



High Temp. Forced Convection Oven

User Guide

version 1.0

Program Mode Model.
LO-HP485, LO-HP605

Thank you for purchasing product of LK LabKorea 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.



[Warning Mark]

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



[Attention Mark]

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

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1. Preparation

1.1 Instruction

This Oven designed Chemical, Biological, Medical, Pharmaceutical and many other purposes.

This Oven can be used for drying many kinds of Glassware and Samples, Samples Thermal Denaturalization, Dry Sterilization and test for measuring life at harsh environment, with excellent performance.

With various function and safety devices installed, designed for users' convenience and safety as the biggest priority of this Oven.

1.2 Feature

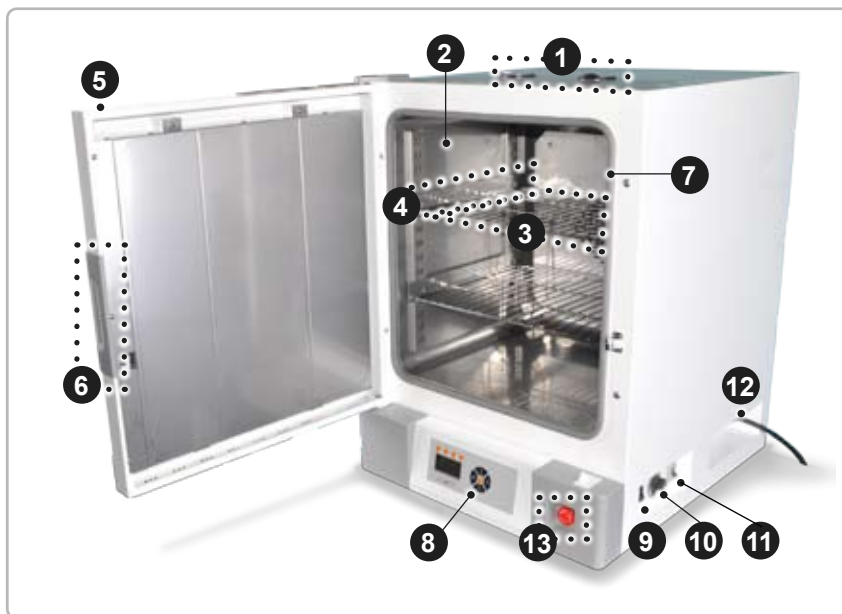
1.2.1► Function and Convenience

- Heat Flow Circulation method, provide to equivalent temperature distribution inside chamber
- 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.

1.2.2► Safety

- User can promptly shut down equipment with 'Emergency Stop Button'.
- Double over heated safety device installed.
(1st Controller Alarm, 2nd Forced Shut Out Circuit)
- No running of Heater and Fan during door open.
- With appearance of disorder, alarm activated with buzzer and message displaying.
- Product's status can be checked with Optional Tower Sign Lamp.

1.3 Structure



[High Temp. Forced Convection Oven]

[1] Vent Hole

[2] Chamber

[3] Shelf

[4] Shelf rail

[5] Door

[6] Door Handle

[7] Door Packing

[8] Temperature Controller

[9] Power Switch

[10] Over Temp. Limiter

[11] Earth Leakage Breaker

[12] Power Cord

[13] Emergency Switch

[1] Vent Hole

removing hume may occur during sample treats.

[2] Chamber

space for treat made with stainless.

[3] Shelf

2 type as wire and perforated, used for put on the sample inside chamber.

[4] Shelf rail

used for fixing shelf, adjustable of height of shelf.

[5] Door

insulation between inside and outside of chamber, prevent overheated of surface.

[6] Door Handle

handle to open and close the door.

[7] Door Packing

packing for high temperature resistant seal the chamber.

[8] Temperature Controller

use for controlling temperature inside.

[9] Power Swtich

on/off switch for main power.

[10] 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.

[11] Earth Leakage Breaker

block overcurrent and electrical short.

[12] Power Cord

supply electronic power to equipment.

[13] Emergency Switch

for immediate stop in emergency situation.

