DING HUA TECHNOLOGY DH-A1L-C BGA Rework Station Instruction Manual

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Company introduction

SHENZHEN DINGHUA TECHNOLOGY DEVELOPMENT CO.,LTD is a professional manufacturer of welding equipments. Our products: bga rework stations, automatic soldering machines, automatic screw driving 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!

Installation of BGA rework station

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

Power Requirements

- Use a smaller power supply voltage fluctuation

- Voltage fluctuations: 220V±10
- Frequency fluctuations: 50Hz±3

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

Structures and specifications

Structures

Features

er			
1	Limit bar	limit the lowest position of the upper heating	Rotate to the right place
2	Tension adjustment knob	lock the upper zone of up and down ,before and after	Rotate the knob
3	Before and after adjustment handle	Adjust the upper zone of before and after position	Rotating the handle
4	Head light	Lighting equipment at work	Press the button
5	PCB fixing workbench	Move the right position , clamping the PCB	Movable and screw
6	Camera	Chip and PCB imaging	Focus
7	Monitor screen	For Chip and PCB imaging on it	Turn on
8	Vacuum pen	Chip picking up	Cover a small hole on it
9	Height of lower heater's adjustment	Adjust the lower nozzle distance from the PCB board	Rotating the handle
10	Upper head	Heigh, direction and upper heater	knob
11	Height of upper head	Height adjusting	Knob
12	Upper nozzle	Hot-air flow through	Magnetic
13	Beams	For PCB supporting	Movable
14	Lower heater	Lower hot-air flow through	Knob
15	Cross-flow fan	For PCB cooling	Automatic
16	Button of light	light switch	Press the button
17	Button of laser	For chip positioning	Press the button
18	Thermocouple port	External temperature testing	Plug in
19	Touch screen	Time and temperature setting	Click
20	Top air-flow adjusting knob	Upper hot-air flow adjusting	Knob

Specification

Total Power	4800W
Top heater	1200W
Bottom heater	2 nd:1200W 3 rd:2400W (Plus large fever area to adapt to all kinds of P board)
Power supply	AC220V±10% 50/60Hz
Dimensions	L500×W600×H650 mm
Positioning	V-groove, PCB support can be adjusted in X direction with external universal fixture
Temperature control	K thermocouple （K Sensor）Closed loop
Temp accuracy	±2 degree
PCB size	Max 380*420 mm Min 22×22 mm
BGA chip	2X2-80X80mm
Minimum chip spacing	0.15mm
External Temperature Sensor	One(optional）
Net weight	40kg

Description

1. Embedded industrial PC, high definition touch screen, human-machine interface operation, PLC control, and instant curve analysis function. Real-time display settings and actual temperature curve, which can also be used to analyze and correct the curve if necessary.
2. It uses high precise k-type thermocouple closed-loop control and automatic temperature compensation system, with PLC and temperature module to enable precise temperature deviation to add and subtract 2 degrees. Meanwhile, external temperature measurement connector enables temperature diction and accurate analysis of real time temperature curve.
3. V-groove PCB works for rapid, convenient and accurate positioning, which can meet all kinds of PCB board of positioning.
4. Flexible and convenient removable fixture on the PCB board can protect the PCB fringe devices from

damaging and transmuting. It can also adapt to various BGA ‘s reworking.

5. Various sizes of BGA alloy nozzles, which can be adjusted 360 degree for easily installation and replacement.
6. Three temperature areas can independently heat and they are multiple temperature control, which can ensure best integration of different temperature areas. Heating temperature, time, slope, cooling and vacuum can all be set in the human-machine interface.
7. There are 6-8 temperature controls up and down. Massive storage of temperature curves which are accessible at any time according to different BGA. Curve analysis, setting and adjustment are also accessible via touch screen. Three heating areas adopt independent PID calculation to control heating process to enable more accurate temperature.
8. It uses high power cross-flow fan to enable fast cooling of PCB board and prevent PCB from deformation. There are also internal vacuum pump and external vacuum chuck, which can help to fetch the BGA chip
9. Collocating with sound control “early warning” function. It can warn workers to make some relative preparation 5-10 seconds before the completion of uninstalling or welding. Cooling system will start after vertical wind stopped heating. When the temperature drops to normal temperature, the cooling process will stop automatically, so that the machine will not be aging after temperature heated up.
10. It approved CE certification, and this appliance was equipped with emergency stop switch and automatic power-off protection device when emergency happens.

