lbx instruments

LBX OVF **Force Air Drying Oven, 230 L**

Please read the User Manual carefully before use, and follow all operating and safety instructions!

user manual

english

User Manual

EN

OVF Force Air Drying Oven, 230 L

Preface

Users should read this Manual carefully, follow the instructions and procedures, and beware of all the cautions when using this instrument.

Service

If help is needed, you can always contact your dealer or Labbox via **www.labbox.com** (declare an incidence)

Please, provide the customer service representative with the following information:

- Serial number
- Description of the problem
- Your contact information

Warranty

This instrument is guaranteed to be free from defects in materials and workmanship under normal use and service, for a period of 24 months from the date of invoice. The warranty is extended only to the original purchaser. It shall not apply to any product or parts which have been damaged on account of improper installation, improper connections, misuse, accident or abnormal conditions of operation.

For claim under the warranty, please contact your supplier.

1. Introduction

The OVF Force Air Drying Oven, 230 L, is widely used for drying, baking, melting, sterilizing, and curing in laboratories of industrial enterprises, scientific research institutions, and healthcare facilities.

2. Structural Features

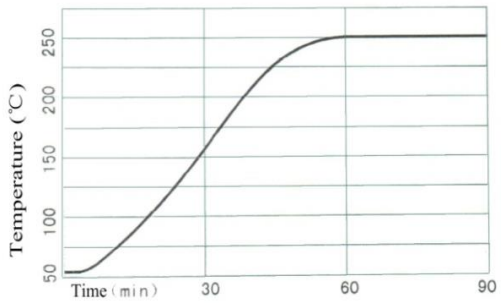
1) The high-quality cold-rolled steel exterior with an electrostatic spray coating ensures durability and an attractive appearance.
2) The working chamber is made of premium stainless steel with smooth, rounded interior corners. The adjustable shelves, lateral air duct plates, and bottom heater cover have a detachable design, making cleaning easy.
3) A PID digital intelligent temperature controller allows precise temperature setting, dual-screen time display, over-temperature alarm, and timing functions.
4) The heater and fan are strategically positioned beneath the working chamber. The circulation fan automatically stops when the target temperature is reached to prevent powdery samples from being disturbed.
5) An independent temperature limiter alarm automatically switches with the temperature controller and alerts when the temperature exceeds the set limit.
6) The airtight adjustable buckle-lock door ensures a secure and effective seal.

3. Product Structure Diagram and Parameters

Main Technical Parameters

Reference	**DOVF-230-001**
Voltage	AC220-240V / 50-60Hz
Power	3000 W
Temperature Range	RT +10 – 300 °C
Temperature Fluctuation	±1.0 °C
Inner Chamber Size	600 x 500 x 750 mm
Exterior Size	735 x 835 x 1287 mm
Shelf Load Capacity	15 kg
Maximum Number of Trays	2
Net Weight	94 kg

Temperature Profile



Note: The warming-up time varies depending on the model type.

4. Working Conditions

The drying oven operates under the following conditions:

1) Temperature range: 5 – 40 ℃
2) Relative humidity: Less than 85% RH
3) Power supply: Voltage 220–240V, Frequency 50–60Hz
4) The surrounding environment must be free of strong vibrations and corrosive gases.

5. Safety Warnings

Install proper grounding protection to ensure the safety of both the machine and the experiment. Ensure the power supply meets the machine's requirements.

This equipment should not be used for flammable, explosive, toxic, or highly corrosive experiments.

Ensure the unit is installed horizontally.

Only qualified professionals are allowed to disassemble or repair this machine.

Be cautious when setting the temperature for flammable materials.

Ensure resin containers are dry; if the temperature is set too high accidentally, the container may dissolve and fall onto the heater, which could cause a fire.

Overfilling the sample may cause overheating in the lower part of the working chamber, potentially causing flammable material to dissolve and lead to a fire.

While the machine is operating, do not touch the top, observation window, or exhaust port to avoid burns from high temperatures.

Read the instruction manual carefully before operation.

