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—专利产品—

QRF Reflow oven

USER MANUAL

(please read this manual carefully before using)

Yueqing Qihe Electronic Technology Co. Ltd.
www.qhsmt.com

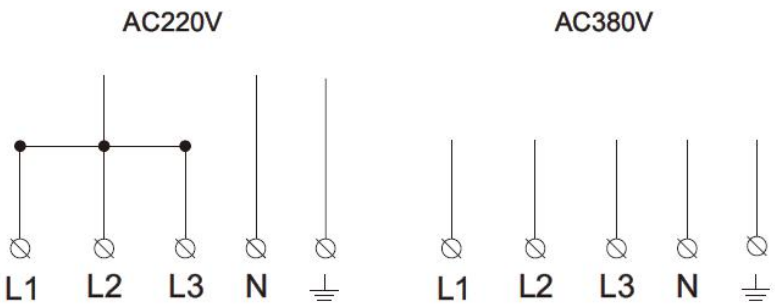
Directory

Ⅰ. Product Overview

Thank you for buying and using the hot air reflow soldering of QRF series 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.

QIHE Electronic offers warm-hearted service for you!

Ⅱ. Circuit Schematic



Ⅲ. Technical Parameters

Model	QRF630	QRF830	QRF1230
Number of heating zones	6 Zones (Up 3 and Low 3)	8 Zones (Up 4 and Low 4)	12 Zones (Up 6 and Low 6)
Heating method	Hot Air	Hot Air	Hot Air
Number of cooling zones	2 Ventilation Cooling		
Length of heating zones	1060MM	1400MM	2080MM
Width of net belt	300MM		
Height of net belt	900±20MM		
PCB dimension	MAX280*280MM		
Transport Speed of Net Belt	160 -- 13500 mm/MIN (Variable frequency Drive)		
Transport Direction of Net Belt	Left—Right (Right –Left)		
Input Power	220V or 380V		
Starting power	9KW	11KW	15KW
Operating Power	3KW	3.5KW	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)		
Overall Dimension	L2100*W680*H1200MM	L2440*W680*H1200MM	L3440*W680*H1200MM
Body Weight	215KG	250KG	390KG

Ⅳ. Equipment Installation

(1)Installation site

1. Please operate the machine in a clean environment;
2. Please avoid operating or storing the machine under the environment conditions of high temperature and humidity;
3. Don't install the machine near electric or magnetic interference sources;
4. 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 50Hzand 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.

Ⅴ. Operating Instructions

Fig.1

(1) Preparation before starting up（Fig.1）

1. Click the displayer button located lower left and make the AC main electric power on then enter the automatic start up statue after the industrial control computer get the electric. Double-click the shortcut icon of reflow oven running program after the computer started up then enter the running interface.

2. Click the lower left starting button on the interface, which shows the machine has been starting up when the “start up” button changed from white to red, the equipment will enter normal running statue after starting up corresponding each function module. Fig. 1

(2) Shutdown

1. Set the delay time of shutdown, the recommended reference value is 30 min.

2. Touch the shutdown button, and the current delay time window starts timekeeping; when the time reaches the presets value, cut off the power supply of complete machine to shut down the machine. Please notice, after pressing the shutdown button, the heater first stops working, and then other functions keep normal operation until shutdown. Note! Please be sure to use delay time shutdown function to ensure sufficient furnace pipe cooling in order to effectively protect the furnace pipe from deformation.

Fig.2

(3) Functions test（Fig.2）

1. Choose the down part self-inspection interface and switch to self-inspection mode, click the temperature zone button “Heat 1” , the state switch from OFF to ON status, which shows you heating is starting. Please check whether the actual display temperature PV value bigger or smaller to judge whether the heating zone is normal and so do other temperature zones.
2. Click the cooling fan, hot wind motor and transfer working then the button statue switch from OFF to ON at this time, check whether each temperature zones is working normal.
3. Shut down each temperature zones after finish testing.

Fig.3

(4) Transportation speed setting（Fig.3）

1. Touch the input box on the right of transportation speed to input the speed needed by users, and its unit is: mm/min.
2. The transportation setting range is 50 – 1500 MM (Note: It is unable to run less than 50 MM)

(5) Over temperature alarm（Fig.3）

Input the over temperature deviation value; when the temperature of an arbitrary temperature zone exceeds the preset deviation value, the alarm will make a noise, and at the same time the red light

is on to show the machine breaks down and that operation should be immediately stopped until debugging. Press the alarm start/stop button to temporarily shut down the alarm noise so as to stop the noise.

(6) Time delay setting for shutdown（Fig.3）

Fill in the shutdown delay time on the setting interface of shutdown delay time column.

Unit: Minute; The machine will be shutdown according to the shut down delay time set ahead.

(7) Temperature setting（Fig.1）

1. Touch the box on the right of SV to set the temperature needed by users.
2. SV window shows the user's preset value, and OV window shows the measured value.

