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One: safety guidance

1. Precautions

Please read the following precautions carefully before starting and using our ultrasonic welding machine!

The manual will give you a detailed description of the proper use of the ultrasonic welding machine, please be sure to strictly observe the implementation

The machine must be installed and used by trained professionals

Do not touch the welding tool head during work and operation. Ultrasonic vibration may cause serious skin burns.

The ultrasonic welding machine is not allowed until the operators have been properly trained

- Before maintenance and overhaul, the machine shall be powered off first, and repair and maintenance work shall be completed by specially trained technicians
- Do not open the chassis or adjust the machine without the permission of the equipment manufacturer, or all warranties of the manufacturer will automatically expire.

The operators shall strictly observe the safety and usage of the operation manual

1. 2 Safety precautions for use

Before starting and using, make sure that the cables are properly connected and that the ultrasonic waves are maintained

Welding machine normal grounding years

* For safe use and to avoid damage, do not use metal steel pins or similar Material placed between welding tools

* Please maintain the welder and welding tools regularly and ensure the machine works. Under normal conditions

Some abnormal conditions, sounds during welding, in order to avoid machine damage,
Please stop using immediately, maintain by relevant professional or contact after-sales
personnel

Two: machine overview

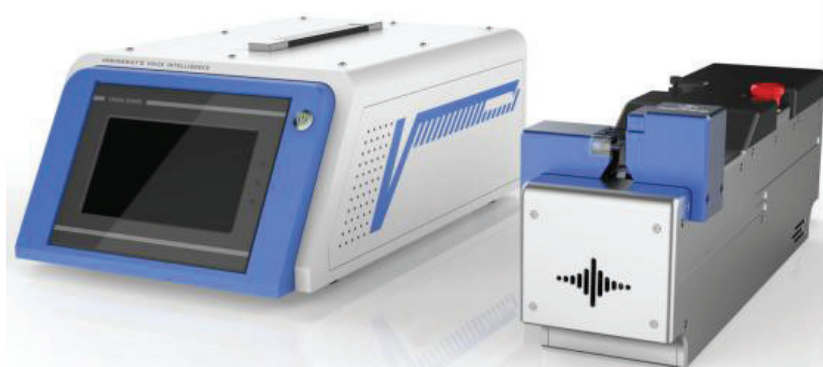


Photo (1) Ultrasonic harness welding machine

2.1 Basic machine parameters

Standard chassis size	480 * 350 * 350(Mm)
Standard rack size	573 * 220 * 160(Mm)
Operating frequency	20kHz
Working air pressure	0.5~06 Mpa
Suitable wire harness dimensions	1-20mm ²

2.2 Composition description of various parts of the machine:

The ultrasonic wire harness welder consists of the following parts

- Ultrasonic generator(Chassis)
- Welding machine body(Rack)

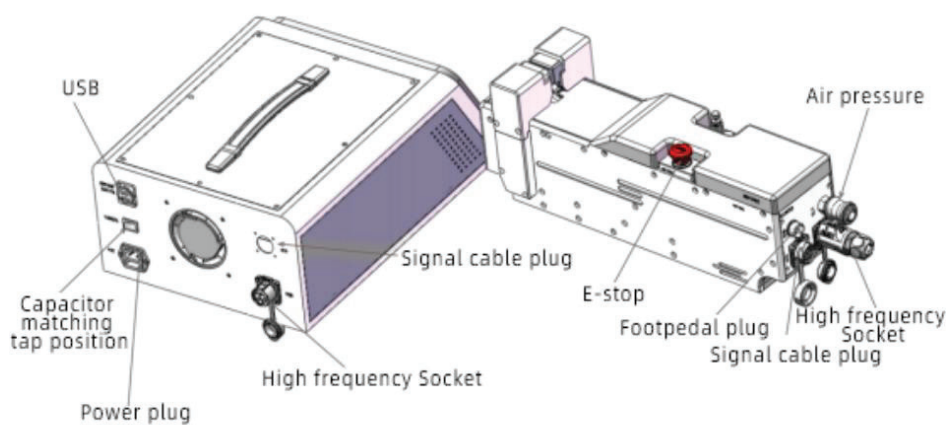
Ultrasonic vibration system

2. 2. Ultrasonic body(Rack)

