

# JYD-2700S Ultrasonic Welding Generator User Manual

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# 1. Basic information introduction



JYD2700S is a new type of universal ultrasonic generator newly developed by our company. Universal means that it can directly replace almost all existing generators on the market with only a small amount of adjustment. It can be used for plastic welding / metal welding / food cutting / long wave applications / screening / cleaning / atomization / extraction / crude oil viscosity reduction for almost all

applications. Through the customization of the laboratory, it can output a frequency of 15k ~ 100kHz and a power of several hundred watts to tens of thousands of watts.

With a 3KHz available bandwidth (such as a 20K range of 18.5KHz ~ 21.5KHz), it can directly drive almost all transducers on the market that comply with this model's frequency without modifying the matching capacitor or adjusting the matching inductor.

## **Working mode:**

automatic mode: long wave mode, suitable for continuous work such as cleaning / cutting / non-woven welding and so on.

Welding machine mode: mode adjustment mode, time mode, energy mode, peak power mode.

**Voltage:** 198 -242VAC (50/60Hz). When AC110V input is used, the output will be much weaker, it needs some adjustment, direct use can almost only be used for cutting applications.

**Dimension:** 384mm \*240mm\*110mm

**Weight:** 7KG

**Color:** light grey

## **Features:**

Automatic frequency tracking: The system automatically tracks the resonance frequency of the welding head. Compensate for detuning caused by heat and other reasons.

Digital frequency control: the operating frequency is digitally controlled by the microcontroller

Digital Amplitude Setting: This feature allows the user to set the precise amplitude according to the application requirements, providing a greater range and repeatability of settings than analog systems.

Large amplitude adjustable range: 1% ~ 100% continuously adjustable, which is different from the shortcomings of traditional generators that are difficult to work with low amplitude.

High-speed microcontroller: ARM 32bit controller samples and controls the working process 2000 times per second.

Color touch screen display: Through color screen and touch, friendly and easy-to-use human-computer interaction is achieved, and the experience is better.

Slanted start: Ultrasonic energy supply and welding head are started at the most suitable ascent speed to reduce the system voltage.

Diagnostics at startup: During the startup process, test the main components of the system.

Various types of protection are complete: including over-power consumption of the entire machine, over-current of the power tube, under-voltage of the power tube drive, over-voltage of the load, over-current of the load, over-power of the load, abnormal load impedance, load frequency out of

range, over-temperature, external components over-current (such as a solenoid valve), the core circuit voltage is out of range.

MODBUS-RTU: standard MODBUS-RTU (via 485 communication) communication.(Optional)

## 2. Environment Requirements

Try to use this equipment in an environment that meets the following conditions, which will help the working life of the generator:

Environmental factors	Range of application
Operate/Working temperature	0°C to 55°C
Save/Shipping temperature	-25°C to +70°C
Relative temperature	30% to 90%,without condensation

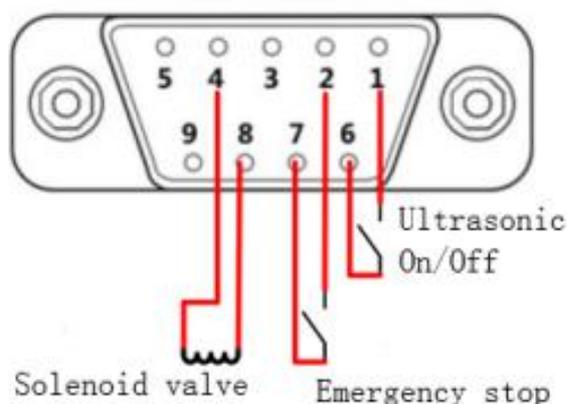
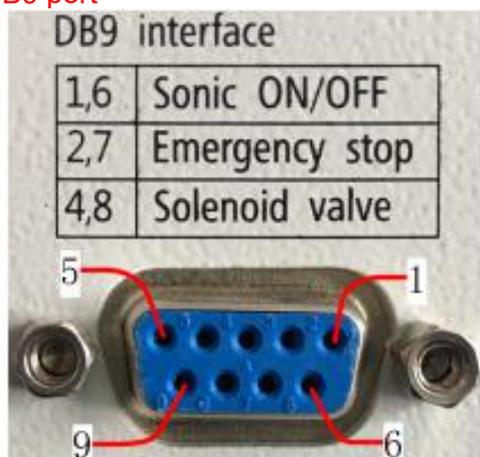


warning

*To ensure that the ultrasonic generator has good ventilation, care must be taken not to cover the generator's ventilation openings. It is strictly forbidden to use this equipment in adverse environment such as corrosive gas. The inhaled air will flow through the internal circuit module. Use in the environment with corrosive gas may greatly reduce the service life of the equipment.*

## 3. Connecting ports introduction

DB9 port



We will include a DB9 connection kit with the generator, which is very easy to use.

