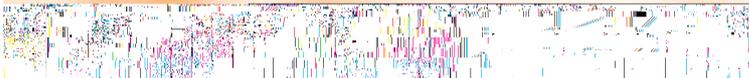
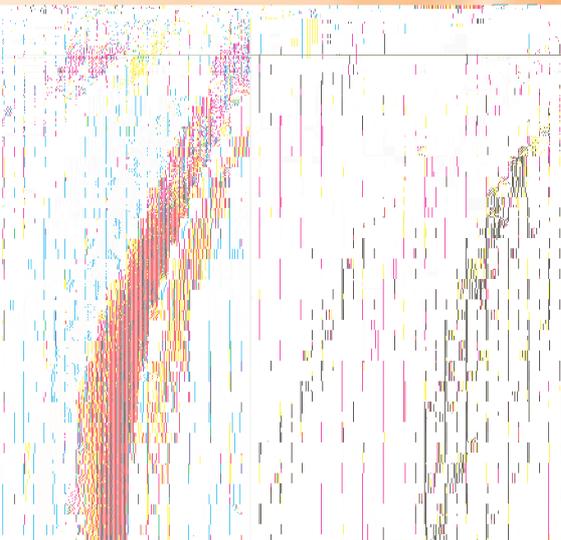




Ultrasonics

Cleaning • Processing • Measuring

GENERAL CATALOGUE



HONDA ELECTRONICS CO.,LTD.

INDUSTRIAL EQUIPMENT DIVISION

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HONDA ELECTRONICS × ULTRASONIC





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Ultrasonic cleaning

Ultrasonic cleaning is the technology that removes various kind of contamination, that can be very fine, on work-pieces immersed in water or solvent using high-frequency sound (ultrasonic) waves.

● **Cleaning effect multiplies with “physical effect” by ultrasonic wave and “chemical effect” by solvent.**

● Physical effect

Effect by Cavitation, Particle acceleration and rectilinear straight flow, can remove, agitate and emulsify the contamination.

● Chemical effect

Chemical power of solvent can be accelerated by ultrasonic excitation.

Low frequency cleaning

- Separate type ▶ p8
- Desktop type ▶ p18

High frequency cleaning

- Batch type ▶ p15
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- point type / Line type

Medium frequency cleaning

- Separate type ▶ p10
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Sonic monitor

▶ p19

Ultrasonic × cleaners

Low frequency cleaning

Pressure impact by cavitation is highly effective for rigid contamination. Suits for general cleaning such as the cleaning of metal chips or oil after cutting, routing, drilling, honing and so on, or flux removal of PCB.

■ Separate type

Vibration unit can be chosen from four styles, immersible box, plate, tank or tank with heater. Customization of the vibration unit is available.

■ Desktop type

Desktop type is available for small size, small amount cleaning for lab use.

Medium frequency cleaning

Medium frequency is used for removal of medium size particles for delicate parts such as HDD parts, glass-mask, LCD glass, magnetic-head and so on those what the powerful low frequency may cause damage.

High frequency cleaning

High frequency cleaner is also known as Megasonic. Sub-micron size contamination can be removed effectively by particle acceleration and it is suitable for silicon wafers, LCD glass or HDD substrate, because of its suppressed damage to the work-piece.

Sonic monitor

Easy handling Sonic monitor is useful for daily maintenance. It shows the relative power value instantly.

Selecting cleaners

Please consider following points for selection of the cleaners.

- (1) Purpose degreasing, removal of lapping or polishing powder or removal of particles
- (2) Type of work material, size (consideration of cage also)
- (3) Type of cleaner ... separate, desktop, quartz, nozzle

* Process planning is important before determine the installation of ultrasonic cleaner. Normally, cleaning process is consisted by "clean -> rinse -> dry" process. Desktop cleaner has a capability of cleaning only, so following process of rinse and dry is necessary.

Utility example of each frequency

Frequency	Contamination	Application	Damage	Feature
28kHz	Visible size Contamination, oil.	Metal parts / resin	Big	Used to remove persistent contamination such as grease cause of strong cleaning energy. Enhance efficiency of solvent.
40kHz	Contamination more than 10μm, dust	Crystal glass / precision metal parts		Used to clean precision parts in many cases cause of less damage happens than 28kHz.
100kHz	Over 10μm - 15μm	Hard disk / CSP board / precision metal parts / optical disk / HD head		Used in many cases when damage happens at 40kHz. Widely known as the frequency cause of stronger energy and less damage.
200kHz	1μm - 10μm	Compound wafers / hard disk		Used receiving wafers. Possible to remove fine contamination with less damage.
400kHz	0.2μm - 5μm	Silicon wafers / glass wafers / glass substrate		Deal with wide range of particle size to remove, various precision cleaning is expected.
1MHz	0.2μm - 1μm	Glass substrate / silicon wafers (with circuit) / glass mask		Used to remove invisible small particle. Less damage on work-piece. Widely known as the frequency for the wafer cleaning.
3MHz	Below 0.2μm	Silicon wafers (with circuit) / glass mask		Small

*1MHz particle acceleration = 10⁵G (100,000 times of gravity acceleration) *Possible removable particle size = more than $3\mu\text{m} \times \frac{28 \times 10^3 \text{ (Hz)}}{f \text{ (Hz)}} \text{ (}\mu\text{m)}$

Type selection of ultrasonic cleaner

Separate type

Separate type ultrasonic cleaner is composed of generator, and vibration unit or cleaning tank. Combination is able to be specified by its utility, facility and purposes.

N type

Combination of generator and vibration unit which is immersed into the tank. Possible to use with customer's cleaning tank.

F type

Combination of generator and vibration plate. Possible to assemble into the external equipment.

S type

Combination of generator and exclusive cleaning tank. Easy to set up and start.

SH type

Heater is added on S type. With warm water effect, it has stronger cleaning power.

Desktop type

Compact all-in-one type. Easy to set up.

Standard type

Heater added type

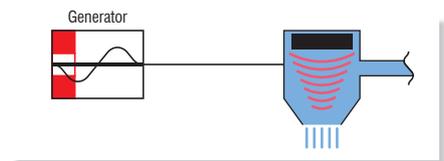
Quartz vibration type

Quartz vibration unit transfers the ultrasonic power effectively to the surface of the work-piece, semiconductor wafers.

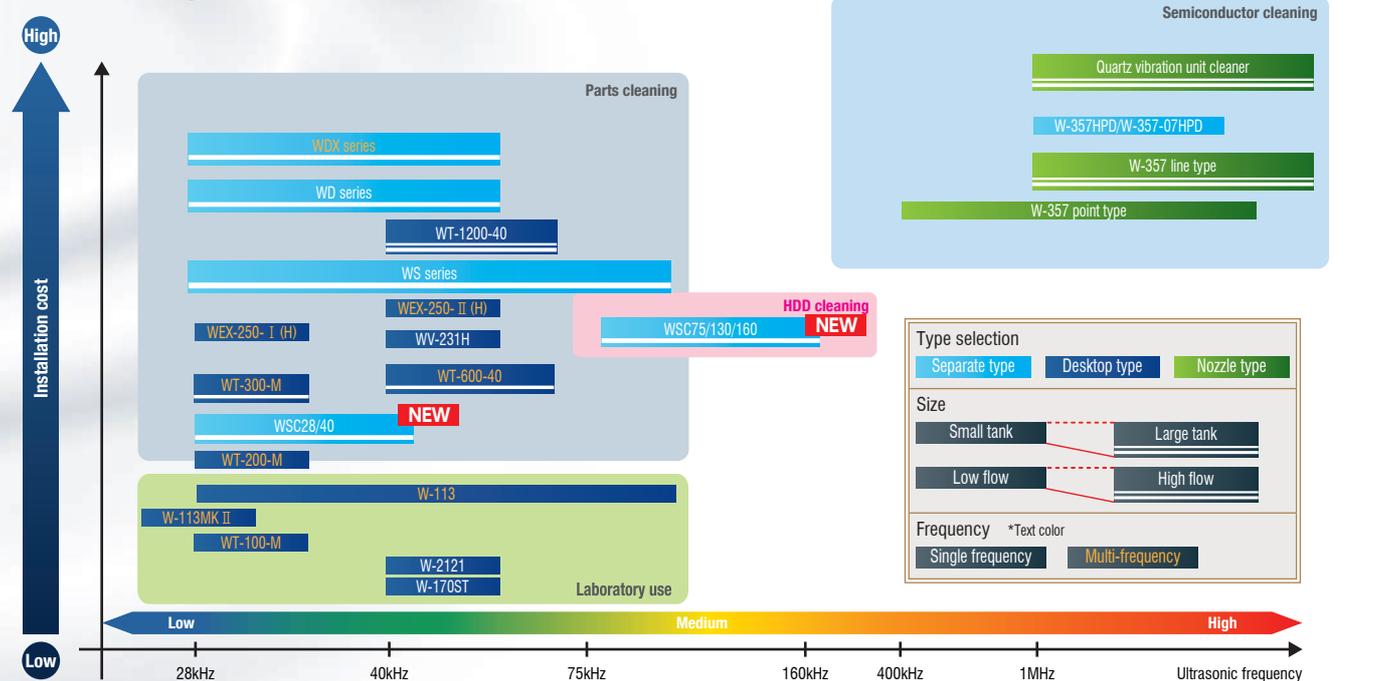


Nozzle type

Wafers stream from the nozzle carries the Megasonic power.



Product lineup



Cleaning

Processing

Measuring

Drawings

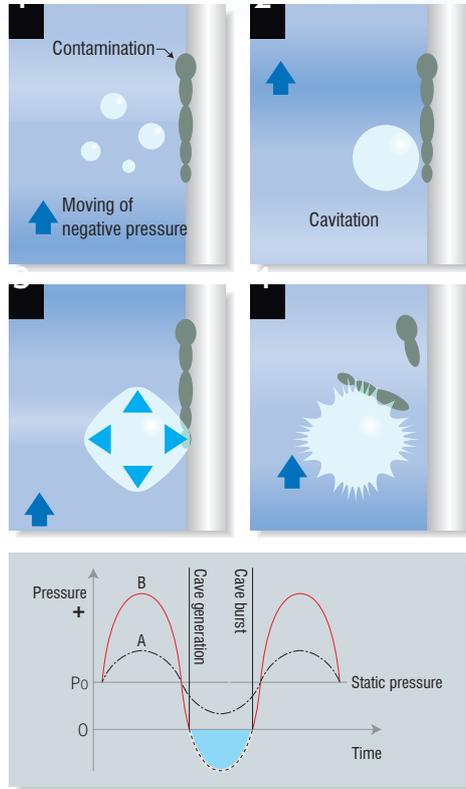
Options

Low / Medium frequency cleaning

Cavitation

Cleaning with low frequency

Countless gaseous molecules are existing in liquid, positive and negative pressure becomes applied on gaseous molecule mutually when strong ultrasonic such as 20kHz to 100kHz are exposed on liquid. Gaseous molecule is compressed by positive pressure but, in the next moment, it is turned to swell violently by negative pressure. Gaseous molecule has very high pressure when it is compressed repeatedly and burst at the limit. This very big shocking pressure generation is called cavitation phenomenon. Bubble burst shocking wave effects on a work-piece and contamination is separated from work-piece, it is called cavitation effect. Cavitation is generated differently; depend on deepness of liquid or liquid type. In order to make good ultrasonic cleaning, condition control is necessary. For example, in case of appearing that cavitation is like crawling on vibration surface, ultrasound is not effectively generated, and also deterioration of vibration board to cause erosion is accelerated. Changing liquid deepness makes cavitation generation effective and ultrasonic cleaning effective, too.

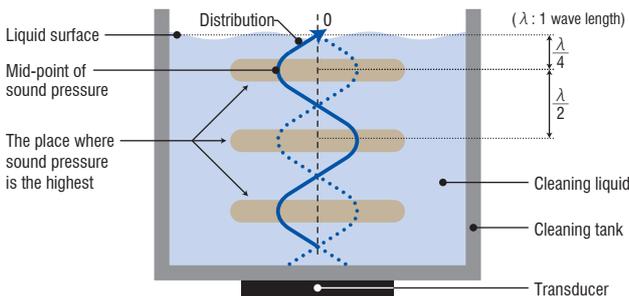


*Erosion

Surface of soft material such as aluminum is eroded by physical power which generated by ultrasonic cavitation phenomenon (happens under condition of temperature over 5,000K, air pressure over 1,000 and several hundreds, partly high value, high pressure)

Standing wave effect (Hot spot)

Ultrasonic wave makes standing wave in liquid related to its frequency. It appears as hot spots and weak spots and the distance is approximately $\lambda/2$ interval. At the hot spot, the cleaning power becomes maximum, though it also has possibility of damage to the work. Multiple frequency or tumbling the work is useful to eliminates this undesired effect. Consideration of balance of cleaning effect and standing wave effect.



The most suitable spot to remove dirt is $\frac{\lambda}{4} + \frac{\lambda}{2} n (n=0,1,2,...)$ From a surface of liquid.

Type of oscillation mode



Switching oscillation mode of neighboring dual frequency

- Suitable to clean inside of fine tube or through-hole board by pumping effect.
- Congestion of cavitation can be prevented and propagate further.



F.M. oscillation mode

*F.M.: Frequency Modulation

- Standing wave can be removed by frequency modulation and realizes evenly cleaning.
- Position of cavitation swipes and prevent a damage to the work-piece.



Single frequency wave oscillation mode

- Cavitation power is strong and suitable for removal of persistent contamination.



Pulse oscillation mode

- Intermittent ultrasonic power enables gentle cleaning and effective for degassing.



Multi-oscillation mode

- 28kHz is suitable to clean persistent contamination, 45kHz is effective to clean fine contamination, 100kHz is suitable to make superfine clean with less damage. Unevenness of cleaning by standing waves is prevented by repeating oscillation of these 3 frequencies sequentially.



DYNASHOCK MODULATION

- Two frequencies simultaneously transmitted with optimum power ratio enables to generate uniform ultrasound at high sound pressure so that optimum cleaning efficiency can be achieved.



FM + AM

- Combination of Frequency Modulation (FM) and Amplitude Modulation (AM) distributes ultrasonic power uniformly in tank entirely and it eliminates the power spot. It is also effective for change of liquid depth and type or the work-piece.

1 wave length = acoustic velocity / frequency

$$\left(\lambda = \frac{c}{f} \right) \begin{matrix} \lambda : \text{wave length} \\ c : \text{Acoustic velocity of washing liquid} \\ f : \text{frequency} \end{matrix}$$

*C...1,500m/s : (in case of water)

In case of 40kHz

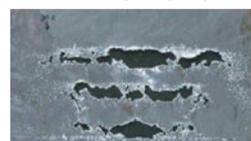
$1,500,000(\text{mm/S}) \div 40,000(\text{Hz}) = 37.5(\text{mm}) \dots \text{wave length}$

Constant wave : $37.5/2 = \text{abbreviation } 19\text{mm}$

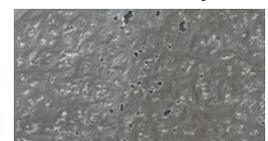
That is at each interval of 19mm there are the best removal of particles.

Comparison on Al-foil test

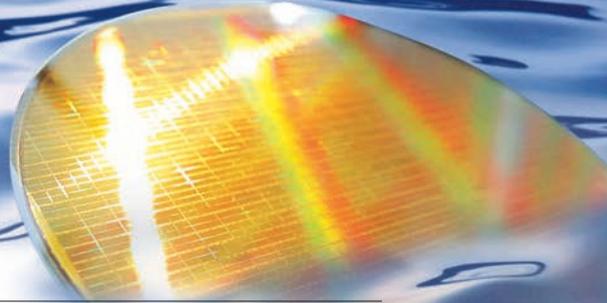
WS-600-28
600W 28kHz single frequency



WDX-600-I
600W 28kHz/75kHz simultaneous generation DM 60%



High frequency cleaning



Batch type cleaner

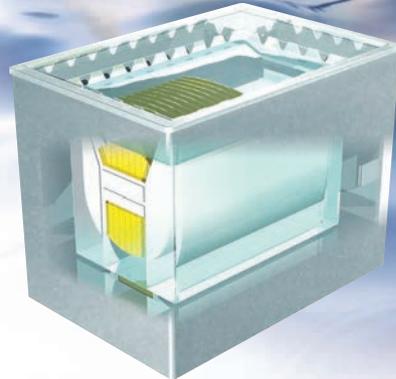
■ A batch cleaning for semiconductor wafer

Put semiconductor wafer on a MHz zone of ultrasonic cleaning tank and clean multiple wafers at once. This way of cleaning is a main stream as following 3 reasons;

- (1) Many wafers can be cleaned for a short time, in order to save the time.
- (2) Less detergent is used in comparison with cleaning single wafer.
- (3) Specific chemicals can be used with dual tanks.

Usually, the ultrasonic transducer is attached directly on the quartz tank when chemicals are used in a batch type cleaner, or dip style cleaner which uses a dual structure of cleaning tank and quartz tank is widely utilized. In this style, the quartz tank can avoid liquation of metal ion and impurities, also effective to keep cleanness.

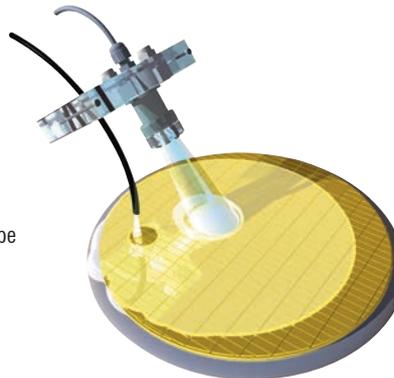
However, the problem of reattaching particles has come up on a batch cleaning due to larger size and fine-pitch of semiconductor wafer.



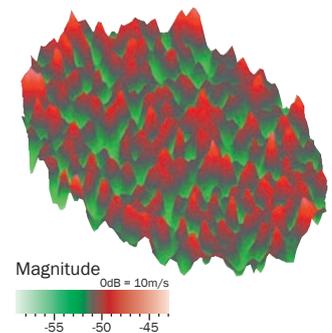
Quartz vibration unit cleaner

■ The next-generation cleaner series to actualize less damage, high cleanness

Honda Electronics developed "the world first" quartz vibration unit type ultrasonic cleaner in 2006. In this system, ultrasonic is convoluted on the quartz vibration unit to clean semiconductor wafer. Amount of chemical can be saved in comparison with batch or nozzle type. The liquid contact part is made of quartz and chemical resistant resin, so rubber material such as gasket is not contacted liquid in order to keep cleanness. With changing shape of the quartz vibration unit, lower damaged cleaning and larger area cleaning can be achieved. Also the edge face or notch, which is difficult to clean, can be cleaned effectively.



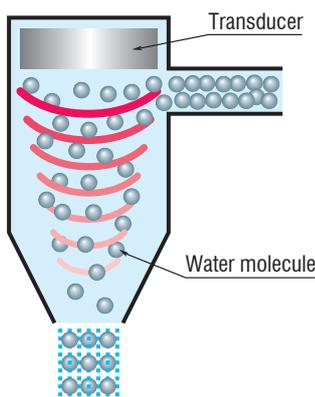
W-357-IMQB-SK sound pressure map



Nozzle type cleaner

■ Cleaning with fluid particle acceleration

In fluid particle acceleration cleaning, water molecules are accelerated and hit against work-piece, and then particles are scattered by the impact. The higher the frequency, the more effect is expected, it is effective for detaching cleaning fine particle. The acceleration increases in proportion to square of multiple of a frequency; wave length comes to be shorter and it is effective for fine particle.



