace worn parts

Change the sonotrodes if they are worn due to cavitation. Worn sonotrodes have a rough, damaged surface.

9 Decommissioning and Transport

To decommission the ultrasonic processor:

1. Switch off
2. Remove the mains plug
3. Remove from stand if applicable
4. Dismantle sonotrode



Pack the parts of your ultrasonic processor safely for transport and storage, if possible in their original packaging. Store the device in a dry room.

10 Waste disposal

If you deliver free, Hielscher Ultrasonics GmbH takes back old devices free of charge. We dispose them ecologically or recycle parts of them, if possible.

Please note, that all devices and used parts have to be decontaminated before return depending on their application.

Before returning your device, please contact our service.

Used materials:

- Electric and electronic parts
- Stainless steel 1.3401 / 1.4571
- Aluminum alloys
- Ceramics
- Titanium alloys

11 Declaration of Conformity

Declaration of Conformity

Hielscher Ultrasonics GmbH
Oderstrasse 53
D-14513 Teltow
GERMANY

We herewith declare that the design and type of device described in the following and the version sold on the market by us den complies with the fundamental health and safety requirements of the EU Directives named in the following, which have all been adopted under German law.

This declaration becomes invalid if the device is modified without our consent.

Device Ultrasonic processor for manual and stand operating

Model **UP50H**
 UP100H

Applicable EU Directives

2014/30/EU (Electromagnetic compatibility)

2014/35/EU (Low Voltage Directive)

2011/65/EC (RoHS-Directive II)

Exemption permit of the Category 9: Monitoring and control instruments
in accordance with article 4 paragraph 3
Device type: industrial monitoring and control instruments
WEEE-Reg.- No.: DE 42652445

Harmonized standards used

EN 55011:2011 (Radio noise)

EN 61010-1-2011 (Safety Requirements)

EN 61010-2-051:2016 (Mixing and Stirring)

Date 2017-12-04

Signature



Managing Director

12 Checklist

<input type="checkbox"/> UP50H <input type="checkbox"/> UP100H	Unit-No.:	Date:		
		Company:		
		Person in charge:		
Accessory		Sonotrode	Flow cell	
		MSxx	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Adjustment of amplitude	%			
Power at PowerMet	W			
Medium				
Volume	L			
Pressure	bar			
Flow rate	<input type="checkbox"/> Yes <input type="checkbox"/> No	L/min		
Temperature input	°C			
Concentration				
Chemical consistence				
Process target	Data measured	Input	Objective	
	1			
	2			
	3			
Process data				
Intensity output	W/mm ²			
Increase of temperature	to ... °C			
Time of sonication	min	<input type="checkbox"/> continuous	<input type="checkbox"/> Interval	
Result	Data measured			
	1			
	2			
	3			
Energy/Volume	E/ V			

13 Figures and tables

Figure 1-1	UP50H and UP100H	5
Figure 1-2	Overall view: ultrasonic processor in portable case	6
Figure 1-3	Selected standard sonotrodes and flow vessels	9
Figure 3-1	Structure of the ultrasonic processor	16
Figure 3-2	Operating and display elements of the ultrasonic processor	17
Figure 3-3	Interface	18
Figure 4-1	Install sonotrode	21
Figure 4-2	Dismantle the sonotrode	21
Figure 4-3	Ultrasonic processor on the stand	22
Figure 4-4	Rating plate of an ultrasonic processor UP100H (electric connected loads are country-typical)	23
Figure 5-1	Ultrasonic processor in manual mode	24
Figure 5-2	Transducer on support bar in SPB-L	25
Figure 5-3	Processor with flow cell at stand	28
Figure 6-1	Cavitation traces in a sonotrode S26d14	29
Table 1-1	Standard sonotrodes.....	10