1,6	input	24V voltage, connect is start, typical application is to connect a
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		normally open micro switch or self-locking switch
2,7	input	24V voltage, emergency stop when connected, typical application is to connect a normally open micro switch or self-locking switch
4,8	output	24V output voltage, connected to a solenoid valve for controlling the lifting of the welding head of the cylinder.
Besides, pins 6, 7, and 8 are the same ground, so 6/7/8 can share a line		

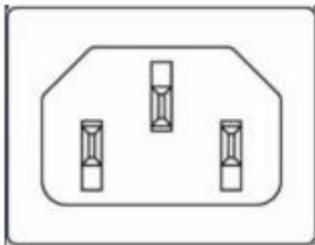


### Ultrasonic output port

1	+, connect to the transducer positive pole
2	-, connect to the transducer negative pole, connected to the earth wire and generator case.

### Power input port

Fuse: 250VAC , 15A

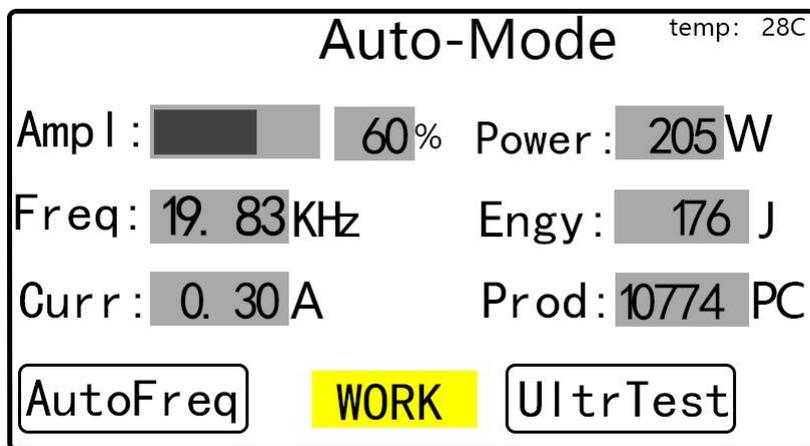


### Attention

*The power plug must be inserted into a socket with a ground terminal. The adaptable power supply range of the ultrasonic signal generator is 220VAC  $\pm$  10% @ 50 / 60Hz. By adjusting the internal settings of the generator, it can also adapt to a power supply range of 110VAC  $\pm$  10% @ 50 / 60Hz. Using 110V without adjustment can almost only be used for cutting and atomizing. The minimum diameter of the power connection cable is 1.5mm<sup>2</sup>.*

## 4. Display interface and parameter introduction

### 4.1 Automatic mode interface (long wave mode, continuous working mode)



### Warning

When the automatic mode is selected: the interface provides a prompt of the current working status (in the above figure, the yellow background running word indicates that it is in work). When it displays as running, it indicates that the sound wave is being output. At this time, be careful, if the belt is cutting The knife mold should avoid touching the tip of the knife.



### Warning

In the case of continuous work (welding time exceeds 5S), it should be ensured to work at a lower power. It is recommended to use less than 1/3 of the model power (such as 2000W models, continuous work should not exceed 666W as much as possible). In order to prevent excessive heat generation, extend the life of the mold, continuous output power can be appropriately increased under enhanced heat dissipation conditions.

**Amplitude:** Adjust the load vibration intensity by adjusting the voltage value output to the load, ranging from 1% to 100%.

**Frequency:** the current output frequency of the ultrasonic generator (when the ultrasonic output is not turned on, it is displayed as the standby start frequency)

**Current:** display the current of the ultrasonic transducer.

**Power:**The output power of the whole machine.

**Production:** Used to record production/yield. Only the number of times the entire welding process has been performed is recorded. Emergency stops during the welding process are not recorded. Can only be cleared, the maximum record is 99999. If you need to record, it is recommended to clear it every day before use.

