

SH02

Operating Manual Number : LVO-2040(3)

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TÀI LIỆU HƯỚNG DẪN SỬ DỤNG

Vacuum Drying Oven

Covering Model LVO-2030 / LVO-2040 / LVO-2050



Related Products

Model #	Descriptions	Capacity	Electrical Requirements
LVO-2030	Vacuum Drying Oven	27 Liters	110 VAC, 60Hz or 220VAC, 50/60Hz
LVO-2040	Vacuum Drying Oven	64 Liters	110 VAC, 60Hz or 220VAC, 50/60Hz
LVO-2050	Vacuum Drying Oven	125 Liters	110 VAC, 60Hz or 220VAC, 50/60Hz

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1.2. Getting Started

Thank you very much for purchasing Dai Han Scientific LVO-Series Vacuum Drying Oven.

Your Vacuum Drying Oven has been designed with function, reliability, and safety in mind. It is your responsibility to install it in conformance with local electrical codes. For safe operation, please pay attention to the alert symbols through the manual.

This manual contains important operating and safety information. You must carefully read and understand the contents of this manual prior to the use of this equipment.



Warning

Warning alert you to a possibility of personal injury



Caution

Caution alert you to a possibility of damage to the equipment.



Note

Notes alert you to pertinent facts and conditions.



HOT

Hot Surface

Hot surface alert you possibility of burning injury by hot instrument surface



Explosive

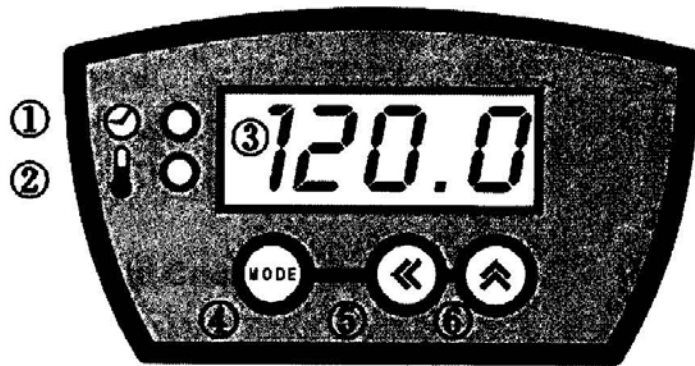
Explosive alerts you to possibility of explosion by high pressure.

1.4. Product Specifications

Model		LVO-2030	LVO-2040	LVO-2050
Dimensions (W x D x H mm)	Inner	300 x 300 x 300	400 x 400 x 400	500 x 500 x 500
	Outer	730 x 455 x 553	830 x 555 x 660	930 x 660 x 757
Capacity		27 l	64 l	125 l
Heater		1.5 kW	2.0 kW	3.0 kW
Controller		Digital PID Multi-Function Controller		
Display		4 Digit LED Display		
Timer		99 hr, 59 min / continuous		
Temperature	Range	Ambient + 5°C to 250 °C		
	Accuracy	± 0.1 °C at 120 °C		
	Uniformity	± 3.0 °C at 120 °C		
Vacuum		10 ~ 760 mmHg		
Material	Inner	Stainless Steel 3 & 4 mm Thickness		
	Outer	Powder Coated Steel		
Door		Tempered Glass Window with Silicon Packing		
Safety		Over Temp Cut-Off, Current Breaker		
Electric Supply		110V, 60Hz or 220V, 50/60 Hz		

1.5. Parts and Functions

1.5.1. Main Controller



① TIME Lamp

Timer On Indicator.

When user set timer and start operation, lamp blinks until the oven temperature reach up to user set temperature. Once timer activated, the lamp stop blinking and start count down.

② HEATER Lamp

Heat On Indicator.

Lamp continuously on and off during operation to maintain user set temperature.

③ Digital LED Readout

Displays current temperature and time

④ MODE BUTTON

User can set parameters such as temperature and time by press MODE BUTTON.

Press MODE -> TEMP ->

MODE -> SV Temperature(000.0) ->

MODE -> TIME ->

MODE -> Set Time (00.00)

⑤ SHIFT BUTTON (Auto-Tuning Button)

1) Move to digit number to be changed

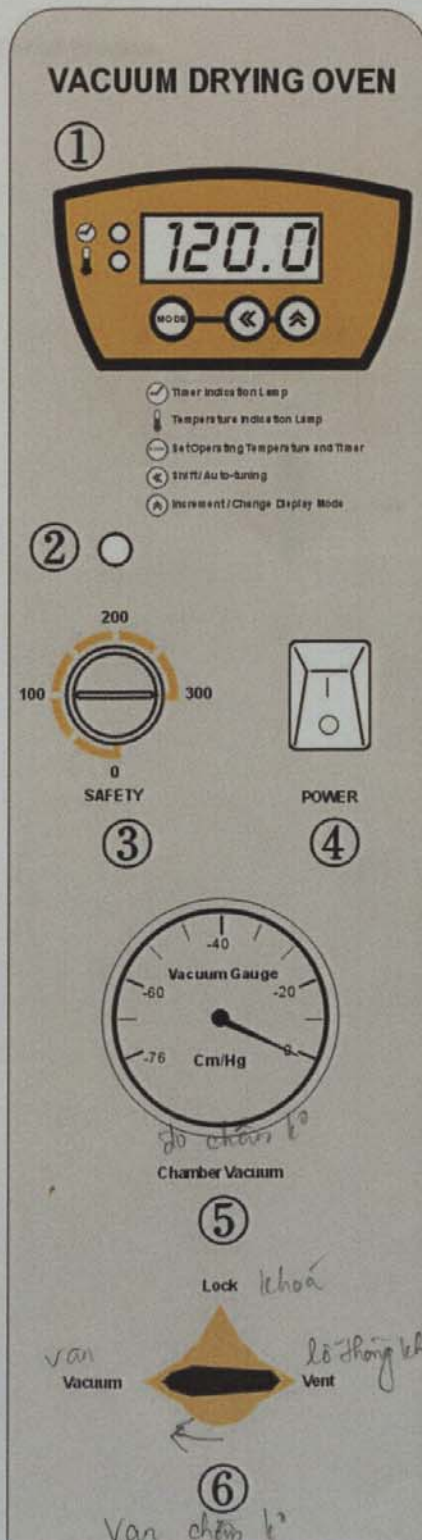
2) AT (Auto-Tuning) function automatically set P, I & D values of the controller to reach the required temperature fast and accurately. User do not need to auto-tuning frequently. (Your Vacuum Oven has been auto-tuned before shipment @ 120 °C)

1.4. Operating

Press and hold SHIFT BUTTON for 5 seconds to start auto-tuning.
Temperature display blinking during auto-tuning.

⑥ INC BUTTON

Change set values



1.5.2. Front Control Panel

① Controller

Main control unit

② Power Lamp

Power on Indication lamp

③ Safety Cut-Off

Safety cut-off function prevents instrument from over heating which may arising by unexpected main controller malfunction to protect your sample and for your safety. The heater is automatically off when the actual chamber temperature exceeds the safety set temperature. Set 10 to 30% higher than your operating temperature.

④ Main Power Switch

⑤ Vacuum Gauge

Indicate actual vacuum in the chamber

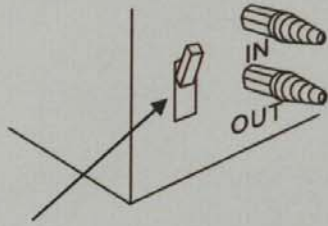
⑥ Vacuum Valve

Vacuum : Turn vacuum valve to "Vacuum" position to load vacuum in the chamber

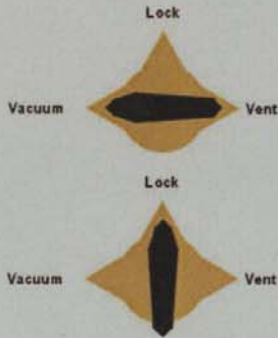
Lock : Turn vacuum valve to "Lock" position during operation

Vent : Turn the vacuum valve to "Vent" position to release vacuum in the chamber

1.6. Operating



Circuit Breaker



□ Before Operation

Connect vacuum hose from vacuum pump to OUT valve tightly. Turn the circuit breaker on.

Put your sample in the chamber and close the door.

□ Vacuum Loading

Turn ⑥ vacuum valve to "Vacuum" position.

Turn the vacuum pump on.

If the vacuum gauge indicate certain vacuum level,

Turn the ⑥ vacuum valve to "Lock" position

Turn the vacuum pump off.

□ How to Set Temperature

1) Press **MODE BUTTON** to set operating temperature. **Digital LED READOUT** displays (TEMP). *TEMP*

2) Press **MODE BUTTON** again.

1) Temperature (00.0 or 000) blinking and prompt user input.

2) Change temperature by using **SHIFT** and **VALUE INCREMENT BUTTON**.

3) Press **MODE BUTTON** to set timer.

If user do not want to set timer function, Press and hold **MODE BUTTON** for 2 seconds to turning back to normal display mode.

□ How to Set Time Scale

User can set timer scales by changing Mode0 parameter

TIME SCALE	Mode0 Parameter
00:00 ~ 99:23 (day:hour)	nn2n
00:00 ~ 99:59 (hour:min)	nn1n
00:00 ~ 99:59 (min:sec)	nn0n

(Where n = number *)

Refer How to set Setting Parameters to change Mode0 parameter value.

□ Safety Temperature Setting

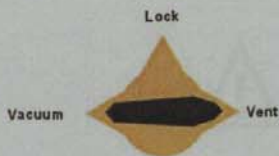
User must set the over temperature protection before operation. Over temperature protection dial switch located by the main power switch will control heaters from over temperature for your safety.

Set temperature about 10 to 30% higher than the operating (user set) temperature.

□ Release Vacuum in the Chamber

Before opening the door you should release the vacuum in the chamber. Turn Vacuum Valve to "Vent" position.

Turn off the main power switch.





Press and Hold
5 Seconds

điều chỉnh
□ **Auto-Tuning (Calibration Method)**

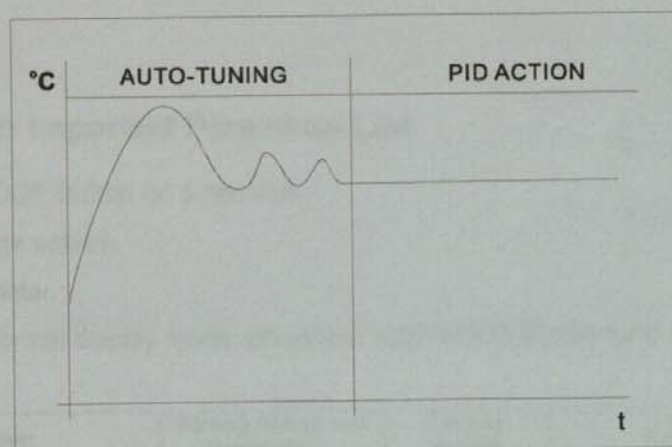
The instrument is precisely tuned for perfect temperature control before shipment.

Press and hold AT button 5 seconds. Auto-tuning is starts and AT lamp is blink until finishing auto-tuning process. The process is automatically done. Leave the instrument until the AT lamp is off. It will take about 30 minutes to finish.

1) Auto-Tuning (AT) Function

Auto-Tuning function provides automatically measure, calculate and set various parameters of PID.

After finishing Auto-Tuning, the controller optimum control.



1.7. Warning



HOT

1. The main voltage *điện áp* must correspond *đúng* to the voltage given on the name-plate
2. Place the oven on the flat and level surface
3. Do not touch the inside of the chamber after operation *hết đing*

1.8. Trouble Shooting

học hỏi (ky thuật)

Xi' ly' bi' e' d'

Trouble	Check First	Trouble Shooting
Power Failure	Check Electric Supply	Plug firmly into the electric supply
	Check fuse <i>cần chì</i>	Replace fuse <i>thay cần chì</i>
Temperature Control Failure	Check set values	Change set values
	Check Over Temperature Protection Value	Set protection temperature 10% to 30% higher than the usual operating temperature <i>Đặt t° bảo vệ cao 10-30% so với</i>

Contact sales representative or customer service department *Liên hệ phòng kinh doanh*

◆ Important Parameter List

To set parameters, press and hold MODE Button for 5 seconds.

Press SHIFT and INC Button to change values.

Press MODE Button to go next parameter.

To escape from Parameter mode to normal display mode, press and hold MODE Button for 6 seconds.

Parameter Symbol	Name of Parameter	Setting Range and Descriptions	Factory Default	User Value
Rnt	Maximum temperature limit to set	-99.9 ~ 299.9 °C	0250	Do Not Alter
adj	Temperature Adjustment (Displayed Temp. = Actual Temp. + Adj.)	-99.9 ~ 299.9 °C	0	
LoC	Data Lock N3 = RESERVED (1: 0:) N2 = RESERVED (1: 0:) N1 = PARAMETER DATA LOCK (1:LOCK 0:UNLOCK) N0 = TEMP. & TIME DATA LOCK (1:LOCK 0:UNLOCK)	N3 N2 N1 N0 0 0 0 0 1 1 1 1	0 0 0 0	
Prd	Period (Output Interval)	1 ~ 99 sec.	Auto_tune	Do Not Alter
P	Lock Proportion	0 ~ 9999		Do Not Alter
I	Integral	0 ~ 9999		Do Not Alter
D	Differential	0 ~ 9999		Do Not Alter

Mode0	<p>Operating Mode Control</p> <p>N3 = PID & ON/OFF REVERSE CONTROL (0: PID 1: ON/OFF)</p> <p>N2 = TIMER FUNCTION ON/OFF (0: TIMER OFF 1: TIMER ON)</p> <p>N1 = TIME SCALE 0: min:sec 1: hr:min 2: day:hr</p> <p>N0 = TEMP. DECIMAL DISPLAY (1: 000 0: 000.0)</p>	<p>N3 N2 N1 N0 0 0 0 0 1 1 1 1</p>	0110	
ACTP	<p>Temp. where timer activate (Parameter can be changed only when the N2 value of Mode0 is 1)</p> <p>Timer starts count down when, (current temp. - set temp.) > ACTP</p>	-00.0 ~ 99.9 °C	0	
ALL	Relative Alarm Low			
Hys	Hysteresis			Do Not Alter

1) rnt : Maximum temperature ^{giới hạn} limit to set.

User cannot set temperature higher than this value.

Do not alter the value. Factory default is 250

2) Adj : Temperature adjustment. ^{hiệu chỉnh}

Sometimes the actual temperature of the water is slightly the different from displayed temperature.

User can adjust the displayed temperature by compensate the difference by Adj value.

Example)

1) Measure temperature of water in the bath with ASTM standard thermometer.

2) Read LED display

3) Change Adj value

Actual Water Temperature	Displayed Temperature	Adj Value
50 °C	49 °C	1
50 °C	51 °C	-1

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INSPECTION LOG

AMB. TEMPERATURE	\checkmark °C \checkmark °F
ELECTRICAL REQUIREMENT	220Volts 60Hz

VACUUM OVEN	
MODEL No.	LVO-2040
SERIAL No.	06071105
CLIENT	

Inspection Item	Article	Judgment		Remarks
		Passed	Rejected	
Appearance	Chassis	\checkmark	\checkmark	
	Powder Coating	\checkmark	\checkmark	
	Chamber	\checkmark	\checkmark	
	Control Panel	\checkmark	\checkmark	
Assembly	Heater	\checkmark	\checkmark	
	Sensors	\checkmark	\checkmark	
	Vacuum Leakage	\checkmark	\checkmark	
Circuit	Correspond to Circuit Diagram	\checkmark	\checkmark	
Temperature	Range ambient +5 °C ~ 250 °C	\checkmark	\checkmark	
	Accuracy within \pm °C	\checkmark	\checkmark	
	Uniformity within \pm °C	\checkmark	\checkmark	

Test Run	Run Hours	✓	✓	
Electric Insulation	Check Electrical Insulation (∞)	✓	✓	
Auto-Tuning	Done	✓	✓	
Operating Manual	Included	✓	✓	
Safety Marks	Attached	✓	✓	

INSPECTION LOG

Parameter List

PARAMETERS	VALUE	FACTORY PARAMETERS	VALUE
Rnt		I	
adj		D	
LoC		Mode0	
Prd		ACTP	
P		ALL	
		Hys	

DAI HAN SCIENTIFIC CO., LTD. hereby certifies that this equipment is judged to be up to manufacturer's standard and satisfy manufacturing specifications. This equipment has been tested using standards whose accuracies are traceable to the manufacturer.