Work-piece size

300 x 300 x 1.1mm

Measurement area

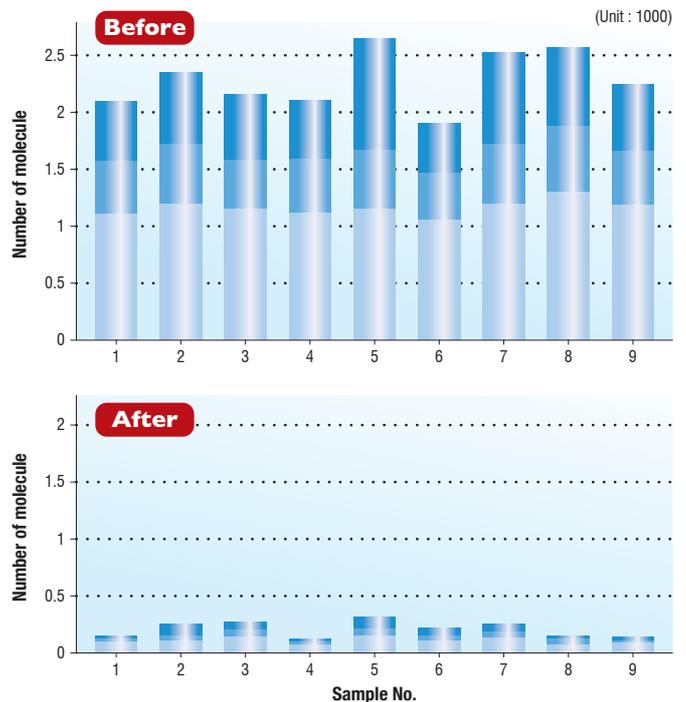
280 x 280mm

Both sides of blank glass

Particle size

- S : 3.0 ~ 05.0m
- M : 5.0 ~ 10.0m
- L : 10.0m~

Transition of particle amount before and after PULSE JET cleaning



Low / Medium frequency separate type

Our unique feature, “DYNASHOCK MODULATION (DM)” mode with fully-digitalized system enables various ranges of cleaning – powerful to precise cleaning depending on cleaning application



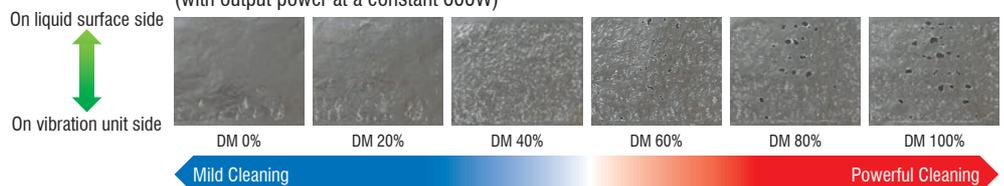
WDX-600-I
WDX-1200-I

“DYNASHOCK MODULATION (DM)”

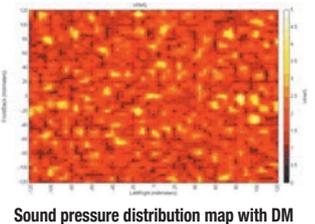
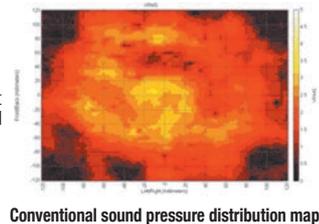
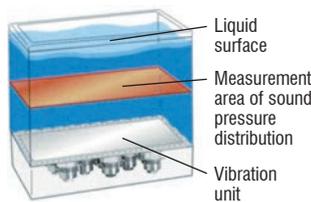
The power ratio (modulation ratio) of two frequencies simultaneously transmitted from a transducer with determinate total output power can be controlled so that optimum cleaning efficiency can be achieved.



Comparison examples of erosion on aluminum foil depending on DM modulation ratio (with output power at a constant 600W)



● With selecting DM ratio, uniform ultrasound at high sound pressure can be generated in whole tank. That enables to clean the object without unevenness.



● Fully-digitalized system enables to achieve varieties of functions.

Optimum cleaning

Optimum frequency control and ultrasonic power control makes stable ultrasonic cleaning.

Universal power input

Power source 200 - 240 VAC ±10% can be accommodated.

Matching adjustment free

With auto-tuning, matching adjustment between generator and vibration unit is not required after vibration unit is replaced.

Self-diagnostic function

When trouble is occurred, the cause is indicated on display for rapid functional recovery.

Monitoring function

Output power can be controlled in reference to front panel display.

Sweep function

Adding sweep function on DM, cleaning becomes more evenly.

DYNASHOCK MODULATION (DM)

DYNASHOCK MODULATION system enables to clean the object with less cleaning unevenness and damage and also to select wide range of cleaning power depending on cleaning application (precise or powerful cleaning for processed metal parts)

Generator

Model No.	WDX-600-I	WDX-1200-I
Oscillation mode	DYNASHOCK MODULATION (DM), modulation ratio 0 - 100%, DYNASHOCK MODULATION (DM), modulation ratio 0 - 100% & Sweep	
Rated power output	600W	1200W
Nominal oscillation frequency	28kHz & 75kHz	
Power source	200 - 240 VAC ±10% 1200VA Single phase 50/60Hz	200 - 240 VAC ±10% 2400VA Single phase 50/60Hz
Dimensions (W x D x Hmm)	330 x 462 x 148 (including rubber cushion)	
Weight	11kg	12kg

- I/O interface Remote function : Ultrasonic oscillation ON/OFF (contact input)
Output function : Alarm at the time of malfunction (Relay contact output:open in fault)
- Output setting range : 0 - 100% continuous variable • Output indicator : Output power (W), DM ratio (%), error message
- Environment for use : Temperature 0 - 40°C Humidity 0 - 80% (without condensation) • Power cord length : 3.5m • Dimensions drawing Page36
- Option : Terminal block Page40

■ Vibration unit

Honda Electronics self-manufactured bolt-clamped Langevin type transducer is adopted. Powerful and high efficient ultrasonic cleaning is actualized.

Bolt-clamped Langevin type transducer, highly efficient and great durability, is used in vibration unit.

Standard specifications to meet a number of frequencies and output power are available.

Customized vibration unit or pressure reduction vibration unit can be manufactured on request.



Customization is available such as low pressure use.



■ Immersible type

N TYPE | Immersible type

Model No.	WDX-600N-I	WDX-1200N-I
Generator Model No.	WDX-600-I	WDX-1200-I
Max.input	600W	1200W
Nominal oscillation frequency	28kHz & 75kHz	
Effective area(W x Dmm)	350 x 200	420 x 300
Dimensions(W x D x Hmm)	350 x 200 x 100	420 x 300 x 100
Material	Case:SUS304 (SUS316L is available)	
Weight	14kg	18kg

- Liquid temperature : 5 - 80°C
- Transducer : Bolt-clamped Langevin type
- Vibration unit cord length : 2.5m (blade part 2m) + Output cord length 3.5m
- Outline drawing Page37



■ Vibration plate type

F TYPE | Vibration plate type

Model No.	WDX-600F-I	WDX-1200F-I
Generator Model No.	WDX-600-I	WDX-1200-I
Max.input	600W	1200W
Nominal oscillation frequency	28kHz & 75kHz	
Effective area(W x Dmm)	350 x 200	420 x 300
Dimensions(W x D x Hmm)	390 x 240 x 83	460 x 340 x 83
wires not included	t=2.5mm	t=2.5mm
Material	Board: SUS304 (SUS316L and hastelloy is available)	Gasket: EPDM t=3mm (Viton and others are available)
Weight	10kg	16kg

- Liquid temperature : 5 - 100°C
- Transducer : Bolt-clamped Langevin type
- Vibration unit cord length : 3.5m + Output cord length 3.5m
- Outline drawing Page37



■ Tank type

S TYPE | Tank type

Model No.	WDX-600S-I	WDX-1200S-I
Generator Model No.	WDX-600-I	WDX-1200-I
Max.input	600W	1200W
Nominal oscillation frequency	28kHz & 75kHz	
Effective area(W x Dmm)	366 x 246	500 x 300
Outer dimensions(W x D x Hmm)	422 x 302 x 405 (including rubber cushion)	550 x 350 x 402 (including rubber cushion)
Inner dimensions(W x D x Hmm)	366 x 246 x 248 (23L)	500 x 300 x 224 (35L)
Material	Tank: SUS304 (SUS316L is available)	
Weight	22kg	39kg

- Liquid temperature : 5 - 100°C
- Transducer : Bolt-clamped Langevin type
- Vibration unit cord length : 3.5m
- Option : Cleaning basket (KG10/KG11) Page40



■ Tank type with heater

SH TYPE | Tank type with heater

Model No.	WDX-600SH-I	WDX-1200SH-I
Generator Model No.	WDX-600-I	WDX-1200-I
Max.input	600W	1200W
Nominal oscillation frequency	28kHz & 75kHz	
Heater	200 VAC 2kW Single phase 50/60Hz	200 VAC 3kW Single phase 50/60Hz
Effective area(W x Dmm)	370 x 250	500 x 300
Outer dimensions(W x D x Hmm)	580 x 310 x 406 (including rubber cushion)	710 x 360 x 405 (including rubber cushion)
Inner dimensions(W x D x Hmm)	370 x 250 x 250 (23L)	500 x 300 x 224 (35L)
Material	Tank: SUS304 (SUS316L is available)	
Weight	28kg	46kg

- Liquid temperature : 5 - 100°C
- Transducer : Bolt-clamped Langevin type
- Vibration unit cord length : 3.5m
- Option : Cleaning basket (KG10/KG11) Page40
- * The heater is only for water. Do not use other liquid. * Separate power source for the heater is required.

WSC series

NEW



- WSC 28Standard
- WSC 28High-power
- WSC 40Standard
- WSC 40High-power
- WSC 75
- WSC 130
- WSC 160

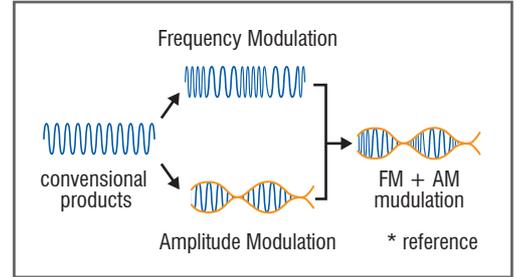
Low / Medium frequency separate type

Combination of our self-developed BLT and FM + AM modes could achieve high efficiency

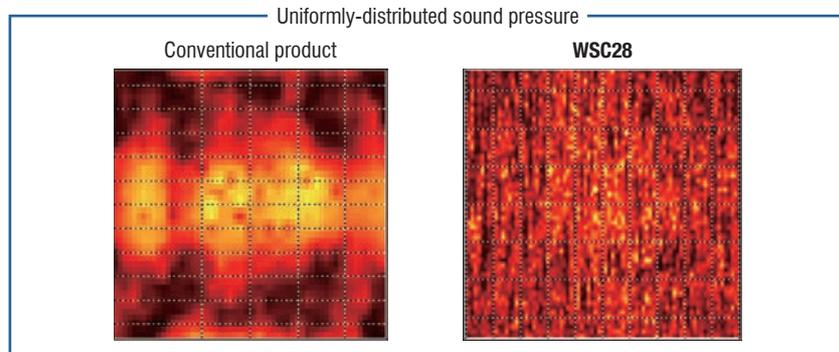


FM + AM

FM stands for Frequency Modulation that varies operating frequency continuously. AM stands for Amplitude Modulation that varies the output power continuously. FM has an effect to spread ultrasonic agitation evenly to entire tank and realize evenly cleaning. AM has capability of stable operation with different load (solvent type, depth and variety of work-piece).



Comparison between our conventional product and WSC28



Cavitations can be distributed both with FM and AM modes in the cleaning tank so that uniformity of cleaning can be improved.



FM + AM oscillation with our original transducer enables to improve transmission efficiency of ultrasound. As the a result, higher cleaning power is achieved at low power consumption.

No recalibration

No recalibration of generator is needed for replacing a vibration unit.
(Transducers must have same ID for replacement)

Safety function

Capable of excessive power output alarm, abnormal temp., rising alarm and malfunction transducer alarm (open / short).

Energy saving compact generator

- FM (Frequency Modulation) + AM (Amplitude Modulation)
Realizing evenly cleaning and energy saving high efficiency type.
- Minimized the weight and the dimension to 1/3 of the conventional generator

Low Frequency

Generator

Model No.	WSC28		WSC40	
Power type	Standard	High-Power	Standard	High-Power
Oscillation mode	FM+AM modulation			
Rated power output	600W	1200W	600W	1200W
Nominal oscillation frequency	28kHz	28kHz	40kHz	40kHz
Power source	200 - 230 VAC ±10% Single phase 50/60Hz 300VA	200 - 230 VAC ±10% Single phase 50/60Hz 600VA	200 - 230 VAC ±10% Single phase 50/60Hz 300VA	200 - 230 VAC ±10% Single phase 50/60Hz 600VA
Dimensions (W x D x Hmm)	210 x 250 x 107 (including rubber cushion)			
Weight	3.6kg			

- **I/O interface Remote function**: Ultrasonic oscillation mode selection ON / OFF (contact input).
Output function: Alarm in the time of malfunction (Relay contact output: Short circuit in the time of malfunction)
- **Output setting range**: 0 - 100% continuous variable • **Environment for use**: Temperature 5 - 40°C Humidity 5 - 80% (without condensation)
- **Power cord length**: 3.5m • **Outline drawing** Page36 • **Option**: I/O remote cable (5m) Page40

N TYPE | Immersible type

Model No.	WSC28ST-N	WSC28HP-N	WSC40ST-N	WSC40HP-N
Power type	Standard	High-Power	Standard	High-Power
Generator Model No.	WSC28 Standard	WSC28 High-Power	WSC40 Standard	WSC40 High-Power
Max. input	600W	1200W	600W	1200W
Nominal oscillation frequency	28kHz	28kHz	40kHz	40kHz
Effective area (W x Dmm)	350 x 200	420 x 300	350 x 200	420 x 300
Dimensions (W x D x Hmm)	350 x 200 x 100	420 x 300 x 100	350 x 200 x 75	420 x 300 x 75
Material	SUS304			
Qty of BLT	7	14	10	20
Weight	8kg	14kg	7kg	12kg

- **Liquid temperature**: 80°C • **Transducer**: Bolt-clamped Langevin type • **Vibration unit cord length**: 2.5m (blade part 2m) + Output cord length 3.5m • **Outline drawing** Page37

F TYPE | Vibration plate type

Model No.	WSC28ST-F	WSC28HP-F	WSC40ST-F	WSC40HP-F
Power type	Standard	High-Power	Standard	High-Power
Generator Model No.	WSC28 Standard	WSC28 High-Power	WSC40 Standard	WSC40 High-Power
Max. input	600W	1200W	600W	1200W
Nominal oscillation frequency	28kHz	28kHz	40kHz	40kHz
Effective area (W x Dmm)	350 x 200	420 x 300	350 x 200	420 x 300
Dimensions (W x D x Hmm)	390 x 240 x 68	460 x 340 x 68	390 x 240 x 68	460 x 340 x 68
wires not included	t=2.5	t=2.5	t=2.5	t=2.5
Material	Plate: SUS304			
Qty of BLT	7	14	10	20
Weight	5kg	9kg	4kg	8kg

- **Liquid temperature**: 100°C • **Transducer**: Bolt-clamped Langevin type • **Vibration unit cord length**: 3.5m + Output cord length 3.5m • **Outline drawing** Page37
- *Gasket and retainer plate are also available.

Vibration unit



Immersible type



Vibration plate type

Medium Frequency

Generator

Model No.	WSC75	WSC130	WSC160
Power type	Standard		
Oscillation mode	FM+AM modulation		
Rated power output	600W		
Nominal oscillation frequency	75kHz	130kHz	160kHz
Power source	200 - 230 VAC ±10% Single phase 50/60Hz 300VA	200 VAC ±10% or 220 - 230 VAC ±10% Single phase 50/60Hz 300VA	200 - 230 VAC ±10% Single phase 50/60Hz 300VA
Dimensions (W x D x Hmm)	210 x 250 x 107 (including rubber cushion)		
Weight	3.6kg		

- **I/O interface Remote function**: Ultrasonic oscillation mode selection ON / OFF (contact input).
Output function: Alarm in the time of malfunction (Relay contact output: Short circuit in the time of malfunction)
- **Output setting range**: 0 - 100% continuous variable • **Environment for use**: Temperature 5 - 40°C Humidity 5 - 80% (without condensation)
- **Power cord length**: 3.5m • **Outline drawing** Page36 • **Option**: I/O remote cable (5m) Page40

N TYPE | Immersible type

Model No.	WSC75N	WSC130N	WSC160N
Power type	Standard		
Generator Model No.	WSC75 Standard	WSC130 Standard	WSC160 Standard
Max. input	600W		
Nominal oscillation frequency	75kHz	130kHz	160kHz
Effective area (W x Dmm)	350 x 200		
Dimensions (W x D x Hmm)	350 x 200 x 100		
Material	SUS304		
Qty of BLT	18		
Weight	14kg		11kg

- **Liquid temperature**: 80°C • **Transducer**: Bolt-clamped Langevin type • **Vibration unit cord length**: 2.5m (blade part 2m) + Output cord length 3.5m • **Outline drawing** Page37

F TYPE | Vibration plate type

Model No.	WSC75F	WSC130F	WSC160F
Power type	Standard		
Generator Model No.	WSC75 Standard	WSC130 Standard	WSC160 Standard
Max. input	600W		
Nominal oscillation frequency	75kHz	130kHz	160kHz
Effective area (W x Dmm)	350 x 200		
Dimensions (W x D x Hmm)	390 x 240 x 80	390 x 240 x 80	390 x 240 x 54
wires not included	t=2.5	t=2.5	t=2.5
Material	Plate: SUS304		
Qty of BLT	18		
Weight	10kg		8kg

- **Liquid temperature**: 100°C • **Transducer**: Bolt-clamped Langevin type • **Vibration unit cord length**: 3.5m + Output cord length 3.5m • **Outline drawing** Page37
- *Gasket and retainer plate are also available.

Vibration unit



Immersible type



Vibration plate type

DYNASHOCK

WD series



WD-600-28
WD-600-40
WD-1200-28
WD-1200-40

Ultrasonic generator

- Providing stable cleaning power by optimum oscillation control with digital control system.
- "Self-diagnosis function" which judges a possible malfunction cause is loaded.

Low frequency separate type

Powerful and various cleaning patterns by 4 oscillation modes

Loading 4 oscillation modes

Capable of various cleaning patterns by 4 oscillation modes (DUAL, F.M., SINGLE, PULSE).

Malfunction judging indication

6 types of malfunction are recognized and indicated on front panel by ALARM lamp and LED.

I/O interface

Capable of selecting oscillation mode from 4 types. Also, ultrasonic oscillation ON/OFF, output control from a distant place remote control or alarm output of the malfunction.



Generator

Model No.	WD-600-28T	WD-600-40T	WD-1200-28T	WD-1200-40T
Oscillation mode	Switching oscillation mode of neighboring dual frequencies (DUAL) F.M. oscillation mode (F.M.)		Single frequency oscillation mode (SINGLE) Pulse oscillation mode (PULSE)	
Rated power output	DUAL,FM	400W	800W	
	SINGLE	600W	1200W	
	PULSE	600W	1200W	
Nominal oscillation frequency	28kHz	40kHz	28kHz	40kHz
Power source	200 VAC ± 10% 1200VA	Single phase 50/60Hz	200 VAC ± 10% 2400VA	Single phase 50/60Hz
Dimensions (W x D x Hmm)	330 x 463 x 150 (including rubber cushion)			
Weight	11kg		12kg	

- **I/O interface Remote function** : Oscillation modes and ultrasonic oscillation ON/OFF (contact input), Output control with 8 levels (contact input)
Output function : Alarm in the time of malfunction (Relay contact output: Short circuit in the time of malfunction)
- **DUAL/F.M. frequency modulation zone** : Center frequency 1kHz • **Output setting range** : 20 - 100%
- **Output indicator** : LED level indicator (matching to output) • **Environment for use** : Temperature 0 - 40°C Humidity 0 - 80% (without condensation)
- **Power cord length** : 3.5m • **Outline drawing** ◀Page36 • **Option** : I/O remote cable (5m, 10m), Terminal block ▶Page40

WS series



WS-600-28
WS-600-40
WS-600-75
WS-1200-28
WS-1200-40

Single frequency standard model

- "Stop for protection function" against over output, temperature elevation or vibration unit (terminal short/open) fault is loaded.

