BGA Rework Station ZM-R5850 Manual

Preface

Dear customer, Thank you for using the BGA rework station ZM-R6820G of Shenzhen Zhuo Mao Technology Co., Ltd.

Features of ZM－R5850 :

1. Unique design of three heating areas operating independently to control temperature more accurately.

2, First / second temperature areas heat independently, which can set up 8 rising temperature segments and 8 constant temperature segments to control. It can save 10 groups of temperature curves at the same time.

3. The third area uses far-infrared heater to preheat and control the temperature independently, so that the PCB can be fully preheated during the desoldering process and it can be free from deformation.

4. Choose imported high-precision K-Sensor and closed-loop to detect the up/down temperature precisely.

5. 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.

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

7. Use a V-groove equipped with a flexible fixture for PCB positioning to protect the PCB from deformation when heated or cooled.

8. This machine can be connected to a computer to be controlled more conveniently with a built-in PC serial port and proprietary software attached to it.

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

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

Shenzhen ZhuoMao Technology Co., Ltd. is a high-technology company located in the western district of BaoAn. Thanks to its proximity to the international airport and container terminal, this part of the booming industrial city of Shenzhen is rich in modern business opportunities.

BGA repair turnkey solutions are the heart of ZhuoMao activities. A strong R&D team supports a dynamic workforce of over fifty people. A well established sales network and after-sales service has built ZhuoMao a strong reputation in China among high profile customers.

The main products of ZhuoMao are BGA Rework Station (BGA Mounting, BGA Reballing Machine, and BGA Soldering Machine), BGA Testing Machine (main board testing, video card testing, digital camera testing, mobile chip testing, and various of ICT, FCT, ATE precise air/hand testing machines)

Devoted to put in practice the motto “Specialized, Innovative and Dedicated”, the company is focused on its customer’s satisfaction and has set up a network of local offices to tailor its offer to an expanding market.

Developing new solutions to help customers tackle issues always more diverse and complex keeps ZhuoMao engineering teams to the forefront of the technology and rewards its products with the most prestigious awards and recognition in China.

Because ZhuoMao understands BGA repair is a critical activity needing speed, accuracy and user-friendliness, its machines are designed for you to **REGAIN SATISFACTION.**

Contents

1st 、Installation

In order to ensure the validity of BGA Rework Station, the installation should meet the following requirements.

a. Away from inflammable and explosives;

b. Away from water and other liquids;

c. Ventilated, dry place;

d. Stable and flat, free from tremor.

e. Less dust;

f. No heavy objects on the controlling box;

g. Not affected by airflow of air conditioner, heater or ventilator.

h. Leave a space of 30cm or more behind the rework station for the upper part to move and rotate.

2nd 、Specifications

1、Power supply : AC220V±10%　　50/60Hz

2、Power consumption: 4.8KW

3、Heater: Main heater: 0.8KW

Sub heater: 1.2KW heating element: 2.7KW ,others:0.1KW

4、Electric material: PLC, support computer communication.

5、Temperature control: K-type closed-loop thermocouple, top and bottom heating independently, temperature error ±3˚.

6、Positioning: V-groove fixture for PCB positioning

7、PCB size: MAX 410×370mm　　Min 22×22

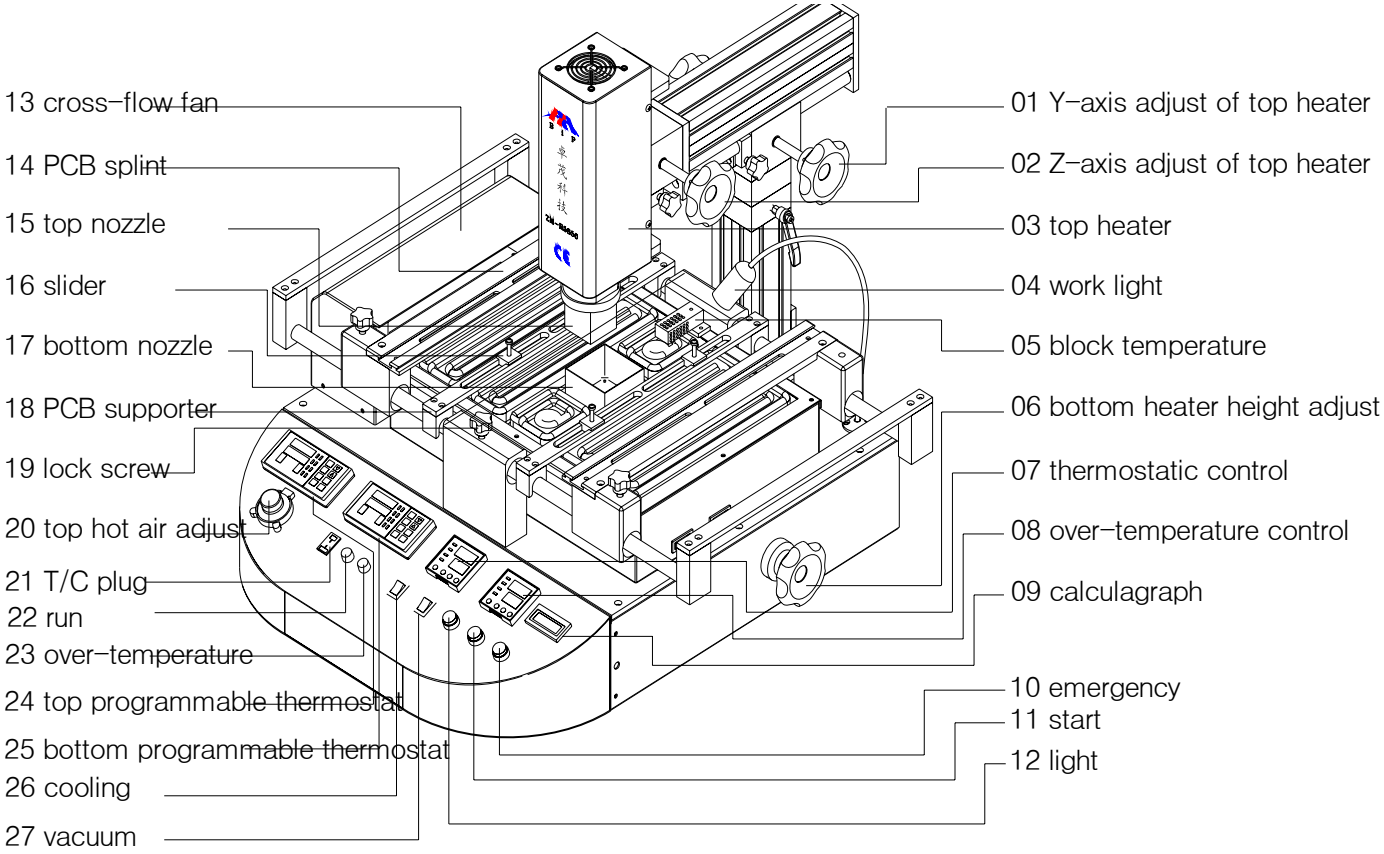
8、Machine dimension：710×680×660mm

9、Weight：40kg

10、Machine color：Black

3rd 、main structure description

(1) Structure description



(2) Function introduction

NO	Name	Function	Use method
1	Y-axis adjust of top heater	Adjust the top heater	Right-back，left-forward
2	Z-axis adjust of top heater	Adjust the top heater	Right-up，left-down
3	Top heater	Heating BGA when welding	Adjust through Z-axis
4	light	Work lighting	
5	Block temperature		
6	Height adjust of bottom heater	Adjust the lower height	Adjust to a suitable place
7	thermostatically control	To set the procedures	Over-temperature control
8	Over-temperature control		According to setting

