

KSS-1200DT

Ultrasonic Homogenizer

Operation Manual



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Human · Passion · Creation

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1. Summary

With the development of biological industry, the requirements of experiment which carried out upon ultrasonic homogenizer improve accordingly, such as determination, control of the sample temperature, improvement of the intelligent degree of low temperature cool samples and complete machines, all put forward new requirement. In order to further improve various performances of the instrument, on the basis of existing ultrasonic homogenizer, our company develops new ultrasonic homogenizer that merging foreign latest technologies with software and hardware technologies such as controlling, selecting frequency, testing temperature and protecting by microcomputer. The ultrasonic homogenizer has lots of advantages, such as advanced technology, reliable performance, convenient operation, esthetic appearance, clear and bright display, and the temperatures can be examined and controlled, etc.

Ultrasonic homogenizer are multi-function and multipurpose instruments that utilize strong supersonic to induce cavitation effect in liquid, the instruments deal with the supersonic to the material, and can be used in the brokenness of animal and plant tissues, cells, bacterium, sporular strains, also can be used to emulsify, separate, disperse, homogenize, distill, wash and accelerate the chemical reaction etc. The instrument are widely used in various fields, such as teaching, scientific research, production of biochemistry, microbiology, medicine chemistry, surface chemistry, physics, zoology, agronomy, physic, pharmacy, etc.

2. Technical Parameters:

| | |
|-----------------------------|---|
| MODEL | KSS-1200DT |
| Frequency | 19.5-20.5KHz |
| Power | 1200W |
| Accompany(Φ) | Φ 20 |
| Optional Tip (Φ) | Φ 15、 25 |
| Processing Volume | 200-1000 ml |
| Duty Ratio (%) | 0.1-99.9% |
| Supply | 220/110V 50Hz/60Hz |
| Host Size: | 400*280*220 mm |
| Sound Abating Chamber Size: | 275*250*480 mm |
| Packing Size: | Host: 534*295*435mm; Sound Abating Chamber: 410*410*550 mm |

3. Variable amplitude Lever reference value

| Tip Model | | Frequency(KHZ) | Power Range | Crushing Capacity |
|-----------|--------|------------------------|-------------|-------------------|
| Φ 2 | 1/12 " | 20-25KHz | 20-250W | 0.5-5ml |
| Φ 3 | 1/8 " | 20-25KHz | 30-400W | 3-10ml |
| Φ 6 | 1/4 " | 20-25KHz | 60-650W | 10-100ml |
| Φ 10 | 5/12 " | 20-25KHz/19.5-20.5 KHz | 100-950W | 100-200ml |
| Φ 12 | 1/2 " | 20-25KHz | 100-950W | 100-400ml |
| Φ 15 | 5/8 " | 20-25KHz/19.5-20.5 KHz | 200-950W | 200-500ml |
| Φ 18 | 3/4 " | 20-25KHz | 200-950W | 200-700ml |
| Φ 20 | 3/4 " | 19.5-20.5KHz | 400-1200W | 500-1000ml |
| Φ 25 | 1 " | 19.5-20.5KHz | 800-1800W | 500-1200ml |



4. The principle of operation:

This machine is made up of ultrasonic generator and ultrasonic transducer subassembly. The ultrasonic generator (power supply) turns the single-phase electricity of 220VAC, 50Hz into the alternating electricity of 20-25 kHz, 600V by frequency conversion device. And the transducer is driven by appropriate impedance and power to engender longitudinal mechanical vibration. Vibrational wave induces cavitation effect of various taking broken cells by titanium alloy variable amplitude lever which is immersed in the sample solution, to break cells. The electrocircuit principle is making up of rectification power, switch power, frequency conversion system, power amplifier, phase-locked frequency automatic tracking device, power regulator, power detector, power protector device and microcomputer controller, etc.

The transducer subassembly is to amplitude the mechanical energy which is brought by piezoelectric resonator and amplitude amplifier.

