



Muffle Furnace

LMMF-A204

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1. Safety Measures

- When using the furnace for the first time or after a long period of inactivity, it is important to follow a specific baking procedure to avoid damaging the heating elements and the furnace lining. Begin by baking the furnace for 1 hour at 120°C, followed by baking for 2 hours at 300°C. This gradual heating process helps prevent cracking and ensures the furnace is ready for use.
- The furnace will automatically enter a stop state when the program is complete. You can turn off the air switch on the back of the furnace once the temperature has dropped below 200°C.
- When the furnace is not in use, raise the lifting platform to the top to keep the chamber dry.
- Although the furnace is designed with safety in mind, incorrect use can still cause harm.
- Unauthorized modifications to this equipment are prohibited.
- Do not place toxic, hazardous chemical products or highly polluting items in the furnace, as this can harm human health.
- Continuous heating may cause parts of the furnace surface to exceed 70°C, posing a burn risk.
- Avoid touching the furnace surface during operation.
- Always turn off the power before cleaning the furnace.
- Use only a wet towel; do not use detergents or combustible liquids.
- Avoid pressing the control unit display screen to prevent injury.
- Regularly clean the display screen with a specialized screen cleaner that prevents scratches and static electricity.
- Damage from improper cleaning is not covered under warranty.
- The system is equipped with an exhaust fan to control temperature and ensure safety.
- Do not block the furnace cover during use.

Note:

To enhance the instrument's performance, modifications may be implemented in either the software or mechanical components. Consequently, discrepancies between the operating system and the user guide may arise in certain details.

2. Introduction

Muffle Furnace LMMF-A204 is proven to be a suitable unit for daily laboratory use. With the distinguished digital PID controller, it provides you with precise control of the temperature range 1200°C and easiness to operate this equipment. The unit is available in 14L capacity having ceramic fibre insulation to prevent overheat and short circuits. This compact muffle furnace is ideal for a wide range of applications due to its high performance-to-size ratio and quick heat-up rates.

3. Features

- Intelligent sensor alarm function
- Digital PID controller
- Auto-tuning function
- Intuitive and easy-to-use operating menu
- Easy to open door handles
- Current temperature and setting temperature are displayed separately on the control panel
- Highly efficient fan motor ensures uniform air circulation
- Excellent temperature accuracy
- Simple to use and maintain
- Over-temperature limit function
- Less and low noise operation with gentle air currents
- Forced exhaust system

4. Specifications

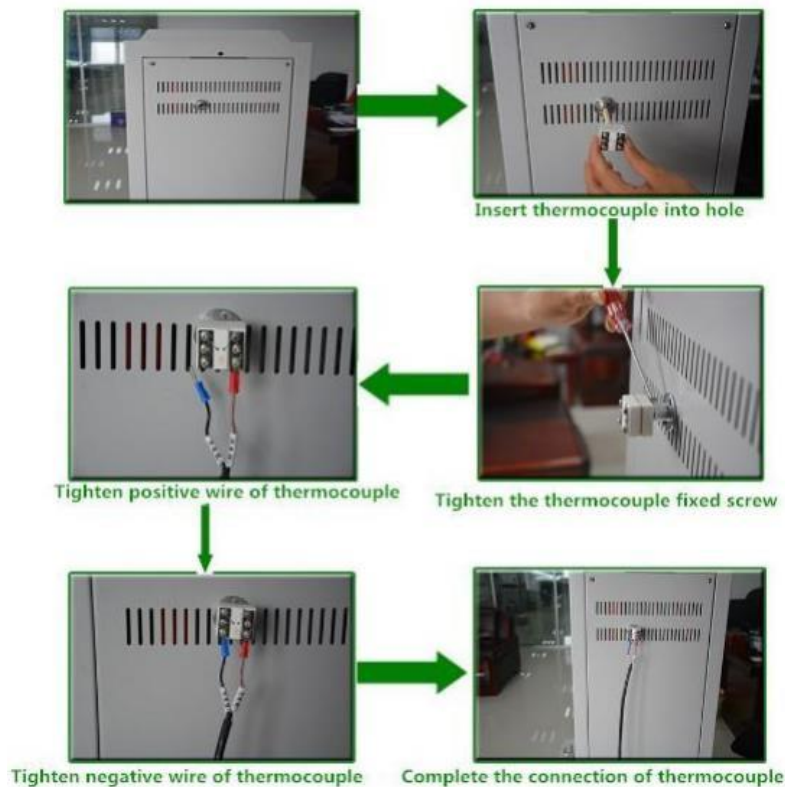
Model No.	LMMF-A204
Capacity	14 Liters
Maximum Temperature	1100°C up to 1200°C
Operating Temperature Range	300°C to 1000°C
Temperature Control	Digital PID controller, program type (5 pattern 18 segment)
Timer	99Hr 59min
Thermocouple	K-type
Insulation	Ceramic fiber
Internal Material	Ceramic fiber
External Material	Steel plate with powder coating
Heater Capacity	4 Kw
Power	AC 220V, 50/60Hz, 1-Phase
Internal Dimension (W×D×H)	250×350×160 mm
External Dimension (W×D×H)	530×600×640 mm
Weight	55 Kg