**Ultrasonic test:** The maximum amplitude of the sonic test is 40% of the total amplitude. Even if your setting exceeds 40, if you want to exceed 40% of the output, you must use an external start. The purpose of this is to protect the mold to a certain extent to prevent irreversible damage caused by direct driving with large amplitude when the mold is abnormal (such as not being locked).

## 4.2 Use of automatic frequency tracking function:

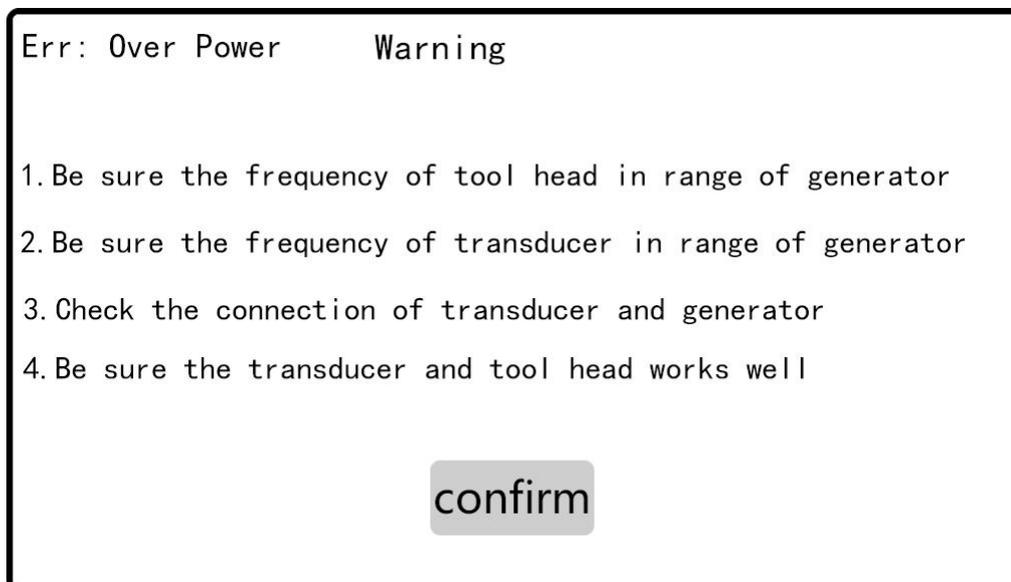
**Auto-Freq:** Search for mold resonance frequency. After setting a frequency sweep starting frequency, click to start the search and the system will automatically find the best resonance frequency.

If you replace a new set of load (including transducer / amplifier / mold or their combination), you should re-run the automatic frequency search to obtain the working frequency, or manually enter the automatic frequency tracking interface and press "Start "Search, if the report is out of" Out of DAC fine-tuning range error ", it means that the system cannot find a working frequency point.

## 5. The most common setup process for welding applications:

1. Connect the transducer (transducer + amplifier + mould combination) through the 2-core aviation plug on the back of the device.
2. Connect the equipment to 220VAC power and turn on the power.
3. On the touch screen interface, click the "Frequency Search" button to enter the frequency search interface, and press the "Start" button to search the resonance frequency of the welding head.
4. After successful search, it will automatically exit to the main interface. If an error is reported, please check the possible cause according to the instruction manual.
5. Set the amplitude to 40%. According to the sonic test, observe whether the current is within 1A, whether the power is within 500W, and whether the sound is mainly based on crisp model frequency sounds. If you report an error that is out of range, you should check the mold or transducer for abnormalities, and the mold is not tightened, cracked, etc.
6. Short the pins 1 and 6 of the DB9 interface on the back of the device through a control device such as a button or PLC. Start ultrasound
7. Adjust the amplitude according to the welding result to meet the welding requirements. Note that after adjusting the amplitude, the sound wave needs to be restarted to take effect.

## 6. Warning messages and possible causes



### 6.1 Error: Lock frequency is out of DAC coarse adjustment range

Triggering this protection indicates that the frequency has lost lock, and the microcontroller frequency is adjusted to its own capacity limit or the correct operating frequency has not been found.