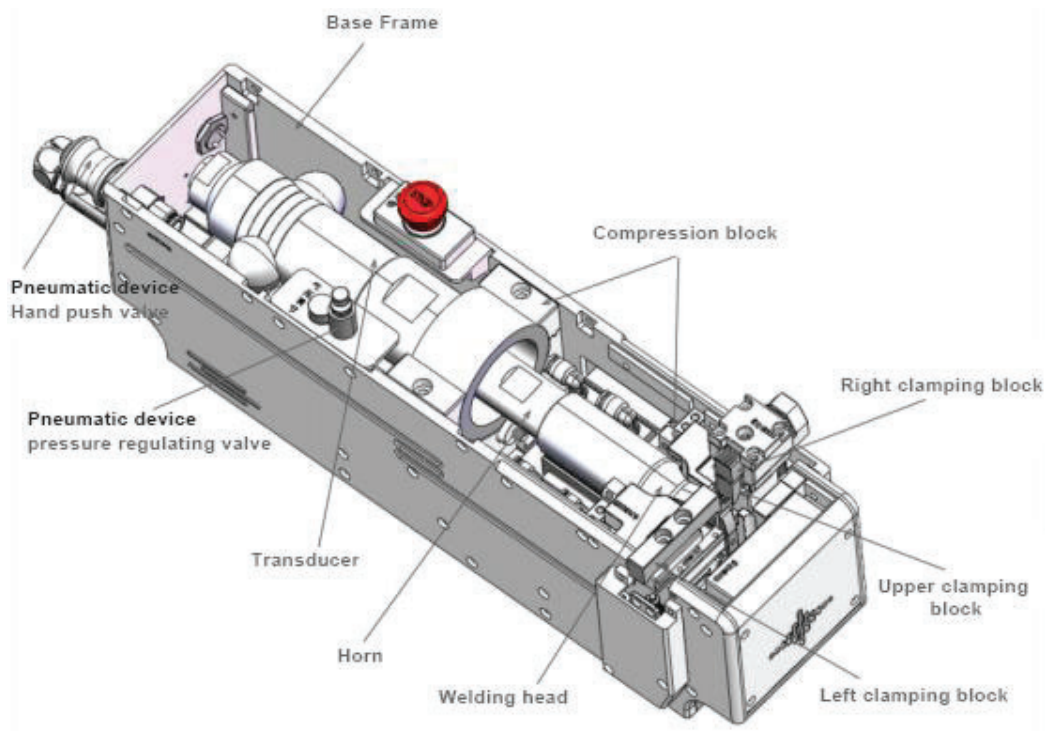
The body of the welding machine is mainly composed of pneumatic device and control device, and the fixing device is mainly fixed ultrasonic wave.

Vibration system; A pneumatic device is to provide the pressure required for welding; And the adjusting device is composed of the left module and the right module.

Figure 1 Electrical introduction of the equipment



Welding body introduction



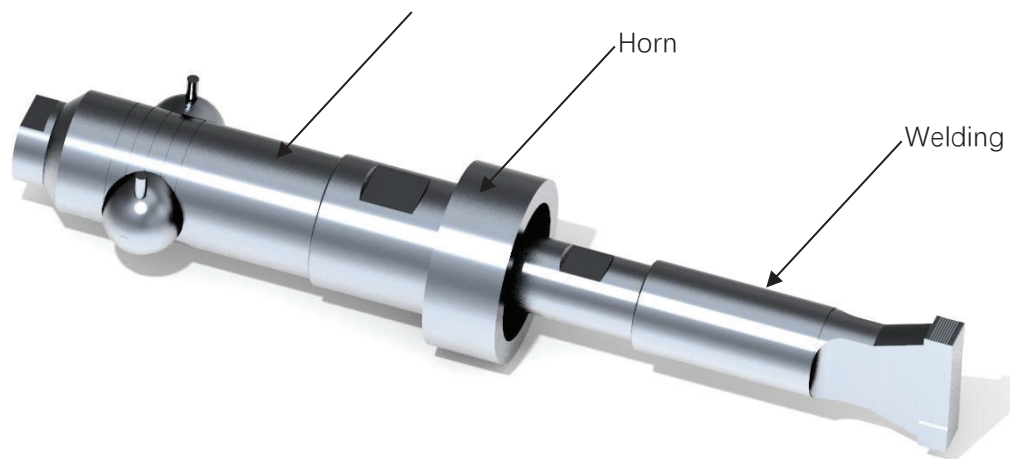
Notes

- ◆ Electrical connection in the process must ensure that the equipment is in a state power
- ◆ The stability of the input air pressure should be ensured when the equipment is running
- ◆ When the equipment is in working state, it is strictly prohibited to touch or adjust the parts related to the welding area with your hands
- ◆ It is strictly prohibited to equipment no-load air compressor
- ◆ It is recommended that one machine with one person operate to avoid human-caused errors

Component Description:

Part name	Functional description
Transducer, horn, welding head.	Complete vibration system
Compression block	For fixing the vibration system to the rack
Left clamping block	For welding and width control; Two set screws on the left clamping block for setting the width to zero
Upper clamping block	Press movement during welding
Right clamping block	Use of limit position to prevent right line running phenomenon during welding
Adjusting Left Module High and Low Screws	Adjust the upper and lower clearance between the left clamping block and the welding head to prevent the left running line phenomenon during welding

Welding tool head(Acoustic pole)



Figure(Four)

These three parts are connected by special bolts, the contact surfaces of which are highly machined and ground, have high flatness, lack of flatness or uncleaned contact surfaces may cause great energy loss, and the parts are tightened with special hook wrench to avoid loosening due to ultrasonic vibration.

Transducer

The transducer is a device for converting high-frequency electrical energy into high-frequency mechanical energy.

