

深圳市鼎华科技发展有限公司

SHENZHEN DINGHUA TECHNOLOGY DEVELOPMENT CO.,LTD



DH-A09L BGA Rework station specification

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Contents

- I 、 Company introduction**
- II 、 Installation**
- III 、 Safe notices**
- IV 、 Introduction of structure and parameter**
- V 、 Specification and decrsption**
- VI 、 PC 410Setting and operation**
- VII 、 Operation steps**
- VIII 、 Announcements of operation of BGA Rework Station**
- IX 、 Chip welding FAQ**

Attach: Packing List

I . Company introduction

SHENZHEN DINGHUA TECHNOLOGY DEVELOPMENT CO.,LTD is a professional manufacturer of welding equipments.Our products: bga rework stations,automatic soldering machines,automatic screwdriving machines,welding kits and SMT materials etc.Our mission: “Research as basis, Quality as core, Service as guarantee” . Our goal: “Professional equipment, quality and service”

To ensure the quality, Dinghua was the first to pass UL、E-MARK、CCC、FCC、CE ROHS certificates. Meanwhile, to improve and perfect the quality system, Dinghua has passed ISO、GMP、FCCA、C-TPAT on-site audit certification.

Science and technology are the primary productive forces, with over years of hardworking, Dinghua has owned core technology of temperature controlled and 38 patents and finished the development and production of manual, semi-auto and automatic series and realized the second revolution from traditional hardware combination to integrated control.Our products have been exported to Europe , America, Southeast Asia, Australia, Africa, the Middle East, Taiwan and more than 80 countries and regions and established the relatively sales network and terminal services system.We are becoming the pioneer and guide of SMT welding industrial and our products have been applied in individual maintenance,industrial and mining enterprises,teaching and research work,military manufacturing industry and aerospace industry and so on, which has treed good reputation among users.

We believe:your successes are our successes,let’s work together and build a better future!

II. Installation of BGA rework station

(A) Installation places

In order to guarantee the longevity of BGA rework station, you should follow the conditions as follows when install the machine:

- 1、 Far away from the inflammables, explosion-prone objects
- 2、 The places will not be splashed water or other liquid
- 3、 Well-ventilated, dry places
- 4、 Stable , flat areas less susceptible to vibration
- 5 The places with little dust
- 6、 Prohibit placing heavy objects on the top of the control case
- 7、 The places without the affect of air-condition, heaters and fans
- 8、 There should be more than 30cm space behind rework station for moving and rotating the head.

(B) Power source requirements: Use the power source which is small voltage fluctuation.

voltage fluctuation:220V±10

frequency fluctuation:50Hz±3

III. Safety notices of BGA Rework Station

- a、 Do not use fans or other devices to blow directly the repair station when it works, otherwise the heating plate surface will suffer minus tolerance, which can burn the work piece.
- b、 After starting up, high-temperature heating zone can not contact with the object directly, it may cause fire or explosion ,and the PCB work piece should be placed on the PCB support shelves.
- c、 Do not shake rework station, and move gently
- d、 Do not touch the high fever area , otherwise it will scald you
- e、 After starting up, do not use the flammable spray , liquid or flammable gas near the repair station.
- f、 Do not try to modify rework station; Otherwise it will cause fire or electric shock.
- g、 Electrical box has the high-voltage components, do not attempt to disassemble
- h、 If the metal objects or liquids fall into the repair station when it works , immediately disconnect the power , unplug the power cord until the machine cool down , then completely remove litter , dirt ; if dirt left ,there is odor when reboot.
- i、 When abnormal heating or smoke appears, immediately disconnect the power, and inform the

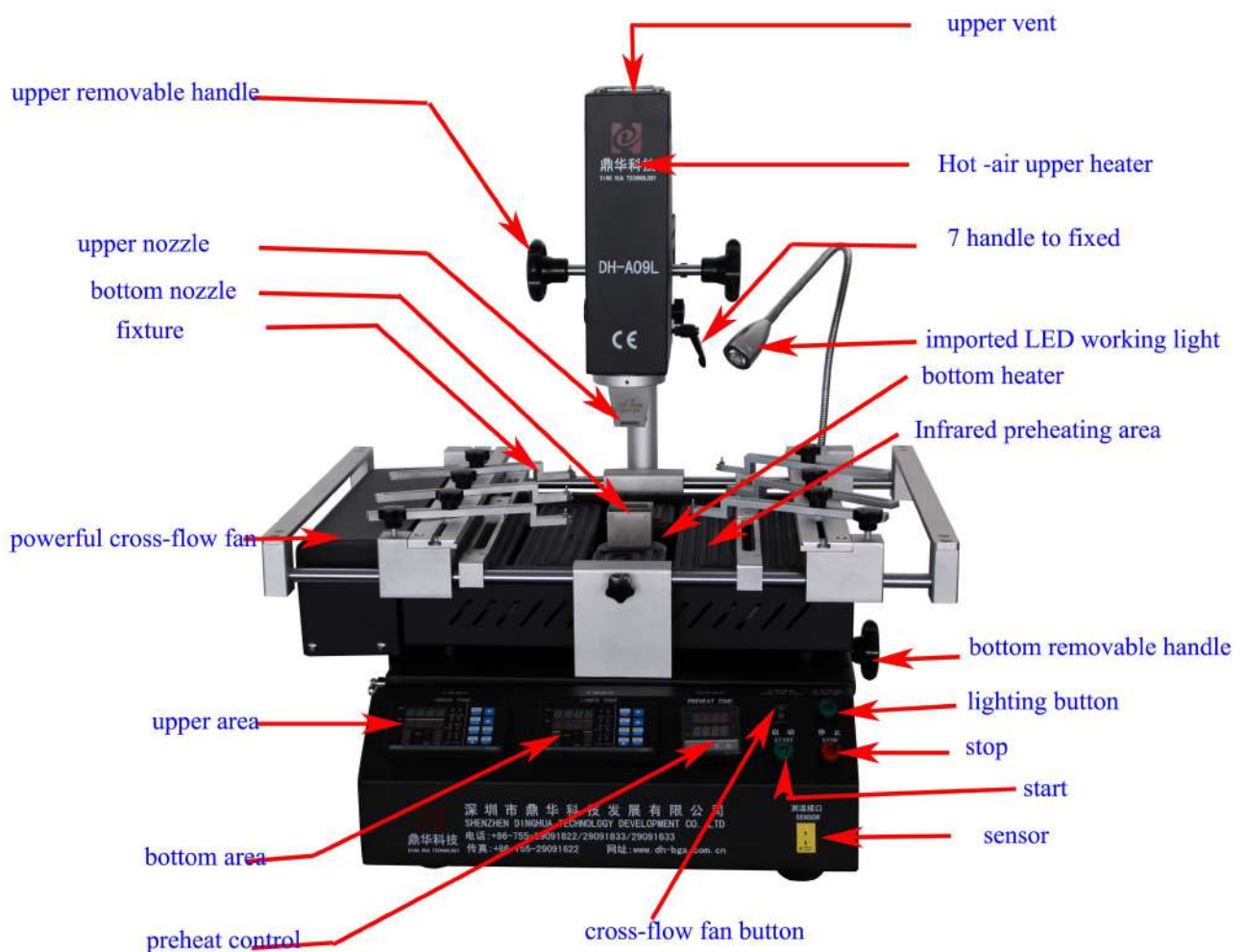
technical service to repair. Disconnect the wire between the electrical cases and machine when carry, hold the pin when pull out the wire, or it will cause bad contact and it won't work normally.