When this error occurs, try:

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Whether the load is connected to the mold during the frequency search, because the device searches for the resonance frequency with a very low amplitude. If a load is connected (such as searching for frequency in water), the driving capability is not enough to promote the load to obtain correct feedback. Please load search frequency

Reset a higher frequency and manually search the frequency

Inspect the welding head for cracks, unlocked, silk, and dirty.

Check whether the direct connection between the generator and the load is not connected, disconnected or disconnected.

Check that the contact surface between the welding head and the horn is smooth and flat.

Replace a normal welding head test to confirm that the equipment works normally, check whether the resonance frequency of the welding head is within the allowable frequency range of the equipment, such as 20k models between 18.5k and 21.5k

## **6.2 Error: Phase lock out of DAC fine-tuning range**

Triggering this protection means that the resonance frequency cannot be found or the frequency has been locked when the system is adjusting the frequency in real time.

When this error occurs, try:

Reduce the load, such as reducing the size of the mold, the air pressure value in the plastic welding machine mode, etc.

Increase the amplitude and use a higher voltage to push it.

Replace the horn with a ratio of 1: 2 or less. This is what we recommend. The traditional 1: 3 horn is more suitable for traditional self-excitation ultrasound.

Re-search the resonance frequency and set the frequency to work at the resonance frequency + 0.06kHz.

Check for other possible causes, such as abnormalities in connecting wires, molds, transducers, voltage, etc.

## **6.3 Error: excessive power consumption**

During the working process, the system will detect the real-time power in real time, and immediately protect it when the power exceeds the rated power of the equipment, so as not to damage the equipment.

When this error occurs, try:

Re-search the frequency and check whether the current and power are out of range under the sonic test. The specific values can be found in this article.

Excessive load, such as large mold plus heavy load (such as water load), exceeds its own safe power output range to provide protection

The mold or generator is abnormal, such as the mold is cracked but not completely damaged. At this time, the resonance characteristics are deteriorated, the power consumption is increased, but the actual amplitude is small.

The amplitude is too large. A large amplitude means a large driving voltage. In addition, the power output of some loads needs to increase sharply. If it exceeds the range, the amplitude is appropriately reduced.

If it is confirmed that the load is too large or the amplitude is too large and this parameter must be used, please consider using other high-power models of our company.

## **6.4 Error: over temperature**

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During the working process, the system will continuously monitor the temperature of the power inverter part of the generator to ensure that it can prevent further temperature rise and damage the equipment in time when the temperature is too high. The design has fully taken into account the temperature generation and heat dissipation, and this protection does not occur under normal circumstances.

When this prompt occurs, try:

Improve the use environment, increase heat dissipation space or provide external heat dissipation.

Check if the vents are blocked and the fans are not damaged.

Wait a few minutes for the temperature to drop, and then restart the machine to continue working.

## **6.5 Error: IGBT overcurrent protection**

This protection indicates that some reasons have caused a very large power consumption of the whole machine, which has exceeded more than twice the rated power in a short period of time. Special care should be taken.

When this prompt occurs, try:

Check whether the frequency is correct. Under no-load conditions, set the frequency of chasing frequency to a relatively high value, such as 20.4k for 20k models, and perform frequency search.

Check if the mold is damaged. Disassemble the mold or replace it with a mold that is confirmed to be good and check again.

Whether the load is short-circuited. Check whether there is a short-circuit or insufficient voltage resistance of the load connecting wires and plugs that cause short-circuit overcurrent protection.

Other issues that can cause severe over power consumption.

## **6.6 Error: load overcurrent**

The system detects that the load current exceeds the internally set protection current value.

When this prompt occurs, you can try:

Check if the load is too heavy. Reduce load

For overcurrent caused by excessive load, you can appropriately increase the amplitude and output the same power by increasing the driving voltage to reduce the driving current, but this will more easily cause a warning of excessive load power consumption and have a greater impact on the life of the mold Big.

If there is no sound wave output, check the load line for short circuit.

Increase the frequency by 0.1khz, try again

## **6.7 Error: load overvoltage**

The system detects that the load voltage exceeds the internally set protection voltage value.

When this prompt occurs, you can try:

Reduce the amplitude to reduce the drive voltage.

Check if the load is not connected.

Check whether the utility power is serious.

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## **6.8 Error: 12V or 24V, 5V, 3V3, etc.**

The system detects that the core voltage is not within the set range.

When this prompt occurs, try:

Contact us

If you still cannot find the cause after above testings, please contact us to resolve it.