Amplitude changer

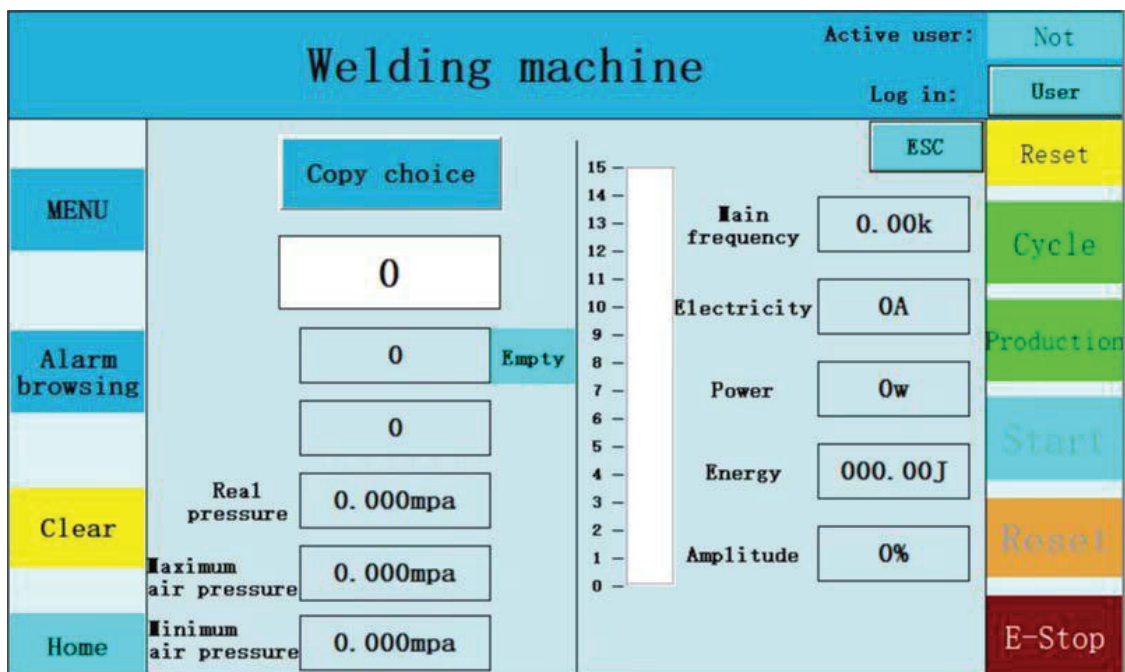
The amplitude changer functions to change the amplitude in the vibration system, to obtain the desired welding amplitude value and to stabilize the vibration process, and to increase or decrease the amplitude by changing the shape and size of the changer

Welding tool head(Acoustic pole)

The welding head (acoustic pole) is to transmit energy to the workpiece and drive the workpiece to vibrate in the axial direction of the welding head (acoustic pole) to realize welding. In order to make the welding head and the workpiece skid (relative movement) as far as possible in the vibration process with high frequency acceleration, transmit energy to the welding surface as far as possible, ultrasonic metal welding will usually be designed on the welding position surface of the welding head, the base surface, and the design of the mesh has square, rhombus, stripe mesh, mesh size and depth according to the specific welding material requirements.

Operating instructions for ultrasonic generator

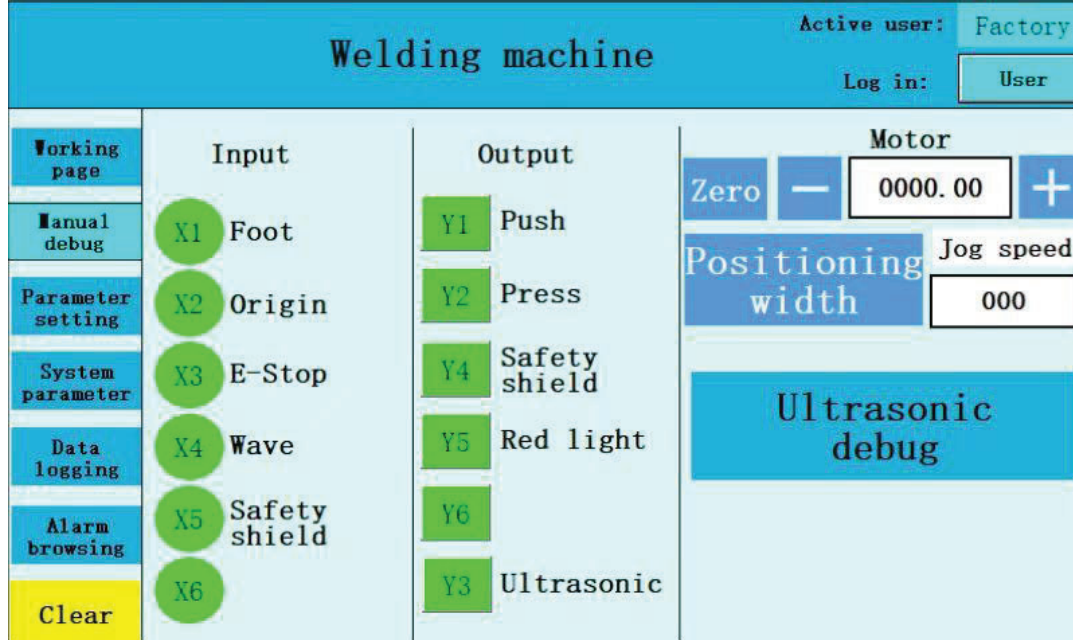
3.1.1 Click the power switch button to enter the page, and click "Enter System" to switch to operation interface (Note: Enter the main interface when welding).



3.1.1 Log in the current user and enter the system (Operator password "2222", Technician password "1111").

Select permission to log in (for example, technician)---enter password--click here to login--Enter the work interface.

On the main screen, select a template, Input square, Template Selection, Set quantity, reset, Start (Footpedal start).



