



Operation Manual



BODR 100 series

Drying Oven

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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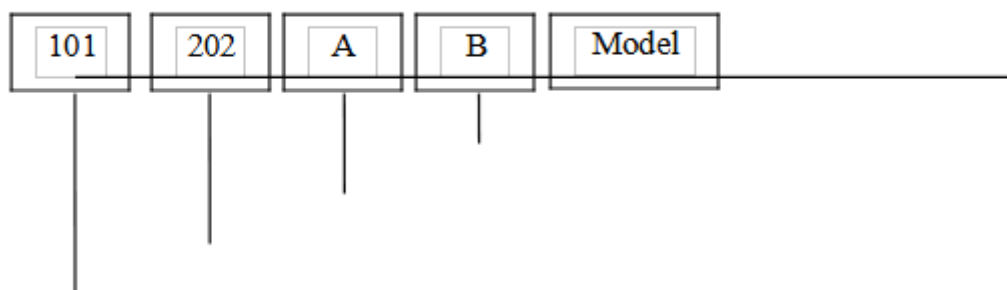
01 Product Overview

This product is applied to drying, melting, baking, sterilization, etc in the Industrial and mining enterprises, labs, universities and research institutes.

02 Structural Features

Cold rolling steel electrostatic spraying exterior, novelty and nice

- Stainless steel or cold rolling steel corrosion- resistant inner chamber
- Plastic window in the center of the door for observation
- Door with rubber seal ensures sealability
- Digital display of temperature inside makes read easily
- Precise temperature control system comprised by platinum sensor and thermostat with time proportion adjustment function.
- Exhaust valve above the chamber vents the moisture while heating.



03 Working Principle

After heated in the chamber, the air exchanges the heat with the item uniformly by natural convection (forced convection in air forced drying oven).

04 Working Conditions

Voltage: 220±22V; 50±1Hz

·Ambient Temperature: 5~40°C

·Relative humidity: < 85%

·No strong shock and airflow around

·No corrosive air

05 Main Technical Parameters

Model		BODR-101	BODR-102	BODR-103	BODR-104
Cycle Mode		101 means Forced convection;202 means Natural convection			
Function	Temp. Range	RT+10-250°C			
	Temp. Resolution Ratio	0.1°C			
	Temp. Motion	±1°C			
	Temp. Uniformity	±2.5%			
Structure	Inner Chamber	B model: High quality stainless steel; without B model: High strength galvanized sheet			
	Outer Shell	Cold rolling steel electrostatic spraying exterior			
	Insulation layer	High quality rock wool board(with CE)			
	Heater	101 model with Stainless steel electric heating tube; 202 model with Nickel chromium alloy heating wire			
	Power rating	1.2kW	1.6kW	2.3kW	3.0kW
Controlle	Temp. control	Two temperature section PID intelligent			

r	mode				
	Timer	0-9999min(with timing wait function)			
	Sensor	pt100			
Specification	Inner Chamber size(W*L*H)(mm)	350*350*350	450*350*450	550*450*550	600*500*750
	Exterior size (W*L*H)(mm)	652*472*587	752*472*687	852*572*786	902*622*986
	Packing size (W*L*H)(mm)	755*615*735	855*615*835	955*715*935	1005*765*1135
	Volume	43L	71L	136L	225L
	Shelf number	9	13	17	21
	Load per rack	15kg			
	Shelf space	25mm			
	(50/60HZ)Current rating	AC220V/5.5A	AC220V/7.3A	AC220V/9.1A	AC220V/13.6A
	NW/GW (kg)	33/37	45/50	62/68	77/96
Accessory	Shelf	2			
	Shelf frame	4			
optional accessories		Shelf			

06 Instructions of Blast Drying Box

Open the door; put the item to be heated on the shelf; then open the half of the exhaust valve above the chamber (can readjust the valve according to the temperature of the item) after closing the door;

- Plug in the corresponding charge and ensure all the grounding terminals of the power outlet are grounded;
- Turn on the power switch; then power light is on, heat begins, temperature control instrument shows the temperature inside.
- Set the temperature according to the need of the item; rotate the button on the temperature controller for pointer instrument (refer to the temperature controller instruction for digital instrument);
- Turn off the power after completing the work.

07 Instructions of Thermostatic Drying Oven

Open the door; put the item to be heated on the shelf; close the door;

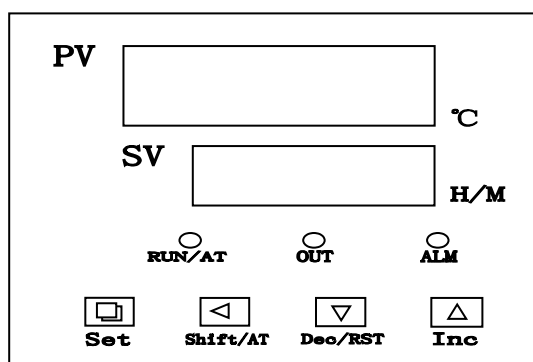
- Plug in the corresponding charge and ensure all the grounding terminals of the power outlet are grounded;
- Turn on the power switch; then power light is on, heat begins, temperature control instrument shows the temperature inside.
- Open Heat 1 when need low temperature; turn on both of the heating switches if higher temperature is needed.
- Set the temperature according to the need of the item; rotate the button on the temperature controller for pointer instrument (refer to the temperature controller instruction for digital instrument);
- Turn off the power and the two heating switches after completing the work.

08 Notice

- No flammable, explosive and corrosive things or items releasing flammable, explosive and corrosive material after heated in the chamber;
- Relative humidity is no more than 85%;
- Items are put on the shelf uniformly and the area occupied is no more than 70%.

