Preface

Shenzhen Zhuomao Technology Co., Ltd. is a high-tech enterprises of research and development, production and sales. Main products: multifunctional BGA rework Station, X-Ray inspection equipment,X-Ray Counting Machine, laser welding equipment, automatic tin removal quipment, automatic re-balling equipment, non-standard automation equipment. Zhuomao echnology has been committed to providing a more comprehensive one-stop service and solution for the global intelligent manufacturing industry. Since establishment, the company is with strong technical strength, integrity of business ideas, improved distribution network, comprehensive and thoughtful service by absorb and introduce advanced technology, improve ourselves on BGA rework systems and peripheral auxiliary equipment and supplies to win the trust and support of our customers.

Company products are sold in major cities throughout the country and exported to the international market covers Europe, Asia, Africa, Oceania, Southeast Asia, the Middle East and other countries and regions. It has established corresponding distribution systems in the United States, Canada, Brazil, Germany, France, Australia and other countries and regions, while in India, Pakistan, Vietnam, Thailand, Singapore and other Southeast Asian countries and Hong Kong, Taiwan and other regions have established a sound sales channel, gathered the corresponding brand effect, and become the trusted brand of choice for more than 100,000 users worldwide.

Has a strong vitality and higher visibility in the industry. We will continue to uphold the "profession, innovation and integrity" concept, with the community care and support of our friends, we are together to provide our customers with more high-quality, high efficiency and good service! Your smile is Zhuo mao’s eternal pursuit!

- Thank you for using our ZM-R5860 BGA Rework Station
- To make sure you use safety equipment and full high performance of

this product, please read

the instructions before operation.

●Due to constantly updated technology, Shenzhen Zhuomao Technology Co., Ltd. reserves the right without prior notice to customer to modify the technology and specifications of products.

● This instructions is for users packed with machine, please keep it for maintenance of machine.

● As for the use of this equipment and special requirements in doubt, contact the company at any time.

● The Company reserves the final interpretation of the contents of this instruction.

Contents

1.Features

1) The machine used touch-screen interface and PLC control to show the three temperature graphs at any time, so that the temperature error can be controlled within 1.

2) Have 7 temperature sections for control such as preheating, insulation, heating, welding 1, welding 2, cooling and refrigeration. The excellent temperature control system ensures the effectiveness of welding.

3) It can save 1 to 100 groups of graph parameters at one time. It can analyze the graphs and change the settings at any time on the touch screen.

4) There are three independent heating areas from top to bottom. the first and second temperature areas can control many groups & sections of temperature parameters at the same time. The third area preheats the PCB thoroughly to achieve the best welding effect. Temperature, time, slope, cooling and alarming all display on the touch screen.

5) Choose imported high-precision K-Sensor with closed-loop to detect up/down temperature precisely.

6) After finishing desoldering & soldering, there is an alarming. When the temperature goes beyond control, the electric circuit can cut off automatically, with over-heating protection.

7) Use a powerful cross-flow fan to cool PCB rapidly to prevent it from deformation and ensure the welding effect.

8) Use a V-groove equipped with a flexible fixture for PCB positioning to protect the PCB.

9) For large thermal capacity of PCB/CSP or other high-temperature lead-free requirements, all can be handled easily.

10) The hot air nozzle can rotate 360 ° freely and it's easy to replace. We can offer BGA nozzles of different sizes for you to replace easily. Nozzles of special requirements are customize.

2. Installation

1) Be away from flammable, explosive, corrosive gas or liquid.

2) Avoid damp places, the air humidity is less than 90%.

3) Temperature -10 ℃ ~ 40 ℃, avoid direct sunlight, prolonged sun exposure.

4) No dust, fibers and metal particles floating in the operational environment.

5) The place of installation should be flat, solid, no vibration.

6) Place heavy objects on the body are strictly prohibited.

7) Avoid the affection of direct airflow, such as air-conditioners, heaters or fans.

8) The back of rework station should be reserved 30CM space for heat dissipation.

9) The placing table (900 × 900 mm) should be flat, the relative level of a height 750 ~ 850 mm.

10) Distribute wiring must be handled by a qualified professional technician, the main line is 1.5 square feet. Equipment must be well grounded.

11) Switch off the power after using, Power must be shut down if not use it for a long time.

3.Specifications and technical parameters

1) Power supply : 220V±10％ VAC 50/60Hz

2) Power consumption: 5.0KW Max

3) Heater power: Top heater: 0.8KW;

4) bottom heater: 1.2KW; IR: 2.7KW

5) Electric material: PLC programmable controller + TFT Touch Screen+ high precision intelligent temperature control module

6) Temperature control: K-type closed-loop thermocouple, top and bottom heating independently, temperature error±3℃

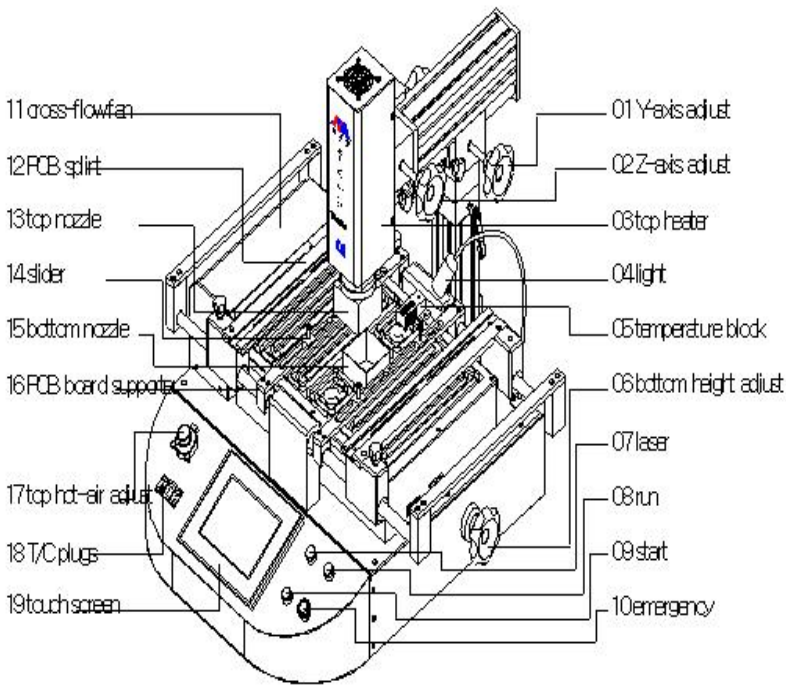
7) Positioning: V-groove fixture for PCB positioning

