

全自动焊接机
Automatic Welding Machine
HZ036R

Original Version

To avoid the wrong operation, please keep the manual available and read the manual completely before operating the machine.

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Sign Description



High voltage Warning. It could be harmful to your health if you are exposed to the electric field. Don't ignore this warning, or else your life is in dangerous.



Security warning. It could damage your body and the machine if you ignore this warning.



Laser Caution. Be careful of laser when you operate the machine.



Cardiac pacemaker. Keep away from the machine if anybody wear cardiac pacemaker、 cardiac defibrillator or other life support electric device.

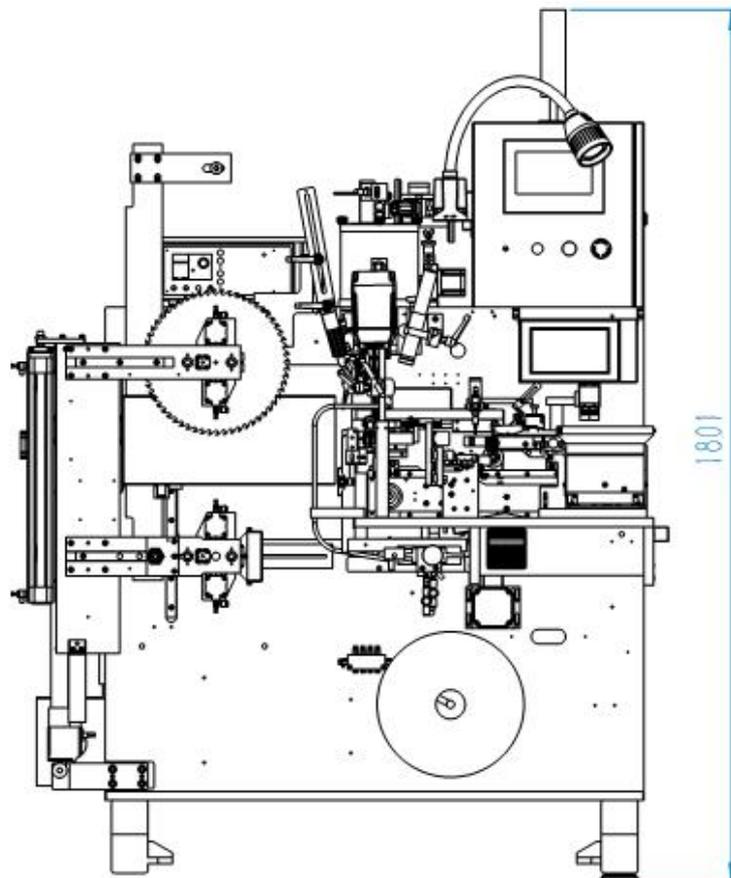
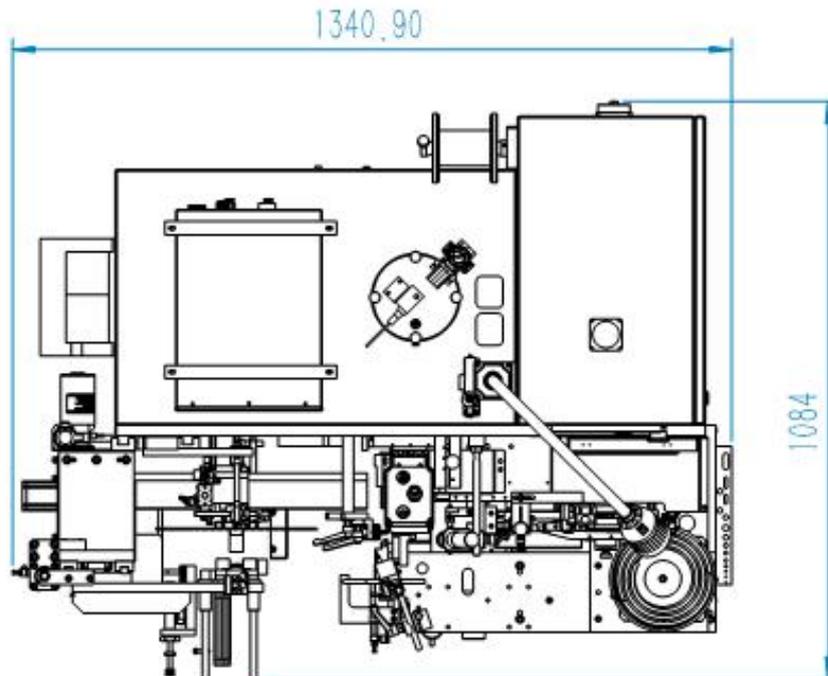
Install

All installation work must be implement by the specialist.

Notice:

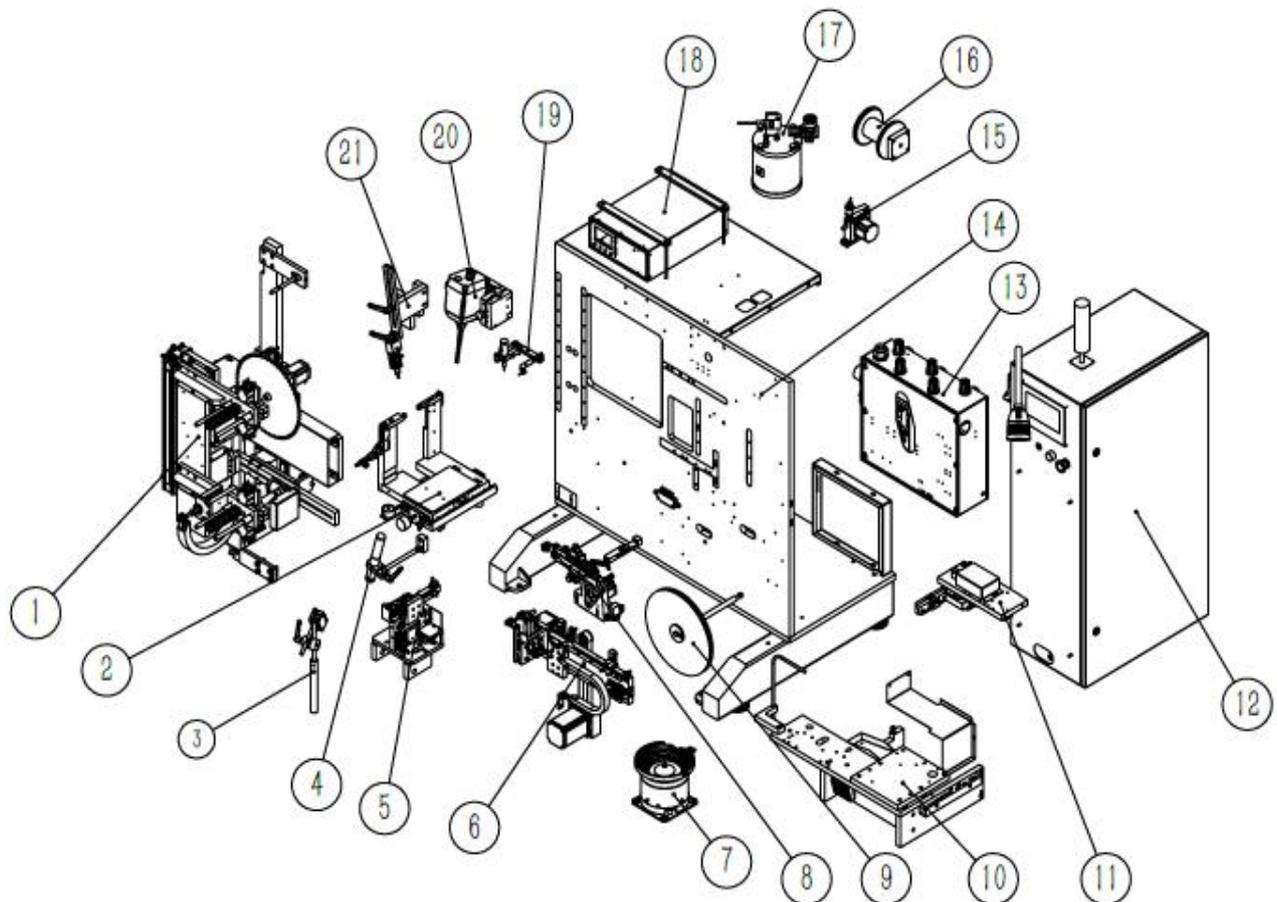
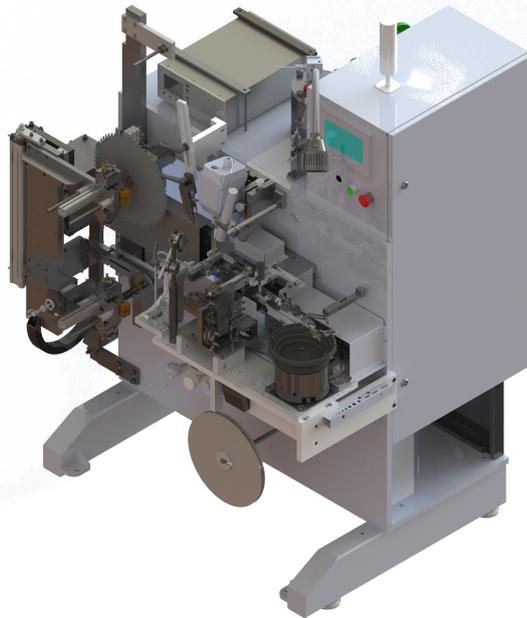
1. A clean and dry indoor environment is better to mount machine. Keep the room constant temperature of 25℃。
2. Mount the machine on a flat and hard ground, adjust bear feet to suitable position and maintain horizontal, keep the machine unshakable and avoid being in an abnormal state.
3. Reserved enough space around the machine, be sure electric box door can be opened smoothly and operator can approach in from any direction.
4. Keep one side path of electric box is clear and good ventilation. Be sure the distance between wall to machine is long than 80cm. To cool the machine effectively, The minimum width of operation corridor is 100cm and The minimum distance of two electric box(left and right) is 60cm.
5. Connect Power supply, air pump and water cooling system correctly
6. Reserved 1m distance on every side of operation space for

maintain the machine. The top projection size of machine
(space area: length-1350mm, width-1100mm, height-1660mm)



Chapter 1 Mechanical and Technical Specification

● 1.1、Mechanical Structure



- | | | |
|----------------------------|-------------------------------------|------------------------------------|
| 1、Saw manipulator | 2、Clip | 3、Wire Feeding |
| 4、Thermometer | 5、Solder flake slicing | 6、1 st carbide transfer |
| 7、vibrating disk | 8、pending carbide | 9、Solder flake reel |
| 10、Workspace | 11、2 nd carbide transfer | 12、Electric box |
| 13、Air valve control board | 14、Main Body | 15、Wire Feed Motor |
| 16、Solder wire reel | 17、solder flux tank | 18、High Frequency Power |
| 19、solder flux Dispenser | 20、HF position adjuster | 21、Saw Locking rod |

