Operation Manual

BOFC 100 series

Forced Convection Oven BOFC 100 series

Thank you for Choosing Biolab products. Please read the “Operating Instructions” and “Warranty” before operating this unit to assure proper operation.

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01 SUMMARY

100 series Oven is widely used for drying, baking, melting, sterilizing and curing in labs of industrial enterprises, scientific research institutions, and health and medicine units etc.

02 STRUCTURE FEATURES

1. High-quality cold rolling steel case with electrostatic spraying surface ensures the aesthetics and longevity of the product.

2. Favin stainless steel working room; foursquare semicircle transition; adjustable shelf, airduct lateral plate and bottom heater covering are knock-down construction, which is convenient for cleaning.

3. PID digital intelligent temperature controller with function of temperature setting, time dual screen displaying, over-temperature alarming and timing.

4. The heater and fan are reasonably constructed by placing them under the working room; circulation fan will be closed when it reaches the target temperature to prevent the powdery sample from blowing away.

5. Independent temperature limiter alarm, which can realize auto-switch with temperature controller; over temperature alarm.

6. Air-tightness adjustable buckle lock door to ensure good sealability.

Optional accessories:

a. RS485/232 interface, which can be connected with computer by principal computer software to control temperature; convenient to control stopping switch.

b. Micro type printer, which could continuously print temperature record of the running machine.

c. Independent power cut alarm system to help the user process sample immediately.

d. Independent temperature limit alarm system; auto-break-off when over temperature limit.

03 PRODUCT STRUCTURE DIAGRAM AND PARAMETERS

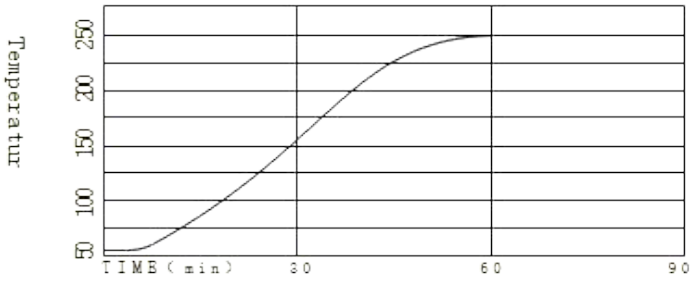
i . Structure diagram

ii .Main technical parameters

Model		BOFC-101	BOFC-102	BOFC-103	BOFC-104
Cycle Mode		Forced convection			
Function	Temp.Range	RT+10-300℃			
	Temp. Resolution Ratio	0.1℃			
	Temp.Motion	±1℃			
	Temp.Uniformity	±2.5%			
Structure	Inner Chamber	Mirror Stainless Steel			
	Outer Shell	Cold rolling steel electrostatic spraying exterior			
	Insulation layer	High quality rock wool board(with CE)			
	Heater	Stainless steel heater			

	Power rating	0.8kW	1.2kW	1.6kW	2.3kW
	Exhaust hole	φ28mmtop(with function of test hole)			
	Timer	0-9999min(with timing wait function)			
	Sensor	pt100			
Specification	Inner Chamber size(W*L*H) (mm)	310*310*310	350*350*350	400*360*450	500*450*550
	Exterior size (W*L*H)(mm)	450*500*690	490*540*730	540*550*830	640*640*930
	Packing size (W*L*H)(mm)	550*585*845	590*625*885	640*635*985	740*725*1085
	Volume	30L	45L	65L	125L
	Shelf number	6	7	9	13
	Load per rack	15kg			
	Shelf space	35mm			
	Power rating (50/60HZ)	AC220V/3.6A	AC220V/5.5A	AC220V/7.2A	AC220V/10.5A
	NW/GW (kg)	33/37	37/43	44/49	60/66
Accessory	Shelf	2			
	Shelf frame	4			

iii **.Temperature profile**



Note: according to the different model type, the time of warming up is different

04 WORKING CONDITIONS

The drying oven work under the following conditions:

1. Temperature ranges between 5~40℃;
2. Relative humidity less than 85% RH;
3. Power: voltage 110v, frequency50-60Hz;
4. No succession and corrosive gas surround the oven.