5. Applications

These furnaces are used for various purposes such as the development of new materials, including industrial and biotechnology products are being used as the basis of common laboratory equipment.

6. Installation

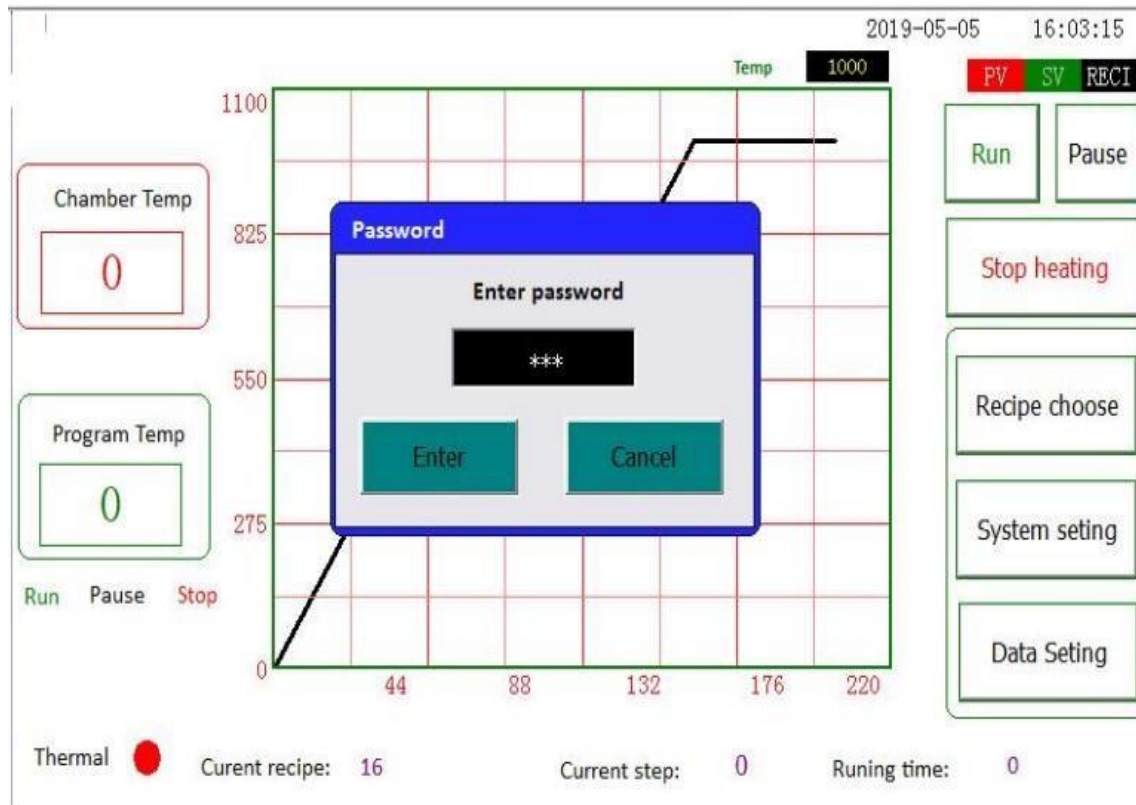
- 1) Unpack the wooden package and check if the equipment is in good condition and random accessories are complete according to the configuration list.
- 2) Kindly place the furnace on the dry and ventilated indoor platform without much dust, the distance from others should be more than 25 cm so that the furnace can work in a good ventilation condition.
- 3) Kindly note the thermal performance of the devices around the furnace, because the furnace will release some heat in the working process, although its heat value is in the safe range, we can't exclude the possibility of surrounding equipment enclosure discoloration due to long time working and close distance.
- 4) Make sure not to place any flammable and explosive materials around the furnace.
- 5) Open the cover and remove the protection foam pad of the heating elements, then check whether the heating elements are damaged in the transport process, if no damage, kindly install the cover well using the Allen screw.
- 6) Open the furnace back cover and install the measuring temperature sensor on the sensor wiring position. Make sure signal line connects properly, "+" match "+", and "-" match "-". Operation way as shown in the figure below:

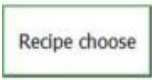


7. Operations

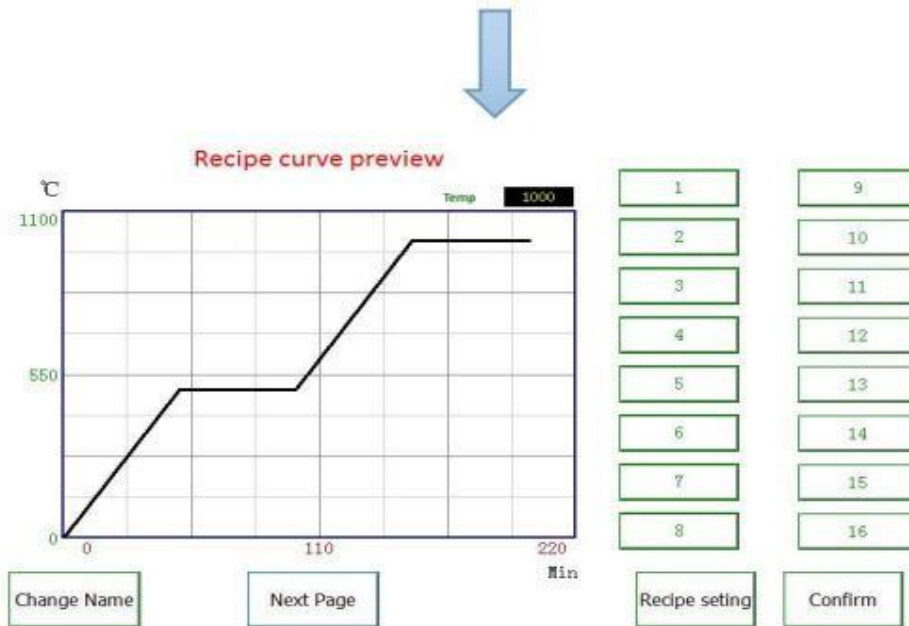
7.1 Intelligent Temperature Controller

7.1.1 Process curves setting



Click on  Editing process curve (original password is 123):

Muffle Furnace LMMF-A204



Recipe seting

Click on the Editing process curve:

16 Temperature setting

Step	Time(Min)	Temp(°C)	Step	Time(Min)	Temp(°C)
Step 1	50	500	Step 9	0	0
Step 2	50	500	Step 10	0	0
Step 3	50	1000	Step 11	0	0
Step 4	50	1000	Step 12	0	0
Step 5	-121	0	Step 13	0	0
Step 6	0	0	Step 14	0	0
Step 7	0	0	Step 15	0	0
Step 8	0	0	Step 16	0	0