● 1.2、Technical Specification

Angle of Serrated Surface: $-5\sim+25^{\circ}$ Total Output power: 6.4 Kw/h

Saw Diameter: $\Phi 100\sim\Phi 350$ mm carbide Width: 1.5~6 mm

carbide Length: 3.5~12 mm carbide Thickness: 1.5~3.0 mm

Air Pressure : ≥ 5 KG Water pressure: ≥ 2.5 KG

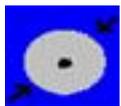
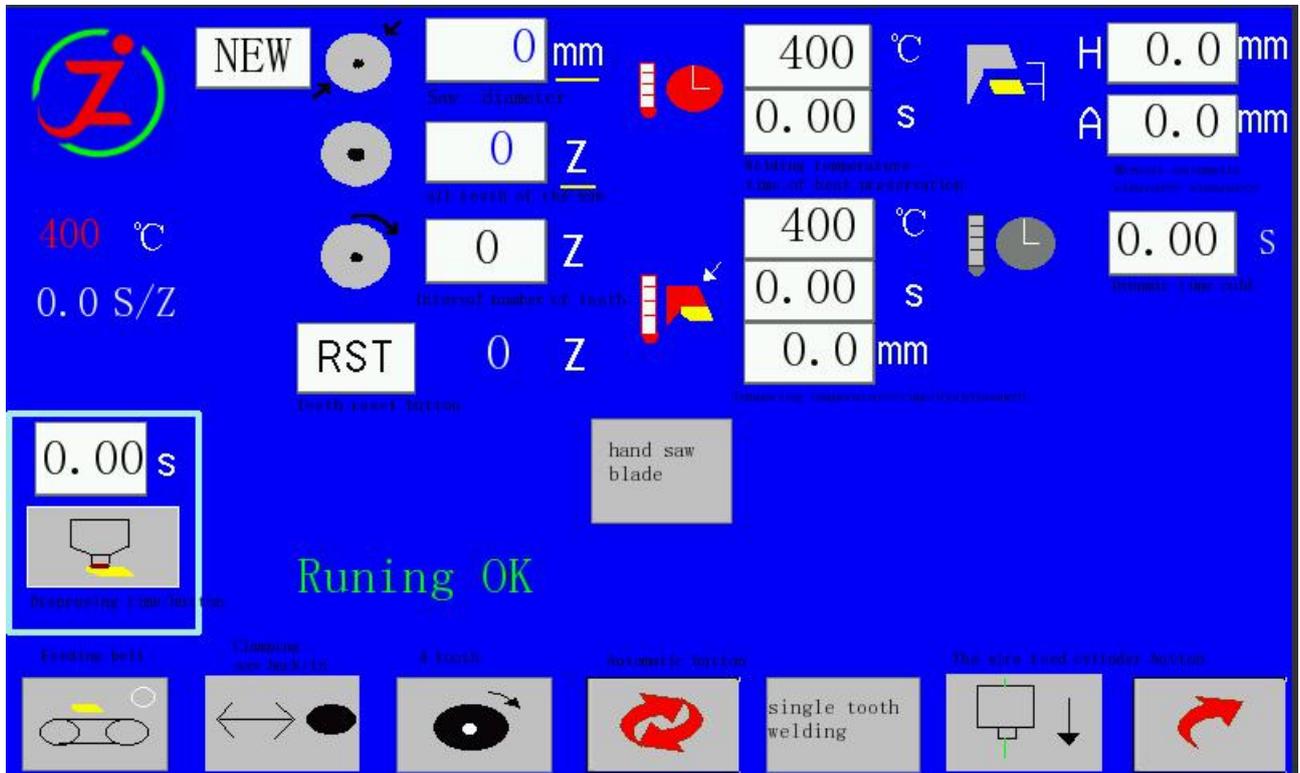
Input Supply: 220V/AC (50Hz Single Phase, AWG9 copper wire)

Nameplate

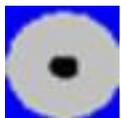
Automatic Welding Machine		
型号 MODEL : HZ036R	电源 MACHINE : 220VAC 50/60Hz	
重量 WEIGHT : 375KG	功率 POWER : 7.5 KW	
尺寸 SIZE(MM) : 1300*1060*1800	满载电流 FULL LOAD CURRENT : 35A	
制造日期 DATE :	气压 AIR PRESSURE : 0.55 MPa	
出厂编号 SERIAL NO:		
DONGGUAN JUNZHI AUTOMATION MACHINERY CO.,LTD.		
Address : No.01,Lane04,SongbaiLang,Dalang Village,Dongguan,Guangdong,China		

Chapter 2 Control Panel

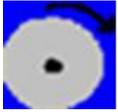
● 2.1、Main Window :



saw diameter: set to the real diameter of the saw, or else the machine can't locate saw's correct rotation position.



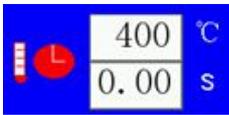
total of saw tooth: set to the real count of the saw, or else the machine can't locate saw's correct rotation position (please take into count the empty saw tooth)



interval number of tooth: the count of skipping saw tooth every time when welded a tooth . 1: don' t skip , 2: skip 1 saw tooth……and so on, this parameter couldn' t be 0.

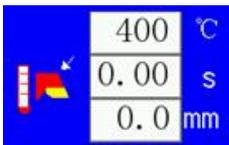


reset saw tooth: reset the count of saw tooth when put on a new saw to solder. Machine will reset this parameter if the number of saw tooth to be weld is zero.



Welding temperature: set the temperature of be welding.

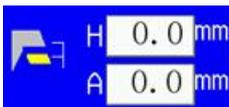
Holding time: time span of sustain welding temperature.



Tempering Temperature: set the tempering temperature.

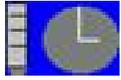
Tempering time: time span of tempering.

Tempering position offset: Rotate saw according to the offset when tempering. (you can set higher tempering temperature, then control the heating time, finally analyze the color of saw tooth during tempering)

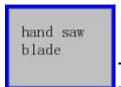


Gap setting H: when photoelectric detector detect the first saw tooth, then rotate the saw back manually. the difference of two position is the Gap H (bigger value , bigger gap)

Gap setting A: when welded one saw tooth, rotate to the next saw tooth automatically, the gap A is a compensation of automatic rotation. (bigger value , bigger gap)



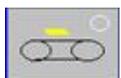
Cooling time (time span between holding time and tempering time): waiting for a while cooling down when you welded one saw tooth, then return back the solder clip. The bigger carbide is, The longer cooling time is. Shorter cooling time will degrade the weld strength.



loose or fasten the saw clamp.



dispensing time : the quantity of solder flux every carbide is allocated (bigger value, more quantity solder cream)



conveyer belt button: stop or start conveying carbide.



move saw backward or forward button: move saw forward in place or move saw backward out of place manually.

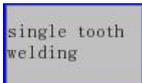


next saw tooth: press the button when tuning, rotate saw

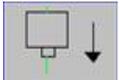
to the corresponding position and you can change this position according to the gap 1.



automatic/manual button: show or change the state of machine (when main window display OK picture, press this button, the machine enter automatic state, and this icon isn't green until finished the solder process or be in fault state. Red icon indicate the manual operation mode) .



single saw tooth process button: press this button, this machine will run one cycle operation and weld a saw tooth.

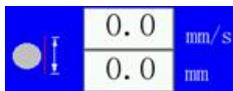
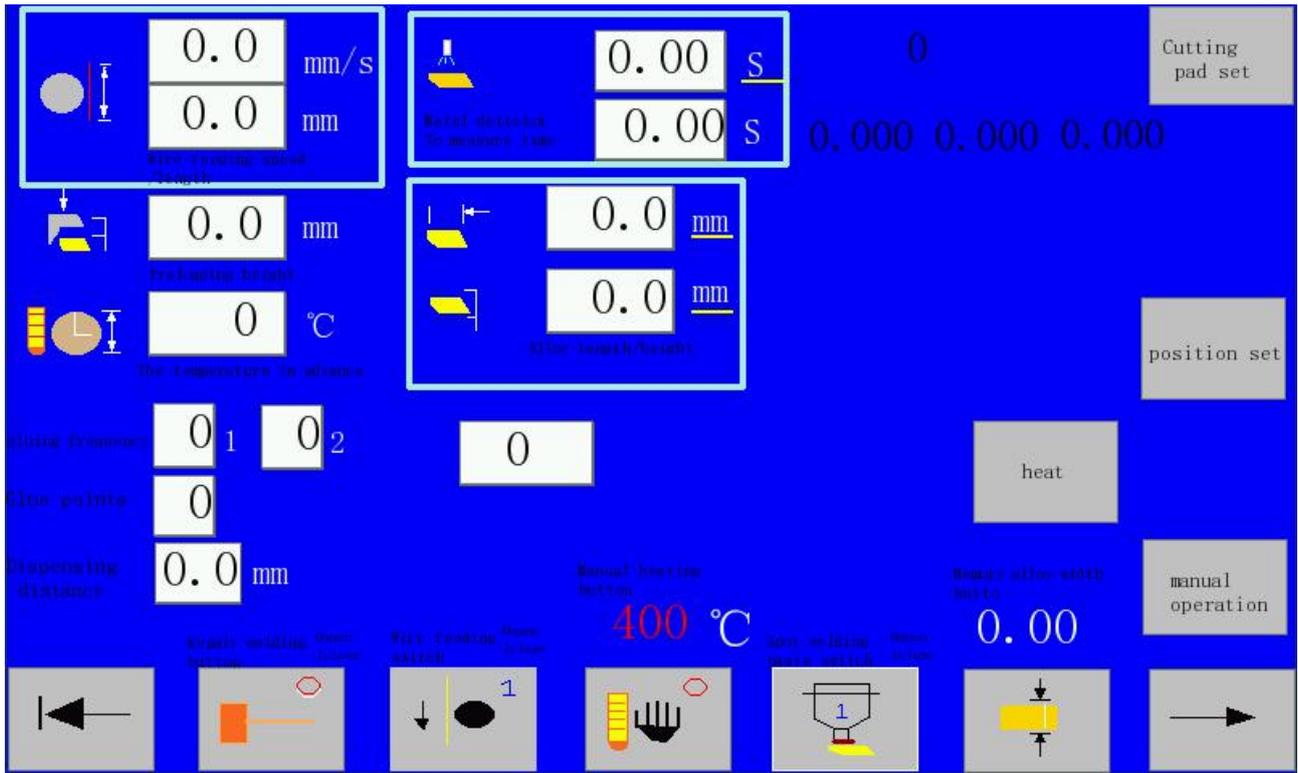


air valve of wiring feed mechanism : when press the button, air valve loosed and push cylinder down. You can adjust the position by the manual adjuster of wire feed.



next page (window 2) .

● 2.2、Window 2 :



speed of wire feeding : set the speed according

to the melt state of solder wire. If solder wire melt more quickly, it is easier to result the derivation of the position of solder wire. If solder wire melt more slowly, it is easier to result welding defect.

