



# Jumbo hotplate

## User Guide

Version 1.0

### Model

DLP250, DLP300, DLP430, DLP630  
PDLP250, PDLP300, PDLP430, PDLP630

LK LabKorea : +82-31-572-4952

Thank you for purchasing the 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 marks as below for the occasion.



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

[Warning Mark]



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

[Attention Mark]

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# 1. Preparation

## 1.1 Instruction

This Hotplate is designed for Chemical, Biological, Medical, Pharmaceutical and many other purposes. This Hotplate can be used for chemical reaction, evaporation, titration and many other research situations with great performance, also very handy for masking and baking for wafer as well. With various function and safety devices installed, designed for users' convenience and safety as the biggest priority of this Vacuum Oven. This Vacuum Oven has a following features.

## 1.2 Feature

### 1.2.1 Function and Convenience

- With Anodizing heating plate, performs better heating and chemical resistance
- Graphic LCD Display provide handy operation and control.
- 2 types of timers. Start at the same time as drive, start after reaching target temperature.
- Fast and convenient controls the experimental temperature by installed Auto-Tuning function that provides automatic calculation of PID value based on test environment.
- Freely transferred the experimental data to PC via RS485 communication port. (PDLP products)
- The temperature of the experimental solution can be separately controlled through an external sensor. (PDLP products)

### 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



[ Precision Jumbo Hotplate ]

**[1] Heating Plate**

Heating plate for sample heating

**[2] Radiant Heat Cover**

Protect user from heating plate

**[3] Temperature Controller**

Control temperature.

**[4] Over Temp. Limiter**

Prevent Over heating by shutting out the power of heater

**[5] Power Switch**

On/Off switch for main power.

**[6] Circuit Breaker**

Shut off when the overcurrent is occurred.

**[7] Power Cord**

Supply electronic power to equipment

**[8] External Sensor Port**

Port for connecting the external sensor

**[9] RS485 Port**

RS485 Port for Telecommunication

**[10] Support frame Holder** In case of using external sensor, holding the support frame

## 1.4 Installation

### 1.4.1 Contents of Products

Main Body 1EA, User Guide 1EA

### 1.4.2 Installation Environment

- Avoid direct light
- Place where with less vibration and flat surface
- Do not place where may occur flammable gas.
- Avoid the place where may occur strong high frequency noise.
- Avoid the place where may occur overcurrent or water leak.
- the place where may occur corrosive gas or dust
- Avoid the place where an enclosed.
- Secure a space of about 20cm distance around the product



- Place where temperature between 5℃ to 40 ℃
- Place where ambient humidity under 80%

### 1.4.3 Power Connecting

- Set the Power Switch as “off” .
- In case the power cord is separated from the main body, connect them first and plug the cord into the power supply point (outlet).



- Supply power that meets product specifications
- Must use power supply point that completely ground connected.

# 2. Operation

## 2.1 Naming and Function of Temperature Controller



### [1] Graphic LCD

Display status of the equipment and various 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**

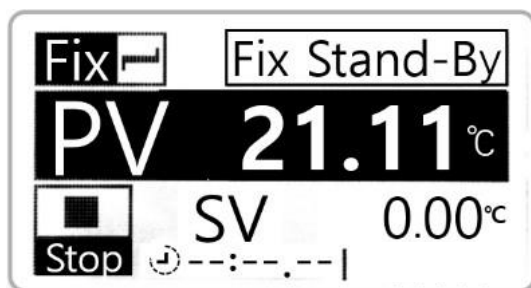
Timer display remaining time for operating “--.--” means timer off.

**[16] RUN / STOP Display**

Display the status RUN or STOP

## 2.2 Operation Method

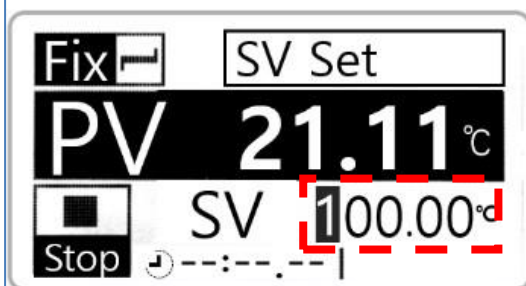
### 2.2.1 Setting



- Main menu display



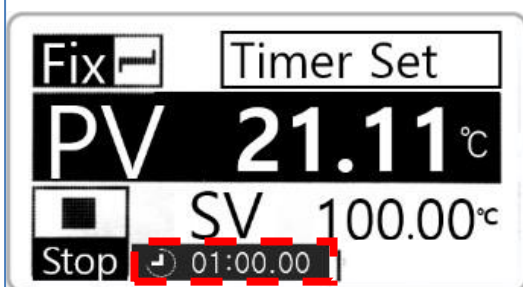
Mode Key



- Temperature (SV) Setting



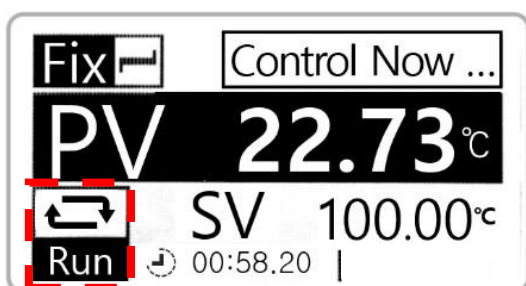
Run/Stop Key



- Set Timer Mode



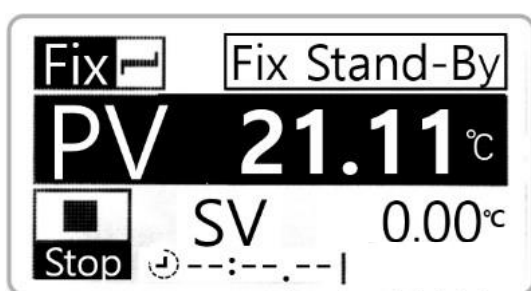
Run/Stop Key (3Seconds)



- RUN Start

## 2.3 Auto Tuning

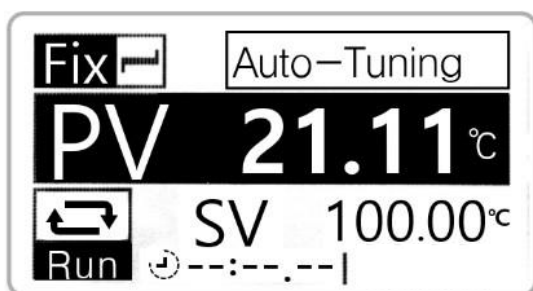
Auto Tuning is provide the best value for P.I.D Gain after calculation with considering treat environment automatically, so that user can experiment more accuracy and quickly. Calculated Gain value is saved automatically, if user wish to same experiment once again, the user need only tuning once. Auto Tuning is only available during RUN session.



\* Fix Control Mode



(Press both buttons for 3 seconds)



\* Start with Auto-Tuning message.

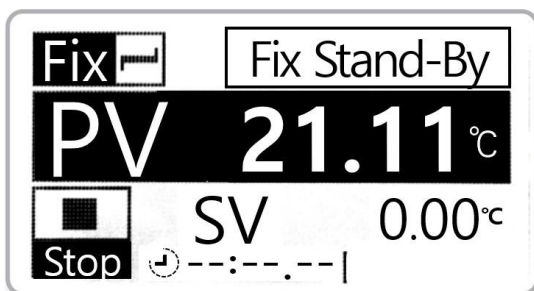
- \* After the Auto-Tuning, the equipment will operate with set temperature.
- \* In case stop Auto tuning, apply Shift and RUN/STOP for 2 seconds at the same time.



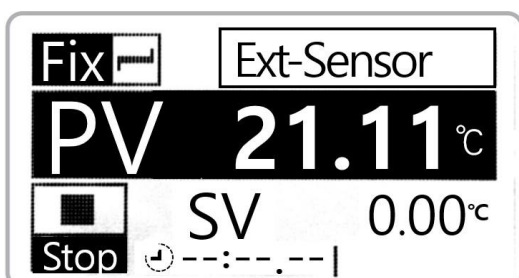
During Auto-Tuning, due to calculate, in order to reach set temperature Heater gives 100% output, so temperature go higher than set value.