Capable of various cleaning patterns by frequency variations

Matching adjustment free generator

Generator tuning is not required when replacing with another vibration unit (the same parameters), thus maintenance is easy (28kHz, 40kHz).

Wide range of variable power (output 0 ~ 100%)

Wide range of power can be controlled depending on cleaning & treatment purpose.

Stable automatic frequency tracking

Oscillation is always stable on optimum frequency so that resonance frequency change can be pursued automatically with new oscillation system (vibrational components detecting circuit + PLL circuit).

Stable output power control

Output power is always kept stable even though the impedance change and the power voltage change occurred by changing load conditions such as liquid deepness, liquid temperatures, cleaning objects, pressure reduction (vacuum).



Generator

Model No.	WS-600-28T	WS-600-40T	WS-600-75T	WS-1200-28T	WS-1200-40T
Oscillation mode	Single frequency oscillation				
Rated power output	600W			1200W	
Nominal oscillation frequency	28kHz	40kHz	75kHz	28kHz	40kHz
Power source	Select from 200, 220, 230, 240 VAC ± 10% when ordering. 1200VA Single phase 50/60Hz			Select from 200, 220, 230, 240 VAC ± 10% when ordering. 2400VA Single phase 50/60Hz	
Dimensions (W x D x Hmm)	300 x 345 x 130 (including rubber cushion)			360 x 400 x 130 (including rubber cushion)	
Weight	10kg			12kg	

- **I/O interface Remote function** : Ultrasonic oscillation mode selection, ON/OFF (contact input),
Output function : Alarm in the time of malfunction (Relay contact output: Short circuit in the time of malfunction)
- **Output setting range** : 0 - 100% continuous variable • **Output indicator** : LED level indicator (matching to output)
- **Environment for use** : Temperature 0 - 40°C Humidity 0 - 80% (without condensation)
- **Power cord length** : 3.5m • **Outline drawing** ◀Page36 • **Option** : Terminal block ▶Page40

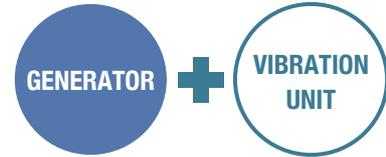
■ Vibration unit

Honda Electronics self-manufactured bolt-clamped Langevin type transducer is adopted. Powerful and high efficient ultrasonic cleaning is actualized.

Bolt-clamped Langevin type transducer, highly efficient and great durability, is used in vibration unit.

Standard specifications to meet a number of frequencies and output power are available.

Customized vibration unit or pressure reduction vibration unit can be manufactured on request.



Customization is available such as low pressure use.



■ Immersible type

N TYPE | Immersible type

Model No.	WS-600-28N	WS-600-40N	WD-600-40N	WS-600-75N	WS-1200-28N	WS-1200-40N	WD-1200-40N
Generator Model No.	WD-600-28T WS-600-28T	WS-600-40T	WD-600-40T	WS-600-75T	WD-1200-28T WS-1200-28T	WS-1200-40T	WD-1200-40T
Max.input	600W				1200W		
Nominal oscillation frequency	28kHz	40kHz		75kHz	28kHz		40kHz
Effective area(W x Dmm)	350 x 200				420 x 300		
Dimensions(W x D x Hmm)	350 x 200 x 100	350 x 200 x 75		350 x 200 x 100	420 x 300 x 100	420 x 300 x 75	
Material	Case : SUS304 (SUS316L is available)						
Weight	14kg	11kg		14kg	18kg	14kg	

- Liquid temperature : 5 - 80°C
- Transducer : Bolt-clamped Langevin type
- Vibration unit cord length : 2.5m (blade part 2m) + Output cord length 3.5m
- Outline drawing Page37



■ Vibration plate type

F TYPE | Vibration plate type

Model No.	WS-600-28F	WS-600-40F	WD-600-40F	WS-600-75F	WS-1200-28F	WS-1200-40F	WD-1200-40F
Generator Model No.	WD-600-28T WS-600-28T	WS-600-40T	WD-600-40T	WS-600-75T	WD-1200-28T WS-1200-28T	WS-1200-40T	WD-1200-40T
Max.input	600W				1200W		
Nominal oscillation frequency	28kHz	40kHz		75kHz	28kHz		40kHz
Effective area(W x Dmm)	350 x 200				420 x 300		
Dimensions(W x D x Hmm)	390 x 240 x 83	390 x 240 x 57		390 x 240 x 83	460 x 340 x 83	460 x 340 x 57	
wires not included	t=2.5mm	t=2.5mm		t=2.5mm	t=2.5mm	t=2.5mm	
Material	Board : SUS304 (SUS316L and hastelloy is available) Gasket : EPDM t=3mm (Viton and others are available)						
Weight	10kg	8kg		10kg	16kg	13kg	

- Liquid temperature : 5 - 100°C
- Transducer : Bolt-clamped Langevin type
- Vibration unit cord length : 3.5m + Output cord length 3.5m
- Outline drawing Page37



■ Tank type

S TYPE | Tank type

Model No.	WS-600-28S	WS-600-40S	WD-600-40S	WS-1200-28S	WS-1200-40S	WD-1200-40S
Generator Model No.	WD-600-28T WS-600-28T	WS-600-40T	WD-600-40T	WD-1200-28T WS-1200-28T	WS-1200-40T	WD-1200-40T
Max.input	600W			1200W		
Nominal oscillation frequency	28kHz	40kHz		28kHz	40kHz	
Effective area(W x Dmm)	366 x 246			500 x 300		
Outer dimensions(W x D x Hmm)	422 x 302 x 405 (including rubber cushion)			550 x 350 x 402 (including rubber cushion)		
Inner dimensions(W x D x Hmm)	366 x 246 x 248 (23L)			500 x 300 x 224 (35L)		
Material	Tank: SUS304 (SUS316L is available)					
Drain valve	Rc 15A (1/2B)			Rc 20A (3/4B)		
Weight	22kg	19kg		39kg	34kg	

- Liquid temperature : 5 - 100°C
- Transducer : Bolt-clamped Langevin type
- Vibration unit cord length : 3.5m
- Option : Cleaning basket (KG10/KG11) Page40



■ Tank type with heater

SH TYPE | Tank type with heater

Model No.	WS-600-28SH	WS-600-40SH	WD-600-40SH	WS-1200-28SH	WS-1200-40SH	WD-1200-40SH
Generator Model No.	WD-600-28T WS-600-28T	WS-600-40T	WD-600-40T	WD-1200-28T WS-1200-28T	WS-1200-40T	WD-1200-40T
Max.input	600W			1200W		
Nominal oscillation frequency	28kHz	40kHz		28kHz	40kHz	
Heater	2kW			3kW		
Effective area(W x Dmm)	370 x 250			500 x 300		
Outer dimensions(W x D x Hmm)	580 x 310 x 406 (including rubber cushion)			710 x 360 x 405 (including rubber cushion)		
Inner dimensions(W x D x Hmm)	370 x 250 x 250 (23L)			500 x 300 x 224 (35L)		
Material	Tank : SUS304 (SUS316L is available)					
Drain valve	Rc 15A (1/2B)			Rc 20A (3/4B)		
Weight	28kg	25kg		46kg	40kg	

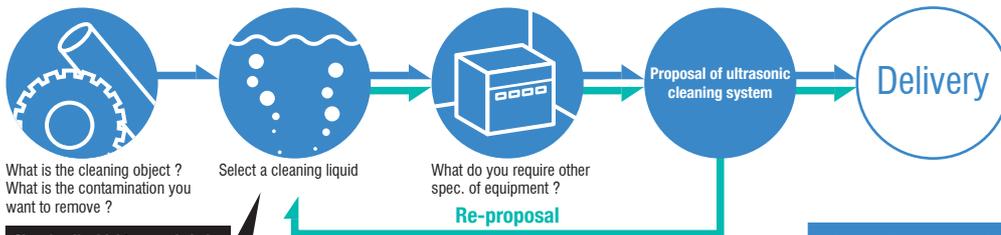
- Liquid temperature : 5 - 100°C
- Transducer : Bolt-clamped Langevin type
- Vibration unit cord length : 3.5m
- Option : Cleaning basket (KG10/KG11) Page40
- *The heater is only for water. Do not use other liquid. * Separate power source for the heater is required.

*All transducers in this page is dia.45 type.
Dia.60 type (WS series 28kHz type) is also available, please contact sales representative.

Special order equipment

Special orders are available for more effective cleaning!!

Flow chart for proposal of appropriate ultrasonic cleaning system



Cleaning liquids' type and choice

Category	Cleaning liquid	Contamination	Feature
Aqueous solution	Alkaline	Grease, cutting chips, dust	Non-combustible The primary ingredient is surface-activating agent.
	Neutral		
	Acidic	Scale Surface treatment for plating	Effluent treatment is necessary.
Hydrocarbon solvent	Isoparaffin solution	Grease Flux	Inflammable but the ignition point is high. Low price and recyclable.
	Normal-paraffin solution		
Other solvent	Flourine solution	Grease, cutting chips and dust	High dissolving power and high drying characteristics. High price but recyclable.
	Bromine solution		High dissolving power and high drying characteristics. High price but recyclable.
	Alcohols		Inflammable but high drying characteristics. Low price



- Overflow**
 It is effective for circulation of liquid and discharging the top dirty layer of liquid in the tank.
- Heater**
 Liquid temperature is set to the ideal condition for better cleaning efficiency.
- Filter**
 The contamination in liquid is collected on a filter and reattaching contamination on work-piece is prevented.
- Swing**
 Unevenness of cleaning is reduced and contamination on work-piece is shocked off by vertical motion of cleaning basket.

Please contact our sales representative for details.

System example

Single-tank vacuum cleaning system



◆ Air inside of a sac hole on the work-piece or in a pocket of fixed parts is released, and then cleaning detergent is sank in vacuum cleaning.

System example

Triple-tank cleaning system



◆ From ultrasonic cleaning, rinsing and temporary drying are performed in one sequence operation

High frequency separate type



W-357HPD W-357-07HPD



Submicron particles are removed

- Operation frequency tracks automatically to the most suitable value and no need of frequency tuning.
- Submicron particles attaching on precision parts can be removed with 740kHz, 1MHz high frequency cleaning, less damages on work-piece.
- High frequency type cleaner developed for the 300mm wafer quartz tank.

Generator

Model No.	W-357HPD	W-357-07HPD
Oscillation system	PLL system	
Rated power output	600W	
Nominal oscillation frequency	1MHz	740kHz
Power source	200-240 VAC	200-240 VAC
	Single phase 50/60Hz 1200VA	Single phase 50/60Hz 1200VA
Dimensions (WxDxHmm)	360 x 400 x 128(including rubber cushion)	360 x 400 x 128(including rubber cushion)
Weight	4kg	4kg

- Output setting range : 100W~600W
- Power cord length : 3.5m
- Communication:RS-485 adopted
- Dimensions drawing Page36

Vibration unit

F TYPE | Vibration plate type

Model No.	W-357HPD-F	W-357-07HPD-F
Generator model No.	W-357HPD	W-357-07HPD
Max.input	600W	
Nominal oscillation frequency	1MHz	740kHz
Effective area(W x Dmm)	126 x 110	
Dimensions(W x D x Hmm) (wires not included)	310 x 250 x 61	
Material	Board : SUS316L	
Weight	3kg	



- Environment for use : Temperature 5 - 50°C
- Transducer : Special PZT
- Vibration unit cord length : 5m
- Dimensions drawing Page37

Vibration unit

S TYPE | Tank type

Model No.	W-357HPD-S	W-357-07HPDS
Generator model No.	W-357HPD	W-357-07HPD
Max. input	600W	
Nominal oscillation frequency	1MHz	740kHz
Effective area(WxDmm)	126x110	
Outer dimensions(WxDxHmm)	310 x 250 x 356	
Inner dimensions(WxDxHmm)	243 x 183 x 254	
Drain valve	1/2 inch	
Weight	14kg	



- 6", 8" and 12" corresponding custom-made vibration units are also available.

Quartz vibration unit cleaner



W-357 -1MQB-SKC W-357 -2MQB-SKC W-357 -3MQB-SKC



High performance type

- Max. power is increased to 240% in comparison with the standard type with cooling function for transducer.
- Frequency is maintained with cooling transducer so that stable continuous running can be achieved.
- <Vibration Unit> Longer operating life since temperature is not changed rapidly with cooling transducer.

Generator

Model No.	W-357-1MQB-SKC	W-357-2MQB-SKC	W-357-3MQB-SKC
Oscillation system	Frequency setting separate excitation oscillation		
Output adjustment	12W		
Nominal oscillation frequency	1MHz	2MHz	3MHz
Power source	100 - 240 VAC Single phase 50 / 60Hz 300VA		
Dimensions (W x D x Hmm)	185 x 265 x 100(including rubber cushion)		
Weight	2.2kg		

Vibration unit

Flow rate	Not specified	
Weight (kg)	Approx. 600g	
Length	Approx. 159mm	Approx. 169mm
Dimension of chuck	dia.24 or 34mm	
Applied area	24 (cm ²)	27 (cm ²)

*Above specifications for W-357-2MQB/3MQB -SKC are the interim specifications, just for reference only.

- Output setting range : 0.1W - 12W
- Environment for use : Temperature 5 - 40°C
- Humidity : 10 - 85%
- Interface Input : Remote control, Flow sensing
- Output : Output power in 4-20 mA, Alarm
- RS-422A communication : Output power control, Irregular output signal, Irregular flow signal
- Attached cable : Power cord (100V/2m or 200V/3m), Control cord(5m)x4

- Liquid Temperature : 20 - 50°C
- Transducer : PZT
- Material : Vibration Unit Quartz, Gasket Silicon rubber, Case PCTFE
- Output cord (from vibration unit) length : 1.5m (PVC) + 3.5m (PVC) with a relay connector



Nozzle type cleaner PULSE JET point type



W-357-1MPD



Standard nozzle

Chemical resistant nozzle

Custom-made

- Transducer performance check capability
- Calibration-free nozzle replacement *Standard nozzle only
- Auto self calibration function
- Corresponding RS-422A, also 4-20mA output is available.

Generator

Model No.	W-357-1MPD
Oscillation system	Self-excitation oscillation (automatic frequency tracking)
Rated power output	40W
Nominal oscillation frequency	1MHz
Power source	100 - 240 VAC Single phase 50/60Hz 300VA
Dimensions (WxDxHmm)	180 x 250 x 100 (including rubber cushion)
Weight	2.2kg

- **Output setting range** : 0.1W - 40W
- **Environment for use** : Temperature 5 - 40°C Humidity : 10 - 85%
- **Interface** Input : Remote control, Flow sensing
Output : Output power in 4-20 mA, Alarm
RS-422A communication : Output power control, Irregular output signal, Irregular flow signal
- **Attached cable** : Power cord (100V/2m or 200V/3m), Control cord(5m)x4

Standard Nozzle

Flow rate (from nozzle)	0.9L/min
Dimensions	dia.25 x 80mm
Nozzle inside diameter	dia.4mm
Weight	300g

- **Liquid temperature** : 20 - 50°C
- **Transducer** : PZT
- **Material** : **Nozzle** PCTFE, PTFE, **Gasket** Perfluoroelastomer, **Vibration plate** Special ceramics
- **Inlet** : Specified tube (Outer dia.6)
- **Output cord (from vibration unit) length** : 5m

Chemical resistant nozzle

	*Custom-made
Flow rate (from nozzle)	1.2L/min
Dimensions	dia.34 x 87mm
Nozzle inside diameter	dia.4.2mm
Weight	300g

- **Liquid temperature** : 20 - 50°C
- **Transducer** : Special PZT
- **Material** : **Wetted part** Quartz, **Joint** PTFE
- **Inlet** : Specified tube (Outer dia.6)
- **Output cord (from vibration unit) length** : 5m

W-357-1.5MPD



- Fine particles are removed high frequency of 1.5MHz, remote controls available with RS-422A

Generator

Model No.	W-357-1.5MPD
Oscillation system	Self-excitation oscillation (automatic frequency tracking)
Rated power output	40W
Nominal oscillation frequency	1.5MHz
Power source	100 - 240 VAC Single phase 50/60Hz 300VA
Dimensions (WxDxHmm)	180 x 250 x 100 (including rubber cushion)
Weight	2.2kg

- **Output setting range** : 0.1W - 40W
- **Environment for use** : Temperature 5 - 40°C Humidity : 10 - 85%
- **Interface** Input : Remote control, Flow sensing
Output : Output power in 4-20 mA, Alarm
RS-422A communication : Output power control, Irregular output signal, Irregular flow signal
- **Attached cable** : Power cord (100V/2m or 200V/3m), Control cord(5m)x4

Nozzle

Flow rate (from nozzle)	0.9L/min
Dimensions	29 x 35 x 92mm
Nozzle inside diameter	dia.4mm
Weight	300g

- **Liquid temperature** : 20 - 50°C
- **Transducer** : PZT
- **Material** : **Nozzle** PCTFE, PTFE, **Gasket** Silicon rubber, **Vibration plate** Tantalum
- **Inlet** : Specified tube (Outer dia.6)
- **Output cord (from vibration unit) length** : 5m

W-357-3MPD



- Fine particles are removed and damage is reduced with 3MHz.

Generator

Model No.	W-357-3MPD
Oscillation system	Frequency setting separate excitation oscillation
Rated power output	40W
Nominal oscillation frequency	3MHz
Power source	100 - 240 VAC Single phase 50/60Hz 300VA
Dimensions (WxDxHmm)	180 x 250 x 100 (including rubber cushion)
Weight	2.2kg

- **Output setting range** : 0.1W - 40W
- **Environment for use** : Temperature 5 - 40°C Humidity : 10 - 85%
- **Interface** Input : Remote control, Flow sensing
Output : Output power in 4-20 mA, Alarm
RS-422A communication : Output power control, Irregular output signal, Irregular flow signal
- **Attached cable** : Power cord (100V/2m or 200V/3m), Control cord(5m)x4

Nozzle

Flow rate (from nozzle)	0.9- 1.5L/min
Dimensions	29 x 35 x 92mm
Nozzle inside diameter	dia.4mm
Weight	300g

- **Liquid temperature** : 20 - 50°C
- **Transducer** : PZT
- **Material** : **Nozzle** Special ceramics, **Gasket** Silicon rubber, **Vibration plate** Special ceramics
- **Inlet** : Specified tube (Outer dia.6)
- **Output cord (from vibration unit) length** : 5m

W-357P-50



- Wide range of cleaning area. Powering up cleaning at medium frequency (400kHz) and high output power(100W).