j、 Note that the repair station not to press or run over other electrical equipment or power lines or communication cable, and it may cause device malfunction or cause fire or electric shock.

k、 You have to read this instruction book before you handle the BGA machine.

IV. Structure and parameters:

(一)、 structure



(2) .Function

name	usage	How to use
Top limit knob	Restrict the bit head down position	Rotate to appropriate place
Top heating zone	The upper part of the hot air generated institutions	
Removable handle	Adjust up and down the location of the bit head	Rotate the handle
Top nozzle	Hot air more focused uniform	Resorted to the appropriate location of the outlet from the BGA
PCB clip	Clamping the PCB, to the appropriate location	Adjustment knob, move to the appropriate location
Pre-heating temperature area	Control preheat zone temperature	start button , automatic heating
Lighting button	Light switch	Press the button
stop	Stop the machine self-heating	Press the button
start	Start the machine self-heating	Press the button
External temperature measuring interface	Connect an external galvanic measuring the actual temperature	Directly connected temperature line
Cross-flow fan	Automatic and manual conversion of the cross-flow fan	Switch to a different location
LED	Lighting when Equipment works	Press the lighting button
Cross-flow fan	Cooling PCB board after soldering	
Bottom heating nozzle	Hot air more focused uniform	Resorted to the appropriate location of the outlet from the BGA
PCB supporter	Supporting the PCB without distorted	Adjust the supporting columns
Top temperature controller	Control of the upper hot air temperature	start button , automatic heating
Bottom temperature controller	Control of the lower part of the hot air temperature	start button , automatic heating
Top limit knob	Restrict the bit head down position	Rotate to appropriate place

Top heating zone	The upper part of the hot air generated institutions	
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(3)、Main Parameters

Total Power	4800W
Top heater	800W
Bottom heater	2nd1200W, 3rd2700W (extra large heat size is available for all kinds of PCB boards)
power	AC220V±10% 50Hz
Dimensions	L510×W480×H600 mm
Positioning	V-groove, PCB support can be adjusted in any direction with external universal fixture
Temperature control	K-type thermocouple(Closed Loop). Heating independently ,
Temp accuracy	±2 degree
PCB size	Max 390mm × 380mm Min20mm × 20mm
BGA chip	5*5~55*55
Minimum chip spacing	0.15mm
External Temperature Sensor	1 个
Net weight	About 28KG

Description:

- There are 3 independent heating areas from top to bottom. The 1st and 2nd are hot-air heaters, the 3rd is IR preheating, temperature controlled within ±2 degree. Top heater can be adjusted freely, second heater can be up and down, and the top and the bottom temperature can set 8 groups and save 10 groups groups section of temperature parameters at the same time. External sensor, can be setted, revised every temperature parameters.
- Choose imported high-precision K-type thermocouple, closed loop control and automatic temperature compensation system. With the temperature module for the precision control of temperature., temperature precision controlled within ±2 degree. The external sensor can detect temperature precisely, analyze and calibrate the real temperature curve accurately.
- Use a V-groove equipped with a flexible fixture fro PCB positioning, to protect the PCB from deformation when heater or cooled, and it can rework any BGA package size.
- Offer all kinds of hot-air nozzle, with 360degree rotation; With magnet, easy to install and change, customized is available;
- 8 level up(down)+ 8 level constant temperature control
- Including Voice"early warning"function. Powerful cross-flow fan to cool the PCB board automatically after desoldering and soldering, it can prevent the deformation of PCB board to ensure the weldng effect.











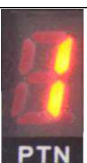







- CE certification,with emergency switch and automatic power-off protection decice when emergency happens.



VI、 Setting and operation

1、 Introduction about the functions of the temperature controller



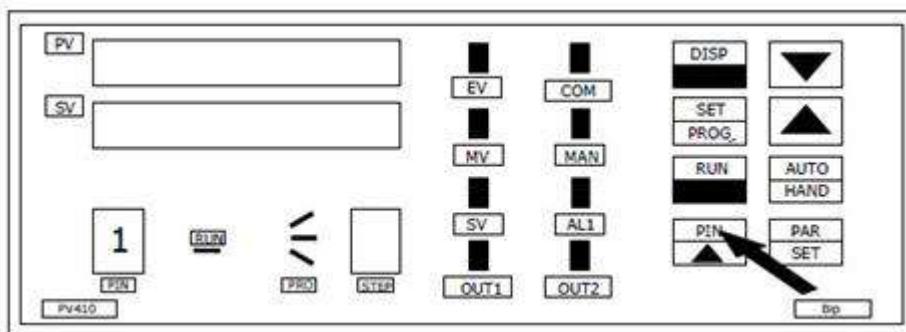
Item	Name	Description
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1		Display item switch key
2		numerical reduce key
3		Curve program parameters set key
4		numerical increase key
5		Start / pause curve program running key
6		Automatic / manual switch key
7		Curve program group increased bond
8		Parameter hypothesis key
9		indicator light
10		Display of Curve program segment, display curve program is running, the segment number display curve
11		Curves running indicating lamp
12		Program number display curve, curve shows the program number
13		Show that the set value, the output value or the long running time, when you press the DISPSELECT key items to display toggle
14		Display measured values
15		press  to change, when  lights,  show the percentatge rate.
16		press  to change, when  lights,  show the temperature.

