FORCED CONVECTION DRYING OVEN LB-11FCO

Index

1. Safety Measures

- No flammable, explosive, and corrosive things or items releasing flammable,explosive, and corrosive material after being 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%.
- Keep the room well-ventilated with good airflow.
- The instrument should have a good grounding.

2. Introduction

Forced convection drying oven LB-11FCO is equipped with rapid heating and working temperature of 250 °C. Built-in silicate insulated layer prevents heat loss. Forced air convection provides optimal air circulation, temperature uniformity, and brief heat-up time. Circulating fan motor hot air ensures uniform temperature distribution in a chamber. Internal parameter locking preventing unwanted changes.

3. Features

1. PID-controlled dual temperature
2. Forced air convection for rapid heating with uniform temperature distribution
3. Homogenous temperature distribution and/or rapid dynamic response
4. Cold rolled steel electrostatic sprayed exterior
5. Touch button setting for easy user convenience
6. Transparent window provision for sample process viewing
7. Exhaust hole for unpleasant fume removal
8. Anti-hot door handle for user safety
9. Internal parameter locking preventing unwanted changes
10. Overheating is prevented by automatic circuit shut-off
11. Over-temperature and over-current protection
12. Audio visual alarm for system dysfunctionality
13. High-quality stainless-steel chamber (customizable)

4. Specifications

Model No.	LB-11FCO
Chamber volume	71L
Number of shelves	13
Inner chamber size (W×L×H)	450 × 350 × 450 mm
Temperature range	RT + 10°C to 250 °C
Cycle mode	Forced convection
Temperature resolution ratio	0.1 ℃
Temperature motion	± 1 ℃
Temperature uniformity	± 2.5 %
Inner chamber	High-strength galvanized steel
Outer shell	Cold rolled steel electrostatic spraying chamber.
Insulation layer	Silicate heat preservation board
Heater	Stainless steel electric heating tube
Exhaust hole	Φ 28 mm top (with test hole function)
Display mode	LED digital display
Timer	0~999 min (time wait function)
Operational function	Fixed temperature operation, timing function, auto stop.
Sensor	Pt100
Load per rack	15 Kgs
Shelf space	25 mm
Power	1.6 KW
Power supply	AC 220V/ 7.3 A
Exterior dimensions (W×L×H)	752 × 472 × 687 mm
Weight	45 kgs

5. Applications

Used in glassware drying, warming, sterilizing, aging, curing, baking, soldering, annealing, desiccation, torrefaction, wax-melting and sterilization in mining enterprises, laboratories and scientific research institutes.

6. Operations

6.1 Instruction of blast drying box

1) Open the door; put the item to be heated on the shelf then open half of the exhaust valve above the chamber (can adjust the valve according to the temperature of the item) after closing the door.
2) Plug in the corresponding charge and ensure all the grounding terminals of the power are grounded.
3) Turn ON the power switch; the power light is ON heat begins; the temperature control instrument shows the temperature inside.
4) Set the temperature according to the need of the item; rotate the button on the temperature controller for the pointer instrument (refer to the temperature controller instruction for the digital instrument).

6.2 Instruction of thermostatic drying box

1) Open the door; put the item to be heated on the shelf and close the door.
2) Plug in the corresponding charge and ensure all the grounding terminals of the power outlet are grounded.
3) Turn **ON** the power switch then power light is ON heat begins, temperature control instrument shows the temperature inside.
4) Open Heat 1 when need low temperature; turn on both heating switches if a higher temperature is needed.
5) Set the temperature according to the need of the item; rotate the button on the temperature controller for the pointer instrument (refer to the temperature controller instruction for the digital instrument).
6) Turn OFF the power and the two-heating switches after completing the work.

6.3 Panel instruction

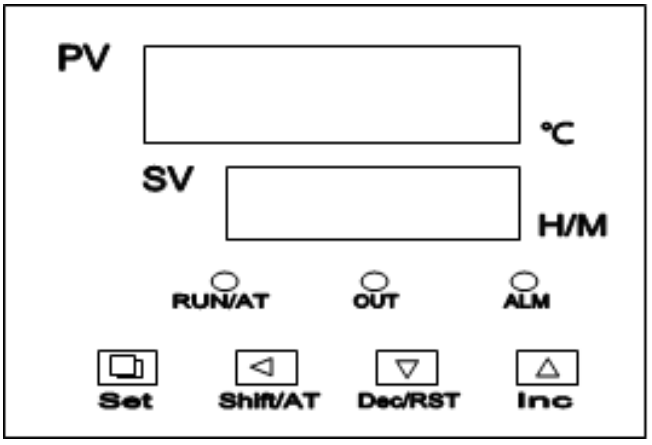


Figure.1

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 the indicator is not bright.
3) **"ALM" indicator**: When the over-temperature alarm occurs, this indicator is bright.

