



深圳市卓茂科技有限公司
SHENZHEN ZHUOMAO TECHNOLOGY CO., LTD.

BGA Rework Station ZM-R380B Manual



NO. : ZM-SMS-03-02

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Preface

Shenzhen ZhuoMao Technology Co., Ltd. is a high-tech enterprise involved in research, development, production and marketing. Since its establishment, with strong technical force, faithful business philosophy, a sound sales network, comprehensive and thoughtful after-sales service, through the absorption and the introduction of foreign advanced technology, we improved ourselves and won customers trust & supports in the field of BGA rework systems and peripheral auxiliary equipment.

Company's product are sold in most cities in China and exported to Japan, South Korea, North Africa, Vietnam, Southeast Asia, the Middle East, Europe and the United States etc. We got a strong vitality and higher visibility in the same industry. Our company will continue adhering to the idea of "profession, innovation and integrity", to provide our customers with more efficient high-quality and convenient services! Your smile is always Zhuomao's constant pursuit.

- Thank you so much for choosing BGA rework station ZM-R380C of Shenzhen ZhuoMao Technology Co., Ltd.
- Before you operate the machine, please read the manual book carefully to make sure of the safety and Superior performance of the machine.
- As technology continues to update, Zhuo Mao Technology Co., Ltd. has the right to modify specifications of the product before notice.
- Please take care of the accessories of the machine.
- If you have any doubt and special requirements of this equipment, you may contact with our company at any time.
- The Company reserves the final right to interpret the Manual.

Contents

1st 、 Introduction Features	3
2nd 、 installation	3
3rd 、 Product specifications and technical parameters	4
4th 、 Introduce of the main structure	5
(1) Structure description	5
(2) Features	5
5th 、 procedures Installation and operation	6
(1) Upper temperature settings	6
(2) use of an external computer	18
(3) operation	20
6th 、 Reballing process	21
7th 、 Equipment repair and maintenance	23
(1) Replacement of the upper heating wire	23
(2) Replacement of the lower heating plate	24
(3) Maintenance	24
8th 、 precautions	25
Normal BGA welding and disordering parameters	26

1st. Features

1. Choose imported high-precision materials (temperature sensor, PLC, heater) to control the BGA desoldering & soldering procedures precisely.
2. The Top (hot-air) & bottom (IR) heaters heat independently, and it 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. 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.
4. Choose imported high-precision thermocouple to detect top/bottom temperature precisely.
5. Top & bottom heating can be controlled independently by the temperature graphs. A cross-flow fan cools rapidly to protect the PCB from deformation when welding.
6. After finishing desoldering & soldering, there is an alarming. The machine is equipped with a vacuum suction pen to facilitate the removing of BGA after desoldering.
7. Use a V-groove equipped with a flexible fixture for PCB positioning to protect the PCB.
8. For large thermal capacity of PCB or other high-temperature and

lead-free welding requirements, all can be handled easily.

2nd 、 Installation

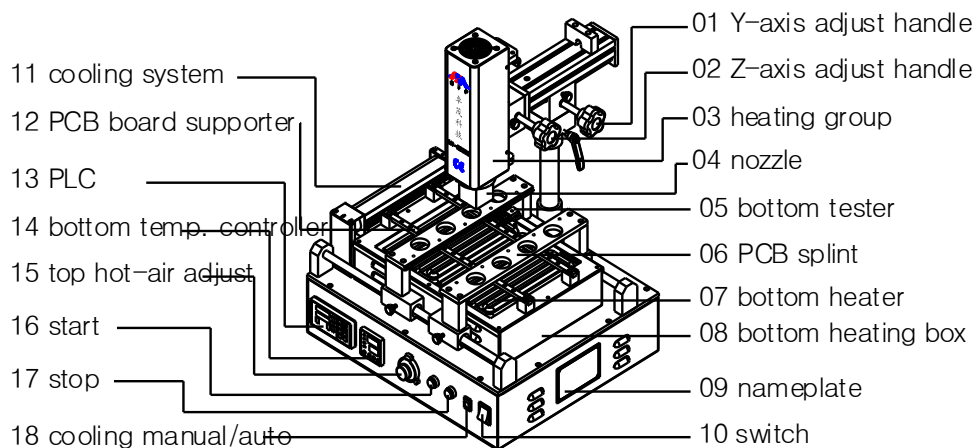
- 1、 Be away from flammable, explosive, corrosive gas or liquid.
- 2、 Avoid damp places, the air humidity is less than 90%.
- 3、 Temperature $-10\text{ }^{\circ}\text{C} \sim 40\text{ }^{\circ}\text{C}$, avoid direct sunlight, prolonged sun exposure.
- 4、 No dust, fibers and metal particles floating in the operational environment.
- 5、 The place of installation needs to 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 for heat dissipation.
- 9、 The placing table ($900 \times 900\text{ mm}$) be flat, the relative level of a height $750 \sim 850\text{ mm}$.
- 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 use, Power must be disabled if a long-term no need.

3th 、 Specifications

- 1、 Power : $220V \pm 10\%$ VAC 50/60 Hz;
- 2、 Total power: 3.25KW Max;
- 3、 Heater power: The upper heater 0.8KW; the bottom IR heater 2.4KW;
- 4、 Temperature control: K-type thermocouple of high closed-loop control:
Upper and lower parts independently measured;
Temperature precision is within ± 3 degree.
- 5、 Positioning mode: V-groove PCB positioning.
- 6、 PCB size: $310 \times 300\text{mm}$ Max $42 \times 42\text{ mm}$ Min
- 7、 Dimension:: $445 \times 430 \times 600\text{mm}$
- 8、 Weight: About 25kg
- 9、 Exterior color: Black