17		Communication indicator lights, and other registration form to transmit data, the indicator light
18		Show the setting temperature

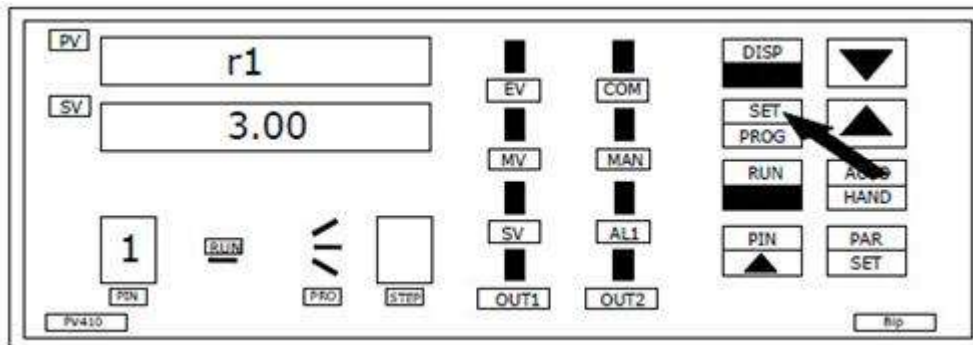
2. Setting steps

(1) First start the power and then choose the temperature store position:(set the group number) Press PIN button (it can store 10 group data) when you press the button , the group will change(1,2,3,4,5.....10), choose one group data to be the temperature curve(choose one group of these ten groups data, now we will choose the first group data to set).



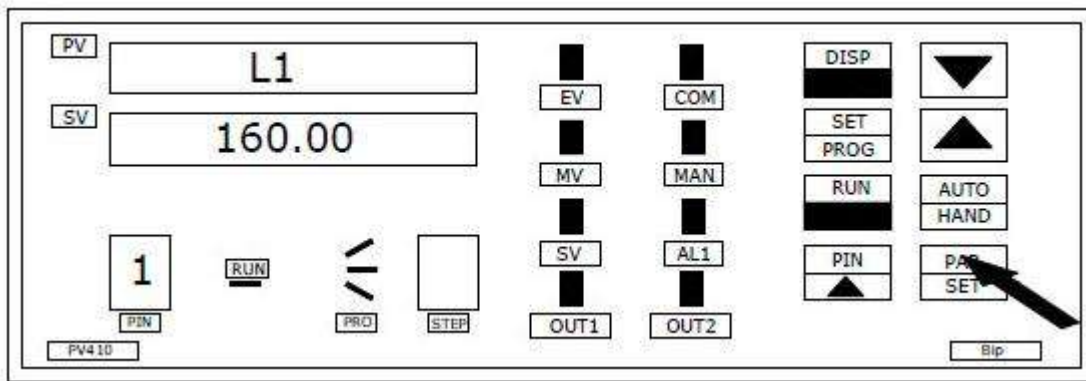
(2) speed rate setting(Rising temperature per second, use R to represent)

Press SET button to set the temperature ,r1 represents the speed rate of first temperature section(the rest can be done in the same manner,r2 represents the speed rate of the second temperature section.....);3.00 represents 3 degrees\second. Press the increase\reduce button to adjust, press PAP to save the setting and run the next step.(as the following picture)



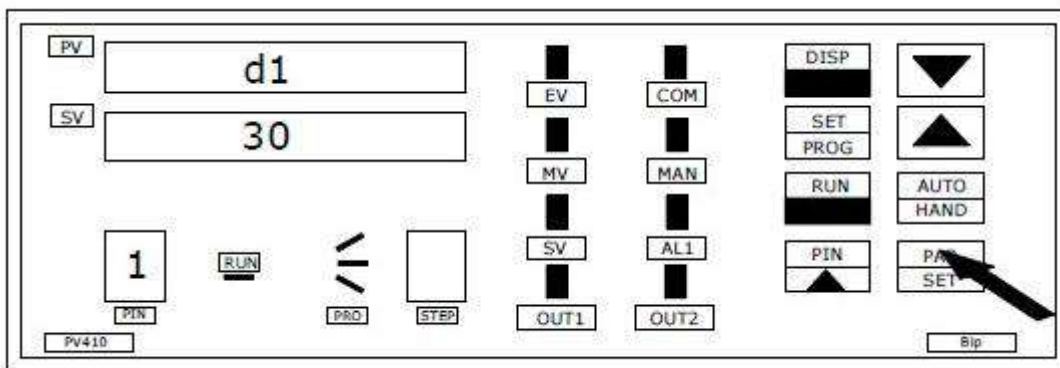
(3) Temperature(L) setting (As following picture)

L1 represents the first temperature section(L2 represents the second temperature section.....); 160 represents temperature number (pre-heating temperature is 160 degree), press the increase\reduce buttons to adjust. Press PAR button to save the setting and run the next step.



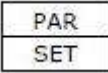
(4) Time(d) setting (like the following picture)


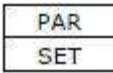
d1 shows the first time of constant temperature; 30 shows the time value, to adjust by pressing up and down key, and press the PAR key for sure finish and go on the following step.