Generator

Model No.	W-357P-50
Oscillation system	Self-excitation oscillation (automatic frequency tracking)
Rated power output	100W
Nominal oscillation frequency	400kHz
Power source	100 VAC ±10% Single phase 50/60Hz 250VA
Dimensions (WxDxHmm)	232 x 340 x 138 (including rubber cushion)
Weight	6.0kg

- **Output setting range** : Approx.0 - 100%
- **Environment for use** : Temperature 5 - 40°C Humidity : 10 - 85%
- **Rating of contact point for external drive** :
Contact point capacity of ultrasonic oscillation control (Control side) : over 24 VDC 20mA
Contact point capacity of alarm output (Main body) : Photocoupler output capacity below 24 VDC 20mA
- **Attached cord** : Power cord 2m, Overheating prevention cord 5m
External drive cord 5m, Alarm output cord 5m

Nozzle

Flow rate (from nozzle)	3.5L/min
Dimensions	dia.60 x 135mm
Nozzle inside diameter	dia.8mm
Weight	700g

- **Liquid temperature** : 20 - 50°C
- **Transducer** : PZT
- **Material** : **Nozzle** Polypropylene, Special ceramics, **Gasket** Silicon rubber, **Vibration plate** Tantalum
- **Inlet** : Specified tube (Outer dia.13)
- **Output cord (from vibration unit) length** : 5m

Nozzle type cleaner PULSE JET line type

W-357LS-160



Up to 180mm liquid crystal glass can be cleaned with a nozzle.

- Ionization of metal is suppressed because the nozzle is made of PP (Polypropylene).

Generator

Model No.	W-357LS-160
Oscillation system	Transistorized self-excitation oscillation
Rated power output	240W (120W x 2CH)
Nominal oscillation frequency	1MHz ± 100kHz
Power source	200 VAC Single phase 50/60Hz 600VA
Dimensions (WxDxHmm)	358 x 447 x 137 (including rubber cushion)
Weight	15kg

- **Output setting range :** 60W - 120W/1CH
- **Environment for use :** Temperature 5 - 40°C Humidity : Below 80%
- **Rating of contact point for external drive :**
Contact point capacity of ultrasonic oscillation control (Control side) : over 250 VAC 1A
Contact point capacity of alarm output (Main body) : 250 VAC 400mA or 24 VDC 1.25A
- **Attached cord :** Power cord 5m x 1, Overheating prevention cord 5m x 1,
External drive cord 5m x 1, Alarm output cord 5m x 1

Nozzle

Flow rate (from cleaning head)	18L/min
Dimensions (WxDxHmm)	282 x 182 x 105
Dimensions of slit	194 x 2mm
Effective cleaning area	180 x 2mm
Weight	2.7kg

- **Liquid temperature :** 20 - 40°C
- **Transducer :** Special PZT
- **Material :** *cleaning head* Polypropylene,
Gasket Silicon rubber,
Vibration plate Tantalum
- **Inlet :** Specified tube (Inner dia.11, Outer dia.13)
- **Output cord (from vibration unit) length :** 5m x 2

W-357LS-380



Fine particles are removed rapidly with high frequency shower system

- Up to 380mm liquid crystal glass can be cleaned with a nozzle.
- Less metal ion is generated because of that the nozzle is made of PP (Polypropylene).

Generator

Model No.	W-357LS-380
Oscillation system	Transistorized self-excitation oscillation
Rated power output	480W (120W x 4CH)
Nominal oscillation frequency	1MHz ± 100kHz
Power source	200 VAC Single phase 50/60Hz 600VA x 2
Dimensions (W x D x Hmm)	358 x 447 x 137 (including rubber cushion) x 2 devices
Weight	15kg x 2 devices

- **Output setting range :** 60W - 120W/1CH
- **Environment for use :** Temperature 5 - 40°C Humidity : Below 80%
- **Rating of contact point for external drive :**
Contact point capacity of ultrasonic oscillation control (Control side) : over 250 VAC 1A
Contact point capacity of alarm output (Main body) : 250 VAC 400mA or 24 VDC 1.25A
- **Attached cord :** Power cord 5m x 2, Overheating prevention cord 5m x 2,
External drive cord 5m x 2, Alarm output cord 5m x 2, Parallel drive cord 0.4m x 1

Nozzle

Flow rate (from cleaning head)	30L/min
Dimensions (W x D x Hmm)	482 x 182 x 105
Dimensions of slit	400 x 2mm
Effective cleaning area	380 x 2mm
Weight	4.5kg

- **Liquid temperature :** 20 - 40°C
- **Transducer :** Special PZT
- **Material :** *cleaning head* Polypropylene,
Gasket Silicon rubber,
Vibration plate Tantalum
- **Inlet :** Specified tube (Inner dia.11, Outer dia.13)
- **Output cord (from vibration unit) length :** 5m x 4

W-357LS-580



Fine particles in wider area are cleaned and removed

- Up to 580mm liquid crystal glass can be cleaned with a nozzle.
- Less metal ion is less generated because of that the nozzle is made of PP (Polypropylene).

Generator

Model No.	W-357LS-580
Oscillation system	Transistorized self-excitation oscillation
Rated power output	720W (120W x 6CH)
Nominal oscillation frequency	1MHz ± 100kHz
Power source	200 VAC Single phase 50/60Hz 600VA x 3
Dimensions (W x D x Hmm)	358 x 447 x 137 (including rubber cushion) x 3 devices
Weight	15kg x 3 devices

- **Output setting range :** 60W - 120W/1CH
- **Environment for use :** Temperature 5 - 40°C Humidity : Below 80%
- **Rating of contact point for external drive :**
Contact point capacity of ultrasonic oscillation control (Control side) : over 250 VAC 1A
Contact point capacity of alarm output (Main body) : 250 VAC 400mA or 24 VDC 1.25A
- **Attached cord :** Power cord 5m x 3, Overheating prevention cord 5m x 3,
External drive cord 5m x 3, Alarm output cord 5m x 3, Parallel drive cord 0.4m x 2

Nozzle

Flow rate (from cleaning head)	45 - 60L/min
Dimensions (W x D x Hmm)	682 x 182 x 105
Dimensions of slit	600 x 2mm
Effective cleaning area	580 x 2mm
Weight	6kg

- **Liquid temperature :** 20 - 40°C
- **Transducer :** Special PZT
- **Material :** *cleaning head* Polypropylene,
Gasket Silicon rubber,
Vibration plate Tantalum
- **Inlet :** Specified tube (Inner dia.11, Outer dia.13)
- **Output cord (from vibration unit) length :** 5m x 6



Low / Medium frequency desktop type

WEX-250-I (H) WEX-250-II (H)



Honda original "DYNASHOCK MODULATION (DM)" enables uniform cleaning

"DYNASHOCK MODULATION (DM)"

Two frequencies simultaneously generated with optimum power ratio enables to generate uniform ultrasound at high sound pressure in whole tank. That achieves high cleaning efficiency.

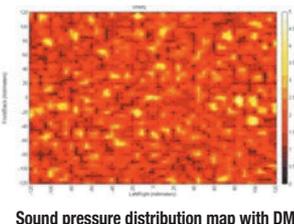
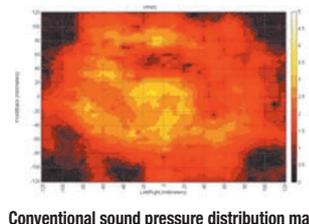
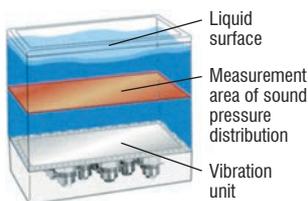


- Desktop type with DM cleaning system.
- Strong power by 28kHz is distributed evenly by 75kHz. Low damage and evenly cleaning is realized.
- Cavitation power by 40kHz and particle acceleration power by 160kHz enables fine and even cleaning.
- Desktop type is suitable for simple test at laboratory.

Model No.	WEX-250-I (H)	WEX-250-II (H)
Oscillation mode	DYNASHOCK MODULATION (DM)	
Rated power output	250W	
Nominal oscillation frequency	28kHz & 75kHz	40kHz & 160kHz
Power source	100 VAC 750VA Single phase 50/60Hz	
Heater	250W (ON / OFF selectable)	
Outer dimensions(W x D x H:mm)	339 x 365 x 330 (including rubber cushion)	339 x 365 x 355 (including rubber cushion)
Inner dimensions(W x D x H:mm)	300 x 240 x 150 (10.5L)	300 x 240 x 150 (10.5L)
Drain valve	15A (1/2B) hose nipple	
Weight	12kg	11kg

- **Accessories** : Lid, Drainboard
- **Max. Liquid temperature** : 80°C
- **Timer** : Selectable 1 - 30 min (1 min step)
- **Option** : Cleaning basket (KG14), Beaker stand (BR03), Beaker (BK02) ●Page40
- **Transducer** : Bolt-clamped Langevin type
- **Power cord length** : 2m
- **Tank material** : SUS304

Ultrasonic power distribution



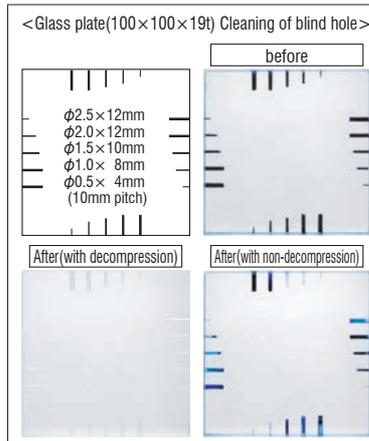
Low Frequency desktop type

WV-231H



Pressure reduction function is adopted (Exclusive for aqueous solution)

■ Cleaning data



- Minute holes or sac holes, which could not be cleaned with conventional ultrasonic cleaner, can be cleaned.
- Cavitation effect (one of cleaning elements) of ultrasonic cleaner is accelerated.
- The contamination is removed instantly with a sequence of normal pressure and decompression.

Model No.	WV-231H
Oscillation mode	Single frequency oscillation
Rated power output	300W
Nominal oscillation frequency	40kHz
Power source	100 VAC 800VA Single phase 50/60Hz
Heater	300W
Outer dimensions(W x D x H:mm)	380 x 355 x 440 (including rubber cushion)
Inner dimensions(W x D x H:mm)	300 x 240 x 250 (15L)
Drain valve	Rc 15A (1/2B)
Weight	25kg

- **Max. Liquid temperature** : 70°C
- **Timer** : 0 - 30 min or continuous
- **Switching of decompression/normal pressure** : 1 cycle (Decompression 5 min/Normal 0.5 min)
- **Power cord length** : 2m
- **Material** : Tank : SUS304, Lid : Polycarbonate
- **Option** : Cleaning basket (KG13), Beaker stand (BR05) ●Page40
- **Transducer** : Bolt-clamped Langevin type
- **Degree of vacuum** : 50kPa



WT-100-M
WT-200-M
WT-300-M



Resonant dual frequency reduces unevenness of cleaning.
High performance in sophisticated models



- SOFT, RHYTHM, POWERFUL (single frequency, single frequency on and off, switching dual frequencies), triple oscillation modes are adopted and a most suitable mode is selected for cleaning objects.
- 28kHz is suitable to clean persistent dirt, 45kHz is effective to clean fine dirt. Unevenness of cleaning occurred by standing wave is prevented by switching oscillation of these 2 frequencies repeatedly. Damage on work-piece and the cleaning tank by erosion is reduced.
- Simple and practical sophisticated design.

Model No.	WT-100-M	WT-200-M	WT-300-M
Oscillation mode	SOFT (single frequency 45kHz oscillation) RHYTHM (single frequency 45kHz ON/OFF oscillation) POWERFUL (switching dual frequencies)		
Rated power output	100W	200W	300W
Nominal oscillation frequency	28kHz, 45kHz		
Power source	100 VAC 325VA Single phase 50/60Hz	100 VAC 650VA Single phase 50/60Hz	100 VAC 1200VA Single phase 50/60Hz
Heater	125W	250W	500W
Outer dimensions(W x D x Hmm)	279 x 265 x 310 (including rubber cushion)	339 x 365 x 330 (including rubber cushion)	544 x 425 x 410 (including rubber cushion)
Inner dimensions(W x D x Hmm)	240 x 140 x 150 (5L)	300 x 240 x 150 (10.5L)	505 x 300 x 200 (29.5L)
Drain valve	15A (1/2B) hose nipple		
Weight	7kg	10kg	15kg

- Accessory : Drainboard
- Max. Liquid temperature : 80°C
- Transducer : Bolt-clamped Langevin type
- Timer : Selectable 0 - 60 min (1 min step)
- Power cord length : 2m
- Tank material : SUS304
- Option : Cleaning basket (KG04/KG06/KG07), Lid (FT01/FT03/FT04), Beaker stand (BR02-BR04), Beaker (BK02) ▶Page40



WT-600-40
WT-1200-40

Significant output of 600W / 1200W



- Desktop type which has significant output (output control 30 - 100%), large size instruments or parts are applicable.
- Cleaning power is stable with auto-tracking oscillation frequency and output setting.
- Circulation system can be expanded with a drain installation hole for overflow.



Model No.	WT-600-40	WT-1200-40
Oscillation mode	Single frequency oscillation	
Rated power output	600W	1200W
Nominal oscillation frequency	40kHz	
Power source	100 VAC 1200VA Single phase 50/60Hz	200 VAC 2400VA Single phase 50/60Hz
Outer dimensions(W x D x Hmm)	600 x 410 x 472 (including rubber cushion)	800 x 460 x 472 (including rubber cushion)
Inner dimensions(W x D x Hmm)	400 x 350 x 272 (40L)	610 x 400 x 268 (69L)
Drain valve	20A (3/4B) valve	25A (1B) valve
Weight	40kg	55kg

- Liquid temperature : 5 - 80°C
- Transducer : Bolt-clamped Langevin type
- Output setting range : 200W - 600W
- Timer : 10, 20, 30 min or continuous
- Operation switch : ON/OFF by photoelectric sensor (with Japanese voice guide)
- Power cord length : 3.5m
- Tank material : SUS304
- Option : Cleaning basket (KG08/KG09), Lid (FT05/FT06), Frame (DA01/DA02), Immersible type heater (NH01/NH02) ▶Page40

Cleaning

Processing

Measuring

Drawings

Options

W-113 SANPA



Compact type of multi-oscillations - triple frequency (SANPA)

*SANPA: Multiple Frequency

- Unevenness of cleaning occurred by standing waves is prevented with multi-oscillation system.
- Any oscillation time with 3 frequencies can be set, most suitable cleaning time for work-piece can be selected.



Model No.	W-113 SANPA
Oscillation mode	Single oscillation / Oscillation with switching triple frequency in order
Rated power output	100W
Nominal oscillation frequency	28kHz, 45kHz, 100kHz
Power source	100 VAC 200VA Single phase 50/60Hz
Outer dimensions(W x D x Hmm)	290 x 208 x 249 (including rubber cushion)
Inner dimensions(W x D x Hmm)	240 x 140 x 100 (3L)
Drain valve	Inner dia.6 / Outer dia.12
Weight	4.4kg

- **Accessory** : Lid
- **Max. Liquid temperature** : 80°C
- **Transducer** : Bolt-clamped Langevin type
- **Timer** : Total cleaning time : 1 - 30 min
Each frequency set time : 1 - 99 sec
- **Power cord length** : 2m
- **Material** : Tank : SUS304, Lid : Polycarbonate
- **Option** : Cleaning basket (KG03),
Beaker stand (BR01), Beaker (BK02) ▶Page40

W-113 MK-II



Neighboring dual frequency is effective for persistent contamination.



- High-speed switching oscillation and tremendous energy are generated instantaneously. High cleaning efficiency can be achieved.
- Inside of narrow tube and through-hole board can be cleaned.

Model No.	W-113MK- II
Oscillation mode	Single frequency High speed switching oscillation
Rated power output	110W
Nominal oscillation frequency	24kHz, 31kHz
Power source	100 VAC 50/60Hz 200VA
Outer dimensions(W x D x Hmm)	290 x 208 x 249 (including rubber cushion)
Inner dimensions(W x D x Hmm)	240 x 140 x 100 (3L)
Weight	4.4kg

- **Accessory** : Lid
- **Max. Liquid temperature** : 80°C
- **Transducer** : Bolt-clamped Langevin type
- **Timer** : 1 - 99min (1min step)
- **Power cord length** : 2m
- **Material** : Tank SUS304 Body, Lid Polypropylene
- **Option** : Cleaning basket (KG03),
Beaker stand (BR01), Beaker (BK02) ▶Page40

W-170ST



With one-touch, Simple compact cleaner



- Simple operation, just select 5 or 10 min cleaning time
- Small & light weighted design for a limited space



- **Accessories** :
Beaker stand, Lid,
Drainboard

Model No.	W-170ST
Oscillation mode	Single oscillation
Rated power output	70W
Nominal oscillation frequency	40kHz
Power source	100 VAC 50/60Hz 100VA
Outer dimensions(W x D x Hmm)	243 x 192 x 173 (including rubber cushion)
Inner dimensions(W x D x Hmm)	170 x 100 x 80 (1.3L)
Weight	2.0kg

- **Max. Liquid temperature** : 80°C
- **Transducer** : Bolt-clamped Langevin type
- **Timer** : 5 / 10min
- **Power cord length** : 1.5m
- **Material** : Tank SUS304 Body, Lid Polypropylene
- **Option** : Cleaning basket (KG02), Beaker (BK01) ▶Page40

W-2121



New concept cleaner called ULTRASONIC ROTARY CLEANER



- Various cleaning can be done with sorted bottles for different applications
- Easy detergent change
- Uniformity cleaning can be done with rotation of bottle
- Built in overheating protection

■ Accessory : Bottle x3



Model No.	W-2121
Oscillation mode	Single oscillation
Rated power output	20W
Nominal oscillation frequency	40kHz
Power source	100 VAC 50/60Hz 70VA
Dimensions (WxDxHmm)	135 x 300 x 135 (including rubber cushion) (Bottle include:135 x 300 x 160)
Weight	1.6kg

- **Transducer** : Bolt-clamped Langevin type
- **Timer** : 3 / 5min
- **Revolution of bottle** : Approx.8 (r/min)
- **Power cord length** :1.5m

Dedicated cleaning bottle

Outer dimensions	dia.77 x 170mm
Net	650ml
Material	Bottle, Lid: Polypropylene Gasket: PE forming agent with PP film

- **Liquid temperature** : 5 - 50°C
- *It is not available for high permeability solutions.
- **Option** : Blister pack for eye glasses cleaning (MB01)
Blister pack for small parts cleaning (KB01)
Inner cleaning bottle (SUB01)
Cleaning bottle with rake (RB01)
Cleaning bottle with rake (RB02)
- ▶Page40

SONIC MONITOR -Adjustment and inspection / Quality control for cleaner-

HUS-3

Sonic monitor

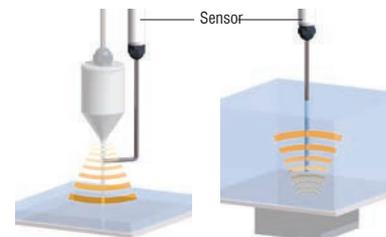


HUS-3 Main unit

A must for quality control of cleaning Portable type with rechargeable battery



- Applicable for a wide range of frequencies from 10kHz to 5MHz.
- It is usable with rechargeable battery in various places.
- Dipping a sensor tip into liquid for checking sound pressure.
- Customized length of sensor is available.



Putting the sensor into ultrasonic cleaning tank (or flowing water), ultrasonic power which is generated inside the tank is indicated as mV.

