



Vacuum Oven

User Guide version 1.0

Model

LO-VS232N, LO-VS313N, LO-VS424N, LO-VS525N
LO-VS330N, LO-VS380N

Thank you for purchasing product of LK Lab Korea co., Ltd.

This User Guide describes your product's function,

Operation and safe use.

Please read carefully and keep them in mind before you operate products.

In case some parts which need extra care for users,

We put some mark as below for the occasion.



This is mark come up with the situation which needs extra care.
When users recognize this sign, they have to operate more carefully.

[Attention Mark]



This is mark for Dangerous Situation.
If users ignore this, it might cause of serious personal injury
or damage for products.

[Warning Mark]

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1. Preparation

1.1 Instruction

This Vacuum Oven designed Chemical, Biological, Medical, Pharmaceutical and many other purposes. Using to make vacuum state inside chamber and heat.

Using for drying of resin powder, drying of explosion hazard material and heating of high boiling point solution. With various function and safety devices installed, designed for users' convenience and safety as the biggest priority of this Vacuum Oven.

1.2 Feature

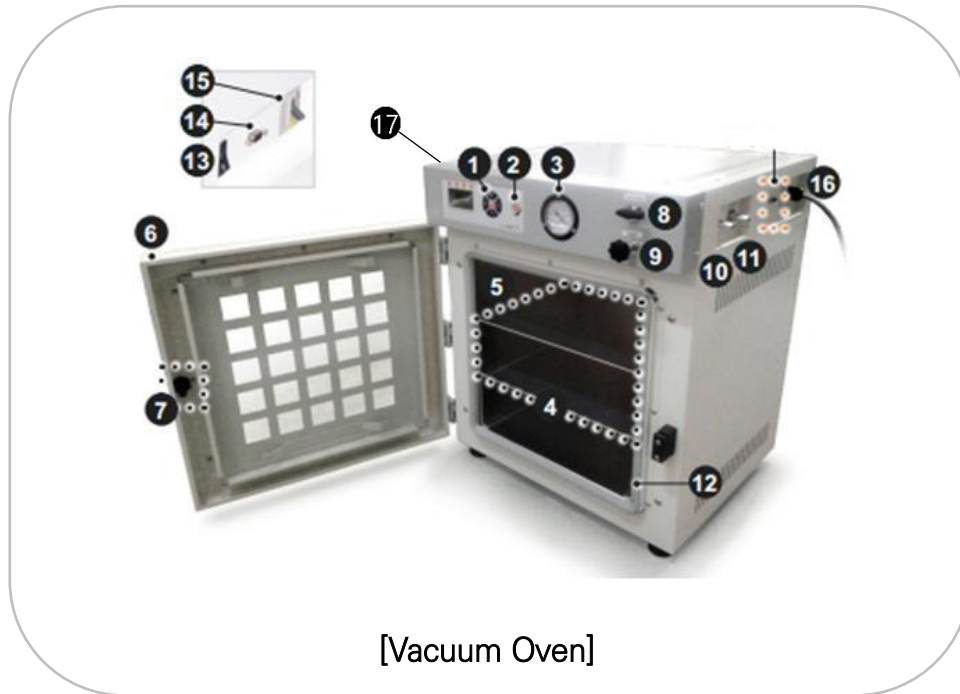
1.2.1 Function and Convenience

- Using DU-AL with great heat conductive.
- Prevent spreading powder sample function from external air inflow during releasing vacuum
- Observation inside through double safety glass door installed
- Graphic LCD Display provide handy operation and control.
- Program designed to control at multiple temperature. (10 step control available)
- PID control system with high performance microprocessor provide quick and Precision temp. control
- By Auto Tuning installed provide automatic calculation of PID value based on test environment.
- Available to get the result or data of test from Vacuum Oven to PC with RS485 connection.