9	calculagraph		
10	stop		
11	Start switch		
12	Lighting switch		
13	Crow-flow fan	Cool the PCB after heating	
14	PCB splint	To hold up PCB board	
15	Top nozzle	Make hot air focus on BGA	Make a suitable place to BGA
16	Slider	Lock screw to support PCB	
17	Bottom nozzle	Lower heating when welding	
18	PCB board supporter		
19	Locking screw	To fix the splint	
20	Top hot-air adjust	Adjust the top hot air	Turn left and right
21	T/C plug	To measure the true temp.	
22	run	To show it is heating	
23	Over-temperature		
24	Top programmable thermostat		
25	Bottom programmable thermostat		
26	Cooling switch		
27	Vacuum switch		

4th、Program setting and operating instructions

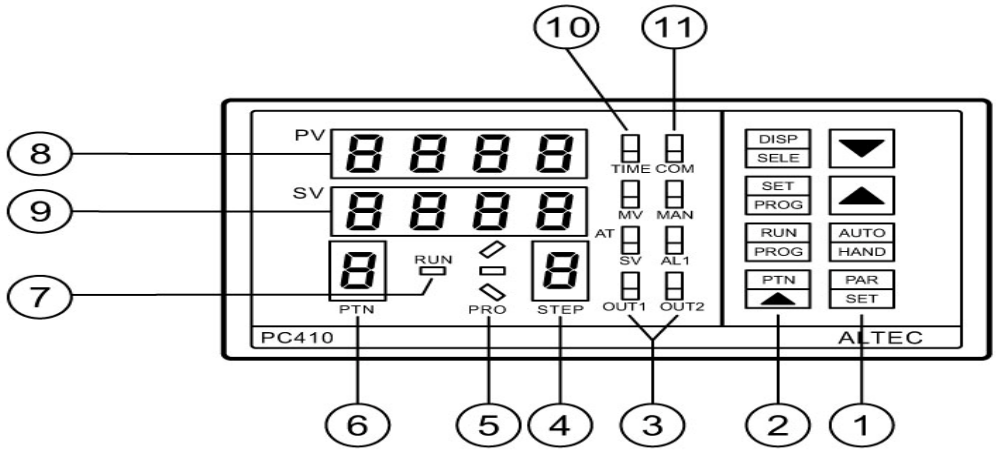
(1) Program setting:

Meter setting:

Top/bottom PLC are using same meter, some using.

PLC appearance:

PC410



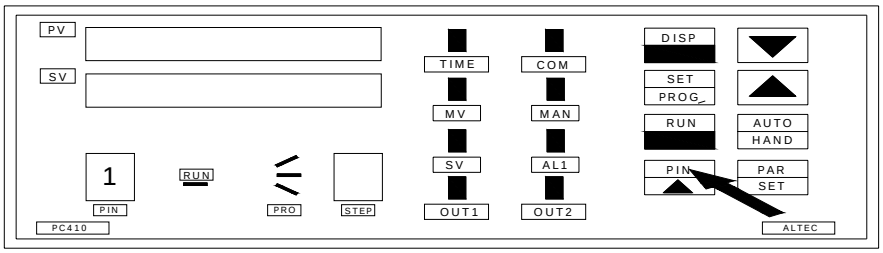
PLC panel instruction

1	PAR SET	PAR/SET switch	6	PTN	Order of temperature profile
	AUTO HAND	AUTO/HAND switch	7	OP3	Output 3
	▲	number increase		AT RUN	PID self setting Running show
	▼	number decrease	8	P V	The actual temperature
2	PTN ▲	Group number increase	9	SV/MV/TIME	The left time
	RUN PROG	RUN/STOP	10	SV	Setting show
	SET PROG	SET/STOP		MV	Output show
	DISP SELECT	Display Select		PV	Actual temperature show
3	OUT1 OUT2	Output 1 Output 2	11	AL1	Alarming 1
4	step	Step number		MAN	Man control show
5	PRFILE	state of profile		COM	Communicating show

Setting process: First turn on the power supply

1) Choose temperature profile: (set groups) press PTN button (can save 10 groups temperature profiles), Press PTN groups will be changed

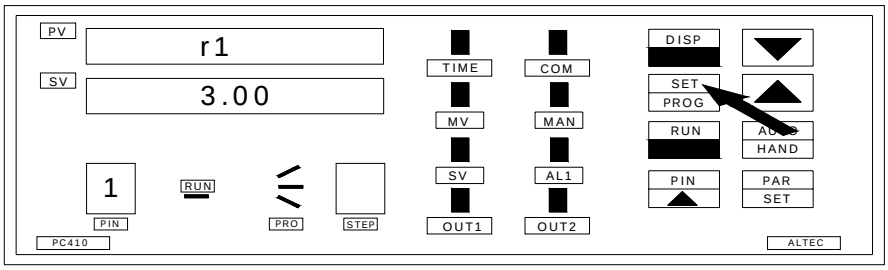
(1, 2, 3, 4, 5 …0) choose one of them for temperature profiles (We take 1st group for example)



2) Preheating: Slope(r)

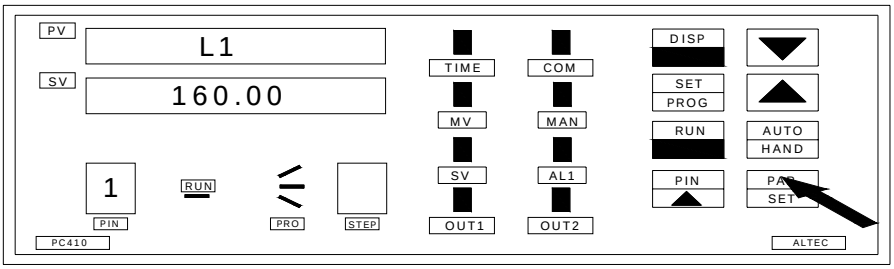
Press SET button enter into temperature curve, r1 stands for slope (the temperature will rise at the speed of 3℃ in one second)

3.00 stands for 3℃/second, press number increase button to adjust. Press PAR button enter next step.



3) Preheating: Temperature (L),

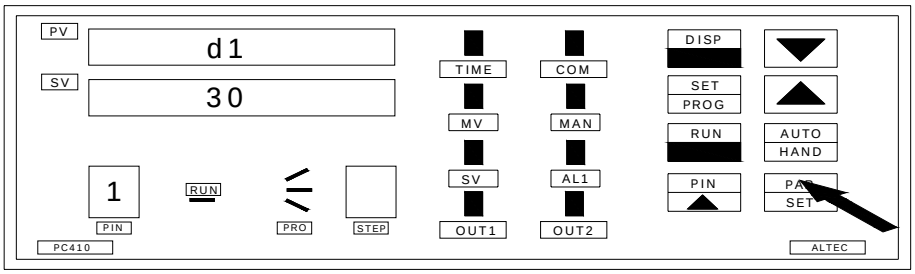
Press number increase button to adjust, 160 stands for preheating temperature 160℃. Press PAR button enter to next step.



