Operation Manual

BIDP 100 series

Dual Purpose Incubator

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 Introduction

The new Dual Purpose Incubator is widely used in labs of industrial enterprises, scientific research institutions, colleges and health and medicine units for drying, baking, melting, sterilizing and curing etc.

02 Characteristics

This equipment serves a double purpose as drying oven and incubator.

1. High-quality cold rolling steel electrostatic spraying exterior ensures the aesthetics and longevity of the product.
2. Stainless steel working room; foursquare semicircle transition; airduct lateral plate and bottom heater covering are easy assembly and disassembly for convenient cleaning.
3. Blue screen liquid crystal intelligent temperature controller with function of temperature setting, high-brightness digital display, over-temperature protection and timing.
4. Well structured heater and fan; advanced air flue; gentle breeze circulation prevents the powdery specimen 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.
7. Function of drying and culturing can be switched freely for easy use.

Optional accessories:

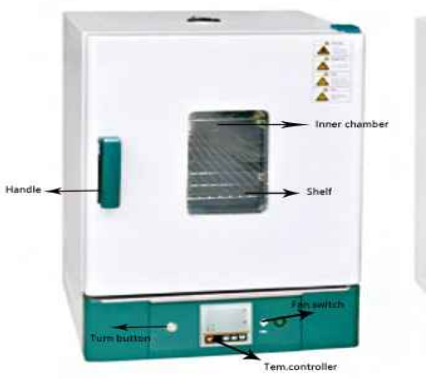
a. RS485/232 interface, which can be connected with computer by principal computer software to control temperature; convenient to control stopping switch.

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.

03 Product structure diagram and parameters

1.Structure diagram



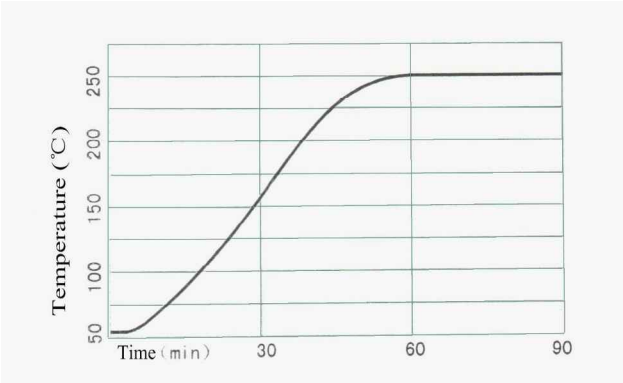
2. Main technical parameters

Model	BIDP-101	BIDP-102	BIDP-103	BIDP-104	BIDP-105
Cycle Mode	Forced convection				
Temp. range	Incubator: RT+5-80°C; Drying oven:80-300°C				
Temp. Resolution Ratio	0.1°C				
Temp.Motion	±1°C				
Temp. Uniformity	Incubator:±1.0°C Drying oven:±2.5%				
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	3.0KW
Exhaust hole	Φ28mm top(with function of test hole)				
Temp. control mode	PID Two temperature section intelligent PID				
Timer	0-9999min(with timing wait function)				
Operation function	Fixed temperature operation, timing function, auto stop.				
Sensor	Pt100				
Inner Chamber size (W*L*H) (mm)	310*310 *310	350*350 *350	400*360 *450	500*450 *550	600*500*750
Exterior size (W*L*H) (mm)	460*510 *695	500*550 *735	550*550 *840	636*680 *915	730*680*1250
Packing size (W*L*H) (mm)	550*585 *845	590*625 *885	640*635 *985	740*725 *1085	860*790*1400
Volume	30L	45L	65L	125L	230L
Shelf number	6	7	8	13	17
Load per rack	15kg				
Shelf space	35mm				
Current rating	AC220V 3.6A	AC220V 5.5A	AC220V 7.2A	AC220V/ 10.5A	AC220V/ 13.6A
NW/GW (kg)	33/37	37/43	44/49	60/66	94/120

Shelf	2
Shelf frame	4

3. 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 220-240±10%, frequency 50-60±1Hz;
4. No violent vibrations 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 instruction

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.