05 ATTENTIONS

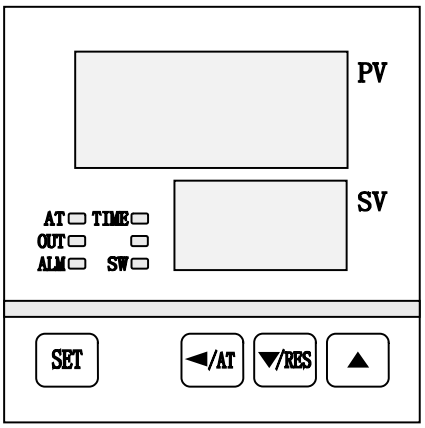
1. Install the outer ground protection to ensure safety of machine and experiment; supply power as the machine nameplate required.
2. This equipment is forbid to use in inflammable and explosive, poisonous and strong corrosive experiments.
3. Make sure horizontal installation.
4. Non-professionals are not allowed to disassemble and repair this machine.
5. Pay attention to the setting temperature when dealing with inflammable matters.
6. Make sure dry the resin container, if the temperature is setting too high by accident, the container would be dissolved and then fall on the heater, which will cause fire.
7. Overfilled of sample will lead to overheat of working room under part, which will dissolve the inflammable material and cause fire.
8. While the machine is working, don't touch the device top, as well as observation window and exhaust port to keep away from high-temperature burns.
9. Read the instruction book before operation.

06 OPERATION INSTRUCTIONS

1. Put the material needs drying into container (advice: size of drying material should not over 2/3 of the shelf); then close the container door and switch power, and next switch on the blower.
2. Heating
Set the temperature as needs (find details in meter instruction), then the temperature starts to rise; when temperature inside working room reaches the set point, the indication light will go out, after constant temperature for 30min, the working room goes into constant temperature state.
Note: don't close blower when the temperature is rising, or else it will accelerate ageing of heater.
3. Working time:
Decide the drying time according to humidity of sample.
Note: for example, if the sample humidity is big, the sample on each layer should not be too thick to ensure intensive drying of sample.
4. After finishing drying, turn off power, and then bring the sample out.
5. Keep the drying oven clean, wipe the container sealing rubber strip by soft cloth and clear the dirt out; avoid cleaning it by chemical solution to prevent chemical reaction damage on sealing rubber strip.
6. If the oven is unused for a long time, daub neutral grease or Vaseline on galvanized parts to prevent corrosion; cover the oven with plastic dust cap, and store it in the dry room to keep the electric device against wet.

07 METER OPERATION INSTRUCTION

i.Panel Instructions



ii.Indicator light function

1) AT：It flickers during self-tuning, it is not bright in any other state.

2) OUT：It is lit when heating output.

3) TIME：It is lit when time is set, it flickers in the process of timing.

4) ALM：It is lit when there is a temperature alarm.

5) SW：It is invalid.

iii **.Button function**

1)【SET】：In normal state, press this button to enter the setting state.

2)【◄/AT】："SHIFT" button. In the setting state, click this button to shift the set value. In normal state, press this button for 6 seconds to enter the auto-tuning selection state.

3)【▼/RES】："DEC" button. In the setting state, click this button to reduce the set value. If you keep pressing this button, the value will reduce continuously. In the normal state, when the timer ends, press this button for 3 seconds, the controller will restart to work .

4)【▲】："INC" button. In the setting state, click this button to increase the set value. If you keep pressing this button, the value will increase continuously.

iv. Operation and using

1-1. When the controller is switched on, All displays light up for 2 seconds, display windows show the version number and controller model for 2 seconds, then it starts running.

1-2. Temperature and Time Setting

1) Without Timing Function :

In the normal state , press the “SET” button to enter the temperature setting state, windows display the prompt "SP" and the temperature set point value. Using the “SHIFT”、“DEC” and “INC” buttons, user can edit the temperature set value. Press the “SET” button again, the controller will return to its normal state, the setting value will be saved automatically.

2) With Timing Function :

In the normal state , press the “SET” button to enter the temperature setting state, windows display the prompt “SP” and the temperature set point value. Re-press the “SET” button to enter the time setting state, windows display the prompt “ST” and the time set point value. Press the “SET” button again, the controller will return to its normal state, the set values will be saved automatically.

When the time is set to "0", it indicates the timer is inoperative, the controller will run continuously, the under window will display the temperature set point value. If there is time set, the under window will display the running time, its decimal point and the “TIME” indicator are lit, when the timer starts, its decimal point and the “TIME” indicator flickers. When the timer ends, the under window will display the “End” prompt, the buzzer will sound for 5 minutes, it can be muted by pressing any button, press the “DEC” button for 3 seconds, the controller will restart to work .