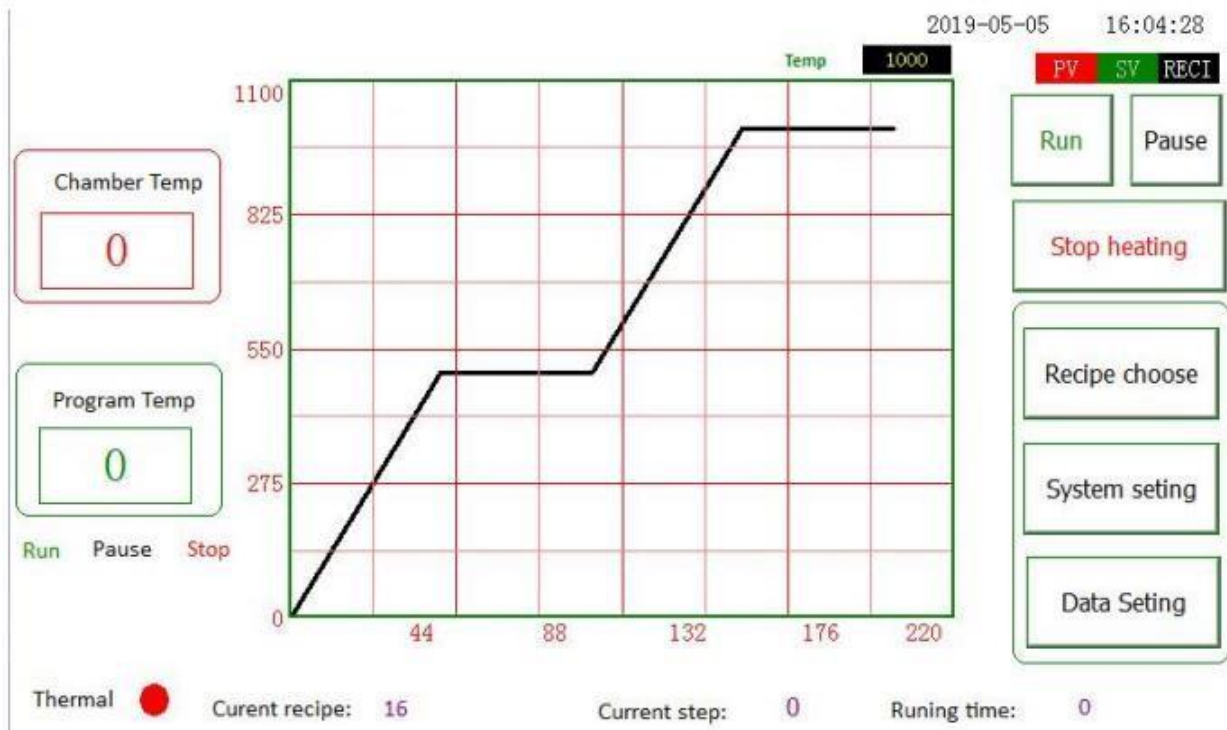
Save Recipe Next Page Back

The above curve heat process is that it takes 50 mins heat from 0 °C to 500°C, maintain 500°C for 50min, take 50 mins heat from 500°C to 1000°C, maintain 1000°C for 50mins, then furnace stop heating. Kindly note that “-121” is the instruction to stop heating.

After setting, click on **Save Recipe** the key, to save curves. You can set multiple spare process curves.

7.1.2 Select process curve

Click on Recipe choose Editing process curve:



Choose the curve you need and then click Confirm.

