BioLAB

Operation Manual

Dual Purpose Incubator

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

Index

01 Introduction

The 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 Parameter

Model	BIDP-201	BIDP-202	BIDP-203	BIDP-204	BIDP-205
Cycle Mode	Forced convection				
Temp. range	Incubator: RT+5-80℃ Drying oven:80-300℃				
Temp. Resolution Ratio	0.1℃				
Temp. Motion	±1℃				
Temp. Uniformity	Incubator:±1.0℃ 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

Inner Chamber size (WxLxH) (mm)	310x310x310	350x350x350	400x360x450	500x450x550	600x500x750
Exterior size (WxLxH) (mm)	460x510x695	500x550x735	550x550x840	636x680x915	730x680x1250
Packing size (WxLxH) (mm)	550x585x845	590x625x885	640x635x985	740x725 x1085	860x790 x1400
Volume	30L	45L	65L	125L	230L
Shelf number	6	7	8	13	17
Load per rack	15kg				

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				

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.
   Note: Don't close the blower when heating up, or it will speed up the aging of heater.
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
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 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
8.Big temperature fluctuation when incubating	Choose the right switch for drying and incubating	Readjustment or reset

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.

i. **Panel Instructions**
   The panel indication
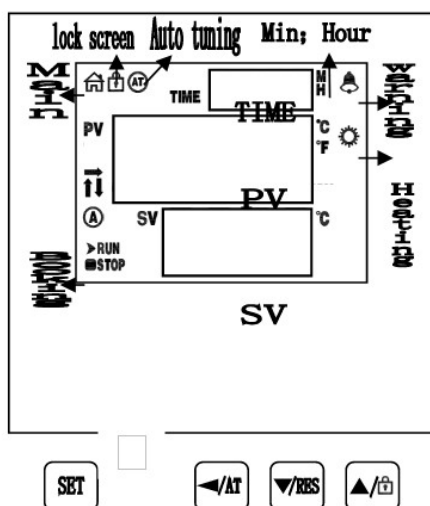
Key defines
1. 【Set】: Set key, in the main screen state, click this key to enter the temperature and time target value Setting state, long press this key for 3 seconds to enter the internal parameter Setting state.
2. 【◄/AT】: Shift / Auto-tuning, in the Setting state, click this key to change the Setting value.In the main screen state, long press this key for 6 seconds to temperature auto-tuning selection state.
3. 【▼/RES】: Decrease / rerun key. In the Setting state, click or long press this key to decrease the Setting value. In the main screen state, long press this key for 3 seconds to restart the run.
4. 【▲/🔒】: Increase / lock screen key. In the Setting state, click or long press this key to increase the Setting value.In the main screen state, click this key to lock or unlock the screen.

PC-D9000 VA LCD indicator Defines

1. 【Main】indicator : In the normal working state (non-Setting state), the lamp will be on, otherwise it will be off.
2. 【Lock】indicator: It will be on when the screen is locked, otherwise it will be off.
3. 【AT】indicator:The lamp flashes during temperature self-adjustment and goes out instead.
4. 【Alarm】indicator: The lamp will be on when there is temperature deviation alarm or abnormal temperature measurement. It will flash when there is temperature deviation alarm. Under normal condition, it will be off.
5. 【Heating】indicator: The lamp will be on when there is heating output, otherwise it will be off.
6. 【A】indicator: The lamp will be flash in reservation timing, otherwise it will be off.
7. 【RUN/STOP】indicator: Only STOP lights up at the end of timing, and RUN lights up in other states.
8. 【↑/→/↓】indicator:It will flash when heating, constant temperature and cooling.

ii. Operations and usages

1. Controller power on display
    1) Type PC-D9000：PV displays【P(K) – d9】, the SV displays the version number for about 3 seconds and then enters the normal display state.
    2) Type PC-E9000：After all the display are on for about 3 seconds, PV area displays 【P(K) – E9】, SV displays version number for about 1 second and then enters the normal display state.

2. Reference and Setting of temperature and time
    1) No-timing function:

    In the main screen state, click the【Set】to enter the temperature Setting state, the PV area displays prompt SP, and the SV area displays the temperature Setting value, which can be modified to the required Setting value through the【shift】,【increase】, 【decrease】, then click the【Set】to exit the Setting state, and the Setting value will be saved automatically.

