

# 深圳市安泰信电子有限公司

ShenZhen ATTEN Electronics Co.,LTD



## AT-8225 BGA Rework Station Manual

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# 1、Company profile

Shenzhen Atten Electronics Co. Ltd., is the pioneering name in electronics instruments manufacturing in China. Established in 1996 and in a short span of 12 years, Atten had grown into a professional enterprise engages in electronic instruments and communication apparatus and also we are the largest electronic company and strongest in technology around china.

Atten is the unique large-scale ISO9001:2000 company who produces spectrum analyzers for industry and commerce in china. Our company has more then 600 skilled workers, with 10 production lines and 20000 square meter modern factory area manufacturing high quality products.

ATTEN GROUP OVERVIEW ATTEN GROUP Inc's subsidiaries include: ATTEN (HONGKONG) Co., Ltd, Shanghai TANA Electronics Co., Ltd., Shenzhen ATTEN Electronic Co. Ltd., Atten Microwave Co. Ltd. and Shenzhen ATTEN Power Supply Factory. We have sales branches all over the country, in Beijing, Shanghai, Chengdu, Jinan Kunming, Xi'an, Nanchang, Changsha, Quanzhou, Hefei, Guangzhou and Shenzhen. So far, we have established two Product R D Departments and a Microwave Instrument Institute. They mainly engage in developing and application of RF, Microwave products, and has developed more than ten national patented products.

## 2、Safety Precautions

Please carefully read the relevant information provided by the manual before starting using this machine. □

- A. Make sure that the power cord has been properly connected before using the machine.
- B. Install the rework station at a location free from splashing of water or other liquids. □
- C. Install the rework station at a dry location. □
- D. Install the rework station at a location free from excessive dust. □
- E. Install the rework station at a location away from inflammables. □
- F. Before starting any process, install the rework station at a location free from the direct airflow impact from air Conditioner, heater or ventilator. □
- G. Regularly clean the surface of the machine especially the ceramic. □
- H. For more safety, please wear heat-proof gloves and never touch the high-temperature zone.

**Power Supply :AC220V±10%    50/60Hz**

## 3、Specification:

## 1. Structure



Number	Name	Functions	Use ways
1	Limit bar	limit the lowest position of the upper heating	Rotate to the right place
2	Upper heater	Generate hot air	
3	Knob of up-down adjust	lock the upper zone of up and down ,before and after	Rotate the knob
4	LED light	Lighting equipment at work	Press the button
5	Upper heater nozzle	Adjust the lower nozzle distance from the PCB	Rotating the handle

		board	
6	PCB supporter	Supporting the pcb board	
7	LED button	LED light control	Press the button
8	Stop button	Stop the machine	Press the button
9	Start button	Start the machine	
10	PCB supporter	Adjust the upper zone of the position up and down	Rotating the handle
11	IR heater	Preheating the PCB board	
12	Cross flow fan	Cooling the PCB board after weilding	
13	Upper heater controller	Control the upper heater	
14	Fan button	Control the fan on/off	
15	IR heater controller	Control the IR heater	

## Specification

<b>Power</b>	<b>2600w</b>
<b>Top heater</b>	<b>800W</b>
<b>Bottom heater</b>	<b>1800w</b>
<b>Power supply</b>	<b>AC220V±10% 50/60Hz</b>
<b>Dimensions</b>	<b>L470×W370×H500 mm</b>
<b>Positioning</b>	<b>V-groove, PCB support can be adjusted in X,Ydirection with external universal fixture</b>
<b>Temperature control</b>	<b>K thermocouple (K Sensor) Closed loop</b>
<b>Temp accuracy</b>	<b>±2 degree</b>
<b>PCB size</b>	<b>Max 300mm × 300mm Min20mm × 20mm</b>
<b>BGA chip</b>	<b>5*5~55*55</b>
<b>Minimum chip spacing</b>	<b>0.15mm</b>
<b>Net weight</b>	<b>About 14.5KG</b>

### 3,Description:

1.This machine adopts two -zone design , the upper hot air heating and the lower part of IR heating , the upper and lower temperature independent temperature control , configuration, high-precision temperature controller , which can set 8 heating and cooling , can also store 10 groups of temperature .

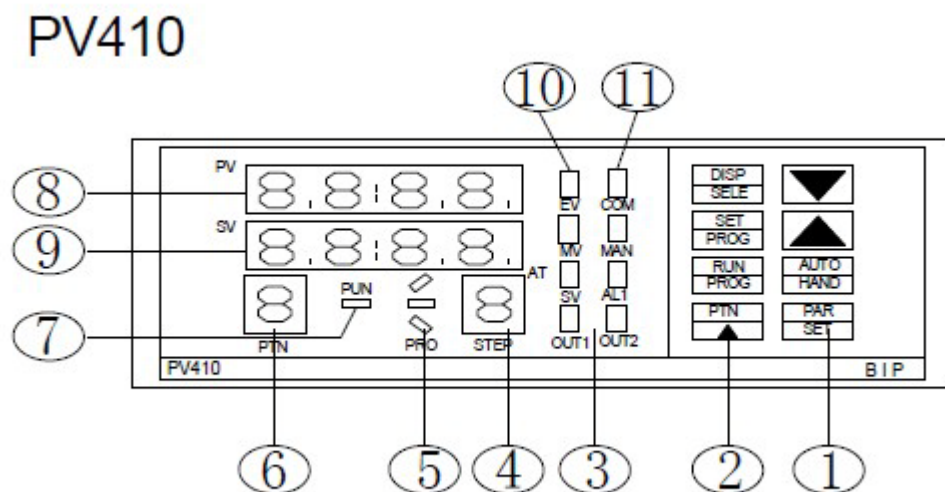
2. It uses high precise k-type thermocouple closed-loop control and automatic temperature compensation system, with PLC and temperature module to enable precise temperature deviation to add and subtract 2 degrees. Meanwhile, external temperature measurement connector enables temperature diction and accurate analysis of real time temperature

curve.

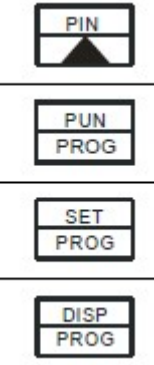
3. V-groove PCB works for rapid, convenient and accurate positioning, which can meet all kinds of PCB board of positioning.
4. Flexible and convenient removable fixture on the PCB board can protect the PCB fringe devices from damaging and transmuting. It can also adapt to various BGA chip's repaired.
5. Various sizes of BGA alloy nozzles, which can be adjusted 360 degree for easily installation and replacement.
6. 8 liters (down) and 8 segments constant temperature control
7. After demolition and completion of welding, operators should make relevant preparations as hearing the warning voice; meanwhile it should use a large flow cross-flow fan by auto / manual to cooling of the PCB board, to prevent the deformation of PCB board to ensure the welding results.
8. It approved CE certification, and this appliance was equipped with emergency stop switch and automatic power-off protection device when emergency happens.

## 4、Setting and operation

### 1、Introduction about the functions of the temperature controller



No	Item	Explanation
		Parameter hypothesis key
		Automatic / manual switch key
		numerical increase key




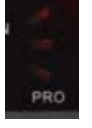





















1		numerical reduce key
2		Curve program group increased bond
		Start / pause curve program running key
		Curve program parameters set key
		Display item switch key
3	OUT1	Output 1 indicator light
	OUT2	Output 2 indicator light
4	STEP	Display of Curve program segment, display curve program is running, the segment number display curve
5	PROFILE	Curve program monitoring indicator light, when operating in the ramp up time, display" /" when running on the platform section, show "-"
6	PIN	Program number display curve, curve shows the program number
7	OP3	The third output indicator
	AT	PID self tuning indicator
	RUN	Curves running indicating lamp
8	PV	Display measured values
9	SV/MV/EV	Show that the set value, the output value or the long running time, when you press the DISPSELECT key items to display toggle
10		Set value indicating lamp, a downlink window display the set value, the indicator will be lit
		Output value indicating lamp, downlink window display value, the indicator will be lit



	MV	
		External indicator lamp, a downlink window display the set value, the indicator will be lit
11	AL1	The first alarm lamp
	MAN	Manual control indicator light, when the manual control, the indicator light
	COM	Communication indicator lights, and other registration form to transmit data, the indicator light



No	Name	Description
1		Display toggle key
2		Decrease value key
3		Curve editor setting key
4		Increase value key
5		Run or stop key
6		Manual or auto toggle key
7		The group count of curve increase key



8		parameter setting key
9		output indicator
1 0		Curve display, displaying the running segment number
1 1		Curve program monitoring indicator light. When rise, displays "↑", when parallel, displays "-", when display drop, displays "↓"
1 2		Curve run indicator key
1 3	 	Curve programme No display key.press  can choose from 0 to 9, one of the ten
1 4		Display the setting temperature
1 5		Display the fact sensing temperature
1 6	   	press  to change, when  light open.  Window shows the percentage of the output power
1 7	   	press  to change, when  light open.  Showed that the temperature of the temperature measuring port outside the window(using the sensor wire)
1 8		When connect to the computer.it shines



1 9		When the light of this key open,  Window display set temperature curve
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**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	
<b>Upper rate</b>	r1	3	r2	3	r3	3	r4	3	r5	3
<b>Upper temperature</b>	L1	165	L2	190	L3	225	L4	245	L5	250
<b>Time constant</b>	D1	30	D2	30	D3	35	D4	45	D5	25
<b>Lower rate</b>	r1	3	r2	3	r3	3	r4	3	r5	3
<b>Lower temperature</b>	L1	165	L2	190	L3	225	L4	245	L5	250
<b>Time constant</b>	D1	30	D2	30	D3	35	D4	45	D5	25
<b>infrared temperature</b>		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 **SET** **PROG** 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 **PAR** **SET** to continue.






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




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

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



5) r2 means the 2<sup>nd</sup> 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 2<sup>nd</sup> temperature, we set 190, then press  to continue.



7) D2 means the 2<sup>nd</sup> time, we set 30, then press  to continue.



8) r3 means the 3<sup>rd</sup>, temperature rate, we set 3.00, then press **PAR SET** to continue.




9) L3 means the third temperature. we set 225, then press **PAR SET** to continue.




10) D3 means the third time, we set 35, then press **PAR SET** 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 sxth, 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 window when you open the computer. Now setting is over.



Set the Infrared preheat area:

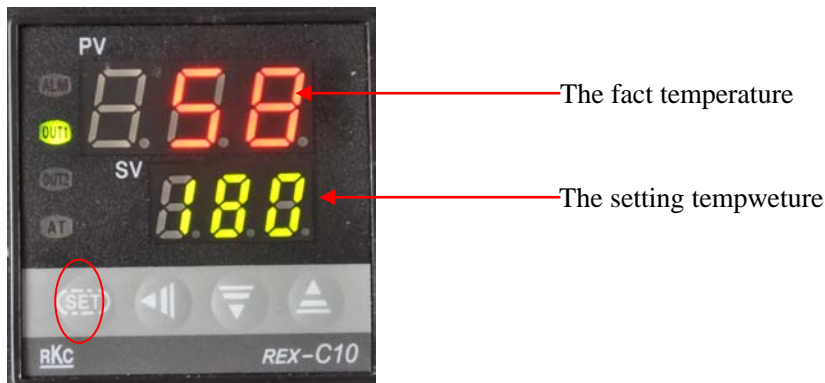


Press the adjust key about 3s.then  the temperature figure shines,

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.



## 5. 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 the phenomenon of empty welding and false welding. So you need to extend 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.

## 6, 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 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

### 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.

## 7、 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 setted 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!**

## 8, 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 safer, more convenient, more speedily assembly and repair equipment craft.

### Packing list:

NO	Item	Specification	Unit	Qty
1	<b>BGA rework station</b>	AT-8225	Set	1
2	<b>Instruction manual</b>	AT-8225	Copy	1
3	<b>Hot air nozzle</b>	31*31 、 41*41 、 38*38	Pcs	3
4	<b>Shaped clip</b>		Pcs	6
5	<b>Blossom knob</b>		Pcs	6
6	<b>Cross-flow cooling fan</b>		Pcs	1
7	<b>Supporting screw</b>		Pcs	4
8	<b>Data line</b>		Pcs	1
9	<b>Temperature Disc</b>		Pcs	1