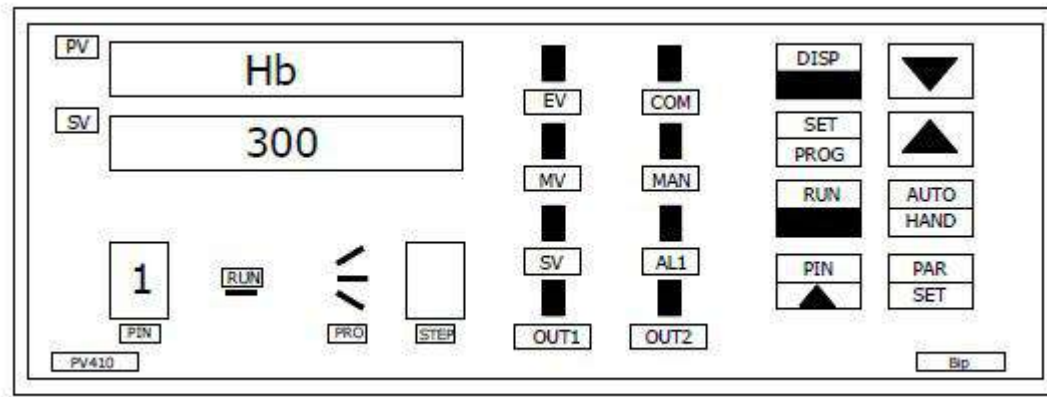
(5) The remaining seven of the temperature settings are identical with the above setting

(6) Not need to use the eight sets of temperature, to set up a few paragraphs you want, for example, just

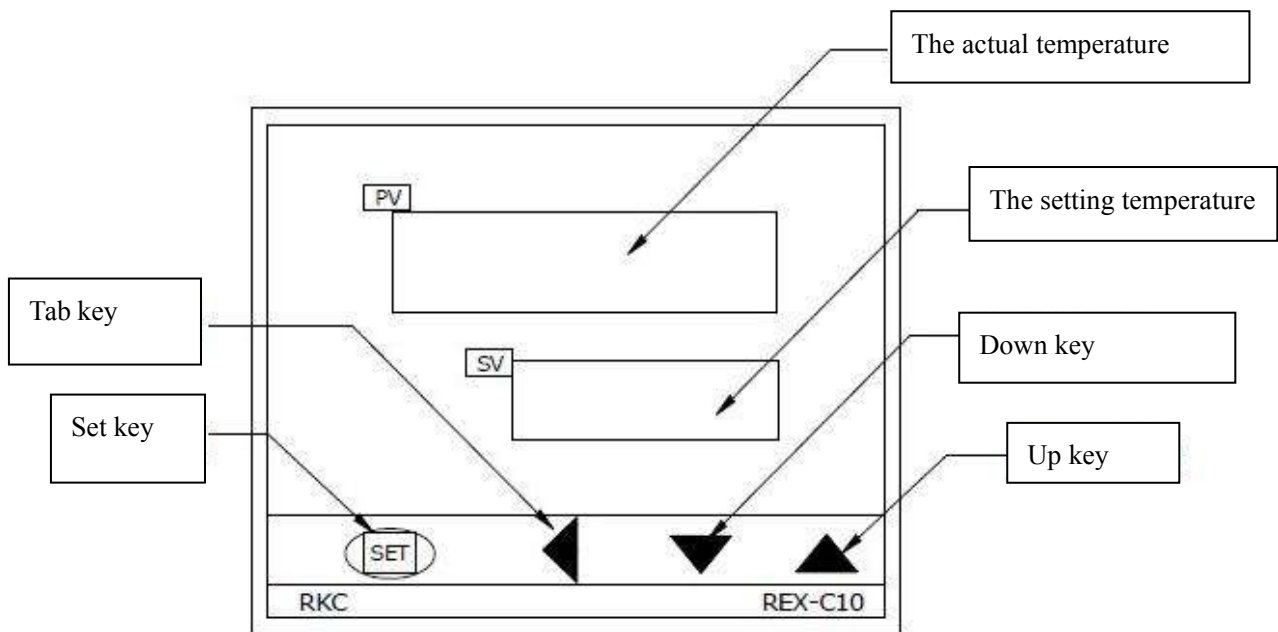
need 6 sets, after the setting for 6th temperature, press  to enter the rate of 7th, pressing the

down key until the  shows "END", then press  will appear the following picture (show it finishes), press it again for sure.

(7) When it finished, it will show the following picture (the highest temperature can't be changed).



3. The lower part of the temperature setting



Setting method: Press the Set key for 5~6 seconds, and at this time the bits of setting temperature is flashing, then press the up or down key to get the right value, and then to press the tab key, the flash will changed from bits to ten, the following operation is same with the bits. At last, get the right value to press the set key for sure.



For example: Intei chip, and 38*38 nozzle. BGA lead free-temperat setting.

Attention: nozzle is larger the BGA chip about 2mm.


	1st		2nd		3rd		4th		5th	
Upper rate	r1	3	r2	3	r3	3	r4	3	r5	3
Upper temperature	L1	165	L2	190	L3	225	L4	245	L5	250
Time constant	D1	30	D2	30	D3	35	D4	45	D5	25



Lower rate	r1	3	r2	3	r3	3	r4	3	r5	3
Lower temperature	L1	165	L2	190	L3	225	L4	245	L5	250
Time constant	D1	30	D2	30	D3	35	D4	45	D5	25
infrared temperature		180								


1) First start the power and then choose the temperature store position (set the group number) Press PIN button (it can store 10 group data) when you press the button, the group will change (1,2,3,4,5.....10), choose one group data to be the temperature curve (choose one group of these ten groups data, now we will choose the first group data to set).

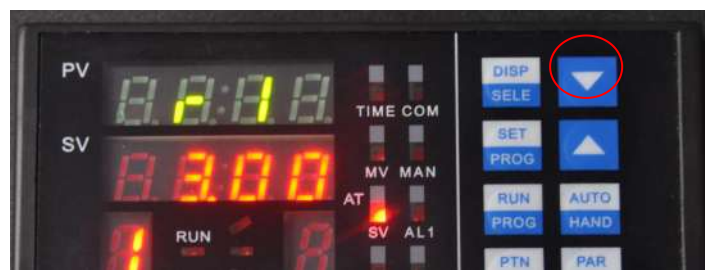
First group as the sample., press  key, when  display, the setting for the first group.

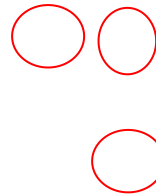





2) press  key to set the curve, r1 means the first temperature rate, 3.00 means Heating up 3 degrees per second

.press   key can decrease and increase the figure. (in order to take an example of

SMT producing progress, we set 3 generally), after finishing, press  to continue.