4th 、 main structure description

(1)、 structure description



(2)、function description

NO.	NAME	FUNCTION	USE METHOD
1	Y-axis adjust handle	Adjust the top heater right and left	/
2	Z-axis adjust handle	Adjust the top heater up and down	/
3	Heating group	Heating the BGA from top	Adjust by Z-axis handle
4	nozzle	Focus on the BGA surface	/
5	Lower thermometer	Feedback the true information	/
6	PCB splint	Support the PCB board	/
7	Lower heating plate	Heating the BGA from bottom	/
8	Lower heat box	Assembly, protect the heating plate	/
9	nameplate	Information identifying the machine	/
10	Power switch	Control power on and off	/
11	Cooling system	Cool the PCB board after heating	Auto activated after heating
12	PCB supporter	Stop the PCB board from distorting	Adjust the height of the screw
13	PLC	Control the top temperature	According to the manual

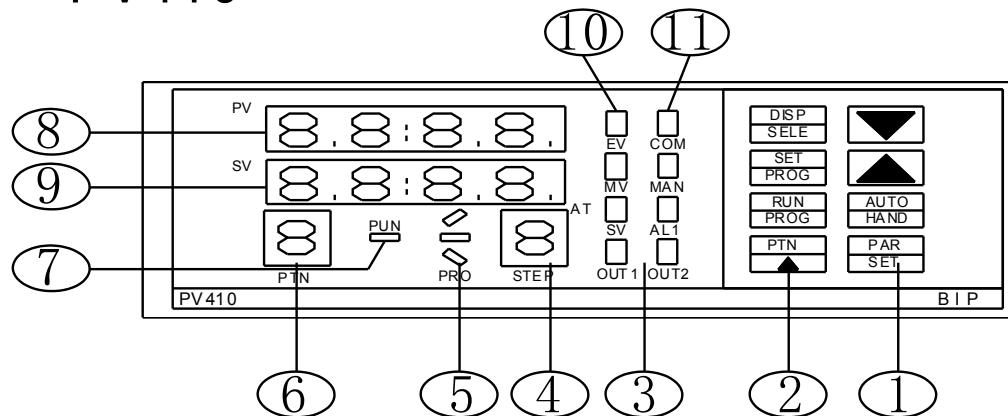
14	Lower Thermostat	Control the lower temperature	According to the manual
15	Top hot-air adjust	Adjust the top air flow	Turn left and right to adjust
16	start	To start the machine	Press 5 seconds to start it
17	stop	Stop the machine during working	Press 5 seconds to stop it
18	Cooling manual/ Auto	Switch cooling manual and automatic	/









5th 、 Program setting and operating instructions

(1)、Top temperature Program setting:

1、Thermostat button interface and Features introduction

PV410

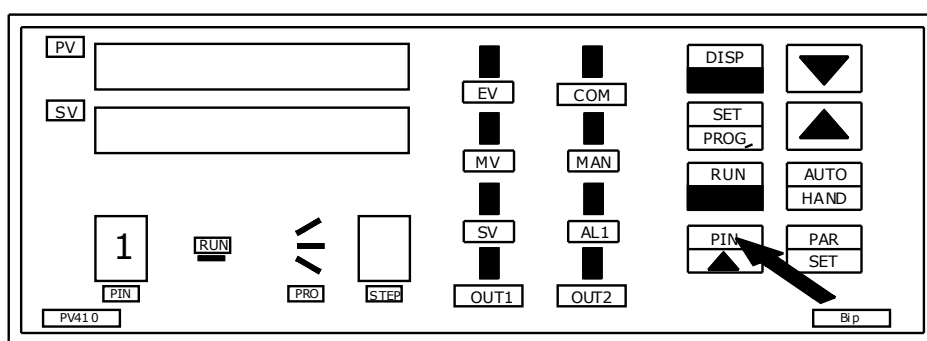


NO.	item	explain
1		parameter setup key
		Auto / Hand switching button
		Number increase
		Number decrease
2		Curve group number increase
		Run/stop button for curve running
		curves program parameter setting button
		Display select
3	OUT1	Output 1 indicator
	OUT2	Output 2 indicator
4	STEP	Curve program segment NO. Display, showing the running NO. of the curve procedure
5	PROFILE	curves Procedures monitoring light, when running up of the slope section, it will display "/", when running in the platform section, it will display "-", when running down of the slope segment, it will display "\".
6	PIN	Curve program number display, display curve program number
7	OP3	3rd Output indicator
	AT	PID self-tuning indicator
	RUN	Curve Running indicator
8	PV window	Show measured values

9	SV/MV/EV window	Display settings, the output value or run the remainder of section, press DISP SELECT key, it will show display items switch
10	SV	Setting indicator, lower display shows the set value, the indicator will be lit
	MV	Output indicator, lower display shows the value, the indicator will be lit
	EV	Outside test light, lower display shows the set value, this indicator will light up
11	AL1	1st alarm indicator
	MAN	Manual control indicator ----when you use the manual control, the indicator light
	COM	when sending data the indicator light

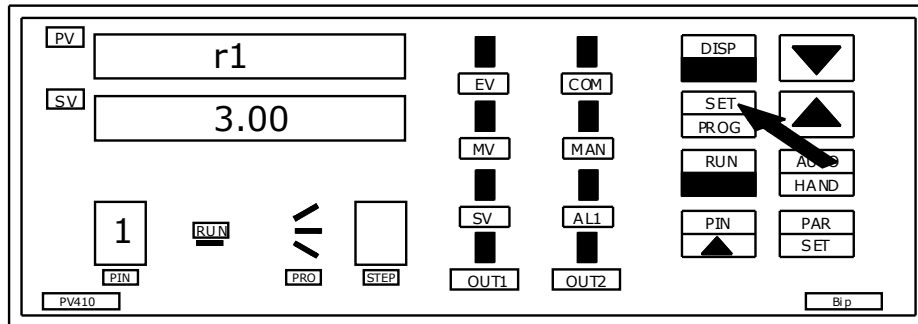
2、Setting process

First turn on the power supply, choose the number for saving the temperature profile: (set groups) press PTN button (can save 10 groups temperature profiles), Press PTN groups will be changed (1, 2, 3, 4, 5, and 0) choose one of them for temperature profiles (We take 1st group for example)