8) PCB size: Max 410×370mm Min 20×20mm

9) Machine dimension：L635*W620*H655 mm
10) Weight：43.5kg
11) Machine color：Black

4.Introduce structure

（A）structure introduction



（B）Function introduction

Item	Name	Function	Use method
1	Y-axis adjust	Adjust the top	Right-back，
2	Z-axis adjust	Adjust the top heater at Z	Right-up，left-down
3	Top heater	Solder the BGA	Adjust by Z-axis
4	LED light		
5	Temperature block		
6	Bottom height adjust	Adjust bottom height	Adjust the distance to PCB
7	Laser		
8	Run		
9	Start		
10	Emergency		
11	Cross-flow fan	Cool the PCB board	
12	PCB splint	Support PCB board	
13	Top nozzle	Focus on the BGA	
14	Slider	Lock screw for PCB board	
15	Bottom heater		
16	PCB supporter	Support the slider	
17	Locking screw	To fix splint	
18	Top hot-air adjust		Rotate right and left
19	T/C plugs	test external ttetemperature	
20	Touch screen	Control the equipment	

5.Procedures setting and operation

（A）“Setting screen” operation

1) Turn on the power supply, and then the touch screen will show boot screen (picture 1), then touch “SET UP”, it will show password input dialog box (the initial password is 8888). (Picture 2)

Figure 1

Figure 2

2) Input the password and then press the ENT button, it will show debugging curve screen (picture 3)

Figure3

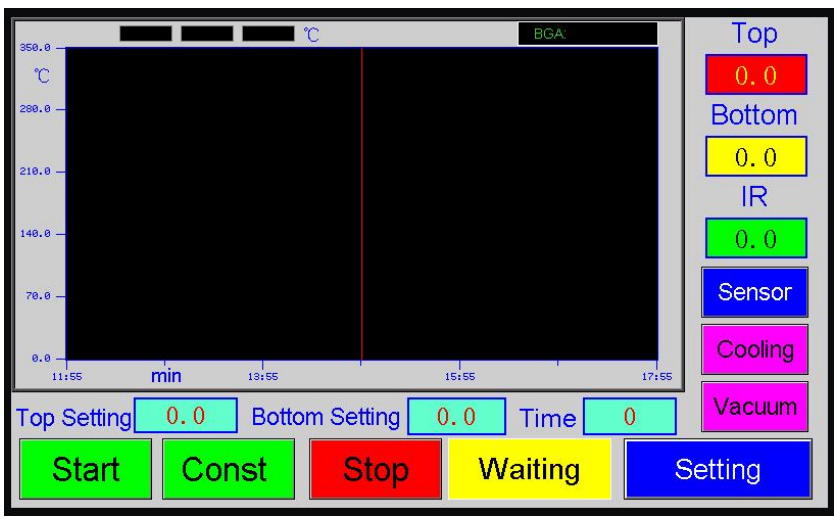


Figure4

3) Click “setting”, it will show picture 4, then click “temperature setting” and enter it.（Figure5）

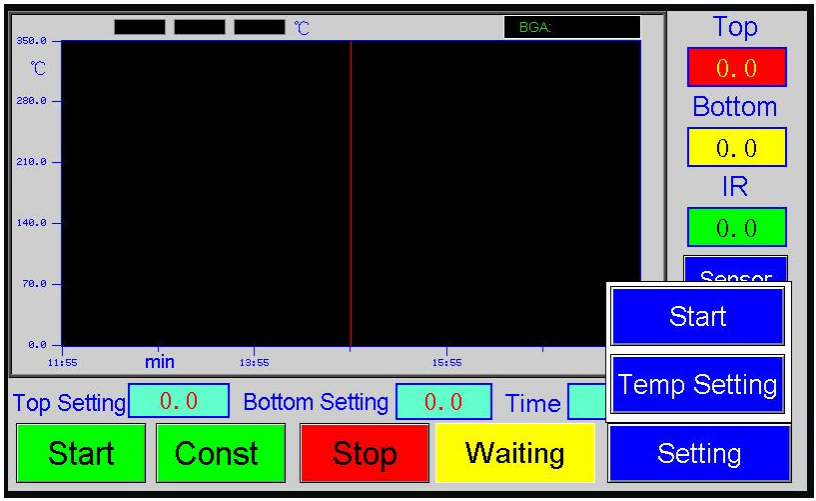


Figure5

4) Enter the temperature setting screen (as Figure 6); then set the temperature as required.

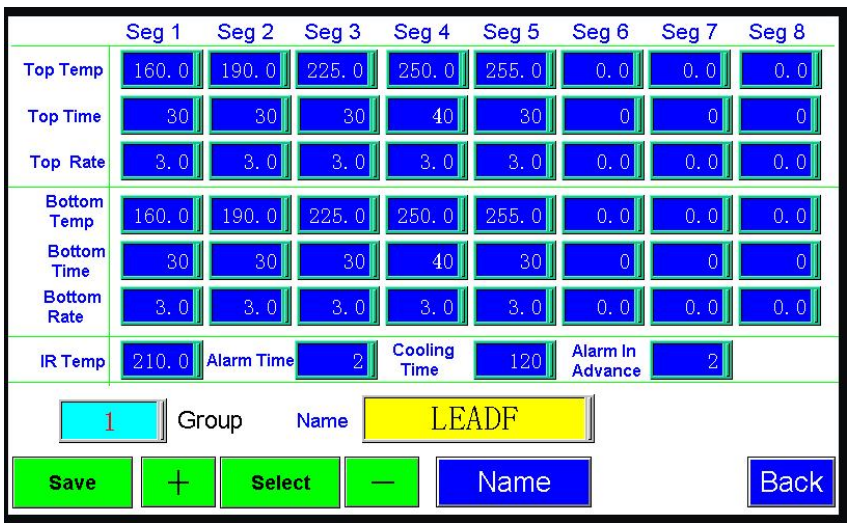


Figure6 temperature setting program screen

（B）Interface description（take picture 6 as an example）

Preheating section: when you start the program, the top heater will enter the process of heating, the slope of it is 3 degrees per second, when it reaches to 160℃ (the temperature setting of preheating section ），keep this temperature for 30 seconds (the time setting of preheating section, till now, the preheating section is finished, then the top heater will enter the next work process—insulation section.

The bottom heater start to heat from room temperature, the heating slope is 3 degrees per second, when it reaches to 160℃ (the temperature setting of preheating section ），keep this temperature for 30 seconds (the time setting of preheating section, till now, the preheating section is finished, then the top heater will enter the next work process—insulation section.

IR preheating: Set 210℃,it means that the IR heating plate will be heated to 210℃,and then keep it.

Insulation section: The slope of the top heater is 3 degrees per second, start from 160℃ to 190℃, then keep it for 30 seconds.

The slope of the bottom heater is 3 degrees per second, start from 160℃ to 190℃, then keep it for 30 seconds.

Heating section: The slope of the top heater is 3 degrees per second, start from 190℃ to 225℃, then keep it for 30 seconds.

The slope of the bottom heater is 3 degrees per second, start from 190℃ to 225℃, then keep it for 30 seconds.

Welding 1、welding 2 and cooling section are same as above.

The process of actual temperature control of this system can be less than the maximum control sections (6 sections). During the heating process, if you do not need to use the control section, then you can set 0 to close it.

