V1.07

Simple │ Fast │ High-quality

Contents

1. Preface

Dear customer, welcome to use our machine.

This manual details the use of the machine, including safety precautions, performance parameters, and parameter setting method. Spend a little time reading this manual before formal production, will help you to produce high quality circuit board safely and efficiently according to your needs.

If there is any problem in using, welcome to contact us. Your satisfaction is our satisfaction; your success is our success.

2. Precaution

- Too high or too low voltage may cause machine work properly, or damage machine's electrical control system;
- Please do not disassemble, because it can lead to electric shock or poor heat insulation;
- Must use the power cord attached to the machine, the power cord that is not up to the rated power requirements may cause overheat, even cause fire;
- Keep the machine away from flammable and explosive goods;
- Keep the machine clean and ventilated, especially in the back of the machine, keep at least 20cm of space, to ensure good heat dissipation and welding effect;
- The waste gas from the chimney needs to be collected and processed when machine running, direct discharge may cause damage to the body, and cause pollution to the environment;
- The waste gas discharged from the chimney and the chimney itself has a high temperature, rush contact has a risk of being scalded;
- Pay attention to prevent waste heat of the drawer when operating.

3. Features

- ➢ Hot air and infrared heating, heat evenly, short period;

- ➢ 8 Curves are optional, production is flexibility;

- ➢ Curve adjustment simple, just need adjust a few parameters, the machine can generate curves automatically and show it directly;

- ➢ Built in PID controller, high control accuracy;

- ➢ Drawer window design(optional), adjust convenient;

- ➢ High life heating tube;

- ➢ Double sensor temperature measurement;

- ➢ Use iron double ball fan, high temperature resistance, high life;

- ➢ Full stainless steel chamber;

- ➢ Close thermal insulation;

- ➢ Industrial grade display and control circuit;

- ➢ Simple, intuitive and efficient human-machine interface design.

4. Performance

Item	Parameter	Remark
Outline Dimension	L 405mm W 420mm H 255mm	
Net Weight	20kg	
Rated Power	2500W	Peak Power
Rated Voltage	220V/60Hz	
Drawer Area	300mm×300mm	
Solder Type	Lead/Lead-free	
Max. Temperature	300°C	
Heating Mode	Hot Air and Infrared	
Temperature Control Precision	±1°C	Constant Temperature
Production cycle	5～10min	
Curve Number	8	

5. Profile Introduction

Machine profile is shown as below.

- **Air Intake**: At the back of the machine, used for inhaling cold air to cooling chamber, need to keep ventilation;

- **Chimney**: Used to discharge waste gas, must pay attention to high temperature;

- **Pilot Lamp**: There 3 lights altogether, 'Heat' light said chamber is heating, 'Cool' light said machine is cooling, and 'Run' light said machine is running;

- **Observation Window(optional)**: Used to observe circuit board in the machine when welding;

- **Power Switch**: Machine power switch;

- **Button、Screen**: Used to operate machine, see below for detailed description.

6. Operation

6.1. Power On

Turn on the power switch, then the buzzer in the machine will give out a long

ringing, and the screen display as shown below, means that the machine starts OK, then machine will enter the 'Menu' page automatically.

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BRTRO-420
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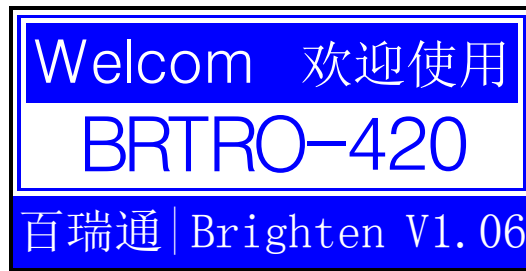
Current firmware version was displayed on the bottom right corner of the screen.

6.2. Screen Element

Before introducing specific screen page, first introduce the classification of different elements on the screen, in fact, knowing the type of a screen element, then know how to operate it, see following table, screen elements are simply divided into three types.

Type	Description
Display Terms	Display fixed message or real-time data, however, it's can not be framed and to be operated
Function Terms	Display function name, can be framed and be selected to perform a specific function
Parameter Terms	Display parameter values, can be framed and be selected to adjust values

Users are able to operate "function" and "parameter" types of screen elements, two operating states are shown as below.

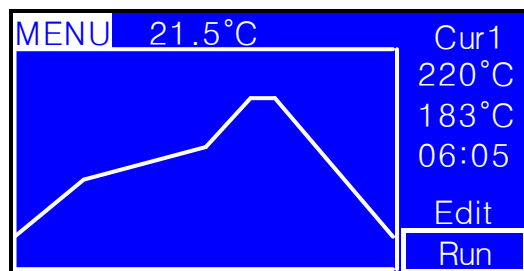| State	Description
Framed	The elements on the screen are occupied by a box, indicates that the current element is selected, but can not be adjusted or perform the corresponding functions
Selected	The screen elements are highlighted, indicates that the current element can be modified at any time

6.3. Use of Buttons

All the operations are implemented through four buttons on the operation panel, see the table below for details.

