



Desktop Reflow oven User Manual



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**Thank you very much for
your choice of our products and
please read this manual carefully before using!**



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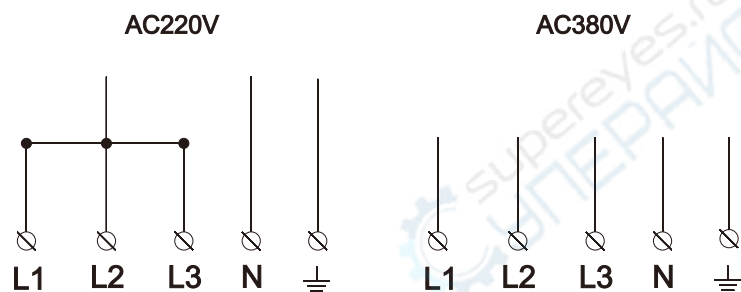
I . Product Overview

Thank you for buying and using the hot air reflow soldering of ZB-RF series produced by Wenzhou Zhengbang Electronic Equipment Co., Ltd. This model can meet different customers' demands of SMD soldering or solidification of different products with its compact and reasonable structure and superior performance.

This machine adopts the M-type stainless steel finned heating pipe with corrosion resistance, high temperature resistance, long service life and high heat efficiency. Cooperating with hot air circulation system, the heat storage structure allows the heat to be fully used. The multi-layered heat insulation structure minimizes the loss of heat. The temperature is controlled by PID closed circle, with highly precise temperature control.

Our quality policy is: "Continuous improvement, sustainable effectiveness, and users first". Zhengbang Electronic offers warm-hearted service for you!

II . Circuit Schematic



Remark : AC220V Wiring Diagram

Remark : AC380V Wiring Diagram

XI. After-sales Service

Warranty Card

Date of production: _____.

Marketing unit: _____.

REMARK

1. One year warranty from date of production, free maintenance as mechanical quality problem.
2. The warranty does not cover faults resulting from operation careless, handling or not following instructions.
3. Life service provided for the customers if out of warranty, only cost price for the spare parts.
4. Transportation fee won't be paid.

IX. Packing List

Before starting up, check whether the operating voltage of the machine is within the safe range or is steady, to ensure that all the parts of the machine can work normally and safely, and check whether all the setting parameters are consistent with those in the last shutdown. When shutting down, don't make the transport belt stop inside the machine which is still in high temperature, in order to avoid the accelerated aging of transport belt in the high temperature. It is advisable to stop the transport belt after the temperature in the machine is lower.

Generally, every day when the machine works, due to the requirements of indoor environment, the casing of machine and the residues on the outlet should be cleaned before and after work, in order to keep the machine look clean and tidy.

Transport belt:

- Lubricate the drive roller chain. Smear it with high temperature lubricant every two months.
- Regularly clean up the dust on the nylon wheel of chain drive.

Motor:

The motor of machine operates at a high speed for a long time. It is indispensable to add high temperature lubricant onto its arbor wheels not less than twice every week, in order to keep its smooth operation.

Fan:

Stir the air flow in the machine when the fan works. At the same time, clean all kinds of residues stuck on the fan blades and motor inside the machine timely, so as not to add up to cause a short circuit and burn out the fan.

Ground wire:

When the machine uses three-phase five-wire, the ground wire must be connected with the earth. Check whether the ground wire is connected before starting.

X. Accessories List

- | | |
|---------------------------------------|---------|
| 1. Instruction manual | 1 piece |
| 2. Certification | 1 piece |
| 3. Exhaust duct | 2 units |
| 4. Pipe button | 2 units |
| 5. Temperature profile sensor | 1 unit |
| 6. Computer, keyboard, mouse, display | 1 unit |

III. Technical Parameters

Type	ZBHW330	ZBRF530
Number of heating zones	3 Temperature Zones	5 Temperature Zones
Heating method	Infrared	Hot Wind
Number of cooling zones	2 Ventilation Cooling	
Length of heating zones	1000 mm	960 mm
Width of net belt	300 MM	
PCB dimension	MAX 280*280 MM	
Height of net belt	300 ± 20 mm	
Transport Speed of Net Belt	0 -- 15 00MM/MIN (Variable frequency Drive)	
Transport Direction of Net Belt	Left—Right (Right —Left)	
Input Power	Three-phase Rive-wire AC 380V 10% 50Hz	
Starting power	6KW	7KW
Operating Power	2KW	2.5KW
Heating up time	About 20 minutes	
Time of Passing Through the Machine	3.5 - 5.5 min	
Temperature Control Range	Ambient Temperature – 400℃	
Temperature Control Method	Touch Screen Control (PID Closed-loop Calculation)	
Outline size	L1700*W710*H660 mm	
Body Weight	131Kg	150Kg