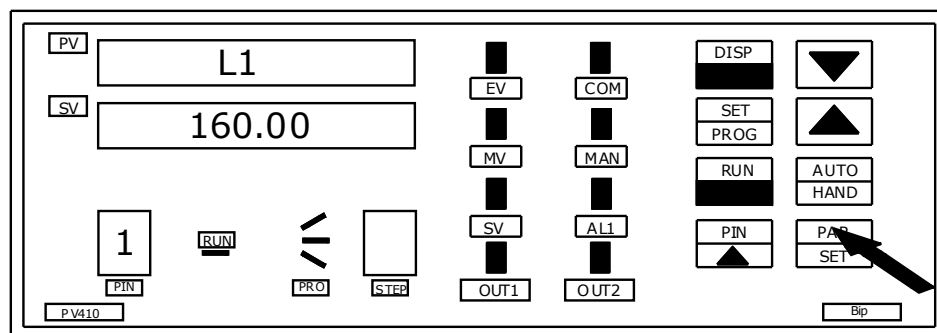
(1)、Slope setting (r) (Per second increase in temperature)

Press SET button enter into temperature curve, r1 stands for slope
(the temperature will rise at the speed of 3°C in one second) 3.00
stands for 3°C/second, press number increase button to adjust. Press
PAR button enter next step.



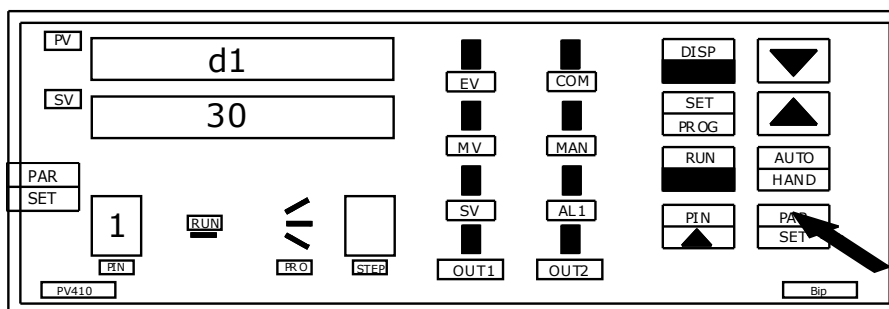
(2)、Temperature setting (L)(as following picture)





Press number increase button to adjust, L1 means that this is the
temperature for segment1(L2 means that the temperature for
segment 2, and so on), 160 stands for preheating temperature 160°C.
Press PAR button for confirming and enter to next step.

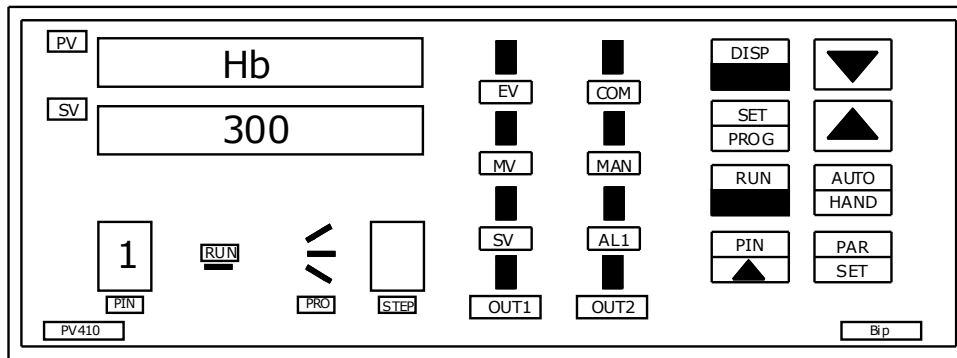


(3)、Time setting (d) (as pictured)

D1 stands for the time how long the temperature stays at this stage. (30 means that when the temperature reach 160°C, it will last 30 seconds.) Press number increase button to adjust. Press PAR button for confirmation and enter to next step.

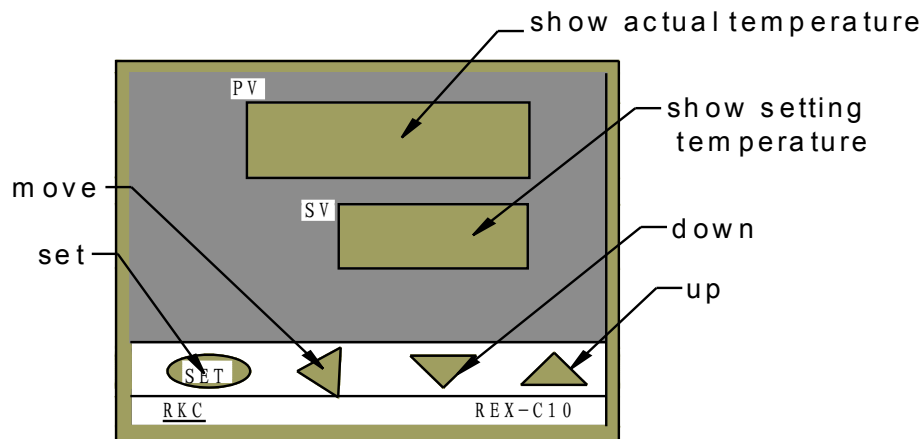


Remarks: The remaining seven-segment temperature settings are same as above exactly. If you do not need so many segments, then no need to set. For example, if you just need 6 segments, then after you finished segment 6 setting, then you can press  button enter into segment 7 setting, press  button until  button show END. Press  button, it will show the picture as following. (It means that setting finished. This function is the highest temperature limit, you cannot change Hb 300), press again to confirm.

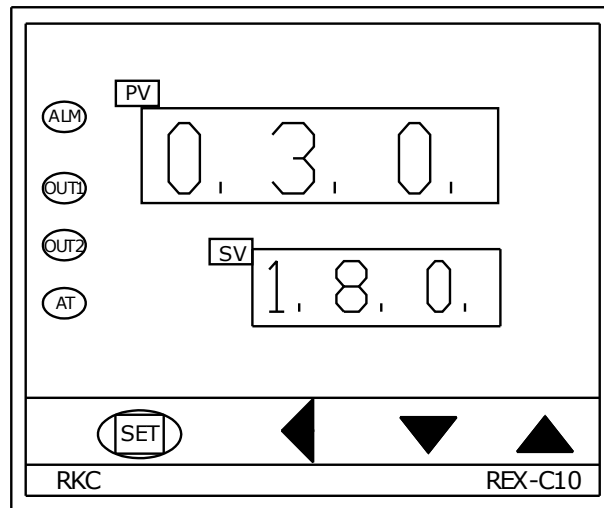


REX--C10 temperature controller:

Thermostatic control adopts REX--C10 temperature controller.