1.4 Installation

1.4.1▶ Contents of product(with delivery)

Main Body(1set), Power Cord(1ea), Wire Shelf(2ea),
Shelf Rail(4ea), User Guide(1copy)

1.4.2▶ Installation Environment

- Avoid direct light.
- Place where with less vibration and flat surface.
- Maintain the temperature of surrounding area the product placed between 5 to 40℃.
- Maintain the humidity of surrounding area the product placed below RH 80%.
- 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.



/ Must place where temprature between 5 to 40℃ and humidity under 80%

1.4.3▶ Connecting of Power

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



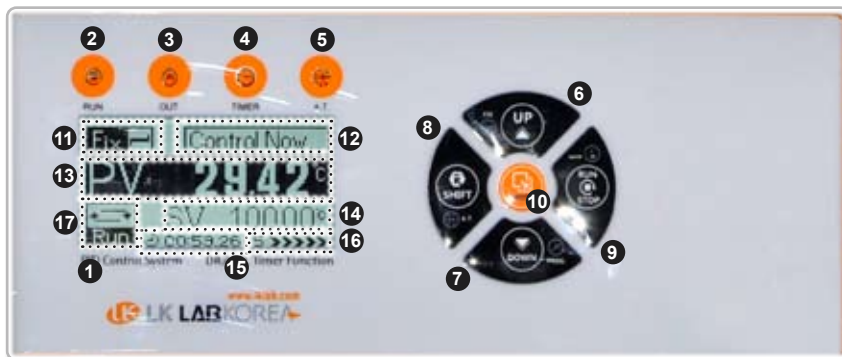
/ Before you plug to supply electronic power, please carefully check for electrical specification of equipment and considering the specification.

/ Must use power supply point that completely ground connected.

/ Do not touch the power cord with wet hand.

2. Operation

2.1 Naming and Function of Temperature Controller



[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] Fan Speed Display

Display Step of inner circulating fan(available to set 0 to 5).

[17] RUN/STOP Display

Display the status RUN or STOP.

2.2 Program MODE(multiple temp. operation) / Operation 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

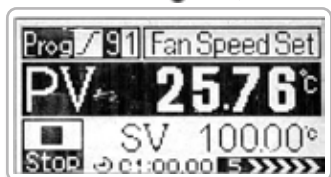
- Set SV Value for Step - 1.



Program Mode Setting Method Continued ►



- Step-1 Timer Set mode
- Set time value for Step - 1.



- Step-1 Fan Set Mode
- Set speed value for Step - 1.



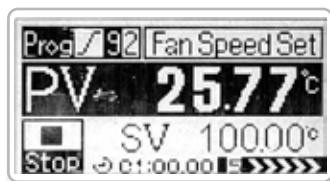
- Step-2 SV Set mode
- Set SV Value for Step - 2.



- Step-2 Timer Set mode
- Set time value for Step - 2.



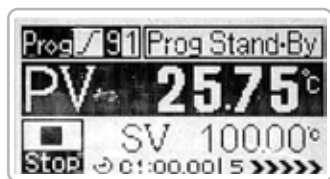
Program Mode Setting Method Continued ►



- Step-1 Fan Set Mode
- Set speed value for Step - 2.

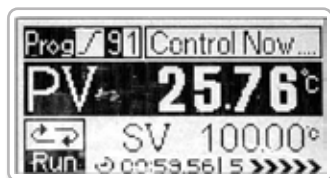


- With same method, set values till the last step
(in order of temp., time, fan speed)



- Program Mode Stand-By

2sec.



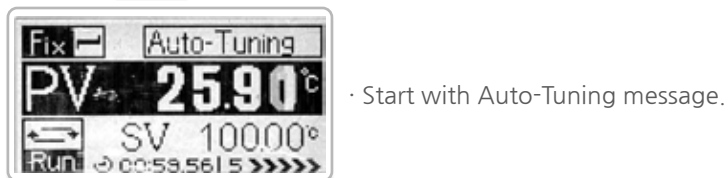
- Start Operation

2.3 Additional Function

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.