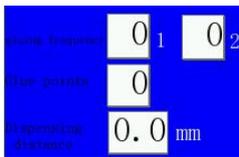
length of wire feeding



height of prepressure: after transferring carbide to the right place and before starting heating, we need rotate saw first and make sure the saw tooth is cling to the carbide tightly . the rotation distance is the height of prepressure.



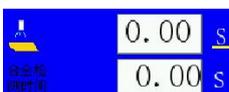
temperature in advance : welding temperature - value of temperature in advance = temperature of starting wire feeding



the number of repeat dispensing : 1. solder flux on carbide.
2. solder flux on solder flake. Do nothing, 1.repeat once on same position. 2.repeat twice. And so on...

total points of dispensation: 0. dispensing solder flux only one point. 1. dispensing solder flux to another point after move the distance of dispensation . 2. dispensing solder flux to one point again after move another distance of dispensation , and so on...

distance of dispensation : Distance between two continuous dispensing points at the different position if total points of dispensation > 0.



First Time of carbide detection: it is the time span that carbide go forward to air blow port.

Second Time of carbide detection: it is the effective time of detection, it should be zero if choosing computer vision classify system



Length of carbide : real length of carbide

Height of carbide: real height of carbide



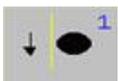
saw manipulator setting: 0. manual operation mode.
1. automatic operation mode. .



back button: press button and back to main window.



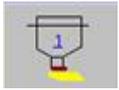
repair button : 0. default state. 1. press the button to change icon into 1, then you can repair the defective saw tooth (in manual mode, choosing whether feed wire
If entire saw is in defective state, you can also choose automatic mode to repair it.



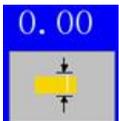
wire feeding switch: 0. don' t feed wire when it solder the carbide . 1. feeding wire when there is welding wire in the procedure of soldering carbide.



manual heating button: in manual mode, press this button to heat the saw tooth (you can go on a test for high frequency power or soldering the high frequency head made of copper tube) .



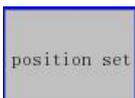
Dispensation switch: 1.switch on dispensing solder flux . 0.switch off dispensing solder flux (set it to zero when in tuning phase,) .



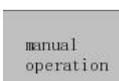
Memorize the width of carbide: when we change carbide, press this button for a 3 seconds while the first carbide is clamped by the welding clip,system will take the carbide' s width down as system standard width. The width of all the sequential carbide must be in the tolerance range of system standard width,or else the carbide will be drop off.



press this button and enter into setting window of slicing solder flake.



press this button and enter into setting window of locating position.



press this button and enter manual setting window.



next page (window 3)

● 2.3、Window 3:



Sum of saw tooth soldered every day : the number need to be cleared when start up the machine every day 。

Sum of saw tooth soldered: don't be cleared forever.



reset the number of saw tooth soldered every day 。



password : input box of password.



next page (window 4), press this button and enter the password

“  “33333” 。

● 2.4 Window 4:

0.00	mm	Alloy width tolerance	0.000	mm/S	saw blade manual	0	0.00	Saw rotation loose clamp set
0.0	mm	Reverse amount set	0.000	mm/s	saw blade automatic	0	0.00	pressure setting
0.00	mm	Saw reduction and zero	0.00	S	Gluing waiting time	0	0.00	Welding loose clamp selection
0		times send welding	0.00	S	postpone delivering wire	0	0.00	Welding clamp test set
		1-2000 pieces	0.00	S	Rubber valve close	0	0.00	Saw rotation optical fiber set
Heating setting			0.00	S	Heat preservation mode	0	0.00	Conveying test set
0		heating parameters 30-150	0	0.00	Heat preservation mode	0	0.00	Re-test set
0.0		Retain the power	0.00	S	welding clip delay	0	0.00	Welding mode
0.0		Max power	0.00	S	postpone feeding	0	0.00	Wire feeding mode
0.0		tempering to maintain power	0	0.00	flat choose	0	0.00	High frequency head lift
						0	0.00	Heated rotating

Notice: don't modify the values if not necessary

Tolerance of carbide's width : tolerance of carbide's width that it is permittable .

Reverse amount set : gap of rotating reversely after cooling down (used by very big or thick saw)。

Saw reduction and zero : the left-right derivation of the zero point of the center of saw.

Send welding pieces : 0. length of single solder flake. 1. length of two solder flake .2 length of three solder flake , and so on... length of flake is tuned by the mechanical position

Parameter of heating : rising rate of the intensity of heating, the greater the value is , the steeper the rising rate of the intensity of heating is.

Retain the power : the intensity of output of high frequency power during sustaining the temperature of saw.

Maximum Power : maximum output power of high frequency power. When It is in 99 percent, the actual output is 100 percent.

Holding power of tempering: the output power that could sustain the temperature of saw during tempering.

Saw blade manual: rotation speed of saw after pressing the rotation button in manual mode .

Saw blade automatic : rotation speed of saw when in automatic mode .。

Glue waiting time: pause time of the needle after you dispense the solder flux on the surface of carbide.

Postpone delivering wire : delay time that turn on the air cylinder of wire feeding to move down.

Rubber valve close: delay time of closing the solder flux valve.

Heat preservation mode: 0. start sustaining temperature when welding clip grab the carbide tightly, 1. start sustaining temperature after the welding clip loosen the carbide.

Welding clip delay : delay time when the welding clip fasten the carbide.

Postpone feeding: duration that the welding clip keep on fastening before push carbide forward again .

Flat choose: : align the surface of carbide with the surface of welding tray. 0. on 1.off.

Saw rotation/loose clamp set : clamp loosen or not when saw rotate. 0.don't loosen clamp, 1.loosen clamp.

Pressure setting: 0.raise the pressure after heating the saw. 1.raise the pressure before heating the saw.2.raise the pressure before heating the saw and raise the pressure after heating the saw.

Welding loose clamp selection: welding clip loosen or fasten when heating carbide. 0.heating carbide when fasten carbide, 1.heating carbide when loosen carbide.

Welding clamp test: check the carbide's width on the welding clip. 0.check it. 1. don't check it.

Saw rotation optical fiber set: check if saw tooth is in place. 0.check the first saw tooth. 1. don't check it. It must be zero when operate by automatic manipulator.

Conveyance test: if the transfer clip is vacant or occupied by carbide when transfer single carbide. 0.check it, 1 don't check it.

Re-test: switch on/off the double check of carbide 0.on , 1.off.

Welding mode: how to push carbide while welding . 0.push carbide to

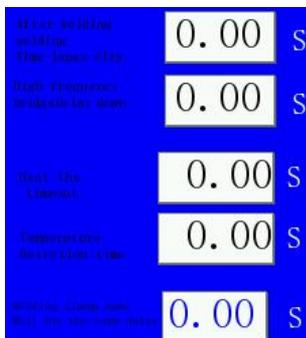
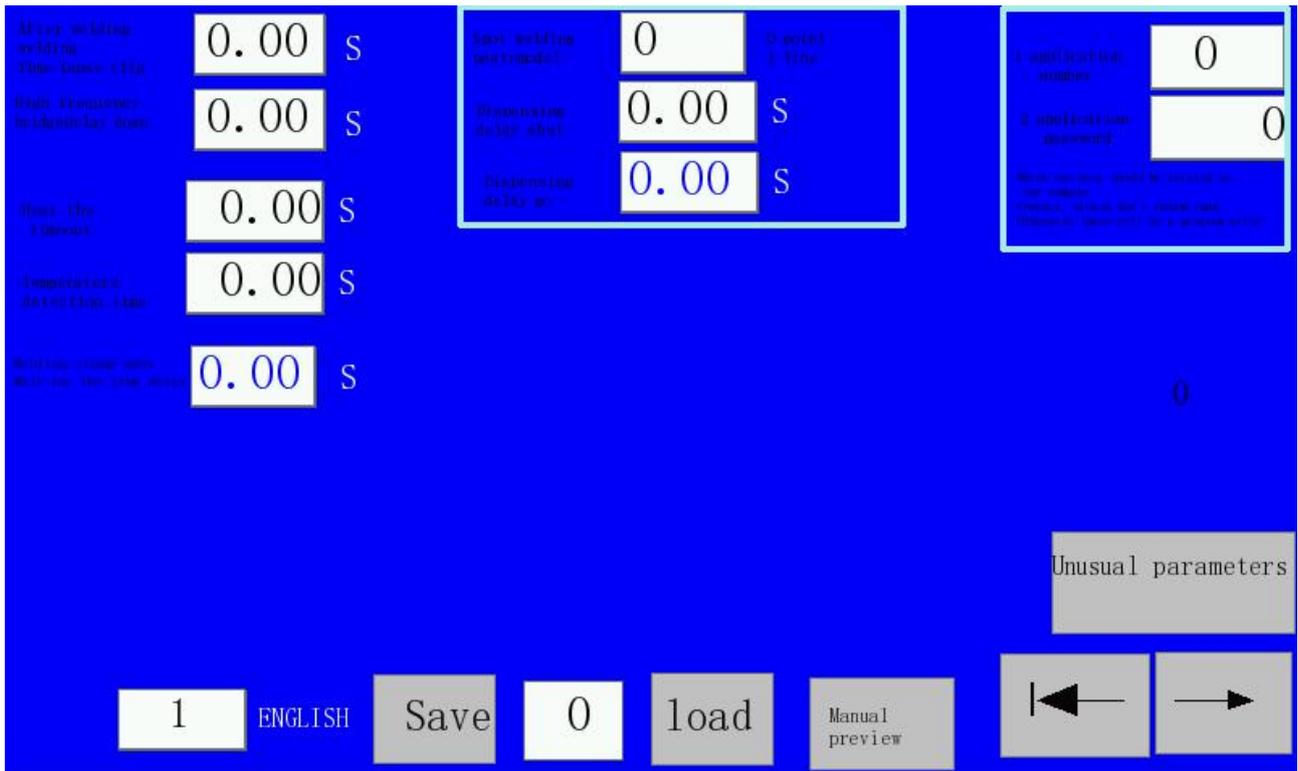
bottom after heating the saw tooth. 1. push carbide to bottom before heating the saw tooth.

Wire feeding mode: 0. push the wire cylinder down and feed wire to saw tooth after reach the temperature of wire feeding. 1. push the wire cylinder down before heating the saw tooth, then feed wire to saw tooth after reach the temperature of wire feeding.

High frequency head lift: 0. move the high frequency head down while heating saw tooth. 1. don't move the high frequency head to heat saw tooth.

Heated rotating : 0. rotate saw clockwise to exert the downward force when heating saw tooth. 1. don't rotate saw when heating saw tooth.

● 2.5、Window 5



Welding time-lapse clip After welding : delay time that the welding clip should waiting to avoid collide with the induction coil because that the induction coil lift up too late after heating up to the

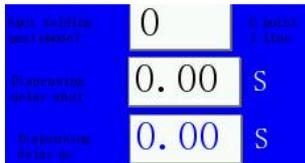
welding temperature. It is used in induction coil' s sinking mode.

