Operation Manual

BODR-303

Drying Oven

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

Index

01 Summary

Drying 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, air duct 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 auto-switch with temperature controller and alarm when over temperature limit.

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

Optional accessories:

a. RS485/232 interface for connecting computer by principal computer software to control temperature switch.

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

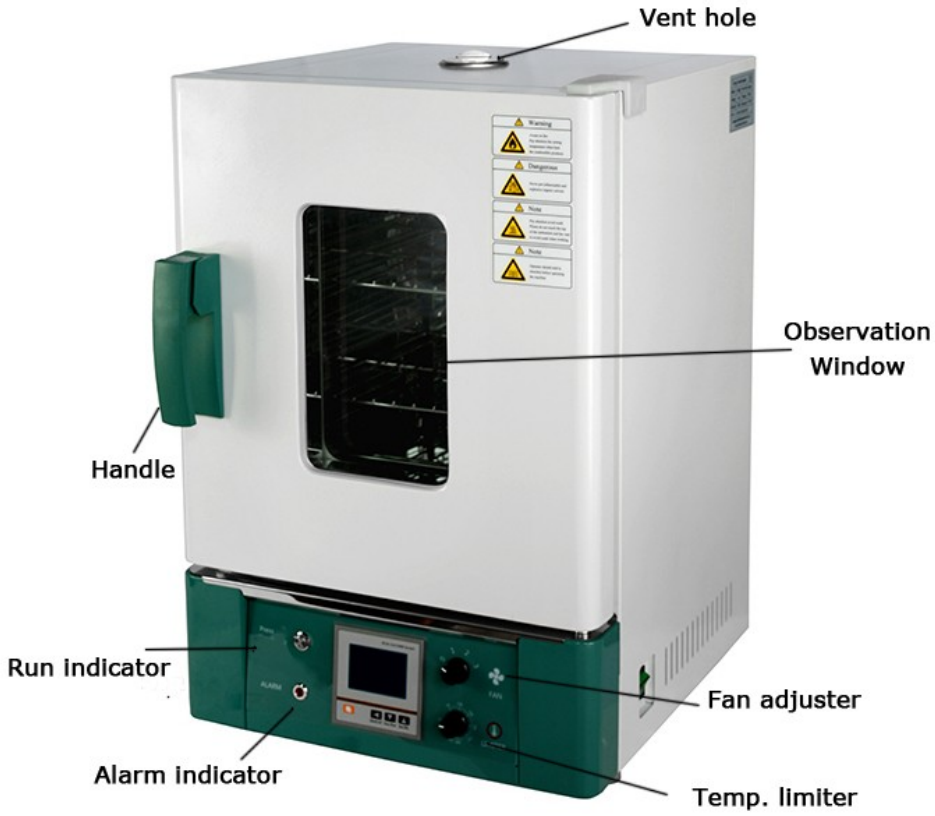
c. Independent power cut alarm system to help the user process sample immediately.

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

temperature limit.

03 Product structure diagram and parameters

i. Structure diagram

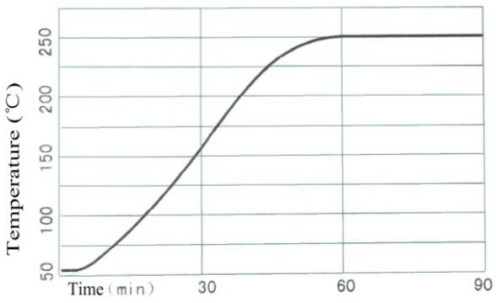


ii. Main technical parameters

Model	BODR-301	BODR-302	BODR-303	BODR-304	BODR-305
voltage	AC220-240V 50-60Hz				
power(w)	800W	1200W	1600W	2300W	3000
Tem. range	RT+10~300℃				
Tem. fluctuation	±1.0℃				
Inner Chamber Size(mm)	310×310×310	350×350×350	400×360×450	500×450×550	600×500×750
Exterior size(mm)	460×510×695	500×550×735	550×550×840	636×680×915	730×670×1220

Shelf load		15/kg			
N.W(kg)	39	42	44	56	70
Shelf No.		2pcs			

iii. Temperature profile



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

04 Working Conditions

The drying oven works under the following conditions:

1. Temperature ranges between 5~40℃;
2. Relative humidity less than 85% RH;
3. Power: voltage 220-240V, frequency 50-60Hz;
4. No violent vibrations and corrosive gas surround the oven.

05 Attentions

	Install the outer ground protection to ensure safety of machine and experiment; ensure power as the machine required.
	This equipment is forbid to use in inflammable and explosive, poisonous and strong corrosive experiments.
	Make sure horizontal installation.