1.2.2 Safety

- Double over heated safety device installed.
(1st Controller Alarm, 2nd Forced Shut out Circuit)
- With appearance of disorder, alarm activated with buzzer and message displaying

1.3 Structure



[1] Temperature Controller

Use for controlling temperature inside

[2] Over Temp. Limiter

The temperature go over the set temperature, shut out the power of heater immediately to prevent overheat, user need to set 10% higher temperature from actual treat.

[3] Vacuum Gauge

Display vacuum pressure

[4] Shelf

Heat transfer by conduction

[5] Chamber

Space for treat made with stainless

[6] Door

Installed double safety glass

[7] Door Handle

Handle to open and close the door

[8] Vacuum Valve

Open when vacuuming, close before the pump stopped

[9] Vent Valve

Close when vacuuming, Open with control

[10] Vent Port

By connect with vacuum pump, make vacuum environment inside chamber

[11] Vacuum Port

Using to release vacuum or put inert gas

[12] Door Packing

Seal inside with high temperature packing

[13] Power Switch

On/Off switch for main power

[14] Communication Port

RS485 communication port

[15] Emergency Switch

For immediate stop in emergency situation

[16] Power Cord

Supply electronic power to equipment

[17] Water Line Port

Connecting cooling line in order to operate endure high temperature over 250 °C

1.4 Installation

1.4.1 Contents of product (with delivery)

Main Body(1set), Power Cord(1ea), Wire Shelf(2ea), User Guide (1copy)

1.4.2 Installation Environment

- Avoid direct light.
- Place where with less vibration and flat surface.
- Avoid the place where may occur flammable gas.
- Avoid the place where may occur noise and high frequency.
- Avoid the place where may occur overcurrent or water leak.
- Avoid the place where may occur corrosive gas or dust.



Connecting cooling line in order to operate endure high temperature over 250 °C



Place where temperature between 5 to 40 °C and humidity under 80%

1.4.3 Connecting of Power

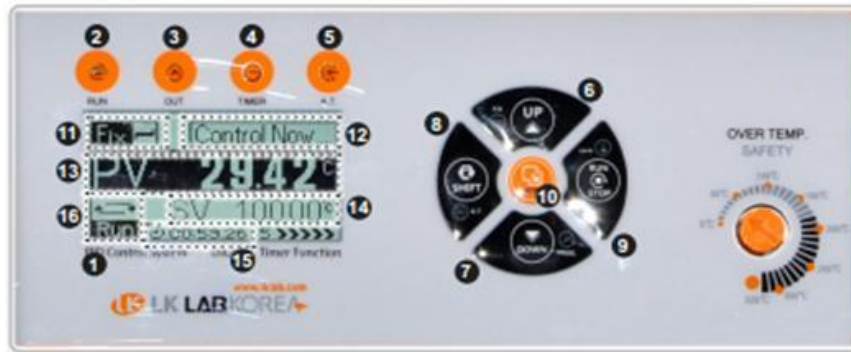
- Set power switch and earth leakage breaker as 'OFF'
- In case the power cord is separated from main body, connect them first and plug the cord to power supply point(outlet)



-Before you plug to supply electronic power, please carefully check for electrical specification of equipment and considering the specification.
-Must use power supply point that completely ground connected.

2. Operation

2.1 Naming and Function of Temperature



[1] Graphic LCD

Available to check status of the equipment and display data

[2] Run Lamp

Light on during the equipment operates

[3] Heater Lamp

Display quantity of output with flickering

[4] Timer Lamp

Light on during operate with timer.

[5] A.T Lamp

Light on during operate with auto tuning.

[6] Up Key

Use for increasing of set value and set of Fix Mode

[7] Down Key

Use for decreasing of set value and set of Program Mode

[8] Shift Key

Use for moving the position of set value and set of Auto-Tuning Mode

[9] RUN / STOP Key

Use for operating, stop and set values

[10] Mode Key

Use for changing menu

[11] Display MODE

User can select one between FIX(one temp.) and Program(multiple temp.) Mode

[12] Message Displaying Window

Display of the message related status of the product

[13] PV Display

Display current temperature of equipment

[14] SV Display

Display target temperature the user set

[15] TIMER Display

Timer display remain time for operation "--.--.--" means timer off.

