

# 深圳市鼎华科技发展有限公司

SHENZHEN DINGHUA TECHNOLOGY DEVELOPMENT CO.,LTD



## DH-200 BGA Rework Station Manual

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## **A. Company profile**

**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!

## **B. Installation of BGA rework station**

### **( 1 ) Installation sites**

In order to ensure that the useful life of BGA rework station, installation of repair station must meet the following conditions:

- 1、 Away from flammable and explosive materials
- 2、 Do not splash water or other liquids
- 3、 Well-ventilated , dry place
- 4、 Stable , flat areas less susceptible to vibration
- 5、 Place less dust
- 6、 Prohibit Placing heavy objects on top of the control box
- 7、 Without the affect of air-conditioners, heaters and fans
- 8、 Reserved for 30cm to move and rotate around the upper for the back of rework station

## **(2).Power Requirements**

Use smaller voltage fluctuation power

Voltage fluctuations:  $220V\pm 10$

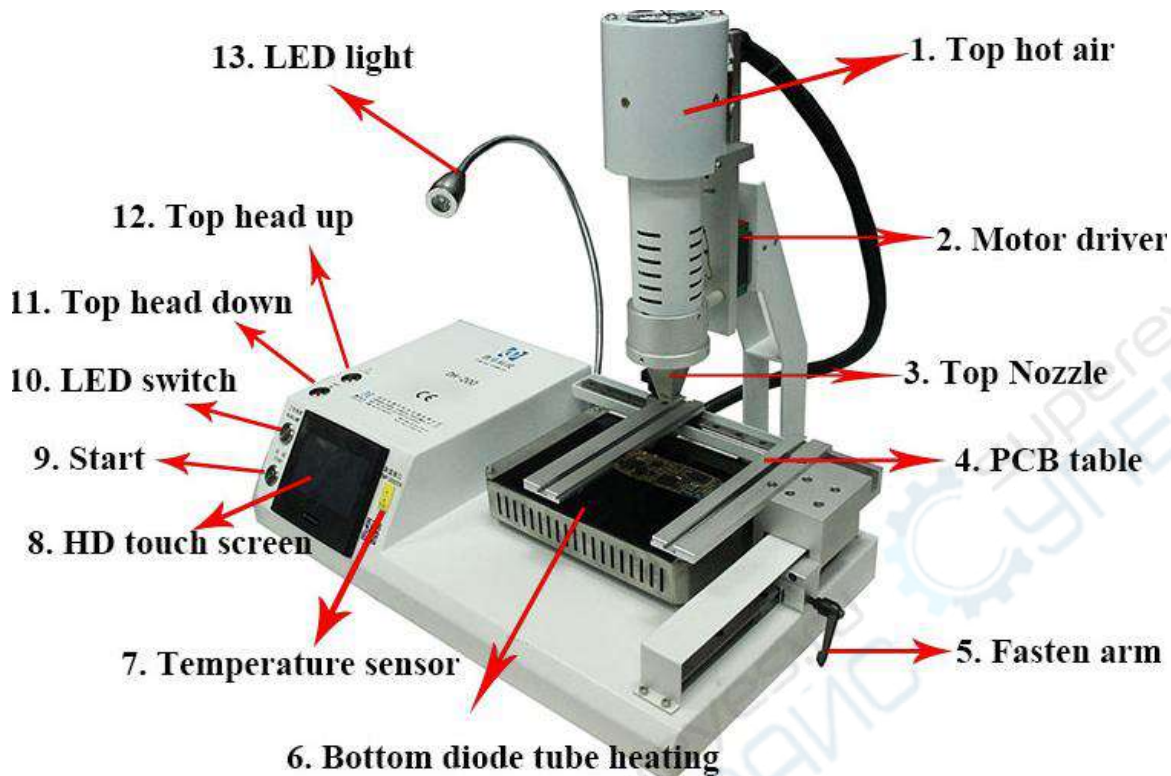
Frequency fluctuations:  $50Hz\pm 3$

## **C. Safety Precautions of rework station**

- 1、 Do not use fans or other devices directly to the repair station hair when it works, otherwise it will lead to negative differential heating plate surface , burn the workpiece.
- 2、 When turned on, high-temperature heating zone can not be any direct contact with the object , it may cause fire or explosion ,and the PCB workpiece should be placed on the PCB support shelves.
- 3、 Do not shake rework station , and move gently
- 4、 Do not touch the high fever area , otherwise it will burn
- 5、 When turned on, do not use the flammable spray , liquid or flammable gas near the repair station.
- 6、 Do not try to modify rework station , otherwise it will cause fire or electric shock.
- 7、 Electrical box has the high-voltage components , do not attempt to disassemble
- 8、 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 to cool down , then completely remove litter , dirt ; if dirt left ,there is odor when reboot.
- 9、 When abnormal heating or smoking,immediately disconnect the power , and inform the technical service to repair.It needs to disconnect the wires between the electrical boxes and machine parts,and have to hold the plug,otherwise it leads to poor contact ,and does not work.
- 10、 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.
- 11、 Before use the rework station, you must read this manual carefully

## D、 Structures and specifications

### (1) Structures



### (2) Features

Number	Name	Functions	Use ways
1	Top hot air	Hot air top heater, heating more evenly, stable and easy focus with nozzle.	Top heating for bga
2	Motor driver	To control top head up / down movement	
3	Top nozzle	Different size of nozzles for different bga, IC...	
4	PCB table	Place pcb easily on the table, it can move right / left.	Rotating the knob
5	Fasten arm	Control bottom heating frontward / backward	Rotating the arm
6	Bottom diode tube heating	Pre-heating for pcb, prevent it from deformation when heating.	

7	Temperature sensor	With sensor wire to detect actual temperature of solders.	Conected with sensor wire
8	HD touch screen	To focus the hot air	Pull air from the BGA suitable location
9	Start	Start the heating	Pressing the button
10	LED switch	Turn on / off lighting	Press button
11	Top head down	Control top head down movement	Press the button
12	Top head up	Control top head up movement	Press the button
13	LED light	Lighting	

### (3)Specification:

Total Power	2300W
Top hot air heater	450W
Bottom diode heater	1800W
Power	AC220V±10% 50Hz
Lighting	Taiwan led working light, any angle adjusted.
Operation mode	High definition touch screen, intelligent conversational interface, digital system setting
Storage	5000 groups
Top heater movement	Automatic up / down with button, manual Right/left,
Bottom diode heating	Manual right / left movement.
Positioning	Intelligent positioning, PCB can be adjusted in X, Y direction with "5 points support" + V-groov pcb bracket + universal fixtures.
Temperature control	K sensor, close loop
Temp accuracy	±2°C
PCB size	Max 170×280 mm Min 22×22 mm
BGA chip	2x2 mm - 80x80 mm
Minimum chip spacing	0.15mm
External temper sensor	1pc
Dimensions	L560*W380*H510mm
Net weight	16KG

#### **(4)Description :**

#### **Features:**

1. DH-200 special for mobile repairing, such as Samsung, iPhone, Huawei, HTC.... Mini type.
2. Top hot air heating, bottom German diode heating zone with glass guard. Top head can move up / down automatic with button. Bottom zone can move forward / backward. Machine movement with slides, stable and durable.
3. Embedded industrial PC, HD touch screen conversational interface, human-machine interface operation, multi-functional integrated control, human structure design, optional numbers storage, apply temperature curve freely. With multi-functions: "keep same temperature", "instant curve analysis" and "voice warning before heating finish". Real-time actual temperature and temperature curve setting can also be used to analyze and correct the curve if necessary.
4. high precise k-type thermocouple closed-loop control, with temperature module and intelligent control unit to enable precise temperature deviation on  $\pm 2^{\circ}\text{C}$ . Meanwhile, external temperature measurement connector enables temperature diction and accurate analysis of real time temperature curve.
5. V-groove PCB works for rapid, convenient and accurate positioning, which can suitable for all kinds of PCB board positioning.
6. Movable universal fixture prevent pcb from damaged on fringe component, suitable for all kinds of pcb repairing.
7. With different size of magnet nozzles, easy replace and install, rotate freely  $360^{\circ}$ , any size can be custom if need. Titanium alloy material, never deformation, never rusty
8. Two heating zones can independently heat and they are multiple temperature control, which can ensure best integration of different temperature areas. Heating temperature, time, slope and cooling can all be set in touch screen conversational interface. Meanwhile PID calculation to control heating process more accurate and more stable.
9. 6-8 segments temperature can be set for top heating and lower heating(up to 16 segments). 50,000 groups of temperature curves can be stored, which can number, modification and apply at any time according to different BGA. Curve analysis, setting and adjustment are also available on touch screen.
10. With Voice warning 5-10 seconds before heating finish: remind operator to pick up bga chip on time. After heating, cooling fan will work automatic, when temperature cool down to room temperature ( $< 45^{\circ}\text{C}$ ), cooling system will stop automatic to prevent the heater from aging.
11. CE certification approval. Double protection: Overheating guard + emergency stop function.

## **E、 Operations:**

### **1、 Preheat**

Preheat the PCB board and BGA chip, and the temperature of constant temperature oven is set at 80 °C -100 °C, for 4-8 hours to remove internal moisture of the PCB and BGA, to prevent the burst phenomenon when heating.

### **2、 Remove**

Place the PCB board into the bracket on the repair station, and select the appropriate hot air reflow nozzle, and set the appropriate soldering curve, press the open button until it finishes, and then move the hot air manually, pick up BGA chip with the vacuum suction pen.

### **3、 Clean-up welding**

The BGA pad clean-up , one with de-soldering line to drag flat, the second with iron; Best to remove the tin quickly after the BGA removed. BGA has not completely cooled , and the temperature difference make less damage to the pad; Use the flux can improve the activity of soldering tin, clean the soldering tin easily. Particular attention not to damage the PCB pad, and in order to ensure the reliability of BGA solder, when the cleaning pad to make use of some of the solder paste residues with more volatile solvents , such as plate washer water, industrial alcohol.

### **4、 BGA re-balling**

Wipe the paste flux equably with the brush pen on the BGA pad, choose the right steel mesh, and then plant tin beads by the re-balling kit on the right pad.

### **5、 BGA tin beads welding**

Heat the bottom heating zone of BGA re-balling station and then weld the tin beads on the pad.

### **6、 Besmear flux**

Wipe the paste flux with the brush pen on the PCB pad. If you wipe so much, it will cause connected welding, on the contrary, it will cause null welding. In order to wipe off dust and impurity of tin balls, and enhance welding effect, the welding paste must be wiped equally.

### **7、 Place the BGA chip**

Place the BGA chip on the PCB board with manual alignment and silk-screen borders, meanwhile the tension of the solder joint when melt will have a good self- alignment effect.

### **8、 Weld**

First, put the PCB board which is pasted with BGA chip on the positioning stand, and then move the hot wind head to the working place. Second, choose the appropriate backflow nozzle and set right welding temperature curve, start heating, open the switch, and then run the welding process. Besides, after the welding process is finished, you have to cool the BGA by the cooling fan. Hoist the upper hot wind head and make the bottom of hot wind nozzle apart from the surface of BGA 3-5mm, and stay 30-40 seconds, or, you can move the hot wind head after the starting switch is put out, withdraw the hot wind head. Finally, take away the PCB board from the heating zones.

#### **(1) null welding:**

Because of counterpoint by hand will cause deviation between chip and welding plate, surface tension of tin ball will make BGA chip and welding plate in the process of

automatic correction. Once heating, BGA falls not evenly, which cause the chip drops not evenly. If stop reflowing at this time, the chip will not fall normally, which will cause the phenomenon of empty welding and false welding. So you need to extend time of third and fourth temperature zones or add the bottom pre-heating temperature to make the tin balls meltdown and drop evenly.

**(2) short circuit:**

When the ball reached the melting point, it is in a liquid state, if too long or too high temperature and pressure, it will destroy surface tension of solder balls and the supporting role, resulting in short-circuit phenomenon when reflows, the chips fall entirely on the PCB pads, so we need to appropriately reduce the heating section of the third and fourth soldering temperature and time, or reduce the bottom of the preheat temperature.

**Note:** In normal use rework station it will produce small quantities of bad smelly, in order to ensure comfortable, safe and healthy operating environment, please keep indoor and outdoor air flow.



## F、 Procedure setting and usage

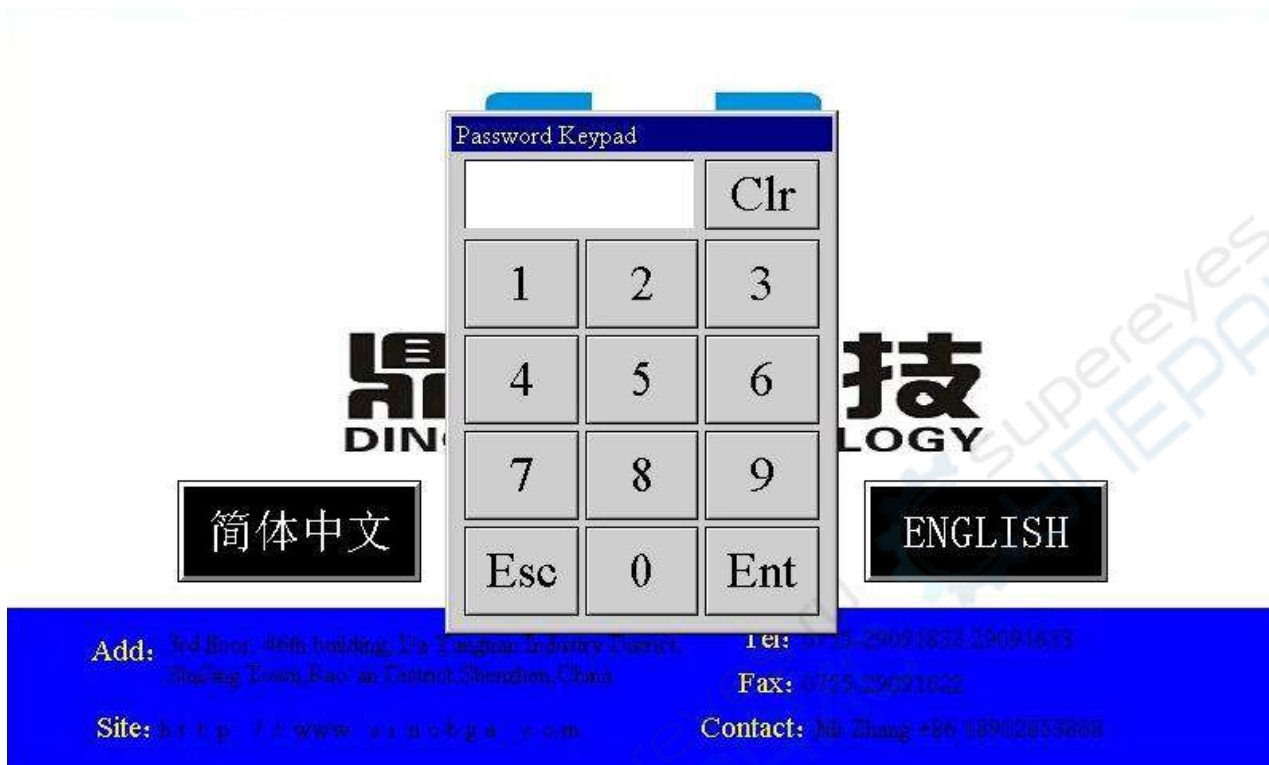
### Introduction of touch screen operation

1. Switch on the power, the BGA rework station can connect with electricity. The home page of touch screen will appear the interface like the following picture, and then you can choose the language interface as required.

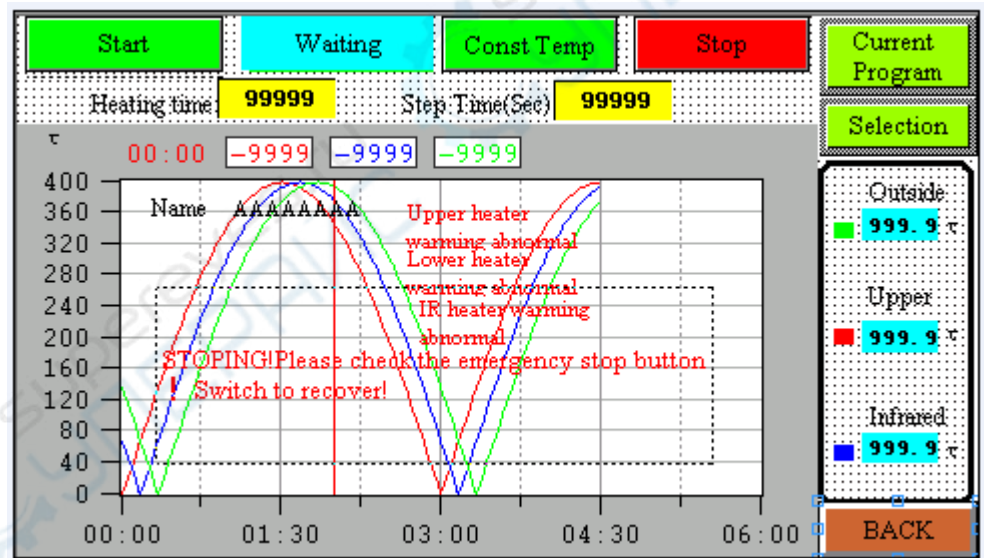


2. When we choose English, it will appear the working interface like the following picture.

Input password 8888, then click **Ent**.

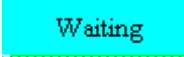



3. After logging password, you will get the following homepage



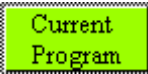
4. Introduction of the homepage:

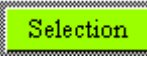
1) Start **Start**: Start heating button

2)Waiting / Heating : Show in the display frame of the heating condition after the heating is finished,

3)Const Temp : Click this button the heating temperature will stay the same to longer heating time.

4)Stop : Stop heating.

5)Current Program : Click this button, you will see current heating temperature parameter.

6)Selection : Click this button, you can choose one group of temperature profile from groups.

7)Heating time: Total heating time

8)Step time: Count down of each segment.

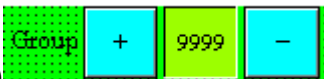
9)Outside: showing outside sensor curve, actual temperature running. The green color

10)Upper: showing temperature of upper hot air. The red color.


11)Lower: Show bottom IR heating temperature. The blue color

Name	Group	+	9999	-	Copy Date	Saved	BACK
▲▲▲▲▲▲▲	1st	2nd	3rd	4th	5th	6th	7th
Upper Tem	9999	9999	9999	9999	9999	9999	9999
Upper Rate	9999	9999	9999	9999	9999	9999	9999
Upper Time	9999	9999	9999	9999	9999	9999	9999
IR Temp	9999	9999	9999	9999	9999	9999	9999
IR Rate	9999	9999	9999	9999	9999	9999	9999
IR Time	9999	9999	9999	9999	9999	9999	9999

12)Name : Name for temperature profile.

13) : Group No., You can choose temperature profile here.

click  and  to choose

14)Copy Data : Used for copying last group of temperature to change /modify to a new one, you don't need to type every parameters when add more.

15) Saved Saved: Save temperature profile after modification.

16) Current Program Current Program: Click to get in the current curve frames, the following picture shows the working temperature parameters after starting heating. They are target temperature, constant temperature time, and the speed of heating (the speed of heating with °C/SEC calculation).

Current Program	1st	2nd	3rd	4th	5th	6th	7th	Name
Upper Tem	9999	9999	9999	9999	9999	9999	9999	AAAAAAAA
Speed Rate	9999	9999	9999	9999	9999	9999	9999	Group
Const Time	9999	9999	9999	9999	9999	9999	9999	
IR Temp	9999	9999	9999	9999	9999	9999	9999	Group
Speed Rate	9999	9999	9999	9999	9999	9999	9999	
Const Time	9999	9999	9999	9999	9999	9999	9999	

Two-zone temperatures can be set 7 levels of variable and constant temperature controls. If need, you can change the related parameters, but it's not saved, just can heat it with this line.

If saving is necessary, please refer to relative information of ingredient setting! If the temperature curve does not meet the needed welding temperature; please press the

return button BACK, returning to the main Interface.

Name	Group	+	9999	-	Copy Data	Saved	BACK
▲▲▲▲▲▲▲▲	1st	2nd	3rd	4th	5th	6th	7th
Upper Tem	9999	9999	9999	9999	9999	9999	9999
Speed Rate	9999	9999	9999	9999	9999	9999	9999
Const Time	9999	9999	9999	9999	9999	9999	9999
IR Temp	9999	9999	9999	9999	9999	9999	9999
Speed rate	9999	9999	9999	9999	9999	9999	9999
Const Time	9999	9999	9999	9999	9999	9999	9999


**In this interface, the temperature can be changed and saved.**

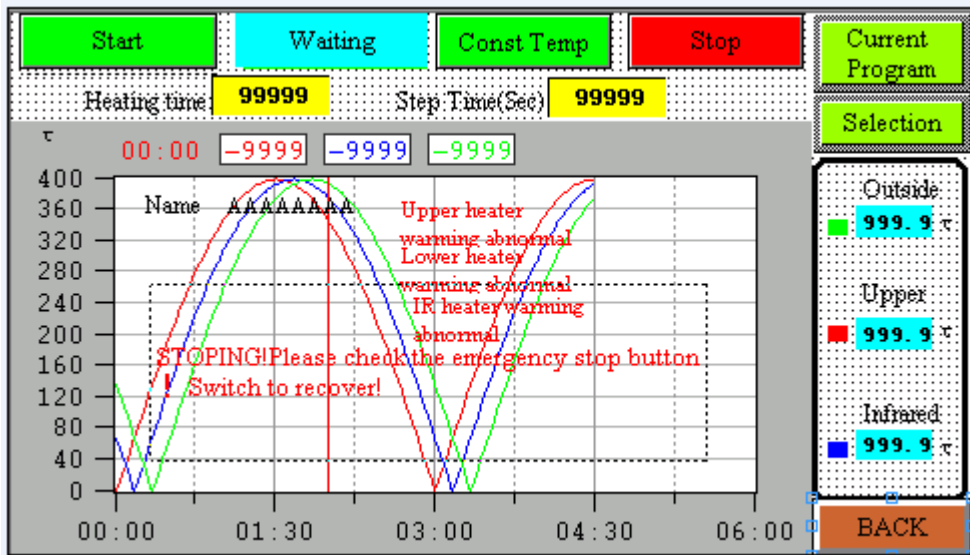
User can set the heating temperature, the constant time and the heat speed according to the requirements of the production process. The machine can be mass storage temperature curve. User can store a variety of manufacturing process parameters in the system. When replacing of the production process, direct call to the parameters saved in the system, equivalent to formulation saved in the system. There are different heating temperature with different products, it can save various kinds of parameters in the different formulation, and it will be easy to use it when changed the products, not need to change

many parameters. It can click  and  to choose the right formulation directly.


If have to input new parameter, click the parameter you will get a small page..

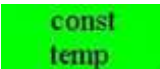
Input the parameter you need, press "ENTER" key . When temperature parameters


Settings of these three temperature zones are finished, click "save curve" , then all parameters you have set are all saved.



Click 'Start' ,the whole station start heating, and the working curve is showing the current parameter, There is "voice warning" 5-10 seconds before heating

finish. If click 'stop'  in the normal operation process, the machine will stop

heating. And click 'Keep' , the button appears as flashing, showing the machine entering the temperature kept status, and the whole heating temperature will keep the current temperature constant working, until click the button again, it will return to normal heating as setting.

When Click the 'Back' , it wills pop-up function selection screen.You can

choose the 'English'  interface.

**NOTE:**

**When it alarm because of stoppage, all function buttons are in locked state! After managing the stoppage and starting up, it can recover to normal state!**

**G. usual temperature parameters as follows:**

### **Lead temperature curve welding**

**15\*15 BGA chip welding temperature setting**

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

**12\*12 BGA chip welding temperature setting**

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

### 7\*7 BGA chip welding temperature setting

	First	Second	Third	Fourth	Fifth
Upper heating	160	180	200	210	215
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

#### 15\*15 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				

#### 12\*12 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				

### 7\*7 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.**

**When remove the BGA chip, the temperature reduction is set at 0.**

### H. Handling Precautions

1. After opening the power, firstly you should check whether the upper hot air nozzle have cold wind. If not, starting the power is strictly prohibited. or the heaters will be burnt.
2. You should set different temperature curves when repair different BGA, each temperature should not higher than 300°C; Lead-free rework setting can refer to welding temperature curve of BGA tin bead.
3. 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.
4. Before installation of BGA chip, it is necessary to check that if the PCB pad and BGA tin bead are all in good condition. After welding, it have to check the exterior appearance by

piece, if it is unusual, it should stop the BGA chip installation and test the temperature, and it has to be adjusted properly before welding, otherwise it will be damage the BGA chip or PCB board.

5. The machine surface needs to be clean at regular time, especially the Bottom pre-heating zone. Avoid the dirt stay on the board, because the dirt can lead to heat radiation un-normally, bad welding quality and shorten the using time of infrared heating element.

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

#### **Concluding remarks:**

In the electric products line, especially the PC and electric production field, component trend to microminiaturization, multifunction 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 safer, more convenient, more speedily assembly and repair equipment craft.

#### **Packing list:**

NO	Item	specification	Unit	Qty
1	BGA rework station	DH-200	SET	1
2	Vacuum sucker		SET	1
3	Instruction manual	DH-200	COPY	1
4	Hot-air nozzle	7*7,12*12,15*15mm,	PCS	3
5	Universal fixture		PCS	6
6	Plum knob		PCS	4
7	Temperature sensor		PCS	1