IV. Equipment Installation

(1)Installation site

- Please operate the machine in a clean environment;
- Please avoid operating or storing the machine under the environment conditions of high temperature and humidity;
- Don't install the machine near electric or magnetic interference sources;
- When installing, the inlet and outlet of reflow soldering machine should not directly face the fan or the windows with wind blowing.

(2) Safety precautions

1. When using it, don't put something other than the work pieces into the machine;
2. Please pay attention to the high temperature during operation, to avoid scalding;
3. When conducting the maintenance, try best to start up the machine in room temperature.

(3) The operating environment of this series of model

Environment temperature: Regardless of whether there are any work pieces in the reflow soldering machine, the working environment temperature of this series of reflow soldering machine should be between 5-40℃.

Relative humidity: The relative humidity of the working environment of this series of reflow soldering machine should be between 20-95%.

Transportation and storage: This series of reflow soldering machine can be transported and stored within the range of -25-55℃. Within 24 hours, it can withstand the high temperature not more than 65℃. During the transportation, please try best to avoid excessive humidity, vibration, pressure and mechanical shocks.

(4) Power source

Please use the power source of three-phase four-wire 380V 50Hz and rated current, and ground the rack. The grounding should be operated by the licensed electrician.

(5) Height adjustment of reflow soldering machine

Adjust the transport height and level of reflow soldering machine through the adjustable four machine legs at the bottom of machine. The adjustment method is using industrial and alcohol level meter to measure, and make repeated horizontal adjustments to the reflow soldering machine on all sides through the adjustable four machine legs at the bottom of machine, until it is completely horizontal.

(6) Notice for users Notes

1. The reflow soldering machine should operate in a clean environment, to ensure the soldering quality;
2. Don't use and store the machine under the conditions of open air, high temperature and humidity;
3. Don't install the machine near electric or magnetic interference sources;
4. When repairing the machine, please shut down the power to prevent electric shock or short circuit;
5. After moving the machine, it is necessary to check all the parts, especially the position of transport net belt, to prevent it from getting stuck or falling off;
6. The machine should keep steady, without any tilted or unsteady phenomenon. Adjust the foot cups at the bottom of machine to ensure that the transport net chain is in a horizontal state, to avoid the displacement of PCB board during transportation.
7. When operating, please pay attention to high temperature, to avoid scalding;
8. Make sure that the transport net chain will not fall off the roller at the bottom.