3. While it is drying or culturing, put the switch is at the right position, to make sure good temperature accuracy.

4. 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.

5. After finishing drying, turn off power, and then bring the sample out.

6. 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.

7. 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 Fault treatment

Phenomena	Causation	Treatment Method
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.
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.
No temperature rising alarm	1. Setting temperature of Detached temp. limiter is low	1. Readjust the temperature 30℃ above setting temperature.

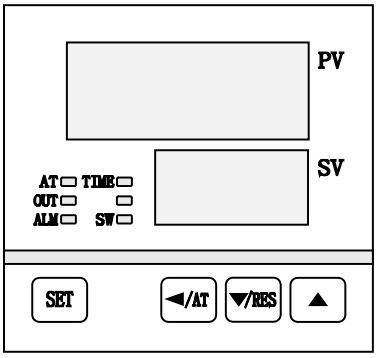
	2. Detached temperature limiter sensor is broke.	2. Change the detached temperature limiter sensor
Temperature cannot reach the setting point.	1. Exhaust port is fully opened	1. Shut off the exhaust port.
	2. The container is overfilled, hot air cannot convect.	2. Decrease amount of sample to improve convection condition.
The fan does not work.	The fan motor is broke	Stop work and check electric capacity and motor
Displaying----	The sensor is broke	Change the sensor
Display STOP	Time-up	Press the program key for 3s to start

08 Meter operation instruction

Note:

Drying oven/Incubator conversion operation: there is a rotary switch on left side of the meter. Please follow the panel instructions to operate: turn the switch to left to make product run as drying oven, turn the switch to top to make product run as incubator.

Panel Instructions



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.

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.

1.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.

2. 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.

3. 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	Adjustment of integration	(1 ～ 2000S) 300

	time	function.	
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) ÷ 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. 1: Hour.	(0 ～ 1) 0
SPd	Timer parameter	If “ndT=1”, Start timing when “SV − SPd≤PV≤SV + SPd”	(0.1 ～ 50.0℃) 0.5

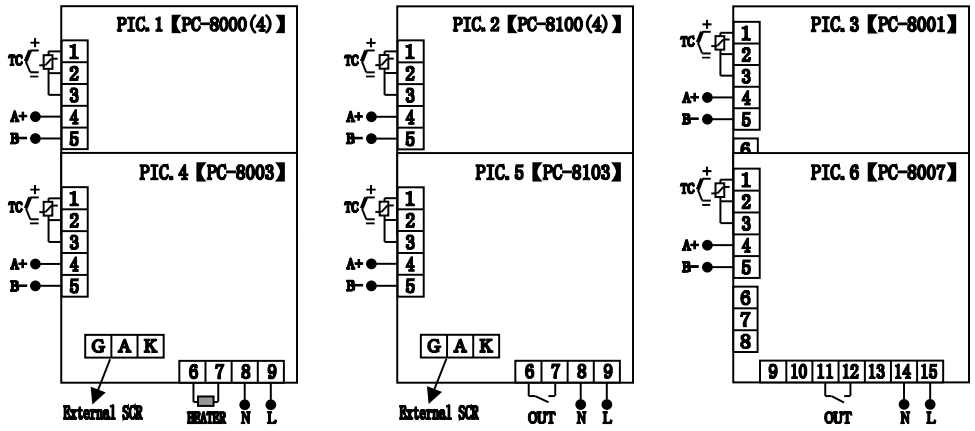
EH	Timer end mode	0: Continue to control the temperature 1: Stop temperature control	(0 ～ 1) 0
oPn	Door parameter	Automatic judge door opening. 0: invalid; 0: valid	(0 ～ 1) 0
nP	Power percentage	Percentage of max heating power output.	(0 ～ 100%) 100
Co	Heating prohibited deviation	When "PV≥SV+Co", heating 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