    2) Timing function:

    In the main screen state, click the【Set】to enter the temperature Setting state, the PV area displays the prompt SP, the SV area displays the temperature Setting value, and the modification method is the same as above; then click the【Set】to enter the time Setting state, the PV area displays the prompt ST, TIME area displays the time Setting value; then click【Set】to exit the Setting state, and the Setting value will be saved

automatically.

When the Setting time is "0", it means continuous operation. When the Setting time is not "0", before the timing starts, if the timing direction is count-down, the TIME area will display the timing time; if the timing is count-up, the TIME area will display "0". When the timing starts, "indicator" will flash.When the time is up, the operation will end. The TIME area will display End, and the buzzer will beep for EST seconds (see 7. Parameter TABLE-1). At this time, long press the 【decrease】for 3 seconds, the operation can be restarted.

Description: PC-D9000 type, "indicator" is "time unit";

PC-E9000 type, the "indicator" is "TIME displays decimal point of single digits."

3．Reservation function（see7．Parameter TABLE-6）

When an reservation time is Set, heating operation is prohibited.
1) PC-D9000 type: In reservation timing, A indicator flashes, and the count-down TIME area displays the reservation running time.
2) PC-E9000: In reservation timing,TIM indicator flashes, and the count-down TIME area displays the reservation running time.

4. Abnormal temperature measurement alarm

If the PV area displays "----", it means that the temperature sensor is faulty or the temperature exceeds the measuring range or the controller itself is faulty. The controller will automatically disconnect the heating output, the buzzer will sound continuously and the alarm light will be on. Please check the temperature sensor and its wiring carefully.

5．Deviation over temperature alarm (see 7. Parameter TABLE-1)

When the upper deviation over temperature alarm occurs in process, the buzzer beeps, the alarm light is continuously on, and the heating output is disconnected.When the lower deviation over temperature, the alarm will occur and flash. If the over temperature alarm is generated due to changing the temperature Setting value, the alarm light will be on, but the buzzer will not sound.

6. Lock screen function.

Three screen locking modes are provided. See [7. Parameter TABLE-1] for details.
Password unlocking: In the lock screen state, click the 【increase】, the input password prompt PA is displayed in PV area, and the password is displayed in SV area. After entering the correct password, click the【Set】to unlock.

7. When the buzzer sounds, press any keys to silence.

iii. Auto-tuning system

When the temperature control effect is not ideal, the system can be auto-tuning. There will be a large overshoot in the process of auto-tuning. Please take this factor into consideration before system auto-tuning.

In the running state and the main screen state, long press the【shift】for 6 seconds to enter the system auto-tuning selection state. The PV area displays the auto-tuning prompt AT, and the SV area displays "0". You can click the【increase】or【decrease】to select the display "1", and then click the【Set】to enter the system auto-tuning state. The AT light flashes. After the auto-tuning is completed, the AT light stops flashing. The controller will get a better set of PID parameters and save them automatically. In the process of system auto-tuning, long press the【shift】for 6 seconds to stop the auto-tuning program.

In the process of system auto-tuning, if there is an over temperature alarm of upper deviation, the alarm light will not be on and the buzzer will not sound, but the alarm relay will be automatically disconnected. In the process of system auto-tuning, the【Set】is invalid.

iv. Internal parameters settings

In the main screen state, long press the【Set】for 3 seconds, the password prompt LC will be displayed in PV area, and the password will be displayed in SV area.Modify the required password through【increase】、【decrease】and【shift】, and then click the【Set】. If the password is incorrect, the instrument will automatically return to the main screen state. If the password is correct, enter the internal parameter setting state, and then click the【Set】to modify each parameter in turn. In this process, long press the【Set】for 3 seconds to exit this state, and the parameter value will be saved automatically. See the table below for details:

Description:
1) In the parameter TABLE, the temperature setting is referred to as SP,the temperature measurementis referred to as PV.
2)In the TABLE below, PT100, M=400.0℃, Type K, M =600.0℃