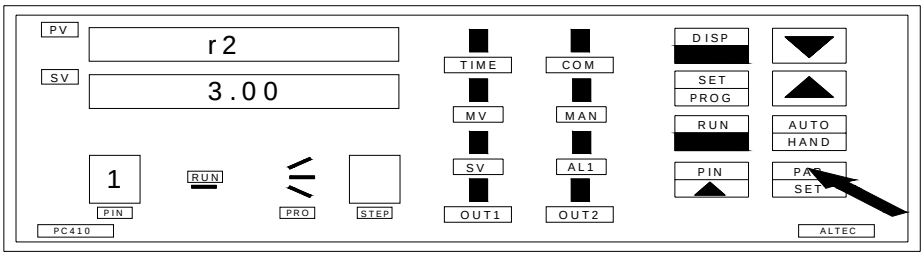
4) Preheating: Time (d),

Press number increase button to adjust, D stands for the time how

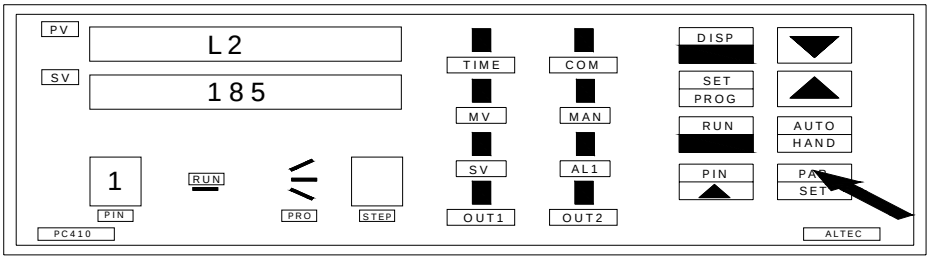
long the temperature stays at this stage. Press PAR button enter to next step.



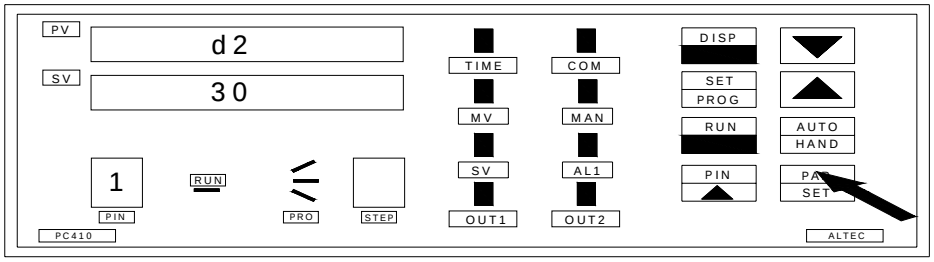
5) Preheating 2: Speed setting, press number increase button to adjust. Press PAR button enter next step.



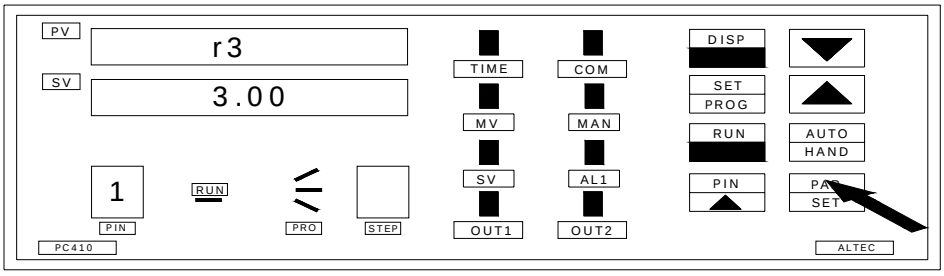
6) Preheating 2: Temperature setting, press number increase button to adjust. Press PAR button enter next step.



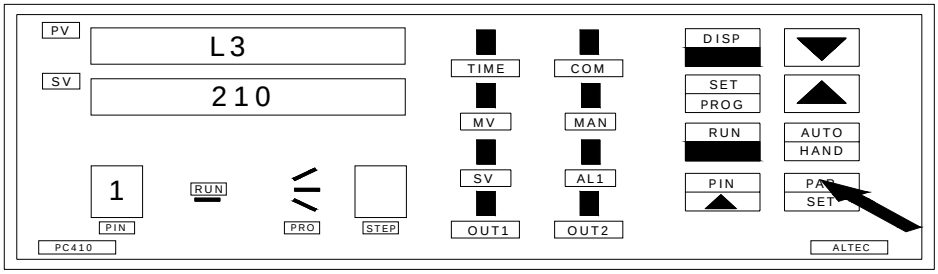
7) Preheating 2: Time setting, press number increase button to adjust. Press PAR button enter next step.



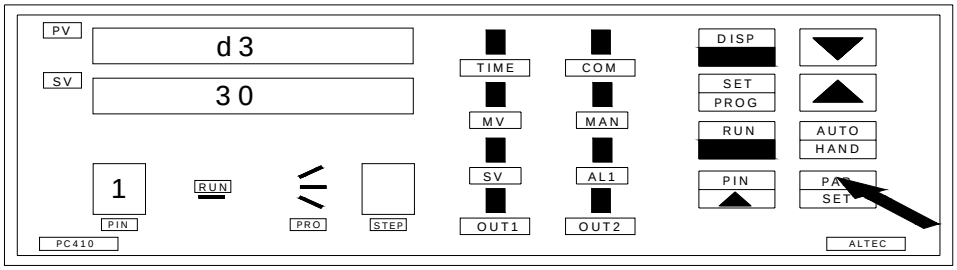
8) Preheating 3: Speed setting, press number increase button to adjust. Press PAR button enter next step.



9) Preheating 3: constant temperature setting, press up and down button to adjust. Press PAR button for confirm.

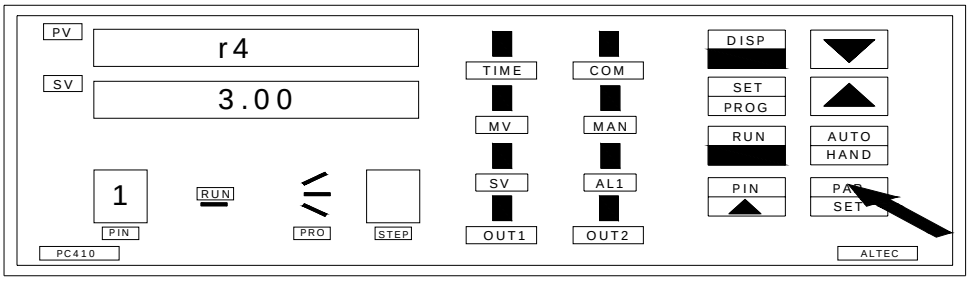


10) Preheating 3: constant temperature time setting; press up and down button to adjust. Press PAR button for confirm.