Muffle Furnace LMMF-A204

Recipe curve preview



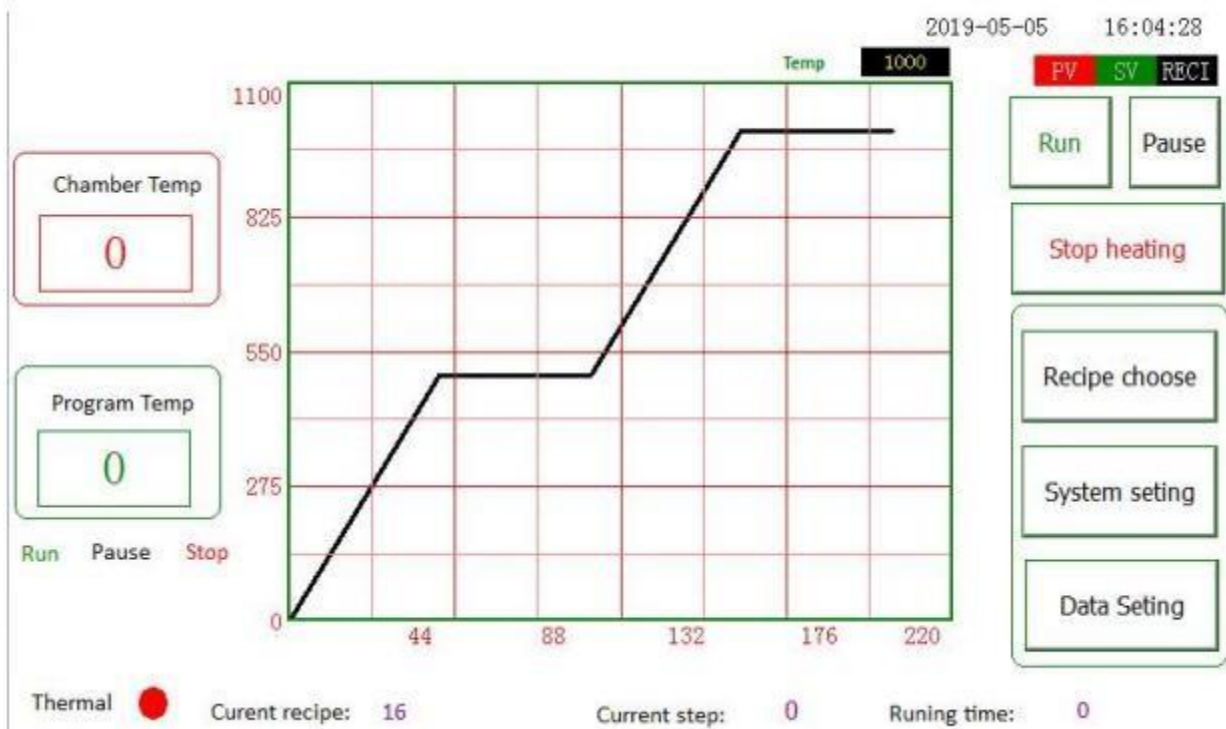
1	9
2	10
3	11
4	12
5	13
6	14
7	15
8	16

Change Name

Next Page

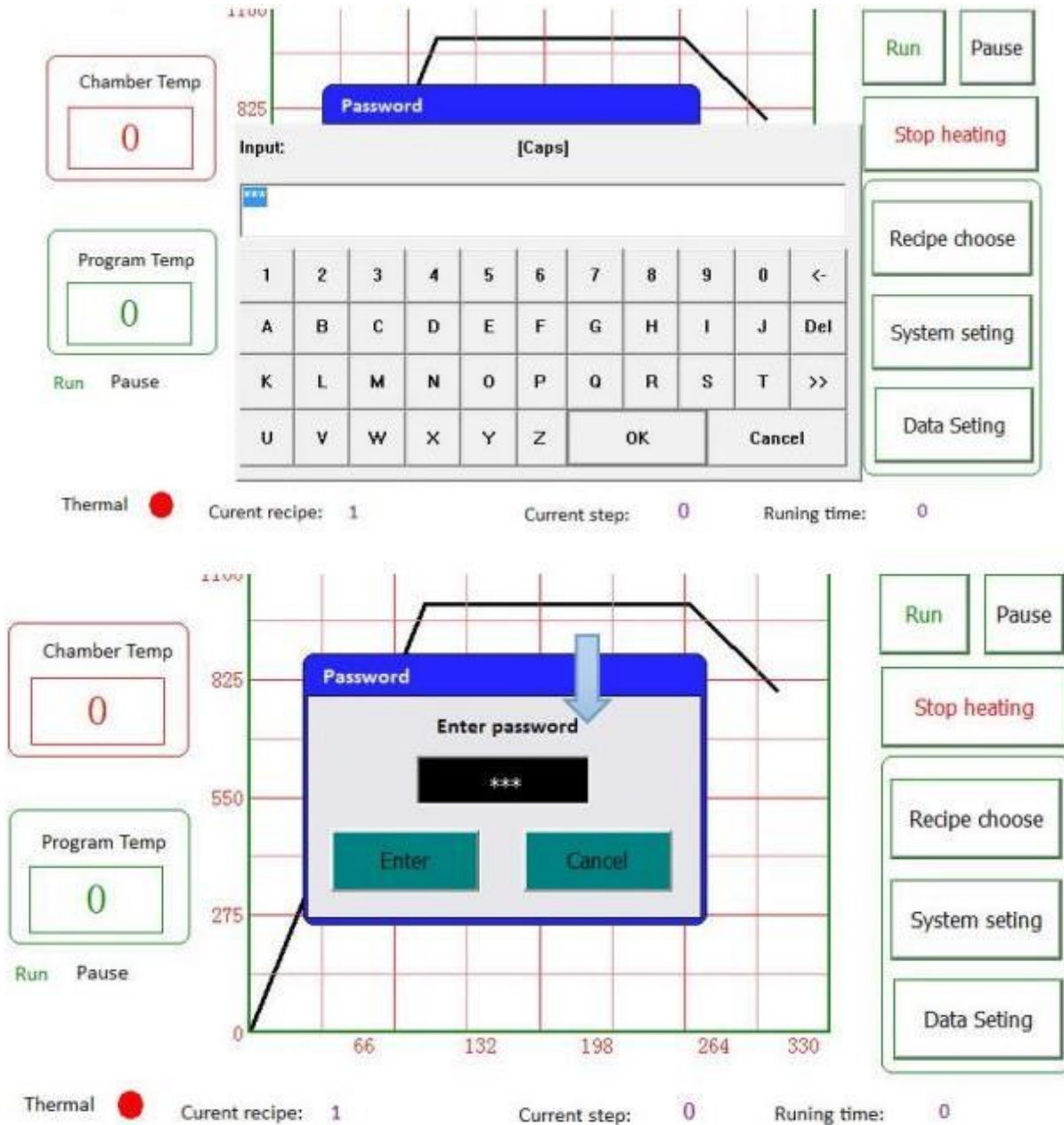
Recipe seting

Confirm



7.1.3 Modify general parameters

1. Click on **System setting** to set the parameters. Enter the password 123.



language choose		Lift system		Parameter setting											
HIAL	0	Ctrl	0	dIP	0	oPL	0								
LOAL	0	M5	0.0	dIL	0	oPH	0								
dHAL	0.0	P	0	dIH	0	CF	0								
dLAL	0.0	T	0	ALP	0	dL	0								
dF	0.0	Ctl	0	Sc	0.0	run	0								
		Sn	0	OPt	0	Loc	0								

Write in Read Back

2. M5 【keep parameter】、P 【Rate parameter】、t 【Retardation time】:

The correct setting of the three control parameters is directly related to the control accuracy of the furnace temperature. Our equipment is all subject to stringent high-temperature burn-in tests at the factory. (Heating rate is 10°C/min). We made sure