(8) Reference value of temperature setting

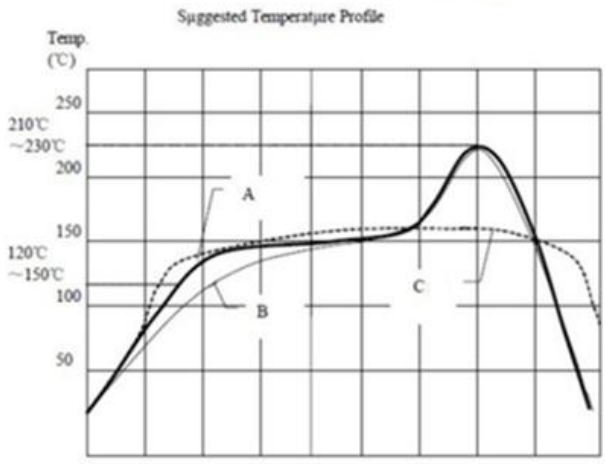
Model	QRF630	QRF830	QRF1230	QRF630	QRF830	QRF1230
Accessories Type	Set temperature (Solder paste)			Set temperature (Red plastic)		
The first temperature zone	180±15℃	180±15℃	140±15℃	150±15℃	150±15℃	150±15℃
The second temperature zone	210±15℃	190±15℃	150±15℃	150±15℃	150±15℃	150±15℃
The third temperature zone	250±15℃	210±15℃	160±15℃	150±15℃	150±15℃	150±15℃
The fourth temperature zone	180±15℃	250±15℃	180±15℃	150±15℃	150±15℃	150±15℃
The fifth temperature zone	210±15℃	180±15℃	210±15℃	150±15℃	150±15℃	150±15℃
The sixth temperature zone	250±15℃	190±15℃	250±15℃	150±15℃	150±15℃	150±15℃
The seventh temperature zone	NONE	210±15℃	140±15℃	NONE	150±15℃	150±15℃
The eighth temperature zone	NONE	250±15℃	150±15℃	NONE	150±15℃	150±15℃
The ninth temperature zone	NONE	NONE	160±15℃	NONE	NONE	150±15℃
The tenth temperature zone	NONE	NONE	180±15℃	NONE	NONE	150±15℃
The eleventh temperature zone	NONE	NONE	210±15℃	NONE	NONE	150±15℃
The twelfth temperature zone	NONE	NONE	250±15℃	NONE	NONE	150±15℃

Ⅵ. Temperature Profile

RF 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℃ within 60 seconds, with the rate below 3℃/s. In the 90-150 seconds of 60~180 seconds, stabilize it at around 150℃ 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℃, 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℃, keep 3-5 minutes of basic constant temperature curing time.

Fig.4

(2) Temperature setting（Fig.4）

1. Click the temperature profile button on the lower right of the display screen, and the temperature profile window is as shown in Picture 3.
2. Take out the acquisition sensor of temperature profile provided by the machine.
3. Connect the end with the air-mail plug of the sensor to the ail-mail socket on the back of the touch screen.
4. Take a bare board the same as the board for soldering, and fix the sensor detection head onto the board.
5. Put the made board on the extension rope of the welder input terminal, and then click the start collecting button on the touch screen to start collecting. The touch screen will display the changes of temperature, and finally form a complete temperature profile.
6. Users can make tin paste temperature profile similar to that provided by the tin paste provider through setting temperature, and the more similar the profile made is, the more ideal the soldering effect is.

Ⅶ. Formula

Fig. 5 apply to the model RF1230, other type refer to it

(1) Definition of formula

What is formula: It means that users can store the group of temperature whose soldering effects corresponding to a certain PCB board is the most ideal to facilitate callout at any time.

(2) Use of formula

1. Window callout: touch the formula button on the main control menu, and the window displays the formula window (as shown in Picture 4).

2. Group number selection: input group number in the group number selection bar (e.g. 1 stands for the first group of data).

3. Formula upload: input the twelve-way users' set temperature value in the formula data, and press the upload button to send to PLC for storage.

4. Formula download: input corresponding group number in the group number selection bar, and press the formula download button to download the data of corresponding group number to the temperature control window.

Ⅷ. 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℃) 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℃ 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	QRF630		QRF830		QRF1230	
The first temperature zone	Up preheating zone	2kw	Up preheating zone	2kw	Up preheating zone	2kw
The second temperature zone	Up Temperature holding zone	1kw	Up first Temperature holding zone	1kw	Up first Temperature holding zone	1kw
The third temperature zone	Up welding zone	2kw	Up second Temperature holding zone	1kw	Up second Temperature holding zone	1kw
The fourth temperature zone	Down preheating zone	1kw	Up welding zone	2kw	Up third Temperature holding zone	1kw
The fifth temperature zone	Down Temperature holding zone	1kw	Down preheating zone	1kw	Up fourth Temperature holding zone	1kw
The sixth temperature zone	Down welding zone	1kw	Down first Temperature holding zone	1kw	Up welding zone	2kw
The seventh temperature zone	None	None	Down second Temperature holding zone	1kw	Down preheating zone	1kw
The eighth temperature zone	None	None	Down welding zone	1kw	Down first Temperature holding zone	1kw
The ninth temperature zone	None	None	None	None	Down second Temperature holding zone	1kw
The tenth temperature zone	None	None	None	None	Down third Temperature holding zone	1kw
The eleventh temperature zone	None	None	None	None	Down fourth Temperature holding zone	1kw
The twelfth temperature zone	None	None	None	None	Down welding zone	1kw

Ⅸ. 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:

a. Open the furnace pipe to disassemble the sensor.

b. Remove the cooling aluminum plate.

c. Remove the connecting lines at both ends of the electric heating tube.

d. Remove the fixed nuts at both ends of the heating tube.

e. Take out and replace the heating pipe.

Suggested repairing spare parts to prepare:

1. SSR;
2. Fan;
3. Heater;
4. Alarm bulb

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 soler 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.

X. 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:

a. Lubricate the drive roller chain. Smear it with high temperature lubricant every two months.

b. 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.

Ⅺ. 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, displayer 1 unit

Ⅻ. After-sales Service

1，One year warranty from data of production, free maintenance as mechanical quality problem.

2，The warranty does not cover fault 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 .