Hold down the adjustment button for 5-6 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.



(2)、 the use of an 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!

1、 Software Install

(1)、 Lowest requirement of computer configuration for software installment

- a. CPU: P III 800
- b. Memory: 128M
- c. display card: 4M
- d. driver: CD ROM
- e. Serial Communication Interface

(2)、 Software Installation,

- a Put the video into the video driver, open CD driver ,
run“V2.08setup” appear language select. Choose” English” and
Click “Next” to enter Picture

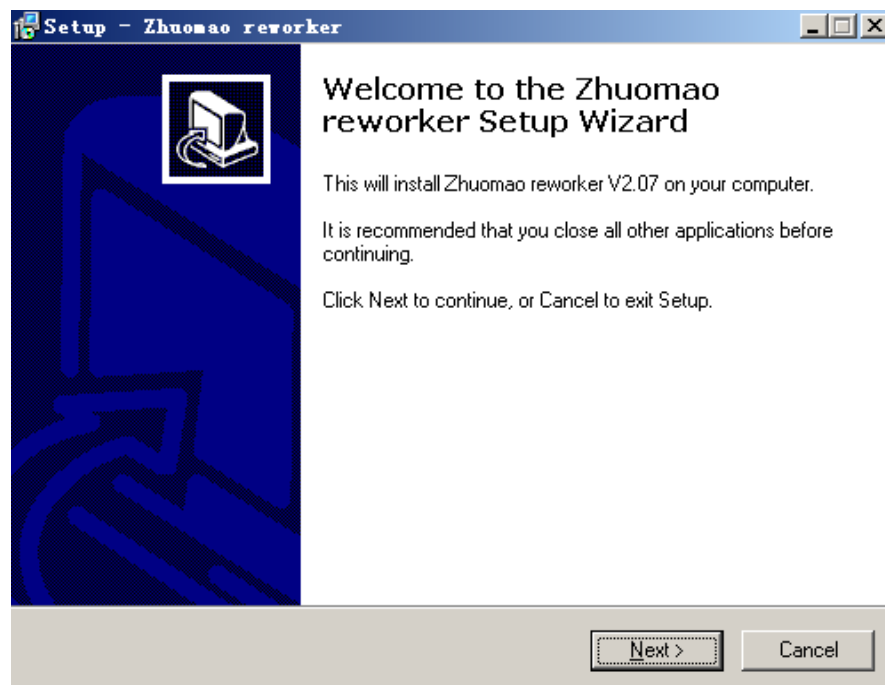


Figure1

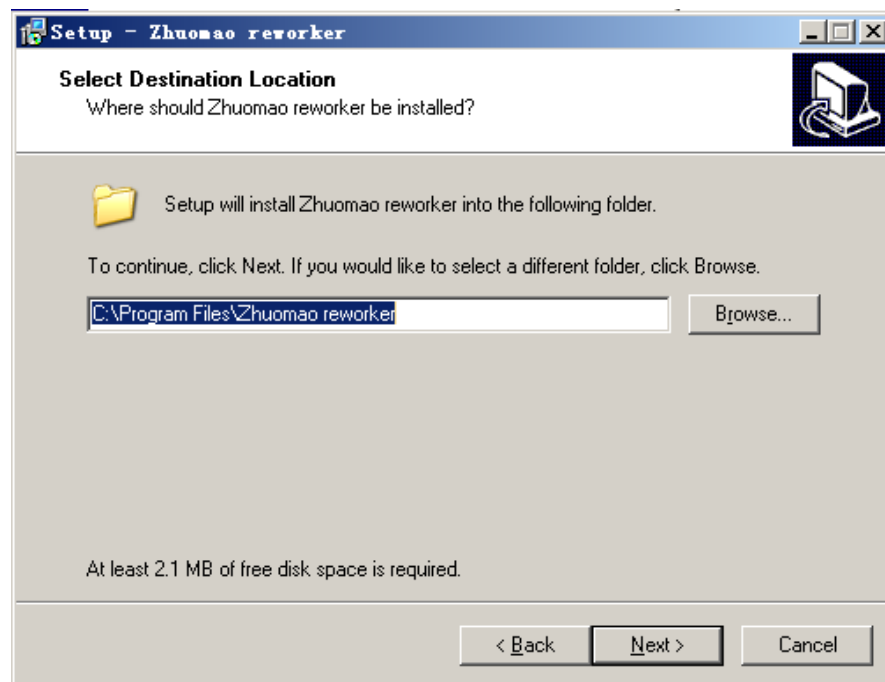


Figure2

- 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.