Explanation of function keys of the instrument (see following figure)

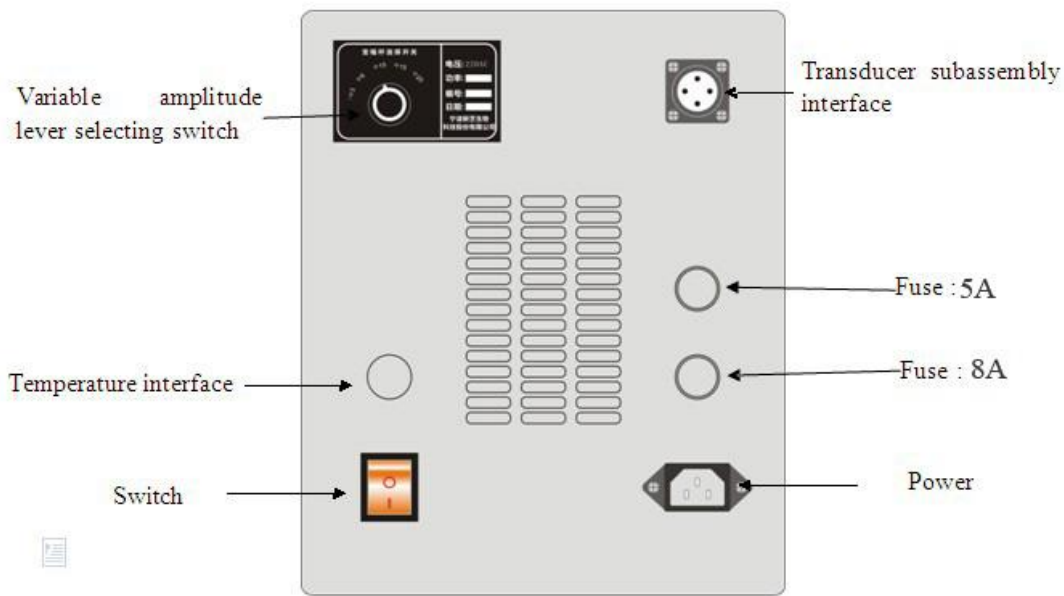


Figure 1

5. Parameters Setting:

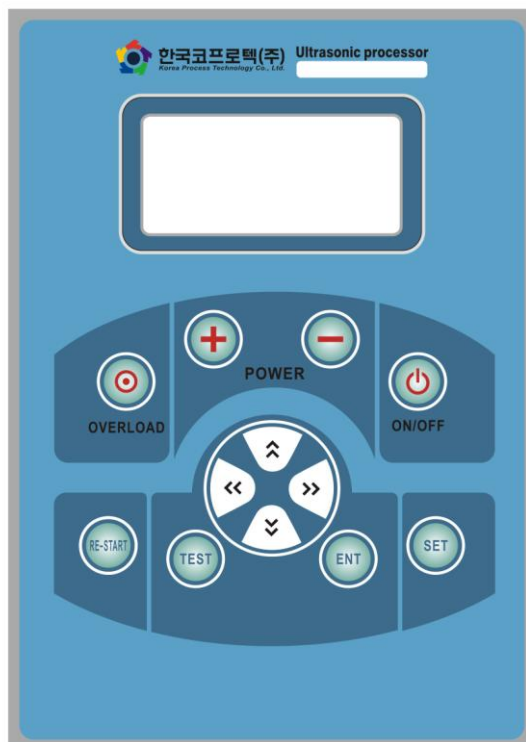


Figure 2

(1) Install this instrument according to the installing instruction, and use power line to connect power sockets that on the back of the generator, then connect the signal input port of transducer

subassembly with the signal output interface. Hold the transducer subassembly in special aperture which on top of soundproof box, that is complete the installation of the instrument.

Check the variable amplitude lever selecting switch which on the instrument back board is in the corresponding position of the variable amplitude lever.

(2) Turn on the power, display window shows transformer choice (as shown in figure 3)



Figure 3

In the figure above shows "-02-" choose transformer for $\Phi 2$. Press < Navigation keys > and the key switch transformer specifications, Choice scope: $\Phi 2 \Phi 3 \Phi 6 \Phi 8 \Phi 10 \Phi 12 \Phi 15 \Phi 18 \Phi 20 \Phi 25$. Press < ok > sure transformer specifications, specifications according to actual must choose the specifications choice.

(3) Choose engineering group parameters (as shown in figure 4)



Figure 4

Press < Navigation keys > and the key switch transformer specifications, choose range: Pro00-19 of 20 group parameters. Press <OK > sure engineering group parameters.