1) Alarm time and ahead alarm: the whole heating process can bedivided into following sections: set temperature parameters----start heating----preheating----insulation----heating----welding 1----welding 2----finish the whole heating process, after named click OK. If you set

alarm ahead as 6 seconds, then it means that it will alarm ahead 6 seconds, just start from OK.

2) Cooling time: it means that the time of cooling after heating

3) Group ( ): ( ) means that the group you stored or need, this system can store 50 groups, you can choose (1-50) to save the data.

4) Name: it means that the name of this group data, (you can use letters or numbers).

（C）Parameters setting

1）Temperature、time and slope setting:

Click the part that you want to set or modify (picture 7),it will show the dialogue box(picture 8),then you can input the parameters of welding and desoldering as required, and then click ENT for confirmation.(picture 9).you can according to the reference of the attachment 1.

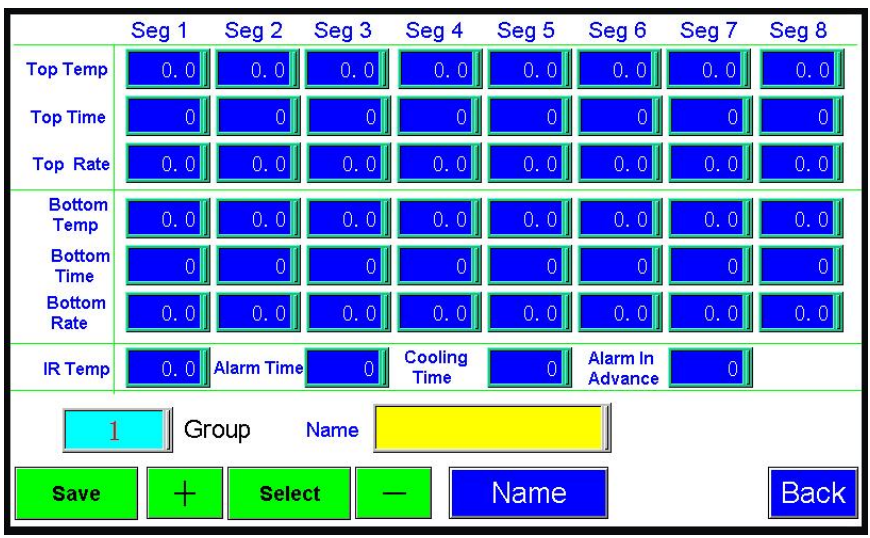


Figure7

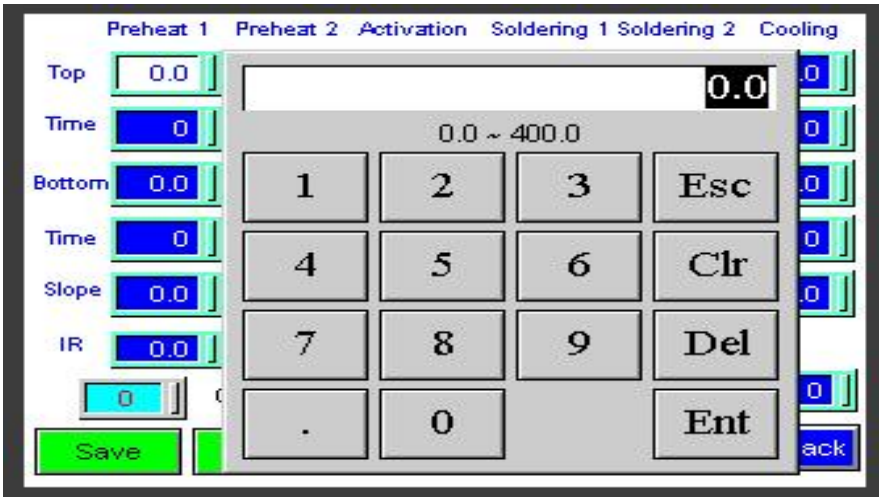


Figure8

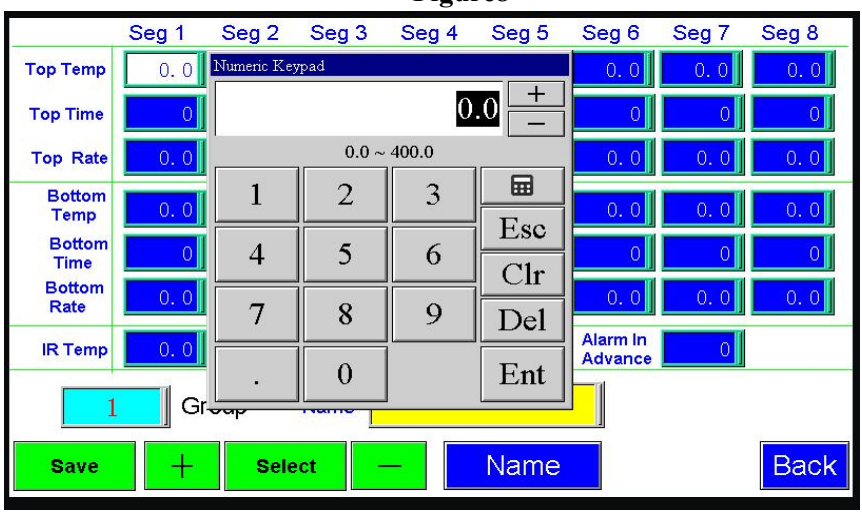


Figure9

2）Groups setting: (This data is the group number.)

(Picture 10) click “Group”, it will show picture 10, then input the numbers (1-50), named it (this system can save 50 groups), such as picture 11, set it as group 2, and click ENT for confirmation.