1-3. If the upper window show the prompt “---”, it indicates that the temperature sensor has faults or temperature exceeds the measuring range or the controller itself is faulty, the controller will cut off the heat output automatically, the buzzer will sounds continuously, “ALM” indicator is lit, Please check the temperature sensor and its wiring carefully.

1-4. When over temperature alarm, the buzzer beeps continuously, "ALM" indicator is lit, the heat output is cut off. If the over temperature alarm is caused by the change of the temperature setting value, "ALM" indicator is lit, but the buzzer does not beep.

1-5. When the buzzer sounds, press any key to mute.

v. Auto-tuning

In the normal state, press the “SHIFT” button for 6 seconds, the controller will enter the auto-tuning selection state, the upper window displays the prompt “AT”, the under window displays "0", change "0" to "1" by pressing the “INC” button, then press the “SET” button, the controller will run the auto-tuning program, the “AT” indicator flickers. After auto-tuning end, the indicator stops flickering, PID parameter value is saved automatically. In the auto-tuning process, press the “SHIFT” button for another 6 seconds, the controller will stop the auto-tuning program.

During the Auto-tuning process, if over temperature alarm, the buzzer does not beep, "ALM" indicator is not lit, the heat output will be cut off, the “SET” button is invalid, the under window always displays temperature set point value.

vi. Internal parameters settings

Note: All the internal parameter has been adjusted when factory test. Forbidden to modify them except Sensor Correction parameter.

In the normal state, press the “SET” button for 3 seconds, windows will display the prompt “Lc” and the password value. Adjust the password to the required value, then press the “SET” button again, it will enter the internal parameters setting state. Press the “SET” button for another 3 seconds, it will return to the normal state, the set value will be saved automatically.

Parameter table 1

Prompt	Name	Function description	(Setting range) Factory value
Lc	Password key	When “Lc=3”, enter the next parameters.	0
ALH	Over-temp alarm	If “PV>SV+ALH”, the ALM indicator turns on. The buzzer sounds and the heat output turn off.	(0～100.0℃) 20.0
P	Proportional band	Adjustment of proportional function.	(0～300.0℃) 35.0
I	Integration time	Adjustment of integration function.	(1～2000S) 300
D	Differential time	Adjustment of differential function.	(0～1000S) 200
T	Control cycle	The temperature control cycle.	(1～60S)
Pb	Temperature deviation correction	It is usually used to correct errors in low temperature measurement. Pb = Actual value – PV	(-50.0～50.0℃) 0

PL	Temperature slope correction	It is usually used to correct errors in high temperature measurement. PK = 1000 × (Actual value – PV) ÷	(-999～999) 0

Parameter table 2

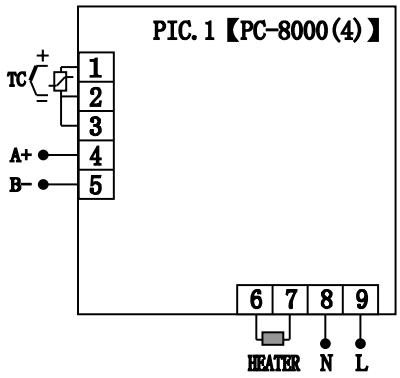
Prompt	Name	Function description	(Setting range) Factory value
Lc-	Password key	When “Lc=9”, enter the next parameters.	0
doT	Temperature decimal point	0: No decimal point display 1: With decimal point display	(0～1) 1
ndT	Timer mode	0: No timer function. 1: Start timing when the temp reaches the set value. 2: Start timing as soon as the controller starts working.	(0～2) 1
Hn	Timer unit	0: Minute	(0～1) 0
SPd	Timer parameter	If “ndT=1”, Start timing when “SV − SPd≤PV≤SV + SPd”	(0.1～50.0℃) 0.5
EH	Timer end mode	0: . 1: Hour.Continue to control the temperature	(0～1) 0
oPn	Door parameter	1: Stop temperature control. Automatic judge door opening. 0: invalid; 0: valid	(0～1) 0
nP	Power percentage	Percentage of max heating power output.	(0～100%) 100
Co	Heating prohibited deviation	When “PV≥SV+Co”, heating output will be cut off	(0～50.0℃) 50.0
SPH	Max set value	The maximum temperature set point value.	(0～400℃) 300.0

