



**OPERATION MANUAL FOR**

# **SONIC series**

**Ultrasonic Cell Disrupture (Economy)**



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## **M.R.C LTD.**

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## I. Brief Introduction:

Adopting advanced foreign technologies, our series ultrasonic cell crushers, with high-quality and international-level functions have been tested and approved by Bureau of Quality & Technical Supervision and partial of these products have already commanded steady markets at abroad. Ultrasonic cell crusher, as a multi-functional and multi-purpose instrument to treat various matters and make cavitation effect to liquid with ultrasound can not only be used to crush plant and animal cell, and even virocyte, but also for emulsification, separation, extraction, froth breaking, degassing, cleaning and acceleration of chemical reaction, etc. Our products are qualified to be used in teaching, research and production of various fields, such as biochemistry, microbiology, pharmaceutical chemistry, surface chemistry, physics, zoology, agriculture and pharmacy, etc.

## II. Technical Data:

SONIC-250W Type. Frequency: 20-25 KHz

Frequency Automatic Tracing Ultrasonic Time Set: 0.1s ---9s

Working-off Time set: 0.1s---9s

Overall Time Set: 0.1min---99min

Ultrasonic Power: 20---250W

Adjustable Random Amplitude Transformer:  $\Phi 6$

Optional Amplitude Transformer:  $\Phi 3$

Crusher Capacity: 0.2---200ml

Duty Cycle: 0.1-99.9%

Power: 220V $\pm$ 5%

Work Environment: Indoor (no damp, sunshine and corrosive gas)

## III. Applicable Range of amplitude transformer (probe)with various specifications

Amplitude Transformer (Probe)  $\Phi$  mm  $\Phi 3$   $\Phi 6$   $\Phi 10$

Crusher Capacity ml 0.2-10, 10-100, 100-250

## IV Instrument Structure:

This machine is composed of three parts, namely ultrasonic generator (power), transducer unit and sound proof box which are connected by specific cable, making the machine flexible and convenient. It can carry out operation on holders or in the sound proof box. Similarly, the amplitude transformers are optional according to different crush capacity, such as, choose  $\Phi 2$  for crush capacity below 2ml;  $\Phi 3$  for that among 3---10ml;  $\Phi 6$  for 10---100ml. Note: Probe into the liquid for 10-15mm. While many samples exist, make sure the margin from the end of the probe to that of the vessel is more than 30mm. Please do not shot the air when the probe does not touch the liquid.

## V. Operating Manual:

1. Install the instrument as follows: Connect the specific power cord with the power connector (220VAC 50Hz) located at the back of generator and the signal connector of transducer unit with that of generator, and then fix the transducer unit into the special hole located in the middle of the sound proof box surface, afterwards, put the crushed substance on the lift table of sound proof box and lift the lift table to where the amplitude transformer is in the liquid among 10—15mm.

2. Check whether the amplitude transformer select switch at the back panel is in the position in compliance with the transformer. Generally, new instrument or amplitude transformer should match with the select switch.

★3. Power the switch at the back of generator on and the indicator is on. Press reset button at the top left corner of the panel to return the instrument to the former step, so that a good running condition can be ensured.

### 4. Data Setting and Query

this kind of instrument, they can either start it according to the data set last time(the data will be autosaved if the power is off), or reset the ultrasonic time(S), working-off time(S), overall time(min)and instrument protect temperature(°C). (While setting, make sure the time between double pressings shall less than 5s, otherwise, the machine will jump out of the setting procedures. Please set as follows: Firstly, press the setting key and the display window at far left will show a “-1”, which means you can set the ultrasonic time. The data showed on the display window at far right is the original data. Press function key to prepare for the next if there's no need to reset it. Otherwise, press numeral and decimal point key (+10,+01s) first for you to reset, then function key. Secondly, setting the functions, the display window at far left will show a “-2”, which means you can set the working-off time, afterwards, press numeral and decimal point key (+10.+01) to set the ultrasonic time (fewer than 9s is the best). Thirdly, press function key and the display window at far left will show a “-3”, which means you can set the overall time, and press numeral and decimal point key to set the overall time (min). Fourthly, press function key and the display window at far left will show a “-4”, which means you can set the instrument protect temperature from 40-50°C. Until now, as long as you make sure all the functions have been set accurately, press setting key first and then ON/OFF to make the machine run as the data set above, meanwhile, the display window at far left begins to count down, ultrasonic indicator is on and working-off indicators (off) is on in turn. When the overall time is passed, the display window in the middle will show the overall time and glitters, the alarm will ring automatically and the machine will stop running. A repeat is needed, press data recovery key first, then on/off key to start the machine to run. A

pause is needed during running, press on/off again, and so on.

If you press setting key during setting, the system will jump out of setting procedures, return to work state and autosave the data set.

In case that external signal is at fault or protect, the protect indicator will be on and the instrument stop running. Relevant staff should make efforts to remove the failure first, and then press reset key to recover.

5. Power Adjust: Set the power you need by adjusting power add key and minus key on the instrument panel. (Adjust the power at the ultrasonic working-off is recommended).

★ 6. Easy Operation: Press setting key

Press function key

Press numeral and decimal point key (set the ultrasonic time)

Press function key

Press numeral and decimal point key (set the working-off time)

Press function key

Press numeral and decimal point key (set the overall time)

Press function key

Press numeral and decimal point key (set the protect temperature)

Press setting key→on/off→adjust the power

## VI. Attentions:

1. Do not power on before the probe into the liquid, otherwise the transducer or ultrasonic generator will be damaged.

2. Determine and choose the best cell crush capacity, time and power for various cells. Because of high output power of this instrument, a low power is needed when you choose amplitude transformer of  $\Phi 2$ ,  $\Phi 3$ , or  $\Phi 6$ , so that breakage of the transformer due to overload can be avoided.