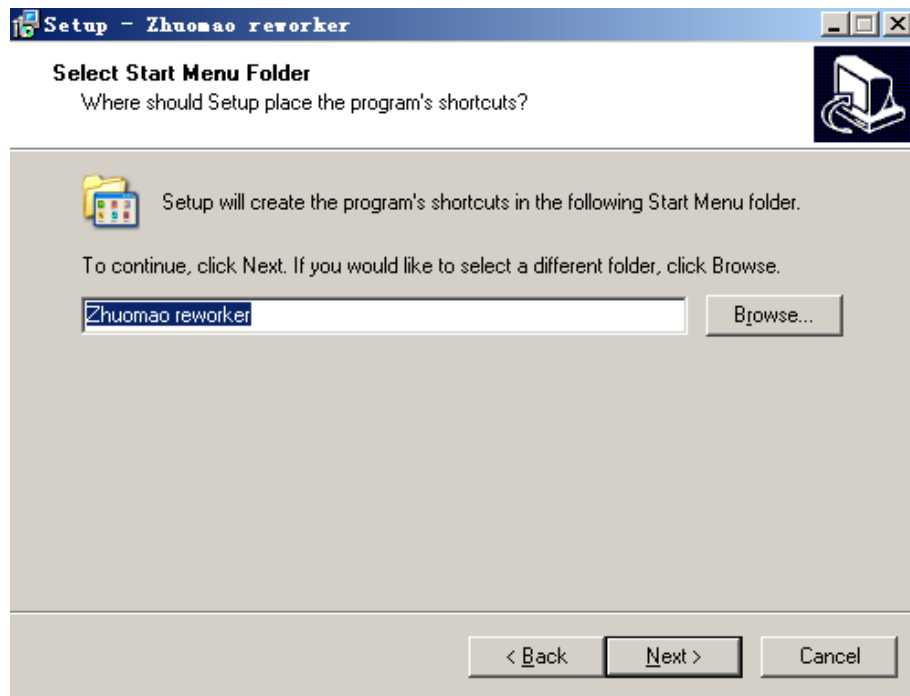


Figure3

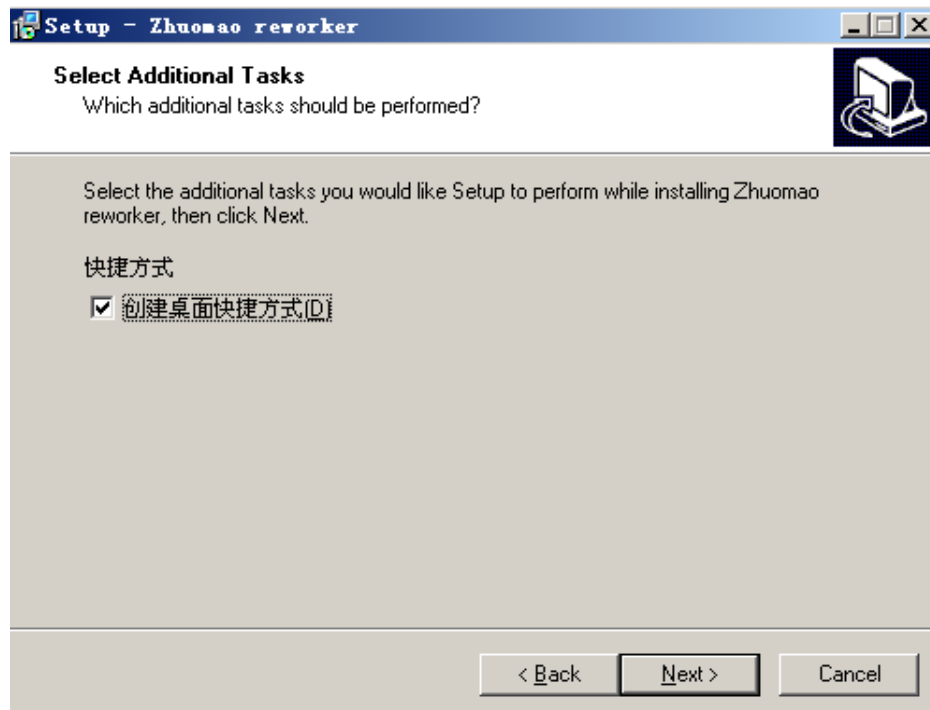


Figure4

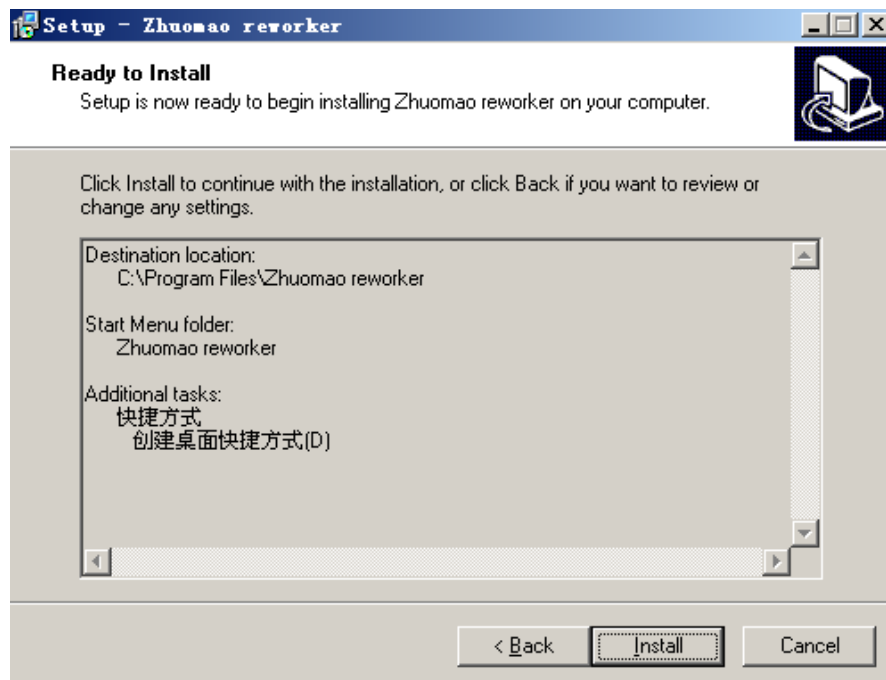


Figure5

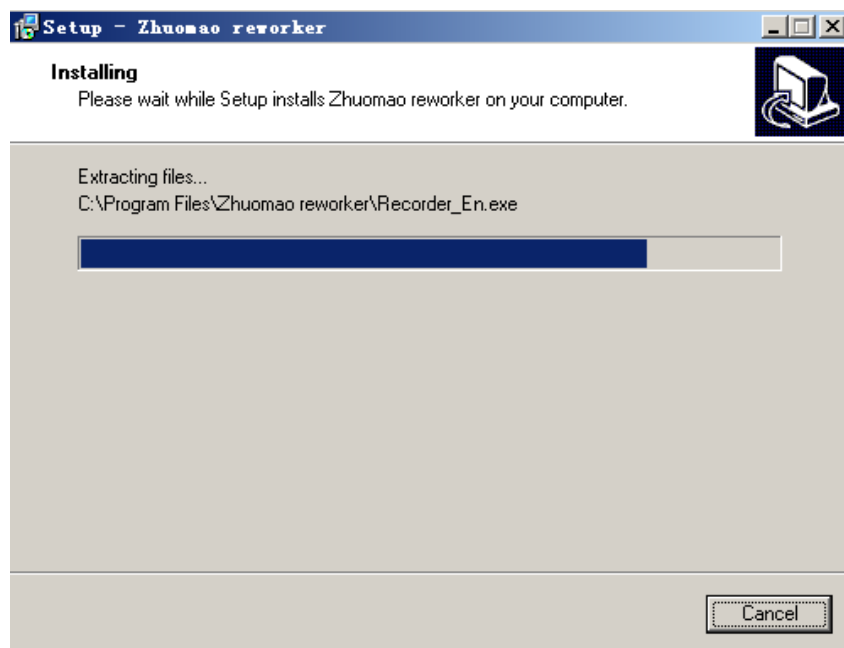


Figure6

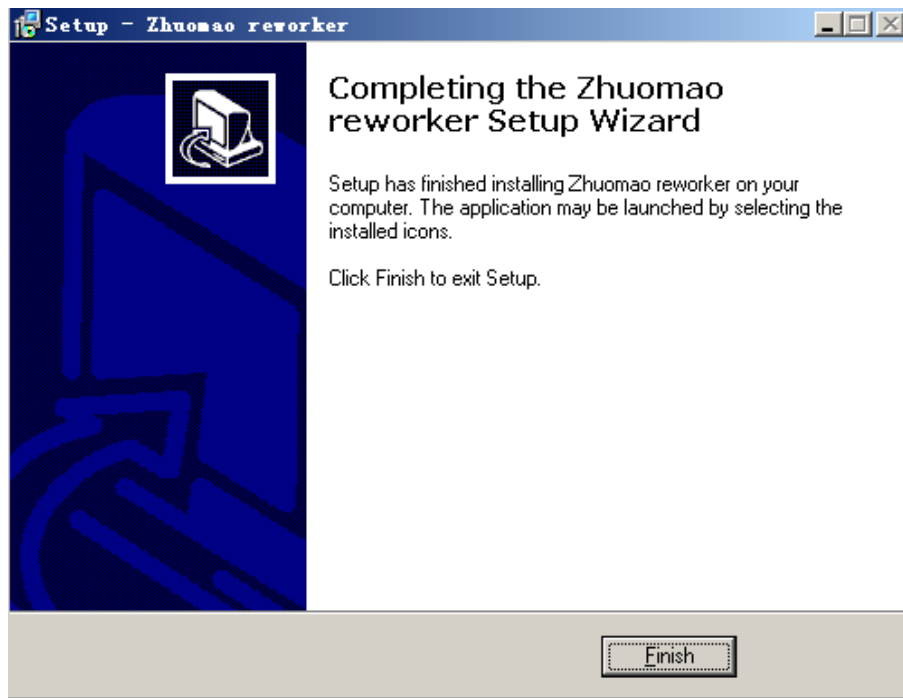


Figure7

2、Using of software

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

2) Turn on the power of the equipment.



3)、Click Zhuomao reworker.lnk on the desktop, enter into temperature curve recorder system interface (picture 10)

4)、Set the temperature, time, slope parameter for every 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

refer for the construction book.

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

(6)、Fix the nozzle according to the BGA chip, pay attention to the top heater work normal or not; if not, stop heating, and check what the problem is. Otherwise it will damage the heating wire easily as the high temperature.

(7)、Fix the PCB board on the PCB pallet, and make the heating part just below the nozzle.

(8)、Adjust Z-axis and Y-axis to make the nozzle on the top of the heating part, the height between them is 2~5mm.(Figure 8)

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

(10)、At this time you can see the temperature curve.(Figure 9)

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

(12)、After heating, it will automatically run cooling system; It will reduce the deformation of the PCB board, shorten the work cycle and improve the work efficiency through cooling.

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

(14)、Click "Exit System" button, the computer will quit the application programmer.

3、Development Features Instruction (figure 9、 figure 10)

(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 maximum number (minutes) "number setting window: The