3) L1 means the first set temperature, press   can increase and decrease the figure, we set 165, press  to continue.



4) D1 means Temperature constant temperature time, we set 30s

press   can decrease and increase the figure, after finishing, press  to continue.



5) r2 means the 2nd temperature rate, we set 3.00, press   can decrease and increase can decrease and increase the figure, after finishing, press  to continue.



6) L2 means the 2nd tempweature, we set190, then press **PAR SET** to continue.




7) D2 means the 2nd time, we set30, then press **PAR SET** to continue.




8) r3 means the 3rd, temperature rate, we set3.00, then press **PAR SET** to continue.




9) L3 means the third temperature we set 22.5, then press  to continue.




10) D3 means the third time, we set 35, then press  to continue.




11) r4 means the third rate, we set 3.00, then press  to continue




12) L4 means the fifth temperature, we set 245, 按 then press  to continue.




13) D4 means the time, we set 45, then press  to continue




14) r5 means the fifth temperature rate, we set 3.00, then press  to continue.





15) L5 means the temperature , we set 250, then press  to continue.



16) D5 means the fifth time, we set 25, then press  to continue



17) If you just use 5 curve, then set the rate of sixth, press  all time, till  End displays.



18) When it displays Hb , 500 not change (it means the limit is 500) press again return to the windows when you open the computer. Now setting is over.





Set the Infrared preheat area:

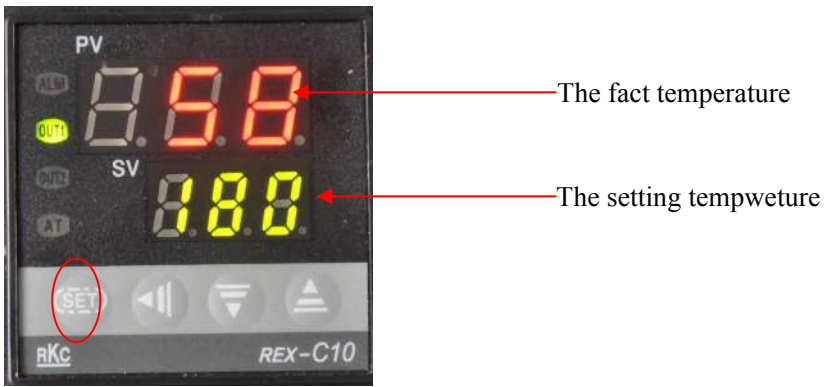
Press the adjust key about 3s. then



the temperature figure shines ,

press  decrease and increase the temperature figure, press again  Numerical TAB key mobile changes the value of ten

, and hundreds place, After setting, press SET confirm and return.

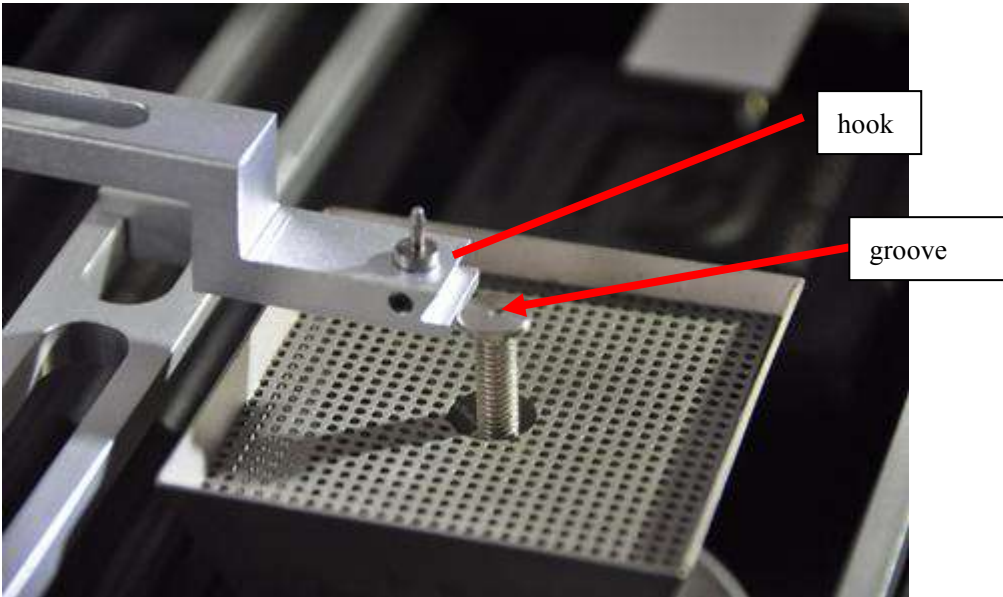


VII、 Practical Application; the dismounting and mounting process of the chip

(1) Mounting

1. install the fixture. Adjust the supporting screw and the groove to the same height(to prevent sinking during the heating and have the effect of s. The same as the supporting of the bottom nozzle.