(4) Standby interface introduction (as shown in figure 5)



Figure 5

Press < Navigation keys > button around to switch job/clearance time to show, "r" means working , "P" means clearance

Press < Navigation keys > on the keys, it shows the device software version (V4.0.4 new function)

Press < Set key > into the parameters setting

Press < Ultrasonic enable/disable > into the ultrasound start

Press < Test key > into the ultrasonic testing

(5) Parameters Settings (figure 6)

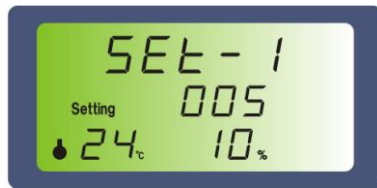


Figure 6

Press < Set key > switch of parameters.

| No. | Explain | Scope |
|-------|---------------------------|------------|
| Set-1 | Total Time | 1-999 min |
| Set-2 | Ultrasonic Time | 0.1-99.9 s |
| Set-3 | Ultrasound Clearance Time | 0.1-99.9s |
| Set-4 | Temperature Alarm | 0-99 °C |
| Set-5 | Power | 1-99 % |

Press < Navigation keys > the up/down, add/down key parameters

Press < Navigation keys > left/right, left/right shift

Press< Determine key > sure and keep the parameters, standby interface return

(6) Start ultrasound (as shown in figure 7)



Figure 7

Press < Power-minus > / < Power-add > key, real-time power control.

Press< Ultrasonic enable/disable > button to turn off the ultrasound, and return to standby interface.

Press <Test key > bond suspended ultrasound (only in ultrasonic start is suspended function) .

When the total time after ultrasonic work, the picture suspended at end at the last moment, press any key to be returned standby interface.

(7) Ultrasound Stop (as shown in figure 8)



Figure 8

Press< Test key > key recovery ultrasound work

Press <Ultrasonic enable/disable > closed ultrasound, and return to standby interface

(8) Ultrasonic testing (as shown in figure 9)



Figure 9

In the standby screen, press < test key > ultrasonic work, release <Test key > close ultrasound.

(9) Error alarm interface (as shown in figure 9)



Figure 10

| | Parameters | Explain | The reason |
|-------|------------|-----------------------------|--|
| Error | -1 | Over-temperature protection | When the sample temperature is greater than the actual set temperature, alarm produce protection |
| Error | -2 | Overload protection | When the output power too large, hardware produce protection |

When "temperature protection produce" press <Ultrasonic enable/disable > closed ultrasound, and to set parameters

Waiting for the sample temperature below 2 °C, set temperature automatic recovery ultrasound

When "ultrasonic power produce" press <Ultrasonic enable/disable > closed ultrasound, and to set parameters

Press< overload reset >, restore hardware protection, and automatic recovery ultrasound.

(10) Program reset

Press < reset > key, reset program.

Change after transformer, please be sure to to reset program, choose corresponding transformer specifications and case by ansys software yourself

6. Notes:

1) Starting the machine without the variable amplitude lever is inserted to liquid (unload) is forbidden, otherwise the transducer or ultrasonic generator will be damaged.

2) The transducer should be fixed on the bracket firmly to avoid gliding from rod, make sure the

end of the variable amplitude lever not to collide to avoid distortion and damnification.

3) Users determine the amount of broken sample, time and power according to different medium and choose optimum value. (General the working time is 1s and the interval time is 1s, propose taking a sample every 5 minutes according to the experiment conditions). If choose the variable amplitude lever of $\phi 2\phi 3\phi 6$, the ultrasonic power should be set smaller to avoid rupturing which caused by overload.

4) As used for a certain time, the end of the variable amplitude lever will be eroded by cavitation effect to beard hair, which can be rasped by hone or file, Otherwise it will effect the working result. After numerous rasping, the variable amplitude lever will be shorter than before, so that the power may be too small or can not send ultrasonic. At the moment, set aside the selecting switch to the corresponding position up to working normally (The position of the variable amplitude lever can be inconsistent with the selecting switch, try to put the selecting switch to the shelves which can send ultrasonic). The service time of the variable amplitude lever will be properly extended in this way, but not use for long time, and should consider changing the new variable amplitude lever in time.

5) when using KSS-1200DT, if the crash capacity is less than 5ml, should choose the variable amplitude lever of $\phi 2$ or $\phi 3$, the depth that the variable amplitude lever inserting into liquid is about 1cm, the distance between the end of the variable amplitude lever and container bottom can be determined by power, the minimum can't be less than 0.5cm.

Do not fan the air and not splash while sending ultrasonic in principle, if fan the air or splash, should turn the power lower and set the ultrasonic time shorter to avoid damaging the variable amplitude lever(the optimal ultrasonic time is between 0.5s and 1s).