MANUFACTURING

QUALITY ASSUARANCE

CHECKED BY

DATE

CHECKED BY

DATE

DHP02-001-02

DAI HAN SCIENTIFIC CO.,LTD.

A4(210X297mm)



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Limited Warranty

Descriptions	Vacuum Oven
Model	LVO-2040
Serial No.	
Warranty Period	12 Months after purchase
Date of Purchase	
Purchase From	

WARRANTY COVERAGE

Dai Han Scientific's warranty obligations for the products are limited to the terms set forth below:

Dai Han Scientific Co., Ltd. warrants the product against defects in materials and workmanship for a period of one (1) year from the date of original purchase ("Warranty Period"), providing that the unit is operated according to the instruction in the operating manual.

The guarantee comprises removal of all damages that arises during the guarantee period and that are proven to be due to faulty material or poor workmanship.

If a defect arises and a valid claim is received by Dai Han Scientific within the Warranty Period, at its option, Dai Han Scientific will (1) repair the product at no charge, using new or refurbished replacement parts, (2) exchange the product with a product that is new or which has been manufactured from new or serviceable used parts and is at least functionally equivalent to the original product.

If a defect arises and a valid claim is received by Dai Han Scientific after the first one hundred and eighty (180) days of the Warranty Period, a shipping and handling charge will apply to any repair or exchange of the product undertaken by Dai Han Scientific.

Dai Han Scientific warrants replacement products or parts provided under this warranty against defects in materials and workmanship from the date of the replacement or repair for ninety (90) days or for the remaining portion of the original product's warranty, whichever provides longer coverage for you. When a product or part is exchanged, any replacement item becomes your property and the replaced item becomes Dai Han Scientific 's property. When a refund is given, your product becomes Dai Han Scientific 's property.

EXCLUSIONS AND LIMITATIONS

This Limited Warranty applies only to the product manufactured by or for Dai Han Scientific that can be identified by Name Plate.

Dai Han Scientific is not liable for any damage to or loss of any products or material stored or tested in the instruments or programs, data, or other information stored on any media contained within the product, or any non-Dai Han Scientific product or part not covered by this warranty. Recovery or reinstallation of programs, data or other information is not covered under this Limited Warranty.

This warranty does not apply: (a) to damage caused by accident, abuse, misuse, misapplication, or non-Dai Han Scientific products; (b) to damage caused by service performed by anyone other than Dai Han Scientific; (c) to a product or a part that has been modified without the written permission of Dai Han Scientific; or (d) if any Dai Han Scientific serial number has been removed or defaced; or (e) if the unit is not used according to its purpose; or (f) no original spare parts are used.

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FOR CONSUMERS WHO HAVE THE BENEFIT OF CONSUMER PROTECTION LAWS OR REGULATIONS IN THEIR COUNTRY OF PURCHASE OR, IF DIFFERENT, THEIR COUNTRY OF RESIDENCE, THE BENEFITS CONFERRED BY THIS WARRANTY ARE IN ADDITION TO ALL RIGHTS AND REMEDIES CONVEYED BY SUCH CONSUMER PROTECTION LAWS AND REGULATIONS. TO THE EXTENT THAT LIABILITY UNDER SUCH CONSUMER PROTECTION LAWS AND REGULATIONS MAY BE LIMITED, LABTECH'S LIABILITY IS LIMITED, AT ITS SOLE OPTION TO REPLACEMENT OR REPAIR OF THE PRODUCT OR SUPPLY OF THE REPAIR SERVICE AGAIN.

Note: Before you deliver your product for warranty service it is your responsibility to remove all products or materials stored in the instrument.

Before returning a defective unit, please contact local representative or Dai Han Scientific Support Center at service@labtech.co.kr.

Dai Han Scientific will issue RGA number for authorized return ;

If we agree to the unit being returned, arrange for careful packing and send the unit to

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Email : kjm@dhscience.com

Please remember to describe the kind of fault you found and state your complete address.