Parameter TABLE-1

The Indicator	Parameter Name	Description of the parameter function	(Range) Initial value
Lc	Password.	Lc=3,parameter values can be viewed and modified	0
ALH	Upper Deviation Over-temperature Alarm	PV>SP+ALH, over-temperature alarm of upper deviation	(0～100.0°C) 20.0
ALL	Lower Deviation Over-temperature Alarm	PV<SP-ALL,over-temperature alarm of upper deviation **Description:ALL=0,the lower deviation alarm is invalid**	(0～100.0°C) 0
Pb	Temperature Measurement Deviation Correction	Used to correct errors in temperature measurement. Pb = Actual temperature－PV	(-50.0～50.0°C) 0
PL	Temperature Measurement Slope Correction	It is commonly used to correct errors arising from high temperature measurement. PL = 1000 x（Actual temperature－PV）÷ PV **Description: In Parameter【TABLE - 4】,En = 1 This feature is invalid.**	(-999～999) 0
ndT	Timing Mode	0:No-timing; 1:Constant temperature timing; 2: Run timing.	(0～2) 1
Tdn	Timing Direction.	0:Count-up; 1:Count-down	(0～1) 0
Hn	Time Unit.	0:Minute；1:Hour	(0～1) 0
SPd	Constant Temperature Deviation	SP－SP d ≤PV≤SP＋SP d, Enter a constant temperature state.	(0.1～50.0°C) 0.5

EST	End Timing Prompt Time	When the timing is over, the buzzer will prompt the time. Note: EST = 9999, indicates a permanent prompt.	(0～9999s) 60
EH	End Timing Constant Temperature Controller	0: Turn off the heating output after timing; 1: Keep constant temperature controlling after timing	(0～1) 0
LF	Lock Screen Function	0: Lockless screen function; 1: Lock screen function, unlock without password. 2: Lock screen function, need password to unlocked.	(0～2) 0
LdT	Lock Screen Delay	In the main screen state, if no key is pressed in the delay LDT time, the controller will automatically lock the screen. **Description: LDT = 600, the delay screen locking function is invalid**	(10～600s) 30
PAd	Unlock Password	The password must be entered to unlock it.	(0～9999) 1
Add	Mail Address	Local Address **Description:** PC-E9000 has no communication function.	(1～32) 1

Argument TABLE -2

The Indicator	Parameter Name	Description of the parameter function	(Range) Initial value
Lc	Password	Lc=6,parameter values can be viewed and modified	0
dP	Demarcation Point	High and low temperature PID control demarcation point. When SP≤ DP, it is low temperature control, otherwise it is high temperature control.	(0～M°C) M
T	Control period	Heating control period.	(1～30s) 5
P1	Proportional Band 1	The time proportion regulation in low temperature control. **Description: P1 = 0, it is digit controlling.**	(0～300.0°C) 35.0
I1	Integral time 1	Integral regulation in low temperature control.	(1～2000s) 300
d1	Differential time 1	Differential regulation in low temperature control.	(0～1000s) 200
nP1	Power Output 1	Maximum power percentage of heating output at low temperature control.	(0～100%) 100
nH1	Heating Off Deviation 1	In low temperature control, if PV ≥ SP + nh1, it will turn off the heating. **Description: please use this parameter with caution!**	(0～50.0°C) 50.0
P2	Proportional Band 2	The time proportion regulation in high temperature control. **Description: P2 = 0, it is digit controlling.**	(0～300.0°C) 35.0
I2	Integral Time 2	Integral regulation in high temperature control.	(1～2000s) 300

d2	Differential Time 2	Differential regulation in high temperature control.	(0～1000s) 200
nP2	Power Output 2	Maximum power percentage of heating output at high temperature control.	(0～100%) 100
nH2	Heating Off Deviation 2	In high temperature control, if PV ≥ SP + nh2, it will turn off the heating. **Description: please use this parameter with caution!**	(0～50.0℃) 50.0

Argument TABLE -3

The Indicator	Parameter Name	Description of the parameter function	(Range) Initial value
Lc	Password.	Lc=9,parameter values can be viewed and modified	0
doT	Display Decimal point	0: No decimal point for temperature measurement and set value; 1: The temperature measurement and the set value have 1 decimal point.	(0～1) 1
oPn	The Door Control Function	0：No use； 1：Use **Note1**	(0～1) 0
SPL	Minimum. Set value	The minimum value of the temperature setting.	(-50.0～20.0℃) 0
SPH	Maximum Set value	The maximum value of the temperature setting.	(20.0～M℃)300.0

ouT	Heating. Output Mode	0: normal state ; 1: The alarm relay output (normally opening point) is changed to heating output, and the original heating output is invalid. **Note2**	(0～1) 0
db	Nonsense Region	The nonsense region of the temperature measurement.	(0～5.0) 0.0
ndo	Switch Output Mode	0: At the end of timing; 1: Over-temperature alarm; Enter the constant temperature state **Note3**	(0～2) 1
ndA	Temperature Alarm Mode	0: Only the temperature deviation over-temperature alarm; 1: Temperature up and down deviation over-temperature alarm concurrently.	(0～1) 0

Note 1: In order to avoid misjudgment, please select to turn off the open door judgment function for the equipment that does not need to open the door or the temperature drops quickly.