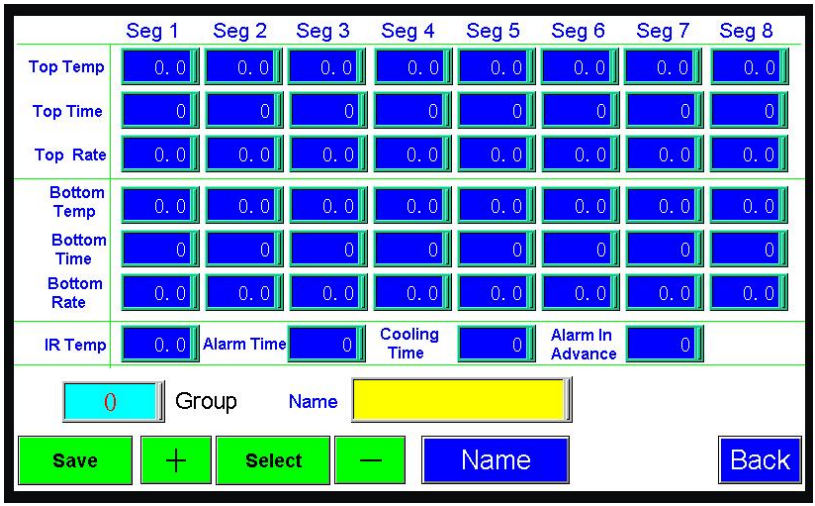


Figure10

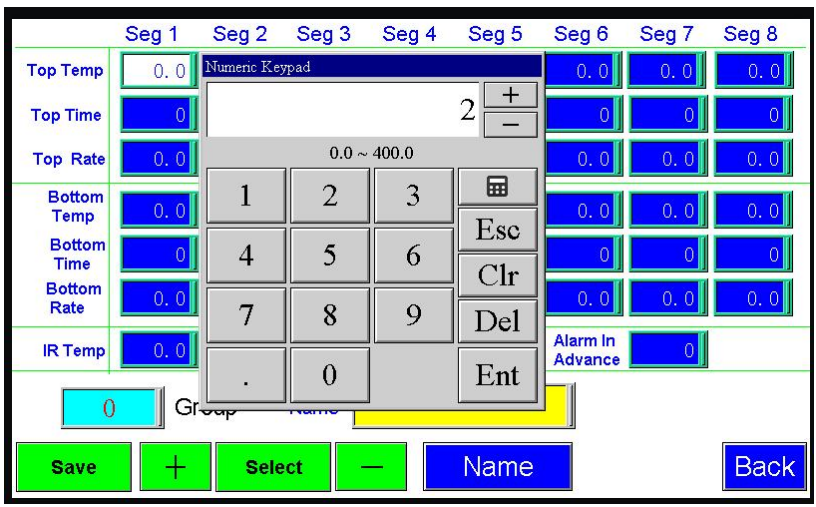


Figure11

3）Data name setting:

(1)letters input: Click NAME (Figure12), then it will show as Figure13screen, input the name as required, now you just can input letters as the name, if you named A, then click ENT for confirmation.

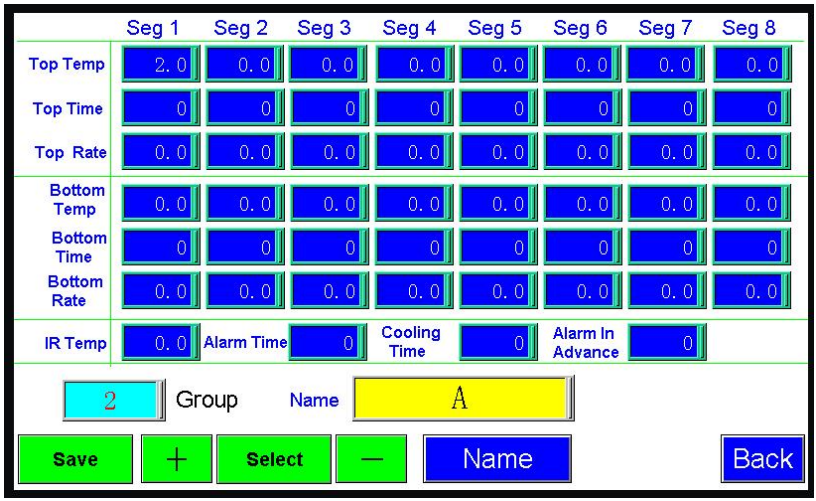


Figure12

Figure13

(2)Number input: Named the group as numbers

First you Click CLR for clearance, then click ALT, name the data as numbers, at last click ENT for confirmation. (Picture 14, picture 15)

Figure14

Figure15

4）other settings:

（1）alarm time setting: set as above，set as 2～5 seconds。

（2）cooling time setting: set as 20～50 seconds。

（3）ahead alarm: set as 5～10 seconds。

{1} When all data setting finished, click SAVE, store all the data in the system, and then click “Yes” for confirmation. (Picture 16)

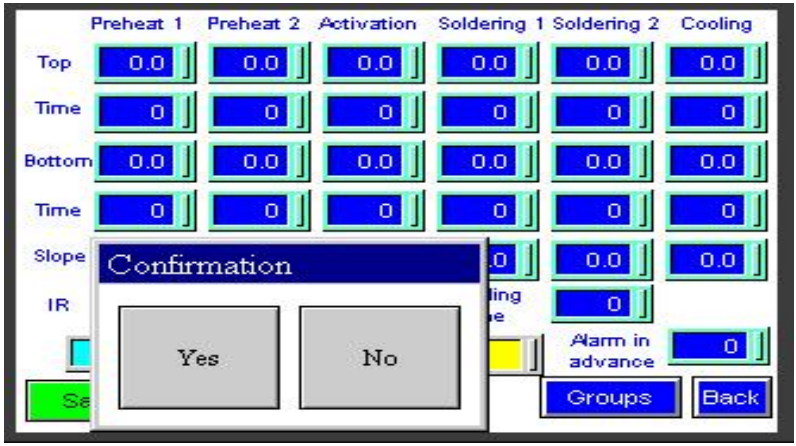


Figure16

{2}When all data setting finished, click SELECT, then it will show confirmation window, click YES for confirmation, then the data will select. (Picture 16 7)

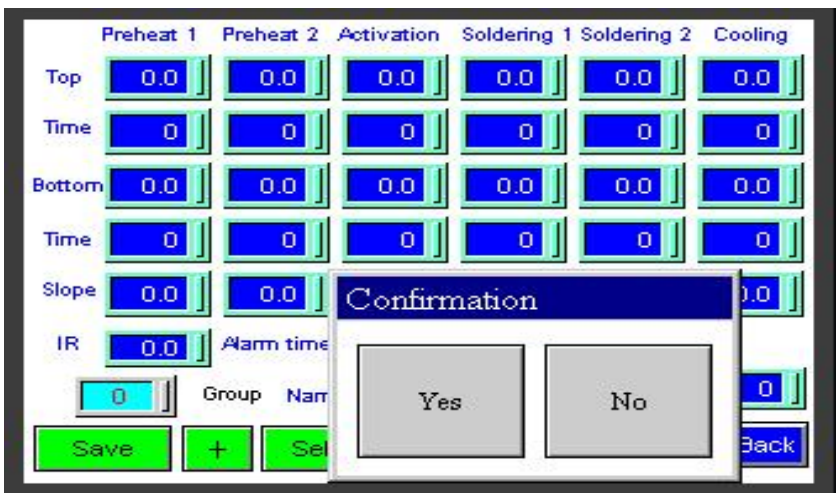


Figure17

5)"OPERATION"

(1) Back to the boot screen, (Figure18); click "OPERATION", (Figure18), then it will show operation curve screen. (Figure19)

Figure18

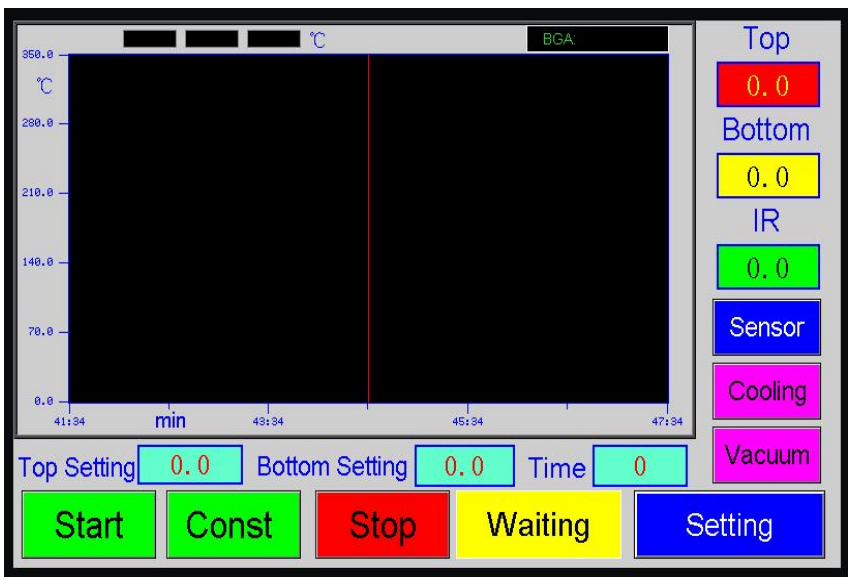


Figure19

（2）Click “parameters setting”, it will show Figure20 screen.