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,to suck the BGA chip away with the vacuum suction pen.
3. Clean-up welding

   The BGA pad clean-up , one with desoldering line to drag flat, the second with iron; Best to remove the tin a short time after the BGA removed , then 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,better to clean the soldering tin. 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 th phenomenon of empty welding and false welding.So you need to extent time of third forth 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 the , 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.

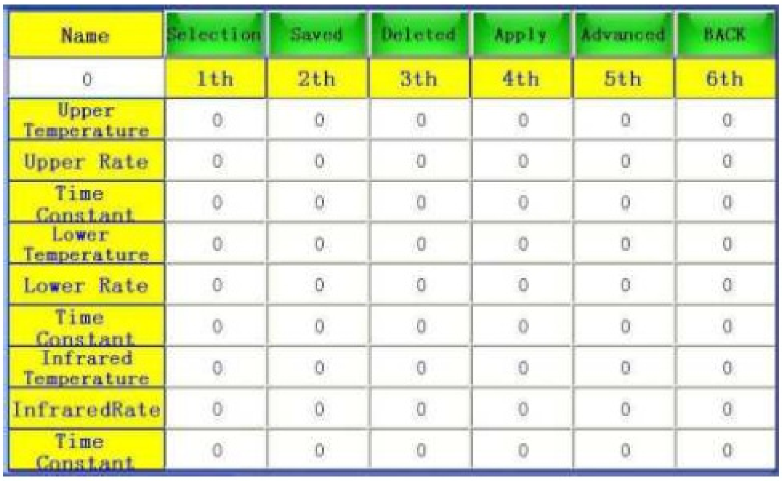
      Note: In normal use rework station it will produce small quantities of bad smelly, in order to ensure comfortable, safe and healthy operating environment, pls keep indoor and outdoor air flow.

Procedure setting and usage

Introduction of touch screen operation

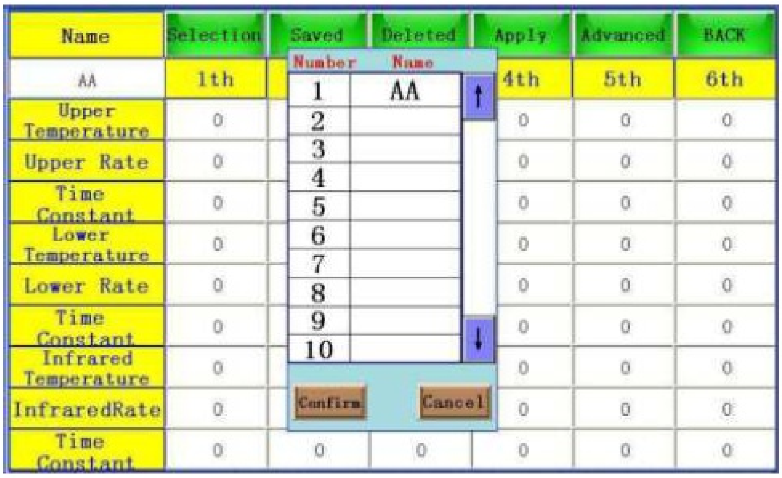
1. Open the control power, the BGA rework station can connect with electricity. The home page of touch screen will appear the interface like the following picture, and then you can choose the language interface as required.
2. When we choose Chinese, it will appear the working interface like the following picture:
3. Input password, then click to enter LOAD.

Click the button of “current curve”, enter “START” to operate the heating lines we need. They are separately target temperature, instant temperature time, and the speed of heating (the speed of heating with °C/SEC calculation). Three-zone temperatures can be set 6 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 doesn’t meet to the needed welding temperature; please press the return button, returning to the main Interface.
Press” Curve Selection”, it will show the flowing interface after entering.