maximum setting of the horizontal of the curve screen

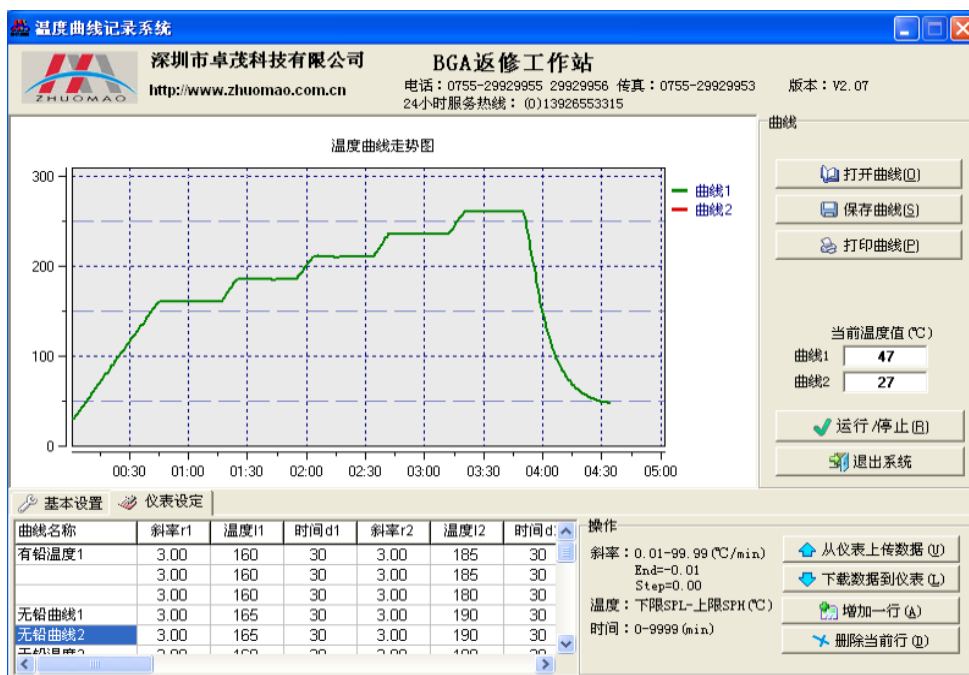


Figure8

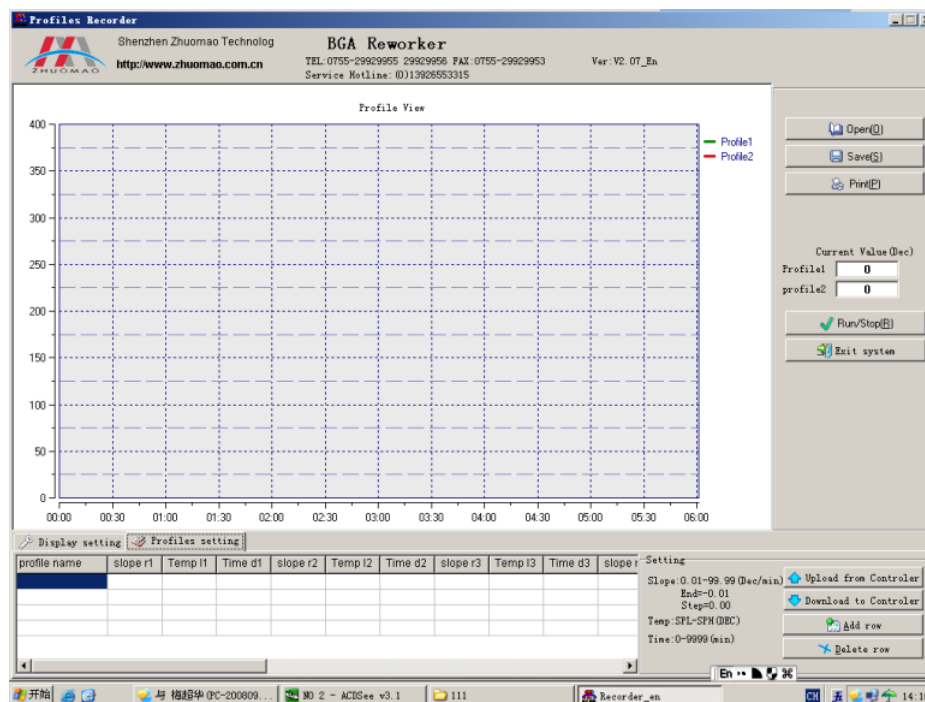


Figure9

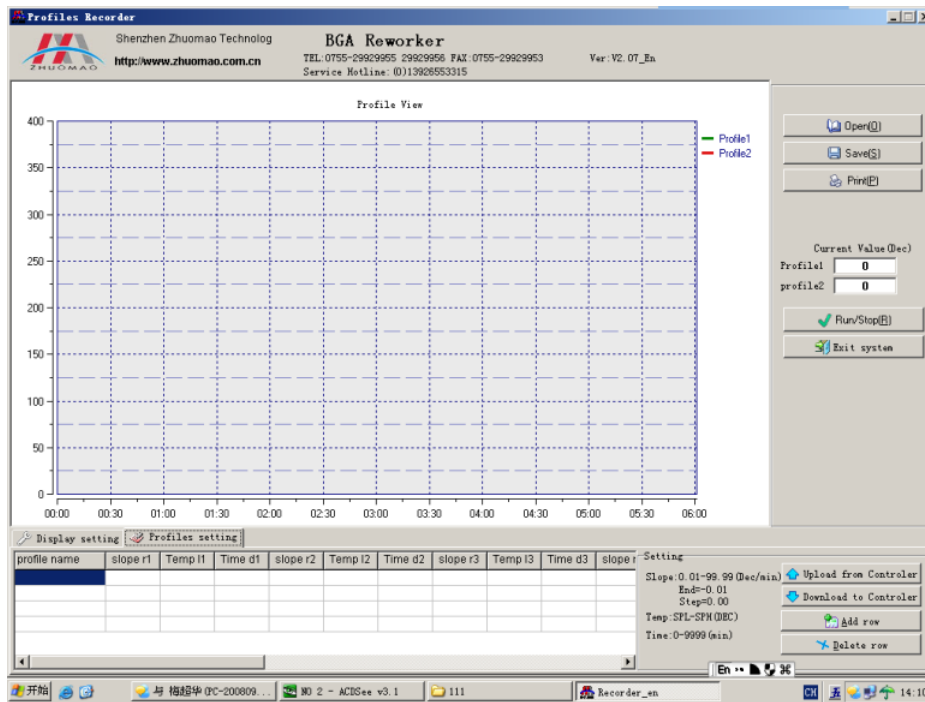


Figure10

4th Computer settings (upper heater)

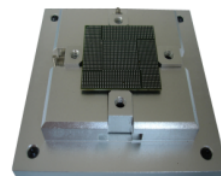
- 1) Click on the icon, the screen display as (Figure 11), bottom of the screen for setting the temperature curve parameters, drag the cursor point 160, with reference parameter set reference value in the table of parameters to be modified.
- 2) After the setting of the paragraphs parameter, click on as (Figure 11) "to download data to the instrument" so that the data can be stored in the instrument, (Remark: The group number displayed on the meter number during transmission is the NO. of the data that transmitted, the original number of the data in the instrument will be overwritten)

(3) Operation

1. Turn on the Main Power Switch, then check whether there is cold air blow out from the top of the hot air nozzle, if not, it is strictly prohibited to turn on switch, otherwise it will burn the top heater;
2. Set the procedures as the above method, and install the computer data lines correctly, turn on the power supply.
3. Install the PCB board which is need to weld and the appropriate nozzle; make the centers of the nozzle are on the center of the PCB board, turning Y-axis adjustment handle of the heater, so that the nozzle is at the height of 3-5mm of the top surface of the PCB board.
4. Presses the “start”, the system will automatically heating and welding; the temperature trend curve will appear on the screen;
5. After welding, the system will automatically alarm, and stop heating. And then turn the Y-axis adjustable handle of the heater upward, check the welding results. Welding process is completed.