with the M5、P、t, according to the control characteristics of each furnace. Usually, no need to change. This can meet the requirements of more than 95% of customers. However, Due to the geographical environment in which the chamber is inside and outside as well as the differences in the customer's production process requirements. Maybe the correct operation is still unable to obtain stable control accuracy. Then you need to manually modify the M5, P, and t control parameters to adjust the control accuracy of the furnace temperature.

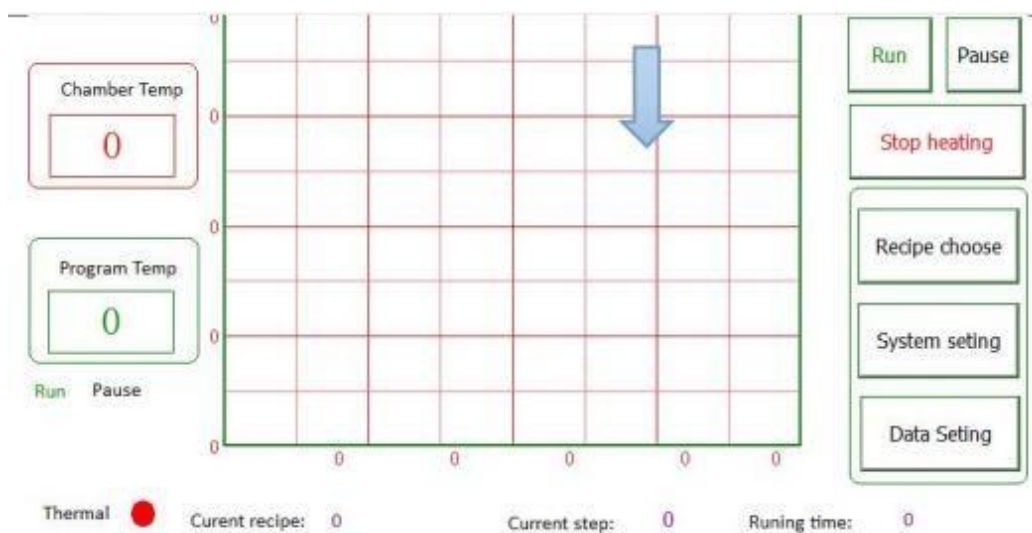
These three parameters are the parameters which are the three coordinated. Only with the organic reasonable combination of the three parameters. It is possible to obtain reasonably stable and reliable control accuracy. When for the artificial modification, keep a weather eye out for the situation changes of the furnace temperature deviation. If:

- Short-cycle oscillation:** Priority to reduce P, then consider increasing M5 and t.
- Long-cycle oscillation:** Priority to increase M5. Then consider increasing P, t.
- No oscillation and too big static difference:** Priority to reduce t, then consider increasing P.
- Can finally stabilize, but too long time:** Priority to reduce t, then increase P, reduce M5.

- E. When debugging can use one test method. Put one of the parameters (M5, P, t) increase or reduce 30%~50%, If the control effect gets better, continue to increase or reduce this parameter. Otherwise, adjust the opposite direction. Until then you get a qualified quality adjustment to the end. Usually modify M5 at first, if you can't meet the requirements then, in turn, modify P, t parameters until meeting the requirements. The furnace temperature can't be higher than the rated temperature.

7.1.4 Data setting and exporting

If you need to analyze data, you can export the data by inserting the USB flash drive of the USB interface on the back of the equipment, then click on Data Seting to choose the data you need to export, then click on USB flash save to export the data.



8. Maintenance

1. When powered on, if you cannot hear a sound from the cooling fan, then don't continue to operate. You must shut down the power to check or replace the cooling fan.
2. During furnace running, don't touch the furnace's outside body to avoid any high-temperature burn.
3. If the furnace is being used for the first time or has not use for a long time, kindly always preheat the furnace to 350 °C for at least 2 hours to remove moisture inside the chamber and to avoid chamber cracking.
4. To keep a uniform temperature zone and avoid furnace doors with high temperatures, one-door insulation brick should be used. It is in the standard package.
5. SiC heating element is very brittle. Kindly pay great attention during moving and handing.

The screenshot displays the control interface of the Muffle Furnace LMMF-A204. It features a data table with four columns: Code, Time, PV, and SV. The table has multiple rows, with the first row highlighted. Below the table, there are fields for Start time (2016-08-01 00:00:00) and End time (2020-08-01 00:00:00). To the right, there is a Time interval field set to 0 seconds. At the bottom, there are five buttons: Clear all data, Clear 10 days ago data, USB flash save, Quit save, and Back. A Config button is also visible near the table.

Code	Time	PV	SV

Start time: 2016-08-01 00:00:00
End time: 2020-08-01 00:00:00
Time interval: 0 s

Buttons: Clear all data, Clear 10 days ago data, USB flash save, Quit save, Back, Config

6. The maximum suggested heating speed is 15C/min, 5~10°C/ min when higher than 1000°C.
7. Kindly check the heating element every three months to see if they are in good connecting condition. If the connection gets loose, carefully open the case and tighten it properly.
8. The furnace must be used under the following conditions: Inside a room at a temperature between -10 - 75°C.
Elevate <1000 M, Humidity <85%.
9. In an environment without vibration and conductible dust, explosive, flammable and corrosive gases.

9. Troubleshooting

Problems	Reason	Solution
No current in the meter, but there is max. voltage.	The heating element is broken.	Find a broken heating element and replace it.
Controller panel SV shows "OrAL"	Thermocouples broken	Replace Thermocouples (BType).
Controller panel SV shows "HiaL"	Furnace temperature > 1400°C, protection from alarm.	Cool the furnace down and find a reason why the temperature is so high. (The program setting may be wrong)
The power and heating elements are ok, but the furnace can't be controlled by the program.	The controller or related circuit may be damaged.	Follow manual operation to run the furnace. If voltage and current output are normal, then there is a problem with the controller.
During heating below 300°C temperature value (PV) is not stable and does not match with setting programs. (SV)	It is normal because the furnace comes with a high-temperature thermocouple, which is not sensitive at temperatures below 300°C.	Don't worry. Let the furnace heat to 300°C, then the thermocouple will function stably with the program. If the PV value at 300°C is still less than SV, you may need to increase the OPL value a little.



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