09 Intelligent Thermal Control Instruction

I · Panel Instructions



Indicator definition

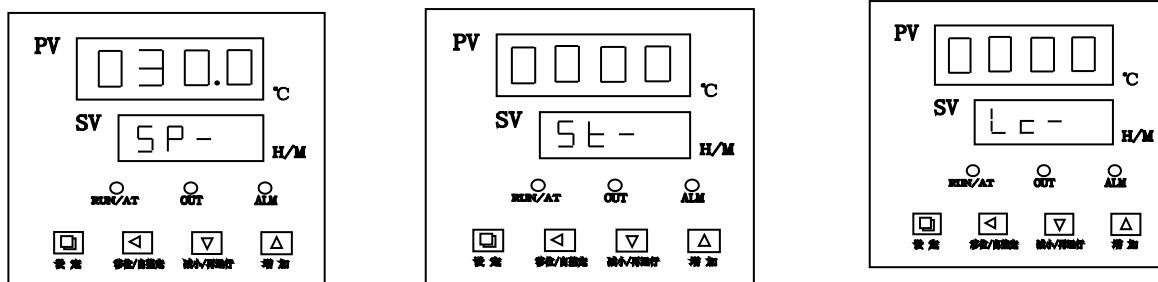
- 1) "RUN/AT" indicator: This indicator is bright when the controller is running, when the run time is over, this indicator is not bright. When the controller enters the auto-tuning of PID, this indicator is flashing.
- 2) "OUT" indicator: If the heater output turns on, this indicator is bright, else this indicator is not bright.
- 3) "ALM" indicator: When the over-temperature alarm occurs, this indicator is bright.

II. Operation and using

1) When the controller is switched on, display windows show "In index (P, C, K, S)" and the value of temperature range for 3 seconds, then it starts running.

2) 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.



When $ET = 0$, no timing function, setting time will not display. When the constant temperature time is set to "0", it means that there is no timing function, the controller runs continuously, the display window shows the temperature set value in the lower row; when $ET = 1$, the lower display window shows the running time, and the dot is lit, the timer starting when meter power up. When $ET = 2$, the display window shows the running time in the lower row, and the dot is lit, and the timer starts timing when the measured temperature reaches the set temperature. If $En = 0$, when the runtime is over, the "sV" window will display "End", the buzzer will sound for 30s, off all outputs;

If $En = 1$, when the runtime is over, the "sV" window don't show "End", the buzzer sounds for 30 seconds, temperature Continue to constant temperature; After the end of operation, long press" shift / run" button for 3 seconds can restart the timer operation.

- 3) 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.
- 4) When the buzzer sounds, it can be muted by pressing any button.
- 5) "◀" button: In the setting state, it can shift the set value by pressing the button.
- 6) "▼" 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.
- 7) "▲" 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.
- 8) In setting state, the controller will return to run status if without any key press in one minute.
- 9) If the display window shows "----", it indicates the fault of temperature.

III · 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.

IV · Internal parameters settings

Note: All the internal parameter has been adjusted when factory test.

Forbidden to modify them except Sensor Correction parameter.

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°C) 20
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°C) 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.

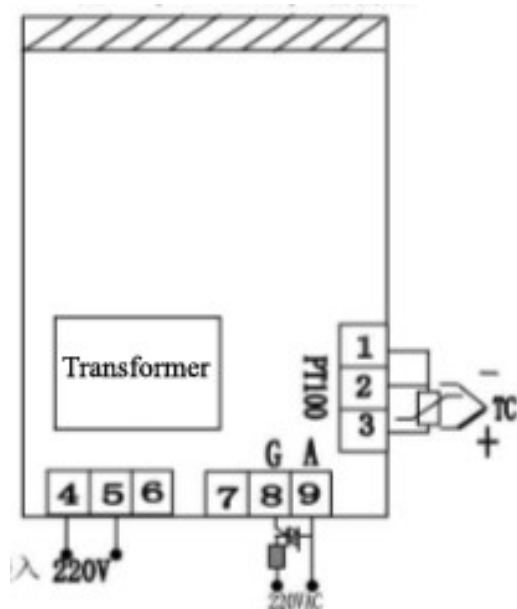
Parameter list-2:

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°C) 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°C(300°C); FCD-31xx : 0 ~ 100.0°C(100°C);
FCD-3Kxx : 0 ~ 1200°C(1200°C); FCD-3Sxx : 0 ~ 1600°C ; (1500°C)

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	Pk	Co	Hn	oP	rH	En	Lt
English Name	Pb	Pk	Co	Hn	oP	rH	En	Lt



10 Troubleshooting

Problems	Reason	Solution
No power	Plug is not plugged in or line breaks	Plug well or replace the plug
	Fuse breaks	Replace the fuse
Temperature in the chamber does not increase	Temperature is set too low	Reset the temperature
	Electric heater breaks	Replace the Electric heater
	Temperature controller breaks	Replace the temperature controller
	Circulating fan breaks	Replace the fan(Blast drying box)
Set and measured temperature has big difference	Temperature sensor breaks	Replace the sensor
	Temperature trimmer potentiometer is not adjusted well	Adjust 'RST' button on the instrument using screwdriver

11 Storage and Delivery

Please store the equipment in the dry and cool environment around -20~+40°C;
Avoid collision and intensive shake and rain while deliver.

12 Installation and Maintenance

- Ground (table) should be flat;
- No flammable, explosive and corrosive things or gas around;
- 20-30 cm away from the wall is fine.
- Ventilate well, dust volume is small and humidity is no more than 85%;
- Keep the equipment clean and dry;
- No stacked items on the drying box.



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