Operation

When the controller is switched **ON** display the window "In index (P, C, K, S) and the value of temperature and time setting.

Temperature and time setting

1) Press the **"Set"** button and the controller runs into the temperature setting state.
2) Re-press the "**Set**" button, the controller runs into the time setting state. Inthe setting state, users can use the " ◀ " ▼ and " ▲ buttons to get the required settings.
3) Press the "**Set**" button again, it returns from the setting state and the settingsare saved automatically.

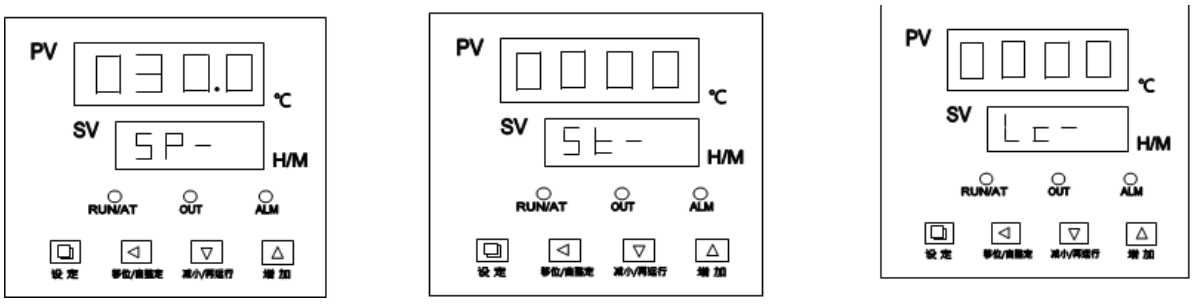


Figure.2

4) When ET = 0, no timing function, setting time will not display. When theconstant temperature time is set to "0", it means that there is no timingfunction, the controller runs continuously, and the display window shows the temperature set value in the lower row.
5) When ET = 1, the lower display window shows the running time, and the dotis lit, the timer starting when the meter powers up.
6) When ET = 2, the displaywindow shows the running time in the lower row, the dot is lit and the timerstarts timing when the measured temperature reaches the set temperature.
7) If En = 0, when the runtime is over, the "sV" window will display "End", the
8) The buzzer will sound for the 30s, off all outputs.
9) If En = 1, when the runtime is over, the "sV" window doesn't show "End", the buzzer sounds for 30 seconds, temperature Continues to be constant temperature.
10) After the end of the operation, long press the" shift/run" button for3 seconds to restart the timer operation.

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

12) When the buzzer sounds, it can be muted by pressing any button. 11)“ ◄button: In the setting state, it can shift the set value by pressing the button.

12) “ ▼ 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.

13) ” ▲ 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.

14) In the setting state, the controller will return to run status without anykey press in one minute.

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

AT function

1) When the temperature control effect is not ideal for system tuning.
2) Self-tuning process temperature can have a bigger overshot, for the usersin a system setting before considering this factor.
3) 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.
4) In the state, the compressor into normally open mode, when the auto-tuning of PID after the end of a group of PID parameters, the parameter automatically saves and returns to the normal mode of operation.
5) When running the auto-tuning of PID, it can be stopped by pressing the “ ◄
6) button for 6s again.
7) In the auto-tuning of PID state, if the temperature alarm, no songs buzzer and" ALM" don’t light, but the heating alarm relay automatically disconnects and the “Set” keys to effective.
8) In the system self-tuning process regardless of whether there is a constant temperature time setting, the controller display window lower always displays the temperature setting value.

Internal parameter setting

1) Press the “**Set**” button for 3 seconds, controller will display the password
2) prompt “**Lc**”.
3) Adjust the password to the required value, then press the “**Set**” button againit will run into the internal parameter setting state.
4) If press the “**Set**” buttonfor another 3 seconds, it will return to the running state.

Parameter table 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 the temperature is beyond "SP+AL", the Alarm indicator turns on. The buzzer sounds and the heater output turns off.	(0 ~ 100℃) 20
T-	Control cycle	The heat control cycle of temperature.	(1 ~ 60S)Note 1
P-	Proportional band	Adjustment of the proportional parameter.	(1.0 ~ rH) 30
I-	Integration time	Adjustment of integration parameter.	(1 ~ 1000S)400
d-	Differential time	Adjustment of the differentialparameter.	(0 ~ 1000S)200
Pb-	Zero point adjust	When the zero error is larger, updating this value should be needed. Pb=measure value –actual value	(-50 ~ 50℃) 0
PK-	Full point adjusts	When the full point error is also larger, updating 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