High frequency bridge delay down: delay time of the high frequency head descending.

Timeout of heating: emit alarm out if the temperature don' t reach the preset value after the timeout of heating.

Temperature detection time: emit alarm out if temperature don' t raised up to 500°C in the preset time.

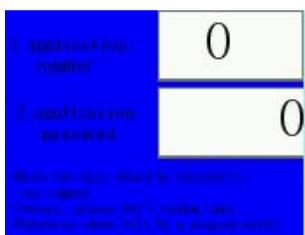
Welding clamp open waiting for the time delay: time span that welding clip fasten and calibrate the carbide if carbide is loosen during heating carbide.



Spot welding paste mode: 0.it is point shape that the dispenser squeeze out the solder flux. 1.it is line shape that the dispenser squeeze out the solder flux.

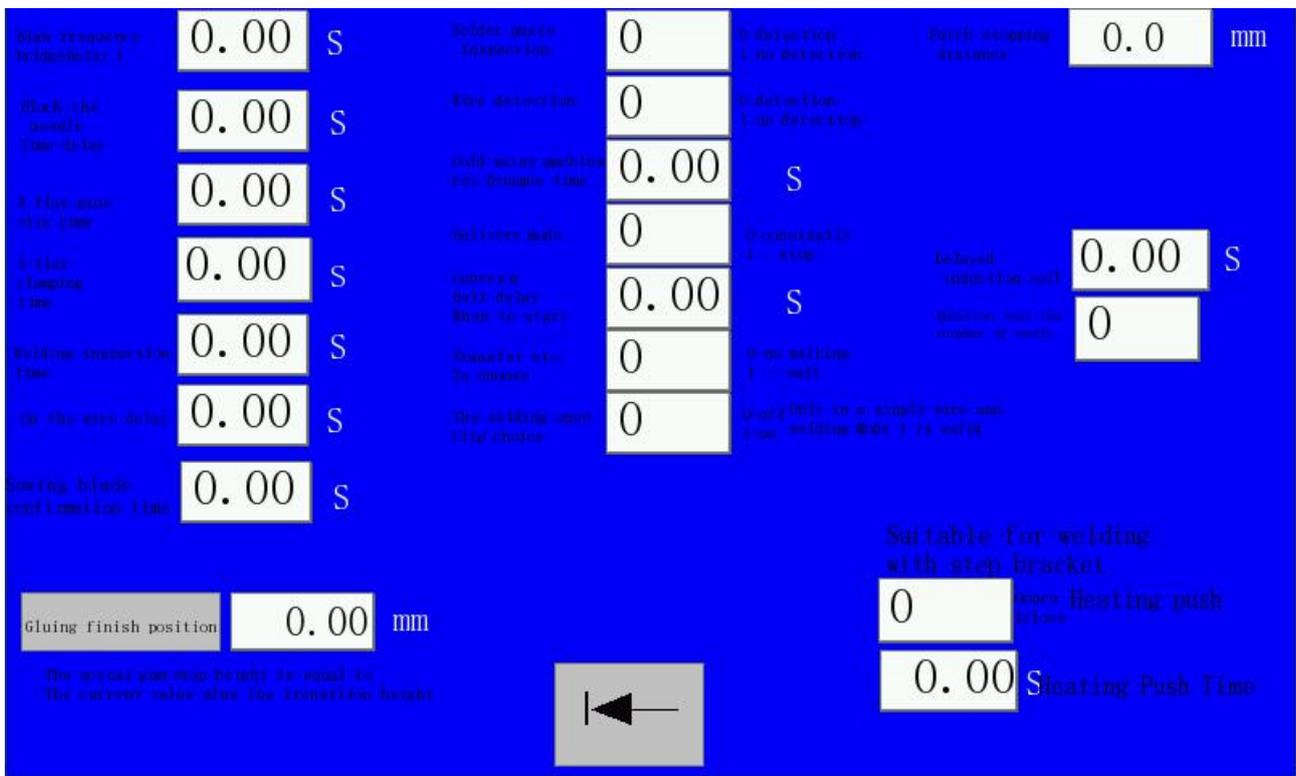
Dispensing delay shut: when spot welding paste mode = 1, delay time of shutdown the dispenser.

Dispensing delay go: when spot welding paste mode = 1, waiting time before conveyer clip move on.



Don't modify the value of the two option, or else the program is in abnormal state. Please contact with related personnel If you actually want to change it.

● 2.6、Rarely used parameter window:



High frequency bridge Delay 1: delay time of the high frequency head ascending.

Block the needle time delay: delay time that the block pin over conveyer belt is ascending.

a flat pine clip time : delay time of loosen clip when welding clip go on aligning the surface of carbide with surface of saw tooth .

A flat clamp time : delay time of fasten clip when welding clip go on aligning the surface of carbide with surface of saw tooth .

Welding inspection time: time of check carbide' s width.

On the wire delay : delay time of the nozzle of wire feeding rising up after starting feed wire.

Saw blade confirmation time : time that check if there is a saw or not when automatic manipulator unload the saw.

Gluing finish position: the dispenser nozzle' s height when conveyer clip is at the foremost position.

Welding paste inspection: 0. turn on check if paste is empty or not.

1. turn off check if paste is empty or not.

Wire detection: 0. turn on check if solder wire is empty or not. .

1. turn off check if solder wire is empty or not.

Cold water machine rev dynamic time: delay time of checking water cooling machine .

Delivery mode : conveyer belt work mode when conveyer clip are ready to grab an carbide. 0. conveyer belt keep running when grabbing an carbide. 1. conveyer belt stop when grabbing an carbide.

Conveyer belt delay when to start: When Delivery mode = 1, delay time of conveyer belt restart after grab an carbide.

Transfer etc to choose: the position of conveyer clip after welding clip return back. 0 at the foremost, 1. at the waiting position.

The welding open clip choice: 0. disable , 1. enable. push welding clip forward when welding clip is in place, Don' t loosen welding clip when sustaining the temperature.

Patch stopping distance : the distance that conveyer clip go forward after paste solder flake on the carbide.

Delayed induction coil: delay time of blow air to induction coil after finished the entire saw' s welding process.

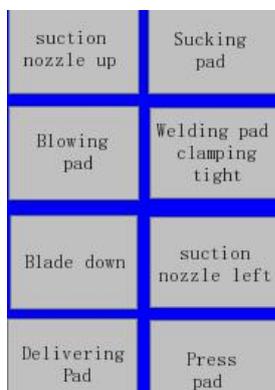
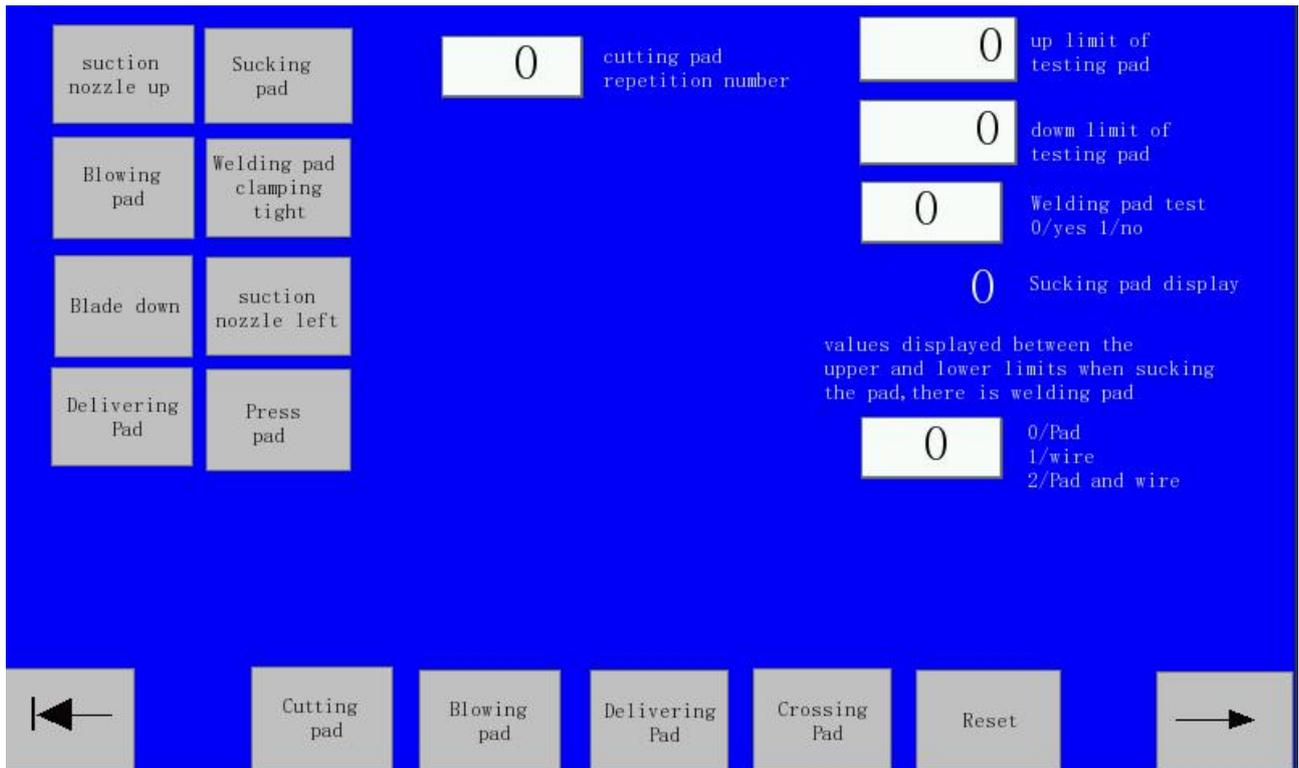
Rotation test the number of teeth: the tooth number detected during rotating test.

The two options is suitable for the welding padding with step.

Heating push: 0. Disable, 1. welding clip start to push carbide forward again after the preset heating time .

Heating push time: when heating time reach at this time, the welding clip start push carbide again. it is effective when Heating push = 1.

● 2.7、Slicing Setting Window



All the action of air cylinder

0

cutting pad
repetition number

cutting pad repetition number: in the state of the solder

flake check turn on, if there is none of solder flake, machine continue to cut solder flake according to the repeat time. If there is none of solder flake still after repeat time, this action will be stopped and screen show no solder flake message.

0

up limit of
testing pad

0

down limit of
testing pad

0

Welding pad test
0/yes 1/no

Up limit of test pad: Display value is greater than the Upper limit When there is none of solder flake. the number will decrease When sucking a flake.

Lower limit of test pad : Display value is greater than lower limit and smaller than upper limit when there is any solder flake.