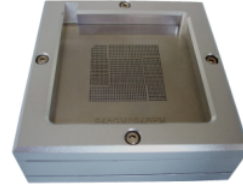
6th 、Reballing Process

- 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



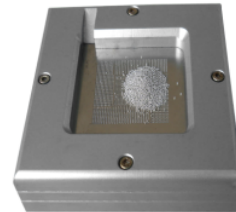
of the reballing kit.

- 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.



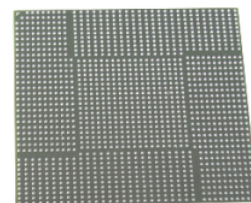
- 3、Observe the hole on steel mesh which should be completely coincide with the solder holes on BGA. If not coincide, we must remove the cap to reposition to ensure steel mesh holes aligned with the chip, and then lock the four screws.

- 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.

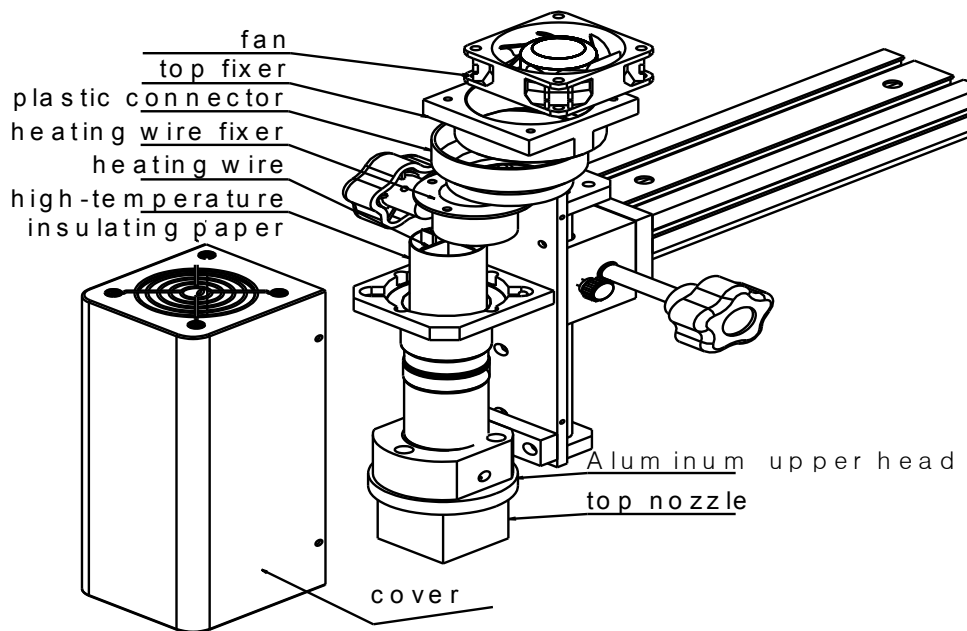
- 6、Place the reballing station on the flat location; Remove the lid, carefully scored BGA chips. Observe the chip, if individual solder balls are not in the hole rightly, please correct it with forceps.



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.

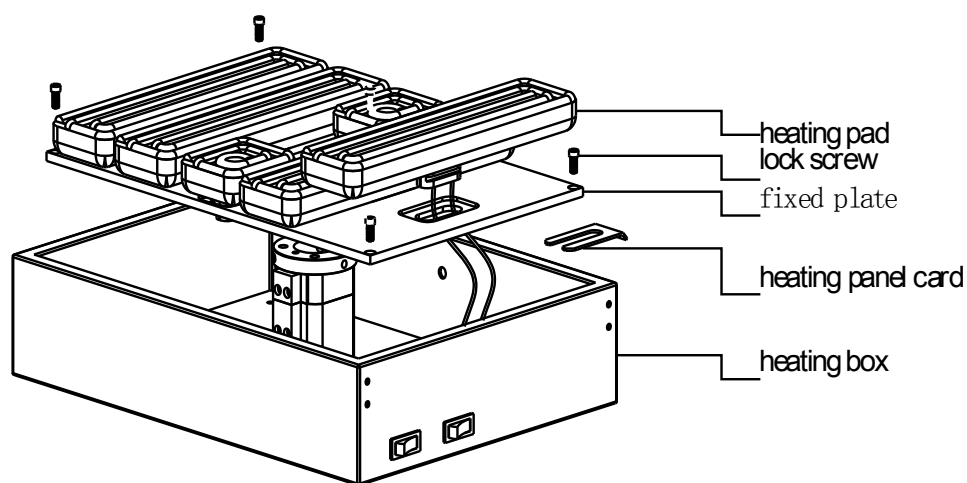
7th 、 repair and maintenance

(1) Replacement of top heating wire (as pictured)



- 1、 First power off, make the top heater completely cool;
- 2、 The replacement of fan:
Take off the cover, and then you can replace the fan.
- 3、 And then take them off as following order: Cover, fan, top fixer, Plastic connector, and heating wire fixer. (As pictured)
Remark: when you change the heating wire, it must be wrapped by High-temperature insulating paper.

(2) Replacement of the bottom heating panel (pictured)



- 1、(as pictured) remove the tank cover.
- 2、remove the heating pad, take out heating panel card from the back, replace the heating plate.
- 3、demolition the power line as required, and install the new board, weld the power cord.

(3) Maintenance of the machine

Clean the surface of heat plate, after power off and cool the heating plate, use fine cotton and oil or alcohol wipe it lightly.

8th 、 safety precautions

- (1)、BGA Rework Station ZM-R380B use AC220V power, working temperature may up to 400 °C, 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.

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
slope	4. 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
slope	4. 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
slope	4. 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
slope	4. 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
slope	4. 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
slope	4. 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.