Name	Selection	Saved	Deleted	Apply	Advanced	BACK
0	1th	2th	3th	4th	5th	6th
Upper Temperature	0	0	0	0	0	0
Upper Rate	0	0	0	0	0	0
Time Constant	0	0	0	0	0	0
Lower Temperature	0	0	0	0	0	0
Lower Rate	0	0	0	0	0	0
Time Constant	0	0	0	0	0	0
Infrared Temperature	0	0	0	0	0	0
InfraredRate	0	0	0	0	0	0
Time Constant	0	0	0	0	0	0

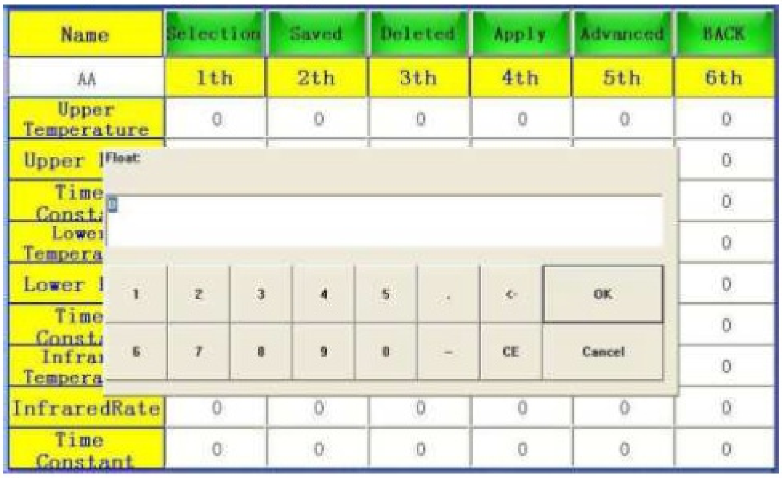
In this interface, the temperature can be changed and saved.
User can set the heating temperature, the constant time and the heat speed according to the requirements of the production process. The machine can be mass storage temperature curve. User can store a a variety of manufacturing process parameters in the system. when replaceing 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 paraments in the different formulation, and it will be easy to use it when changed the products, not need to change many paraments. It can click the line name to choose the right formulation directly.



Name	Selection	Saved	Deleted	Apply	Advanced	BACK
AA	1th			4th	5th	6th
Upper Temperature	0			0	0	0
Upper Rate	0			0	0	0
Time Constant	0			0	0	0
Lower Temperature	0			0	0	0
Lower Rate	0			0	0	0
Time Constant	0			0	0	0
Infrared Temperature	0			0	0	0
InfraredRate	0			0	0	0
Time Constant	0	0	0	0	0	0

Number	Name
1	AA
2	
3	
4	
5	
6	
7	
8	
9	
10	

If have to input new parameter, click the button of “curve choose”, and then click on the numerical place, the input button will appear.

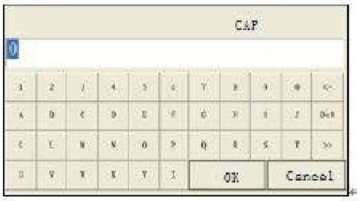


Name	Selection	Saved	Deleted	Apply	Advanced	BACK
AA	1th	2th	3th	4th	5th	6th
Upper Temperature	0	0	0	0	0	0
Upper						0
Time Consta						0
Lower Tempera						0
Lower						0
Time Consta						0
Infra Tempera						0
InfraredRate	0	0	0	0	0	0
Time Constant	0	0	0	0	0	0

Float:

0

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.



And it also can be changed and saved by “curve chooses”.

Click ‘Start’, the whole station starts to heating ,and the working curve is showing the current parameter and it will also clear the previous curve showed on screen. The whole heating will complete until the upper setting temperature or the upper part of the heating rate is zero, and just the machine stops running, with the alarm ringing, if the cooling vacuum interface has been set up within the cooling and vacuum state, then these two output also work. 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.

Advanced Parameters have been set well, and they are not needed to change. The machine can monitor the speed of the cooling fans, and also can set the lowest speed. When the cooling fans stop running or the speed lower than the setting one, and the collection of hot air up and down the value of the actual temperature is higher than 300 degrees, the heating system will stop heating immediately. System can automatically set the early warning time, such as early warning: 10 second, showing that the buzzer alarm will sound when there is 10s left heating. When machine into the cooling state, in the main interface will show the corresponding fault tips! It can help the operator to quickly determine the point of failure!