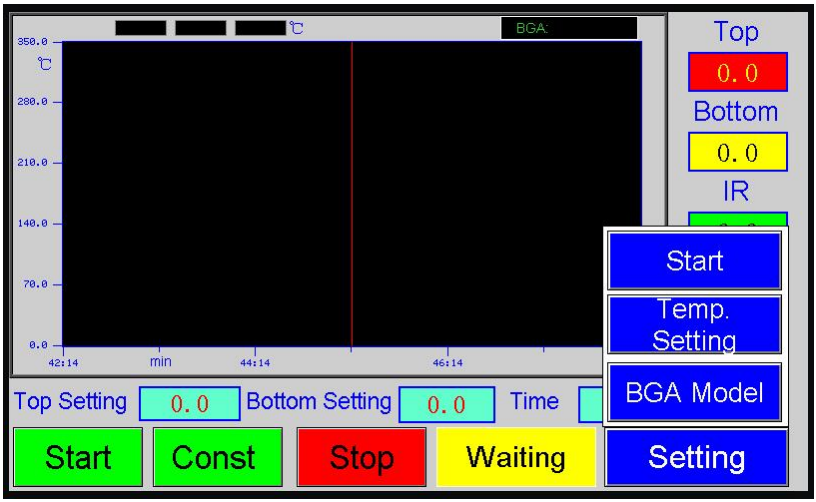


Figure20

（3）Click “BGA model”, it will show Figure21.

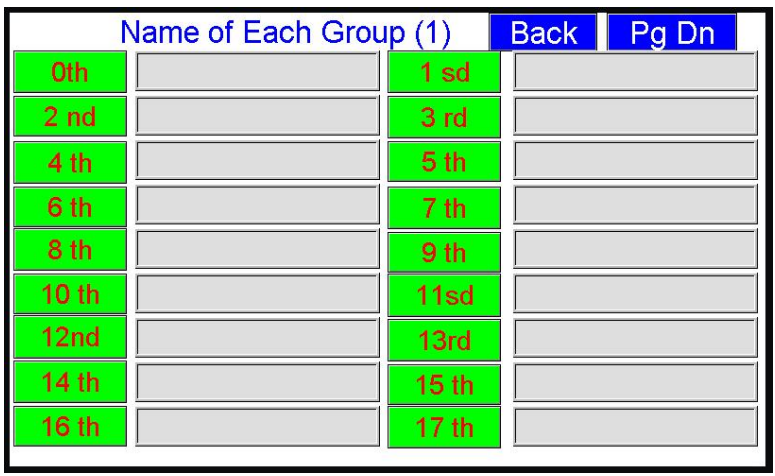


Figure21

（4）Choose the parameters that you have set and stored before, if you set it as group 2, click it, then it will shows the confirmation window, click YES for confirmation, enter Figure22 screen, then it will show you the parameters that you will use now, click BACK, then you will back to the operation screen.(as pictured)