6. Operational Notes

1) Place the material to be dried into a container (Note: the drying material should not exceed 2/3 of the shelf size). Then, close the container door, switch on the power, and turn on the blower.
2) Heating: Set the desired temperature (refer to the meter's instructions). The temperature will begin to rise. When the temperature inside the working chamber reaches the set point, the indicator light will turn off. After maintaining a constant temperature for 30 minutes, the working chamber will enter a constant temperature state.
   Note: Do not turn off the blower while the temperature is rising, as this will accelerate the aging of the heater.
3) Working Time: The drying time should be determined based on the sample's humidity.
   Note: If the sample has high humidity, avoid stacking the material too thickly on each shelf to ensure even and efficient drying.
4) After the drying is complete, turn off the power and remove the sample.
5) Keep the drying oven clean. Wipe the container's sealing rubber strip with a soft cloth and remove any dirt. Avoid using chemical solutions for cleaning to prevent damage to the sealing rubber strip through chemical reactions.
6) If the oven is not going to be used for an extended period, apply neutral grease or Vaseline to the galvanized parts to prevent corrosion. Cover the oven with a plastic dust cover and store it in a dry room to protect the electrical components from moisture.

7. Fault Analysis

Problem	Cause	Solution
No power supply	Poor plug contact or broken wire	Connect the plug and wire
	Fuse protector is broken	Replace the fuse protector
No temperature rise inside the container	Low set temperature	Readjust and set the temperature
	Heater is broken	Replace the heater
	Temperature controller is broken	Replace the temperature controller
	Temperature sensor is loose	Tighten the sensor nut
	Temperature sensor is broken	Replace the temperature sensor
No temperature rise alarm	Set temperature of detached temperature limiter is too low	Readjust the temperature to 30 °C above the set temperature
	Detached temperature limiter sensor is broken	Replace the detached temperature limiter sensor
Temperature cannot reach the set point	Exhaust port is fully open	Close the exhaust port
	The container is overfilled, preventing hot air convection	Decrease the amount of the sample to improve convection conditions
The fan doesn't work	The fan motor is broken	Stop operation and check the electrical capacity and motor
Displaying "-------"	The sensor is broken	Replace the sensor
Display shows "STOP"	Time-up	Press the program key for 3 seconds to start

8. Temperature Controller Instructions

Panel Instructions

Operation and Usage

1) When the controller is powered on, the display window will show the “indexing number (P, C, K, S)” on the upper row and the “range value” on the lower row. After approximately 3 seconds, it will enter the normal display mode.
2) Temperature and Constant Temperature Time Settings
   Press the “Set” button to enter the temperature setting mode. The lower window will display the prompt “SP”, and the upper row will display the temperature setting value (the first digit will flash). Use the shift, increase, and decrease buttons to adjust the value to the desired setting.
   Then, press the “Set” button again to enter the constant temperature time setting mode. The display will show the prompt “St” in the lower row, and the constant temperature time setting value will appear in the upper row (the first digit will flash). Again, modify the value using the shift, increase, and decrease buttons. Once done, press the “Set” button again to exit the setting mode. The modified settings will be saved automatically.
   After completing the operation, long press the “Shift/Rerun” key for 3 seconds to restart the timer.
3) Over-temperature Alarm
   When an over-temperature alarm occurs, the buzzer will sound continuously, and the “!” alarm lamp will light up. If the over-temperature alarm is triggered by changing the temperature setting value, the “!” alarm lamp will light up, but the buzzer will not sound.
4) When the buzzer sounds, you can press any button to mute the alarm.
5) “Shift/Self-Tuning” Button
   Press and hold this button for 6 seconds when not in the setting mode to enter or exit the system's auto-tuning function. In the setting mode, pressing this button will shift the setting value and make it flash, allowing you to modify the value.
6) “Decrease/Rerun” Button
   In the non-setting mode, after the operation is complete, long press this button for 3 seconds to restart the operation. In the setting mode, pressing this button will decrease the setting value, and long-pressing it will continuously decrease the value.
7) “Increase/Backlight” Button
   Press this button in the non-setting mode to turn the LCD backlight on or off (this function is available only for the LCD series). In the setting mode, pressing this button will increase the setting value, and long-pressing it will continuously increase the value.
8) In the setting mode, if no button is pressed for 1 minute, the controller will automatically return to the normal display state.
9) If “----” appears in the upper row of the display window, it indicates that the temperature sensor or the controller itself is faulty. Please check the temperature sensor and its wiring carefully.

System Self-Tuning

When the temperature control effect is not ideal, the system self-tuning can be performed. Please note that there will be a significant overshoot in the temperature during auto-tuning. This factor should be fully considered before initiating the system auto-tuning.
In the non-setting mode, press and hold the “Shift/Auto-Tuning” button for 6 seconds to enter the system auto-tuning program. The “Hai Hong” indicator will flash. The flashing indicator will stop once auto-tuning is completed, and the controller will store a set of optimized system PID parameters. These parameter values are automatically saved.
During the system auto-tuning process, you can stop the process by pressing and holding the “Shift/Auto-Tuning” button for 6 seconds.
If an over-temperature alarm occurs during the system auto-tuning process, the “!” alarm light will not turn on, and the buzzer will not sound. However, the heating alarm relay will automatically turn off.
Please note that the “Set” button will be disabled during the system auto-tuning process. Regardless of whether a constant temperature setting is in progress, the lower row of the controller's display window will always show the temperature setting value.

