UP200S / UP400S
Instruction manual
Ultrasonic processors for Laboratories
Imprint

Instruction manual
UP200S and UP400S ultrasonic processors
Ultrasonic processors for stationary operation.

Purpose and use
This instruction manual shows you the construction and operation of the UP200S and UP400S 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 UP200S and UP400S ultrasonic processors are used. The instruction manual should always be at hand, to help you 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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Stand 01/2007
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1 Product Description

The UP200S and UP400S ultrasonic processors have been developed for use in the laboratory, the areas of use and operation 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. The ultrasonic processors are fitted to a stand for operation.

The difference between the UP200S and UP400S ultrasonic processors lies in their useful output power:

- UP200S: 200 W
- UP400S: 400 W

Outwardly, the two designs only differ in the various designations on the labels on their housings and their dimensions (depth of the housing).

1.1 Designations used in this manual

This instruction manual applies for the two UP200S and UP400S ultrasonic processors.

The following designations are used:

- **Ultrasonic processor**: The generic designation is used in all sections, which apply for both variants.
- **UP200S**: All information, which only concerns the UP200S, will be denoted with this product title.
- **UP400S**: All information, which only concerns the UP400S, 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 UP200S and UP400S ultrasonic processors have a large range of applications for use in biology, medicine, chemistry and engineering, whereby the UP200S and UP400S provide different useful output powers (see Section 1.6 “Technical data”).

Despite their high efficiency, the ultrasonic processors do not have to be artificially cooled and are suitable for continuous operation. 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 operation 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-operation and acoustic irradiation can be continuously varied between 10% and 100%.

The UP200S and UP400S 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 the correct
choice of laboratory vessels according to the media to be acoustically irradiated and the sonotrode size.

**Biology, medicine and chemistry laboratories**

The UP200S and UP400S ultrasonic processors can be used in laboratories, for example to carry out the following tasks:

- Disintegration or homogenisation 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 6.2 “Service address and telephone number”.

### 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, depending on those that are 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 (UP200S or UP400S, depending on the order)
- Sickle spanner size 40 or 42
- Open jawed spanner SW 12
- Instruction manual

Accessories according to the order, possibly supplied separately.
Special equipment
Please note any enclosed separate documentation on the use and installation of the accessories.

1.5 Designation
Manufacturer Hielscher Ultrasonics GmbH
Title UP200S / UP400S
Conformity CE mark (for verifications, please see the “conformity declaration” given in the appendix to this instruction manual)
Year of manufacture See rating plate

1.6 Technical data

Technical specification
Ultrasonic processors UP200S / UP400S
Efficiency > 90 %
Working frequency 24 kHz
Control range ± 1 kHz
Output control 20% …100%, steplessly adjusted
Pulse-pulse mode factor 10% … 100% per second, steplessly adjusted
Test certificates See the “conformity declaration” given in the appendix to this instruction manual

Electrical data
Connected loads 200 … 240 V AC, 48 … 63 Hz, alternatively (country-typical)
100 …130 V AC, 48 … 63 Hz
Fuses (primary, internal) UP200S / 230 V: 2 A
UP400S / 230 V: 4 A
UP200S / 110 V: 4 A
UP400S / 110 V: 8 A

Usable/nominal output

UP200S: 200 W (in aqueous media with sonotrode S14 180 W)
UP400S: 400 W (in aqueous media with sonotrode H22 300 W)

Maximum energy density 12 ... 600 W/cm² depending on the sonotrode

Maximum amplitude 12 ... 260 µm depending on the sonotrode

Operational safety
Protection class I, earthed device

Degree of protection UP200S: IP 40
UP400S: IP 20

Permissible ambient conditions
Temperature range +5 ... +40 °C
Relative air humidity 10 ... 90 %, non-condensing

Device parameters
Dimensions (length x width x height)

UP200S:
300 mm × 210 mm × 100 mm

UP400S:
300 mm × 210 mm × 145 mm

Mass
UP200S: approx. 2.35 kg
UP400S: approx. 3.8 kg
1.7 Available accessories

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

Sonotrodes

Standard sonotrodes are used for the UP200S and UP400S ultrasonic processors, depending on their dimensions and acoustic power.