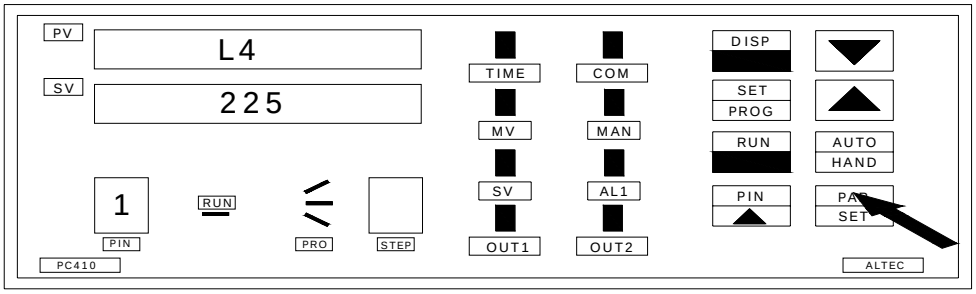


11 Welding 4, press number key to change, Press PAR button

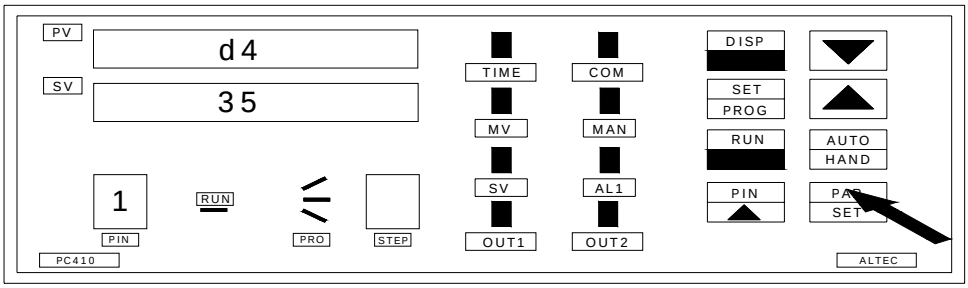
For confirm.



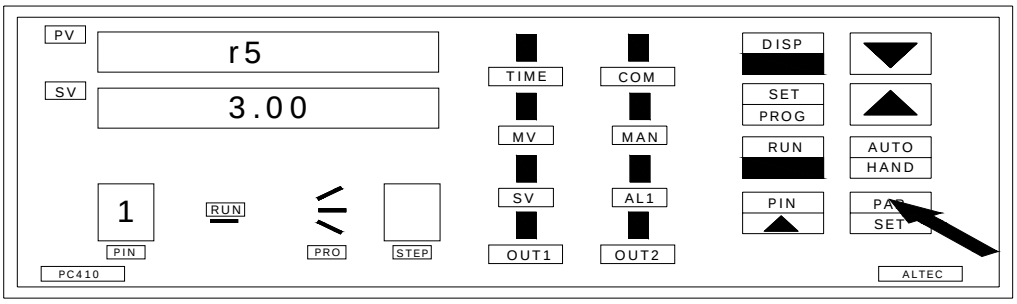
12) Welding 4: preheating constant temperature setting, press Up and down button to adjust. And PAR button confirm.



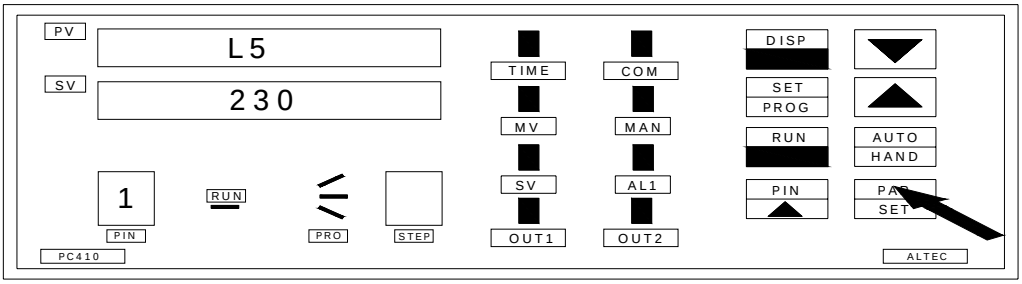
13) Welding 4: constant temperature time setting. press up/ down button to adjust. Press PAR button confirm.



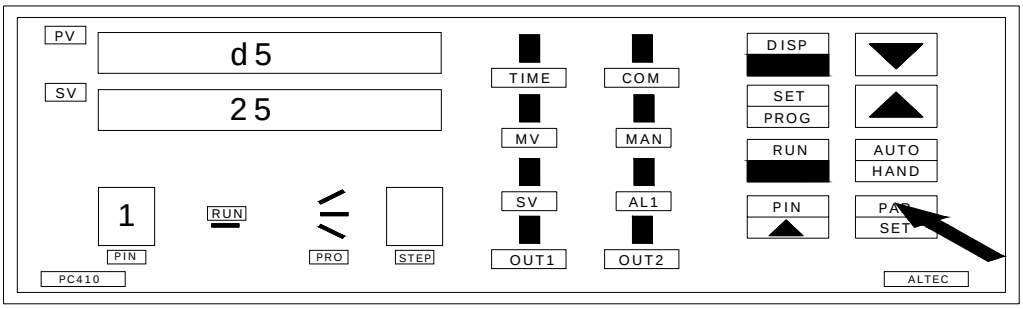
14) Welding 5: the speed of heating setting. Press up and down button to adjust. Press PAR button for confirm.



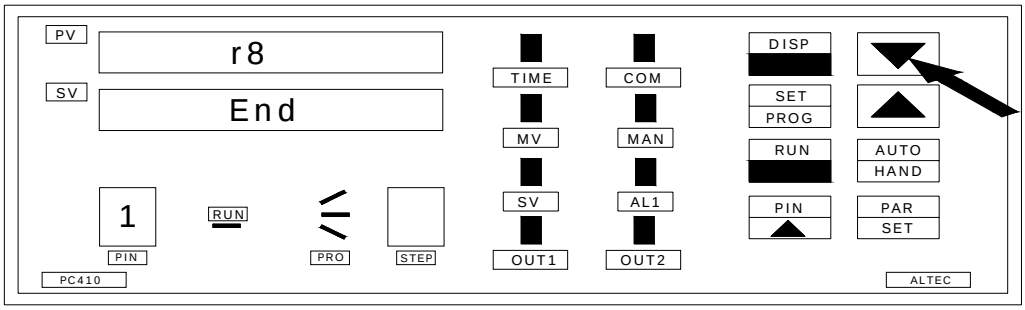
15) Welding 5: preheating constant temperature setting, Press up and down button to adjust. Press PAR button for Confirm.



16) Welding 5: Constant temperature time setting, press up and down button to adjust. And press PAR button for confirm.

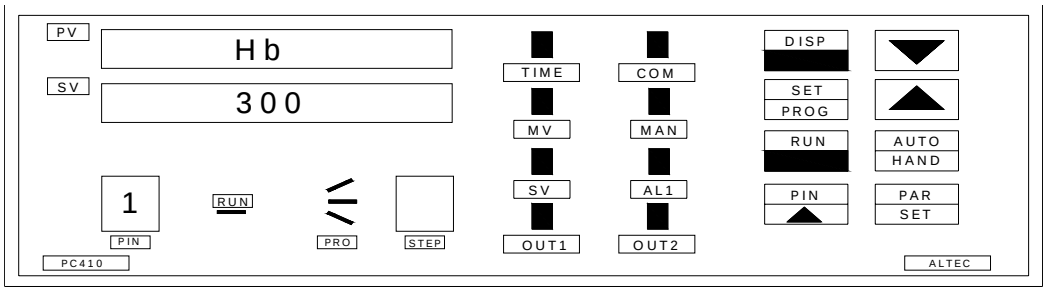


17) After finished Temperature curve setting, press Number Decrease button to show END for closing.