[16] RUN / STOP Display

Display the status RUN or STOP

2.2 FIX MODE (One Temp. operation) / Operation Method

Check the mode status and if not seas FIX MODE

Press 'UP KEY' for 3 seconds to change FIX MODE



* Fix Mode Stand-By



* SV Set Mode
-Set SV Value.

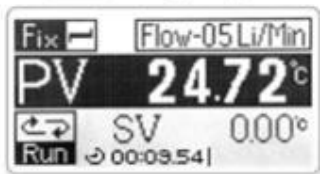


* Timer Set Mode
-Set Time Value





* Fix Mode Stand-By



* Start Operation

2.3 Program MODE (Multiple Temp. operation) / Program Method

Check the mode status and if not set as PROGRAM MODE,
Press 'DOWN KEY' for 3 seconds to change PROGRAM MODE



* Program Mode Stand-By



* End Step Set Mode

-Set number of steps.

(As number of steps set, user can set temperature steps)



* Step-1 SV Set Mode

-Set SV Value for Step -1





- * Step-1 Timer Set Mode
- Set time value for Step-1



- * Step-2 SV Set Mode
- Set SV Value for Step-2



- * Step-2 Timer Set Mode
- Set time value for Step-2



With same method, set values till the last step (in order of temp, time, fan speed)



* Program Mode Stand-By



* Start Operation

2.4 Auto Tuning

Auto Tuning is provide the best value for P.I.D Gain after calculation with considering treat environment automatically, so that user can experiment more accuracy and quickly.

Calculated Gain value is saved automatically, if user wish to same experiment once again, the user need only tuning once.

Auto Tuning is only available during RUN session.



* Fix Control Mode



* Start with Auto tuning message

* After the Auto tuning, the equipment will operate with set temperature.

* In case stop Auto tuning, apply Shift and RUN/STOP for 2 seconds at the same time.



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3. Maintain

3.1 Maintaining after Use

- ① After treat, Power Switch and Earth Leakage Breaker have to be turned off.
- ② If the equipment contaminated plug off the Power Cord and cleaning with Alcoholic liquid.
- ③ If the equipment would not be used for a long time, plug off the Power Cord and cleaning and store the equipment.



Do not use strong acid, alkaline or volatility solution for cleaning the equipment. Also completely dry the equipment after cleaning

3.2 Disorder and Solution

3.2.1 Power On Disorder

- Please check power supply.
- Please check if Earth Leakage Breaker is 'ON'.
- Please check if Power Switch is 'ON'.
- Please check if Power Cord is well connected with main body.
- Please check if the consent's breaker is 'ON'.
- If no problem with the check list above, contact our Technical Support Department.

3.2.2 Earth Leakage Breaker is keep short continuously

- Contact our Technical Support Department.

3.2.3 Temp. Control Disorder

- Please check if the Over Temp. Limiter set 10% higher than treat value.
- Please operate Auto-Tuning.
- If still not working after those solutions above, contact our Technical Support Department.

3.2.4 Error Message



〈Door Open〉

When Door remains open



〈Sensor Open Error〉

Occur when there's some problem with sensor, contact our Technical Support Department.



〈LBA; Control Routine Breaking Down Alarm〉

Please set the Over Temp. Limiter set 10% higher than treat value. If the error message still comes up after set, contact our Technical Support Department.



- In case apply A/S, user have to inquire to our Technical Support Department or Supplier of the equipment. If user randomly disassembles or changes parts inside, repair of equipment cannot be available.
- Disorder or defective out of reasonable ranges, cannot be available to repair.

3.3 After Sales Service

① Warranty

Warranty period is expired by 1 year after purchasing equipment.

After 1 year, cannot get warranty repairing service. User has to pay for replacing parts or repairing work. Within warranty period, user can get service from LK Lab Korea's Technical Support Department or Supplier of the equipment.

② Exceptional Case of Warranty

Damage or defective by fire or inundation, carelessness usage, don't use standard liner power supply recommended, operation at abnormal condition, misuse or unskilled usage cannot be get warranty service.