Wiring

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



4. AT function

When the temperature control effect is not ideal for system tuning. Self tuning process temperature can have bigger overshoot, the users in a system setting before please consider this factor.
In not running state, the controller will enter the auto-tuning of PID by pressing the “◄” button for 6s,”RUN/AT” indicator flashes, it will be not bright when the auto-tuning of PID is completed. In the state, compressor into normally open mode, when the auto-tuning of PID after the end of a group of PID parameter, parameter automatic save and return to the normal mode of operation. When running the auto-tuning of PID, it can be stopped by pressing the “◄” button for 6s again.
In the auto-tuning of PID state, if temperature alarm, no songs buzzer and" ALM" don’t light ,but heating alarm relay automatic disconnect. And" set" keys to effective. In the system self tuning process regardless of whether there is a constant temperature time setting, controller display window lower always display the temperature setting value.

5. Internal parameters settings

Press the “Set” button for 3 seconds, controller will display the password prompt “Lc”. Adjust the password to the required value, then press the “Set” button again, it will run into the internal parameter setting state. if press the “Set” button for another 3 seconds, it will return to the running state.

Parameter list-1:

Parameter indicator	Name	Instruction of the Parameter's function	(Setting range) factory set value
Lc-	Password	when Lc=3 ,then we can see and modify parameters	0
AL-	Alarming setting	When temperature is beyond "SP+AL", the Alarm indicator turns on. The buzzer sounds and the heater output turns off.	(0 ～ 100℃) 5
T-	Control cycle	The heat control cycle of temperature	(1 ～ 60S) Note 1
P-	Proportional band	Adjustment of proportional parameter.	(1.0 ～ rH) 30
I-	Integration time	Adjustment of integration parameter.	(1 ～ 1000S) 400
d-	Differential time	Adjustment of differential parameter.	(0 ～ 1000S) 200
Pb-	Zero point adjust	When the zero error comparatively larger, to update this value should be needed. Pb=measure value – actual value	(-50 ～ 50℃) 0
PK-	Full point adjust	When the full point error also comparatively larger, to update this value should be needed. PK=1000× （measure value –actual value） / actual value.	(-999 ～ 999) 0
Et-	Timing function	When ET = 0, no timing function; 1 electric start timing, 2 to the value set start timing.	(0 ～ 2) Note 2

Note 1 ： If the selection of relay output, heating control cycle should be selected in 20 seconds, the other models for 5 seconds.
Note2 ： if FCD-300X series, a timing function for 2, other models for 0.

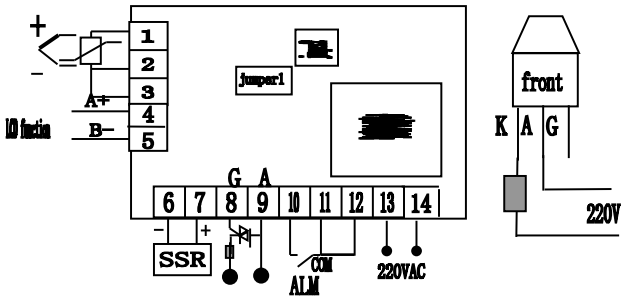
Parameter list-2:

Parameter indicator	Name	Instruction of the Parameter's function	(Setting range) factory set value
Lc-	Password	when Lc=9,then we can see and modify parameters	0
Co-	Turn off the heat output deviation	when"PV≥SP+Co"， Turn off the heating output	(0.0 ～ 50.0℃) 5.0
Hn-	Constant temperature time mode	0 ： minutes time ； 1 ： hours time	(0 ～ 1) 0
En-	End of operation temperature	En = 0 end of run off output; En = 1 end run to constant temperature;	(0 ～ 1) 0
Lt-	Maximum power output	The heating output maximum power percentage;	(0 ～ 100)100
oP-	Gate-control function	0: shut-off function of opening door to judge, 1: unlock function of opening door to judge Note3	(0 ～ 1) 1
rH-	Range of temp setting	The value of temperature setting.	Note 3