Problems Possible Causes Adoptable Measures

SMT Fault Diagnosis and Solutions

Problems	Possible Causes	Adoptable Measures
Incomplete reflow	1. Insufficient heating 2. The shadow of components 3. Copper foil in the middle of board	a. Reduce the speed of belt. b. Increase the heat at the bottom. c. Reduce the speed of belt and increase the preheating zones.
Insufficient wetting	1. The board and components are oxidized and cannot be tinned. 2. There is no time for sufficient wetting.	a. Pre-tin the board and components. b. Increase temperature 1, 2, 3 or 4.
Warping of board	1. Exceed the limit of temperature difference of the board.	a. Reduce the temperature difference of preheating section and the temperature zone at the bottom. b. Increase the speed of belt.
Board is discolored or dim.	1. Exceed the tinning temperature of board. 2. Exceed the temperature gradient or heating speed.	a. Increase the speed of belt. b. Reduce the preset zone temperature. c. Increase the speed of belt and zone temperature 3 and 4.
Too many fine articles	1. The top temperature is over the limitation. 2. The viscosity of solder paste is too small or the network board is too thick.	a. Reduce heat on the top and increase the zone temperature 2 and 4 at the bottom. b. Check the viscosity and reduce the thickness of network board.
Solder balls	1. The drying is too fast. 2. Tin printing is unqualified or the board is reprinted. 3. The solder paste is not good with oxidation. 4. There is moisture in the solder paste. The solder paste is too much.	a. Decrease the speed of belt and zone temperature 3 and 4. b. Use the board only after cleaning and drying it. c. Enhance the activity or change solder paste. d. Reduce the humidity in the surrounding. e. Adjust the printing.
Flux is coked.	1. Exceed the temperature.	a. Increase the speed of belt. b. Reduce the preset zone temperature 5.
Micro-components are dislocated.	1. The location is not proper. 2. The tinning on the pad is irregular or unsymmetrical. 3. Drying too fast causes the airflow to blow components.	a. Check the location. b. Check the tinning shape and thickness. c. Decrease the speed of belt and zone temperature 3 and 4.
Solder bridge	1. The position is not proper or there is tin on the back of the network board. 2. The solder paste collapses. 3. The heating is too fast.	a. Check the position or clean the network board. Adjust the printing pressure. b. Increase the metal ingredients and viscosity. c. Adjust the temperature time profile.
Tin is removed or collapses.	1. The wetting is over time or the environment temperature is too high. 2. The viscosity of solder paste is small.	a. Adjust the profile or increase the speed of belt or control the environment humidity. b. Choose appropriate solder paste.
The components are erected.	1. The heating is too fast and uneven. 2. The solderability of component is poor. 3. The ingredients of solder paste are unsteady.	a. Adjust the temperature time profile. b. Check the components. c. Choose the solder paste with good solderability.
Insufficient solder	1. Printing parameter is wrong, which results in the insufficiency of solder paste. 2. The tinning of pad is uneven. 3. The components are uneven. There is solder mask and dirt on the pad.	a. Reduce the viscous force or check the angle and speed of printing pressure. b. Try to make the tinning on the pad even.
Over-temperature of the board	1. Heating rate is too high.	a. Decrease the speed of belt and preset zone temperature.

VIII. Fault Analysis

Phenomena	Check measures
1. The machine cannot operate.	a. Check the power source: the machine power supply in the switch box on the wall
	b. Check whether the circuit breaker is turned on.
2. The temperature does not rise.	a. Check whether SSR is normal. Reconnect or replace SSR.
	b. Check whether the interface of heating tube is disengaged. Reconnect it.
3. The transport belt does not work.	a. Check whether the speedcontroller is in start state.
	b. Check whether the motor sprocket of transport belt is slipping.
	c. Check whether the speed control motor is damaged.
	d. Check whether the connecting line is solid and reliable.
4. The fan does not work.	a. Check whether the power line is disengaged.
	b. Check whether the fan is damaged.
5. Overheating	a. The fan does not work.
	b. The temperature controller is out of control.
	c. SSR breaks down and burns out.

Warning of maintenance and overhaul:

In emergency stop, though the breaker is disconnected, there is still electricity in the circuit. Before repairing or maintaining the machine, disconnect the circuit devices installed on the wall, to ensure that the electricity entering the machine is cut off.

The replacement of heating tube:

- Open the furnace pipe to disassemble the sensor.
- Remove the cooling aluminum plate.
- Remove the connecting lines at both ends of the electric heating tube.
- Remove the fixed nuts at both ends of the heating tube.
- Take out and replace the heating pipe.

Suggested repairing spare parts to prepare:

- SSR;
- Fan;
- Heater;
- Alarm bulb

V. Operating Instructions

(1) Installation site

- Turn on the switch of power source.
- Turn on the main power switch of reflow oven and make sure that the emergency stop switch is not pressed, and then, press the green starting button.
- Turn on the switch of electron speed regulator of transport belt on the control board, from "STOP" to "RUN", and check whether the position of speed regulator is consistent with that before shutdown.
- Turn on temperature controller, from "OFF" to "ON".
- 20-30 minutes after normal starting up, move on to the next step after the actual temperature and set temperature of temperature controller reach a balance.
- Put the circuit board affixed with components on the net belt to enter the reflow oven to conduct automatic oven.

(2) Shutdown

- After confirming that there is no circuit board in the furnace of reflow oven, press "STOP" button on the panel.
- The machine will automatically shut down after delaying for 15 minutes. (Note: During the delay, it is ineffective to start up. It is only after the automatic shutdown of delay that the machine can be started up.)

(3) Emergency stop switch

The switch is on during normal operation. If the machine breaks down during the operation, pressing the switch will lead to the power off of the main circuit. Take care not to use the switch frequently; otherwise it will result in premature aging and damage. After handling the failure by emergency stop, close the power source and press the start button, and the system will return to the operating state.