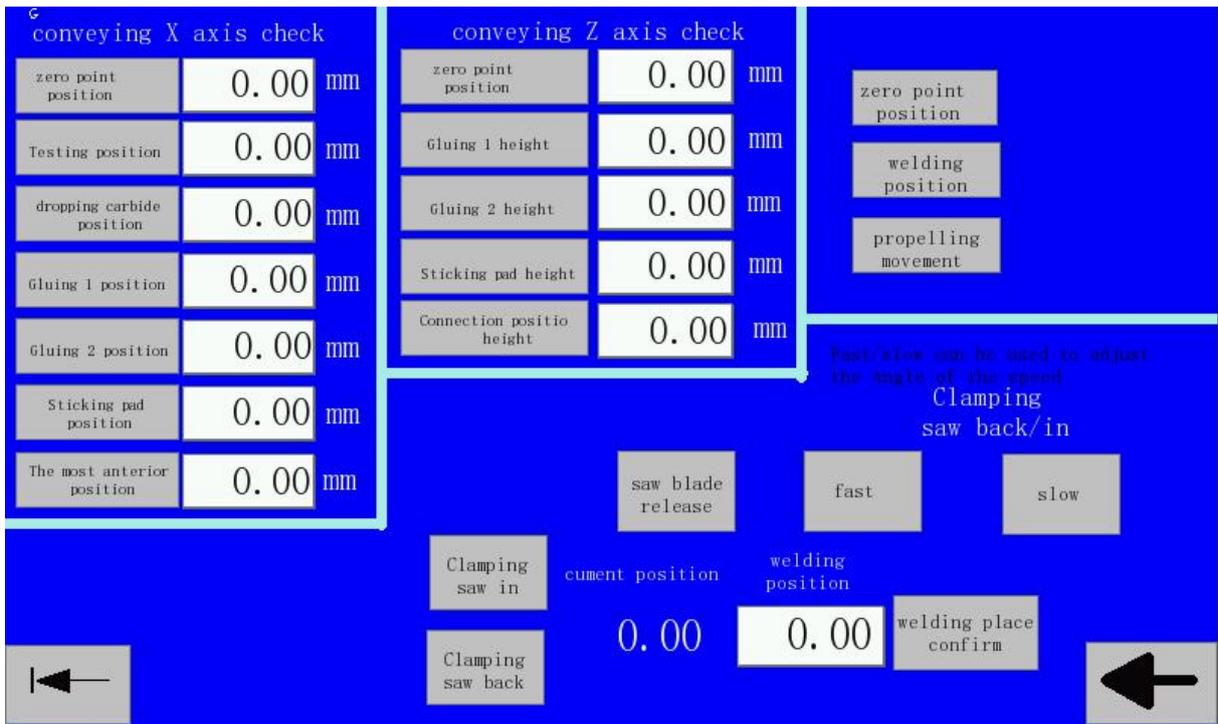
Welding pad test: 0. system will check out if there exist the solder flake after suction nozzle do suck . if the count of the flake sucked is between upper limit and lower limit, suction nozzle get a flake really and vice versa. 1.any case can be pass through.

0

0/Pad
1/wire
2/Pad and wire

Welding material selection : 0. solder flake mode ; 1. solder wire mode ; 2. solder flake and wire mode.

● 2.8、Locating setting window:



conveying X axis check	
zero point position	0.00 mm
Testing position	0.00 mm
dropping carbide position	0.00 mm
Gluing 1 position	0.00 mm
Gluing 2 position	0.00 mm
Sticking pad position	0.00 mm
The most anterior position	0.00 mm

Zero point position: the original point of left to right direction at a single feeding

Testing position: the optical fiber detection position at a single feeding.

Drop carbide position: the position where drop carbide when optical fiber detector find the wrong carbide at a single feeding.

Gluing position 1: the point of left to right direction where dispensing solder flux on carbide at a single feeding. put solder flux on carbide at this step.

Gluing position 2: the point of left to right direction where dispense solder flux on at a single feed. put solder flux on solder flake at this step. Ignore it if don't need solder flake.

Sticking pad position:the solder flake mount point of the left to right direction at a single feeding.

The most anterior position: the foremost point of the left to right direction at a single feeding.

conveying Z axis check		
zero point position	0.00	mm
Gluing 1 height	0.00	mm
Gluing 2 height	0.00	mm
Sticking pad height	0.00	mm
Connection position height	0.00	mm

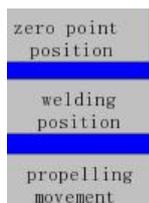
Zero point position: the original point of the top to bottom direction at a single feeding.

Glue height 1: the point of the top to bottom direction where dispense solder flux on the carbide at a single feeding. put solder flux on carbide at this step.

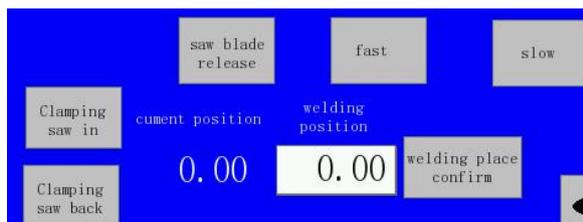
Glue height 2: the point of the top to bottom direction where dispense solder flux on at a single feeding. put solder flux on solder flake at this step. Ignore it if don't need solder flake.

Sticking pad height: the solder flake mount point of the top to bottom direction at a single feeding.

Connection position height: transfer clip will descend to the height and transfer it to welding clip when move at the foremost point at a single feeding.



Manual control about zero position、welding position、push position when feed carbide for a second time.



Saw blade release: Move Saw to Zero point.

Fast speed: move saw fast at the oriental direction. adjust the saw angle fast at vertical direction by press the button also.

Slow speed: move saw slowly at the oriental direction. adjust the saw angle slowly at vertical direction by press the button also.

Clamp saw in: move saw close to the position for welding.

Clamp saw back: move saw far away from the position for welding.

Current position: the distance between the current saw position and the original position.

Welding position: the distance between the welding position and the original position.

Welding place confirm: press this button if tuning the parameter of welding position to be ok.

● 2.9、Manual Window



This window is responsible to manual operation.

Chapter 3 operating procedure

● 3.1、Work flow :

1. Switch on power, Control panel enter main window, press the startup button on the panel, startup button can act as reset button, check if water recycle is fine, check if solder wire exist. Check if the air pressure exceed 0.6MPa.

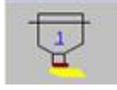
2. Check if the related parameters about the total number of saw tooth, saw diameter, the interval number of saw tooth, the temperature of welding and so on is correct, modify and confirm it according to the fact.

3. Load saw to the sucker of saw, the size of sucker is decided by the saw outer diameter, it should be about 1/3 of outer diameter, then lift the induction coil up.

4. Press the “move saw backward or forward” button, machine move the saw forward, then press this button again, machine will clamp the saw tightly and rotate to the correspond position. Please tuning the saw forward/backward by screw rod until it could be locate correct position

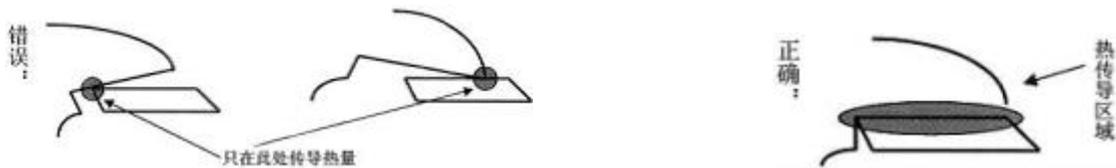
automatically position if optical fiber detector can't perceive the saw tooth.

5. Adjust the limit of height and width for carbide on the conveyer belt, make sure that all carbide can be pass through the orientation slot. Switch on the conveyer belt and ultrasonic vibrator, then check if carbide can move forward to the belt automatically.

6. Select solder wire mode after the carbide queue up on the conveyer belt, please press  button to switch on it and step on the pedal to tell transfer clip to fasten an carbide. Then step down the pedal sequentially until the welding clip grab the carbide and move to the position of welding, then loosen the pedal to adjust the angle of saw tooth.

7. Tuning the welding position about saw body and carbide. adjust saw body pose according to the hook angle of saw tooth. Make sure the gap between the saw tooth's root and carbide tail is 0.3mm, or else the saw body will be heat up first and cause the saw body overheat and the front part of carbide underheat. Much less heat will flow from the saw body to the carbide If the contact plane between the carbide and saw tooth is smaller, then the indicated temperature of

thermometer is lower than real temperature. When the plane of the carbide is parallel with the plane of saw tooth, the difference of the temperature between the saw tooth and the carbide is slight.



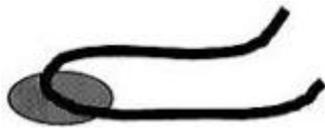
Notice: there will be forming a angle between the carbide and saw tooth if the carbide's supporting bar or the ground base of the carbide's supporting bar is worn, the angle between the top surface of carbide and the base surface of saw tooth cause that the carbide go deep into welding clip and decrease the heat flow from heating coil to carbide. In this case, the main heat accepted by carbide come from the saw body.



8. Adjust the position of heating coil . You can adjust the up/down, left/right, back/front three direction to suitable position by the x/y/z manual gear.



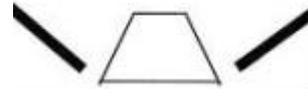
Heating Coil: Due to the higher density of coil at the base ground of the saw tooth, so heat flow from here to the other part. It cause the base ground of saw tooth overheat when the thermometer come up to the preset value if heating too fast. (see picture①) . so you can change the shape of heating coil to avoid it happened. For example, by open the heating coil more widely at the vertical/horizontal direction, it make the density of energy more sparse and make the temperature distribution of the carbide and the base ground of saw tooth more even (see picture ②) . the transmission of energy will be more focused if you open the top of heating coil more widely. (see picture③) .



①



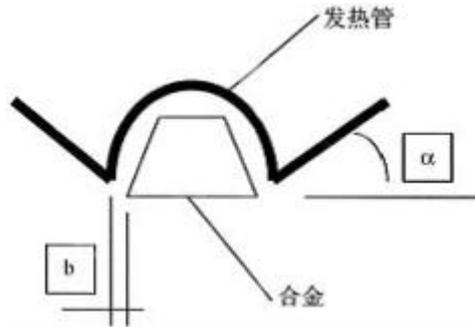
②



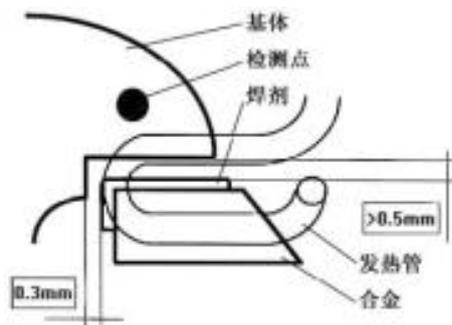
③

adjust for the thin saw : when solder thin saw, it is more dangerous in the overheat state of the saw because the hardness of the base ground of the saw tooth will increase at the region of saw blade. To relieve this situation, it' s better to enlarge the space of the heating coils and be sure the obliquity angle $\alpha = 0 \sim 45^\circ$, keep the gap between the coil and saw blade as small as $b = 0.1 \sim 0.5\text{mm}$; decrease the welding temperature to 700°C , reduce the time

of welding to 0.5~1sec, welding the blade one by one without skipping blade. if the base ground is still too hard, another annealing process is necessary.