![Selected standard sonotrodes for UP200S (left) and UP400S (right)](image)

**Figure 1-2** Selected standard sonotrodes for UP200S (left) and UP400S (right)

### Table 1-1: Performance data for standard sonotrodes for the ultrasonic processor UP200S.

<table>
<thead>
<tr>
<th>Title</th>
<th>Max. submerged depth (mm)</th>
<th>Tip diameter (mm)</th>
<th>Max. amplitude (µm)</th>
<th>Acoustic power density (W/cm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1 Micro tip 1</td>
<td>10</td>
<td>1</td>
<td>260</td>
<td>600</td>
</tr>
<tr>
<td>S2 Micro tip 2</td>
<td>90</td>
<td>2</td>
<td>260</td>
<td>600</td>
</tr>
</tbody>
</table>

**Key**

For UP200S (Table 1-1)
1. Micro tip S2  
2. Micro tip S3  
3. Micro tip S7  
4. Tip S14  
5. Flow tip S14D

For UP400S (Table 1-2)
6. Tip H3  
7. Tip H7  
8. Tip H14  
9. Horn H22  
10. Horn H22D
Table 1-1 Standard sonotrodes for UP200S

Table 1-2 Standard sonotrodes for UP400S

For both UP200S and UP400S ultrasonic processors
Long versions of the S3, S7 and S14 sonotrodes are also available (double the length of the normal design) or with a sealing ring. The designation of these versions are given at the end of the title:

- Long version: L
- Sealing ring: D
- Long, with sealing ring: LD

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

**Further components**

**Only for UP200S:**

- **Flow vessel D14K**: Usable with flow tip S14D (see Table 1-1) stainless steel, autoclavable, with cooling.

**Only for UP400S:**

- **Flow vessel D22K**: Usable with Sonotrode Horn H22 (see Table 1-2) stainless steel, autoclavable, with cooling.

**For both UP200S and UP400S ultrasonic processors:**

- **Sound control box SB1**: Protective box for reducing sound, reduces the continuous sound pressure level by 20 dB. The sound control box has an adjustable plate inside as a standing area for the acoustic irradiation container. We recommend that you use the sound control box for continuous operation of the ultrasonic processor.

- **Stand ST1 with footplate**: Stand made of stainless steel. Footplate 300 mm x 150 mm, Pole diameter 16 mm

- **Acoustic Irradiation beaker BB1**: Acoustic irradiation beaker for simultaneous indirect acoustic irradiation of up to 6 test tubes

- **Screen SG1**: Usable in conjunction with counter horn S40 (see Table 1-1) for fine screening substances within the range from 5 to 100 µm. With stand clamp device.
**Timer T1**
Electronic timer for controlling the acoustic irradiation duration, 1 s to 99 min.
Connection via the PC interface

**PC-connection and concomitant software:**

**UPC-L**
PC connection (own interface) for recording the performance (sonotrodes amplitude, acoustic power)
Extent of delivery: interface converter, connection cable, and software.

**UPCT-L**
PC-connection (own interface) for recording the performance and temperature (sonotrodes amplitude, acoustic power, temperature in a liquid medium)
Extent of delivery: interface converter, connection cable, sensor, and software.

**Complete solution for fully automatic application:**

**Handling system HHS**
Fully-automatic system for continuously recurrent acoustic irradiation tasks. The ultrasonic processor is integrated in the system.
Further HHS components:
- Electromechanical positioning control
- UPC software
- All connection cables.
2 Safety

2.1 Symbols used

Symbols in the manual

- Symbolises an immediate threat of serious injury or even death due to hazard.

- Warning of a possible hazardous situation, the consequences of which could be head injuries.

- Warning of potential damage to property without risk to people.

- Electric voltage!

- Explosive areas!

- Hot surface! Do not touch!

- Wear ear protection!

Symbols on the device
2.2 Use as prescribed

The UP200S and UP400S ultrasonic processors serve

- the acoustic irradiation of liquid media
- or the acoustic irradiation of solid media in a liquid bath
- or the acoustic irradiation of solid media (e.g. for screening granular substances) in a special vessel, explicitly approved by Hielscher Ultrasonics GmbH according to Section 1.7 “Available accessories”.

The following tasks can be solved with the aid of the UP200S and UP400S ultrasonic processors:

- Disintegration or homogenisation of liquids
- Thermoplastic deformation
- Protective coat removal
- Intensive cleaning of flat substrates
- FIA.
- Fine screening granular substances

Use of the ultrasonic processors in liquids

The ultrasonic processors may only be used in or with liquids so that the sonotrode tip is either dipped into the liquid to a depth not greater than the maximum submerged depth of the respective sonotrode type or stands a few millimetres above the liquid (atomisation of the liquid).

Use of the ultrasonic processors for solid media

Only the accessory components recommended and approved by Hielscher Ultrasonics GmbH are to be used for the acoustic irradiation of solid substances (screening of substances, see Section 1.7 “Available accessories”.