Note3: FCD-30XX: 0 ～ 400.0℃(300℃); FCD-31xx： 0 ～ 100.0℃(100℃);
FCD-3Kxx ： 0 ～ 1200℃(1200℃); FCD-3Sxx： 0 ～ 1600℃ ； (1500℃)

English name and parameter indicating the symbol table

Parameters indicating	SP	St	Lc	AL	T	P	I	d
English Name	SP	St	Lc	AL	T	P	I	d
Parameters indicating	Pb	Pt	Co	Hn	oP	rH	En	Lt
English Name	Pb	Pk	Co	Hn	oP	rH	En	Lt

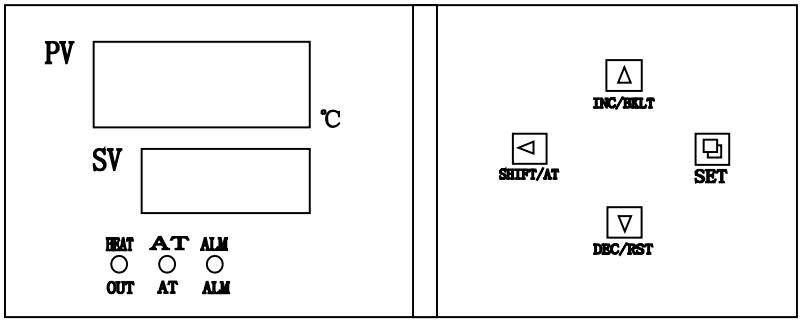


09 Meter Instructions of BIDP-205

1. Brief introduction

1.Shape size ： 170mm*60mm;
2.Range of temperature:1) FCH-20xx ： 0 ～ 400.0℃ 2) FCD-31xx ： 0 ～ 100.0℃ ；
Range of time: 0 ～ 9999 Minute(Hour);
3.Temperature display value of basic error: < 0.5%;
4.Working environment ：
Main board Power ： 220V±10% AC ；
Environmental temperature ： 0 ～ 50℃ ；
Relative Humidity ： <85%RH ；

2.Panel Instructions



3. Indicator definition

1) “OUT” indicator: If the heater output turns on, this indicator is bright, else this indicator is not bright.
2) “AT”When the controller enters the auto-tuning of PID, this indicator is flashing.
3) “ALM” indicator: When the over-temperature alarm occurs, this indicator is bright.

4. Operation and using

1) Temperature and time settings:

Press the “Set” button, the controller runs into the temperature setting state. Re-press the “Set” button, the controller runs into the time setting state. In setting state, you can use the “◄” , ”▼” and ”▲” buttons to get the required settings. Press the “set” button again, it returns from the setting state and the settings are saved automatically.

If the time is set as “0”, the controller will run continuously, the display window of “SV” will display the set point temperature. If the time set value is not equal “0”, timers start time when the measuring temperature reaches the set point temperature, the display window of “SV” will display the runtime.

2) When temperature alarm, the buzzer will sound," ALM" lights. If a change in temperature setting and over-temperature alarm," ALM" lights up, but no songs buzzer.

3) When the buzzer sounds, it can be muted by pressing any button.

4) “◄” button: In the setting state, it can shift the set value by pressing the button.

5) “▼” button: In the setting state, it can reduce the set value by pressing the button. If press and hold the button, the set value will reduce continuously.

6) ”▲” button: In the setting status, it can increase the set value by pressing the button. If press and hold the button, the set value will increase continuously.

7) In setting state, the controller will return to run status if without any key press in one minute.

8) If the display window shows “----“, it indicates the fault of temperature.

5. AT function

When the temperature control effect is not ideal for system tuning. Self tuning process temperature can have bigger overshoot, the users in a system setting before please consider this factor.

In not running state, the controller will enter the auto-tuning of PID by pressing the “◄” button for 6s,”RUN/AT” indicator flashes, it will be not bright when the auto-tuning of PID is completed.In the state, compressor into normally open mode,when the auto-tuning of PID after the end of a group of PID parameter, parameter automatic save and return to the normal mode of operation. When running the auto-tuning of PID, it can be stopped by pressing the “◄” button for 6s again.