Main unit

Model number	HUS-3
Frequency characteristic	10kHz - 5MHz
Power source	Dedicated lithium battery DC14.8V 1.5W
Measurement range	10mV / 50mV / 100mV / 500mV
Meter indication value	Sensor detecting voltage (mV) rms
Dimensions (W x D x Hmm)	179 x 132 x 55
Weight	640g (including battery)

- **Accessories** : Rechargeable AC adpoter (JA01), Dedicated lithium battery (JP01)
- **Liquid temperature** : 5 - 40°C
- **Battery charger** : Rechargeable AC adpoter / BT-024
- **Option** : Point sensing cover ▶Page41

Point sensing cover



* Cover for specifying check point (for straight type only)

Sensor

Model number	HUS-5 SPS	HUS-5 SPL	HUS-5 SUS	HUS-5 SUL
Shape	Straight	L shape	Straight	L shape
Material	Quartz glass		SUS316L	
Length (mm)	340	260 (L shape part: 80)	340	260 (L shape part: 80)
Weight	80g		140g	
Not applicable liquid	Heated strong alkali, hot phosphoric acid, hydrofluoric acid		All acid	

- **Liquid temperature** : 0 - 70°C
- **Cord length** : 1.5m
- * Calibration N/A.
- * Constant drop-in a tank might cause failure.
- * indicated value is not absolute, but relative value.



Quartz glass sensor

SUS sensor

* The sensor shape, straight or L shape type, is selected.

Ultrasonic tools -Power application of Ultrasonic-

Transfer the ultrasonic vibration towards medium (liquid, solid or gas) and utilize the power of motion.

Typical application is cutting, welding, atomization along with cleaning.

Characteristics of ultrasound

- Carries better in higher density medium. gas < liquid < solid
- In gas or liquid, it appears as longitudinal wave. In solid, it appears as longitudinal wave, shear wave or some other shape.
- High sound pressure and strong power with small displacement
- The larger displacement, the farther transferred when the frequency is the same.

Ultrasonic cutting

▶ p23



Ultrasonic atomizer



Ultrasonic
×
tools

Ultrasonic cleaning

▶ p 4



Ultrasonic reactor



Ultrasonic welding

▶ p24



Extraction,
Reforming,
Penetration

Ultrasonic mating (press fit) equipment



Cutting

Ultrasonic vibration added to a blade reduces the friction towards the object and cutting ability extremely increase (acceleration).

Welding

Adding ultrasonic vibration to a work, attaching surface to another work will have heat instantly generated by friction between the works. They will melt and welded. (case of plastic work)

Ultrasonic cutting

Ultrasonic cutter

USW-334



Cut with ultrasonic vibration

The principle of ultrasonic cutting is simply explained by "Ultrasonic vibration applied to a blade enables smooth and easy cutting." Commonly, the frequency used for ultrasonic cutting is 17 to 60kHz, and the vibrational amplitude is approximately 5 to 30 μm (Frequency indicates the number of vibrations per second, and vibrational amplitude indicates the intensity of the vibration).

* The material that cannot be cut by the blade is still uncut with ultrasonic vibration.

Suitable product for personal use by its affordable price and easy operation

- Fast vibration of 40,000 times per second enables a smooth cutting with gentle force and a sophisticated finish.
- The handpiece can be placed in the holder and the compact design allows to use almost everywhere.

Applicable resins and thickness (reference)

- Resin: ABS, PP, PET, acrylic
- Thickness: 3 mm or less

Cutting performance of the resins listed above depend on conditions such as ambient temperature and hardness of workpiece. If other resins have to be cut, please contact us in advance.

Main applications and usage examples

- Gate cutting, deburring plastics, small parts and other components
- Cutting plastic models
- Cutting films, sheets, clothes, etc.
- Pattern cutting of substrates, etc.



Model No.	USW-334
Oscillation method	Self-excited
Rated power output	20W
Nominal oscillation frequency	40kHz
Power source	100 VAC 50/60Hz 30VA
Dimensions(WxDxH)mm main unit	134 x 101 x 71(including rubber cushion)
handpiece	dia.34x139
Weight	540g

- **Accessories:** Standard blade, Blade fixture, blade fixing screws, hexagon wrench (Page41)
- **Transducer:** Bolt-clamped Langevin type
- **Drive switch:** Push switch
- **Environment for use:** 5 - 45°C
- **Protective equipment:** Thermostat
- **Power cord length:** 1.4m
- **Output cord length:** 0.5m(Curl cord)
- **Option:** Blade (see Blade selection) (Page41) Carrying case (CB02)

Ultrasonic cutter

USW-335Ti



Aluminum carrying case

Foot switch

High-performance ultrasonic cutter for professional use

- Fast vibration of 22,000 times per second enables a sophisticated finish with gentle force.
- Main body and all accessories can be stored in the aluminum case.
- Foot switch enables easy operation.

Applicable resins and thickness (reference)

- Resin: ABS, PP, PET, acrylic
- Thickness: 3 mm or less

Cutting performance of the resins listed above depend on conditions such as ambient temperature and hardness of workpiece. If other resins have to be cut, please contact us in advance.

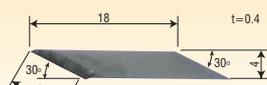


Model No.	USW-335Ti
Oscillation method	Self-excited
Rated power output	30W
Nominal oscillation frequency	22kHz
Power source	100 VAC ± 10% 50/60Hz 100VA
Dimensions(WxDxH)mm main unit	235 x 270 x 135 (Aluminum case)
handpiece	dia.25 x 190
Weight	3.1kg

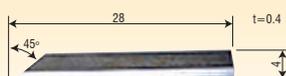
- **Accessories:** Standard blade, Blade fixture, blade fixing screws, hexagon wrench (Page41)
- **Transducer:** Bolt-clamped Langevin type
- **Drive switch:** Foot switch
- **Environment for use:** 5 - 45°C
- **Protective equipment:** Thermostat
- **Power cord length:** 1.5m
- **Output cord length:** 1.4m
- **Option:** Blade (see Blade selection) (Page41)

*230V version is available.

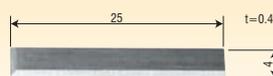
Blade selection



Standard blade (HA04)
Material : SK-2
Used for : USW-334/USW-335Ti
USW-334ek



Long blade (HA09)*
Material : SKH
Used for : USW-334/USW-335Ti



Square blade (HA08)*
Material : SKH
Used for : USW-334/USW-335Ti



Round tip blade (HA10)*
Material : SKH
Used for : USW-334/USW-335Ti



Carbide blade (HA07)
Material : Tungsten carbide
Used for : USW-334/USW-335Ti
* Highest abrasion resistance and used in a wider range of applications than steel
* Without conductivity and magnetism



U-shaped gouge (HAE01)
Material : SKH
Used for : USW-334ek



V-shaped gouge (HAE02)
Material : SKH
Used for : USW-334ek

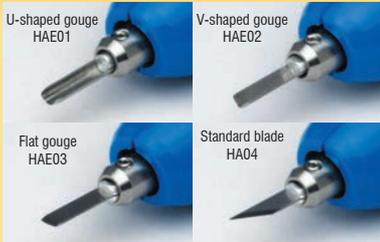


Flat gouge (HAE03)
Material : SKH
Used for : USW-334ek

*When a blade is set in a handpiece, the effective length of the blade is shorten to 11mm

Ultrasonic engraving knife

USW-334ek



Easy engraving with ultrasound

- Fast vibration of 40,000 times per second enables smooth cutting with gentle force and a sophisticated finish.
- Special portable case makes it easy to carry anywhere.
- The handpiece can be placed in the holder and the compact design allows to use almost everywhere.
- Adjustment is not required, just switch on. Even a beginner can use without any special preparation.
- Proceeded surface with ultrasound can be protected from burning and melting.

Model No.	USW-334ek
Oscillation method	Self-excited
Rated power output	20W (brust oscillation)
Nominal oscillation frequency	40kHz
Power source	100 VAC 50/60Hz 30VA
Dimensions(WxDxHmm) main unit	134 x 101 x 68 (including rubber cushion)
handpiece	dia.28 x 124
Weight	540g

- **Accessories:** Spare blade 4 different kinds, Blade fixture 3 different kinds, Carrying case, blade fixing screws, hexagon wrench, sand paper (Page41)
- **Transducer:** Bolt-clamped Langevin type
- **Drive switch:** Push switch
- **Environment for use:** 5 - 45°C
- **Protective equipment:** Thermostat
- **Power cord length:** 1.4m
- **Output cord length:** 0.5m(Curl cord)
- **Option:** Blade (See Blade selection Page 23) (Page41)

Main applications and usage examples

- Holing thin plastic sheet and paper
- Engraving moulded objects
- Cutting PCB circuit
- Deburring plastic and small component
- Engraving wood and paper

• Case example



"Burst" (intermittent) oscillating function

Ultrasonic engraving knife is loaded "burst" oscillation function, which is rapid intermittent operation (on/off) of ultrasonic oscillation. The functions enables not only smooth cutting without melting and burning, but it is easy to grave even slippery surface.

Ultrasonic welder

Portable ultrasonic welder

SONAC-37

Sonic Sealer



Utilizing the vibration power of ultrasound

Ultrasonic vibration will generate instant heat at the welding part of objects by friction and the heat will melt the material and welded. No pre-heat, no standby time required. It is safe since it has no heater. Also, secure for food industry because of no needle, staple or adhesive.

Easy packaging with safety, energy saving and ecology

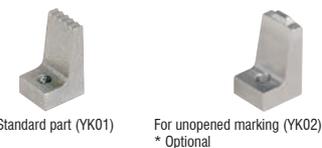
- Safe and easy welding with ultrasonic vibration (60,000 times per second).
- Handpiece can be placed in the main body and is easy to use because of light weight and compact size.
- Metal staples is not used and it is safe for food industry.
- Safe and durable because vibration stops when there is no work object.
- Unseal check of fit package (Optional).

Model No.	SONAC-37
Oscillation method	Self-excited
Rated power output	20W
Nominal oscillation frequency	57kHz
Power source	100 VAC 50/60Hz 30W
Dimensions(WxDxHmm) main unit	70 x 220 x 165
handpiece	32 x 125 x 49
Weight	920g

- **Accessories:** Welder clasp(YK01) (Page41)
- **Transducer:** Bolt-clamped Langevin type
- **Protective equipment:** Thermostat, Blank welding prevention function
- **Effective welding range:** 6 x 3mm
- **Power cord length:** 1.5m
- **Output cord length:** 0.5m(Curl cord)
- **Option:** Welder clasp (YK02) (Page41)

Main applications and usage examples

- Food packages (OPS, A-PET)
- Temporal tacking of synthetic clothing
- Sealing of plastic bags (vinyl)
- Blister packages
- Industrial film
- Resin tape (tag, garden tape)



• Case example



Food package

Nonwoven cloth

Plastic bag

Ultrasonic plastic welder



SONAC-200

Welding in various fields

- Selectable from system built-in type (A type) or manual type (H type).
- Welding, riveting, swaging plastic products and insertion of metal parts.
- Generator with constant amplitude circuit keeps welding stable.

Generator

Model No.	SONAC-200
Oscillation method	PLL auto-tracking oscillation
Rated power output	200W
Nominal oscillation frequency	28kHz
Power source	100 VAC ±10% 50/60Hz
Dimensions(WxDxHmm) main unit	300 x 308 x 107
Weight	4kg

- **Transducer:** Bolt-clamped Langevin type
- **Protective equipment:** Thermostat
- **Variable vibration amplitude:** 50 - 100%
- **Timer:** 0.1 sec-
- **Power cord length:** 2m
- **Option:** Exponential horn, Foot switch (FS01), Handpiece stand (HS01) [Page41](#) alarm cord

Handpiece

Model No.	A type	H type
Dimensions	dia.42 x 238 (excluding horn and cord)	
Weight	0.9kg (excluding horn)	0.7kg (excluding horn)
Output cord length	5m (Flex resistant cord)	1.5m
Accessory	Remote control cord(2m)	-



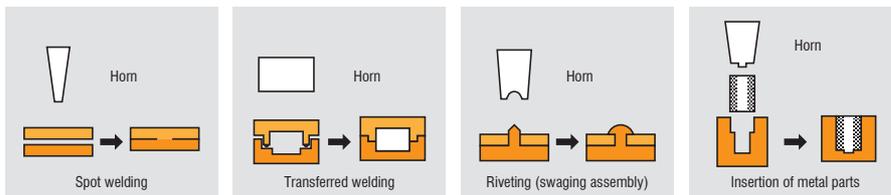
H type



A type

Main applications and usage examples

- Welding, swaging resin parts and insertion of metal parts.



● Exponential horn(Option)



● Applied horn(Custum-made)



For spot welding

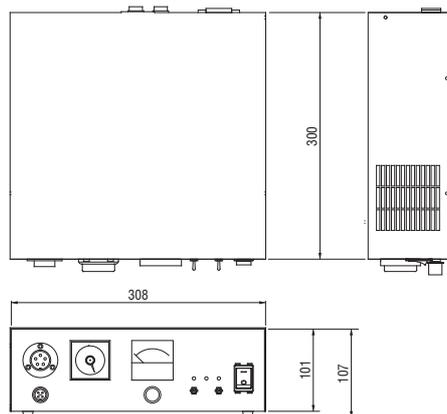


For sealing

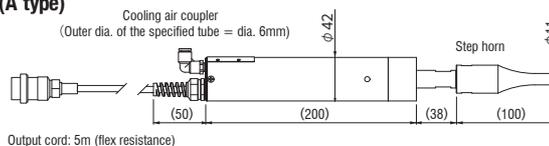
Horn can be designed and manufactured according to the applications and specifications based on requirement.

Outline Drawing

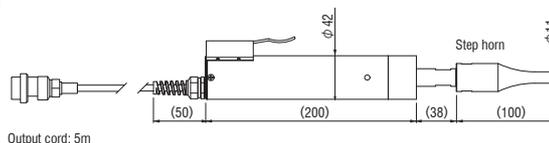
■ Generator



■ System built-in type (A type)



■ Manual type (H type)



Cleaning

Processing

Measuring

Drawings

Options

Measuring instruments -signal processing application-

Transfer the ultrasonic vibration towards medium (liquid, solid or gas) and analyze its behavior as signal.

Typical application is level meter, concentration meter, flow meter, flaw detection device, fish finder, medical image diagnostic equipment, bubble detector and so on.

Characteristics of ultrasound

- Sound speed is slower than light or radio wave and the measurement result is accurate.
- Wave length is shorter and more directional compared to audible frequency.
- Propagation attenuation is larger and covering range is shorter than audible frequency.

Ultrasonic × measuring instruments

Level meter

- Level meter ▶ p27
- Interface level meter ▶ p30



Concentration meter

▶ p31



Flowmeter

▶ p32



Depth sounder

- Measurement in water ▶ p29



Ultrasonic flaw detecting with image equipment

▶ p34



Level meter

■ Level meter

Ultrasonic sensor is physically non-contact to the target, so it enables continuous measurement in dusty environment.

■ Interface level meter

Measures the invisible interface level under non-transparent water in deep tank without hanging down the sensor.

Concentration meter

Measures the suspending object (solid or gas) concentration in the flow by the measurement of attenuation of ultrasonic signal. It suits for high concentration measurement.

Flowmeter

Measures the delay of sound propagation that indicates the flow speed and calculate the volume.

Ultrasonic flaw detecting with image equipment

Non-destructive measurement inside material utilizing the characteristic of ultrasound wave, it reflects at the boundary of different material.

Depth sounder

■ Measurement in water

Measures the delay time of echo signal from the bottom and calculate the distance to the bottom. Not only ship mounting type, handy type is available.

Ultrasonic Level Measurement

Principle

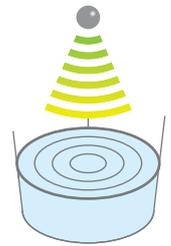
Sensor transmits ultrasonic signals to the object or material, and then the sensor receives the reflected signals. The time of this sequence of actions is measured so that liquid level / remained liquid level / powder can be monitored.

$$\text{Distance} = \text{Sound speed} \times \text{time}$$

The distance to the object is calculated from the sound velocity and the time elapsed between signal transmission and receipt. The distance to the bottom of the tank is set in advance to measure remained liquid level in the tank.

Advantages

- Non-contact with the material to be measured
- Continuous measurement can be done under severe environment.
- e.g. tanks under dust generation. Making it considerably easier to measure cloudy sewage water or a deep tank.



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HD1200



■ TS12-5



■ TS21-5



■ TS40T-5



■ TS40-5



Stable measurement with DSP

- DSP gives the unique level detection algorithm and the stable measurement by the rejection of noise and the undesired reflection.
- By one main unit with 2 different sensors, 2 different measurement ranges at different locations can be measured.
- Log data can be stored on a micro SD™.



Applications and examples

- Liquid / powder level management of the tank inside the machine
- Water level measurement for lakes, ponds and rivers
- Open channel flow measurement



■ Liquid level measurement



■ Powder level measurement



■ Application to large weir

Model No.		HD1200
Number of channels		2
Frequency		10 - 60kHz transducer dependant
Object to be measured		Liquid / Power
Resolution	Measurement	1mm
	Display	1mm
Accuracy		±0.25% (±3cm)
Data update cycle		Approx. 2sec transducer dependant
Power source	Voltage	100 - 240 VAC ±15%
	Power consumption	10VA
Display		LCD
Output	Alarm output	4 lines for each channel 250 VAC, 5A (Relay contact)
	4-20mA current output	Resolution 1/4000 RL(Max)=600Ω
Interface		RS-485 (Max transmission range: 1,200m) RS-232C (Max transmission range: 10m)
Communication		microSD™

Model No.		HD1200
Operating ambient temperature		-20 - +70°C
Material		ABS
Structure		IP66 equivalent
Dimensions(WxDxHmm)		176 x 84 x 237
Weight		1.8kg

*Open channel flowmeter function is provided to CH1 only.

Model No.	Sensor			
	TS40-5	TS40T-5	TS21-5	TS12-5
Frequency	40kHz	40kHz	21kHz	12kHz
Measurement distance range (1/2 for powder)	0.3 - 20m	0.3 - 15m	0.6 - 40m	1.2 - 60m
Sensor directivity angle (beam angle)	12°	22°	14°	
Operating ambient temperature	-20 - +70°C		-20 - +60°C	
Material	Epoxy,PP	PVDF	PVC and others	PVC and others
Structure	IP68 equivalent	IP66 equivalent	IP53 equivalent	
Dimensions(WxDxHmm)	dia.84 x 90mm	dia.98 x 87mm	dia.145 x 120mm	dia.264 x 181mm
Sensor cord length	5m			
Weight	500g	860g	290g	1kg
Sensor attachment screw (old JIS)	R1 (PT1)		G1 (PF1)	

*Any sensor cannot be used under the hydrofluoric atmosphere.

*Please do not hesitate to consult us regarding the extension of sensor cable.

**microSD™ is a trademark or a registered trademark of SD card Association.

HAL420

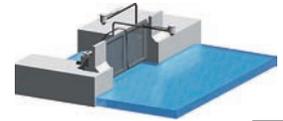
Total cost reduction with the two-wire system

- The two-wire system helps reduce costs associated with installation, wiring and operations.
- The sensor body is composed of chemical resistant resin PP * Polypropylene.
- High resolution(1mm) display / measurement.
- The sensor and the control unit is integrated into a compact, lightweight unit.