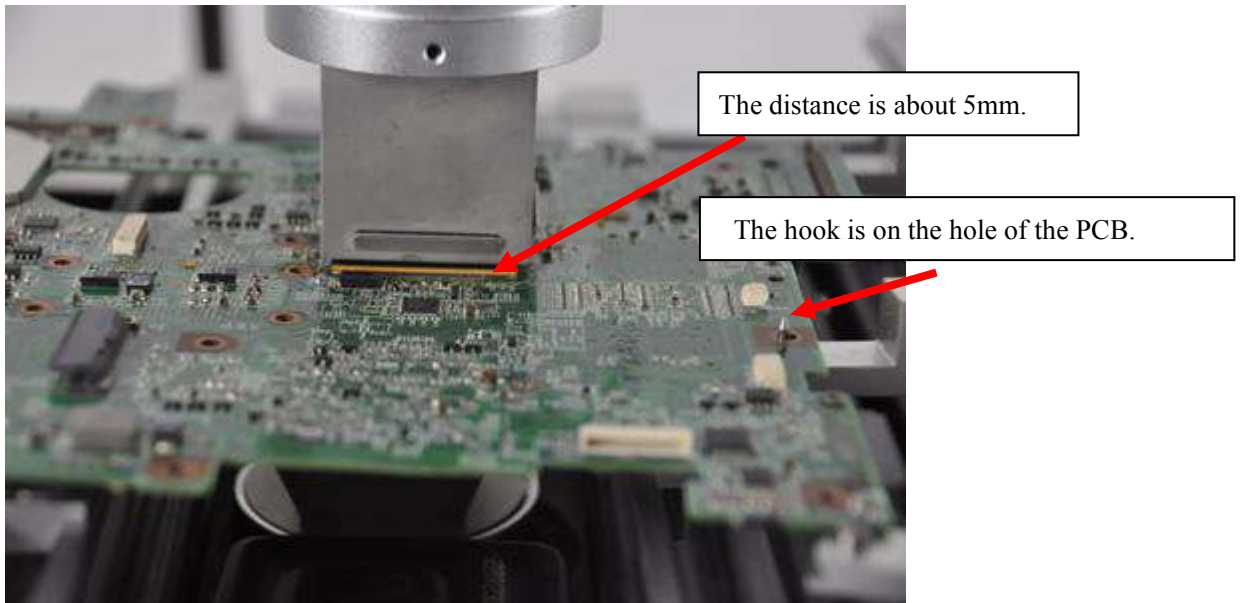
For the irregular plate material which has other components and parts on the PCB and it cannot be fixed by the groove, then we can use the hook to fix. Adjust the supporting screw and the hook to the same height.

2.install the PC.

Using the fixture to fix the PC well and adjust the upper heater to a suitable place.



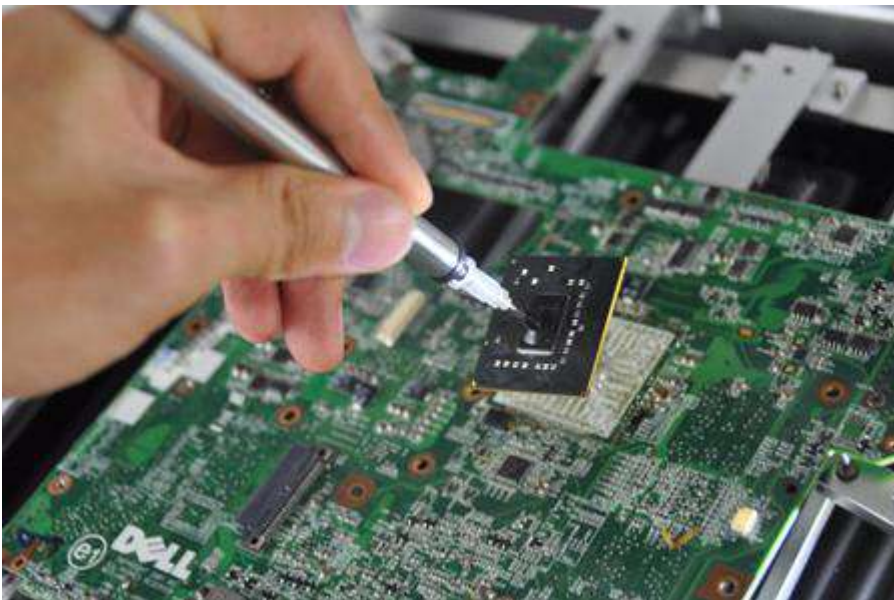
For the irregular plate material, using the hook to fix.



3. Choose the suitable soldering temperature curve. Before sending to our dear customer, we set the chip of INTEL temperature as an example. So we will do as the example.

4. Press the start button(in order to avoid the mistake-operation. And for the machine which is panel(keypad) control BGA rework station, the operator need to press the start and stop with 2 second.

5.After the program is running. Move away the upper heater and use the vacuum pen to pick up the BGA chip.



6. The machine will stop automatic after the running program is over. And then press the cross-flow fan button to use the powerful cross-flow fan, to cool the PCB.



(2) Mounting of the BGA chip

1. cleaning the bonding pad of the PCB and the BGA

You can use the soldering iron to clean (if the operator has a good skill, he can use this way), and you also can use the solder wire to help you to clean with the soldering iron. For the time of clean the bga, you had better to do it within very few minutes. Since during the very few minutes, the BGA chip have not been cooling completely. And the loss of the temperature different is lower; If you can use the flux paste during the cleaning process, it can improve the activity of solder, and it is good for cleaning the soldering tin.

Particularly attention is that do not damage the pads of the PCB.

In order to the successfully rate of the soldering, please use the volatile strong flux, for example the industrial alcohol.