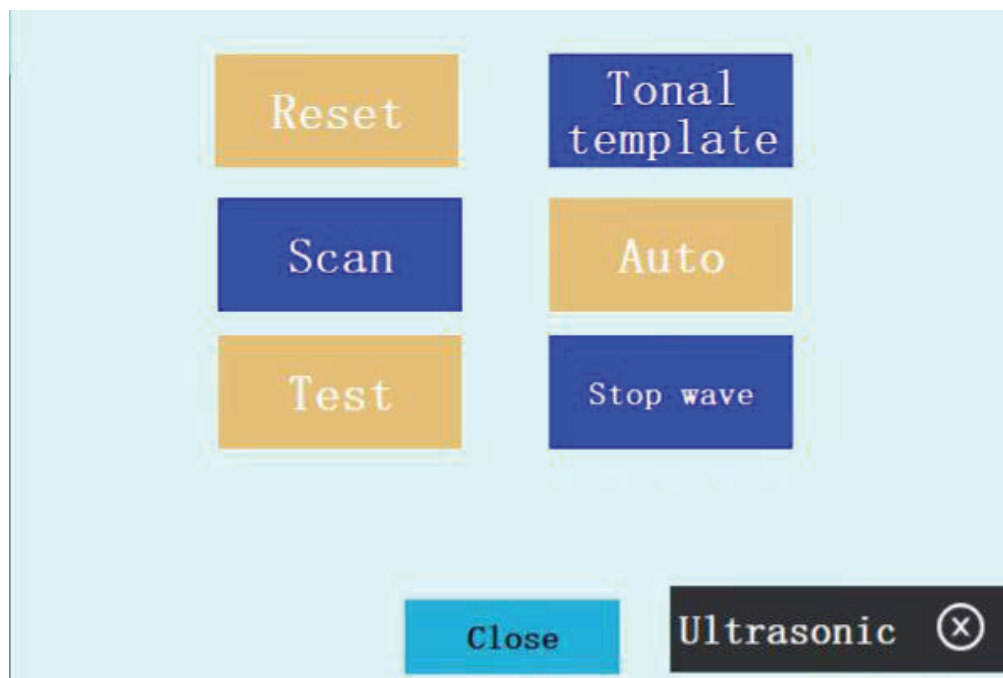
Click on the function menu to enter the option of manual mode:

Manual mode: can test each step of the single-step operation welding mechanism;

Push forward: adjust the left slider forward and backward;

Downward pressure: adjust downward pressure slider downward pressure;

Ultrasonic: manual wave



Ultrasonic Adjustment:

Test: the hair wave detects whether the die head is contacted;

Scan: long wave scanning to detect ultrasonic frequency;

Reset: chassis abnormal reset key;

Click to start ultrasonic: it will start the operation of ultrasonic function, click again will close the operation of ultrasonic function;

Welding machine				Active user:	Factory	
				Log in:	User	
Working page	Amplitude	0%	Dwell time	0.00s	Work Mode	Time
Manual debug	Delayed	0.00S	Energy	000J		0.00
Parameter setting	Weld time	0.00S	Weld width	0.00		0.00
System parameter	Cool time	0.00S	Width compensation	0.00		
Data logging	Vibrate time	0.00S			Template parameter	
Alarm browsing	Weld energy	000.00J			Safety shield (X)	
Clear	Maximum weld time	0.00S			Ultrasonic (X)	

3.1.2 Parameter setting:

Adjusting the welding width and welding time the parameters displayed on the screen are consistent with the actual parameters, which can be adjusted according to the requirements; We recommend to use an existing welding template. If you need to configure a new template, adjust the welding effect based on the actual situation.

Welding machine									Active user: Factory
									Log in: User
Working page	No.	Time	WireRules	Production	WeldTime	PeakPower	EndPower	AveragePower	^
Manual debug									
Parameter setting									
System parameter									
Data logging									
Alarm browsing									
Clear									

Data logging:
Click Data Record to query the historical data of welding.

Welding machine					Active user: Factory
					Log in: User
Working page	Date	Time	Object nam	Alarm description	^
Manual debug					
Parameter setting					
System parameter					
Data logging					
Alarm browsing					
Clear					

Alarm browsing:
Click alarm browse, you can query the information of alarm reason.

4、 Instructions for welding placement of wiring harnesses

During wiring harness welding, refer to Diagram 5 for the requirements on the position of wiring harness:

- ◆ Best placed on the welding head as far as possible not to lift the harness.
- ◆ Multi-strand wire welding, layered together, placed in the lower right, not all flat.