Button	Name	Description
➕	Upward	When no element is selected on the screen, it is used to move the selected box up; and when an element is selected on the screen, it is used to adjust the value of the selected element
➖	Downward	Just be opposite of the above
OK	Confirm	Used to switch the framed parameter to selected state, or perform the framed function
↩	Return	Used to switch the parameter in selected state back to framed state, or return to the upper page

The buzzer will short sound as confirmation when buttons that are able to function currently action. Moreover, some parameters can be adjusted quickly by long press.

6.4. Menu Page

Screen is shown as below.

Descriptions of the elements on the screen are shown in the following table.

Item	Type	Description	Remark
MENU	Display	Indicates that the current screen is menu page	
21.5℃	Display	Current temperature	
Cur1	Display	Current selected curve	
220℃	Display	Max. temperature of the curve	
183℃	Display	The melting point of the solder paste	Only for reference, no control function is given
06：05	Display	Total running time	
Curve	Display	Shape of curve	
Edit	Function	Select to enter edit page	
Run	Function	Select to enter run page and start running	

6.5. Edit Page

Edit page is used to select and edit curves.
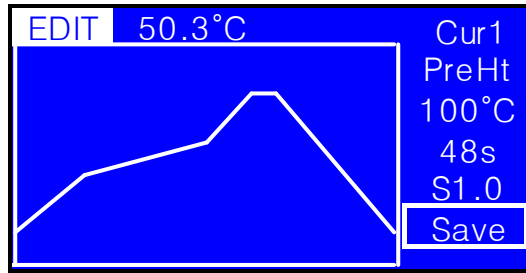
Item	Type	Description
EDIT	Display	Indicates that the current screen is edit page
50.3℃	Display	Current temperature
Cur1	Parameter	Select the curve, different curve contain a set of completely independent parameters
PreHt	Parameter	Select section of the curve, for example, the current selection is the preheating section of curve, the three parameters below will change with different value of this parameter
100℃	Parameter	Target temperature of preheating section
48s	Parameter	Length of preheating section
S1.0	Display	Temperature change rate of preheating section, 1.0 said that the temperature increased by 1℃ per second
Save	Function	There has an '*'if there are parameters are modified but not saved, select to save the modified parameters and the '*' will disappear at the same time; Note, even if the parameters are not saved, the machine will run with new parameters until the power is off
Curve	Display	The shape of current curve, it changes with the change of the parameters of curve

From above, it is obvious that the parameters in section will change along with the selection of different sections. All of these changes are listed below. The values of the parameters in the table are just examples.

Section	Name	Parameter	Type	Description
PreHt	Preheat	100℃	Parameter	Target temperature of preheating. The start temperature of preheating is the target temperature of cooling, taking the parameters in the table as example, temperature will be changed from 50℃ to 100℃ in preheating section
		48s	Parameter	Time of preheating section
		S1.0	Display	Temperature change rate of preheating section
Heat	Heat	150℃	Parameter	Target temperature of heating, The start temperature of heating is the target temperature of preheating, taking the parameters in the table as example, temperature will be changed from 100℃ to 150℃ in

				heating section
		100s	Parameter	Time of heating section
		S0.5	Display	Temperature change rate of heating section
Ref	Reflow	220°C	Parameter	Target temperature of reflowing, this parameter determines the maximum temperature of curve. The start temperature of reflowing is the target temperature of heating, taking the parameters in the table as example, temperature will be changed from 150°C to 220°C in reflowing section
		60s	Parameter	Time of reflowing section
		S1.2	Display	Temperature change rate of reflowing section
RefKp	Reflow Keep	15s	Parameter	Time of keeping max. temperature
Cool	Cool	50°C	Parameter	Target temperature of cooling, this parameter determines the minimum temperature of curve. The start temperature of cooling is the target temperature of reflowing, taking the parameters in the table as example, temperature will be changed from 220°C to 50°C in cooling section
		140s	Parameter	Time of cooling section
		S-1.2	Display	Temperature change rate of cooling section, note that this value is negative
Melt	Melt	183°C	Parameter	Melting temperature of solder paste, only for reference
		77s	Display	The time that solder paste endured above melting point, this parameter will change automatically when the other parameters are changed

Note that the temperature in the table can not be lower than the target temperature of previous or higher than the following.