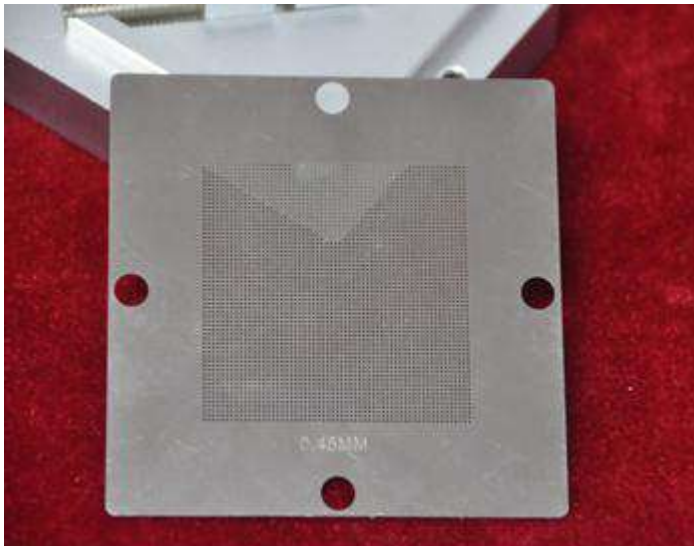


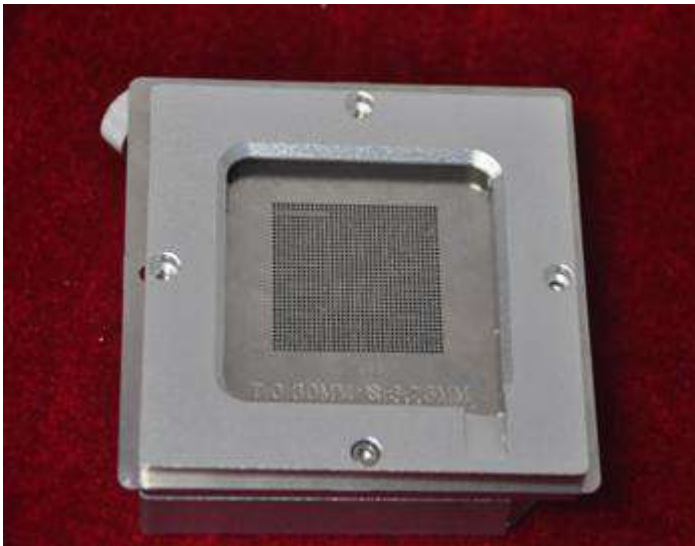
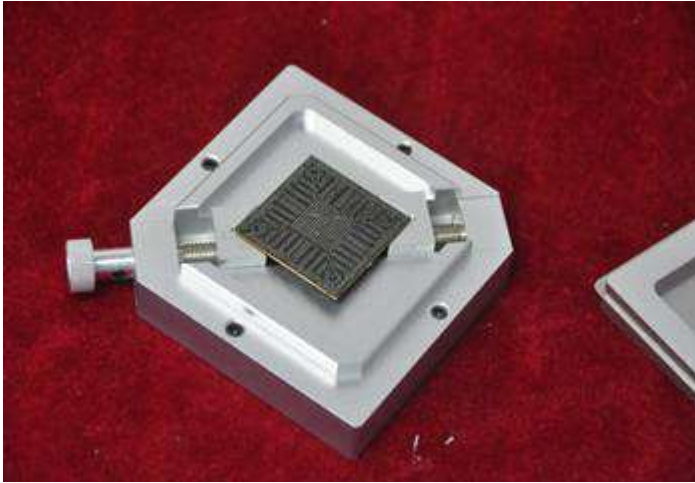
2.BGA reballing

First, to lay the flux paste on the BGA with brush(must be thin and uniform. If over, the ball is easy to stick together).

Second, choose the suitable stencil, and then put the BGA fix on the reballing kit.

Third, put the stencil and then pour into the tin ball and then take out the the BGA. After everything is OK, put the BGA with the new solder ball on the reballing station to heat.

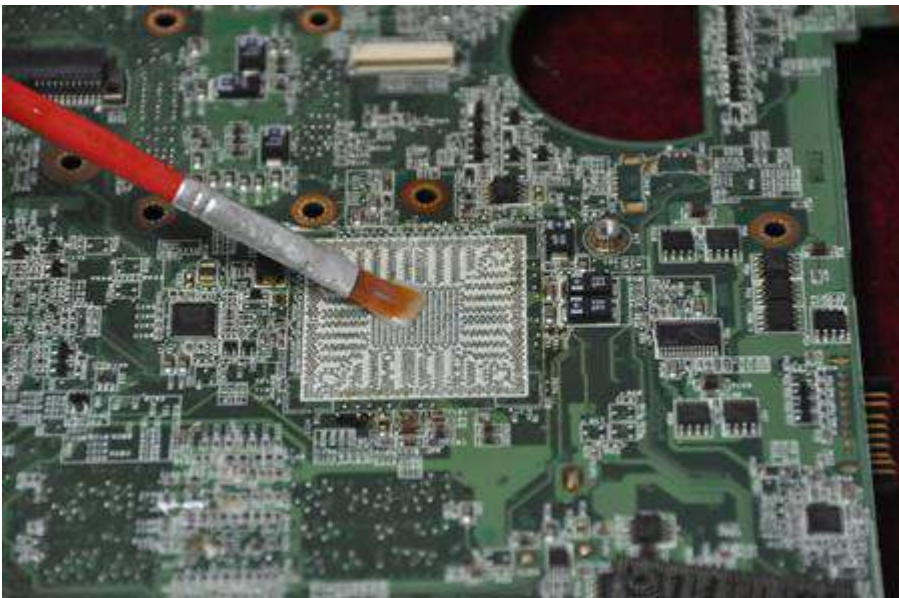






The temperature setting of the reballing station; Lead 220°C and lead free 250°C (as your reference)

3. Before the soldering, we need to put the flux paste on the PCB well-proportioned.



4. Refer to the steps to fix the PCB well.

5. Refer to the printing line to mount the BGA. And please pay attention to the direct of the BGA.

6. Move the upper area to a suitable and working place. Adjust the distance of the nozzle, and then choose the suitable temperature curve. Press the start button.

7. It will stop automatically after the running program is over. And at the same time the powerful cross-flow fan will begin cooling for the PCB(please make sure that the fan button is at the status of opening. When the temperature reduced to 50 degree, then you can pick up the PCB.)

Noticement:

When the machine due to the fault alarm, all function keys are at the status of the locked. Need to deal with fault, and after restart can work normal.

usual temperature parameters:

Lead temperature curve welding

41*41 BGA chip welding temperature setting

	First	Second	Third	Fourth	Fifth
Upper heating	160	185	210	220	225
Speed rate	3	3	3	3	3
Constant time	30	30	35	40	20
IR preheating	180				
Constant time	300				

38*38 BGA chip welding temperature setting

	First	Second	Third	Fourth	Fifth
Upper heating	160	185	210	215	220
Speed rate	3	3	3	3	3
Constant time	30	30	35	40	20
IR preheating	180				
Constant time	300				

31*31 BGA chip welding temperature setting

	First	Second	Third	Fourth	Fifth
Upper	160	180	200	210	215

heating					
Speed rate	3	3	3	3	3
Constant time	30	30	35	40	20
IR preheating	180				
Constant time	300				

Above is lead type BGA chip reference temperature.