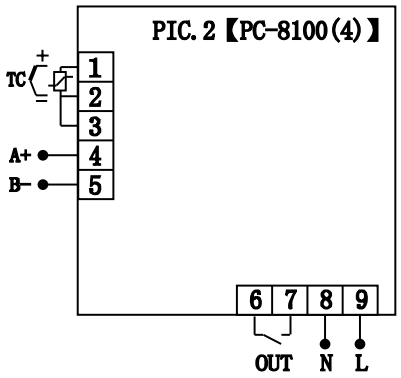
Parameter table 3

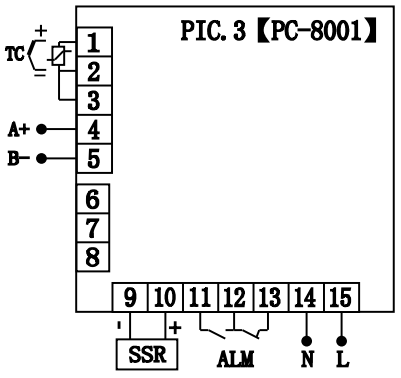
Prompt	Name	Function description	(Setting range) Factory value
Lc	Password key	When “Lc=567”, enter the next parameters.	0
rST	Factory reset	0: cancel; 1: confirm	(0~1) 0

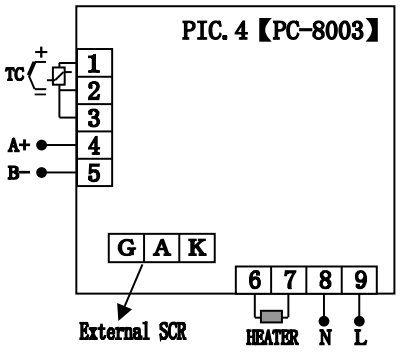
vii .Wiring

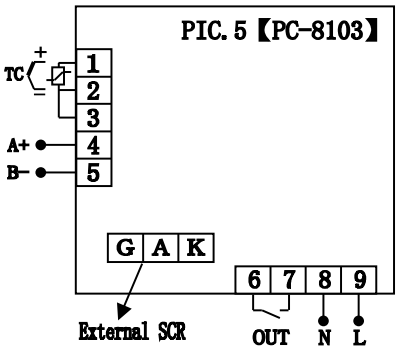
“ ”: Represents the charged output, should be directly connected to the load.
“ ”: Represents the switch output without charge.

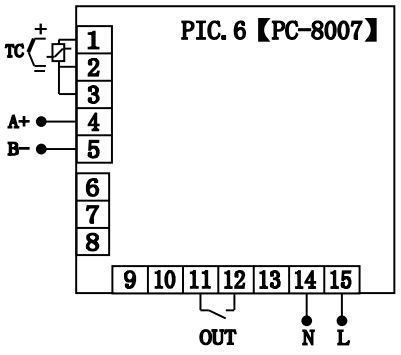












08 FAULT ANALYSIS

Phenomena	Causation	Treatment Method
1.No power supply	1.Plug is poor contact or line broke	1. Connect the plug and line.
	2. Fuse protector is broke.	2. Change the fuse protector.
2. No temperature rising inside container	1. Low setting temperature	1. Readjust and set temperature
	2. Heater is broke.	2. Change the heater
	3.Temperature controller is broke	3. Change the temperature controller
	4. Temperature sensor is loose.	4. Screw up the sensor nut.
	5. Temperature sensor is broke	5. Change the temperature sensor.
3. No temperature rising alarm	1. Setting temperature of Detached temp. limiter is low	1. Readjust the temperature 30℃ above setting temperature.
	2. Detached temperature limiter sensor is broke.	2. Change the detached temperature limiter sensor
4. Temperature cannot reach the setting point.	1. Exhaust port is fully opened	1. Shut off the exhaust port.
	2. The container is overfilled, hot air cannot convert.	2. Decrease amount of sample to improve convection condition.
5. The fan does not work.	The fan motor is broke	Stop work and check electric capacity and motor
6.Displaying-------	The sensor is broke	Change the sensor
7.Display STOP	Time-up	Press the program key for 3s to start

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