КАТАЛОГ

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Ultrasound Technology

UP50H 50 Watts Handheld Ultrasonic Homogenizer

UP50H with MS3

MS1 MS3 MS7

Timer T1

Sound Protection Box SB2-16

The ultrasonic processor UP50H is used in particular in medical, biological or chemical laboratories, where small volumes need to be sonicated. Application fields are found mainly in the analytical field with applications such as the disruption of tissues, the cracking of bacteria or the homogenizing of samples in the food industry.
The UP50H (50 watts, 30kHz) is perfectly suited for handheld operation with its lightweight 1.1kg, but it can also be operated at a stand. Generator and the transducer are combined in one unit, so there is only one cable. One power supply cord - that's all.
For samples volumes from 0.1mL up to 250mL we offer various replaceable sonotrodes with diameters 1mm, 3mm and 7mm. The timer allows to predefine a sonication period. This is very helpful for routine sonication processes. The sound protection box reduces the noise level. We recommend this box when sonicating for a longer period, e.g. 5 minutes.

UP50H with MS7 at Stand ST1-16

Item / Description
Ultrasonic Processor UP50H-230V for manual operation or for stand use, 50 watts, frequency 30kHz, automatic frequency tuning system, amplitude adjustable 20-100%, pulse 0-100%, dry running protected, in portable case, with fixture f. stand STH-16 and mounting tools, 230V~
Sonotrode MS1 made of titanium, tip diameter 1mm, approx. length 80mm, for samples from 0.1ml up to 5ml
Sonotrode MS3 made of titanium, tip diameter 3mm, approx. length 80mm, for samples from 5ml up to 100ml
Sonotrode MS7 made of titanium, tip diameter 7mm, approx. length 80mm, for samples from 10ml up to 250ml
Stand ST1-16 pole diameter 16mm, made of stainless steel, base length 300mm, width 150mm, height 600mm
Sound Protection Box SB2-16 with vertically adjustable table and 16mm stand pole, for UP50H or UP100H
Timer T1 timer, from 00:00 to 99:59 (min:sec)

UP100H 100 Watts Handheld Ultrasonic Homogenizer

UP100H with MS7

Timer T1

Sound Protection Box SB2-16

The ultrasonic processor UP100H is the perfect device for the sonication of small and medium size lab samples. This compact, yet powerful, lab homogenizer is commonly used for sample preparation, such as emulsifying, dispersing, dissolving and cell disruption.
The ultrasonic processor UP100H (100 watts, 30kHz) has the same compact and ergonomic design as the UP50H but it comes with twice the ultrasonic power. At 1.1kg, it is lightweight in the hand. Of course, an operation at a stand is possible, too. The ultrasonic generator and the transducer are combined in one unit, so that there are no hassles with connecting cables. One power supply cable - that's all. Using the 3mm, 7mm or 10mm sonotrode the UP100H is most suitable for the ultrasonication of samples from 0.1mL to 500mL. The UP100H can be operated in the sound protection box for lower noise emissions. The timer allows to sonicate for a pre-defined time span.

UP100H with MS3

Item / Description
Ultrasonic Processor UP100H-230V for manual operation or for stand use, 100 watts, frequency 30kHz, automatic frequency tuning system, amplitude adjustable 20-100%, pulse 0-100%, dry running protected, in portable case, with fixture f.stand STH-16 and mounting tools, 230V~
Sonotrode MS1 made of titanium, tip diameter 1mm, approx. length 80mm, for samples from 0.1ml up to 5ml
Sonotrode MS3 made of titanium, tip diameter 3mm, approx. length 80mm, for samples from 5ml up to 100ml
Sonotrode MS7 made of titanium, tip diameter 7mm, approx. length 80mm, for samples from 10ml up to 250ml
Sonotrode MS10 made of titanium, Ø10mm, approx. length 80mm, for samples from 20ml up to 500ml
Stand ST1-16 pole diameter 16mm, made of stainless steel, base length 300mm, width 150mm, height 600mm
Sound Protection Box SB2-16 with vertically adjustable table and 16mm stand pole, for UP50H or UP100H
Timer T1 timer, from 00:00 to 99:59 (min:sec)

UP200H 200 Watts Handheld Ultrasonic Homogenizer

UP200H with S40

Timer T1

Sound Protection Box SB3-16

The ultrasonic processor UP200H (200 watts, 24kHz) is the most powerful handheld ultrasonic device. The UP200H is well suited for all general ultrasonic applications in small and medium scale. The applications include: Homogenization, disintegration, emulsification, cell disruption, degassing or sonochemistry. The UP200H can be operated at a stand, too. Sample volumes from 5 to 2000ml can be sonicated with sonotrodes of a diameters from 3 to 40mm.
We offer a comprehensive range of accessories for the UP200H such as flow cells, stand, sound protection box, timer and PC- control.
Using the sound protection box is recommended when running the UP200H for a longer time or often during the day. If you would like to operate the UP200H for a pre-defined time span, you can use the timer. This will shut the UP200H off after the time has elapsed.