Lead-free temperature curve welding

41*41 BGA chip welding temperature setting

	First	Second	Third	Fourth	Fifth
Upper heating	165	190	225	245	255
Speed rate	3	3	3	3	3
Constant time	30	30	35	40	40
IR preheating	180				1
Constant time	300				

38*38 BGA chip welding temperature setting

	First	Second	Third	Fourth	Fifth
Upper heating	165	190	225	245	250
Speed rate	3	3	3	3	3
Constant time	30	30	35	40	40
IR preheating	180				
Constant time	300				

31*31 BGA chip welding temperature setting

	First	Second	Third	Fourth	Fifth
Upper heating	165	190	220	240	245
Speed rate	3	3	3	3	3
Constant time	30	30	35	40	40
IR preheating	180				
Constant time	300				

Above is lead-free type BGA reference temperature.

VIII、 Announcements of operation of BGA rework Station

- 1、 After opening the power, firstly you should check whether the upper and bottom hot air nozzles have cold wind. If not, starting the power is strictly prohibited, or the heaters will be burnt. The bottom infrared heating areas are all controlled by switch, and you can choose the bottom heating areas depend on the PCB board size.
- 2、 You should set different temperature curves when repair different BGA, each temperature should not higher than 300℃.Lead-free rework setting can refer to welding temperature curve of BGA tin bead.
- 3、 When demount BGA, the cooling fan and vacuum should be set to automatic transmission,
The buzzer will warn automatically when temperature curve runs to the end. Meanwhile, remove the BGA from PCB board with vacuum pen, and then remove the PCB board from the positioning frame.
- 4、 When welding the BGA chip, set the cooling fan to manual grade、close vacuum. After the temperature curve runs to the end, the buzzer will alarm automatically, the cooling fan begins to cooling the BGA chip and bottom heating zone, meanwhile, the warm heating head will blow a cold wind. Then elevate the upper heater, make the gap has 3-5mm space between the bottom of nozzle and the upper surface of BGA chip and keep cooling for 30-40 seconds, or move away the main heater after the starting light is off, finally take away the PCB board from the support.
- 5、 Before installation of BGA, it is necessary to check that if the PCB pad and BGA tin bead are all in good condition. It is necessary to check the outlet after welding and to stop installation if you find something unusual. Go on welding after anything is normal, or the BGA and PCB board will be damaged.
- 6、 The machine surface needs to be clean at regular time, especially the infrared heating board. Avoid the dirt stay on the board, because the dirt can lead to heat radiation abnormally, bad welding quality and shorten the using time of infrared heating element.

If the heating element was burn out because of this, our company is not responsible for free change!

Conclusion:

In the electric products line, especially the PC and electric production field, component trend to microminiaturization、multi Function and greening of management, various capsulation technology spring up, and BGA/CSP is the main trend.

In order to satisfy the growing need of BGA device circuit assembly, manufacturers should choose more safe、more convenient、more speedily assembly and repair equipment craft.

IX、Chip bond FAQ;

i :missing solder

It will cause the off-normal with the manual counterpoint, and there will be a process of automatic correction between welding plate and the bga chip under the effect of the surface tension of the solder ball.

Chip uneven decline result from the uneven heating, or the early returning result in the run-off. If stop the reflow at this time, it will cause the missing solder. So we need to extend the time of soldering temperature. Or we also can increase the soldering temperature to make the degradation of the solder ball uniformity.

ii Short circuit.

When the solder ball arrive in the melting point and is at the status of liquid, the higher time,temperature and pressure will damage the surface tension and supporting role of the solder ball. And then resulting the short circuit. So we need to cut down the time of soldering appropriately, or we can lower the soldering temperature.

iii A chip burst and bubble.

General there will be three situation;

First, Chip be affected with damp.

Solution: put the BGA and PCB into the oven about 4 to 8 hours, the temperature of oven setting is 80°C to 100°C

Second, higher temperature

Solution: cut down the soldering time and turn up the bottom temperature to avoid chips directly heated too high.

iv longer solder time

Solution: cut down the soldering time or move up the upper area a little. And let the bottom heat first, when the bottom temperature is 200 degree, move back the upper area. It can avoid the chip to heating too long.

v Why the PCB will become black after soldering

General there will be two situation;

First, too much the number of repeat welding.

Second, there is the problem of the flux paste quality.

Solution: use the better quality flux paste.

vi Why there will be the four corners rugged after the soldering.

General there will be two situation;

First, the PCB is not to be installed well or the PCB is out of shape.

Solution: after installing the PCB well. Please check that whether they are on the same line. And adjust the supporting screw to prevent the PCB sinking.

Second, the heat absorption rate of the bonding pad inconsistent resulting from the uneven copper foil lead

Solution: since the work environment of the BGA rework station is not sealed, so it cannot arrive the original reflow effect.. For this, we can turn up the temperature of the preheat infrared area. And change to a larger size nozzle to make the BGA chip has a large heating area. It can effectively prevent the absorption of the PCB copper foil too fast.

vii why the bonding pad will drop when dismount the BGA chip.

General there will be several following question;

First, the temperature of soldering or the time of the soldering is not enough.

When the solder ball has not been melt completely, and pick up the BGA.

Solution: turn up the temperature or extend the soldering time.

viii What will you notice when choose the flux and the solder ball?

First, Our advice is that the operator should buy the special BGA flux paste. If use the bad quality flux paste, there will be the missing solder and dry joint. And even make the PCB become yellow after soldering.(the storage temperature of the flux paste is not too high, or it will be no use)

Second, please pay attention to the date in produced.

Conclusion:

In the electric products line, especially the PC and electric production field, component trend to microminiaturization、multi Function and greening of management, various capsulation technology spring up, and BGA/CSP is the main trend.

In order to satisfy the growing need of BGA device circuit assembly, manufacturers should choose more safe、more convenient、more speedily assembly and repair equipment craft.

Attachment: Packing List

No.	name	type	unit	quantity	Unit price	note
1	BGA rework main engine	DH-A09L	set	1		Precision instrument control
3	Vacuum pen		piece	1	/	
4	Vacuum sucker		set	3	/	
5	Specification	DH-A09L	piece	1	/	
6	nozzle	Top nozzle 38*38、 34*34、 41*41、 bottom nozzle55*5 5	piece	4	/	
7	Shaped folder		piece	6	/	
8	Plum knob		piece	6	/	
9	Support screws		piece	4	/	