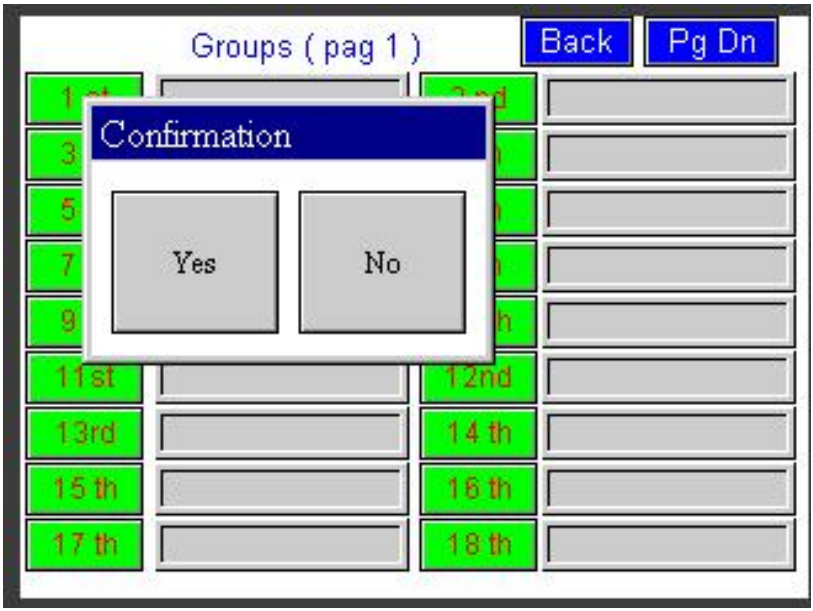


Figure22

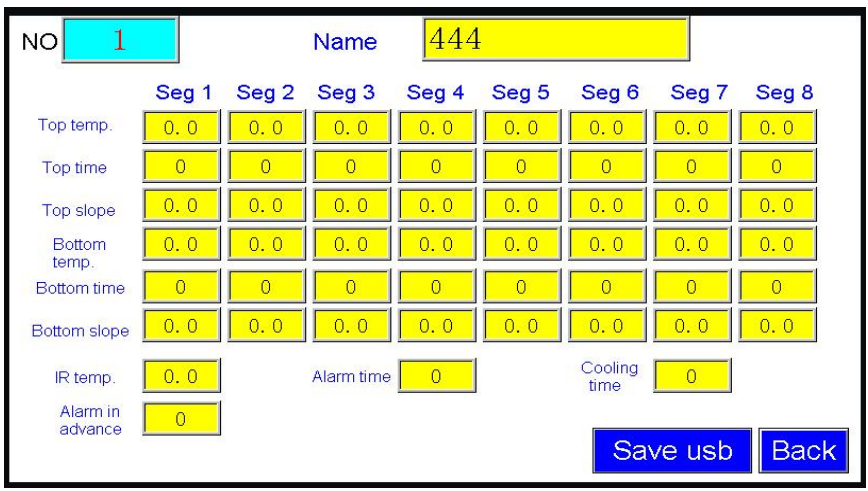


Figure23

（5）Back to OPERATION

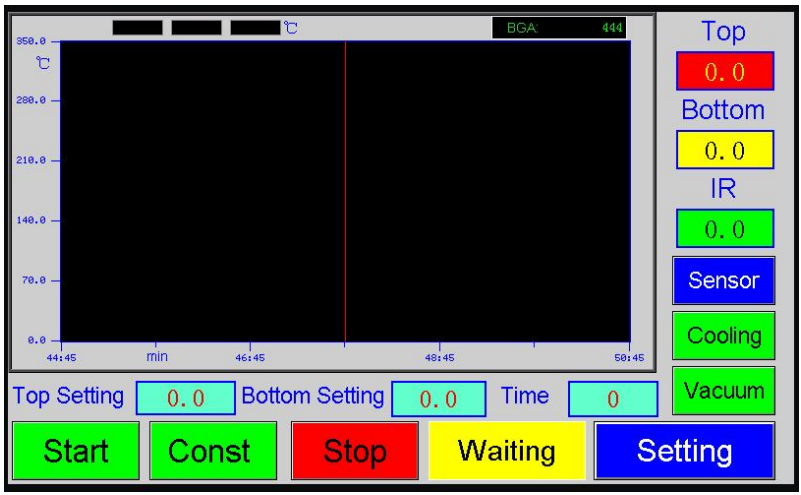


Figure24

（6）Put the PCB board and BGA chip correct as required, adjust the top heater as Figure25, make the distance of nozzle and BGA is 3-5mm,and make the nozzle focus on BGA, click START, then system will start to heat. When welding is close to finishing, the system will alarm automatically, it means that the welding process is finished. (Figure26) ,

Figure25

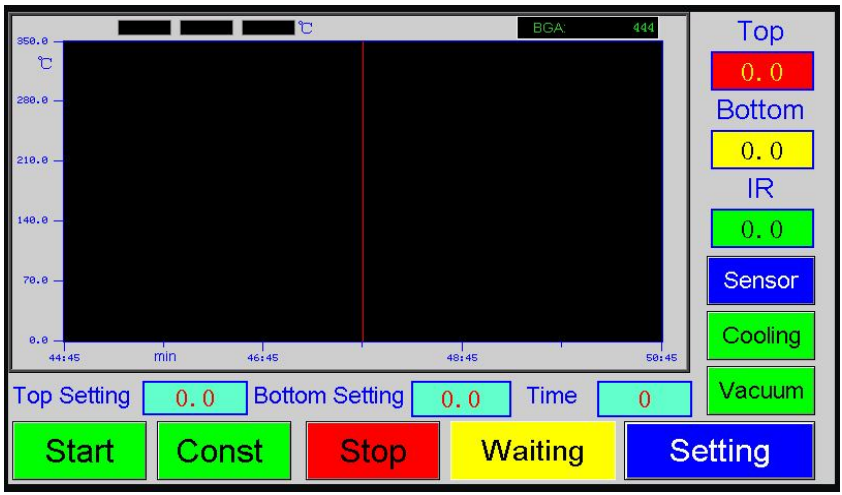
Figure26

Remark: the operation of “OPERATION” and “SET UP” are similar, the differences are:

There is password input in the “SET UP”, first you have to input the password, and then you can set and modify the parameters.

There is no password input in the “OPERATION”, you do not need input password, and you cannot modify any parameters. The specific operation you can make as above “program setting”.

（D）Introduction of other function of touch screen



F**Figure27** Temperature setting curve screen

Top setting: it shows the setting temperature of top hot-air heater

Bottom setting: it shows the setting temperature of top hot-air heater

Time: the time of heating

Top temperature: it shows the internal galvanic actual temperature of the top hot-air heater (red curve)

Bottom temperature: it shows the internal galvanic actual temperature of the bottom hot-air heater (yellow curve)

IR temperature: it shows the internal galvanic actual temperature of the bottom IR heater (green curve)

“000” :It shows the name of the data which is used now.

Sensor: screen change button. Press this button, then it will change to “temperature setting curve screen”.

Cooling: change button of manual control of motion/stop of cross flow fan Vacuum: change button of manual control of motion/stop of vacuum sucker

Start: trigger button. Click it, and then the system will start heating.

Stop: trigger button. Click it, and then the system will stop heating.

Pause: system show window, it shows the state of the system now.

Figure28

Actual temperature curve screen

Parameters analysis curve screen

Parameters analysis: screen change button. Click it, then it will change to "parameters analysis curve window"

Control screen: screen change button. Click it, then it will back to "temperature setting curve screen"

Actual measurement 1: the actual temperature of external galvanic measurement (the green curve)

6.External thermocouple use instructions

（A）Function

1) More accurate to measure the actual temperature of the part to be heated during the welding process.

2) It is easy to move, so that it can be convenient to measure the temperature of the different parts of the welded components during the heating process.

3) After installing galvanic correctly, it will display the galvanic current measurement temperature in the touch-screen outside the measured temperature curve screen "measured" column.

（B）Installation

1) Check the galvanic lines, whether there are disconnected phenomena or not.

2) Insert the galvanic Plug into the "outer galvanic Socket” on the control panel according to the positive and negative mark.

3) After Sensor installed correctly, click "Sensor" button on the touch screen, the corresponding galvanic current temperature will be displayed on the touch screen.

（C）Measurement

1) PCB board will be installed on the rework station, with the galvanic fixed on the PCB board using foil stickers. (As shown in Figure 29)

2) Adjust the height of the probe with the probe galvanic head located in the top 1-2mm of the test site (as shown in Figure 29)

Figure29

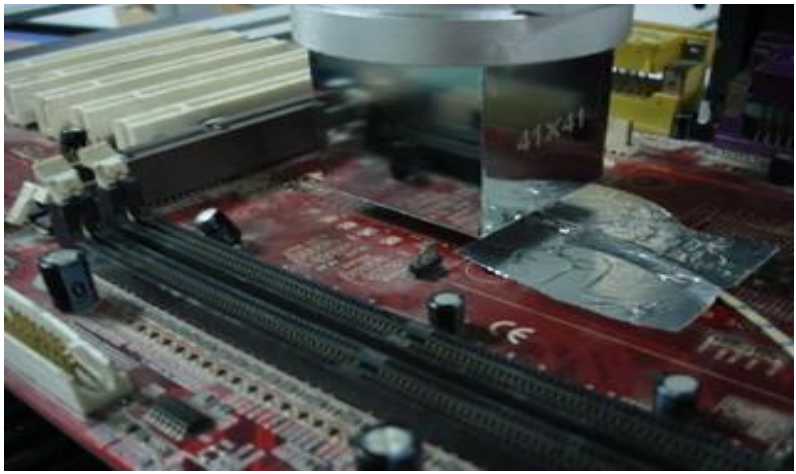


Figure30

3) Adjust the related mechanical adjustment knob, so that the heating part just below the hot-air tube. (As shown in Figure 30)

4) Adjust the up and down adjustment knob of the hot-air head to make the distance between the edge of PCB board side and the hot-air head is 3-5mm.

5) Implementation of the welding / disordering process, that is to start the process of upper and lower heater.

6) Then it will show three curves of the green and red and yellow on the computer monitor screen (picture 31

A. Curve 1, the actual measurement temperature of the internal galvanic of the top heater (green)

B. Curve 2, the actual measurement temperature of the external galvanic curve (red)

C. Curve 3, the actual measurement temperature of the internal galvanic of the bottom heater (yellow)

Figure31

D. Using the outer galvanic to adjust the temperature curve

Statement: In this operation, it may be due to improper operation to cause the temperature deviation of the device or even lose control, please caution!

（D）Take the upper hot-air tube as an example to make detailed description of adjustment method

1) Set the temperature, the time, the slope and so on parameters of the upper heater

2) Adjustment process proposed to do on a waste circuit board in order to prevent damage to the circuit board and on-board electronic components.

3) Implementation of the above process (3), installed the outer measured galvanic, in which the top of the PCB board just below the hot-air tube.

4) Close the lower part of the heating process, click on "Start" button to start the heating process, which will on the computer monitor screen will be displayed on the upper curve of the measured temperature

(green) andexternal galvanic measuring temperature (red) the two curvesGreen curves represent the actual measurement of the galvanic temperature curve of the upper heating wire inside, the red curve represents the actual measurement of the galvanic temperature outside.the smaller the gap between the green curve and red curve, the closer between the actual temperature and set temperature of the heating parts, more standard of the upper heating process; On the contrary, the greater the gap between the two curves, the greater the actual temperature deviate from the set temperature, the more non-standard of the upper part during the heating process.

5) If the deviation between the two curves is too much, you should make the appropriate adjustments

6) （The specific adjustment method is as follows, because of the impact of the system processes and the environmental, deviations in the objective is inevitable. If the temperature deviation does not affect the normal welding and desoldering, non-professionals should avoid the following corrective actions!

A. If the outer galvanic curve (red) lower than the upper one (green), adjust the internal hairdryer galvanic probe upward;

B. If the outer galvanic curve (red) higher than the upper one(green), adjust the internal hairdryer galvanic probe downward;

C. Adjustment must be small, try to control the amplitude of accommodation in 1mm or less;

D. Repeated several adjustments;

E. During adjustment process, the heated of galvanic probe is strictly prohibited from contacting with any objects, so as not to affect the accuracy of measuring temperature;

F. After temperature adjustment, you should fix the probe, to avoid the probe vibration measurement of the temperature of the equipment

G. The method of the adjustment applies only to the two parallel curves in a smooth uniform deviation, and it is invalid to the temperature which is from top to bottom jitter free-laws regulating!

H. The upper part of the internal galvanic Duct location: Remove the upper heater nozzle, at a distance of 2-3cm at the edge wind-cone .

I. Operating the standard procedure to avoid the high-temperature burns!

7) There is no booster thermocouple temperature curve on the bottom of The computer screen, so you have to adjust the process of the lower part of the heaters by visual.

8) fixed the galvanic line with foil stickers on the bottom of PCB board (as opposed to the upper heater set back on the PCB board), so that the probe of the booster thermocouple is located just 2mm above the mouth of the bottom hot-air nozzle, and adjust the mechanical parts, make the upper hot-air nozzle deviate from the heated parts to avoid cold air affect the temperature of the heated parts.

9) Set the parameters of the lower heating temperature, while closing the upper part of the heating process, click on "Start" button to start heating

10) The caution is same as the top heater.

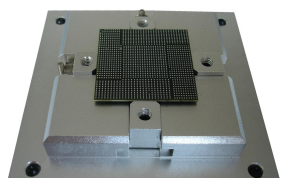
11) The methods of adjustment:

A. If the outer temperature is lower than the bottom, you should adjust the lower internal galvanic probe downward.

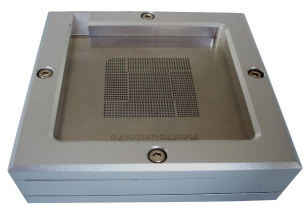
B. If the outer temperature is higher than the bottom; you should adjust the lower internal galvanic probe upward.

7.Reballing Process

1) Fix the BGA chip on the base of our universal reballing station; Adjust the four slipper blocks to fix the chip to make it on the center of the reballing kit.

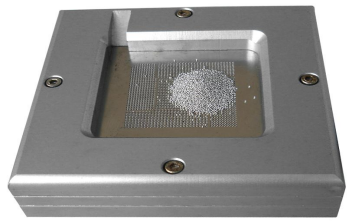


2) Select the appropriate steel mesh according to chip type. Fix the steel mesh to the ceiling cover and tighten it with 4 M3 screws,



covered with lid. Adjust 4 Jimmy on the base to meet the suitable height required.

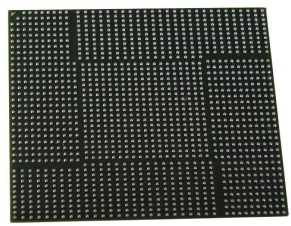
3) Observe the hole on steel mesh which should be completely coincide with the solder holes on BGA. If not coincide, we must remove the cap to reposition to ensure steel mesh holes aligned with the chip, and then lock the four screws.



4) Locking two no spring fixed slide, remove the BGA chip and coated with a thin layer of solder flux, card the chip into the base again, covered with lid(make sure the right direction).

5) Put into solder ball, clench hands and gently swaying reballing station to ensure the solder ball completely filled in the holes and pour out extra solder balls.

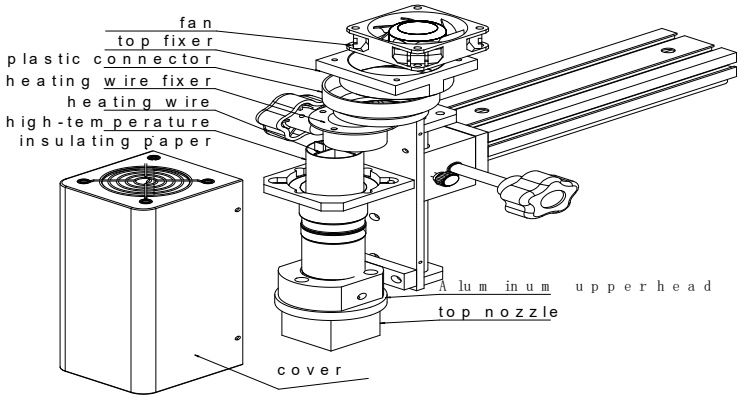
6) Place the reballing station on the flat location; Remove the lid, carefully scored BGA chips. Observe the chip, if individual solder balls are not in the hole rightly, please correct it with forceps.



7) It is convenient to use our different types of repair stations or welding machine to fix solder ball. Heat solders balls on the BGA to soldering it on BGA, thus reballing finished.