UP200H with S7

Item / Description
Ultrasonic Processor UP200H-230V for manual operation or for stand use, 200 watts, frequency 24kHz, automatic frequency tuning system, amplitude adjustable 20-100%, pulse adjustable 0-100%, dry running protected, in portable case, with mounting tools, 230V~
Sonotrode S3 made of titanium, tip diameter 3mm, approx. length 100mm, for samples from 5ml up to 200ml
Sonotrode S7 made of titanium, tip diameter 7mm, approx. length 100mm, for samples from 20ml up to 500ml
Sonotrode S14 made of titanium, tip diameter 14mm, approx. length 100mm, for samples from 50ml up to 1000ml
Sonotrode S40 made of titanium, tip diameter 40mm, approx. length 100mm, for samples from 100ml up to 2000ml
Stand ST1-16 pole diameter 16mm, made of stainless steel, base length 300mm, width 150mm, height 600mm
Sound Protection Box SB3-16 with vertically adjustable table and 16mm stand pole, for UP200H
Timer T1 timer, from 00:00 to 99:59 (min:sec)

UIS250v Ultrasonication of Small Volumes and Vials

VialTweeter (front) and sonotrode (back) at UIS250v

LS24d3

LS24d5

LS24d10

VT24d10

VialTweeter

Timer T1

The UIS250v is an effective means for the sonication of small volumes and vials, e.g. cryo vials and reagent vials. The latter can be sonicated without the need to open the cap or any water bath. This compact device can used either as a hand-held or stand-mounted homogenizer for the direct sonication of liquid volumes from 5 to 1000mL.

The sonotrode VT24d10 and the VialTweeter are designed for the intense sonication of closed Eppendorf or Cryo-Vials (plastic). The VialTweeter delivers up to 10 watts to each of the six vials in its high intensity part and up to 5 watts to the two vials placed in its low intensity part. These power levels allow for sophisticated sonication processes in short time, similar to direct sonication by a homogenizer.

The power can be adjusted by means of the amplitude adjustment at the front panel of the generator. Once set, the amplitude will be maintained at the adjusted value and is distributed evenly across the six high intensity vials and the two low intensity vials, respectively. This gives you reproducible sonication effects.

For a good transmission of the ultrasonic vibrations to the individual vials, the vials are pushed gently into the holes of the VialTweeter. The VialTweeter vibrates through the wall of the vial. The vial can remain closed. Different from the direct sonication by means of an ultrasonic sonotrode that is immersed into the liquid, this eliminates cross contamination of samples and reduces the time required for the sonication of multiple vials.

The VialTweeter can be cleaned and disinfected easily. The VialTweeter is autoclavable and the transducer of the UIS250v is made of stainless steel (IP65, NEMA4). The generator is connected to the transducer by a 4m connection cable. The timer can be used to operate the UIS25v for a pre-defined time span.

Item / Description
Ultrasonic Processor UIS250v-230V for handheld operation or for stand use, 250 watts, ultrasonic frequency 24kHz, automatic frequency tuning system, amplitude adjustable from 20 to 100%, pulse adjustable from 0 to 100%, dry running protected, transducer IP40 grade, 230V~
Sonotrode LS24d3 made of titanium, tip diameter 3mm, length approx. 100mm, for a sample volume 5ml up to 200ml
Sonotrode LS24d5 made of titanium, tip diameter 5mm, length approx. 100mm, for a sample volume 20ml up to 300ml
Sonotrode LS24d10 made of titanium, tip diameter 10mm, length approx. 100mm, for a sample volume 50ml up to 1000ml
Sonotrode VT24d10 made of titanium, with 1 bore hole diameter 10mm for sonication of one vial (outer diameter 10mm), Stand ST1-16 with clamp ST1-16clamp is recommended
Sonotrode VialTweeter made of titanium, with bores and clamping fixture for the sonication of up to eight Eppendorf tubes 1,5ml
Stand ST1-16clamp pole diameter 16mm, made of stainless steel, base length, with clamp, 300mm, width 150mm, height 600mm
Timer T1 timer, from 00:00 to 99:59 (min:sec)

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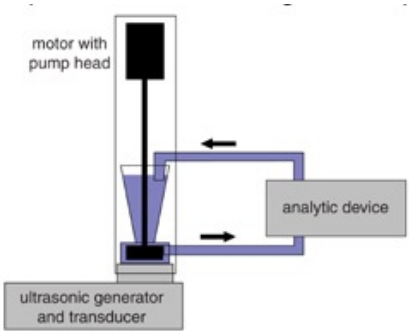
SonoStep Ultrasonic Sample Preparation Unit

SonoStep Set



Schematic of Sonostep for Recirculation

Timer T2

The SonoStep combines ultra-sonication, stirring and pumping of samples in a compact design. It is easy to operate and can be used to deliver sonicated samples to analytic devices, e.g. for particle size measurement.
Ultrasonication helps to disperse agglomerated particles for the preparation and analysis of particle dispersions and emulsions. This is important, when measuring particle size, for example by dynamic light scattering or laser light diffraction.
Ultrasonication of your samples improves the the accuracy of your particle size or morphology measurement, as the SonoStep performs three important functions:

- De-aeration
- Circulation
- Dispersing / Deagglomeration

The ultrasound de-aerates the liquid and therefore prevents microbubbles from interfering with the measurement. It circulates the sample volume at an adjustable flow rate and disperses the particles in the liquid. The ultrasonic power is applied directly under the rotor of the pump and ensures that agglomerated particles are getting dispersed before being measured. This leads to more consistent and repeatable results.
If you would like to operate the SonoStep for a pre-defined time span, you can use the timer T2. This will shut the SonoStep off after the set time has elapsed.