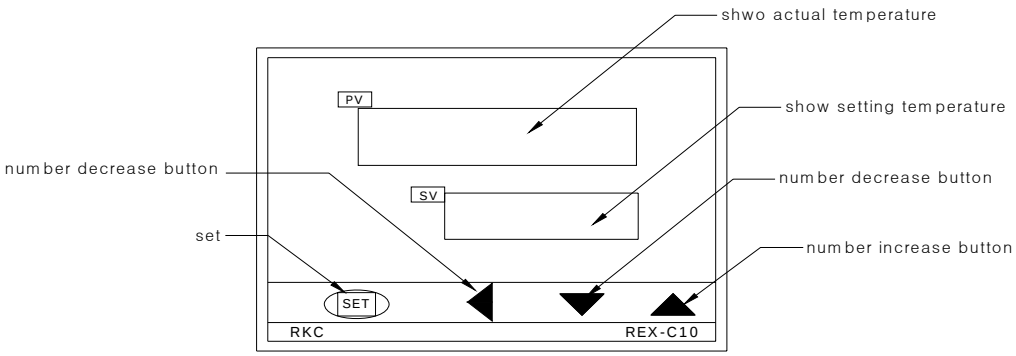
(Note: If you need to increase the temperature then press the upper button)

18) When the setting finished, it will show as the following picture. (This function stands for Max. temperature, do not modify)



REX--C10 Temperature controller:

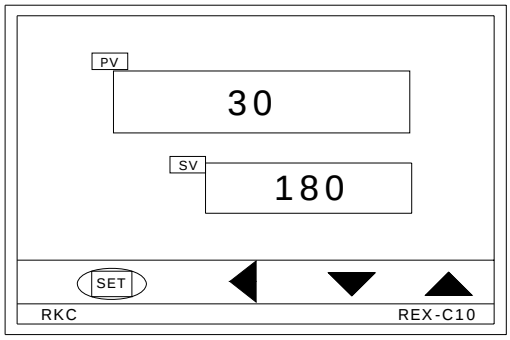
Thermostat setting; top over temperature controller; bottom over temperature controller are adopted REX-C10 temperature controller, so the usage of them are the same.



Setting Method:

1) Hold down the adjustment button for 1-2 seconds, then the setting of the temperature a bit flash, press numerical increase (decrease) key to change. And then move button to move the modified adjusted value of 10, and finally to 100, after finished, press the SET to confirm.

Infrared constant temperature settings Proposal setting : 180℃



(2): The use of the external computer

The device can connect with an external computer, you can observe two temperature curves of the head of internal heating wire and external measurement of galvanic through the computer interface, and you also can set the temperature, time and other parameters through the computer, but also can achieve data transfer between computer and instrument, store many curves and facilitate to print out. (Note: This feature is limited to the upper heating control)

Statement: the related temperature parameters of the equipment can be set-up and stored completely through the instrument age, but in order to set the temperature more user-friendly, more intuitive, and easy to store, and print the temperature curve, our

company specially developed this software

Software Install

1）Lowest requirement for computer configuration.

a. CPU： P Ⅲ 800

b. Memory： 128M

c. Video Card： 4M

d. CD ROM

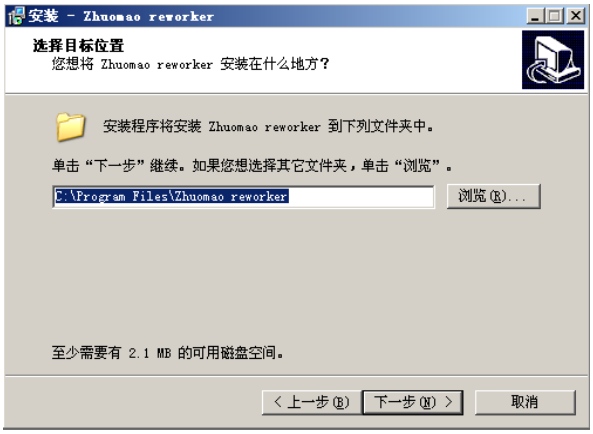
e. Serial Communication Interface

2）Software Installation，

a Put the video into the video card, open CD diver，run“V2.08setup” appear language select.

Choose” English” and Click “Next” to enter Picture 1

Picture 1



Picture 2

b Click“Next”to enter Picture 2

c After enter “Picture 2”，click“Next” button，enter Picture 3

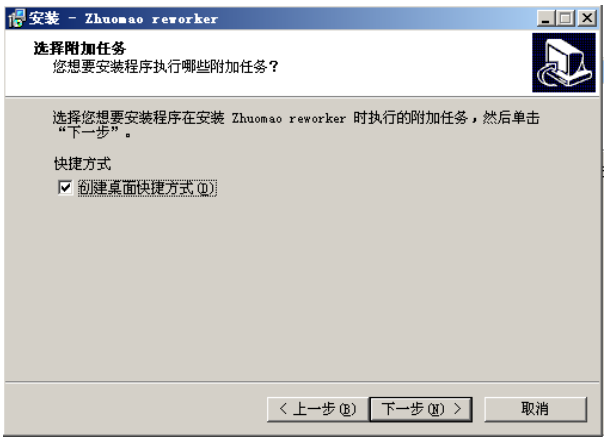
d Click“Next”，enter Picture 4

e Click “Next”，enter Picture 5

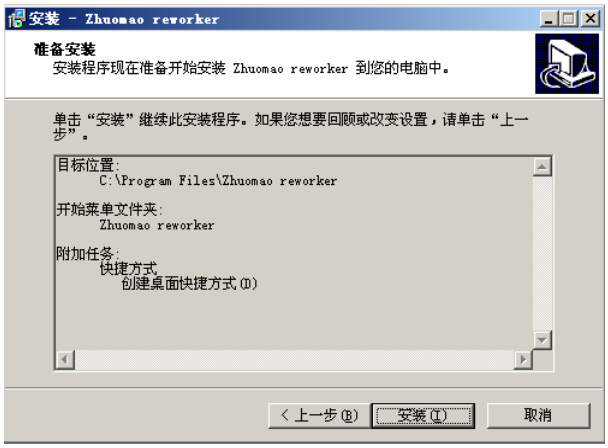
f Click “Install”，enter Picture 6，start installing.

g Click “Finish”，finish installing process.