Parameter table 2

Parameter indicator	Name	Instruction of the parameter's function	(Setting range) factory set value
Lc-	Password	When Lc=9, then we can seeand 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 timemode	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 a constant temperature.	(0 ~ 1) 0

Lt-	Maximum poweroutput	The heating outputmaximum power percentage.	(0 ~ 100)100
oP-	Gate-control function	0: Shut-off function of opening door to judge. 1: unlock the function of opening the door.	(0 ~ 1) 1
rH-	Range of temp setting	The value of temperature setting.	Note 3

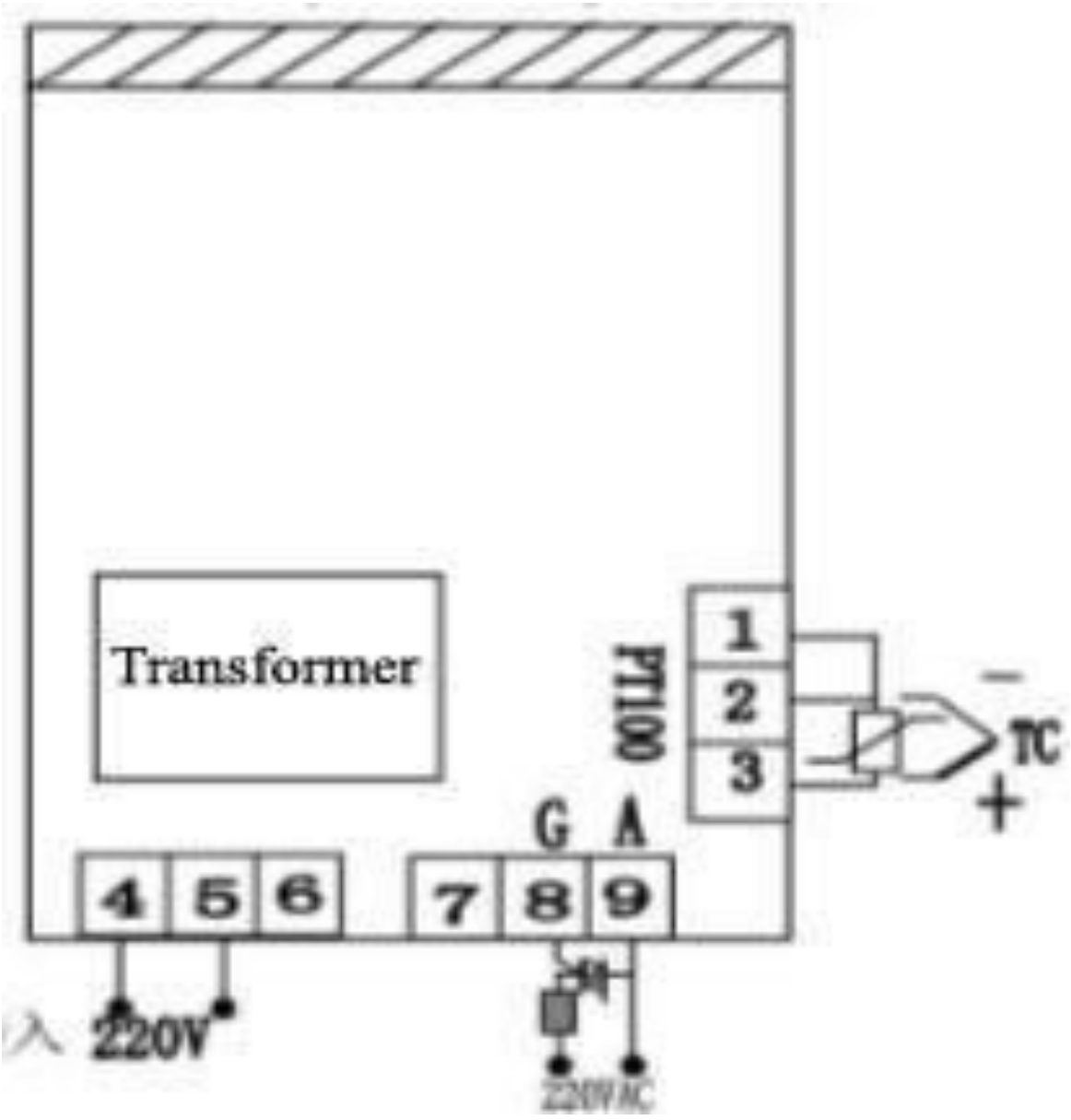
English name and parameter indicating the symbol table

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

7. Troubleshooting

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

8. Circuit Diagram



9. Accessories

Standard Accessories

Accessory No.	Accessory	Quantity
1.	Shelf	2
2.	Shelf frame	4