Item / Description
SonoStep Set ultrasonic processor, 100 watts, ultrasonic frequency 30kHz, microprocessor controlled, automatic frequency tuning system, amplitude adjustable from 20 to 100%, adjustable propeller output signal 20 to 100%, dry running protected, with 15-pin interface (0-10V), with mounting tools, stainless-steel housing, IP65 grade, titanium resonator, thermo-couple (AISI316Ti) with digital display, digital power-meter, O-Rings made of EPDM, detachable stainless steel rotor (AISI316Ti) for pumping and stirring, acrylic shield for noise reduction and spill protection dimensions (LxWxH): 280x210x350mm, 230V~
Timer T2 timer, from 00:00 to 99:59 (min:sec)

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UIS250L Ultrasonic Sieving in the Laboratory

Ultrasonic Sieving System

UIS250L with RIS200

SZS200

Timer T1

The ultrasonic processor UIS250L is used for the acceleration of sieving processes alternatively or complementary to the classical low frequency vibrators. Especially in case of very fine powders ultrasound is often the only possibility to enable the sieving process at all.
Hielscher Ultrasonics has developed a worldwide unique technology especially for exciting common laboratory ring sieves (according to DIN ISO 3310/1 or ASTM E 11-95) with diameters of 200mm or 8 inch. A ring sonotrode that fits the sieve is excited by the ultrasonic processor UIS250L. The ring sonotrode (RIS) transmits the oscillation via the sieve frame to the screening surface. With the help of the clamping fixtures the neighboring sieves are also excited. In contrast to the ultrasonic sieving processes known until now, in which each sieve needs its own ultrasonic excitation, this is a very inexpensive and flexible solution.
Another advantage of this exciting principle is that the transducer is situated outside the material to be sieved. This technology can be used for dry or wet sieving, as well as for cleaning the sieves. The ultrasonic components can be retrofitted in already existing sieving towers and can even be used in combination with vibrators. In this case the delivery scope consists only of the ultrasonic processor UIS250L and the ring sonotrode, which will be fitted into the common laboratory ring sieves of most manufacturers.
An accessory set (SZS) is necessary for a complete sieving tower. The set consists of a basic platform, tension bars with rapid tension nuts, a bottom receiver and a top cover.
The timer T1 allows to operate the sieving system for a pre-defined time span.

Item / Description
Ultrasonic Processor UIS250L-230V for ultrasonic sieving, 250 watts, ultrasonic frequency 24kHz, automatic frequency tuning system, amplitude adjustable from 20 to 100%, pulse adjustable from 0 to 100%, dry running protected, transducer IP40 grade, 230V~
Ring-Sonotrode RIS200 for use with standard laboratory screens (according to DIN ISO 3310/1), diameter 200mm, height 35mm
Ring-Sonotrode RIS203 for use with standard laboratory screens (according to ASTM E 11-95), diameter 203,5mm (8 inch), height 35mm
Accessory Set SZS200 for sieves and ring sonotrodes diameter Ø200mm or Ø203,5mm (Ø8,0”), consisting of platform, tension bars with rapid tension nuts, bottom receiver and top cover
Timer T1 timer, from 00:00 to 99:59 (min:sec)

hielscher ultrasound

UIP250MTP Ultrasonication of Microtiter Plates

The ultrasonic processor UIP250MTP allows for the consistent sonication of an entire microtiter plate within the sonotrode. It can be used for the homogenizing, dispersing, degassing or for disruption of cells.
The ultrasonic power is distributed evenly through each well of the microtiter plate giving you consistent and repeatable sonication effects. Furthermore, the amplitude of oscillation is adjustable and is maintained at the adjusted value for the whole sonication period. The UIP250MTP consists of the 250 watts generator, the sonotrode and the required sound protection hood (acrylic glass). This makes it a complete stand-alone unit that is easy to set-up and operate. The ultrasonic generator is tuned to the frequency of the sonotrode automatically so that there is no manual adjustment required (e.g. in case of a cooled sonotrode). Two attached tubes allow for a continuous flow of the liquid in the sonotrode.
The UIP250MTP can be operated continuously (e.g. 24/7). It is dry-running protected and can be cleaned and disinfected easily. Pulsed operation or different sonication periods can be adjusted exactly at the front panel of the ultrasonic generator.

Item / Description
Ultrasonic Processor UIP250MTP-Set-230V ultrasonic processor for the sonication of microtiter plates, 250W, 20kHz, amplitude adjustable from 20 to 100%, control of pulse ratio and sonication time, transducer in stainless steel housing, connections for cooling water, 2m cable between generator and transducer, 230V~ sonotrode made of titanium, carrying surface 150mmx90mm for microtiter plates, incl. sound protection hood made af acrylic glass

compact, high-efficient, robust

UP400S and UP200H with timer

Since working surface in the laboratory is expensive we supply ultrasonic processors with a compact design: Power supply, generator, control and transducer, all of which are located in an aesthetic housing. No additional cables impede.
The operation of our ultrasonic processors is most simple. The amplitude and therewith the power can be adjusted from 20 to 100%. The sonication time within a second is adjustable from 0.2s up to 1.0s (steady state), so that problems as regards the heating-up and foaming can be avoided. The automatic determination of the ideal frequency makes a manual precision adjustment unnecessary. Independent of the sonotrode's load, the adjusted amplitude remains constant. That creates reproducible conditions and also high robustness as the devices are then steady-state proof even when operated in air.
The well-priced standard devices can be retrofitted with suitable accessories at any time. Diverse sonotrodes, flow cells, sound protection boxes and a timer are part of the standard program.
By means of a PC-control the given test parameters can be displayed and the test results, in particular the resulting power and energy input in the liquid as well as the temperature can be recorded.
The selection of the ultrasonic processor and sonotrodes mainly complies with the volume of the samples to be sonicated. The offered power range for the laboratory includes devices of 50, 100, 200 and 400 watts and is suitable for small droplets but also for several liters. For bigger volumes we offer industrial processors with a power range of up to 16kW per unit.
Should your demands exceed our standard range, please contact us, so that we may design a special solution made to your requirements.