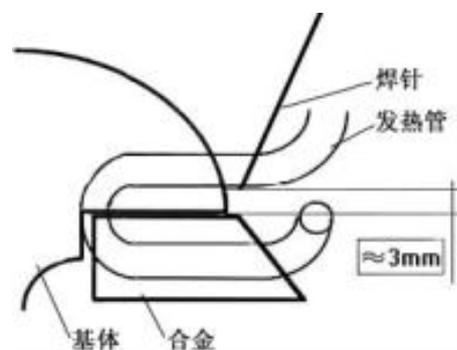
9. Tuning optical fiber detection. The fiber laser emit out from the back sensor and be received by the front sensor. The sensor act the role of emitter and receiver in turn. keep the base ground of saw blade close to laser when laser pass through the heating coil, let the gap between the saw blade and carbide is greater than 0.5mm when rotating, then adjust the horizontal position of the saw to ensure the gap between the saw blade and carbide in the scope of 0.2mm-0.5mm. Press rotate button, then check if the saw is in the correct place after rotation. Modify the gap setting parameter to satisfy your demand.



10. Infrared ray thermometer detector: the detection point of welding temperature must be pin to the neighbourhood of the junction of the carbide and the saw blade' s base ground(margin), if the rear winding of heating coil is close to the carbide, it make the welding flux spattering to the heat coil. The measurement of thermometer is disturbed because of much more welding flux, then lead to the overheat of the saw blade' s base ground .



11. Wire feeding : adjust the air cylinder of wire feeding to the suitable location, let it feed wire to the middle position of the junction of the saw blade' s tip and carbide. Refer to the picture below:



12. Air cylinder for pushing saw blade: adjust the angle and position of the cylinder by the cylinder' s manual

gear, let the cylinder can aim at the saw and push the saw to rotate clockwise under the maximum travel.

13. Dispense welding flux: in the solder flake mode, step down the pedal and grab single carbide to the place of dispensing welding flux, move the needle of dispenser and dispense the welding flux on the carbide, then step down to transfer the carbide to the place of dispensing solder flake and check it. Repeat the procedure of dispensing welding flux and check it, if everything is right, go on the welding procedure. omitting the procedures of dispensing solder flake and dispensing welding flux in the solder wire mode,.

14. Keep in remind that It must be in maximum travel of the saw and clamp the saw tightly for all above step : the conveyer belt of the carbide waiting queue 、 the clip of the component feeding、 the needle of the dispensing welding flux、 the clip of welding clamp、 heat coil of high frequency power、 air cylinder of pushing saw blade、 base ground of the saw, all those centers are in same plane.

15. When all those step is finished , before change to the automatic mode to start welding saw job, press single saw blade process button to welding single carbide, then inspect the result of welding , check if saw blade is align

to center.start the welding job under automatic mode if everything is good.

16. Please press the emergency button to stop all the job If any abnormal state appear in the process of welding. Then press the start button to enter reset, debug it step by step according the manual.

17. Keep on doing the consecutive welding job automatically if the result of welding is satisfy the demand

18. debug the machine step by step in manual mode , press automatic mode button to enter automatic work state and start welding job automatically if debug finished.

19. If machine is in ready state, press automatic mode button to enter automatic work state directly.

20. In full automatic mode, press manual/pause button to exit full automatic state and enter manual mode, then you can step down the pedal to execute next action, press auto button to enter automatic procedure again.

● 3.2、matter need attention

1. Everytime loading a new type of saw for tuning , please reset reducer to zero through the locating setting window , adjust the welding position by “Clamp saw in/back” button.

2. In the case that air pressure go up, make sure the saw tooth' s position isn' t too lower when locate the position of the saw first. if the saw tooth' s position is too lower, please set “Gap setting H” to suitable value. the base ground of saw blade must be 1mm higher than carbide' s top surface on the occasion that carbide is clamped, or else the saw could hit the clip . The bigger the total number of the saw blade

is, the more precise the gap between the carbide top surface and the base ground of saw blade must be.

3. If transfer clip and welding clip isn' t in line or ceramic tray is damaged, the welding clip will miss the carbide. so turn off air pump and adjust the welding clip and transfer clip to be in line. First push the transfer clip close to the position of welding clip, put an carbide to the welding clip, fasten the welding clip and transfer clip manually, check if the two clip is in line. if it isn' t in line, tuning the screw to correct it; if it is in line, check the ceramic tray, replace it or not according your judgement.

4. Choose welding wire length according to the result of welding. Modify the time or temperature of tempering and heating to satisfy your demand.

5. if carbide adhere to the ceramic tray on the procedure of welding , please don' t press the emergency button and restart it subsequently. The saw will go backward when you press the emergency button, so it could pull the ceramic tray apart. When you meet this occasion, waiting the machine pause naturally,

then press  button and get the carbide out, next to clean up the welding clip. Please don' t press start button to enter reset at this situation.

6. During debug, heating coil shouldn' t block the optical laser and infrared thermometer laser, we should avoid disturbing the saw blade location and the temperature detection .

7. To any defective saw blade, clean the blade first before welding it again.

8. Machine go on a auto reset when unloading the saw every time. please press manual reset button if any defective saw blade need to be welding again. Be caution of the variable number of saw blade to be

welding. It is a repair process of welding, so please unload the saw manually after the repair process is completed. Press the reset button after replace it with another saw.

9. Press reset button and clean the welding clip if carbide' s position is wrong or missing carbide while welding.

10. Water can' t flow smoothly and The rising speed of temperature is slower If folding heat coil too flat. Please ensure the smooth flowing of water or air when welding the heat coil.

11. Clean the welding clip and heat coil often.

Chapter 4 machine testing

● 4.1、carbide feeding testing

Ensure the vibrating disk and carbide to be clean and the carbide to be uniform before we pour the carbide down to the vibrating disk。 Don't mixed different carbide together, or else you can't classify it effectively。

The total weight of carbide is better about 0.5Kg——0.8Kg。 (the weight of carbide in disk impact the speed of vibrating disk。 The lighter the weight of carbide in disk is, the faster the speed of vibrating disk is。 The vibrating speed hardly vary when the weight is about 0.5Kg——0.8Kg)

● Cautions

1. Observe the height of the blockade needle to the conveyer belt, make sure that the height is better about 0.3mm-0.5mm。 (don't let “blockade needle” touch the conveyer belt, or else it damage the conveyer belt。)

2. Adjust the bridge connecting conveyer belt and vibrating disk, let the bridge width is about 0.5-1mm than the width of carbide.

3. Turn on the motor of conveyor belt, tuning the frequency and amplitude of vibrating disk, let carbide can get through the bridge steady. then adjust the “carbide detection time” and “air blow time” to make sure the correct carbide get through.

● FAQ

1. In this case that the qualified carbide is blow to the wrong direction while the qualified carbide haven't cross the air blow hole thorough, increasing the time of “Second Time of carbide detection”

2. In the case that conveyor belt's motor isn't rotating. Open the door of electric box, observing the step motor drive. If the power light of the motor drive is off, check the 24v input power of the drive; if the motor drive's red alarm light is on, please replace it.

3. In the case that conveyor belt's motor is rotating but conveyor belt isn't moving. Checking if the some thing stuck the conveyor belt or the friction of conveyor belt is too great because of abrasion. Please clean or change conveyor belt. Checking if the sealing ring of the driving wheel must be replaced.

4. Disk can't vibrate and push the carbide forward after switching on . Check if the overfeeding switch can work first.

Disk should be stopped vibrating when overfeeding light is on. Check if the power of frequency and amplitude controller switch on when the overfeeding light is off. Please tuning the frequency and amplitude of voltage according to “frequency and amplitude of controller brochure” if the power is normal. Investigate the electric scheme if the power is abnormal.

● 4.2、carbide transfer testing.

Enter manual window to go on basic test first. Switch on machine and air pump to reset state. After reset procedure completed, you can regulate the positions of the transfer clip and welding clip, turn on/off the solenoid valve to push the air cylinder by the button of manual window. (for example: click “**Drop carbide position**” button, transfer clip will move the carbide to the position where drop carbide . by modify the value aside this button and click the button again subsequently, the transfer clip will move on according to the value.)

Operating step by step through clicking on single step button. you can click the single step button and step down the pedal once if the screen show “OK”, the machine will do a single step operation. it is convenient to observe the stability of single operation.

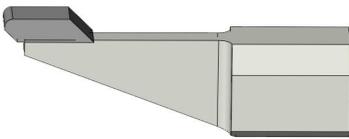
● Cautions

Observe the position of transfer clip stopping and the position of the foremost carbide of the carbide waiting queue after machine reset and the transfer clip clamp the carbide . Tuning the two positions every time the carbide change.the longer the carbide is , the smaller the value of "X axis Zero point position" in locating setting window is, vice versa. Please press the reset button to reset machine every time you modify the value of " X axis Zero point position" , then inspect the position that transfer clip grab the carbide, make sure that transfer clip grab only one carbide every time and the contact area between the clip and carbide isn' t too small.

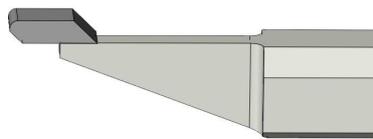
in the case that transfer detector power on, the transfer clip will repeat grab action three times if there isn' t any carbide in the waiting queue, the machine will stop and show "no carbide" if there isn' t carbide yet after three times grabs.

The position of carbide have great effect on the stability of machine in automatic mode, where transfer clip grab the carbide and hand it over to welding clip. The carbide will move to the correct position of the welding outshoot as below picture A. the carbide will tilt down easily because of prepressing if the position of carbide surpass the welding outshoot too much(as below picture B) . it lead to the wrong welding angle and even more lose carbide while welding.the foremost end of carbide

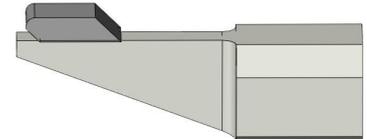
can't be pushed deeply into the root of the saw blade if the position of carbide lag behind the welding outshoot too much (as shown in picture C), it cause that the carbide stick to the welding outshoot when heating the welding material.



Picture A



Picture B



Picture C

Press the step by step button after handing carbide over to welding clip, the transfer clip go back to grab another carbide again. the welding clip continue to move forward to The position of welding, then followed with another remedial push of the welding clip. The destination of remedial push is ahead of the position of welding, but the leading distance must be about 1mm or so.

● FAQ

1. Transfer clip can't grab the carbide out of the conveyer belt. Observe if the center line of the transfer clip and carbide's waiting tray are in the same line. Please adjust the screw that fixed the left/right siding of the carbide's waiting tray. If the tolerance of the gap among the center lines is too much, Make sure the center lines are

overlap with each other, then increase the value of “delay time of the block pin descending”。

2. It is unstable that transfer clip hand carbide over to welding clip.

A. Check if the ceramic block of welding clip is abrasive.
B. Check if there is something stick to the welding outshoot.
C. Check if the carbide collide with welding outshoot when the carbide is transfer to the welding clip. This collision situation is caused by the reason as below:

1、 the size tolerance of the new welding outshoot is higher than the original one.