Other uses

Any other use than those listed here is outside of the specification and can lead to dangerous 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 result from use deviating from the information given in this instruction manual.

2.3 Safety information

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 and aggressive or corrosive gases/vapours to get into the housing!

Risk of burns
- Do not touch the horn and sonotrode during operation, as you risk being burned! Leave the ultrasonic processor to cool after lengthy operation, before touching it. In case of continuous operation lasting several hours, the horn and sonotrodes 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.
- 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 control box SB1.
- 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.
3 Structure and Function

3.1 Structure

The ultrasonic transducer is integrated in a housing. The sonotrode is coupled to the ultrasonic processor via the horn. The ultrasonic processor’s housing is designed for stand assembly.

Key
1 Ultrasonic processor housing
2 Horn
3 Sonotrode

Figure 3-1 Structure of the ultrasonic processor

3.2 Functional principle

The ultrasonic processor generates longitudinal mechanical vibrations by means of electric excitation (reversed piezoelectric effect) with a frequency of 24 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. If the UP200S and UP400S ultrasonic processors are used the medium to be acoustically irradiated can be a liquid or a solid/granular substance in a special vessel.
The ultrasound causes cavitation in the liquid, which can be used for various purposes, e.g. for disintegration, homogenisation and cleaning (see Section 1.3 “Areas of use”).

Solid bodies can be placed in a liquid for acoustic irradiation, whereby the liquid transfer the ultrasound to the surface of the material (e.g. for removing paint). Another possibility for the acoustic irradiation of solid media is to use special vessels and appropriate sonotrodes, e.g. for screening granular substances.

The acoustic power density transferred to a medium depends on the sonotrode shape and the size of the sonotrode’s end face area.

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

**Key**

1. On/Off switch
2. Rotary regulator for pulse control mode (cycle)
3. Rotary regulator for amplitude (ultrasonic output)
4. Stand clamp
5. Drill hole in the horn for attaching the sickle spanner when installing the sonotrode

![Operating and display elements of the ultrasonic processor](image)

The individual elements have the following functions:

**Rotary regulator for pulse control mode (cycle)**

Pulse mode factor for regulating pulse control mode (On/Off switching times of the ultrasonic processor). The set value
equals the acoustic irradiation time in seconds, the difference to 1 second is the pause time.

Setting examples:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Continuously switched on</td>
</tr>
<tr>
<td>0.6</td>
<td>Power discharge 0.6 seconds, pause 0.4 seconds</td>
</tr>
</tbody>
</table>

**On/Off switch**

Switches the ultrasonic processor on or off (0).

**Rotary amplitude regulator (ultrasonic output)**

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

**PC interface (Figure 3-3)**

Special interface for connecting a PC or other components (timer); suitable converter and software are required. Converter and software are available from Hielscher Ultrasonics GmbH.

![Key]

1. Ultrasonic processor
2. Stand
3. PC interface

**Figure 3-3**  PC interface
3.4 Electrical connection

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

Please note:

Note the electrical connected loads

*When making the electric connection of the ultrasonic processor please note the specific connected loads!*  
*See rating plate on the device.*

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 ($s, N_{\text{sonic}} \sim 1/A_{\text{end face}}$).

Please use any information sheets provided as part of the extent of delivery to inform yourself about special properties, possible uses and installation of the sonotrodes supplied.
4 Commissioning

4.1 Room requirements

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

Use in potentially explosive environments

Do not use the ultrasonic processor in potentially explosive areas! There is a risk of an explosion and thus a high risk of injury!

4.2 Install and dismantle the sonotrode

Prerequisites

To install or dismantle a sonotrode you will require:

- Sickle spanner size 45/50
- Open jawed spanner SW 12 or SW 19 or SW 24 (depending on the size of the sonotrode)

The tools are part of the extent of delivery.

Soiled or damaged contact areas

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.

Otherwise the power transmission from the ultrasonic processor to the sonotrode will be disrupted and the processor automatically changes to pulse control mode.

Install sonotrode

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

1. Turn the sonotrode hand-tight in the tapped hole of the horn.

2. Hook the sickle spanner from below and facing the right in the drill hole of the horn (Figure 4-1)
3. Lay the ultrasonic processor on a solid base (table) (Figure 4-1) so that the sickle spanner also lies on the base and serves as a support.