6.6. Reflow Curve

The parameters editing of reflowing curve is introduced above, the figure below shows a complete reflowing curve.
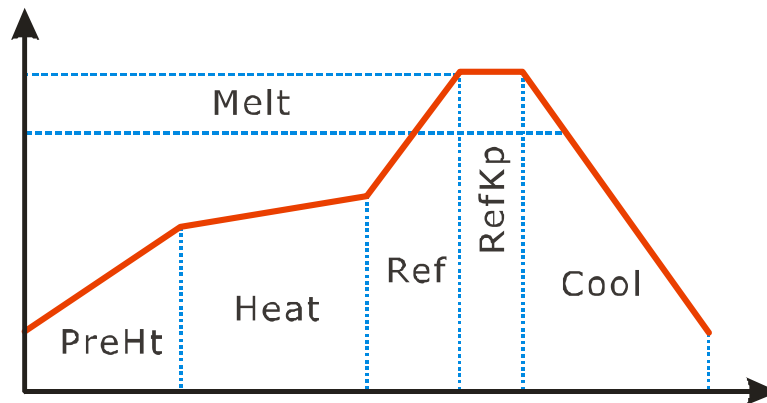
It is very important that a suitable reflowing curve is a guarantee of good welding quality. However, Adjust reflowing curve will become very simple as long as you have got the right method. The method is generally divided into the following three steps.

- Check the reference manual of solder paste, set the initial curve according to the instructions in the manual;

- Adjust the curve according to the maximum acceptable temperature of the components, so as to prevent damage to the components in welding process by high temperature;

- Take actual welding test, and adjust curve according to the welding effect.

The function of each section and the points for attention of reflowing curve are introduced below, in addition, a detailed description can be found in the manual of solder paste.

- **PreHt**: Preheating section, used for rapid heating, heat the circuit board to the temperature of solder paste to start work, the target temperature of this section should not be set too high, and heating time not too long. Temperature too high or time too long is the main reason of solder paste collapse, tiny balls around the pads, solder sticking together;

- **Heat**: Heating section, this section mainly makes the temperature to the same on circuit board, and the flux in solder paste begins to work at the same time. The temperature rise rate of this section is smaller than the previous, and the curve looks slower too, but if the temperature is too high

or time is too long, will cause flux volatile prematurely, and then lead to oxidation and poor wetting;

● **Ref**: Reflowing section, this section is mainly used to melt the solder paste, it's a key step in welding, temperature rise rate is greater than the previous, too high temperature and too long time will lead to oxidation and impact of components on circuit board;

● **RefKp**: Reflowing keep section, used to set the time to maintain the maximum temperature for full of flux volatile and solder flow;

● **Cool**: Cooling section, mainly used to reduce the temperature of the circuit board smoothly, solder will be re-solidified in this process, it is worth mentioning that the cooling process also has a great impact on the welding effect, too fast or too slow cooling process will produce pale and lightless solder beads, what is worse, there may be potential defects;

● **Melt**: Melting point, in fact, the solder paste has strict requirements on time that the temperature above the melting point.

6.7. Run Page

Select 'Run' at the menu page to enter page as below, the buzzer will give out a long ringing, once entering the run page, machine start run the reflowing curve.
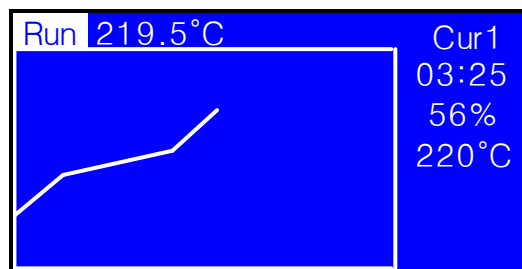
Item	Type	Description
Run	Display	Indicates that the current screen is run page
219.5℃	Display	Current temperature
Cur1	Display	Current selected curve
03:25	Display	Run time
56%	Display	Percentage of completed
220℃	Display	Theoretical temperature
Curve	Display	Actually measured curve

Buzzer will long sound interval after completion, machine will stop running and go back to menu page automatically until the temperature drops below the cooling temperature. Of course, user can also end this running directly by press return button.

Note, the stainless steel will absorb heat in cold start, and lead to temperature rise slow, so it is suggested that running one time without load for preheating before production. On the other hand, it appears that running has been completed but the temperature has not been completely down. Even so, the two cases are occurred below the temperature of solder paste working due to the careful design, therefore, it will not affect the effect of welding.

7. Preset Curve

Two sets of curves have been preset to facilitate users to setup, No. 1～4 are lead curves, No. 5～8 are lead-free curves, users have to adjust them according to the actual needs, parameters are listed as below for reference.

● Lead, total run time 6 min. 5 sec.

Section	Parameter
PreHt	100°C
	50s
	S1.0
Heat	150°C
	100s
	S0.5
Ref	220°C
	60s
	S1.2
RefKp	15s
Cool	50°C
	140s
	S-1.2
Melt	183°C
	77s

● Lead-free, total run time 5 min. 10 sec.

Section	Parameter
PreHt	160°C

	50s
	S2.2
Heat	180°C
	85s
	S0.2
Ref	228°C
	50s
	S1.0
RefKp	25s
Cool	50°C
	100s
	S-1.8
Melt	220°C
	37s

8. Customer Service

Thank you for using our products, please feel free to contact us if you have any questions.