2、 the surface of welding outshoot isn't clean

3、 the bottom surface of carbide is sticking out downwards too much when transfer clip grab the carbide, please calibrate the transfer clip position again.

D. The contact area of the welding clip and carbide is too small. please calibrate the position of transfer clip again.

E. Check the distance between the bottom of transfer clip and the top of ceramic block of welding clip. It is must be in the range of 0.1-0.2mm. Please adjust the screws that fixed welding clip.

F. Check if the center line of the transfer clip and welding clip when two clip fasten tightly is the same line. Please

adjust the screws that fixed the transfer clip.

G. During hand over and take over procedure, the welding clip don't fasten the carbide when transfer clip loosen the carbide. You should check if welding clip get stuck by something or if the guide rail of welding clip should be clean and should be lubricated. Please disassemble the slide block, clean it and lubricate the guide rail with oil.

- 4.3、bilateral symmetry and angle testing
- 4.3.1、translation and rotation testing

Tuning screw rod back and forth when the diameter of saw change, be careful when you replace a small diameter saw with a large diameter saw specially, or else you could damage the induction coil.

After machine reset, click the “Clamp saw in” in the locating setting window to move the welding clip to the position of welding, then tuning the X/Y/Z rotation knob to make sure the induction coil to be in the middle of welding clip; to make sure the ceramic block is tangent to the bottom of welding clip horizontally; to make sure the front end of the welding clip and the ceramic block is at the same level.

Let the welding clip grab single carbide and stay at the position of welding, hang saw on the sucker, click the “Clamp

“saw in” in the locating setting window, rotating the saw by electric cylinder until any saw tooth move to the top of welding outshoot, make sure that the base of saw tooth is overlap with the carbide on the welding outshoot completely. If the induction coil hamper your operation, please lift the induction coil up for observation, then lay down to the original position after terminate observing. finally press the start button to reset.

Click  button, moving the saw to the position of welding. check if the red spot emitted from the tooth selection switch is in the middle of the root of tooth and the tip of tooth. Adjust the position of saw back and forth until the tooth selection switch work correctly and the saw stop rotating. Click “next saw tooth” again, check if the tooth surface is higher than the bottom of the copper pipe of induction coil after the saw stop rotating. Tuning the “Gap setting H” if the tooth surface isn’ t higher than the bottom of the copper pipe. (the higher or lower value of “Gap settingH” cause that the saw tooth collide with welding outshoot.)

Loosen the handle 1 after fasten the saw, then fasten this handle 1 after the saw and saw clamp are tuned to the same line by automatic calibration. Adjust the electric cylinder until the base surface of saw blade is parallel with

the carbide surface.

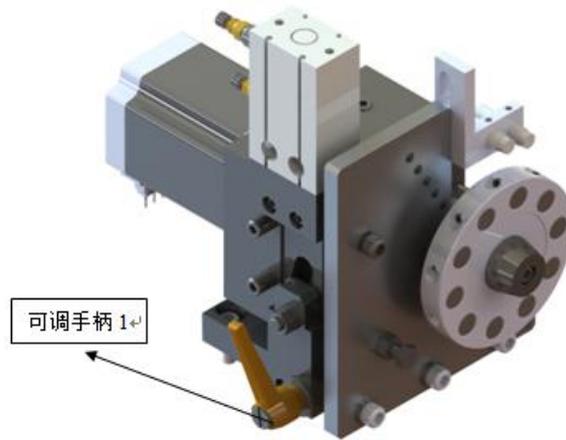
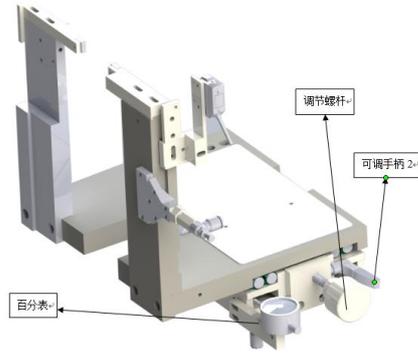


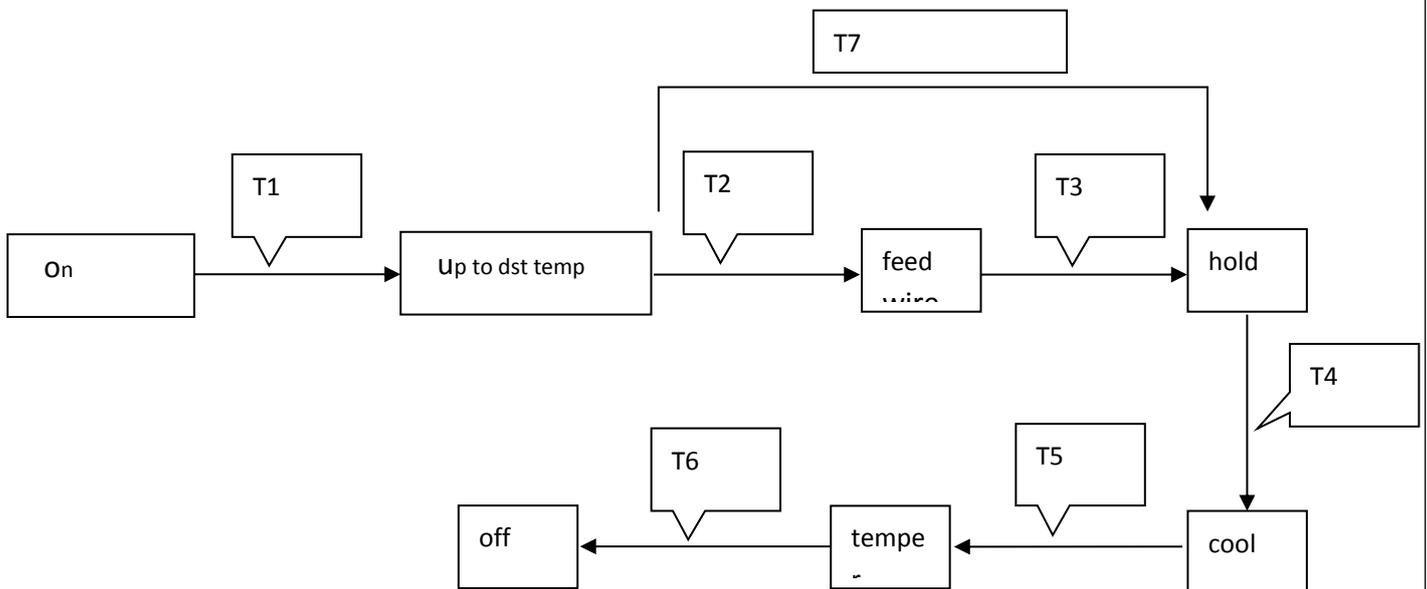
figure 1

● 4.3.2 bilateral symmetry testing.

As shown in figure 2, tuning the bilateral symmetry of the saw blade by the screw rod. When you're tuning the bilateral symmetry of the saw blade, loosening the handle 1 of reducer first, adjusting the handle 2 secondly, then tweak the screw rod, finally tighten the handle 1 and handle 2 up if the carbide welded on the tooth of saw is bilateral symmetric with the saw blade. During the process of tightening handle 2, the dial gauge will vary about a few centimillimetre, so please take into count the variance.



- 4.4、heating testing
- 4.4.1、critical heating time



T1: time that carbide is heated up to the lead temperature (temperature in advance = solder temperature - setting of temperature in advance), there is no place to set the time explicitly, but there are many factors that can change the time, such as the shape and size of heating coil, output of the high frequency power, size of carbide, heating parameter, solder temperature, lead temperature and so on.

T2: delay time of feed wire.

T3: time that feeding wire complete. The time is decided by the length of wire, the speed of feeding and the residence time after feeding wire. The speed of feeding is decided by the speed of wire melting. Make sure the speed of melting can follow the speed of wire feeding. The wire can't melt completely or deviate from the carbide If the speed of wire feeding is too fast. The time will be longer if the speed of wire feeding is too slow.

T4: time of holding the temperature.

T5: cooling time.

T6: tempering time.

T7: the time of the remedial push of welding clip .

● 4.4.2、welding temperature setting

Welding temperature is the temperature that welding the carbide. (it is up to the percentage of the silver of welding flux) 。 For example: the percentage of silver of welding flux is 30%, its melting point is about 750-780, so you can set the welding temperature to be the melting point plus 10.

● 4.4.3、cooling and tempering

Saw cooling is natural cooling procedure after heat the

carbide to the preset temperature.

Saw tempering is secondary heating procedure to decrease the hardness of saw body. The cooling time is decided by the material of saw body and the size of carbide. (this time have great effect on the tempering procedure directly.)

So the cooling time must be match the tempering time. The bigger the size of carbide is , the longer the cooling time is. Cooling time choice :observe the temperature showed on the screen, stay for 0.5s after the temperature drop down to the tempering temperature (according your own calculation). tempering time choice: the tempering time is decided by the size of carbide, the bigger the carbide is , the longer tempering time is. by eye measurement, the saw body and carbide will retain dark red for about 0.5s. **Notice:** the longer the distance between heating coil and carbide is, the higher the tempering temperature is, or the longer the tempering time is .

● 4.4.4、heat preservation

The preservation time is the period of heat preservation time after welding procedure finished. It is use to increase the wettability of welding flake or wire.

The time of heat preservation isn' t suitable to be too

long or too short.

If the time of heat preservation is too long:

- a) welding flux will evaporate and the welding flake or welding wire flow away, the oxide and residue increase.
- b) The stain of welding is bigger and the saw distort easily.
- c) the carbide is fragile

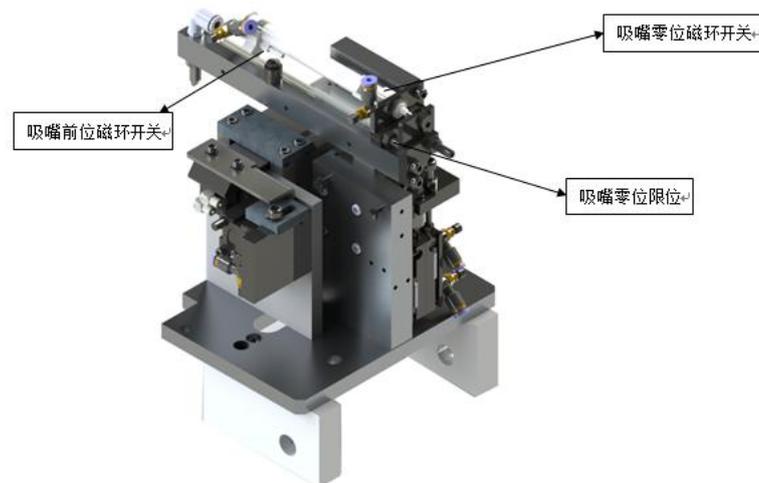
If the time of heat preservation is too short: the wettability of welding flake or wire isn't enough and the strength of welding decrease.