Note 2: When the ouT value changes from 0 to 1, the heating control T period automatically changes to 20 seconds and saves; when the ouT value changes from 1 to 0, the heating control T period automatically changes to 5 seconds and saves.This function is only applicable to PC-9x01 (driving solid-state SSR output) . It is forbidden to change the initial value of other types of instruments, otherwise the control will be abnormal!

Note 3: Only PC-D9201 (driving solid-state SSR with switch output) has this function. Switch output means that the normally opening point of switch relay is closed.

Argument TABLE -4

The Indicator	Parameter Name	Description of the parameter function	(Range) Initial value
Lc	Password.	Lc=12,parameter values can be viewed and modified.	0
En	Correction Enable	0: disable multi-segment correction function; 1: Enable **Note: when En = 1, 【parameter TABLE-1】 is invalid.**	(0～1) 0
U1	Correction Point 1	If PV≤U1,use E1 to correct the temperature slope.	(0-MMC)) M
E1	Correction Point 1	E1 = Actual temperature－PV	(**Note4**) 0
U2	Correction point 2	If PV≤U2,use E2 to correct the temperature slope.	(U1-M-C)) M M
E2	Correction point 2	E2 = Actual temperature－PV	(**Note4**) 0
U3	Correction point 3	If PV≤U3,use E1 to correct the temperature slope.	(U2-M-C)) M M
E3	Correction point 3	E3 = Actual temperature－PV	(**For4**) 0

Note 4: Temperature Unit is Celsius：-180.0～180.0;Temperature Unit is Fahrenheit：-180.0～324.0

Description: Before adopting this correction, Pb in 【parameter TABLE-1】 should be equal to 0, the measured value of temperature display should be equal to the corrected value + Pb

Argument TABLE -5

The Indicator	Name	Description of the parameter function	(Range) Initial value
Lc	Password	Lc=27,parameter values can be viewed and modified modified at Lc s27.	0
Fc	Temperature unit	0: Celsius; 1: Fahrenheit.	**Note5**

Note 5: Type PT100：(0～1) 0 ； K-type thermocouple： (0～0) 0

Argument TABLE -6

The Indicator	Name	Description of the parameter function	(Range) Initial value
Lc	Password	Lc=81,parameter values can be viewed and modified	0
APT	Reservation Time	Set power-up time **Description:APT = 0, this function is invalid.**	(0～9999min) 0

Argument TABLE -7

The Indicator	Name	Description of the parameter function	(Range) Initial value
Lc	Password	Lc=567,parameter values can be viewed and modified	0
rST	Factory Reset	0:Cancel ； 1：Conform.	(0～1) 0

Digital Temperature Limiter Panel Instructions
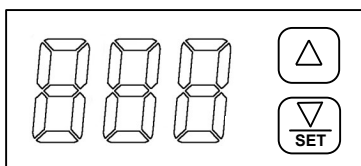
Button function

1. 【▲】："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.
2. 【▼/SET】："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.
   It has the setting function when modifying internal parameters.

v. View and set internal parameters

In the normal state, press the "INC" and "DEC" button for about 6 seconds, the window alternately displays "Lc" and password value, the required password value can be modified only by the "INC" button. Then click the "DEC" button, the controller will enter the internal parameters setting state. Press the "DEC" button for 3 seconds, it will return to the normal state, the set value will be saved automatically.

Parameter table

Prompt	Name	Function description	(Setting range) Factory value
Lc	Password key	When "Lc=3", enter the next parameters.	0
Pb	Temperature deviation correction	It is usually used to correct errors in low temperature measurement.	(-50～50°C) 0
PL	Temperature slope correction	It is usually used to correct errors in high temperature measurement. PK = 1000 × (Actual value – PV) ÷ PV	(-199～199) 0
SPH	Max set value	The maximum temperature set point value.	(0～400)400

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