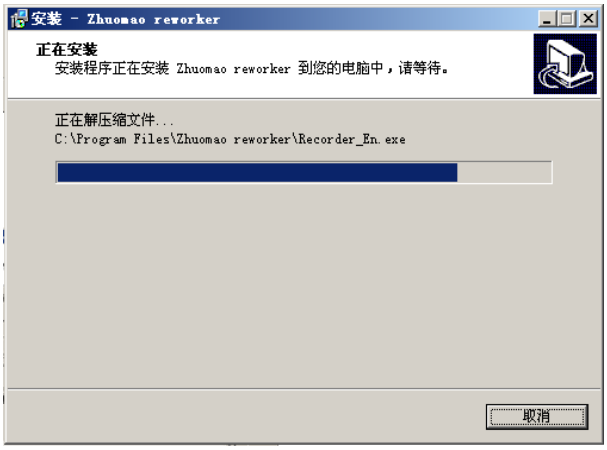
Picture 3



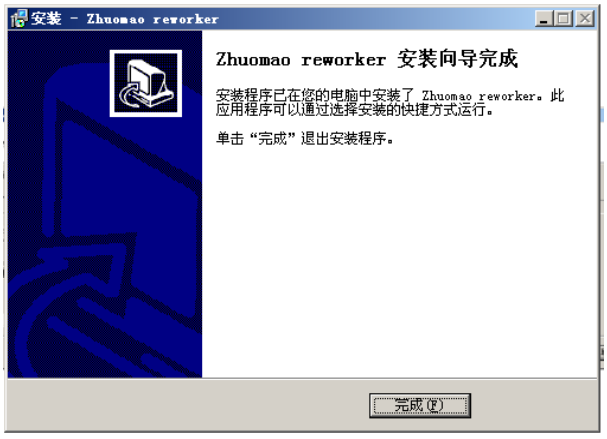
Picture 4



Picture 5



Picture 6



Picture 7

Using of software

1）Connect the computer series port and machine communication port with the enclosed date cable.

2）Open power of the equipment.

3）Click  Zhuomao reworker.lnk on the desktop，enter into temperature curve recorder system interface（picture 8）

4）Set the temperature, time, slope parameter for very segment.

a Click“Profiles setting”，the interface will enter into (Picture 9)，according to “welding BGA” and solder ball to set the parameter for each segment. And for specific date and operating parameters, please see the construction book for reference.

b Note 1：This software is for showing the temperature curve and recorder, the software does not have the motion control functions, for the movement of the machine need manual adjustment.

c Note 2：The related temperature profiles, you can set through the meter on the machine. However, in order to facilitate the users for temperature setting, in particular for the temperature curve showing, save and print, so we develop and expand this software.

5）Manually operation for the machine, make the equipment enter into heating state, and for specific operation, please see the construction book for reference.

6）Click “download Controller”，so the temperature for just setting can be down load to the programmable controller.

7）Click“Run/Stop”，the machine will carry out heating motion.

8）At this time you can see the temperature curve.

9）Curve 1（Green）shows：The actual measurement of heater temperature

10）Curve 2(Red）shows：External Sensor temperature (Testing through the sensor on the machine)

11）During the process of heating，Click“Run/Stop”，or click “Stop”on the control panel，heating process will be stop.

12）Click“Exit system”，computer will exit the application program.

Development Features Instruction

1）“Upload from Controller”：Click this button can upload the internal instrument parameter from controller to the computer; it can set a group of data each click.（Note: the programmable controller can save 10 groups itself）

2）“download Controller”： Click this button can download the parameter from computer to the controller;

3）“Save”：After using the software for heating，“Profile View” curve display page will show the two temperature curve, use this button can save the curves to any position on the computer hard disk.

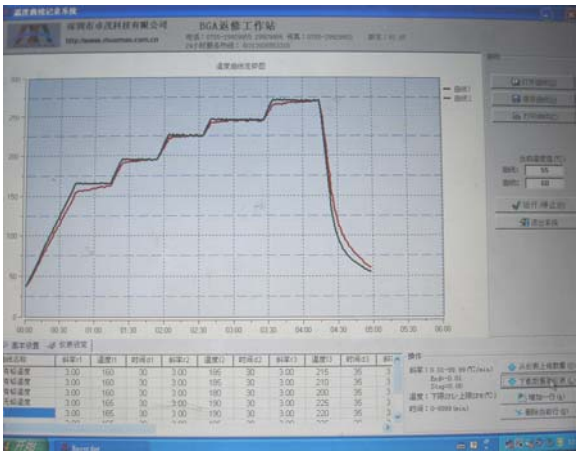
4）“Open”：Through using this button can pick up the temperature curve stored in computer.

5) “Print”：Through an external printer can easily print the current curve.

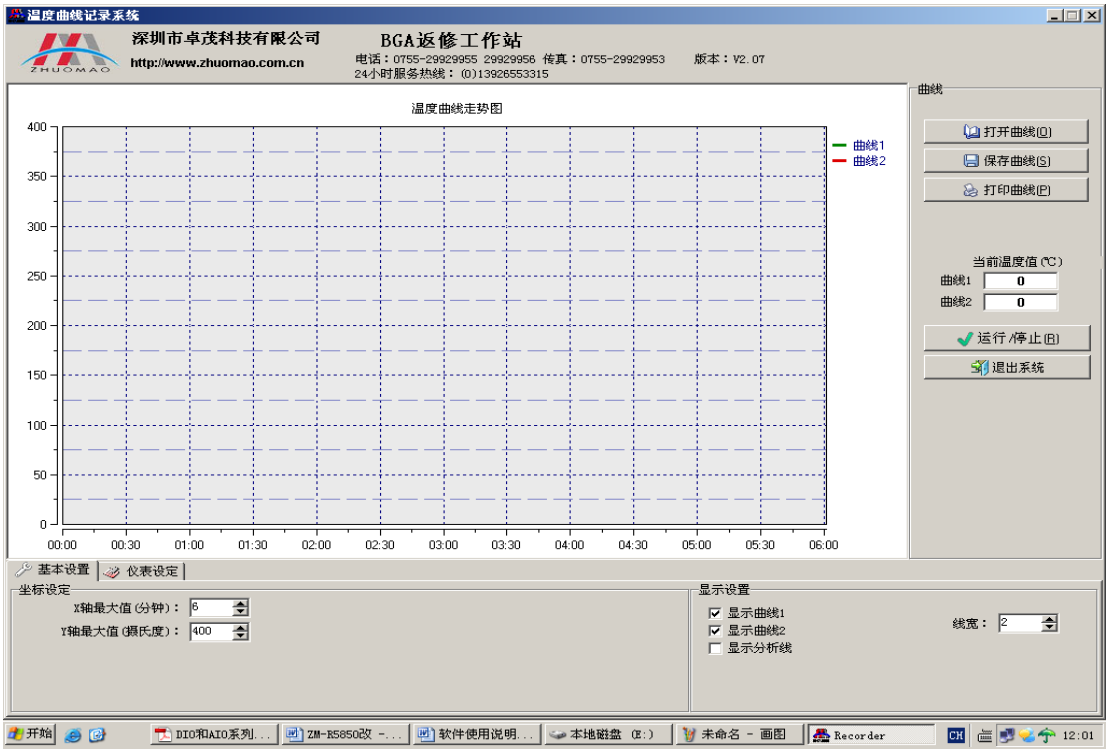
6) X-axis max setting (minutes): the max setting of X-axis.

7) Y-axis max setting (cent degree): the max setting of Y-axis.