	Non-professionals are not allowed to disassemble and repair this machine.
	Pay attention to the setting temperature when dealing with inflammable matters.
	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.
	Overfilled of sample will lead to overheat of working room under part, which will dissolve the inflammable material and cause fire.
	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.
	Read the instruction book before operation.

06 Operational notes

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 (see 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.

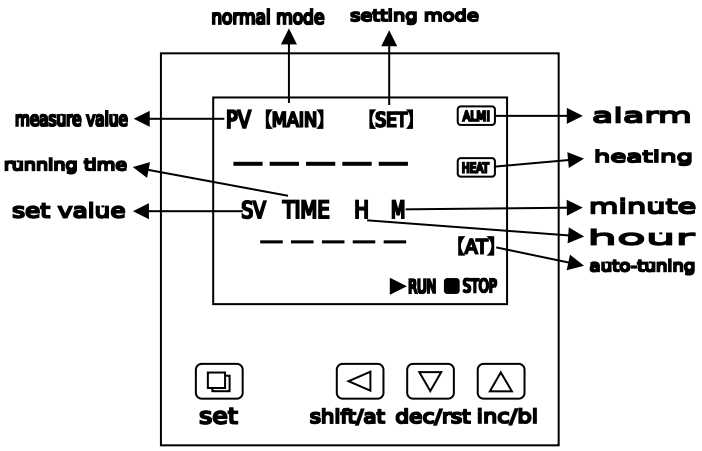
07 Fault Treatment

Phenomena	Causation	Treatment Method
1.No power supply	a. poor plug contact or line broke	a. Connect the plug and line.
	b. Fuse protector is broken.	b. Change the fuse protector.
2.No temperature rising inside container	a. Low setting temperature	a. Readjust and set temperature
	b. Heater is broken.	b. Change the heater
	c.Temp. controller is broken	c. Change the temperature controller
	d. Temp. sensor is loose.	d. Screw up the sensor nut.
	e. Temp. sensor is broken	e. Change the temperature sensor.
3. No temperature rising alarm	a. Set temp. of Detached tem. limiter is low	a. Readjust the temperature 30℃ above setting temperature.
	b. Detached temp. limiter sensor is broken.	b. Change the detached temperature limiter sensor
4. Temperature cannot reach the setting point.	a. Exhaust port is fully opened	a. Shut off the exhaust port.
	b. The container is overfilled, no hot air convection.	b. Decrease amount of sample to improve convection condition.
5. The fan doesn’t work.	The fan motor is broken	Stop work and check electric capacity and motor

6.Displaying-------	The sensor is broken	Change the sensor
7.Display STOP	Time-up	Press the program key for 3s to start

08 Temperature Controller Instruction

1. Panel Instructions



Definitions of symbols:

1. 【MAIN】: Only in normal state(not setting mode),this symbol appears
2. 【SET】: Only in setting mode , this symbol appears
3. RUN: This symbol always appear unless the timing program is over.
4. STOP: This symbol appears to show you timing program is over.
5. 【AT】: This symbol twinkles only when you start an Auto-tuning procedure
6. ALM!: This symbol appears to show you over-temperature alarm
7. HEAT: This symbol appears or twinkles to show you the heater is working.

2. Operation and using

1) When the controller is switched on, display windows show the version number and the value of temperature range for 3 seconds, then it starts running.

2) "◄" button: In the setting state, click on the button to shift the set value.

3) "▼" button: In the setting state, click on the button to reduce the set value. If

you keep pressing on the button, the set value will reduce continuously.

4) ”▲” button: In the setting status, click on the button to increase the set value. If you keep pressing on the button, the set value will increase continuously. In the Normal status, click on the button to open or close the back light lamp.

5) In the setting mode, If no button is pressed within 60s, the controller will automatically return to normal display.

6) Temperature and time setting

No timing function

Press the “SET” button in the non-set state, windows display the prompt “SP” and temperature set value. Using the “SHIFT”、”DEC” and “inc” buttons, user can modify the settings to the desired value, then press the “SET” button again, controller will return to the normal display, the setting value will be saved automatically.

With timing function

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

When the time is set to “0”, it indicates the timer is inoperative, the controller will run continuously. If there is time set, the under window of controller will display temperature setting value or the running time according to the value of “ndt” in Parameters table 2. When display the running time, the unit decimal point is lit, Start timing when the measured temperature reaches to the setting value, When the run time is over, the under window of controller will display “End”, the buzzer will sound for 60s, it can be muted by pressing any button, press the “RST” button for 3s at this time, the controller will restart.

7) When Over-temperature alarm, the buzzer beeps continuously, "ALM" warning light is lit.

8) When the buzzer sounds, press any key to mute.