In the auto-tuning of PID state,if temperature alarm, no songs buzzer and" ALM" don’t light ,but heating alarm relay automatic disconnect.And" set" keys to effective. In the system self tuning process regardless of whether there is a constant temperature time setting, controller display window lower always display the temperature setting value.

6. Internal parameters settings

Press the “Set” button for 3 seconds, controller will display the password prompt “Lc”. Adjust the password to the required value, then press the “Set” button again, it will run into the internal parameter setting state. if press the “Set” button for another 3 seconds, it will return to the running state.

Parameter list-1:

Parameter indicator	Name	Instruction of the Parameter’s function	(Setting range)factory set value
Lc-	Password	when Lc=3 ,then we can see and modify parameters	0
AL-	Alarming setting	When temperature is beyond “SP+AL”, the Alarm indicator turns on. The buzzer sounds and the heater output turn off.	(0 ～ 100℃) 5
T-	Control cycle	The heat control cycle of temperature	(1 ～ 60S) Note 1
P-	Proportional band	Adjustment of proportional parameter.	(1.0 ～ rH) 30
I-	Integration time	Adjustment of integration parameter.	(1 ～ 1000S) 400
d-	Differential time	Adjustment of differential parameter.	(0 ～ 1000S) 200
Pb-	Zero point adjust	When the zero error comparatively larger, to update this value should be needed. Pb=measure value –actual value	(-50 ～ 50℃) 0
PK-	Full point adjust	When the full point error also comparatively larger, to update this value should be needed. PK=1000× (measure value – actual value ） / actual value.	(-999 ～ 999) 0

Note 1 ： If the selection of relay output, heating control cycle should be selected in 20 seconds, the other models for 5 seconds.

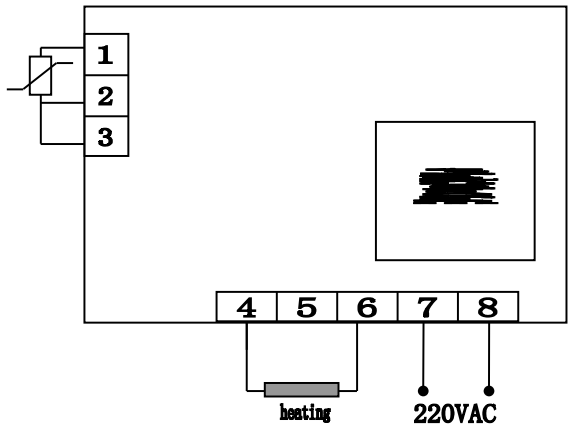
Parameter list-2:

Parameter indicator	Name	Instruction of the Parameter's function	(Setting range) factory set value
Lc-	Password	when Lc=9,then we can see and modify parameters	0
Co-	Turn off the heat output deviation	when"PV≥SP+Co"， Turn off the heating output 。	(0.0 ～ 50.0℃) 5.0
En-	End of operation temperature	En = 0 end of run off output; En = 1 end run to constant temperature;	(0 ～ 1) 0
oP-	Door control	0 ： Disable the function of door control ； 1 ： Enable the function of door control.	(0 ～ 1) 1
rH-	Range of temp setting	The value of temperature setting.	(0 ～ 400.0℃) 300.0

English name and parameter indicating the symbol table

Parameters indicating	SP	St	Lc	AL	T	P	I	d
English Name	SP	St	Lc	AL	T	P	I	d
Parameters indicating	Pb	Pt	Co	Hn	oP	rH		
English Name	Pb	Pk	Co	Hn	oP	rH		

7. Wiring



10 Fault treatment

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.
	1. Setting temperature of	1. Readjust the temperature

3. No temperature rising alarm	Detached tem. limiter is low	30°C 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 convect.	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

Email: contact@biolabscientific.com
Website: www.biolabscientific.com