6) Number value and voltage that power meter reveal, become pieces of pole insert depth and load (broken density, consistency of sample) the liquid have something to do with

The value that power meter displays relate to voltage, the depth that the variable amplitude lever inserting into liquid and load (such as the density, consistency of the broken sample), if the voltage is lower than 220V, the depth that the variable amplitude lever inserting into liquid is relatively deep, the load is too dense in density, so that the value that power meter displays will be smaller, contrariwise, bigger. The value is simulation parameter, which does not influence the actual power.

7) This machine does not need preheating, and should have good earthing while running.

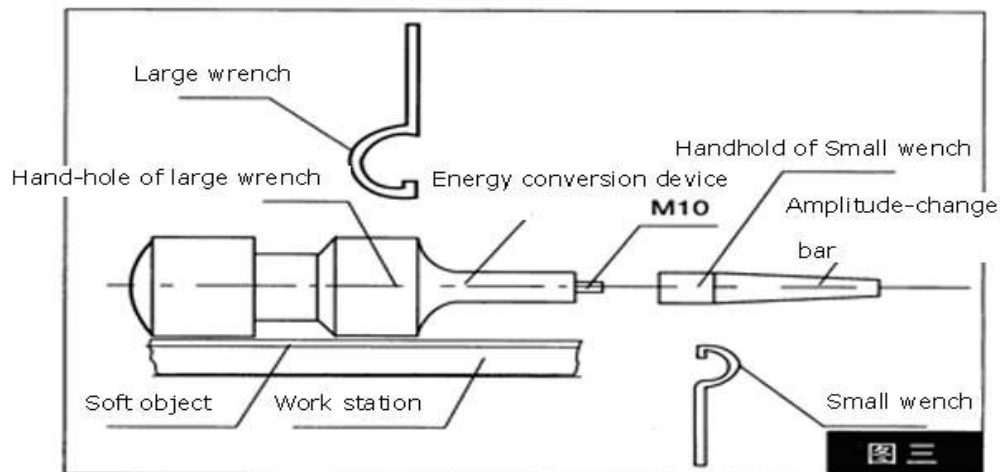
8) When ultrasonic crushing cell, liquid temperature will rise quickly because of the cavitation effect in liquid that induced by ultrasonic. Users should pay more attention to various cell temperatures. Propose crushing cell more times in short time, and cooled by extra frozen water at the same time (the propositional ultrasonic time is within 3-5s, the propositional interval time is less than 3-5s)

9) The machine should be put in dry place and there is no moisture, no sunshine, no corrosive gas in the place.

10) The capacity and shape of container should assort with the amount of sample, Practice proves that the broken result of leptosomatic container is better.

11) Practice proves: Crushing more times in short time (working time is 1-2s, interval time is 1-2s) is better than incessantly running for a long time. In order to prevent the liquid from heating, longer interval time can be set. In addition, it is apt to no-load as the instrument incessantly running for a long time that will shorten service life of the instrument.

Applicable scope of the variable amplitude lever (propositional):



Put the transducer subassembly on the chair with soft object (such as towel, etc), and put small spanner into spanner hole of the variable amplitude lever, then put big spanner into spanner hole of the transducer, while putting spanners, must keep them at same lever.

Hold the small spanner in the left hand, hold the big spanner in the right hand; both hands exert oneself at the same time, twist downwards to unscrew; Hold the big spanner in the left hand, hold the small spanner in the right hand; both hands exert oneself at the same time, twist downwards to screw.

While changing the variable amplitude lever, if the screw M10 attaches to the variable amplitude lever, twist the screw out with hands, and twist the screw to the middle of the transducer, then install the necessary variable amplitude lever, make sure it is tighten.

7. Packing List:

- | | |
|---|------|
| 1) Ultrasonic generator: | 1pc |
| 2) Vibration system(ultrasonic transducer subassembly): | 1pc |
| 3) Soundproof box | 1pc |
| 4) Cross clamp (in soundproof box): | 1pc |
| 5) Pest tube clamp (in soundproof box): | 1pc |
| 6) Power line plug | 1pc |
| 7) Special spanner (used to dismantle variable amplitude lever) | 1set |
| 8) Fuse: | 4pcs |
| 9) Operating instruction: | 1pc |

Available fittings: multifarious variable amplitude levers, special crush flask、 cell crush pearl.

The businesses that our company accepts include repair, refit, mount variable amplitude lever of the ultrasonic cell crushers that made by American, England, Japan, Germany, etc.