Applications and examples

- Liquid level management — e.g. tank liquid levels
- Water level measurement for lakes, ponds or rivers
- Water level management in a sewer



■ Liquid level measurement

■ Riverine water level management



Model No.	HAL420
Number of channels	1
Frequency	50kHz
Object to be measured	Liquid
Measurement distance range (1/2 for powder)	0.3 - 6.5m
Resolution	Measurement: 1mm Display: 1mm
Accuracy	±0.25% (±1.63cm)
Data update cycle	1 sec
Sensor directivity angle (beam angle)	14°
Power source	Voltage: 16 - 32 VDC Power consumption: 0.64W
Display	4-digit LCD 12 bit
Output	4-20mA current output RL(Max)=500Ω (24V 2 wire-system)

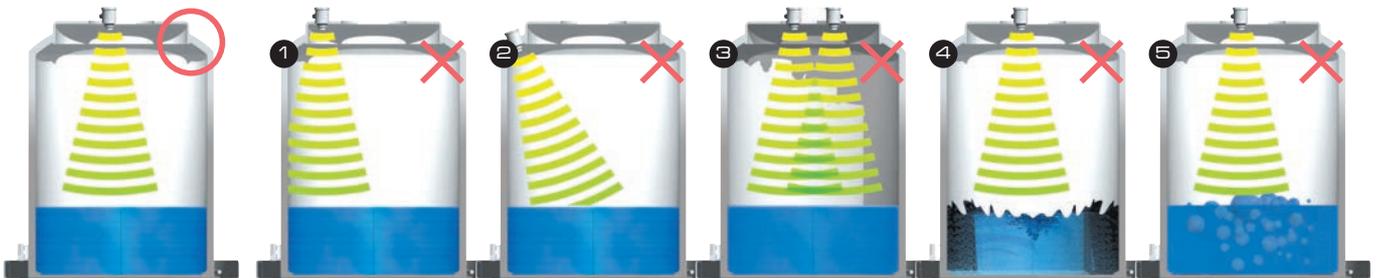
Model No.	HAL420
Operating ambient temperature	-20 - +60°C
Material	Polypropylene
Structure	IP66 equivalent (without lid: IP20 equivalent)
Dimensions	dia.93 x 110mm
Distribution cord length	10m
Weight	350g
Sensor attachment screw	G2 (PF2)

What is a two-wire system?

A two-wire system is a signal transmission system in which power for the amplifier drive is taken from the current output signal, eliminating separate power source wiring.

*Please do not mounting on a metal nut, a flange and etc. It becomes a cause of malfunction. Please contact us for mounting on metal screws and flanges

Ultrasonic Level Meter - Notes on sensor installation



• Avoid obstacles

Make sure that no obstacles are interfered within the directivity angle of the sensor of the ultrasonic level meter. (1)

• Make sure the sensor position

Make sure the transmitting/receiving plane of the ultrasonic sensor is arallel to the object to be measured. Do not install a sensor in the center of a tank. (2, 4)

• Do not install more than one sensor

Multiple ultrasonic sensors in a tank will interfere with another one. (3)

• Avoid strong water movements or bubbles

Swirling water and bubbles might have bad effect on precise measurement. (4, 5)

Ultrasonic level meter selection guide

	Measurement distance range											
	0m	2m	5m	10m	20m	60m						
HAL420	0.3	6.5					One Unit (P28)				
HD1200 with TS40-5	0.3	20					2CH	Open channel function	RS-232C	RS-485	microSD™ (P27)
HD1200 with TS40T-5	0.3	15					Chemical-resistance	2CH	Open channel function	RS-232C	RS-485	microSD™
HD1200 with TS21-5	0.6	40					2CH	Open channel function	RS-232C	RS-485	microSD™ (P27)
HD1200 with TS12-5	1.2	60					2CH	Open channel function	RS-232C	RS-485	microSD™ (P27)

Please select the model that the desired measurement distance is around the middle of covering range.

Water depth measurement

Ultrasonic depth sounder HFD700



Principal

The ultrasound transmitted from a transducer is reflected at sea bottoms and received by the transducer. Depth sounder converts the transit time between a transmission and a reception to a distance, and indicates a depth.

Advantages

Non-contact measurement for water depth, so it is suitable for a wide range of work sites.

Suitable for various measurement sites



- Non-contact measurement for water depth, so it is suitable for a wide range of work sites.
- RS-232-C port is provided as part of the standard configuration. Data can be transferred to PC.



■ Depth measurement at dam (unit is installed on ship hull)



■ Water depth measurement at construction site

Applications and examples

- Water depth measurement for rivers, lakes or sea

Model No.	HFD700	
Number of channels	1	
Frequency	200kHz	
Object to be measured	Bottom of water	
Measurement distance range (1/2 for powder)	0.5 - 99.9m	
Resolution	Measurement	1cm
	Display	10cm
Accuracy	±2% F.S. (±2m)	
Data update cycle	0.33 sec	
Sensor directivity angle (beam angle)	15°	
Power source	Voltage	12 - 24 VDC ± 15%
	Power consumption	3W
Display	3-digit LED	
Output	Alarm output	Upper / lower limit relay contact output
		30 VDC 0.1A
	4-20mA current output	8 bit RL(Max)=300Ω
Interface	RS-232C (Max transmission range: 10m)	

Model No.	Main unit	Sensor
Operating ambient temperature	-20 - + 60°C	
Material	Aluminum case	Chloroprene rubber and ABS
Structure	IP40 equivalent	IP68 equivalent
Dimensions (WxDxHmm)	100 x 55 x 77.4	53 x 73 x 47
Sensor cord length	-	6m
Max sensor cord length	-	6m
Distribution cord length	10m	-
Weight	200g	320g
Sensor attachment screw	Fixed with screws	

* Varies depending on measuring site.

Ultrasonic depth sounder PS-7 series



Suitable for water depth measurement at remote location in conjunction with float sensor

- Tough design with 50 m waterproof and anti-impactness allows comfortable and handy use (PS-7).
- Distance can be measured by pointing the sensor toward the object and sliding the power switch for a few seconds.
- * In case that the object to be measured is slime, seaweed, etc., measurement might be failed.
- Dry-cell battery, S-006P, is used. Power is turned off automatically for approx. 10 seconds after the power switch is released.
- Float sensor with anti-impactness is adopted. Remote measurement with 10m cable (PS-7FL).

Applications and examples

- Water depth measurement at construction site and survey site



Model No.	PS-7	PS-7FL
Number of channels	1	
Frequency	200kHz	
Object to be measured	Bottom of water	
Measurement distance range (1/2 for powder)	0.6 - 80m	
Sensor directivity angle (beam angle)	24°	15°
Power source	Voltage	9 VDC Battery(S-006P)
Display	LCD	

Model No.	PS-7	PS-7FL
Operating ambient temp.	0 - 50°C	
Dimensions (WxDxHmm)	dia.42 x 198	Main unit : dia.42 x 198 Float sensor : dia.50 x 155
Sensor cord length	-	10m
Weight	190g	Main unit : 170g Float sensor : 320g

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Ultrasonic measurement in water

Ultrasonic interface level meter HL2000



Principle

Ultrasonic waves reflect off interface between different media. Sensor placed underwater transmits the ultrasonic signals, the signals reflect off the interface, and the sensor receives the reflected signals. The main unit measures the elapsed time and calculates the sediment level.

Advantages

- Measurement is done without any contact to the sediment. The sensor does not need to be lowered into the sediment.
- Making it considerably easier to measure cloudy sewage water or a deep tank.

Monitoring sludge level in various settling tanks

- Non-contact measurement with the mounted sensor, so the sensor is never screwed with rake.
- 0.4 to 10 m from the transmitting point of the sensor can be detected.
- Neither the main unit nor the sensor has any moving part so that it can avoid interface disturbances. Continuous stable measurement can be done.
- Stable interface measurements is ensured with the unique arithmetic processing.
- The main unit can be connected to two sensors to perform interface measurements at two points. (The second sensor is optional.)

Applications and examples

- Interface management of settling tank at an industrial wastewater treatment facility
- Interface management for a settling tank at a sewage treatment facility

Model No.	HL2000	Model No.	Main unit	Sensor
Number of channels	2	Operating ambient temperature	-10 - +60°C	-5 - +60°C
Frequency	400kHz	Material	Painted steel	Case / cord: PVC
Object to be measured	Sludge interface	Structure	IP54 equivalent	IP68 equivalent
Measurement distance range (1/2 for powder)	0.4 - 10m	Dimensions (WxDxHmm)	280 x 92.5 x 322	dia.80 x 95
Resolution	Measurement	Sensor cord length	-	20m
	Display	Max sensor cord length	-	100m
Data update cycle	1sec	Weight	3.6kg	2.2kg
Sensor directivity angle (beam angle)	6°	*Please contact us for specific cord length		
Power source	Voltage	100 - 240 VAC ± 15%		
	Power consumption	10VA		
Display		LCD		
Output	Alarm output	Upper / lower limit alarm output 2channels each (4lines) 250 VAC, 30 VDC 5A (relay contact)		
	4-20mA current output	16bit RL(Max)=450Ω		
Interface		RS-232C (Max transmission range: 10m)		

Ultrasonic Interface Level Meter in Operation

Concept

Application Example of Ultrasonic Interface Level Meter

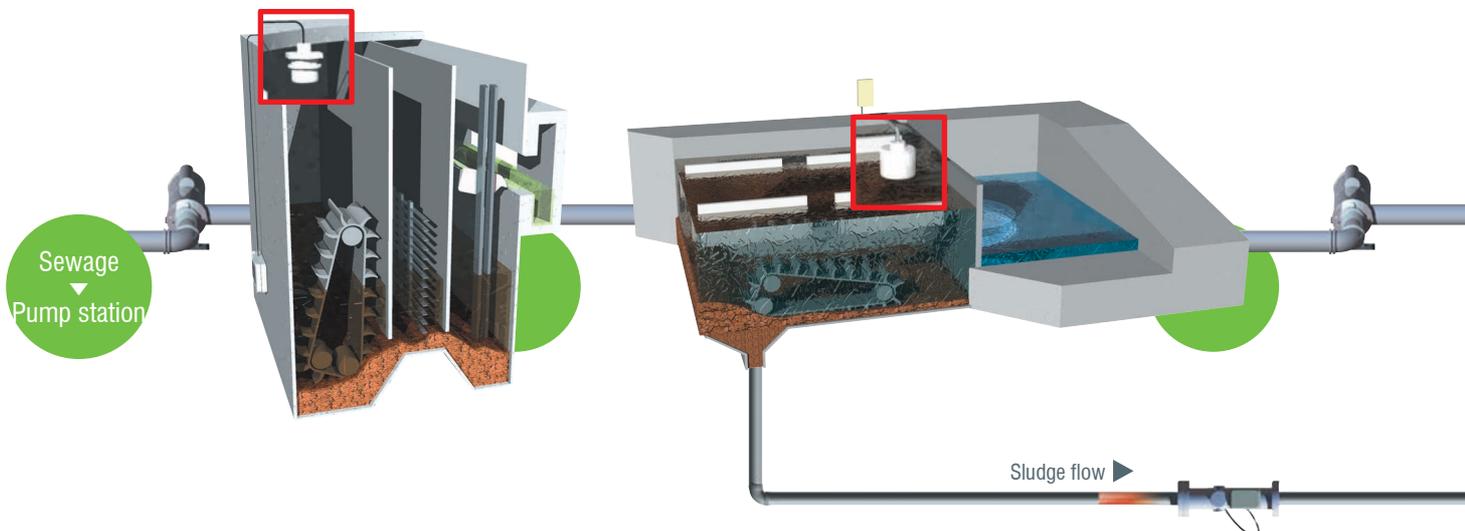
• Make sure that there are no obstacles within a 1m radius from the sensor.

Use of ultrasonic measuring instruments for sewage systems

Using ultrasonic measuring instruments enables more reliable monitoring and automatic control.

Grit chamber
Ultrasonic level meter
Ultrasonic interface level meter

First settling tank
Ultrasonic level meter



Ultrasonic concentration meter

Ultrasonic concentration meter

HLD340



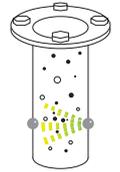
Principle

Ultrasonic attenuation system

Ultrasonic waves pass through a liquid. Ultrasonic waves are reflected and attenuated by any solids or gas bubbles present in the liquid. Ultrasonic density meters rely on this phenomenon. The transmitting sensor and the receiving sensor are installed opposite each other outside a pipe. Attenuation [dB] is obtained from the original and received signal intensity and converted to a value for suspended solid concentration [%].

Advantages

- More cost effective than devices based on electromagnetic waves or lasers.
- Suitable for measurement of high suspended-solid concentrations.



Measurement of suspended solid concentration in the liquid in the pipeline

- Multi-channel function enables stable measurement from clean water to sewage water.
- Measuring frequency is automatically selected by the condition of concentration level.
- The RS-485 is provided as part of the standard configuration to enable remote control at a distance of up to 1,200 m.
- MODBUS protocol enables communication with PLC.



■ Measurement of concentration of sludge returned to aeration tank

Applications and examples

- Sludge concentration management at sludge treatment line
- Measurement of suspended slurry concentrations

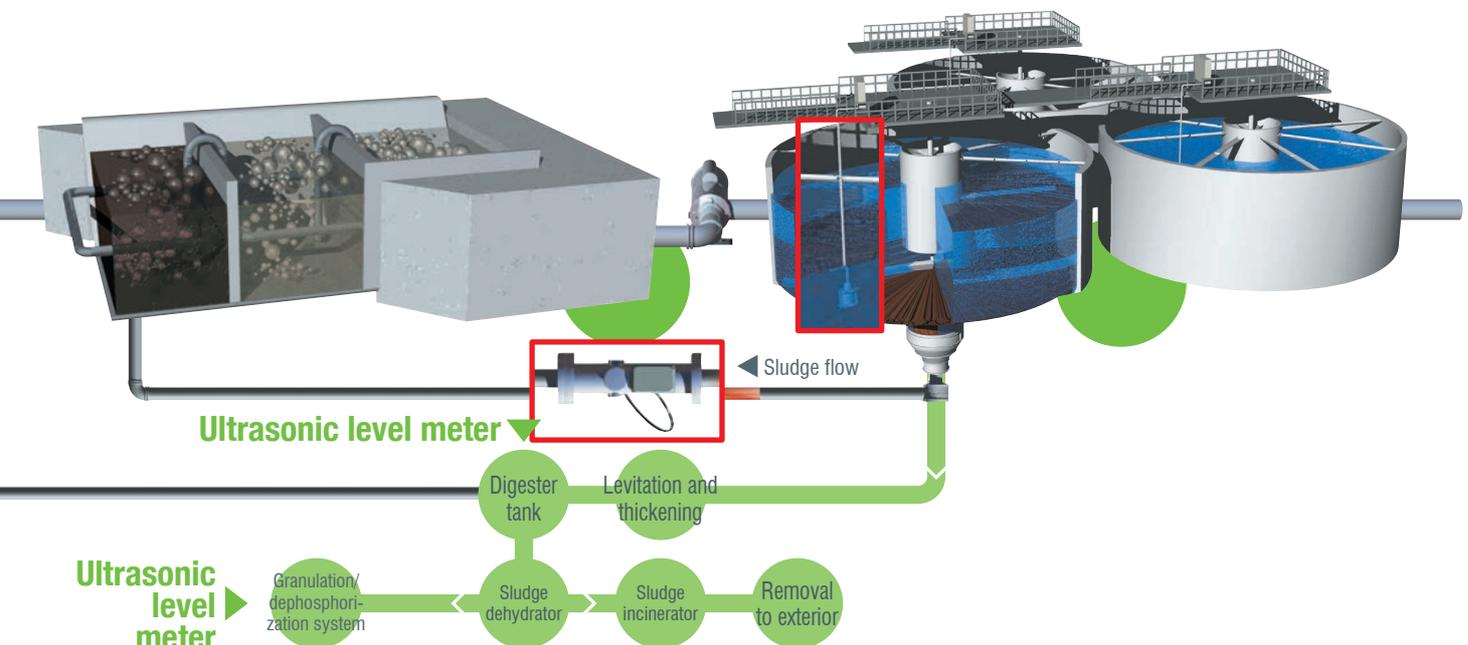
Model No.	HLD340	
Number of channels	4	
Frequency	1MHz/3MHz Automatic	
Object to be measured	Concentration of sludge in clean / sewage water	
Measurement distance range (1/2 for powder)	0.0 - 40.0dB	
Transducer mounting method	Fixed by 4 threaded screw	
Measuring pipe size	Standard 100A (100A - 800A)*	
Pipe material	SUS304	
Withstand pressure of measuring pipe	1.0MPa	
Measuring concentration	0 - 20%	
Accuracy	±5% F.S.	
Data update cycle	1sec	
Power source	Voltage	100 - 240 VAC ± 15%
	Power consumption	30VA
Display	LCD	
Output	Alarm output	Upper / lower limit alarm output 1channels each 250 VAC, 30 VDC 5A (relay contact)
	4-20mA current output	12bit RL(Max)=450Ω
Interface	RS-485 (Max transmission range: 1200m)	

Model No.	Main unit	Sensor
Operating ambient temperature	-10 - +60°C	0 - 80°C
Storage temperature	-30- +80°C	
Material	Painted steel	SUS316
Structure	IP54 equivalent	IP67 equivalent
Dimensions (WxDxHmm)	280 x 92.5 x 322	dia.37 x 72
Sensor cord length	-	1m
Max sensor cord length	-	10m
Distribution cord length	-	10m
Weight	5.5kg	1.0kg

*The following measuring pipe size are available.
Select appropriate pipe depending on usage environment.
50A 65A, 80A, 100A, 125A, 150A, 200A, 250A, 300A, 350A, 400A, 500A, 600A, 700A, 800A

Aeration tank Ultrasonic concentration meter

Final settling tank Ultrasonic Interface level meter



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Ultrasonic flow measurement

Ultrasonic flowmeter HLF800 series



Converter HLF810



Converter HLF820



Principle

Time-of-flight measurement method

Using ultrasonic waves, the flowmeter measures fluid velocity and calculates the flow rate. Transducers installed upstream and downstream transmit ultrasonic signals forward and inverse directions of flow. The velocity is obtained from the time elapsed for ultrasonic transmission and converted to the flow rate.



Advantages

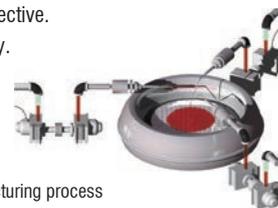
- No structures are placed in piping, so it enables flow rate measurements with the minimum pressure loss.
- The flowmeter measures in a wide range from low velocity to high velocity.

Accurate flow rate measurement for pure water or chemical liquids

- Unique arithmetic processing by DSP (Digital Signal Processor) makes stable flow measurement.
- 2-channel measurement helps cost reduction and space-saving.
- Easy installation with detachable cable.
- No moving part inside of the sensor and low pressure loss.
- All the wetted surfaces are made of NEW PFA resisting against DIW and various chemical liquids.
- Conformed to EMC standard (EN61326) and complied with RoHS directive.
- Selectable from either HLF820 with display or HLF810 without display.

Applications and examples

- Flow measurement of DIW or ultrapure water for the semiconductor manufacturing process
- Flow control of high corrosive chemical liquids to be dispensed for the manufacturing process
- Flow measurement of slurry liquids for CMP (Chemical Mechanical Polishing) process



Converter

Model No.	HLF810	HLF820	
Measuring method	Time-of-flight measurement method		
Accuracy	± 1%F.S.(DIW at 20°C)		
Data update cycle	10 msec		
Power source	Voltage	24 VDC ± 10%	
	Power consumption	Approx. 4W	
Display		Approx. 5W	
		VFD (16 characters / 2 line)	
Digital input	Open collector or Non-voltage contact input x2 Selectable from integrated value reset or 0 (Zero) point adjustment input		
Output	4-20mA current output	Resolution:12bit (RL(Max)=600Ω)	
	Digital	Open collector(Max 35v / 0.1A)output x2 Selectable from Comparison, integrated pulse, Instantaneous frequency or Error output	
Interface	RS-485 (MODBUS protocol, RTU mode) Up to 32 converters can be contained (Address setting: 1- 32) Baud rate:9600, 19200, 38400 or 57600bps		
Housing material	ABS		
Operating temperature	0 - 50°C (No condensation)		
Weight	130g	230g	
Installation	DIN rail	Panel mount	

Sensor

Model No.	HLFS01-04	HLFS01-06	HLFS01-08	HLFS01-12
Application	Ultrapure water / Pure water / Chemical liquids			
Flow rate range	0 - 2L / min	0 - 6L / min	0 - 20L / min	0 - 50L / min
Tube size	1/4 inch	3/8 inch	1/2 inch	3/4 inch
Max operating pressure	0.5MPa (0 - 90°C) / 0.2MPa (90 - 180°C)			
Max fluid temp.	Standard type: 0 - 90°C, High-temperature type: 0 - 200°C			
Operation temperature	0 - 80°C			
Wetted surface	NEW PFA			
Weight	90g	110g	130g	160g
Pressure loss factor	3.7863	0.6937	0.1146	0.0138

Pressure loss

$$\Delta P = A Q^2$$

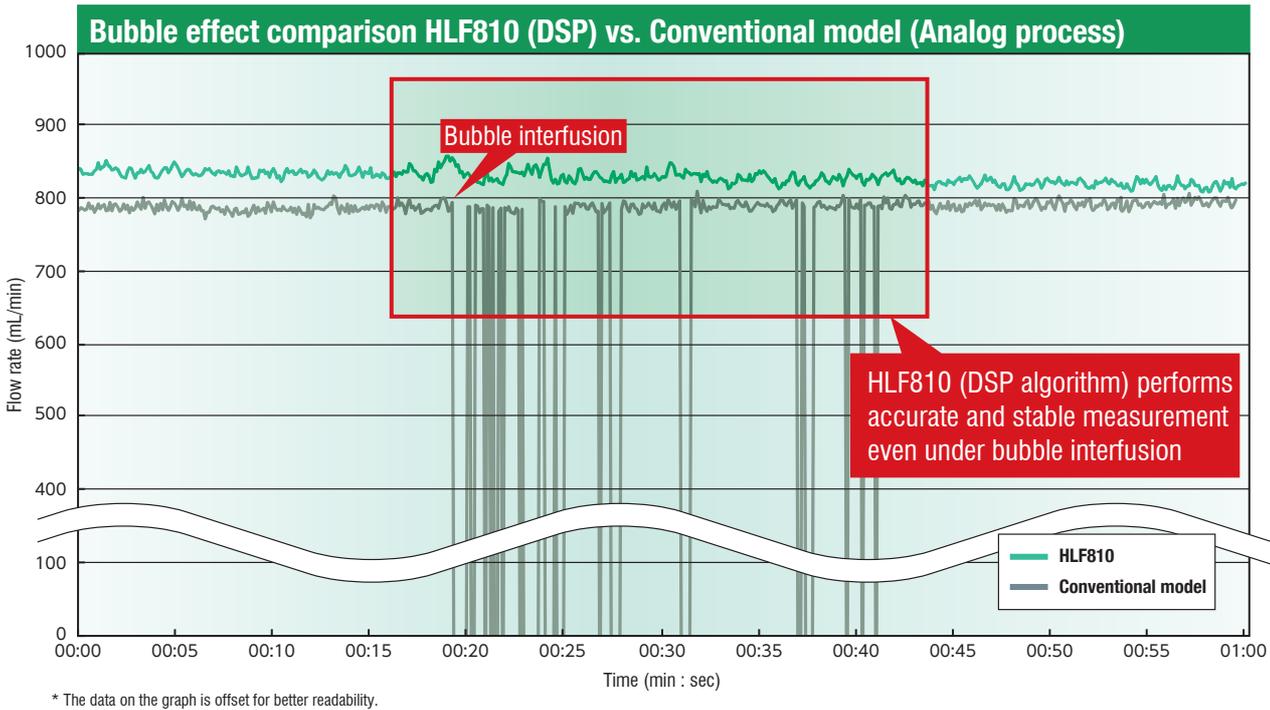
ΔP : Pressure loss[kPa] A : Pressure loss factor (20°C pure water) Q : flow rate[L/min]

Connection cable between converter and sensor

Model No.	HLF01 cable 5m	HLF01 cable 7m
Material	ETFE	
Cord length	5m	7m
Weight	150g	210g

Type name and specification

HLFS01 - ○ ○ △ □
 nil : standard
 K : high-temperature / O4 type : Up to 180°C
 Shape U : U-shape Z : Z-shape
 Tube size *refer above table



* The data on the graph is offset for better readability.

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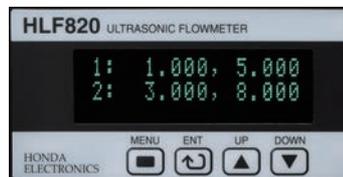
Two different sensors can be used with one converter.

Space-saving and good cost performance are realized because two sensors can be connected to one converter. Those sensors can measure different types of flow liquids or can be different size sensors.



Display is VFD.

VFD enables good visibility (HLF820).



High temperature chemical liquids can be measured.

Adaptive to the most advanced semiconductor production system. All the wetted surfaces are made of NEW PFA and it is high chemical resistant. Self-developed sensor element is capable for the high temperature up to 200 degree C. (K type)

* HLF501-04K : Up to 180 degree C.



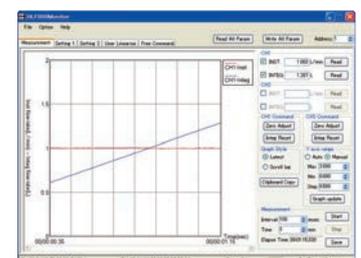
Detachable cable enables easy installation.

Sensor cable can be detached at the sensor unit, therefore the installation of sensor unit can be done without cable. The cable length can be selected from 5 m or 7 m.



PC monitoring is possible with RS-485.

Using the dedicated control software (HLF800 Monitor) on PC, parameter setting and monitoring the measurement data can be done via RS-485 remotely.



Ultrasonic flaw detection

Ultrasonic flaw detecting with imaging equipment

HA-701W



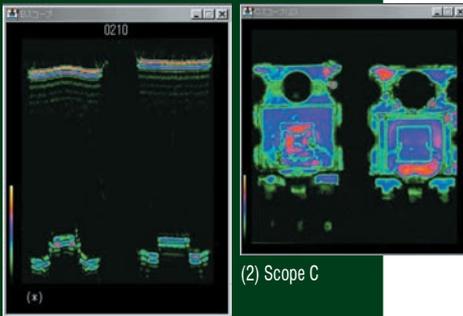
Perfect for inspections of the structures or flaws in various materials

- Scope A, B and C are displayed simultaneously on the screen for easy determination on the depth of a flaw, its location (X, Y), and its dimensions.
- Concave polymer ultrasonic probes at various frequencies in accordance with a range of objects are available. Selectable the appropriate probe for detecting various on materials, dimensions and types of flaw.

Applications and examples

- Detection of flaws – e.g. cracks, voids and delamination in semiconductors, ceramics, plastics, metals and molded parts

Flaw detection image (Transistor)



(1) Scope B

(2) Scope C

* In both images (1) and (2), the left images represent damaged parts and the right images represent normal parts.

Model No.	HA-701W	
Ultrasonic flaw detection function	Frequency	5 - 50MHz(25 - 100MHz)
	Probe Standard	25MHz (spot size: 200 μm)*1
Image capture function	Display	Simultaneous display of scopes A,B and C Variable C scope area
	Max number of images to capture	Simultaneous capture of 8 images
	Image data capture system	Cursor sampling (gate 4n sec) Gate hold sampling (4n sec - 38.4 μsec) Tracking gate sampling (4n sec- 38.4 μsec)
	A/D sampling frequency	500MSPS
Scanner	Type	X, Y and Z-stage scanning
	Stage travel distance	140 x 140 x 50mm (X-axis) (Y-axis) (Z-axis)
	Scan speed	Max 400mm / sec
	Visual field size	Free size
	Scan step	X,Y: 10 μm Z: 4 μm
Image display	Display	17 inch color LCD
	Image resolution	Horizontal: 1,280 x Vertical 1,024 dots
Power source	Voltage	100 VAC
	Power consumption	600VA
Weight	Main unit	Display: 4.6kg Main unit: 17kg
	Scanner	38kg
Dimensions	Main unit	Display: 374 x 195 x 378mm Main unit: 177 x 480 x 427mm
	Scanner	470 x 560 x 300mm
OS	Windows ® 7	

*Windows is either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Option

- Rotary scanner



- Ultrasonic probe



- High-frequency transmitter/receiver TRX



*1 Ultrasonic flaw detection function

Probe	Spot size	High-frequency transmitter / receiver TRX *Option
10MHz (Option)	500 μm	—
25MHz (Standard)	200 μm	—
50MHz (Option)	100 μm	●
100MHz (Option)	50 μm	●

Three scope images

● Scope A

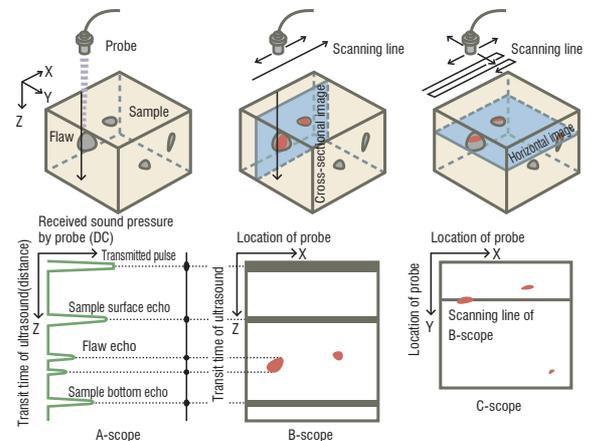
The basic wave pattern indication of flaw detection. It indicates reflected echo intensity (wave patterns) received by a probe and the transit time of ultrasound (distance) on the rectangular coordinates.

● Scope B

Tomogram, or cross-sectional profile, through one vertical slice of a sample. It indicates the location of a probe and the transit time of ultrasound (distance) on the rectangular coordinates. The intensity of echo in the A-scope wave pattern is modulated by brightness or color, and the brightness (or color) of a dot on the coordinates is proportional to the intensity of the echo. The existence, distribution and location is determined intuitively.

● Scope C

Tomogram, or cross-sectional profile, through one horizontal slice of a sample. The image of C-scope is similar to that of an optical microscope. The echo intensity received at a fixed depth is modulated by intensity. The distribution of flaws on the horizontal plane is more easily determined.



Transducer - Piezoelectric ceramics-



For cleaners



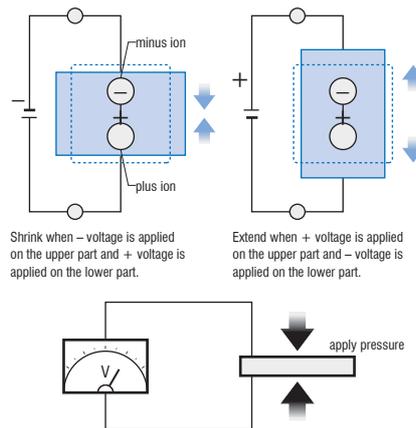
For processing tools



With horn

Bolt-clamped Langevin type transducer

Sound is generated by vibrations when something is knocked but high frequency like ultrasound requires in different manner. Applying the voltage to the element (ceramics) between two electrodes to expand, contract repeatedly and vibrate the element generates the ultrasound. In an opposite manner, applying the pressure to the element generates the voltage between the electrodes. These phenomena are called as the piezoelectric effect and the element is called as the electric acoustic transducer or transducer. Piezoelectric ceramics is a polycrystal ceramics which is congealed high purity powder (titanium oxide, barium oxide, etc.) at the high temperature. Polarization treatment to this ceramic give to the ceramics as that of single crystal such as the low quartz. The piezoelectric ceramics have unlimited potential as electronics and ultrasonic sensor.



Shrink when - voltage is applied on the upper part and + voltage is applied on the lower part.

Extend when + voltage is applied on the upper part and - voltage is applied on the lower part.

For Cleaner

Transducers for cleaners are durable and less damaged even when wide amplitude excitation happens because piezoelectric ceramics is unified mechanically. Operation is stable under high temperature because of high electro-acoustic conversion efficiency and low heat generation.

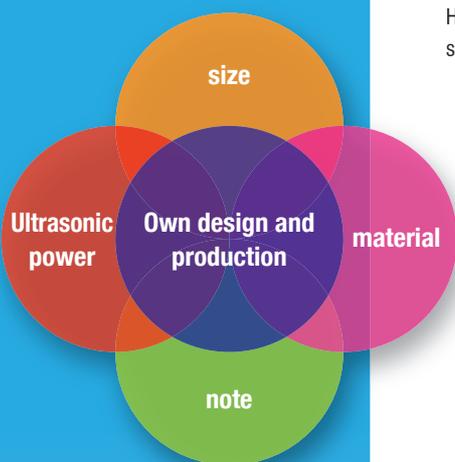
PZT type

Model No.	Weight (g)	Diameter (mm)	Length (mm)	Size of bolt	Frequency (kHz)	Measurement voltage (Vrms)	Impedance (Ω)	Electrostatic capacity (pF)	Max. Input voltage (V) ^①	◆Torque to vibration plate thickness	
										Vibration plate thickness (mm)	Installation torque (N·m) ^②
HEC-45282	395	45	80	M10 P1.0	28	1.0	35以下	3300	50	1.0~1.5	5
HEC-60282	410	60	68	M10 P1.0	28	1.0	35以下	3300	50		
HEC-45402	225	45	54	M10 P1.0	40	1.0	35以下	3300	50	1.6~2.0	8
HEC-45254M	385	45	88	M10 P1.0	25-45	1.0	30以下	6600	50		
HEC-30502	130	31.5	50	M10 P1.0	50	1.0	30以下	2100	30	2.1~3.0	10
HEC-301002	175	30	74	M10 P1.0	108	1.0	50以下	2600	30		

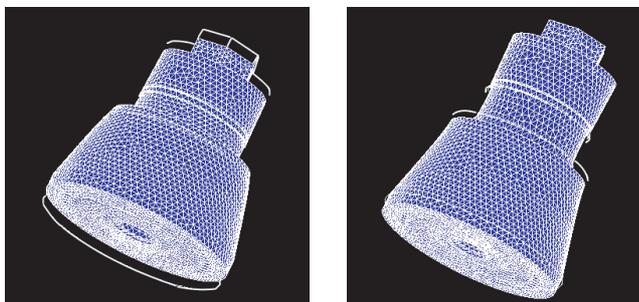
^①Reference power value ^②Values of installation torque are as reference.

Strong point of Honda Electronics

Honda Electronics produces their transducers from compound materials. Self-developed transducers and sensors are designed to optimize the specifications and realize the best quality and cost with good delivery time.



Transducer design with FEM analysis



Specially designed transducers

Transducers with the most appropriate figure specifications.

Special material



HEC-1540P4HFD

Special figure



HEC-1560P2HFE

Special work



HC-2024

Cleaning

Processing

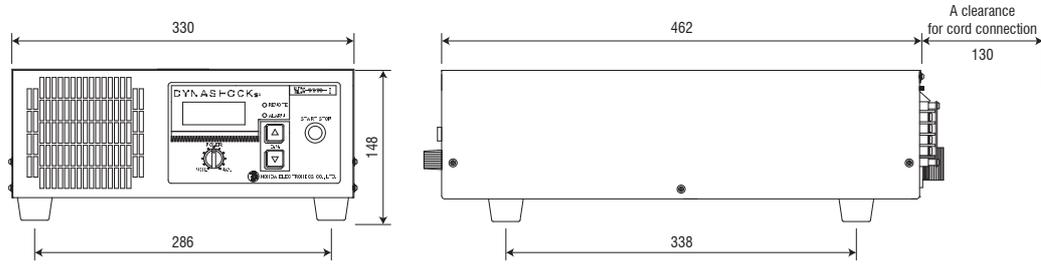
Measuring

Drawings

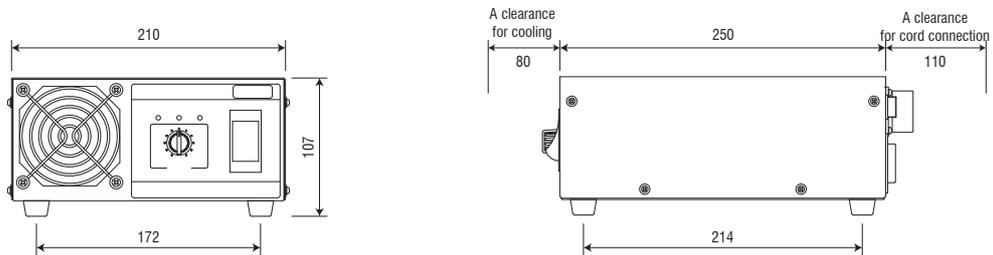
Options

nGenerator

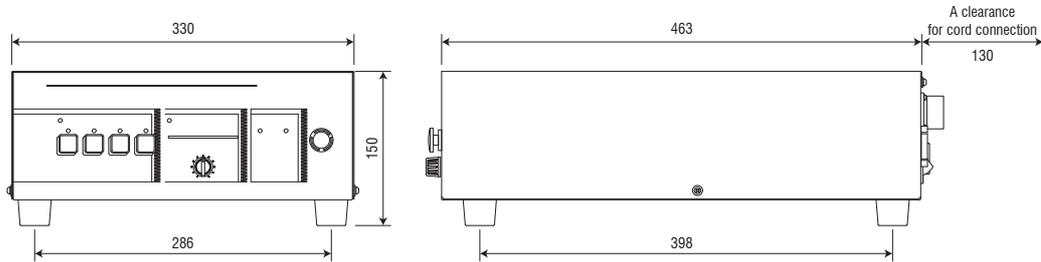
nWDX series



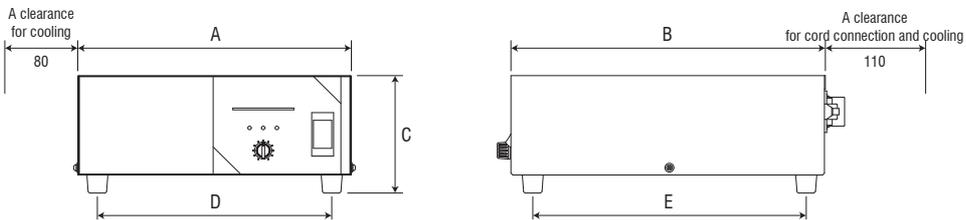
nWSC series



nWD series

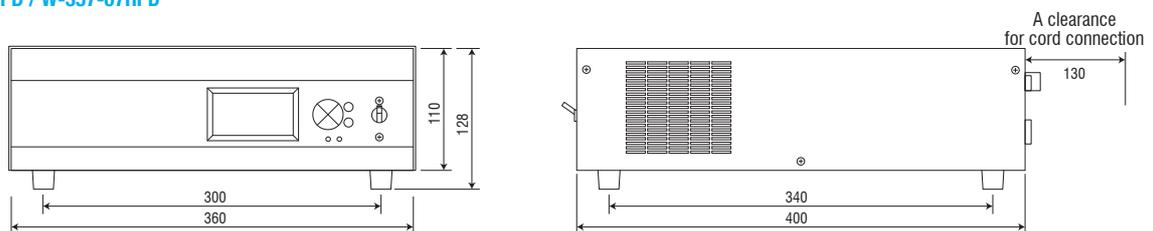


nWS series



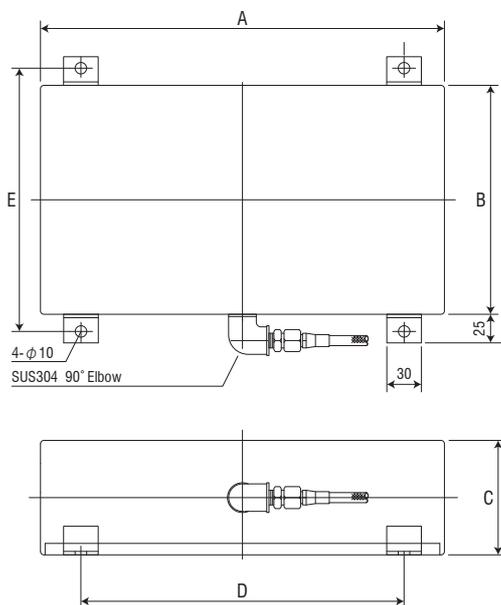
Model No.	A (W)	B (D)	C (H)	D	E
WS-600-28T					
WS-600-40T	300	345	130	243	286
WS-600-75T					
WS-1200-28T	360	400	130	303	342
WS-1200-40T					