3. Use the probe Select Switches

Probe select switches aim to match to different frequency and resistance of various amplitude transformers and generators. The ultrasound cannot work normally if the frequency of transducer unit is not in compliance with the resistance of generator.

When adopting this series new instrument and amplitude transformer, you should make sure that the select switches are set in the relevant positions. In the condition that the amplitude transformer is abrasive, you can adjust the switches until the ultrasound works normally. Here, the switch gears are allowed to be not in compliance with the specifications of amplitude transformers.

4. The value, voltage, the depth of amplitude transformer in the liquid and load have something to be with the density and consistency of the sample crushed. For example, if the voltage is lower than 200V, the amplitude transformer dips into the liquid deeper and the load density is larger, the valve would be smaller. On the contrary, the valve would be larger. (This data is stimulation parameter and the value has nothing to do with the actual power of the ultrasound).

5. There's no need to preheat this machine, but a well ground connection should be ensured.

6. Due to cavitation effect of the ultrasound in the liquid, the liquid temperature will rise rapidly. Therefore, customers should pay attention to the temperature of various samples. We suggest you crush for a short time (no more than 5s each time) but with more times and put ice outside the sample box to cool them down.

7. Because of industrial frequency transformer switch power of this machine, you should not touch the shell to avoid an electricity shock when the generator is open. This instrument is of high performance and is not easy to be damaged.

8. Result: The effect of short-time work, as 2-3s working-off for every 2-3 working is higher than that of long-time work without rest. In order to avoid the heating of the liquid, a long working-off time is permissible. In addition, long-time work without rest can cause empty-load and shorten the service life of instrument.

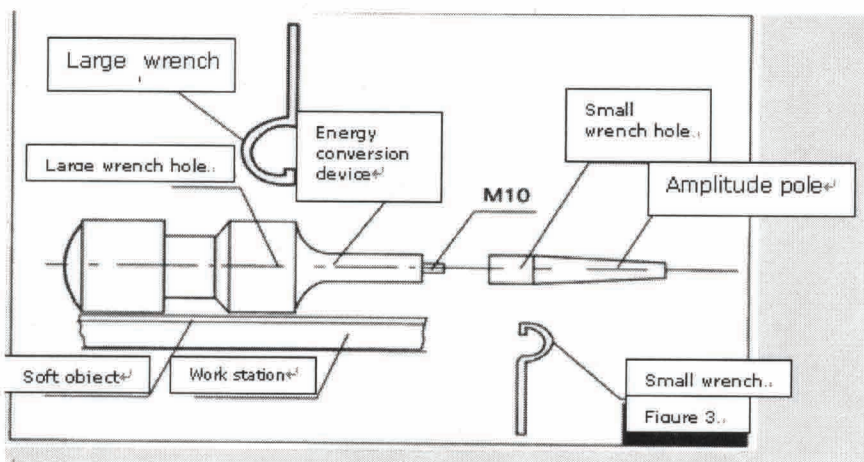
**Warning: For probe 2,3mm max. 30% power**

#### VII. Experiment Data of Partial Samples (For Reference)

| Content                  | Working-off Time (S) | Ultrasonic Time (S) | Total Time (min) | Power (W) | Vessel (ML) | Crush Rate (%) |
|--------------------------|----------------------|---------------------|------------------|-----------|-------------|----------------|
| Plum Green<br>Leptospira | 5                    | 5                   | 5—20             | 500       | 10          | 90<br>Above 90 |
| Staphylococci            | 5                    | 5                   | 10—22            | 500       | 10          | 90<br>Above 90 |
| Sciatic Nerve of<br>Rat  | 3                    | 4                   | 7—16             | 600       | 10          | 92<br>Above 92 |
| Liver of Rat             | 3                    | 4                   | 4—12             | 600       | 20          | 95<br>Above 95 |

|                        |   |   |      |     |    |                |
|------------------------|---|---|------|-----|----|----------------|
| Liver Cytozyme         | 2 | 3 | 3—9  | 500 | 20 | 95<br>Above 95 |
| Escherichia Coli       | 3 | 3 | 6—13 | 500 | 50 | 93<br>Above 93 |
| Bacillus<br>Pyocyaneus | 3 | 3 | 6—12 | 500 | 50 | 92<br>Above 92 |

### Disassembly and Assembly Figure of Amplitude Transformer



### VIII. Disassembly and Assembly of Amplitude Transformer

Place the transducer on a table with soft matter (e.g. towel), and then place the petty wrench into the wrench hole of probe and wrench into the hole of transducer, and then exert at the same time from opposite directions. Screw the probe clockwise is up and counterclockwise is down. If you want to exchange the probe and the 10mm screw belt is bolted on it, you should screw the screw out first, and then screw half into the transducer, afterwards, screw another half into the amplitude transformer.

Our company provides various services, such as repair, equipping amplitude transformer and sound proof box for both imported and domestic ultrasonic cell crushers.

### IX. List:

- Ultrasonic Generator
- A Set of Transducer Unit
- A Whole Set of Sound Proof Box
- A Power Cord
- A Fuse
- Two Instructions