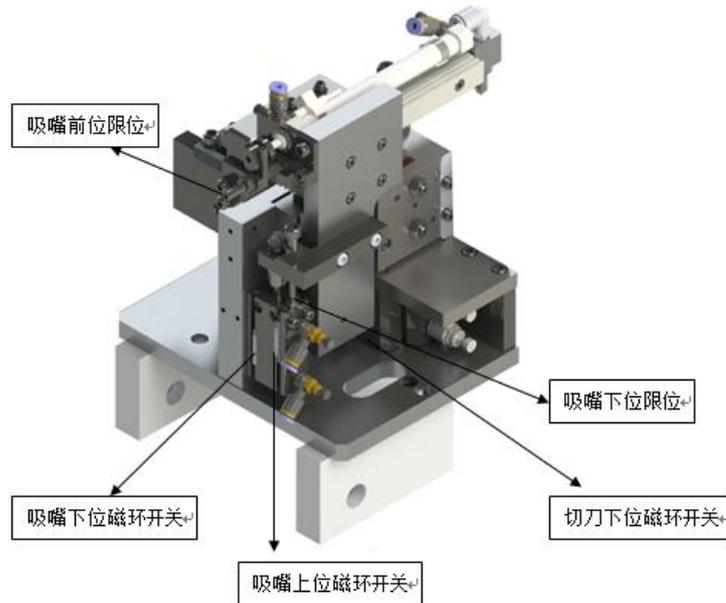
● 4.4.5、induction coil

- a) The induction coil should be compatible with large, middle, small carbide as possible as it can. Make sure the induction coil is away from carbide about 1mm.
- b) Please clean the oxide coating of the inner hole of induction coil before welding the coil.
- c) The two conductive copper of the high frequency head should be in same plane. the copper could be oxidize after long time. so you must burnish it by sand paper. When connect the induction coil and the high frequency head, please screw down the bolt symmetrically to avoid that a great current go through the bolt and damage it.

● 4.4.6、FAQ

1. the reasons of improper push are as below :
 - a) Heating temperature isn' t high enough;
 - b) Welding wire melt incompletely.
 - c) Air pressure of welding clip is too small.
 - d) Air pressure is too greater.
 - e) The position of the carbide on welding outshoot isn' t suitable. (see picture C in 4.1 section)
- 2、the reasons of the poor fluidity of welding wire are as below:
 - a) welding flux isn' t sufficient or the quality of the
 - b) welding flux is poor;
 - c) temperature isn' t high enough.;
 - d) the work area of the induction coil lie far back.
 - e) d) the burrs on the base surface of the saw tooth .





● 4.5 slicing testing.

1、sucking flake exception

Analyse:

- a) when sucking the flake, the force of sucking isn't enough if suction nozzle don't aim at the center of the flake. please adjust the position of nozzle to the center of flake. suction nozzle is blocked. when suction nozzle
- b) is blocked, the force of sucking decreased, so the nozzle can't suck the flake up. Please disassemble the suction nozzle and clean it.
- c) wrong settings about "Upper limit of test pad" and "lower limit of test pad". the number of flakes sucked should be in the range of the upper limit and lower limit of the flake detection after nozzle sucked a flake, or else machine will consider that

the nozzle don' t suck any flake. So please adjust the upper limit and lower limit, and let the number of flakes sucked is in the range of the two limits.

- d) vacuum generator break down. The force of nozzle is provided by vacuum generator. please replace a new generator.

2、paste flake exception

a) flake pasted deviate from the center of carbide. please paste flake on the center of carbide. adjust the jack screw to move suction nozzle back and forth.

b) the nozzle collide the carbide or the flake can' t touch the carbide when pasting flake on the surface of carbide. Adjust jack screw to move the nozzle up and down.

c) After nozzle move down to the place, the nozzle don' t paste flake and the transfer clip don' t execute the next step also. Please check if the magnetic ring switch is out of place or is damaged.

3、machine don' t slice the flake down after nozzle paste the flake.

- a) the number of flake sucked is wrong and out of the range of the upper and lower limit of welding flake detection.
- b) the magnetic ring switch at the initial position of nozzle turn off, so machine consider that the nozzle don' t return back. Please check if the magnetic ring switch is out of place or is damaged.
- c) the magnetic ring switch at the lower position of the slicer turn off. so machine consider that the procedure of the flake feeding isn' t finished. Please check if the magnetic ring switch is out of place or is damaged.

Chapter 5 Alarm and Solution

Seq	Alarm Message	Solution
1	Emergency stop	Press the emergency stop, turn on the emergency stop switch.
2	Lower pressure	Check if the air pressure is above 5.5MPa .stable work pressure must be above 5.5MPa.
3	Water cooling device stopped	Press reset button, turn on the water cooling device.
4	No carbide in	Transfer clip grab nothing, conveyer belt is stuck

	the transfer clip	by carbide ; there are very few carbide in vibrating Disk; the transfer clip' s detection sensor can' t perceived the carbide.
5	saw loosen	Click  to refasten the saw。
6	Exception of Welding point	When welding clip go to the welding point, the sensor at welding point don' t work. Please tuning it again.
7	Conveyer belt stopped	When the machine is running automatically, please turn on the conveyer belt through the panel.
8	Transfer isn' t return to zero	Press reset button to reset machine. If reset don' t work, please check if the corresponding drive exception exist.
9	Wrong interval number of saw tooth	Please make sure the total of the saw tooth must be divided by interval number without remainder.
10	Welding timeout	Emit this alarm if high frequency heater don' t stop and work enough time that exceed the value of “time of heating”. modify the value of “time of heating” if heater work. Check the high frequency heater if heater don' t work.
11	Welding clip	Welding clip don' t return to zero, please press

	initial point exception	reset button and reset the welding clip.
12	Saw initial point exception.	Emit this alarm if exception happened. the magnetic ring sensor at saw' s initial point don' t work after the saw retreat to the initial point. Please regulate it again.
13	Saw final point exception	the foremost sensor switch don' t work after saw move forward to the final point or the foremost point. Please regulate it again.
14	Wrong carbide width	The current carbide' s width isn' t in the scope of the target' s width. So increase the tolerance of carbide' s width and memory it.
15	Program Error 1	Please contact the manufacturer.
16	Program Error 1	Please contact the manufacturer.
17	Program Error 1	Please contact the manufacturer.
18	The lower point of Slicer exception	Magnetic ring sensor don' t work when the slicer descend to the bottom, check if this sensor is damaged or out of place.
19	The fore point of suction nozzle' s exception	The magnetic ring switch at suction nozzle' s fore point don' t work, check if this sensor is damaged or out of place.

20	The initial point of suction nozzle' s exception	The magnetic ring switch at suction nozzle' s initial point don' t work, check if this sensor is damaged or out of place.
21	The upper point of suction nozzle' s exception	The magnetic ring switch at suction nozzle' s upper point don' t work, check if this sensor is damaged or out of place.
22	The lower point of suction nozzle' s exception	The magnetic ring switch at suction nozzle' s lower point don' t work, check if this sensor is damaged or out of place.

Chapter 6 maintainment

1. Clean the heating coil every period of time.recommend that using Banana oil to wash the coil every hour at least
2. Clean the machine before the every shift end up。 Include saw clamp, welding clip, transfer clip, conveyer belt ,worktable and so on. Recommend that apply the kerosene or diesel oil to this parts such as saw clamp,

welding clip, transfer clip and worktable first, then wipe those place be applied the oil with dry rug after a few minutes. The conveyer belt should use banana oil to clean it.

3. Inspect all the component such as air cylinder, air finger, motor, bearing, slider and so on every half month. Please replace it in time if any abrasion founded.
4. In the period of working, observe the state of air pump often, make sure the pressure of air pump is over 0.55Mpa and under 0.65Mpa. The stablity of air pressure have a great effect on the air cylinder' s movement. Please ensure the air source is arid and clean. In a good air condition, the machine is more durable, specially the arid air will extend the life of solenoid valve.
5. Clean fiber lens and infrared temperature detector with clean cotton, don' t using the hard or sharp object to avoid damaging the surface of lens.
6. Replace the recycle cooling water periodically to avoid the explosion of heating coil when something choke the water pipe .
7. After explosion of heating coil , clean the water thoroughly in time, or else the residual water corrode

the machine, including the slider, guide rail and bearing parts.

8. Clean the vibrating disk up every day, wipe the disk with clean rag before dump the carbide into the disk. Cover the disk after work.
9. Regular maintainment should be done by specialist every quarter.
10. Shutdown all the power and air pump to avoid turning on the main switch accidentally during carry out the overall maintainment, inspection and repairment.

● **Linear guide rail' s maintainment:**

- A. Wash the sweat of hand off thoroughly and apply the excellent mineral oil to your hand before you touch the guide rail with hand . be careful about rust-proof specially in summer/monsoon or under the condition of leakage water .
- B. Don' t beat the linear guide rail with hammer or any other hard object directly, avoid detaining any rag, short fiber , welding flux, welding wire, welding slice, carbide in slider or guide groove as possible as we can.
- C. Machine will produce a lot of erosive smog and dust during work procedure. such a plenty of smog or dust deposit on the surface of the machine and accelerate the abrasion and rustiness of the linear guide rail. It must shorten the life of work of the

machine. To ensure the machine to running steadily, you should do your daily maintainment work carefully, include linear guide rail specially.

DONGGUAN JUNZHI AUTOMATION MACHINERY CO.,LTD
No.01,Lane04,SongbaiLang,Dalang Village,Dongguan,Guangdong,China

EC/EU Declaration of Conformity



The undersigned, representing the following:

Manufacturer and	the authorised representative established within the European Economic Area:
Company name: DONGGUAN JUNZHI AUTOMATION MACHINERY CO.,LTD	
Address: No.01,Lane04,SongbaiLang,Dalang Village,Dongguan,Guangdong,China	
Business name:	
Name and address of person/Company authorised to compile the technical file established in the EU Community:	

herewith declare that the following machinery:

Description of machinery
Generic denomination: Automatic Welding Machine
Function: The machinery is designed to welding carbide tips to saw blades.
Model/s: HZ079E; HZ079R; HZ026R; HZ035R; HZ036R; DK25
Serial no/s.:

Fulfill the relevant provisions of European Directive 2006/42/EC (MD), 2014/30/EU (EMCD) and safety objectives of 2014/35/EU (LVD). The harmonized standards used in order to obtain compliance to 2006/42/EC (MD), 2014/30/EU (EMCD) and 2014/35/EU (LVD) are the following:

EN 60204-1:2018 Safety of machinery - Electrical equipment of machines - Part 1: General requirements;

EN ISO 12100:2010 Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology;

EN 61000-6-2:2019 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments

EN 61000-6-4:2019 Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments