



# Low Temp. Incubator / B.O.D Incubator

## User Guide

version 1.0

Model  
LI-IL060, LI-IL150, LI-IL250, LI-IL450

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.



**[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 product is used for bacterial culture and then cultured tissue culture experiments of various flora and fauna. It is also useful in various experiments such as thermo plant specimen storage and storage experiments, such as environmental change experiments.

We consider the convenience and safety of the users through a variety of functions and a maximum of safety.

## 1.2 Feature

### 1.2.1► Function and Convenience

- Heat Flow Circulation method, provide to equivalent temperature distribution inside chamber.
- 5 steps of Flow Control prevent spreading of samples inside.
- You can observe the internal conveniently through the Glass Door.
- 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.
- The experimental data can be freely transferred to a PC via the RS485 port.

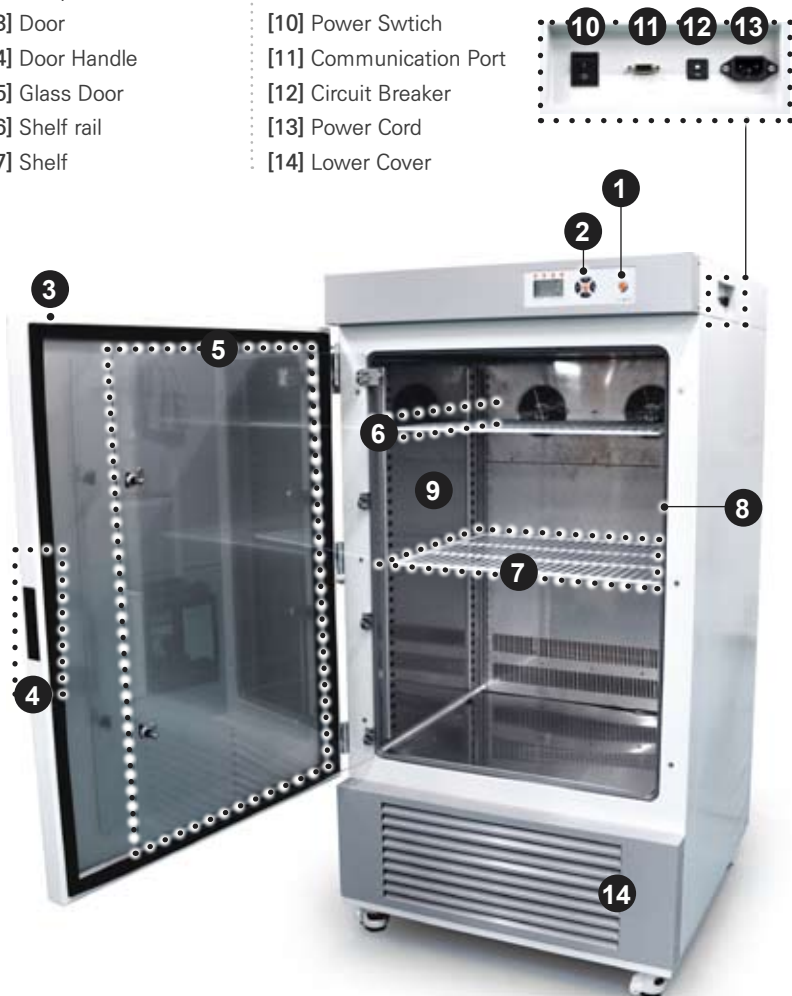
### 1.2.2► Safety

- 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.

### 1.3 Structure

- [1] Over Temp. Limiter
- [2] Temperature Controller
- [3] Door
- [4] Door Handle
- [5] Glass Door
- [6] Shelf rail
- [7] Shelf

- [8] Door Packing
- [9] Chamber
- [10] Power Switch
- [11] Communication Port
- [12] Circuit Breaker
- [13] Power Cord
- [14] Lower Cover



[Low Temp. Incubator / B.O.D Incubator ]

1.3▶ continued.. ▶▶

**[1] 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.

**[2] Temperature Controller**

use for controlling temperature inside.