W-357HPD / W-357-07HPD



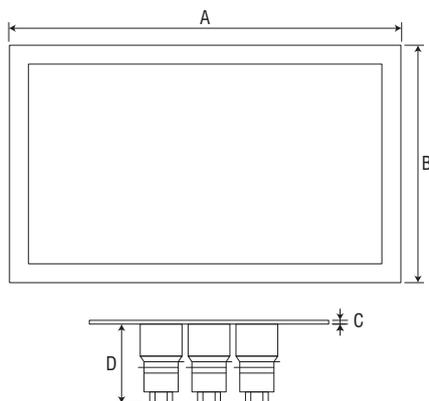
nVibration unit

■ N type - Immersible type



Model No.	A	B	C	D	E
WDX-600N- I	350	200	100	280	230
WDX-1200N- I	420	300	100	320	330
WSC28 Standard	350	200	100	280	230
WSC28 High-Power	420	300	100	320	330
WSC40 Standard	350	200	75	280	230
WSC40 High-Power	420	300	75	320	330
WSC75N	350	200	100	280	230
WSC130N	350	200	100	280	230
WSC160N	350	200	75	280	230
WD-600-28N	350	200	100	280	230
WD-600-40N	350	200	75	280	230
WD-1200-28N	420	300	100	320	320
WD-1200-40N	420	300	75	320	330
WS-600-28N	350	200	100	280	230
WS-600-40N	350	200	75	280	230
WS-600-75N	350	200	100	280	230
WS-1200-28N	420	300	100	320	330
WS-1200-40N	420	300	75	320	330

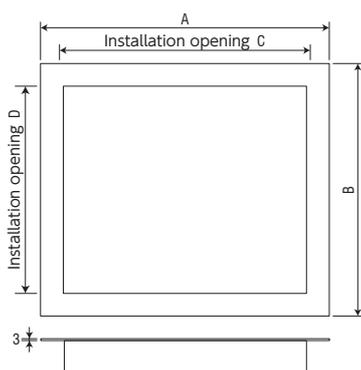
■ F type - Vibration plate type



Model No.	A	B	C(t)	D
WDX-600F- I	390	240	2.5	80
WDX-1200F- I	460	340	2.5	80
WSC28 Standard	390	240	2.5	68
WSC28 High-Power	460	340	2.5	68
WSC40 Standard	390	240	2.5	54
WSC40 High-Power	460	340	2.5	54
WSC75F	390	240	2.5	80
WSC130F	390	240	2.5	80
WSC160F	390	240	2.5	54
WD-600-28F	390	240	2.5	80
WD-600-40F	390	240	2.5	54
WD-1200-28F	460	340	2.5	80
WD-1200-40F	460	340	2.5	54
WS-600-28F	390	240	2.5	80
WS-600-40F	390	240	2.5	54
WS-600-75F	390	240	2.5	80
WS-1200-28F	460	340	2.5	80
WS-1200-40F	460	340	2.5	54

Transducer cover is also available, please contact sales representative.

■ F type - Vibration plate type for W-357HPD



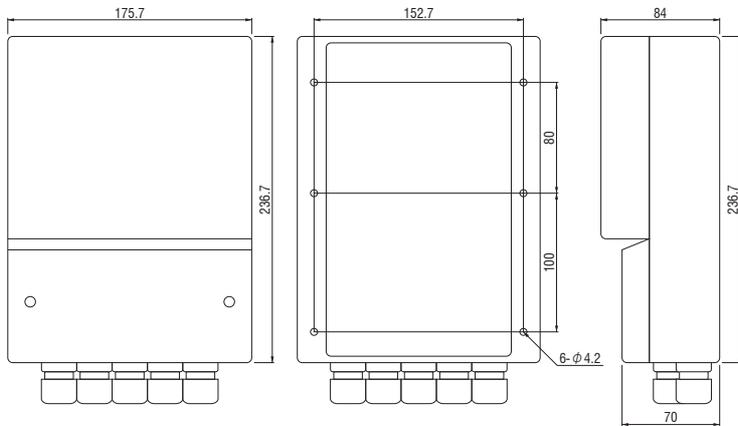
	A	B	C	D	Effective area(W×Dmm)
Standard	310	250	280	220	126×110
6 inch	250	220	210	180	135×160
8 inch	355	245	315	205	272×154
12 inch	374	389	334	349	273×314

(unit : mm)

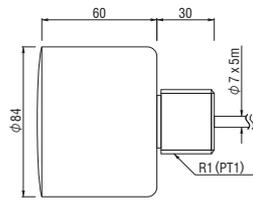
* Above dimensions are for your reference. Must follow official drawings.

■ HD1200

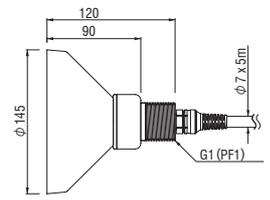
■ Main unit



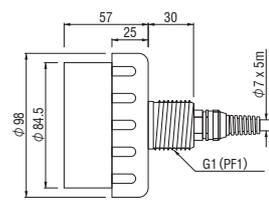
■ TS40-5



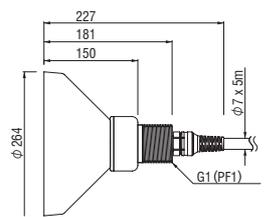
■ TS21-5



■ TS40T-5

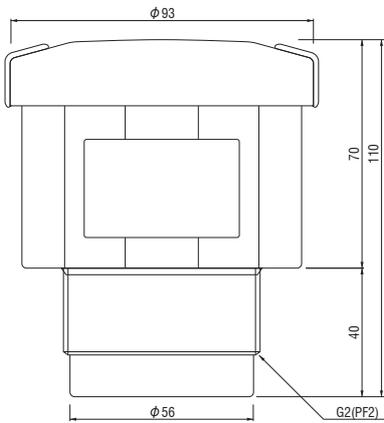


■ TS12-5



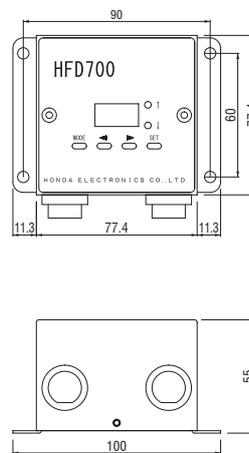
■ HAL420

■ Main unit (Sensor)

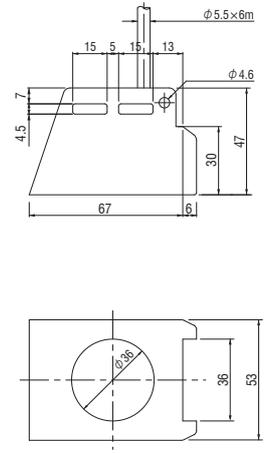


■ HFD700

■ Main unit

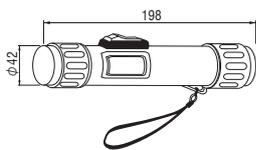


■ Sensor

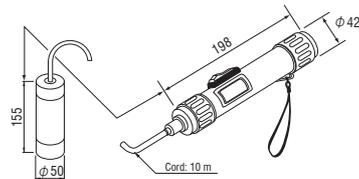


■ PS-7/7FL

■ Main unit (PS-7)

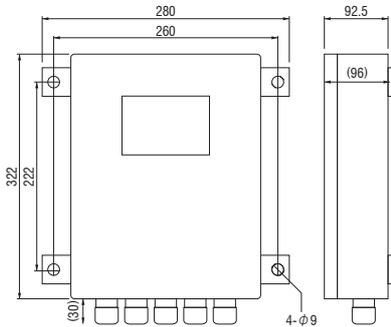


■ Main unit (PS-7FL)

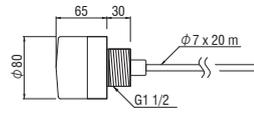


HL2000 • HLD340

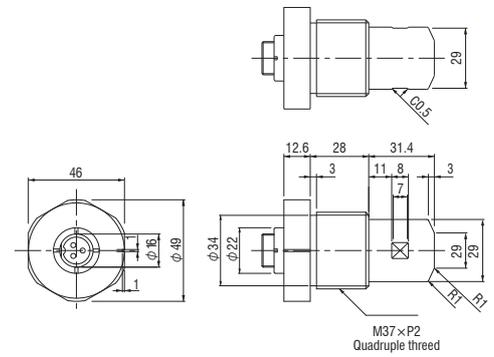
Main unit



Sensor (HL2000)

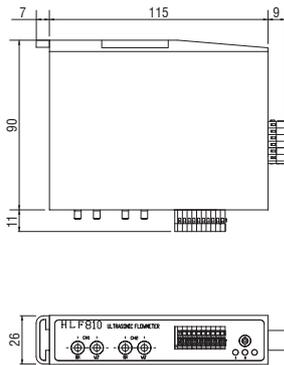


Sensor (HLD340)

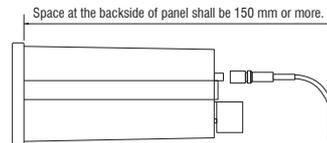
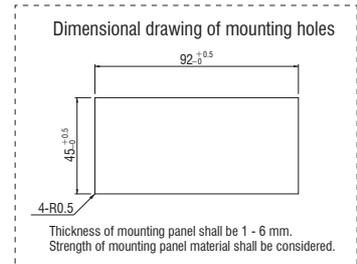
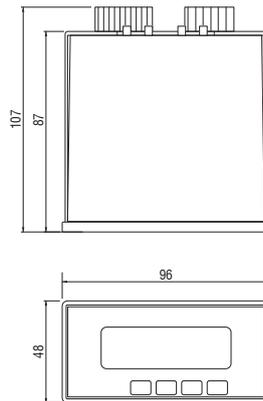


HLF810/820

Converter (HLF810)

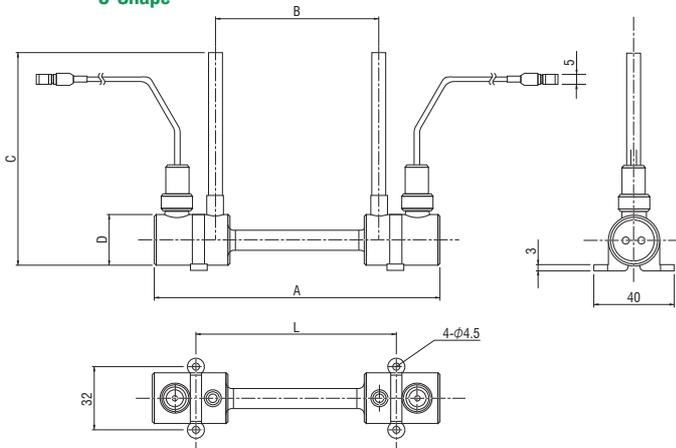


Converter (HLF820)



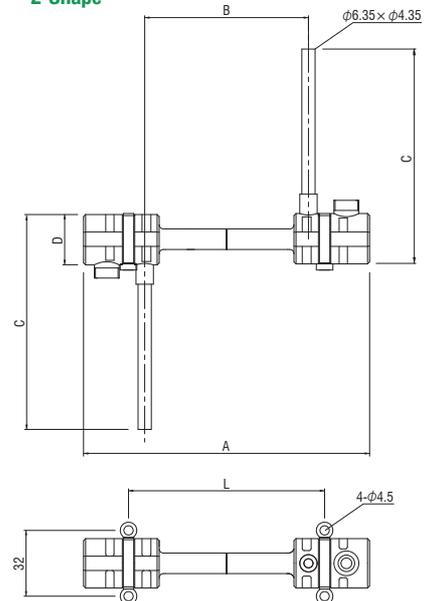
Sensor (HLFS01)

U-Shape



Model No.	A	B	C	D	L
HLFS01-04	138	80	105	φ25	94.6
HLFS01-06	145	80	125	φ25	101.6
HLFS01-08	178	110	125	φ25	134.6
HLFS01-12	184	110	125	φ25	140.6

Z-Shape



(unit : mm)

* Above dimensions are for your reference. Must follow official drawings.

Optional Parts

Part name	Model No.	Matching model	Dimensions (mm)	Remarks	
I/O remote cable		WD series	0m		
		WSC series	5m		
Terminal block		WD series WS series WDX series			
Cleaning basket	KG02 	W-170ST	150×85×60	5.5 mm mesh SUS304	
	KG03 	W-113 SANPA W-113MK II	195×105×50	5 mm mesh SUS304	
	KG04 	WT-100-M	195×105×100	5 mm mesh SUS304	
	KG06 	WT-200-M	255×195×100	5 mm mesh SUS304	
	KG07 	WT-300-M	450×250×140	10 mm mesh SUS304	
	KG08 	WT-600-40	350×310×210	10 mm mesh SUS304 protection tube included	
	KG09 	WT-1200-40	550×360×210	10 mm mesh SUS304 protection tube included	
	KG10 	WD-600 series WS-600 series W-338 W-118 WDX-600- I	355×235×180	5 mm mesh SUS304	
	KG11 	WD-1200 series WS-1200 series WDX-1200- I	485×285×180	5 mm mesh SUS304	
	KG13 	WV-231H	260×220×155	5.5 mm mesh SUS304	
	KG14 	WEX-250- I (H) WEX-250- II (H)	255×195×100	5 mm mesh SUS304 protection tube included	
	Blister pack for eye glasses cleaning		W-2121		PET
	Blister pack for small parts cleaning		W-2121		PET

Part name	Model No.	Matching model	Dimensions (mm)	Remarks
Cleaning bottle with rake	RB01 	W-2121	φ 77×170 650ml	bottle PP(polypropylene) rake SUS304
	RB02 	W-2121	φ 77×170 650ml	bottle PP(polypropylene) rake POM(polyacetal)
Inner cleaning bottle	SUB01 	W-2121		PS(polystyrene)
Lid	FT01 	WT-100-M	263×162×32	SUS304
	FT03 	WT-200-M	320×263×30	SUS304
	FT04 	WT-300-M	527×324×30	SUS304
	FT05 · FT06 	WT-600-40 WT-1200-40	440×390×1.2 650×440×1.2	SUS304
	Stand	DA01 	WT-600-40	593×403×250
DA02 		WT-1200-40	793×453×250	SUS304
Beaker stand	BR01 	W-113 SANPA W-113MK II	245×146 2holes (φ 90.5)	PP (Polypropylene)
	BR02 	WT-100-M	255×155 2holes (φ 90.5)	PP (Polypropylene)
	BR03 	WT-200-M WEX-250- I (H) WEX-250- II (H)	315×255 4holes (φ 90.5)	PP (Polypropylene)
	BR04 	WT-300-M	520×315 8holes (φ 90.5)	PP (Polypropylene)
	BR05 	WV-231H	290×230×169 (φ 90.5)	PP (Polypropylene)
Beaker	BK01 	W-170ST	φ 78×103 300cc	
	BK02 	W-113 SANPA W-113MK II WT-100-M WT-200-M WT-300-M WEX-250- I (H) WEX-250- II (H)	φ 90.3×120 500cc	for BR01-BR05
Immersible type heater	NH01 	WT-600-40	φ 140×735	1kW 2.0kg
	NH02 	WT-1200-40	φ 140×735	1.5kW 2.1kg

Part name	Model No.	Matching model	Dimensions (mm)	Remarks	
Point sensing cover	PS01	HUS-3	φ 15×215 (Inner dia. 7.5)	Fluorine-contained resin Gasket:	
Blade	HA04	USW-334 USW-334ek USW-335Ti	Standard blade	40 pcs Material : SK-2	
	HA07	USW-334 USW-335Ti	Carbide blade	1pc Material : Tungsten carbide	
	HA08	USW-334 USW-335Ti	Square blade	1pc Material : SKH	
	HA09	USW-334 USW-335Ti	Long blade	1pc Material : SKH	
	HA10	USW-334 USW-335Ti	Round tip blade	1pc Material : SKH	
	HAE01	USW-334ek	U-shaped gouge	1pc Material : SKH	
	HAE02	USW-334ek	V-shaped gouge	1pc Material : SKH	
	HAE03	USW-334ek	Flat gouge	1pc Material : SKH	
	Blade fixture	HK02	USW-334 USW-334ek USW-335Ti		USW-334ek (Flat gouge) (Standard blade)
		HKE01	USW-334ek		U-shaped gouge
HKE02		USW-334ek		V-shaped gouge	
Blade fixing screw	HB03	USW-334 USW-334ek			
	HB04	USW-335Ti			
Hexagon wrench	RR02	USW-334 USW-334ek			
	RR03	USW-335Ti			
	RR04	USW-335Ti			
Cutting mat	CM01	USW-334 USW-335Ti USW-334ek	150x200x2mm		
	CM02	USW-334 USW-335Ti USW-334ek	150x200x3mm		

Part name	Model No.	Matching model	Dimensions (mm)	Remarks
Sandpaper	SB01	USW-334 USW-334ek		
	SB02	USW-334 USW-334ek		
Goggles	ZH13	USW-334 USW-335Ti USW-334ek		
Carrying case	CB02	USW-334		
Welder clasp	YK01	SONAC-37		Standard
	YK02	SONAC-37		For unopened marking
Foot switch	FS01	SONAC-200		
Handpiece stand	HS01	SONAC-200		
Exponential horn		SONAC-200		

Cleaning

Processing

Measuring

Drawings

Options

Create a more healthy future with ultrasonics.

Changing the future with ultrasonic technology

Ultrasound Pioneer, Honda Electronics Co., Ltd

Honda Electronics Co., Ltd. started the history by the development of fish finders. And based on the ultrasound technology, we have expanded the field, through the development of cylindrical transducer and netive precision echo sounder. Each division of us shares and links each technology to the others and multiply their abilities. We work for technology "Ultrasound that is friendly to human, the earth and future".





What is Ultrasound

Dolphins' communication and bats' hunting are good examples of ultrasonic usage in the nature. Ultrasound is defined as "inaudible sound lower than 20Hz and Higher than 20kHz". Especially, characteristic of ultrasound higher than 20kHz can be used widely in the world.



Corporate Headquarters

Profile

Company Name : Honda Electronics Co., Ltd.

Location : 20 Oyamazuka, Oiwa-cho, Toyohashi, Aichi 441-3193, Japan

Founded : 10 October, 1956

President : Yosuke Honda

Capital : JPY 100,000,000

employees : 198 as of January, 2014

Branches : Tokyo, Osaka, Bangkok(Thailand)

Products : Fish finder, Color GPS plotter,
Ultrasonic diagnostic scanner,
Ultrasonic cleaner
Ultrasonic cutter, Ultrasonic welder,
Ultrasonic level meter, Ultrasonic flow meter,
Transducer

Industrial Equipment Division

Develop cleaning, processing and measurement instruments with Ultrasound core technology. The products are used widely in various fields such as semiconductor industry, plastic molding, food industry and so on.

Science Museum of Ultrasound



Important and basic elemental technologies of ultrasound and our unique applied products are introduced based on our corporate philosophy. We hope you can look back over the history of ultrasound technology and look forward its future.



Fish finder





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URL <http://www.honda-el.co.jp/en/>

Registered company for ISO9001 and ISO14001

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Catalogue

- Contents of this catalogue are based on data on 31 August, 2014.
- Specification and design may be changed for improvement without notice.
- Colors of actual products may differ from pictures in the catalogue cause of print.

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