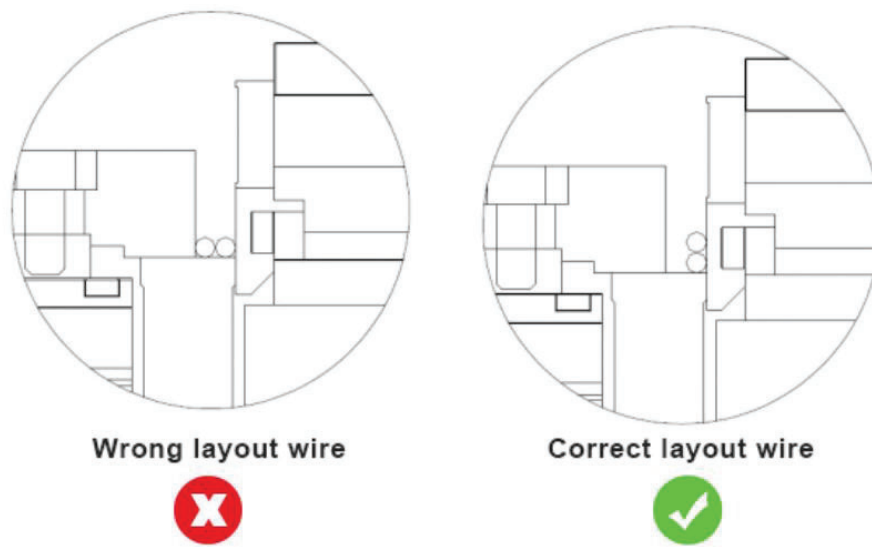


Diagram 5

Five: Installation Details

- Appropriate protective measures shall be taken in the workplace to avoid damp of the ultrasonic generator and to prevent dust and corrosion.

Age of sex gas entering ultrasonic generator

To ensure the normal use of ultrasonic wire harness welding equipment, please connect the grounding wire to avoid interference with ultrasonic metal welding.

Normal working years

Six: procedure

6.1 Unpacking

The ultrasonic welding machine has been tested and adjusted to the best state before delivery

In order to avoid damage to welding equipment, please read this manual carefully and conduct test welding before putting it into use after unpacking.

6.2 Compressed air intake source

Compressed air input (before pressure reducing valve and filter provided by ultrasonic controller):

Minimum: 0.5 MPa

Max: 0.6MPa



Warning!The specific air pressure setting is determined by the number of wires to be welded, when the input air pressure is lower than the air pressure required for welding

When the value, the welding machine use function will not be guaranteed, please pay attention!

6.4 Start the ultrasonic generator

- Check that the emergency stop switch on the rack is not in the depressed position

Press the start button on the generator

Press the test button directly on the ultrasound generator (the ultrasound should not be triggered for more than 5 seconds).

Check the vibration of no-load ultrasonic output

- Ratio of welding time to welding force to welding amplitude to welding width

Place the wires on the solder box, when finished, trigger the foot switch

- Check the firmness of the welded workpiece, check the deformation of the wire, if it does not meet the requirements,

Adjustment of welding parameters and re-test of welding years

Confirm ideal welding parameters and ideal welding results

- Confirm the welding effect meets the requirements of welding specifications, is in ideal working state and is put into production for use



Warning! Do not put your fingers in the welded box while the machine is running!

Seven: adjustment

Each time the welding machine changes the welding head or the wear device, it is difficult to ensure that the welding head is not displaced relative to the device and the module due to the problem of the size of the device or the installation method, and two problems easily occur:

- 1、 The gap between the clamp and the welding head is too small, or even the energy is very large when the ultrasonic trigger is collided, or the gap is too small, or even collided, or the grain between the clamp and the welding head can be directly damaged, or the welding effect can be affected, or even the welding head can be damaged when the number of times is too large, please pay attention to
- 2、 The gap between the clamp and the welding head is too large, and it is easy to run the line during welding, or the welding effect is affected by the excessive age of the cutting edge.

The following describes how to adjust the replacement solder head and wear devices:



Warning! In the process of adjusting the welding machine, it is strictly forbidden to trigger ultrasonic wave to prevent damage to the welding head and fixture. After the adjustment is completed, it is forbidden to trigger ultrasonic wave for a long time. Generally, the trigger ultrasonic wave should not exceed 5 seconds. Each time the machine is adjusted, it is necessary to check the pressing height of the upper clamping block and prevent the welding head from colliding.

7.1 Replace welding head adjustment

Adjustment steps:

- 1、 Remove the upper panel and front panel of the harness machine as shown in Fig. (3)
- 2、 Loosen the fixing screws of the left module and lift the left module a little for easy removal of the vibration system
- 3、 Loosen the pressure block and take out the vibration system
- 4、 Replace the welding head and install it back to the original age
- 5、 Calibration head years
- 6、 Install back pressure block and fix tightly vibration system

Welding head calibration method:

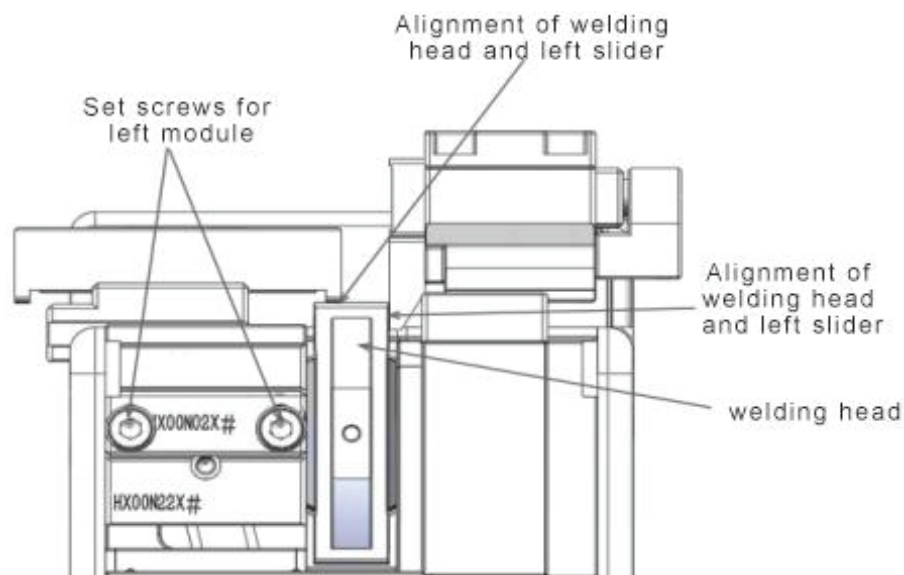
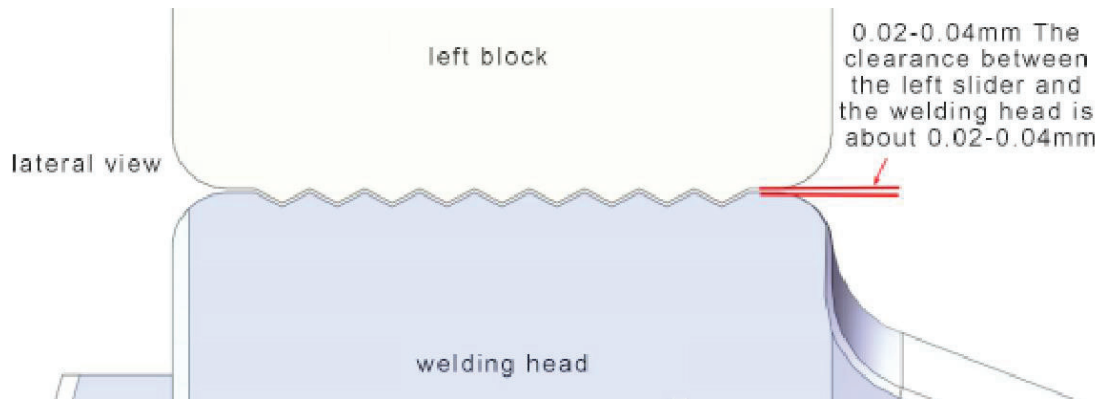


Image 7

It can be seen from the left image (7) that the calibration of the welding head is divided into two aspects:

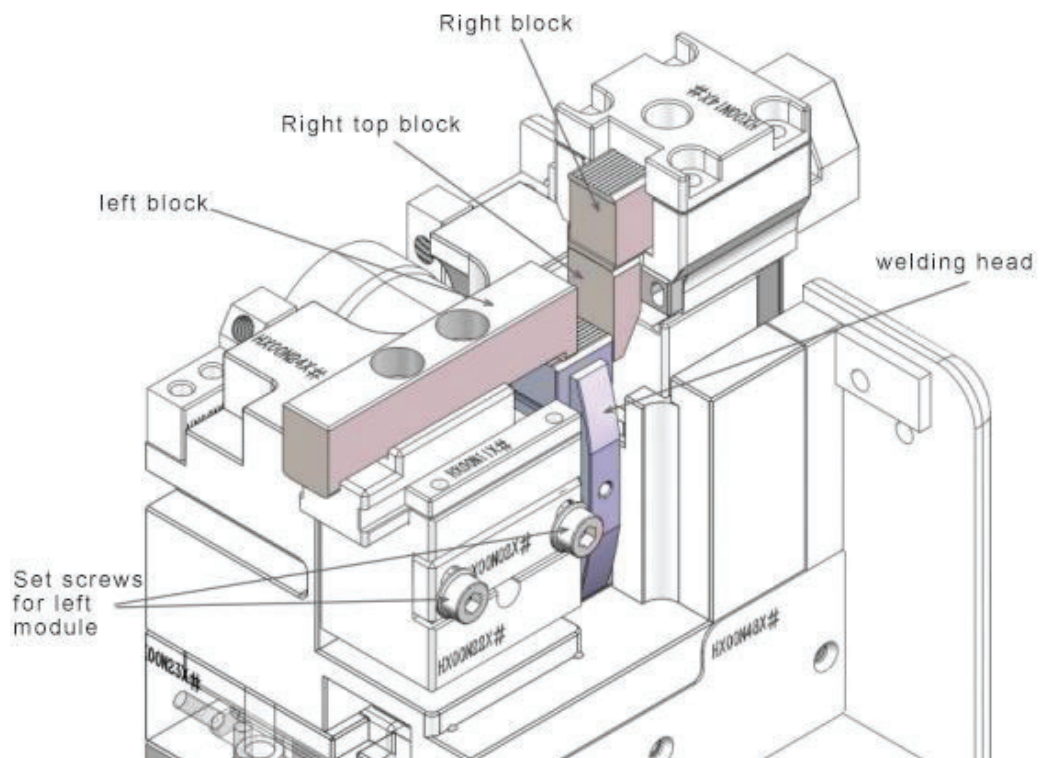
- 1、 Alignment between welding head and left clamping block
- 2、 Welding head vertical calibration



(8)

Alignment between welding head and left clamping block

- 1、 Remove the right module
- 2、 Fasten the left module to prevent displacement
- 3、 Visual inspection of tip alignment groove
- 4、 Alignment between welding head and left clamping block
- 5、 The ripple wave peak of the welding head is aligned with the wave valley of the left clamping block.