**[3] Door**

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

**[4] Door Handle**

handle to open and close the door.

**[5] Glass Door**

observe the internal through the Glass Door.

**[6] Shelf rail**

used for fixing shelf, adjustable of height of shelf.

**[7] Shelf**

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

**[8] Door Packing**

Silicone packing resistant seal the chamber.

**[9] Chamber**

space for treat made with stainless.

**[10] Power Swtich**

on/off switch for main power.

### [11] Communication Port

RS485 communication port.

### [12] Circuit Breaker

Breaker of overcurrent.

### [13] Power Cord

supply electronic power to equipment.

### [14] Lower Cover

Lower part on the cover there are condenser inside.

## 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(1 copy)

### 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.
- Do not put the substance in an organic solvent and or explosive.
- Please drop back from the sides by 20cm at least when installing the unit.



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

### 1.4.3▶ Connecting of Power

- 1) Set power switch 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.

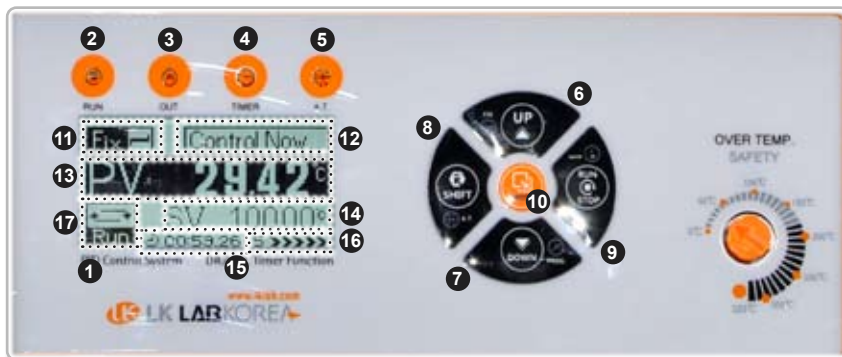
/ Must use power supply point that completely ground connected.

/ 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**

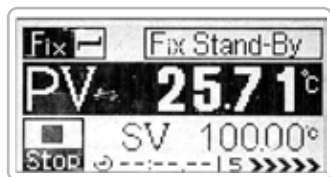
Display Step of inner circulating fan(available to set 0 to 5).

**[17] RUN/STOP Display**

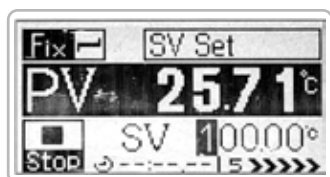
Display the status RUN or STOP.

## 2.2 FIX MODE(one temp. operation) / Operation Method

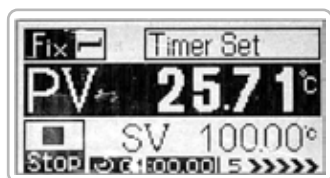
Check the mode status and if not set as FIX MODE,  
press 'UP KEY' for 3 seconds to change FIX MODE.



· Fix Mode Stand-By



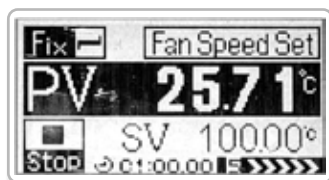
· SV Set Mode  
- Set SV Value.



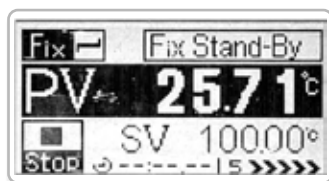
· Timer Set Mode  
- Set Time Value.



Operation Method Continued ►



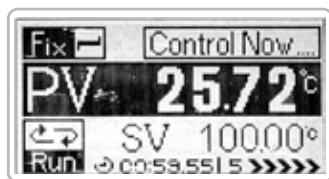
- Fan Speed Set Mode
- Set Speed Value.



- Fix Mode Stand-By



2sec.