9) If the controller upper display window displays “----”, said temperature sensor or the controller itself fails, please carefully check the temperature sensor and wiring.

3. Auto-tuning of PID

Use auto-tuning function when the temperature control is not good.

In the non-set state, press the “AT” button for 6s, the window displays ‘AT’ and ‘oFF’,change ‘oFF’ to ‘oN’ by ‘Inc’ or ‘Dec’ button, then the controller will run the auto-tuning program, the “AT” symbol flashes, after auto-tuning end, the light stops flashing, parameter value is saved automatically. In the auto-tuning process, press the “AT” button for another 6s, the controller will stop the auto-tuning program.

In the auto-tuning process, the “SET” button is invalid, the under window always displays temperature set value.

Action please: the temperature is not precisely controlled when you start an auto-tuning program, there must be over-temp situation, please take out your stuffs from the oven before auto-tuning.

4. Internal parameters settings

In the non-set state, Press the “Set” button for 3s, 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 3s, it will return to the running state, the setting value will be saved automatically.

Parameter table 1

Parameter prompt	Name	Instruction of the function	(Setting range) factory set value
Lc-	Password key	When Lc=3, enter the next parameters.	0
ALH-	Over-temp alarm	If “SV>(SP+ALH)”, the “ALM” light turns on. The buzzer sounds and the heating output turns off.	(0～100.0℃) 20.0
ALL-	Under-temp alarm	If “SV<(SP-ALL)”, the “ALM” light flashes, the buzzer sounds.	(0～100.0℃) 0
P-	Proportional band	Adjustment of proportional function.	(1～400.0℃) 35.0
I-	Integration time	Adjustment of integration function.	(1～2000S) 200
d-	Differential time	Adjustment of differential function.	(0～1000S) 200
T-	Control cycle	The temperature control cycle.	(1～60S) 5
Pb-	Zero point adjust	When the zero error comparatively larger, to update this value should be needed. Pb= actual value – measure value	(-12.0～12.0℃) 0

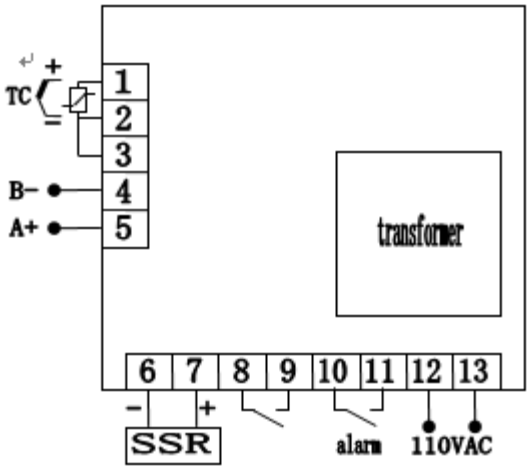
PL-	Full point adjust	When the full point error also comparatively larger, to update this value should be needed. PK=1000×（actual value – measure value）/ measure value.	(-999～999) 0
Addr	Address	The communication address. invalid	(1～32) 1
Loc	Setting lock	0:you are allowed to alter the set value of temperature and time; 1:the set value of temperature or time is not allowed to alter	0(0～1)

Parameter table 2

Parameter prompt	Name	Instruction of the function	(Setting range) factory set value
Lc-	Password key	When Lc=9, enter the next parameters.	0
ndA-	Temp alarm mode	0: With over-temp alarm only. 1: With over-temp alarm and under-temp alarm at the same time.	(0～1) 0
ndt-	Timer mode	0: No timer function. 1: The timer get to work as soon as the set temperature value is achieved.. 2: The timer start to work as soon as the instrument get to work.	(0～2) 1
Hn-	Timer unit	0: Minute. 1: Hour.	(0～1) 0
SPD	Timer parameter	When measured value of temperature >SPD+set value of temperature, timer get to work	(0.1～100.0℃) 0.5
SPT	Constant temperature tip time	In timing mode(set value of temperature is achieved),the buzzer reminds you when the tip time you've set is achieved.	(0～9999S) 0
EST	Tip after timing	When timing program is over, the buzzer reminds you as soon as the tip time you've set is achieved	(0～9999S) 0
EH-	Timer end	0: Continue to maintain the	(0～1)

	mode	constant temperature when the running time is over. 1: Stop the temperature control when the running time is over.	0
ndo-	Switch-output	0: when timing program is over 1: when over-temperature alarm occurs 2:when the timer starts to work	(0～2) 0
SPL-	Minimum set point	The minimum temperature set point.	(-50.0～50.0) 0
SPH-	Maximum set point	The maximum temperature set point.	(0～400.0) 300.0

6. Wiring



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