Reference and Setting of Internal Temperature Parameters

Press and hold the “Set” button for about 3 seconds. The lower display of the controller will show the password prompt “Lc” (as shown in Figure 3). The upper display will show the password value, which can be modified using the increase, decrease, and shift keys to set the desired password. Click the “Set” button again. If the password value is incorrect, the controller will automatically return to the normal display state. If the password value is correct, the system will enter the internal temperature parameter setting mode. You can then press the “Set” button to modify each parameter in sequence.

To exit this mode, press and hold the “Set” button for 3 seconds, and the parameter values will be automatically saved.

Internal Parameter Table 1

Parameter Indication	**Parameter Name**	**Parameter Function Description**	**(Range) Factory value**
Lc-	Password	When “Lc=3”, parameter values can be viewed and modified.	0
AL-	Over Temperature Deviation Alarm	When the “temperature measurement value > temperature setting value + AL” is reached, the alarm light will illuminate, the buzzer will sound, and the heating output will be disconnected.	(0～100 °C) 5.0
T-	Control Cycle	Heating control cycle.	(1～60 s) **Note 1**
P1-	Low Temperature Zone Proportion Zone	Time proportional adjustment.	(1.0～Range value) 35.0
I1-	Low Temperature Zone Integration Time	Integral adjustment.	(1～1000 s) 200
d1-	Low Temperature Zone Differential Time	Differential action regulation.	(0～1000 s) 200
P2-	Proportional Band	Time proportional adjustment.	(1.0～Range value) 35.0
I2-	Integral Time	Integral adjustment.	(1～1000 s) 200

d2-	Differential Time	Differential action regulation.	(0～1000s) 200
dc-	Inflection Point in Low-Temperature Zone	When the set temperature is ≤ dc, it is considered part of the low-temperature zone.	(0～Range value) 80.0
Pb-	Zero Position Adjustment	Correction of errors generated during sensor (low temperature) measurement. Pb = actual temperature value - instrument measurement value	(-50～50 ℃) 0
PK-	Full Scale Adjustment	Correction of errors generated during sensor (high temperature) measurement. PK = 1000 * (actual temperature value - instrument measurement value) / instrument measurement value	(-999～999) 0
Et-	Timing Function	When ET=0, there is no timing function. When ET=1, the timing starts upon power-on. When ET=2, the timing starts once the set time is reached.	(0～2) **Note 2**