**Damage to the ultrasonic processor**

*When fitting the sonotrode, ensure that the horn is not exposed to any torque against the ultrasonic processor!*

*This can damage the precise and sensitive suspension of the horn in the ultrasonic processor and lead to failure of the ultrasonic processor.*

---

4. Place the open jawed spanner on the key surfaces of the sonotrode.

5. Press down on the open jawed spanner in the direction of the base and in this way tighten the sonotrode (approx. 30 Nm). If necessary, fix the sickle spanner with your hand.

**Dismantle the sonotrode**

The sonotrode is dismantled in the reverse order and direction.

1. Hook the sickle spanner from below and facing to the right in the drill hole in the horn (Figure 4-2).

2. Place the ultrasonic processor on the base so that the solid base forms a support for the sickle spanner.
3. Place the open jawed spanner on the key surfaces of the sonotrode.

4. Press down on the open jawed spanner (Figure 4-2) and thus loosen the sonotrode. At the same time, fix the sickle spanner with your hand if necessary.

**Damage to the ultrasonic processor**

*When dismantling the sonotrode, ensure that the horn is not exposed to any torque against the ultrasonic processor!*

This can damage the precise and sensitive suspension of the horn in the ultrasonic processor and lead to failure of the ultrasonic processor.

5. Completely unscrew the sonotrode from the horn by hand.

### 4.3 Stand assembly

The stand holder on the ultrasonic processor fits all stands with a pole diameter of 16 mm. The stand pole should be at least 300 mm long.

How to fit the ultrasonic processor onto the stand:

1. Loosen the stand holder’s clamping screw on the ultrasonic processor.
2. Place the ultrasonic processor with the fitted sonotrode on the stand pole.

**Note the maximum submerged depth**

*Do not immerse the sonotrode in the medium to be acoustically irradiated further than its maximum submerged depth!*

*Maximum submerged depth for the sonotrode: See Table 1-1.*

3. Slide the ultrasonic processor toward the acoustic irradiation vessel at the optimum working height for the sonotrode fitted. 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 atomise liquids or to enrich the sample with air.

Please refer to Table 1-1 for the maximum submerged depth of the sonotrode.

4. Tighten the clamping screw by hand.

4.4 **Electrical connection**

**Note the electrical connected loads!**

*Ensure that the electric connection matches the required connection data of the ultrasonic processor!*

*For the connection data, please see the rating plate auf the device’s housing.*

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

<table>
<thead>
<tr>
<th>Typ</th>
<th>typ</th>
<th>UP200S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nennspannung</td>
<td>rated voltage</td>
<td>200-240 V</td>
</tr>
<tr>
<td>Nennstrom</td>
<td>rated current</td>
<td>2 A</td>
</tr>
<tr>
<td>Nennfrequenz</td>
<td>rated frequency</td>
<td>50/60 Hz</td>
</tr>
</tbody>
</table>

*Figure 4-3  Rating plate of an ultrasonic processor UP200S  (Electric connected loads are country-typical)*
1. Ensure that the ultrasonic processor is switched off before connecting it to the power supply.

2. Insert the ultrasonic processor’s mains plug in a socket outlet with earthing contact.

4.5 PC or timer connection

The ultrasonic processor has a special interface (Figure 3-3) for the connection of a PC or other components (e.g. timer, see Section 1.7 “Available accessories”).

This interface is also used if the ultrasonic processor is integrated in a fully automatic handling system.
5 Operation

When operating the ultrasonic processor, please refer to the information provided about using the sonotrodes and e.g. when changing the sample, pay particular attention to the maximum submerged depth of the sonotrode just used.

For longer acoustic irradiation periods, we recommend operation of the ultrasonic processor in the sound control box SB1 (see Section 1.7 “Available accessories”).

5.1 Switch the ultrasonic processor on and off

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

Switching on with the minimum power

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.

Prerequisites for switching on

- The ultrasonic processor is fitted to the stand at the correct working height, see Section 4.3 “Stand assembly”.
- The samples to be acoustically irradiated have been prepared.
- The ultrasonic processor is electrically connected (mains plug in the socket)

Switching on and off

Please note the following when operating the ultrasonic processor:

Risk of injury due to glass splinters
**Do not touch glass acoustic irradiation vessels with the vibrating sonotrode!**

*Pressure and cavitation can cause the glass to splinter and lead to injuries!*

---

**Risk of explosion**

*Only acoustically irradiate easily flammable samples with adequate ventilation under a switched on extraction hood!*

*Otherwise there is a risk of explosion!*

---

**Risk of burns from hot sonotrode**

*Do not touch the sonotrode and horn during operation! The sonotrode and horn can heat up to 100°C. There is a risk of injury due to the hot surfaces!*

---

**Wear ear protection!**

*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 SB1. Otherwise you could suffer lasting damaged hearing.*

---

1. Set the amplitude at the rotary regulator to 20% (minimum) (see Figure 3-2)
   *This way you avoid accidental foaming or splashing of the sample.*

2. Switch on the ultrasonic processor: Set the On/Off switch to the yellow marking.

3. Set the working parameters (amplitude, pulse mode factor for pulse control mode) according to Section 5.2 “Vary the working parameters”.

4. To switch off the ultrasonic processor, set the On/Off switch to “0”.
5.2 Vary the working parameters

Vary the amplitude / ultrasonic output

1. You can regulate the oscillation amplitude (and thus the ultrasonic output) at the rotary regulator for the amplitude between 20% and 100% (see Section 3.3 “Operating and display elements”, Figure 3-2).

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

Adjust pulse control mode

2. Adjust the pulse mode in pulse control mode using the rotary regulator cycle (Figure 3-2).

For permanent acoustic irradiation, turn the controller to “1”; each other setting means shorter sonic radiation times with corresponding breaks (Total duration per pulse cycle On/Off 1 second, see Section 3.3 “Operating and display elements”).
6 Help With Faults

The UP200S and UP400S ultrasonic processors are internally secured against the usual operational overload situations. Should problems nevertheless occur, the following overview can help you to find a solution.

6.1 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 6.2 “Servic address and telephone number”).

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

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: Did the UP400S ultrasonic processor become very hot during operation?

Solution: The UP400S ultrasonic processor has a thermal switch, which switches off the ultrasonic processor, if the power components reach a temperature of 100°C. If this the case, the UP400S cannot be switched back on until it has cooled.

Question: You still can’t switch the device on?

Solution: Call our service department. Our service telephone number and address are given in Section 6.2 “Service address and telephone number”.

6.2 Service address and telephone number

Our service telephone team will be pleased to help you in case of difficulties:

Hielscher Ultrasonics GmbH
Warthestraße 21  Telephone +49 (0) 33 28 / 437 3
D-14513 Teltow  Fax +49 (0) 33 28 / 437 444
Germany  Email service@hielscher.com
7 Servicing and Maintenance

The UP200S and UP400S 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.
8 Decommissioning and Transport

To decommission the ultrasonic processor:

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

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

If delivered to us with prepaid transport costs, Hielscher Ultrasonics GmbH takes back old devices free of charge. We dispose of them in an environmentally compatible way or recycle the parts.

Please contact our service department before you send your device to us. Our service telephone number and address are given in Section 6.2: “Service address and telephone number”

Materials used:
- Electric and electronic components
- Ceramics
- Titanium alloys for the sonotrodes
- Aluminium for the stack module
- Plastics for the housing
## Appendix

### Warranty Certificate

Hielscher Ultrasonics GmbH shall correct all defects free of charge, which are (verifiably) due to material or production errors and occur within 24 months from the invoice date. The defects shall be corrected by means of repair or replacement.

Warranty claims extending beyond this and claims due to subsequent damages or losses due to defects in the purchased item are precluded.

Defects that are due to non-standard or unusual use and improper handling shall not be covered by the warranty, unless the purchased item actually had a defect at the time of transfer of risk for the item.

If you or third parties have made changes or interfered with the device without our prior consent, claims against this warranty are precluded.

This warranty does not include the replacement of wearing parts, which have failed due to normal wear.

<table>
<thead>
<tr>
<th>Device</th>
<th>Ultrasonic processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>UP200S</td>
</tr>
<tr>
<td></td>
<td>UP400S</td>
</tr>
<tr>
<td>Serial number</td>
<td></td>
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<tr>
<td>Date of purchase</td>
<td></td>
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<tr>
<td>Dealer</td>
<td></td>
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</tbody>
</table>

(Name and stamp)
Konformitätserklärung

Declaration of Conformity

in accordance with FunkStörG, EMVG 1. GSGV

Hielscher Ultrasonics GmbH
Warthestraße 21
D-14513 Teltow

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.

Type of device Ultrasonic processor for stand operation

Types

UP200S

UP400S

Applicable EU Directives

89/336/EWG (Electromagnetic compatibility)

73/23/EEC (Low Voltage Directive)

Harmonised standards used

EN 55011 (Radio noise)
EN 61000-6-1 (Noise immunity)
Additional standards for UP100H:
EN 61000-3-2 (Harmonic components)
EN 61000-3-3 (Voltage fluctuations)

German standards used

VDE 0875 Part 11 (Limiting value Class B)
contained in EN 55011

Date 2006-01-11

Signature

Managing Director