(4) Transportation setting

Alteration of setting value: Press ▲ or ▼ to enter the alteration state of setting value in 3 seconds. PV window in the upper row displays the measured value. SV window in the lower row displays the setting value. Press▲ or ▼ to alter the value. Long pressing of ▲ or ▼ can realize plus or minus rapidly. After altering, press "SET" to save and exit. Without pressing any button, it will automatically save and exit after 10 seconds.

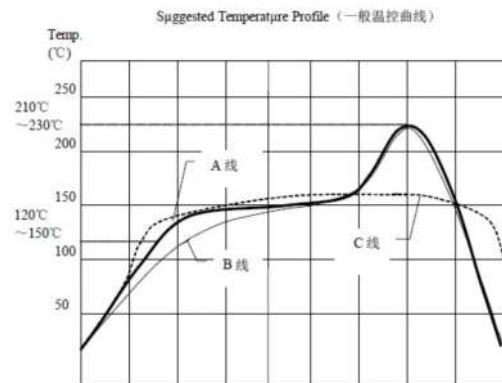
(5) Reference value of temperature setting

Model	ZBHW330	ZBRF530	ZBHW330	ZBRF530
Accessories Type	Set temperature (Solder paste)		Set temperature (Red plastic)	
The first temperature zone	190±15℃	180±15℃	150±5℃	150±5℃
The second temperature zone	210±10℃	210±10℃	150±5℃	150±5℃
The third temperature zone	230±15℃	250±15℃	150±5℃	150±5℃
The fourth temperature zone	NONE	195±15℃	NONE	150±5℃
The fifth temperature zone	NONE	230±10℃	NONE	150±5℃

VI. Temperature Profile

ZB series machine are used to heat the PADS level paste components on the PCB surface and make the tin liquid melt by heating and occur reflow, then get the similar and set tin liquid heating drawing, which won't lead to the PCB and components damage. (like: burn or burn inside etc).
IPC standard welding heating drawing as follow:

(1) Standard soldering temperature chart



A line: Adopted by the soldering of common solder paste.

Raise the temperature of PCB pad from room temperature to 120-150°C within 60 seconds, with the rate below 3°C/s. In the 90-150 seconds of 60~180 seconds, stabilize it at around 150°C to be below the melting point 183 of solder paste, so that the soldering work pieces can achieve temperature equilibrium before the liquefaction of solder paste. From 183 to 210-230°C, keep 30s to enable the full reflow soldering of solder paste.

B line: Used in the soldering techniques with fine pitch IC and tiny components (e.g. 1005). Control the sharp rise of temperature in the preheating zone to postpone the softening of flux in the soldering paste. Postpone the softening of flux in the soldering paste, and make the tiny tin powder particles outflow together to form solder balls.

C line: Used in the solidification of common SMT adhesive. At about 150°C, keep 3-5 minutes of basic constant temperature curing time.

VII. Functions of Temperature Zone

(1) Functional description

1. Preheating section

The purpose of this section is to heat the PCB board at room temperature to the second specific temperature (120-150°C) as soon as possible.

The function of this section is to make the solvent fully volatilized through an endothermic process; the heating rate should be controlled at 1°- 4°/S.

2. Insulation section

It means the section of temperature rising from 120-150° to the melting point of solder paste.

The purpose is to stabilize the temperature inside SMA (component connector), that is, each component is heated evenly.

The flux is volatilized fully, and the oxides on the pad, solder balls and component feet are removed.

3. The reflow section (soldering section)

The purpose is to closely connect the solder and components. The temperature in this section is the highest, of 230°C with lead. The temperature is set according to different solders. By principle, it is the melting point of solder paste plus 20-40°.

This section cannot last too long, or it will damage the components.

4. Cooling section

The purpose is to cool the fully melted solder paste as soon as possible, to make the solder joint smooth and bright. The cooling rate is 3-10°/S.

(2) Power distribution

Model	ZBHW330		ZBRF530	
The first temperature zone	Preheating zone	Power: 2kw	Preheating zone	Power: 2kw
The second temperature zone	Temperature holding zone	Power: 2kw	Up temperature holding zone	Power: 1kw
The third temperature zone	Welding zone	Power: 2kw	Up welding zone	Power: 2kw
The fourth temperature zone	None	None	Down preheating zone	Power: 1kw
The fifth temperature zone	None	None	Down temperature holding zone	Power: 1kw