UP200S well-priced and robust

cavitation at S40

The ultrasonic processor UP200S (200 watts, 24kHz) differs from the UP200H only with its shape and its use only with stand.
The device is suited for sample volumes from 0.1 to 1000ml. Therewith the fields of use comprise the sonication of very small samples in medical or biological laboratories up to bigger samples in the chemical or environmental range.
It is also used for the production of smaller quantities, mostly in continuous flow with the use of flow cells and the appropriate sonotrodes.
The 40mm sonotrode transmits the ultrasound smoothly across a relatively large surface and it is therefore suited to support wet sieving processes using very fine mesh sizes.
As all our laboratory devices the UP200S finds its customers worldwide. Without any additional fees we supply our devices with the adequate supply voltage (100 to 110V) and with the corresponding plugs.

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UP400S for bigger samples and application development

UP400S with H22 in sound protection box

The ultrasonic processor UP400S (400 watts, 24kHz) is our most powerful laboratory device. With sonotrodes of a diameter range from 3 to 40mm the device is suited for sample volumes from 5 to 2000ml. In flow approx. 10 to 50 liters per hour can be treated. For the preparation of test portions the UP400S is mainly used for bigger volumes. It is suited for the practical process development in the laboratory but also in the college of technology as well as for the production of small quantities. For production quantities a PC-control or a connecting lead to a central control of the user's plant is recommended in order to raise the process safety. With special flow cells and flange connections liquids can also be sonicated at high temperatures and pressures.
High power generates the intensive cavitation required, but this results in unwanted noise. For operating the UP400S we recommend to use the sound protection box.

UTR200 a high-intensive ultrasound bath

UTR200 as reactor chamber

The sonoreactor UTR200 (200 watts, 24kHz) works as an ultrasonic bath but at a 50 times higher intensity. In addition, it is dry-running protected. It is suited for the direct or indirect sonication of liquids e.g. for cell disruption, homogenizing or emulsifying. The beaker-shaped sonotrode is machined from one piece in order to prevent leakages. The upper part of the sonotrode is oscillation-free and can be used for mounting the respective accessories for diverse application cases. A corresponding reactor cover takes the Eppendorf tubes or test tubes for indirect sonication. By means of the reactor cover the chamber is hermetically sealed. If the cover has an additional inlet and outlet the sonoreactor can be used as a flow system. A sieving extension with a bajonet lock takes a pile of sieves for fine grain sizes (diameter 75mm, finest mesh size 5 micron). The ultrasound, which is transmitted to the sieves, accelerates the wet sieving process.

sonotrodes

The sonotrodes are the tools that transmit the ultrasound into the liquid. The selection of the sonotrodes depends on the sample volume and on the required ultrasound intensity. Thin-bodied sonotrodes achieve very high amplitudes up to 250µm, that result in very high ultrasound power densities under the oscillating end surface. A small but very intensive cavitation zone is generated. The bigger the diameter, the higher is the ultrasound power, that is transmitted via the consequently bigger end face of the sonotrode. The ultrasound power density i.e. the ratio between power and oscillating surface becomes smaller. The cavitation zone becomes larger but less intensive.
A titanium alloy has proven to be the best sonotrode material as it allows very high amplitudes and as it is resistant to most liquids. Therefore this titanium alloy is the standard material for our sonotrodes and the ultrasonic processors are adjusted to it. For special application cases we manufacture sonotrodes made of stainless steel, glass or ceramics. The max. amplitudes of the sonotrodes made of these materials are significantly below those of the titanium sonotrodes.
The lengths of the sonotrodes are determined by lambda/half. If the ultrasonic processor has the frequency of 24kHz, the titanium sonotrode has approx. the length 100mm but can also be manufactured in manifold lengths. Sonotrodes with O-rings or oscillating-free flanges are used for the input of ultrasound in flow cells or in closed or pressurized systems.
The cavitation, that takes place at the sonotrode surface, results in an abrasional effect. At the max. amplitude, approx. 1mm of the sonotrode abrades within 1000 hours of operation in water.The frequency scanning system of our ultrasonic processors raises then automatically the frequency, so that an abrasion of up to 5mm of the sonotrode does not result in a considerable loss of power.

sample volume (ml)	**UP50H**	**UP100H**	**UP200H**	**UP200S**	**UP400S**
0.01 - 0.50	0.5	0.5			
0.1 - 5.0	1	1	1	1	
2 - 50	2	2	2	2	
5 - 100	3	3	3	3	3
10 - 250	7	7	7	7	7
20 - 500		10			
50 - 1000			14	14	14
100 - 2000					22

Approximated values for the selection of the ultrasonic processors and the sonotrode diameters according to sample size.

flow cells for continuous operation

stainless steel flow cell D7K with MS7D

glass flow cell for UP100H

For our ultrasonic processor we offer flow cells made of glass or stainless steel. The liquid to be sonicated is lead in from below and passes through the cavitation zone under the sonotrode. The appropriate sonotrodes are equipped with O-rings, that are fitted closely to the cell wall or the PTFE-adapter. For higher pressures and temperatures the sonotrodes may be equipped with metallic oscillating-free flanges that are mounted to the stainless steel flow cells. The selected flow rate corresponds to the energy input required. The temperature of the medium can be influenced by means of a cooling jacket. Special designs of the flow cell e.g. several supply connectors, when emulsifying are manufactured according to the demands of the customer. A new product in our product range is the mini flow cell (patent pending). When using this mini cell, the medium is hermetically sealed, so that the sonication can be realized without contamination.