8.Equipment repair and maintenance

（A）Upper heater：(Pictured)



（1）The replacement of fan:

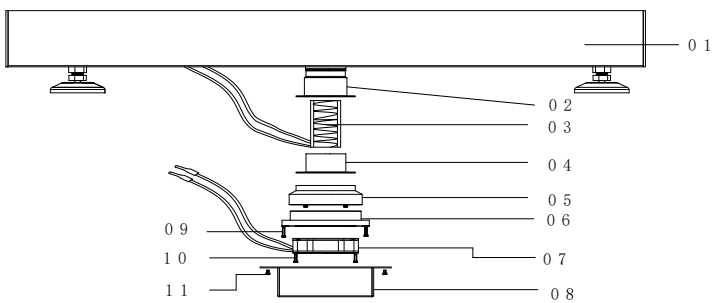
Remove the heater cover, and remove the insulation fiber block, then you can replace the fan.

（2）The replacement of heating wire

Remove the heater cover 、the insulation fiber block and fan, remove the upper fixed block, then take out the hot wire. Then it can be replaced.

Note: When you change the heating wire; it must be wrapped by High-temperature insulating paper.

（B）Replacement of the lower hot air heating wire: (Pictured)



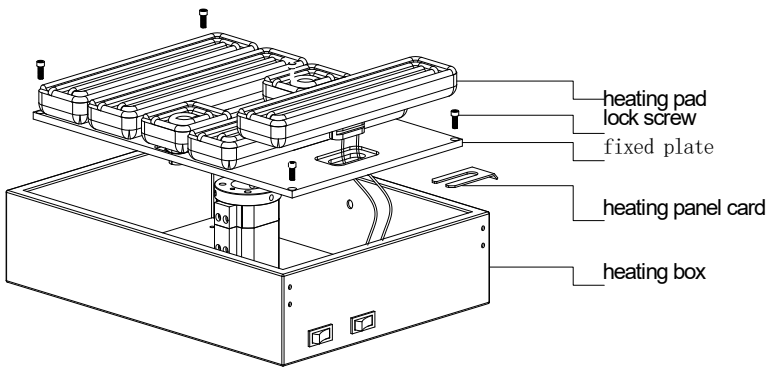
01 Body 02 Heating Duct 03 Heating wire
04 Heating wire fixture 05 Plastic connector
06 Fan holder 07 Fan 08 Heater covers
09 Fan holder bolt 10 Fan bolt 11 heater cover bolt

（C）Replacement of the lower hot-air heating wire:

1）、Remove the heater bolts, and then remove the heater cover.

2）、Demolition of fans, fan holder, plastic connector and fan wire fixture, take out the hot wire. Then you can replace the heating wire,

3）、The bottom heating panel (pictured)



（D）Replacement of heating plate:

1). Demolition of locking screws (4), remove the heating plate and the assembly of the fixed plate, placed on the table which is covered with a sponge (with heating plate surface facing down).

2). Removed the fixed heating plate card, you can break down the fixed plate and heating plate assembly, remove the heating plate then it can be replaced.

9.Safety precautions

(1)BGA Rework Station ZM-R5860 use AC220V power, working temperature may up to 400 ℃, Improper operation may cause damage to the equipment and even endanger the safety of the operator. Therefore must strictly abide the following:

1）、No directly fan or other blowing air to the station when working, otherwise it may cause damage to the equipment or components as the distortion of heater thermometric;

2）、prohibited flammable gases or liquid around the machine; After booting, forbidden combustibles touch high temperature district and peripheral metal parts, otherwise it will easily cause fire or explosion;

3）、To avoid high temperature scald, forbidden touching high temperature fever zone during working. PCB board still warm when completed, operation process should take necessary protective measures;

4)、PCB board should be placed on V type support shelves and used slider pairs to support PCB board in the centre; e. Metal or angular and sharp objects are avoided on touch screen surface;

5)、upper and lower heater inlet must not be blocked, otherwise heating wire will be damaged;

6)、After work, please guarantee natural cooling for 5 minutes, then Switch off;

7)、if metal objects or liquid fall into rework station during working, you should power off immediately, unplug power plug, until it cooled, then eradicate litter and dirt; it will be influenced if grease on the heating panels and accompanied by odor when rebooting. Please keep the machine clean and timely maintenance.

8)、when appears abnormal warming or smoke on the machine, immediately disconnect power and notify technical service personnel to repair it; Remove the connections data line between computer and devices, hold the plug to unplug the data line, to avoid damaging internal connection.

（2）if it belongs to one of the following situations, and other damage caused by them; It will not be in the Company guarantee scope!

1)、Failing uses the method in manual to operate in wrong conditions or environmental operation;;

2)、The Company product outside reasons;

3)、Not the transformation and maintenance of the company;

4)、Not accordance to the method stipulated when using the products ;

5)、unpredictable situation that the company scientific technical level not reached;

6)、Natural disasters or man-made destruction of non-responsibility of the company premises.

BGA welding and disordering parameters（for reference）

1、The temperature curve of lead welding

41*41 the temperature setting of the BGA welding：

	preheating	insulation	heating	welding1	welding2	cooling
upper	160	185	210	225	230	200
time	30	30	35	40	20	15
bottom	160	185	210	225	230	200
time	30	30	35	40	20	15
slope	3.0	3．0	3．0	3．0	3．0	3．0
IR	180					

38*38 the temperature setting of the BGA welding：

	preheating	insulation	heating	welding1	welding2	cooling
upper	160	185	210	220	225	200
time	30	30	35	40	20	15
bottom	160	185	210	220	225	200
time	30	30	35	40	20	15
slope	3.0	3．0	3．0	3．0	3．0	3．0
IR	180					

31*31 the temperature setting of the BGA welding：

	preheating	insulation	heating	welding1	welding2	cooling
upper	160	180	200	215	220	220
time	30	30	35	40	20	15
bottom	160	180	200	215	220	200
time	30	30	35	40	20	15
slope	3.0	3．0	3．0	3．0	3．0	3．0
IR	180					

The upper is the reference temperature of the lead BGA

2、The temperature curve of Lead-free welding

41*41 the temperature setting of the BGA welding：

	preheating	insulation	heating	welding1	welding2	cooling
upper	165	190	225	245	255	240
time	30	30	35	55	20	15
bottom	165	190	225	245	255	240
time	30	30	35	40	25	15
slope	3.0	3．0	3．0	3．0	3．0	3．0
IR	210					

38*38 the temperature setting of the BGA welding：

	preheating	insulation	heating	welding1	welding2	cooling
upper	165	190	220	240	245	235
time	30	30	35	40	20	15
bottom	165	190	225	245	250	235
time	30	30	35	40	20	15
slope	3.0	3．0	3．0	3．0	3．0	3．0
IR	210					

31*31 the temperature setting of the BGA welding：

	preheating	insulation	heating	welding1	welding2	cooling
upper	165	190	220	240	245	235
time	30	30	35	40	20	15
bottom	165	190	220	240	245	235
time	30	30	35	40	20	15
slope	3.0	3．0	3．0	3．0	3．0	3．0
IR	210					

The upper is the reference temperature of the lead-free BGA