Operation Manual

PORTABLE ULTRASONIC WELDER

EGW—2808A

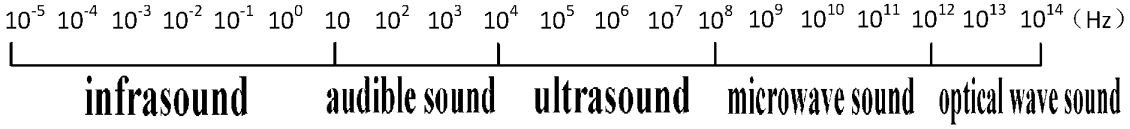
V20.1001

Caution: Please read this manual carefully before operation

Ibortech Machinery Co.,Ltd

I. What is ultrasonic?

Ultrasonic means the sound wave whose frequency is over than the audible sound frequency to human. To human, the audible frequency of sound normally from 16KHz to 20KHz, thus the sound wave in frequency over than 20KHz is called as ultrasonic (or be called as ultrasound). But human hearing sensitive is much lower than most of other human, and most animals is sensitive to sound in frequency over than 20KHz, eg, a cat can hear sound in about 64KHz. And it is reported by "Biology Report"on internet that most kinds of moth can hear sound in frequency as high as 300KHz, then it says that moth ear is the most sensitive in the word. Presently, so far as we know that the frequency of sound from a bat mouth is about 212KHz,which is more than ten times of that human can hear. The frequency of sound wave made by bat is in range of ultrasound.
The sound normally is divided into infra sound, audible sound, ultrasound, microwave sound and optical wave sound, and the related wave frequency can refer as below image.

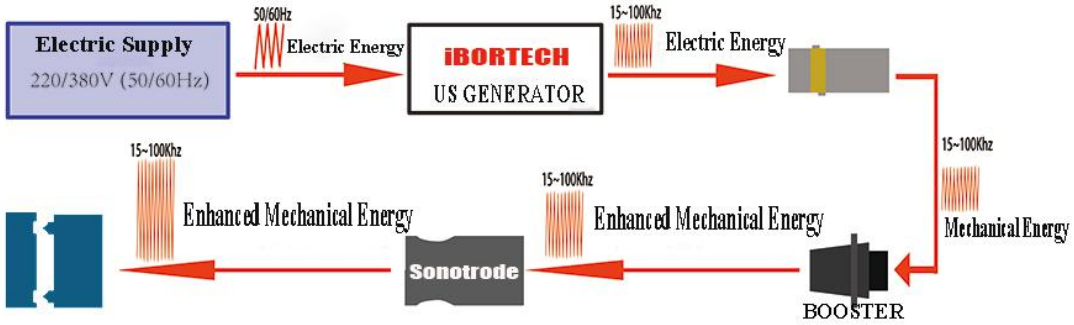


But normally, because of the application of sound wave in the daily industrial production can be as low as 15KHz or lower which is also audible to human, especially for the welding application area, we call welding machine in 15KHz frequency as ultrasonic welding machine or ultrasonic welder.

II. The application of ultrasonic principle?

Ultrasound can be wide applied in various area: such as in military field, civil appliance field, industry production, etc. Eg, it can be applied to sonar detection, ultrasonic steel inspection, driving animals, ultrasonic washing, ultrasonic plastic welding, ultrasonic metal welding, ultrasonic emulsification, ultrasonic cutting, ultrasonic boring,ultrasonic polishing.
The mostly applied ultrasonic in industries is ultrasonic plastic welding, ultrasonic metal welding, ultrasonic cutting, ultrasonic cleaning, ultrasonic sewing / bonding, etc.
II-1. Ultrasonic welding, including ultrasonic plastic welding & metal, means applied a ultrasonic generator which is as a power supply of ultrasonic system to convert supplied electric in low frequency, such as 220V or 380V, to the ultrasonic frequency, normally 15KHz to 70KHz, and supplies to ultrasonic transducer which also called as converter, by which the electrical energy is transfer into mechanism oscillation energy to work on work-pieces and case the internal oscillation and friction between molecules of material to generate heat and melt material, by which the molten material at the contacting area infiltrate into each other and stick together to

form welding. Here, please be note that normally we do not finish through working transducer directly to work-pieces, because the wave from transducer is very short whose oscillation power is not enough to melt material, but it requests booster and horn (also called as sonotrode) to enhance the wave amplitude and work on work-pieces by a ultrasonic horn. It can be clearly explained by below image.



Ultrasonic welding is with the advantages of:
a. High production rate: only seconds can finish the complete welding operation;
b. High strength: comparing to glue sticking, ultrasonic welding is sticking by molten material itself, and the material infiltrate into each other, the assembly strength is the much higher.
c. Air tight: comparing to assembling by screws or buckles, ultrasonic welding can realize air-tight and leak-proof assembling, which can be applied to on products in waterproof or leakage-proof requirement.
Ultrasonic welding is widely applied in automotive industry, house-appliance industry, electronics industry, toy industry, medical consumable production industry, packing procedure area, etc.

III. Specification:

Model: IB-AN2808
Power Source: 220V AC, 1P, 50/60Hz;
Power Output: Normal working value 800W, peak value 1200W;
Max Current: 5.5A;
Weight: 17KG.

IV. Generator Introduction:

1. Power Switch: when power switch on, the indicator will on, and cooling fan of generator will begin working.

2. Amplitude Meter:

   A. It shows the condition of resonance when unloading test ultrasonic. Normally, it should be 0.3~0.6A when unloading test system. If the the needle move in big distance, be means abnormal resonance of system.

   B. When machine works loading, it show the current output of ultrasonic.

3. Delay Time: It means the time from the ultrasonic welding head begin moving down to ultrasonic beginning output. If system applied as handheld welding, then it should be set as “0”.

4. Weld Time: the time length of ultrasonic outputting;

5. Hold Time: Means the time since ultrasonic output stop to ultrasonic head moving up for cooling the welding under pressure. If system applied as handheld welding, it is better to set it as “0”;

6. Mode Selection Switch:

   A. Manual: for machine tooling adjustment if applied on table-type machine. No need if applied as handheld welding;

   B. Auto: Automatic operation for normal production sequence including delay time, welding time and holding time. If applied as handheld welding, set weld time value according to actual condition, and set delay time and hold time as “0”.

   C. Check: check the resonance of system, specially when change-over ultrasonic horn or transducer.

   The test process is as:

1st. Power on system for 1~2 seconds;

2nd. Turn this switch to “Check” and see the amplitude meter. If the amplitude meter is moving and under 0.6A, then it means good resonance, or it means abnormal resonance.

7. Welding Counter: automatic count the welding cycle time.Press the knob to reset counter.

8. Tuning window: if the resonance of ultrasonic system is not good after changing over horn or transducer, it should to manual tuning be below process:

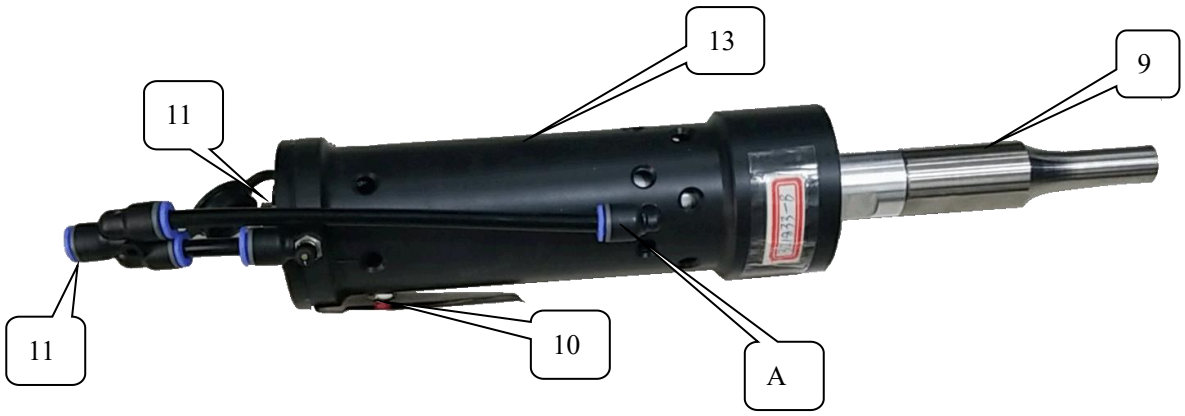
A. Open the window;

B. Turn the coil to get best position of tuning coil to reach the best resonance (Amplitude should be 0.3~0.6A unloading US check).

Note: a. Resonance tuning means get a suitable position of coil, but not means turn to one direction is increasing and other direction is reducing;

b. While do tuning, please turning coil little by little after which do ultrasonic test as above process of Ultrasonic Check process;

c. When do ultrasonic check, it can not keep pressing “Check” over than 1S to avoid system damage by power loading.



9. Ultrasonic Horn: Designed basing on process parts design. Horn is made of aluminum, titanium or steel. It can be design for ultrasonic stacking or spot welding;

10. Ultrasonic Trigger Switch: control the ultrasonic output (on/off) during operation;

11. Plug socket: for the cable connecting ultrasonic generator (please cover the socket if no cable connected to protect it);

12. Blower pipe: connect to compressed air supply. If it requests below horn

for faster cooling, it suggests change the connector at A into T-type connector.

13. Transducer House: inside transducer housing, it is ultrasonic transducer with booster. High voltage in side, avoid water or others conductive material drop into it.

14. Socket for high frequency power supply cable to transducer;
15. Socket for ultrasonic trigger control cable;
16. Fuse.

V. Caution:

1. Please study this manual before operation;
2. Please do daily maintenance for longer machine duration;
3. To protect cable, please tight the screws along with cable plugs/sockets;
4. High voltage inside generator and transducer housing, don't disclose by non-expert technicians;
5. To change horns, please clip transducer and horn by two separate wrenches, the transducer rotation is not allowed;
6. Ensure horns has been tighten together with transducer before operation to avoid damaging ultrasonic system;
7. After tooling or transducer changing over, please to ultrasonic frequency check and tuning to ensure right resonance of system, or system will be damage;
8. Poor resonance also will case weak welding;
9. Damaged horn or horn in wrong frequency might damage ultrasonic system;
10. Power off ultrasonic after production;
11. The tuning coil has been adjusted to a suitable position before delivery, if not necessary, don't tuning it.
12. Machine should be earthed for safety;
13. Machine should be applied at a dry space in good air flow condition.