Welding head vertical calibration

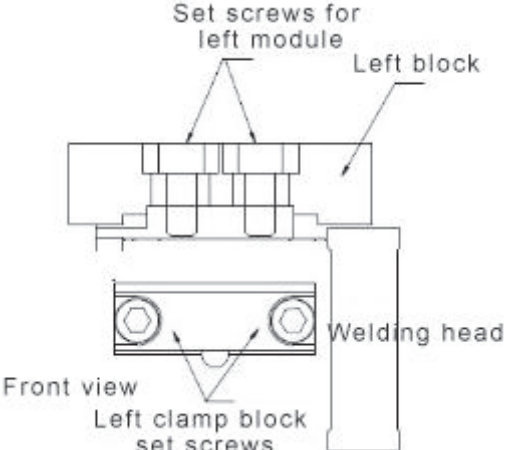
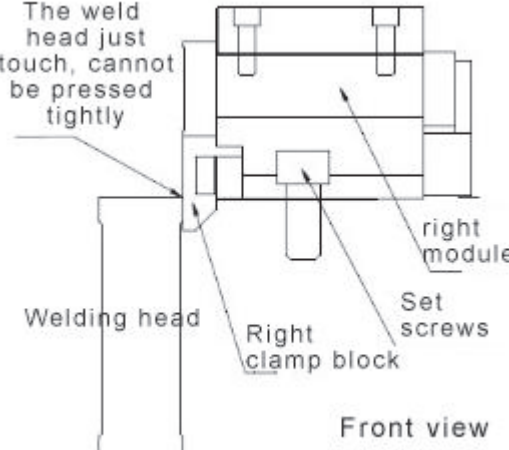
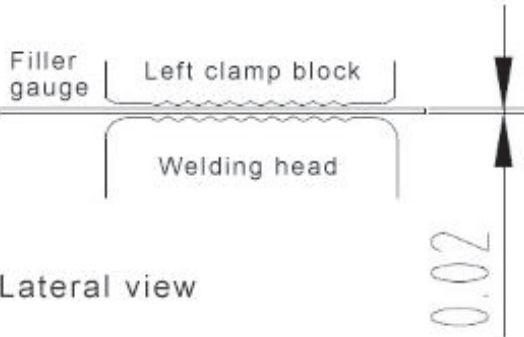
- 1、 Remove the right module
- 2、 Use the adjustment tab supplied with the machine to plug the welding head into the gap between the right module and the underside and the right module
- 3、 Calibrate the angle of welding head and observe the light leakage of welding head.
- 4、 If no light leaks, calibration is complete



Attention!When the welding head is calibrated, the two calibration aspects shall be carried out at the same time. After the calibration is completed, it shall be verified that the vibration system shall be fixed properly. After the calibration is completed, the vibration system shall be prevented from loosening when the vibration system starts to vibrate.

7. Adjustment of clearance between left and right modules

The clearance adjustment methods of the left and right modules must be readjusted each time the welding head is replaced or the wear device is replaced, as shown in the following table:

Gap adjustment between left clamping block and welding head	Gap adjustment between right clamping block and welding head
	
 <p>Lateral view</p>	
<p>Adjustment instructions:</p> <p>Tighten the left clamping block fixing screw during calibration</p> <p>Loosen the left module fixing screws and the left clamping block. Move Please use 0.02 mm feeler gauge for clearance adjustment After calibration, tighten the left module fixing screws</p> <p>Press the "left and right" icon to check whether the left module is tightened and moves smoothly</p>	<p>Adjustment instructions:</p> <p>Loosen the fixing screws in the above figure</p> <p>* The right clamping block is just attached to the welding head. Try not to play a strong role in preventing damage to the welding head or fixture.</p> <p>Tighten the fixing screw year</p> <p>Press the "Up and Down" icon to check whether the right module is tightened and moves smoothly</p>
<p>Precautions:</p>	<p>Precautions:</p>

The fixing screws of left clamping block shall be tightened before adjustment	Can be adjusted using 0.02 mm's feeler gauge for safety
---	---

7. Replacement of four welding surfaces

In order to use the welding head to the maximum extent, please replace the welding surface for every 50,000 times.

Heavy, please replace the welding tool head in time, replace the welding surface at the same time, please check the left and right clamping blocks and upper clamping blocks for wear.

When the welding effect is not ideal due to serious wear, or the welding front is too large after welding, or even running the line, please replace the welding tool in time.

Disassembly, assembly and replacement of eight-year-old vibration system

When the machine is turned on or the machine works for a specified number of times, there are the following reasons for abnormality:

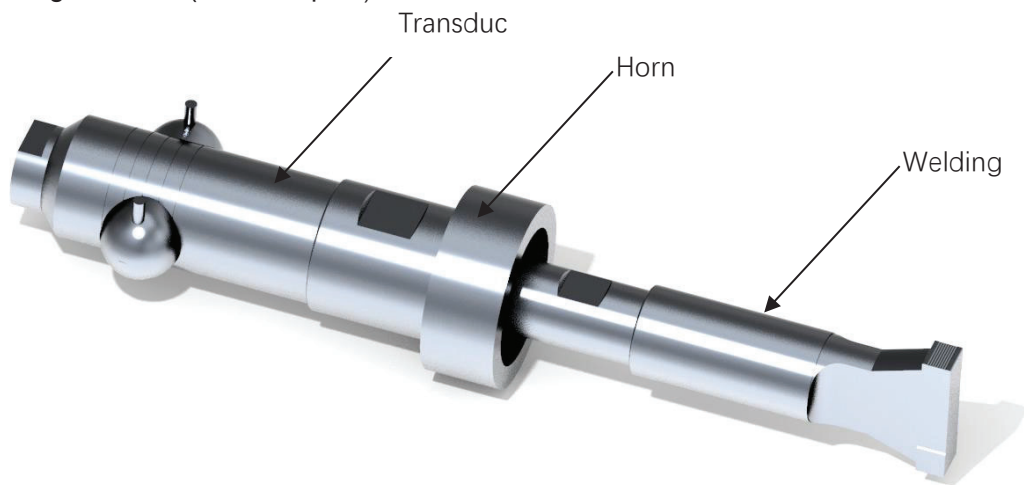
1. The connection surface is not clean when replacing the welding head, and the connection with the horn is not tight enough;
 2. The welding head collides with the clamp too many times, resulting in damage or fracture; Please replace the welding head;
 3. When the welding head is used for a long time and reaches the limit life, the system will give an alarm automatically. Please replace the welding head;
- In order to achieve the best working conditions and maintain the performance of the machine, to ensure the normal operation of the vibration system, the vibration system must be manually checked.
4. All parts of the gantry must be tightened properly. Do not contact the welding head with the workpiece or clamp.
 5. Turn on the power and the power LED is on.
 6. Press the overload test key to check whether the resonance frequency of the vibration system is within the working range and whether overload occurs.
 7. Generally, the ultrasonic sound is a relatively smooth and gentle sound. If strange sound occurs, please replace the welding head or check for loose sound.

Movement;

8. No abnormal sound, normal operation can be performed.

For the whole ultrasonic metal welding machine, the welding head is a wear-prone part, the service life is limited, and the service life of the welding tool head is affected by various factors. The main factors are the hardness difference between the tool head (hardened tool steel) and the workpiece (for example, non-ferrous metal), and the wear and even fracture of the surface groove caused by welding for a long time, and the welding head must be replaced when there is a problem with the welding head.

- Welding tool head(Acoustic pole)



Figure(12)

Problems to be noted during replacement:

- 1、 Carefully observe whether the connection bolt thread is complete, so as not to damage the screw buds of the vibration system due to vibration. If necessary, replace the screw buds.
- 2、 Make sure the connecting surface is clean, free of dirt and objects, butter during installation, and allow ultrasonic waves to pass better.
3. After the bolt is tightened, loosen half a ring to prevent the bolt from being fixed on the welding head, and then install the second stage on the dipole.

Remember!

The rod and transducer must be screwed to the secondary rod first, and then the transducer can not be installed in the reverse order, please pay attention!

- 3、 After the replacement, do not install it on the machine immediately, connect the cables, and place the vibration system directly on the table to test whether the ultrasonic wave is abnormal.

-
-
- a) When there is a strange sound, please reinstall the vibration system
 - b) Intermittent two-year-old three-minute ultrasound, each time the trigger ultrasound should not be too long, check for fever abnormal fever please re-install

Loading(Connection surfaces may not be neat)

If you have any questions, please contact our after-sales service department

Nine: Maintenance

1. After the daily welding work is completed, the copper wire on the welding tool head and fixture surface must be cleaned with a brush.

Please wipe the welding head and welding fixture with tarpaulin.

2. When carrying out the above work, check the wear on the working surface of the welding tool head at the same time.

In case of obvious depression, the working surface or welding tool shall be replaced in time.

3. Pay attention to the air source filter behind the rack. If the filter water and filter oil accumulate more, please clean it in time to avoid affecting the precision pressure regulating valve.

4. When starting the machine every day, pay attention to whether the ultrasonic system is in normal working state during the self-test of the machine. If there is any abnormality, please press

Conduct troubleshooting according to the following steps, and contact the after-sales service personnel in time.

1) The ultrasonic system is divided into three core parts, which are the transducer and the generator.

First, judge whether there is a problem with the welding head, replace the welding head with a new one, and then observe the state of the ultrasonic system.

No return to normal, if yes, it indicates a welding head problem, if no, please see the next step;

2) If it's not a problem with the welding head, you can put another good ultrasonic generator (if there are two devices connected to the problem ultrasonic)

On the vibration rod of wave metal welding machine, observe if the machine is normal. If it is normal, it indicates that the ultrasonic generator has problems.

If it is abnormal, it indicates that the transducer is faulty. If the ultrasonic generator or transducer is faulty, please contact the manufacturer in time.

Business maintenance year

8.1 Abnormal analysis, detection and replacement of vibration system

8.2 Abnormal Analysis (Abnormal vibration system when the machine starts up or works for a specified number of times)

Abnormal cause	Solutions
When replacing the welding head, the connecting surface is not clean, and the lug is not tight enough;	<ul style="list-style-type: none">◆ clean junction surface◆ Check the tightness of the connection with the horn
The welding head collides with the fixture too many times, resulting in damage or fracture	<ul style="list-style-type: none">◆ Replacement of welding head
When the welding head reaches the limit life due to long-term use, the system will alarm automatically	<ul style="list-style-type: none">◆ Replacement of welding head