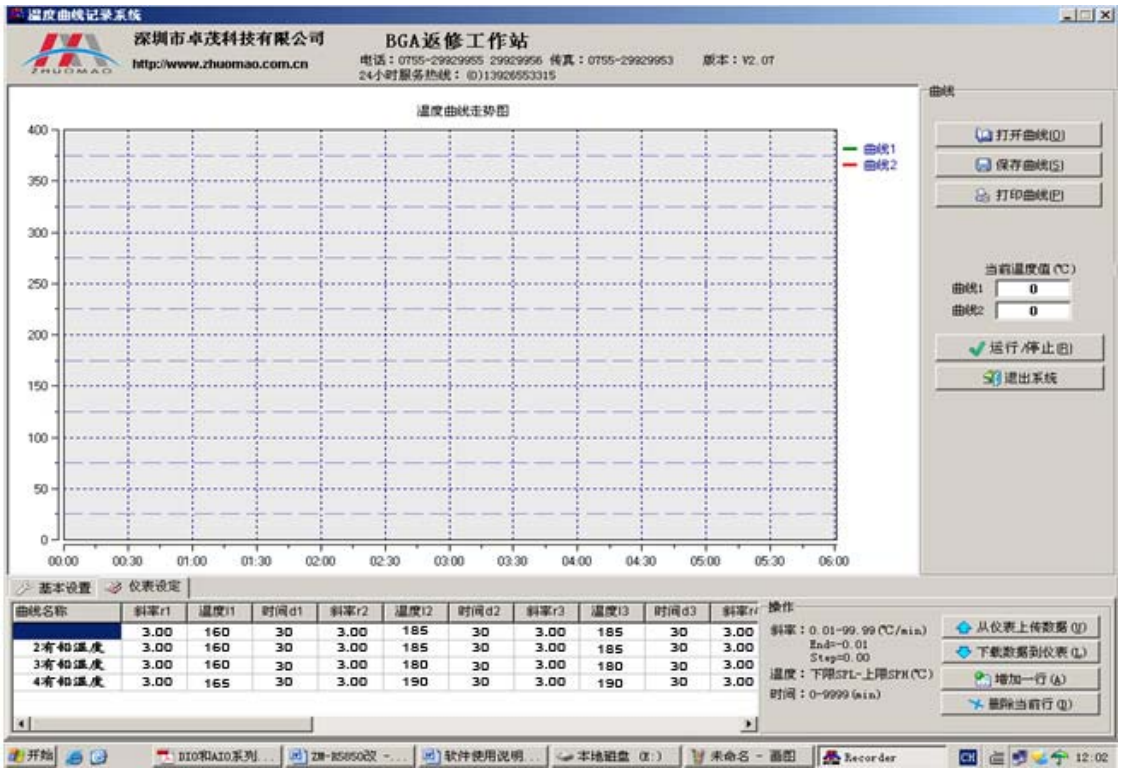
Picture 8



Picture 9



Picture 10



Picture 11

5th 、 The use of external measuring galvanic

（1）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、 Calibration role, through appropriate adjustment, it will make the temperature of the welding parts get close to the set temperature as much as possible.

（2） **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 GALVANIC installed correctly, click "DiSP SELE" button on the upper instrument panel, (the button which is used to switch the displaying item), switch to "TIME", the corresponding galvanic current temperature will be displayed in the second line of instrumentation on the "SV" display window.

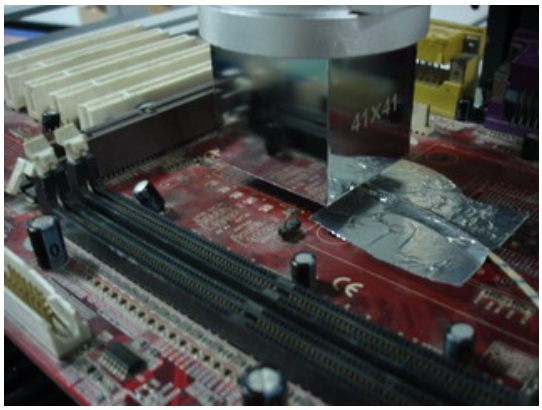
Stated: "DiSP SELE" is the button to switch the displaying items, when press it, the downstream sequence of display windows display setting no., output no., the remainder of the number of segments of running, corresponding to Panel "SV", "MV", "TIME "indicator light.

（3）measurement

1、PCB board will be installed on the rework station, with the galvanic fixed on the PCB board using foil stickers.

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 12)

Picture 12



Picture 13

3、Adjust the related mechanical adjustment knob, so that the heating part just below the hot-air tube. (as shown in Figure 13)

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 two curves of the green and red on the computer monitor screen

7、 Curve 1, the actual measurement temperature of the internal galvanic of the top heater (green)

8、 Curve 2, the actual measurement temperature of the external galvanic curve (red)

（4） 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!

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) and external galvanic measuring temperature (red) the two curves

5、Green 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.

6、 If the deviation between the two curves is too much, you should make the appropriate adjustments

7、 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 desordering, 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 Operate the standard procedure to avoid the high-temperature burns!

8、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.

9、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.

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

11、Now you can see "SV" which displayed on the panel of the upper programmable thermostat (also click on the "DiSP SELE" button of the upper instrument panel, and switch to the position of the "TIME"

indicator light) is the temperature of the external galvanic, with the abbreviation as the outer temperature; And “PV” is the temperature of the internal galvanic, with the abbreviation as the bottom temperature.

12、The caution is same as the top heater.

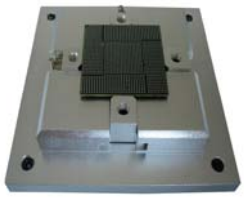
13、The methods of adjustment:

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.

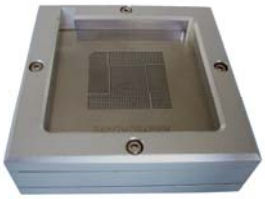
6th 、 Reballing Process

1. Fixed the BGA chip which need to be reballed on the under plate of the adjustable reballing kit, and then adjust the No-spring slider to fix the chip.



2. Choose the stencil according to the style of chip, then fix the stencil on the top cover of the adjustable reballing kit and lock the four M3 screws, cover the cap. Adjust the four screws of the under plate to fit for the height of the chip.

3. Check the alignment of the hole of the stencil and the welding spot of the chip, if it is in misalignment, then remove the cover and adjust the fixed slider until it is in alignment.



4. Lock the fixed slider of the two no-spring slider, take out the BGA chip and wipe a layer of solder paste, fixed the chip on the adjustable reballing kit again, cover the cap.

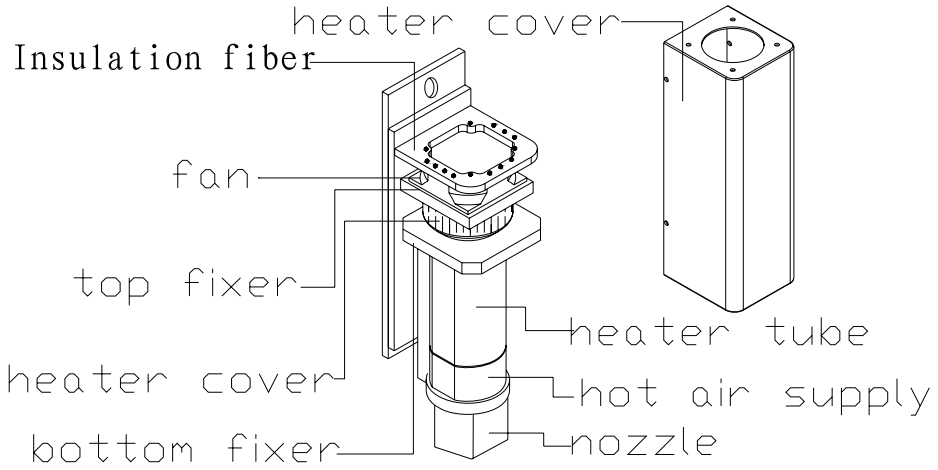
5. Put some solder balls into the kit, clutch and shake it to make all the balls stand on the welding spot, and at the same time, clear the superabundant balls.