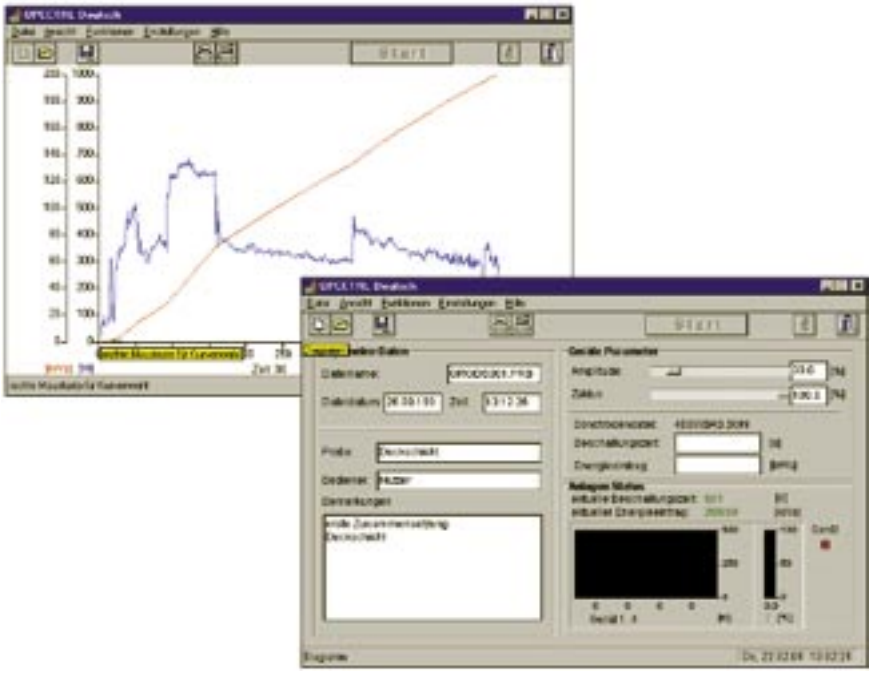
UIP250H56 with mini flow cell Dmini

PC-control

As an option, our ultrasonic processors can be equipped or retrofitted with a PC-control package.
This PC-control gives automation of the process parameters, such as amplitude, pulse, operating time or alternatively the actual energy input. It serves for the monitoring and recording of those parameters, too.
You can display the following features in a time based table or diagram.

- gross ultrasonic power,
- effective ultrasonic power, that is transmitted into the liquid medium,
- effective energy input, and
- temperature (optional).

The PC-control is connected to a laptop or a PC (MS Windows®) using the serial or USB interface.
The PC-control serves as an efficient support in optimizing processes and in creating a compulsory test record.



survey of all accessories

ultrasonic processor	**UP50H**	**UP100H**	**UP200H**	**UP200S**	**UP400S**	**UTR200**
power (W)/frequency (kHz)	50/30	100/30	200/24	200/24	400/24	200/24
sonotrode, diameter (mm)						
- titanium	0.5 - 7	0.5 - 10	1 - 40	1 - 40	3 - 40	38 (inside)
- glass/ceramic				3 - 13 (UP200G)	13, 20 (UP400G)	
flow cell						
- glass flow rate (l/h)	GD7K 1 - 5	GD7K 1 - 5	GD14K 5 - 25	GD14K 5 - 25	GD22K 10 - 50	
- stainless steel flow rate (l/h)	D7K 1 - 5	D7K 1 - 5	D14K 5 - 25	D14K 5 - 25	D22K 10 - 50	reactor cover 5 - 25
standard flask neck adapter	NSA1	NSA1	NSA2	NSA2	NSA3	
sonication beaker			BB1	BB1	BB1	itself
sieving device			yes	yes	yes	yes
fixture for stand	STH-16	STH-16				
stand	ST1-16	ST1-16	ST1-16	ST1-16	ST1-16	
sound protection box	SB2-16	SB2-16	SB3-16	SB1-16	SB1-16	special
timer	T1	T1	T1	T1	T1	T1
PC-control	UPC-Lab or UPCT-Lab (with temperature sensor)					

Please inform us on your planned application cases. We would be pleased to submit you a matching quotation. Should our basis product range not meet your demands exactly, we will develop a customized solution according to your requirements.
Please use the possibility to rent one of our standard devices.

hielscher ultrasound

an extensive spectrum of devices for various applications

Hielscher Ultrasonics develops and manufactures compact laboratory devices as well as a wide product range of ultrasonic processors for industry.
Demanding operational conditions and small space at the location make a conventional separation between the generator and the transducer necessary. There are also economical advantages, if only the transducer is designed for the specific conditions of the application e.g. for food industry standard or with explosion proof, and to house the generator separately in a cabinet.
For industial applications we offer devices ranging from 250 to 16,000 watts per device. With that spectrum most application cases can be achieved.
In addition to that, our standard product range can be enlarged with application-specific designs.

The power of up to 250 watts is sufficient to homogenize or to nebulize small samples.
Higher power of approx. 500 watts is used for cutting, welding and sieving and in particular for the treatment of liquids as well as for special cleaning tasks.
Large-scale liquid volumes or big surfaces to be cleaned demand accordingly higher ultrasonic power. It is more cost effective to use one powerful industrial processor instead of a large number of small devices. That led to the development of our big ultrasonic processors, that are the most powerful continuous processors worldwide, which are incited by piezo ceramics, with a power of up to 16kW per unit.
This opens the way to a rational industrial use of high-efficiency ultrasound in various application fields e.g. in the chemical industry, the food industry, the paint and coating production as well as in the processing of nanomaterials.

survey of our ultrasonic processors

type		power (Watt)	frequency (kHz)	amplitude adjustment	pulse	application
LAB	VialTweeter	250	24	20-100%	yes	lab, very small sample sizes (see brochure on lab equipment)
	UP50H / UP100H	50/100	30	20-100%	yes	lab, small sample sizes (see brochure on lab equipment)
	UP200H / UP200S	200	24	20-100%	yes	lab, medium sample sizes (see brochure on lab equipment)
	UP400S	400	24	20-100%	yes	lab, large samples (see brochure on lab equipment)
	UIS250Dmini	250	24	20-100%	no	contamination-free flow cell
INDUSTRIY	UIP500(D)	500	20	50-100%	no	homogenizing, emulsifying, dispersing, wet-milling, cleaning
	UIP1000(D)	1,000	20	50-100%	no	homogenizing, emulsifying, dispersing, wet-milling, cleaning
	UIP2000(D)	2,000	20	50-100%	no	homogenizing, emulsifying, dispersing, wet-milling, cleaning
	UIP4000	4,000	20	50-100%	no	homogenizing, emulsifying, dispersing, wet-milling
	UIP10000	10,000	20	50-100%	no	homogenizing, emulsifying, dispersing, wet-milling
	UIP16000	16,000	20	50-100%	no	homogenizing, emulsifying, dispersing, wet-milling
SPECIAL	UIS250(I/L)	250	24	20-100%	*	special applications, sieving, sensor cleaning, OEM integration
	UIC100	500	20	20-100%	no	cutting (plastics, paper, cardboard, food, etc.)
	UIC400	400	20	50-100%	no	cutting (plastics, paper, cardboard, food, etc.)
	UIC500	500	20	50-100%	no	cutting (plastics, paper, cardboard, food, etc.)
	UIC1000	1,000	20	50-100%	no	cutting (plastics, paper, cardboard, food, etc.)

* on request, (D) special version for wire cleaning, e.g. UIP1000D, (L) special version for lab use, e.g. UIS250L

UIS250I versatile ultrasonic device for special applications

ultrasonic processor UIS250I

UIS250I generator in top hat rail case

The ultrasonic processor UIS250I (250 watts, 24kHz) is an ultrasonic device for special applications. It can be used to drive special flow cells (right picture), to agitate screens or other structures, to clean sensors, or as an integrated ultrasonic probe in various systems.
The compact stainless steel housing of the transducer in IP64 grade withstands dust, dirt, higher temperatures and humidity. Hence, the transducer can be installed in demanding environments. It is available in explosion-proof (dust, gas) design, too. The generator, supplied in a standard housing or as top hat rail unit for an electrical cabinet, can be located outside the hazardous area. The oscillation decoupling flange of the transducer permits accurate positioning when used in machines or robot arms. For the sonication of liquids at higher temperatures of up to 300°C and pressures of up to 300 atm we offer longer sonotrodes with pressure-tight flange connections.

contamination free flow cell Dmini

UIP500 processing in small scale

The ultrasonic processor UIP500 (500 watts, 20kHz) is an industrial grade device that is being used mainly for process development and for the bench-top scale processing of liquids. When applied to liquids, low frequency, high power ultrasound generates intense cavitation. The cavitational effects can be used for various processes, such as: emulsifying, dispersing, homogenizing, cell disintegration and extraction as well as for the degassing of liquids.

ultrasonic processor UIP500

The UIP500 can be used with a lot of accessories, such as various sonotrodes, booster horns, and flow cells. For the processing of batches larger than 5 liters, we generally recommend to sonicate using a flow cell reactor (flow mode) to achieve a higher processing consistency. The UIP500 allows for the processing of approx. 0.25 to 2.0 liters per minute. Like all devices made by Hielscher, the UIP500 can be operated continuously (24h/7d) under load as well as in air. For this reason, the UIP500 is suitable for use in production, too. The robust design of the UIP500 fulfils industrial requirements.
As a result of outstanding energy efficiency of (>80%) of the UIP500 the ultrasonic power is really transmitted into the liquid. For the processing of larger quantities, we recommend using the devices UIP1000 to UIP16000 (see next pages).

UIP500 with flow cell at stand

UIP1000 versatile and powerful ultrasonic device

UIP1000 with accessories

The UIP1000 (1,000 watts, 20kHz) is a powerful and adaptable ultrasonic device for lab testing and industrial processing of liquids. Its is used for applications, such as emulsifying, dispersing & particle fine milling, extraction & lysis or homogenizing.

The UIP1000 is the powerful link between laboratory testing and the industrial processing of liquids. It combines the flexibility and easy handling required in the research and development with an outstanding performance in heavy-duty operation. For this reason, this single device is used for lab scale feasibility testing, process optimization, and process demonstration for ultrasonic liquid processes.

The flexibility of the UIP1000 results from an extensive list of various accessories, such as sonotrodes, boosters and flow cells. In combination with a sonotrode and the stand, you can sonicate sample beakers to test various liquid formulations for their response to sonication. For the processing of batches larger than 5 liters, we generally recommend to use a flow cell reactor in order to obtain a better processing quality. When used with a flow cell you can run larger samples in recirculation to establish the correlation between parameters, such as amplitude, pressure and liquid composition, and the process results and efficiency. The pictures to the right show alternative setups for the processing of liquids using a flow cell. For most applications, the UIP1000 can process approx. 0.5 to 4.0 liters per minute. As the UIP1000 is full industrial grade, it can be operated continuously (24h/7d). Hence, a UIP1000 can process approx. 1 to 5m³ per day.

Using only one device for lab testing, bench-top optimization and process demonstration saves time and is more cost effective. In addition to that, this single unit covers the widest range of possible ultrasonic configurations, e.g. in terms of amplitude and pressure. The standard accessories allow for:

- sonotrode amplitudes of up to 170 micron
- liquid pressures of up to 10 bars
- liquid flow rates of up to 10L/min (depending on the process)
- liquid temperatures of up to 80°C (other temperatures on request)
- material viscosity of up to 100,000cP

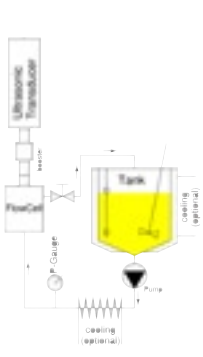
The input of ultrasonic power such parameter configurations creates intense cavitational effects. It is its versatility, why the same UIP1000 can be used in the process development for: Nanomaterials, paint & ink, coatings, food & beverage, cosmetics as well as chemical and biological processes.

The adaptability benefits in particular interdisciplinary R&D. Hence, much research done in universities in the field of ultrasonics is conducted with this versatile ultrasonic device. Another reason is the exact reproducibility and linear scalability of the obtained results. After testing various setups, the configuration found to be best can be used to run larger quantities under production conditions. The UIP1000 does not only give you full control of all sonication parameters; the PC-Control (optional software interface) also facilitates the recording of the individual trials.

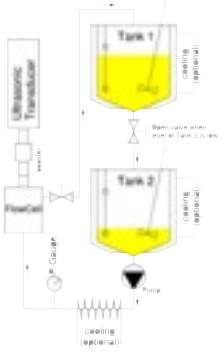
The UIP1000 is designed and built for commercial production. It proves its solid, durable design in more than thousand commercial installations worldwide where it is being used in everyday production. This ultrasonic processor requires little maintenance, is easy to setup and simple to clean and to sanitize. All items are available in food-grade or pharma-grade, too. The transducer of the UIP1000 is IP65 grade, so that it can be installed in demanding environments (dirt, dust, moisture, outside operation etc.), while the generator can be placed remotely in another area.

UIP1000 and sonotrode with flange

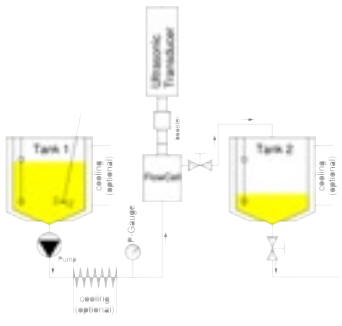
A very high efficiency in the conversion of electrical energy into mechanical oscillations of the sonotrode makes a closed transducer case without louvers possible. As the energy loss, which would cause a heat-up of the transducer is kept very low, no forced cooling, such as compressed air or water is needed. This means, that more energy is transmitted into the liquid, resulting in a better sonication. The overall energy efficiency of the UIP1000 is approx. 80-90% from the power plug into the liquid. You are welcome to put it to a test!



recirculation



discont. recirculation



single pass processing

hielscher ultrasound

UIP2000 proven high-efficiency

UIP2000 with flow cell/sound protection

Despite the enormous power of the ultrasonic processor UIP2000 (2000 watts, 20kHz), the device does not need any additional cooling by water or compressed air. The device works continuously in air. The robust design of the transducer, made of stainless steel and titanium, enables use under extreme conditions of dust, dirt, higher temperatures and humidity. The transducer and in special cases also the generator can be designed as ex-proof versions. According to the operating needs the generator is located in a housing or in a cabinet and is equipped with control displays as well as with electrical interfaces.

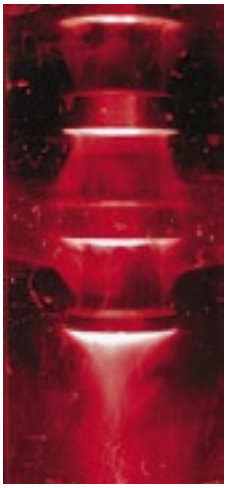
UIP2000 and sonotrode with flange

Important applications for the UIP2000 are the intensive cleaning of continuous material such as wires, tapes and profiles, of single components or bigger bores. Sonotrodes are chosen to match to the application.
The treatment of sewage sludge for a better gas yield, the production of very fine emulsions and suspensions, the extracting and homogenizing as well as the reducing of germs are applications with this device in large scale. Corresponding sonotrodes e.g. the cascade sonotrode provide the required intensity of ultrasonic treatment of the liquid. Corresponding flow cells are offered for continuous operation. Sound protection casings complete the ultrasonic system based on UIP2000.

UIP4000 industrial power in compact design

UIP4000 with flow cell/sound protection

The UIP4000 (4,000 watts, 20kHz) is used mainly for the industrial processing of liquids such as homogenizing, dispersing, disintegrating or deagglomerating.
The new modular concept of the UIP4000 provides you with a powerful and yet very space-saving system. This self-contained design reduces the work required for installation, operation and maintenance to a minimum level. Furthermore, multiple UIP4000 modules can be easily combined to form more powerful clusters. The flow cell as well as the ultrasonic transducer are located in a double-walled stainless steel cabinet that comes with a very effective sound insulation. In addition to that, it protects the ultrasonic unit against external forces such as dust, heat, or aggressive gases.
If required, the UIP4000 can be used for the sonication of liquids in custom-specific reactors.



cavitation at cascade sonotrode

hielscher ultrasound

UIP8000 and UIP16000 giants for challenging tasks

The UIP10000 and UIP16000 are the by far most powerful ultrasonic processor world-wide providing a continuous power of 10 and 16 kilowatts at an efficiency of more than 80%.
The development of such powerful systems stems from the demand for the ultrasonic treatment of liquids in larger scale. Whether emulsifying oil in water, disintegrating sewage sludge, deagglomerating nanoparticles or reducing germs, the needed ultrasound power usually raises proportionally to the liquid, which is to be treated in a certain time.
It is more cost-effective to compose a large ultrasonic system for example a system of 80kW with a flow rate of ten cubic metres per hour of 5 ultrasonic processors with a power of 16kW each than with 40 ultrasonic processors with a power of 2kW each.
The robust design of the transducer allows the use under heavy duty industrial conditions. The processor can also be delivered as explosion proof design. The generator as the transducer and the flow cell are housed in two connected compact stainless steel cabinets. This makes the UIP8000 as well as the UIP16000 a self contained, robust and easy to install equipment. The standard footprint of such a 8 or 16kW unit is just 600mm x 1200mm.
If required, the generator cabinet can be located remotely in a max. distance of 10m from the transducer with the flow cell.
The system includes an independent cooling system that completely avoids the contact between aggressive air or dust in the production site and the electric components of the ultrasonic processor. The operation of the ultrasonic processor can be controlled and monitored by means of power meters and status displays as well as remotely via electric interfaces.

ultrasonic flow systems unlimited potential

The ultrasonic effect in liquids is based mainly on the phenomenon cavitation. A huge amount of small vacuum bubbles are created, that implode immediately after they arose, which act upon the surrounding droplets or particles by means of shock waves and liquid jets. This kind of ultrasonic treatment can be realized in batch or in flow. In the end it is important, that a homogeneous sonication of the liquid is guaranteed. The very high power of the ultrasonic processors allows for amplitudes of 100 micron and therewith a high energy density even for large volume streams. The ultrasound can be transmitted in closed vessels by means of an oscillating-free flange, which is fixed at the sonotrode, and also under higher temperatures or pressures. Flow systems have been proven to be the right technique for the sonication of liquid volumes in large-scale. Such a flow system consists of modular components i.e. of the necessary number of ultrasonic processors, tube-shaped flow cells and cascade-shaped sonotrodes with oscillating-free flanges. The cabinets for the generator and the sound protection casings for the flow cells are supplied customized according to the respective operating conditions.

Please ask for more information.

48kW flow system (24 x UIP2000)

10kW ultrasonic flow system/sound protection (5 x UIP2000)

UIS250I / UIS250L sieving in laboratories and production

UIS250I at sieve frame

Besides the classical low frequency vibrators, the use of ultrasonics has proven particularly efficient for the sieving. This technique accelerates the process or, in cases of difficult material, renders it possible at all.
The ultrasonic processor UIS250L (250 watts, 24 kHz) is suited for laboratory sieves. The industrial version excites industrial sieves of up to 0.4m^2.
Hielscher Ultrasonics has developed the world-wide unique ring sonotrodes for the excitation of laboratory devices, with which the adjoining sieves and by means of the clamping device even more sieves are excited horizontally. If the material is particularly difficult to sieve there is the possibility of an additional sieving pump with which vertical movements are created. The ring sonotrode and the clamp are adjusted to the commercial diameters of laboratory sieves as for example the diameter of 200mm. Similar to the construction of the laboratory sieving tower, the transducer is also installed outside the industrial sieves. Therewith a contact between the material to be sieved and the transducer is avoided, which is an advantage, in particular decisive regarding thermosensitive powder. The transducer can also be supplied as ex-proof version.
Please ask for our detailed sieving information for laboratories or industries.

UIS250L at lab sieve tower

UIC400 to UIC1000 ultrasonic cutting

UIC1000LB with long blade (800mm)

ultrasonic cutting system (8 blades)

The ultrasonic processors UIC100, UIC400, UIC500 and UIC1000 with a power of 100, 400, 500 or 1000 watts, respectively, are designed especially for cutting tasks. This cutting method is nowadays a proven technique, in particular for cutting plastic sheets, textiles, cardboards, rubber, plastics and food. In general ultrasonic cutting means the excitation of a cutting tool or of the counter-bearing. The main advantage is the significant better cutting quality. Lower feed force permit higher cutting speed. Sludge cakings at the blades are removed by the ultrasonic oscillations. The lower wear of the tools and the resulting longer durability have a cost-saving effect.
Exchangeable blades, which are selected to the cutting criteria of the respective application case such as the material, shape and length, are used as tools. The ultrasonic processors can also be constructed for the use in the food industry.

UIC400 with short blade

our product and application spectrum

ultrasonic laboratory processors

ultrasonic industry processors

megahertz processors

ultrasonic sieving in the laboratory

industrial ultrasonic sieving

cutting and welding

ultrasonic dispersing systems

wire-, tape- and profile cleaning

intensive cleaning

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