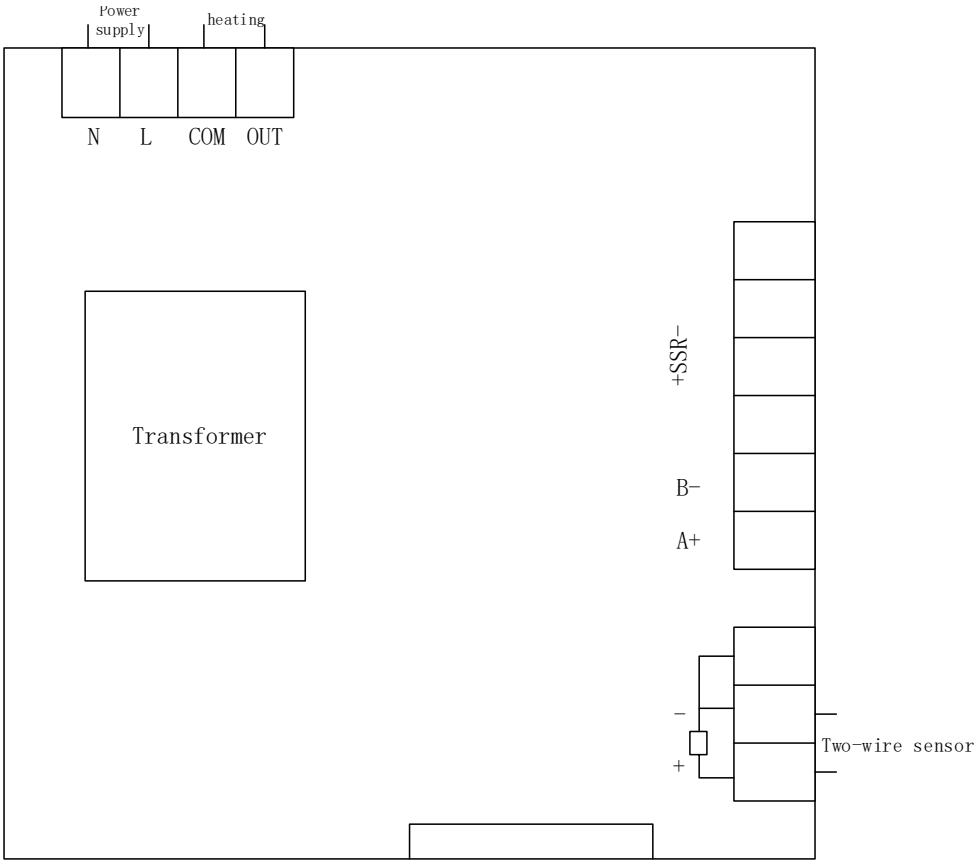
Internal Parameter Table 2

Parameter Indication	**Parameter Name**	**Parameter Function Description**	**(Range) Factory value**
Lc-	Password	When “Lc=9”, parameter values can be viewed and modified.	0
Co-	Turn Off Heating Output Deviation	When the “temperature measurement value ≥ the temperature set value + Co”, turn off the heating output.	(0.0～50.0 ℃) 5.0
Hn-	Constant Temperature Timing Method	0: Minute timing; 1: Hourly timing	(0～1) 0
En-	End of Operation	En=0: End of operation shutdown output. En=1: Continue to maintain constant temperature after operation.	(0～1) 0
Lt-	Maximum Power Output	Maximum power percentage of heating output.	(0～100) 100
oP-	Gate Control Function	0: Turn off the door opening judgment function; 1: Enable the door opening judgment function.	(0～1) 1
rH-	Range Value	Set according to the temperature measurement range.	FCD: (0~400.0 ℃) 400.0 FCH: (0~500.0 ℃) 500.0
ad-	Mailing Address	The communication address of this machine.	(1～32) 1

Comparison Table of English Names and Parameter Indicators

Parameter Indicator	SP	St	Lc	AL	r	P	I	d
English Name	SP	St	Lc	AL	T	P	■	d
Parameter Indicator	Pb	Pt	Co	Hn	oP	rH	En	Lt
English Name	Pb	Pk	Co	Hn	oP	rH	En	Lt

Wiring Diagram



Nota importante para los aparatos electrónicos vendidos en España

Instrucciones sobre la protección del medio ambiente y la eliminación de aparatos electrónicos:

Los aparatos eléctricos y electrónicos marcados con este símbolo no pueden ser eliminados en forma de residuos urbanos.

De conformidad con la Directiva 2012/19/UE, los usuarios de la Unión Europea de aparatos eléctricos y electrónicos, tienen la posibilidad de devolver sus RAEE para su eliminación al distribuidor o fabricante del equipo después de la compra de uno nuevo. La eliminación ilegal de aparatos eléctricos y electrónicos es castigada con multa administrativa.

Remarque importante pour les appareils électroniques vendus en France

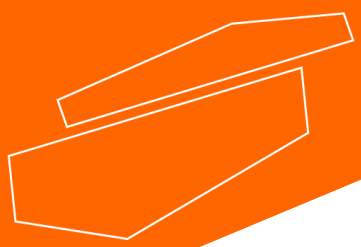
Informations sur la protection du milieu environnemental et élimination des déchets électroniques :

Les appareils électriques et électroniques portant ce symbole ne peuvent pas être jetés dans les décharges.
En réponse à la règlementation, Labbox remplit ses obligations relatives à la fin de vie des équipements électriques de laboratoire qu'il met sur le marché en finançant la filière de recyclage de ecosystem dédiée aux DEEE Pro qui les reprend gratuitement (plus d'informations sur www.ecosystem.eco).
L'élimination illégale d'appareils électriques et électroniques est punie d'amende administrative.

Nota importante per le apparecchiature elettroniche vendute in Italia

Istruzioni sulla protezione ambientale e sullo smaltimento dei dispositivi elettronici:

Le apparecchiature elettriche ed elettroniche contrassegnate con questo simbolo non possono essere smaltite come rifiuti urbani.
In conformità con la Direttiva 2012/19 / UE, gli utenti dell'Unione Europea di apparecchiature elettriche ed elettroniche hanno la possibilità di restituire i propri RAEE per lo smaltimento al distributore o al produttore di apparecchiature dopo averne acquistato uno nuovo. La rimozione illegale di apparecchiature elettriche ed elettroniche è punibile con una sanzione amministrativa.



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