③ Applying A/S

Firstly, contact to our Technical Support Department or Supplier of the products and inform detailed sympathy with contact of user by mail or fax. After receipt of A/S inquiry, our technician quotes and user decides after get quoted. The product after 2 weeks from receipt of A/S inquiry without response will be return to the user.

Technical Support Department of LK Lab Lorea Co.,Ltd: +82 31

4. Specification

Cat. No.	Model	Type	Capacity
O01-02-302	LO-VS232N	PID Controller	8 L
O01-02-310	LO-VS313N		28 L
O01-02-318	LO-VS424N		65 L
O01-02-321	LO-VS525N		125 L

Cat. No.		O01-02-302	O01-02-310	O01-02-318	O01-02-321
Model		LO-VS232N	LO-VS313N	LO-VS424N	LO-VS525N
Capacity		8 L	28 L	65 L	125 L
Controller	Control	PID Control, Auto Tuning			
	Display	GLCD (Graphic LCD)			
	Resolution	0.01 °C			
Temperature	Range	Ambient +5 to +250 °C			
	Accuracy	±0,3 °C (at 100 °C)			
Vacuum		0 ~ 760 mmHg			
Dimension (w x d x h)	Internal (mm)	200x200x200	300x300x300	400x400x400	500x500x500
	External (mm)	370x350x495	470x455x615	570x560x720	770x650x815
Electric supply	Power	1 Phase / 220 VAC / 60 Hz			
	Max Consumption	700 W(3.2 A)	700 W(3.2 A)	1.3 kW(6.0A)	2.0 kW(9.1A)
	Power Line	Standard Plug			
Material	Interior	304 Stainless Steel			
	Exterior	Powder Coated Steel			
Other	Aluminum Shelf	1ea	2ea		
	Vacuum Port	1/4" Hose Nipple Male			
	Vent Port	1/4" Hose Nipple Male			

Cat. No.	Model	Type	Capacity
001-02-357	LO-VS330N	PID Controller	28 L
001-02-365	LO-VS380N		65 L

Cat. No.		001-02-357	001-02-365
Model		LO-VS330N	LO-VS380N
Capacity		28 L	65 L
Controller	Control	PID Control, Auto Tuning	
	Display	GLCD (Graphic LCD)	
	Resolution	0.01 °C	
Temperature	Range	Ambient +5 to +350 °C	
	Accuracy	±0,3 °C (at 100 °C)	
Vacuum		0 ~ 760 mmHg	
Dimension (w x d x h)	Internal (mm)	300 x 300 x 300	400 x 400 x 400
	External (mm)	470 x 455 x 615	570 x 560 x 720
Electric supply	Power	1 Phase / 220 VAC / 60 Hz	
	Max Consumption	1.2 kW (5.5 A)	2.5 kW (11.4)
	Power Line	Standard Plug	
Material	Interior	304 Stainless Steel	
	Exterior	Powder Coated Steel	
Other	Shelves	2ea	
	Vacuum Port	1/4" Hose Nipple Male	
	Vent Port	1/4" Hose Nipple Male	
	Water Line Port	1/4" Hose Nipple Male	

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가입기간	2014년 04월 10일 00:00 ~ 2015년 04월 09일 24:00 (증권발행자의 표준시 기준)		
[계약일반사항]			
제품종류(명)	각종실험기기		
소급담보일	2014년 04월 10일		
재판관할지역	대한민국	배상액	₩ 2,662,000,000
[가입조건]		[사용약관]	
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대인, 대물, 멸실, 연건 총 보상한도: ₩ 100,000,000		생산물배상책임보험(주) 보통약관 - 배상청구기준	
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		재채위험부담보험약관	
[보험료 납입] 일시납			
총 보험료: ₩ 1,827,000			
납입보험료: ₩ 1,827,000 (2014년04월09일)			

이 보험은 단기 환급금이 없는 소액상 상품입니다.

문의처 : 중소기업중앙회
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2014년 04월 09일
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