6. Put the reballing kit on the desk, take out the top cover, and bring out the BGA cheap carefully, and check it whether there are some balls on the wrong place or not, if it is, then make it right with tweezers.

7. The way of making the balls fixed is using the Reballing machine, It can heat the cheap medially. Up to now, we finished reballing.

7th 、Maintenance

（1） Upper heater: (Pictured)



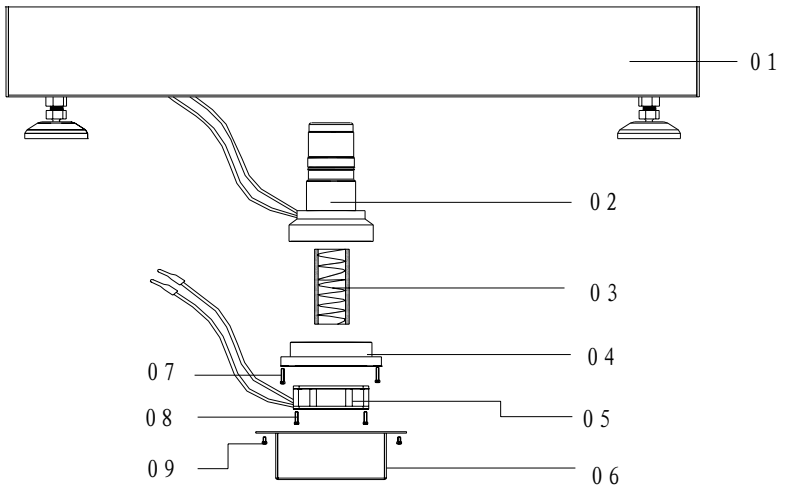
1. The replacement of fan:

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.

(2) The lower (second temperature zone) heating wire replacement (pictured)



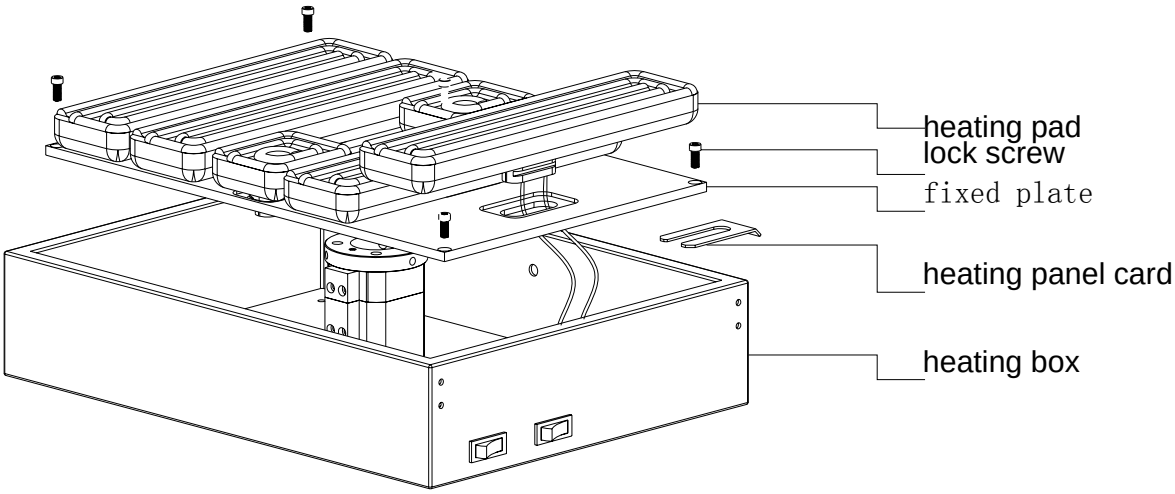
01 body	02 Heating Duct	03 Heating wire
04 Fan Holder	05 **fan**	06 Heater cover
07 Fan Holder Bolt	08 Fan Bolt	09 Heater cover bolts

Replacement of the lower hot air heating wire:

1 Remove the heater bolts, and then remove the heater cover,

2 Demolition of fans and fan mounts, remove the hot wire. Then you can replace the heating wire,

(3) The bottom heating panel (pictured)



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.

8th、Safety Precautions

The power supply of ZM-R6820G is AC220V,the temperature can arrive to 400℃.If you do not operate inappropriately, it will cause damaging to the machine or even to the operator. So you must strictly abide by the following matters:

1. Don't blow to the rework station directly when it is working, or there will be a negative difference from the surface of the heating board, thus some parts will be burnt out.
2. After it is started, the high temperature area should not touch any objects, or it will lead to a fire or explosion. The PCB and other parts should be put on the PCB bracket.
3. No vibration. Handle it gently.

4. Don't touch the heaters with your hands when it is working, or you will get hurt.

5. Don't use combustible spray, liquefied and flammable gas near the rework station after it is started.

6. Don't try to re-equip the machine, or there may be a fire or an electric shock.

7. There are high-pressure parts in the circuit box. Don't disassemble it.

8. If some metals fall in the rework station when it is working, turn off the power immediately. After it is cooled down, get the metal out, and clean the machine. If not, there may a smell when the machine starts working next time.

9. When the rework station's temperature rises abnormally or smokes, turn off the power and inform the service technicians to repair it. Turn off the power of the circuit box and the machine while moving the rework station. Hold the plug when we remove the wire or it will lead to a poor contact then the machine can't work very well.

10. Turn off the power when stop using it.

11. Don't put the rework station on the wires, or there may be a failure, a fire, or an electric shock.

12. Before you use the machine, you must read the instructions attentively.

Note: when the machine works, it will produce some smell. So ensure the comfortable, healthy and safe operation environment, please keep the air in circulation.

Under the following case, if it causes any damage, it will not in our guarantee;

1）Do not operate according to the condition of the environment and methods of operation that the manual book required;

2）The reason out of our product;

3）Not the transformation and maintenance of our company;

4）Do not operate accordance with the way of use that our company's products required;

5）The case that the temporal level of scientific and technological of our company was impossible to predict;

6）Natural disasters or man-made destruction and such non-responsibility of the Company premises, it will not in guarantee.

Normal BGA welding and disordering parameters

（for reference）

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	235	240	225
time	30	30	35	40	20	15
bottom	160	185	210	235	240	225
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	225	235	215
time	30	30	35	40	20	15
bottom	160	185	210	225	235	215
time	30	30	35	40	20	15
slope	3. 0	3. 0	3. 0	3. 0	3. 0	3. 0
IR	185					

31*31 the temperature setting of the BGA welding：

	preheating	insulation	heating	welding1	welding2	cooling
upper	160	180	200	215	225	215
time	30	30	35	40	20	15
bottom	160	180	200	215	225	215
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。

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	25	15
bottom	165	190	225	245	255	240
time	30	30	35	55	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	225	245	250	235
time	30	30	35	45	25	15
bottom	165	190	225	245	250	235
time	30	30	35	45	25	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

Such as set 0 when the demolition of the cooling section of BGA