- Start Operation



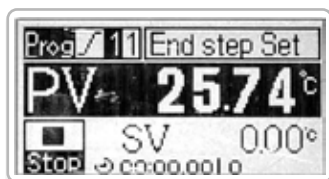
/ Lower setting of fan speed can cause for bigger temperature difference inside chamber.

### 2.3 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

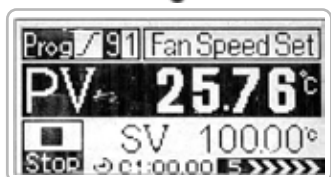
- Set SV Value for Step - 1.



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.



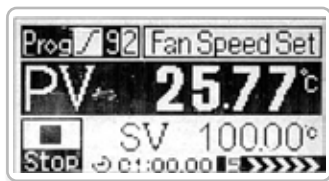
- Step-2 SV Set mode
- Set SV Value for Step - 2.



- 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.

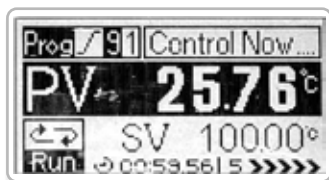


- With same method, set values till the last step  
(in order of temp., time, fan speed)



- Program Mode Stand-By

2sec.



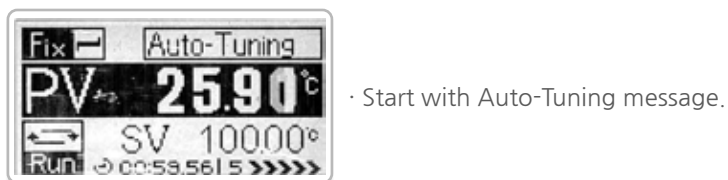
- Start Operation

## 2.4 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.
- [4] Clean the lower cover and the inside of the compressor Condenser once in two months.



/ 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 Power Switch is 'ON'.
- 3) Please check if Power Cord is well connected with main body.
- 4) Please check if the consent's breaker is 'ON'.
- 5) If no problem with the check list above, contact our Technical Support Department.

#### 3.2.2► Circuit 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.

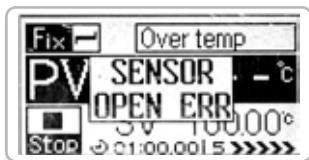
### 3.2.4 Error Messege

- 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 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(A/S)

#### [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 Korea Co.,Ltd: +82 31 572 4952

## 4. Specification

Cat. no.	Model	Capacity	Range
I03-91-045	LI-IL060	60 L	0 ~ 80℃
I03-91-055	LI-IL150	150 L	
I03-91-065	LI-IL250	250 L	
I03-91-075	LI-IL450	450 L	

Cat. no.		I03-91-045	I03-91-055	I03-91-065	I03-91-075
Model		LI-IS060	LI-IS150	LI-IL250	LI-IL450
Capacity		60 L	150 L	150 L	450 L
Controller	Control / Display	PID Control, Autotuning / GLCD (Graphic LCD)			
	Resolution	0.01℃			
Temperature	Range	0 ~ 80℃			
	Accuracy at 37℃	±0.05℃			
	Uniformity at 37℃	±0.54℃	±0.63℃	±0.76℃	±0.68℃
Dimension	Interior (w×d×h) mm	420×350×450	505×505×610	505×505×1000	720×620×1000
	Exterior (w×d×h) mm	530×590×1120	640×830×1310	640×830×1700	850×950×1750
Material	Interior	Stainless Steel (SUS304)			
	External	Powder Coated Steel			
Electric Supply	Power	1 Phase / 220VAC / 60 Hz			
	Max Consumption	1.2 Kw (5.5 A)	1.6 Kw (7.3 A)	1.8 Kw (8.2 A)	2.3 Kw (10.5 A)
	Power Line	Standard Plug			
Other	Wire Shelf	1 ea	2 ea		3 ea

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자기부담금:	₩ 1,000,000		
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