- * 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.



/ During Auto-Tuning, due to calculate, in order to reach set temperature Heater gives 100% output, so temperature go higher than set value

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

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

3.2.2► Earth Leakage Breaker is keep short continuously

- 1) Contact our Technical Support Department.

3.2.3▶ Temp. Control Disorder

- 1) Please check if the Over Temp. Limiter set 10% higher than treat value.
- 2) Please operate Auto-Tuning.
- 3) Please set the fan speed as 5 step.
- 4) If still not working after those solution above, contact our Technical Support Department.

3.2.4▶ Error Messege

- 1) Door Open



*When door remains open.

- 2) Sensor Open error



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

- 3) 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 After sales service, 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 LabKorea'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 After sales service

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 After sales service inquiry, our technician quotes and user decides after get quoted.

The product after 2 weeks from receipt of After sales service inquiry without response will be return to the user.

Technical Support Department of LK LabKorea Co.,Ltd: +82 31 572 4952

4. Specification

Cat. no.		Model	Type		Capacity
O01-02-065		LO-HS480	PID Controller		100 L
O01-02-073		LO-HS600			150 L
O01-02-067		LO-HP485	Program Controller		100 L
O01-02-075		LO-HP605			150 L

Cat. no.		O01-02-065	O01-02-073	O01-02-067	O01-02-075
Model		LO-HS480	LO-HS600	LO-HP485	LO-HP605
Capacity		100 L	150 L	100 L	150 L
Controller	Control	PID Control, Autotuning		Program Controller	
	Display	GLCD (Graphic LCD)			
	Resolution	0.1℃			
	Timer	Run start/Wait start (99 hr 59 min)		-	
	Program	-		2 Pattern, 18 Segment	
Fan Speed		STEP 1 ~ 5			
Temperature	Range	Ambient +5℃ to +350℃			
	Accuracy at 100℃	±0.3℃			
	Uniformity at 100℃	±2.3℃	±3.7℃	±2.3℃	±3.7℃
Dimension	Interior (w×d×h)	480×400×520 mm	600×500×520 mm	480×400×520 mm	600×500×520 mm
	Exterior (w×d×h)	670×675×911 mm	790×710×930 mm	670×675×911 mm	790×710×930 mm
Material	Interior	304 Stainless Steel			
	External	Powder Coated Steel			
Electric Supply	Power	1 Phase , 220VAC , 50/60 Hz			
	Max Consumption	2.5 Kw (11.3 A)	3.0 Kw (13.6 A)	2.5 Kw (11.3 A)	3.0 Kw (13.6A)
	Power Line	Standard Plug			
Other	Wire Shelf	2 ea			
	Vent Hole	ø38 mm×2 ea			
Safety		Over Temp. & Current Protection, Automatical Fault Sensing System			

생산물배상책임보험 증권

증권 번호	P151400668
계약자	(주)엘케이엠펙코리아
주소	[136-075] 서울특별시 성북구 개운사길 57 - 3(안암동5가)
피보험자	(주)엘케이엠펙코리아
주소	[136-075] 서울특별시 성북구 개운사길 57 - 3(안암동5가)
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[생산물배상책임]

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 대인, 대물 일괄 1청구당 보상한도: ₩ 100,000,000
 자기부담금: ₩ 1,000,000

[사용약관]

생산물배상책임(PL)단체보험 공제약관
 생산물배상책임보험(III) 보통약관 - 배상청구기준
 납입인식오류 부담보 추가약관
 품질저하부담보특별약관
 재재위반부담보특별약관

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손해공제부 (www.plkorea.com)

전화번호 : 1666 - 9988

팩스번호 : (0502) 397-0200

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 중소기업중앙회
 회장 김 기 문



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77-3, Toegyewon-ro, Toegyewon-myeon,
Namyangju-si, Gyeonggi-do, Korea
Tel . +82 2 953 4952 Fax. +82 2-953-4958
[Technical Support Department] +82 31 572 4952