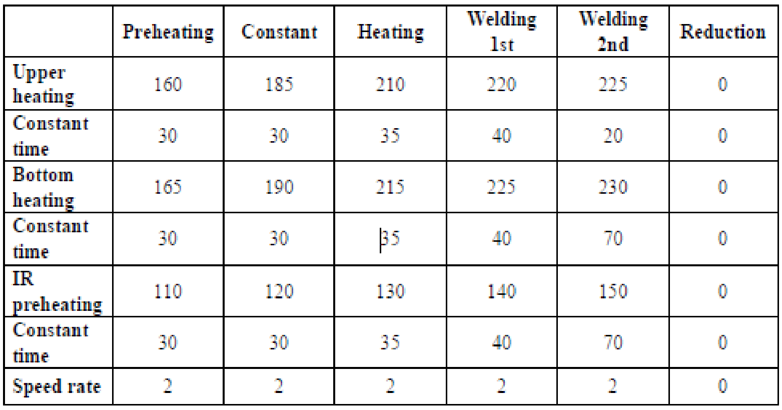
When Click the ‘Back’, it wills pop-up function selection screen.it can choose the ‘English’ interface.

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!

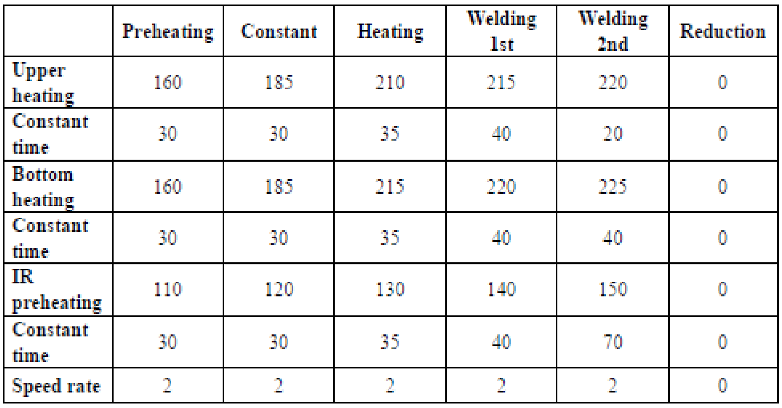
Lead temperature curve welding

41*41 BGA welding temperature setting



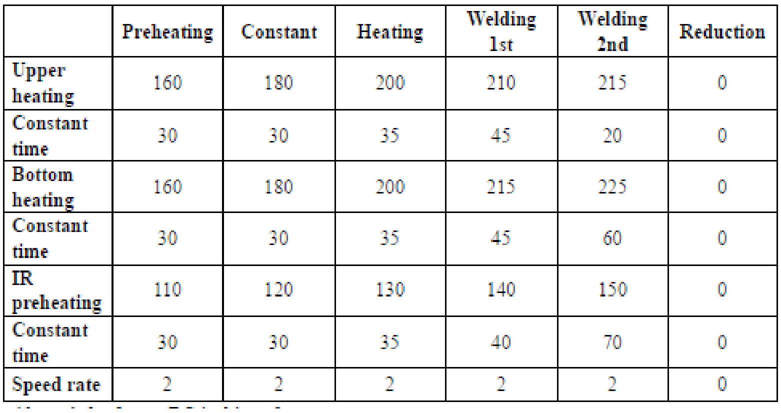
	Preheating	Constant	Heating	Welding 1st	Welding 2nd	Reduction
Upper heating	160	185	210	220	225	0
Constant time	30	30	35	40	20	0
Bottom heating	165	190	215	225	230	0
Constant time	30	30	35	40	70	0
IR preheating	110	120	130	140	150	0
Constant time	30	30	35	40	70	0
Speed rate	2	2	2	2	2	0

38*38 BGA welding temperature setting



	Preheating	Constant	Heating	Welding 1st	Welding 2nd	Reduction
Upper heating	160	185	210	215	220	0
Constant time	30	30	35	40	20	0
Bottom heating	160	185	215	220	225	0
Constant time	30	30	35	40	40	0
IR preheating	110	120	130	140	150	0
Constant time	30	30	35	40	70	0
Speed rate	2	2	2	2	2	0

31*31 BGA welding temperature setting

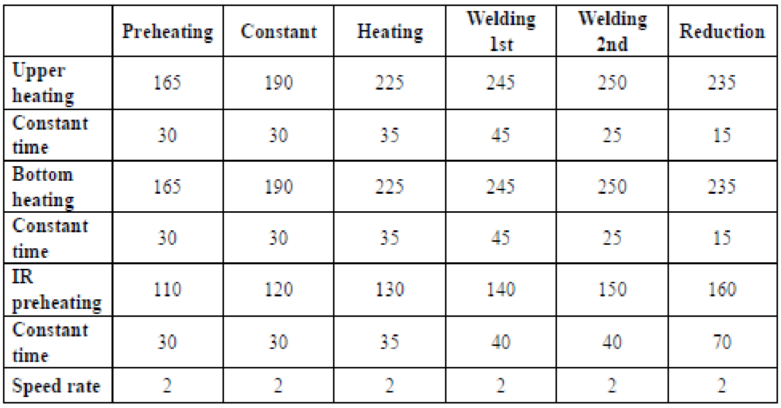


	Preheating	Constant	Heating	Welding 1st	Welding 2nd	Reduction
Upper heating	160	180	200	210	215	0
Constant time	30	30	35	45	20	0
Bottom heating	160	180	200	215	225	0
Constant time	30	30	35	45	60	0
IR preheating	110	120	130	140	150	0
Constant time	30	30	35	40	70	0
Speed rate	2	2	2	2	2	0

Above is lead type BGA chip reference temperature.

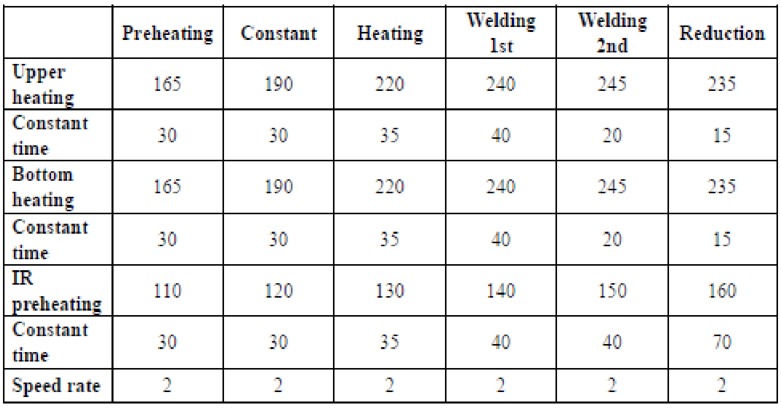
Lead-free temperature curve welding

41*41 BGA welding temperature setting



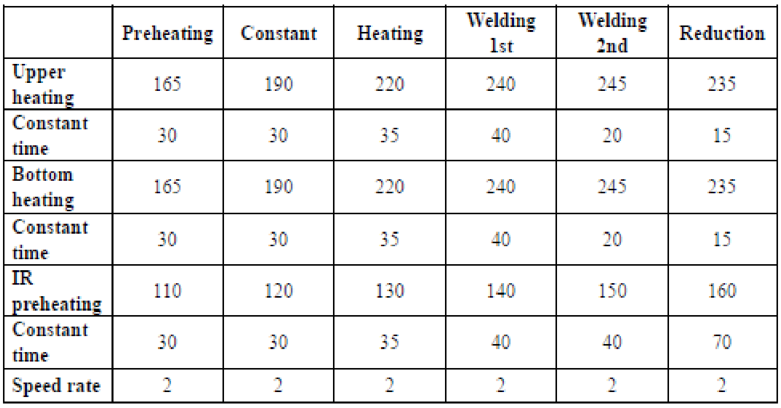
	Preheating	Constant	Heating	Welding 1st	Welding 2nd	Reduction
Upper heating	165	190	225	245	250	235
Constant time	30	30	35	45	25	15
Bottom heating	165	190	225	245	250	235
Constant time	30	30	35	45	25	15
IR preheating	110	120	130	140	150	160
Constant time	30	30	35	40	40	70
Speed rate	2	2	2	2	2	2

38*38 BGA welding temperature setting



	Preheating	Constant	Heating	Welding 1st	Welding 2nd	Reduction
Upper heating	165	190	220	240	245	235
Constant time	30	30	35	40	20	15
Bottom heating	165	190	220	240	245	235
Constant time	30	30	35	40	20	15
IR preheating	110	120	130	140	150	160
Constant time	30	30	35	40	40	70
Speed rate	2	2	2	2	2	2

31*31 BGA welding temperature setting



	Preheating	Constant	Heating	Welding 1st	Welding 2nd	Reduction
Upper heating	165	190	220	240	245	235
Constant time	30	30	35	40	20	15
Bottom heating	165	190	220	240	245	235
Constant time	30	30	35	40	20	15
IR preheating	110	120	130	140	150	160
Constant time	30	30	35	40	40	70
Speed rate	2	2	2	2	2	2

Above is lead-free type BGA reference temperature
When remove the BGA chip, the temperutre reduction is set at 0.

Handling Precautions

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 settled 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 vaccum. 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 chipand keep cooling for 30-40 seconds ,or move away the main heater after the starting light is off ,finally take away the PCB boaed from the support.
5. 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.
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 unnormally, bad welding quality and shorten the using time of infrared heating element.

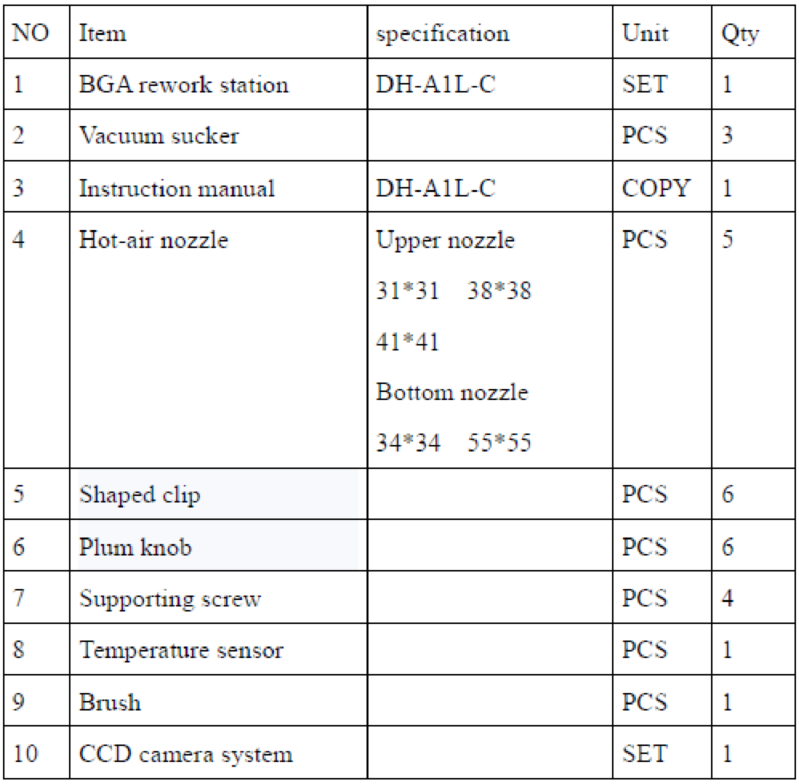
If the heating element was burn out because of these, our company is not responsible for free change!

Concluding remarks

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

Packing list



NO	Item	specification	Unit	Qty
1	BGA rework station	DH-A1L-C	SET	1
2	Vacuum sucker		PCS	3
3	Instruction manual	DH-A1L-C	COPY	1
4	Hot-air nozzle	Upper nozzle 31*31 38*38 41*41 Bottom nozzle 34*34 55*55	PCS	5
5	Shaped clip		PCS	6
6	Plum knob		PCS	6
7	Supporting screw		PCS	4
8	Temperature sensor		PCS	1
9	Brush		PCS	1
10	CCD camera system		SET	1

Documents / Resources

 深圳市鼎华科技发展有限公司 SHENZHEN DINGHUA TECHNOLOGY DEVELOPMENT CO.,LTD DH-A1L-C BGA Rework Station Manual ADD：4th Floor, Building 6B, Shengzuozhi Technology park, Xinqiao Town Bao'an District, Shenzhen City, China Website：www.sinobga.com Tel.：0755-29091633 29091822 Fax：0755-29091622 E-mail:service@dinghua-bga.com	DING HUA TECHNOLOGY DH-A1L-C BGA Rework Station [pdf] Instruction Manual DH-A1L-C BGA Rework Station, DH-A1L-C, BGA Rework Station, Rework Station, Station

References

- Homepage - Battery Global Advisors
- TV Radio FM Trasmitters Amplifiers - DB Broadcast
- BGA rework station|Shenzhen Dinghua Innovation Technology Co., Ltd.