## 2.4 External Sensor Mode

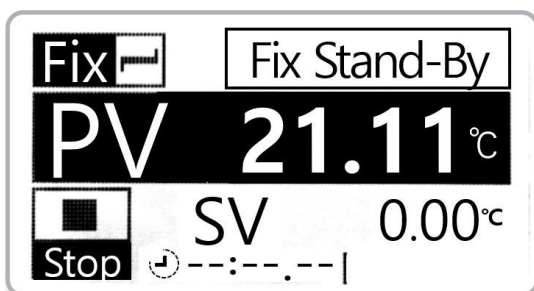
Used to directly control the external experimental temperature via the device. Connecting an external sensor and setting it to external sensor mode allows you to control the temperature with external sensor inputs and use functions such as program mode or auto-adjustment the same as internal sensors.



\* Fix Control Mode



\* Ext. Sensor Mode



\* Int. Sensor Mode



Please do sensor switching only when the unit is stationary condition.

# 3. Maintenance

## 3.1 Maintenance After Use

- After use, Power Switch has to be turned OFF.
- If the equipment is contaminated, plug off the Power Cord and cleaning with Alcoholic Liquid.
- If the equipment would not be used for a long time, plug off the Power Cord, Clean, and store the equipment.



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

## 3.2 Disorder and Solution

### 3.2.1 Power On Disorder

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

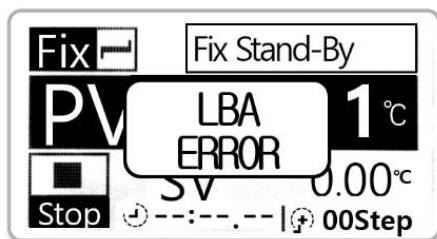
### 3.2.2 Circuit Breaker is keep short continuously

- Contact our Technical Support Department.

### 3.2.3 Temperature Control Disorder

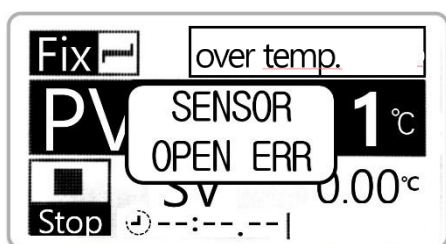
- Please operate Auto-Tuning.
- If still not working after those solutions above, contact our Technical Support Department.

### 3.2.4 Error Message



#### <LBA;Control Routine Breaking Down Alarm>

Contact our technical support department if the error message comes up.



#### <Sensor Open Error>

Occurs when there is an abnormality in the sensor. When using external sensor mode, check whether it is connected.

If you do not use the external sensor mode, please check the mode settings.



- 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.

## After Sales Service

### 3.3.1 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.

### 3.3.2 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.

### 3.3.3 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 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.

# 4. Specification

## Jumbo Hotplate

|                            |            |                      |                |                |                |
|----------------------------|------------|----------------------|----------------|----------------|----------------|
| Cat. No.                   |            | H03-04-050           | H03-04-060     | H03-04-080     | H03-04-090     |
| Model                      |            | DLP250               | DLP300         | DLP430         | DLP630         |
| Plate Size (w x d)         |            | 250x250 mm           | 300x300 mm     | 400x400 mm     | 600x300 mm     |
| Temperature<br>(at 100 °C) | Range      | Ambient +5 to 320 °C |                |                |                |
|                            | Accuracy   | ±0.8 °C              |                |                |                |
|                            | Uniformity | ±1.5 °C              | ±1.7 °C        | ±1.9 °C        | ±2.4 °C        |
| Dimension (w x d x h mm)   |            | 258x258x150          | 308x308x150    | 408x308x150    | 608x308x150    |
| Max consumption            |            | 1.2 kW (5.5 A)       | 1.5 kW (6.8 A) | 1.8 kW (8.2 A) | 1.8 kW (8.2 A) |

## Precision Jumbo Hotplate

|                            |            |                      |                |                |                |
|----------------------------|------------|----------------------|----------------|----------------|----------------|
| Cat. No.                   |            | H03-04-150           | H03-04-160     | H03-04-180     | H03-04-190     |
| Model                      |            | PDLP250              | PDLP300        | PDLP430        | PDLP630        |
| Plate Size (w x d)         |            | 250x250 mm           | 300x300 mm     | 400x400 mm     | 600x300 mm     |
| Temperature<br>(at 100 °C) | Range      | Ambient +5 to 320 °C |                |                |                |
|                            | Accuracy   | ±0.3 °C              |                |                |                |
|                            | Uniformity | ±0.8 °C              | ±1.0 °C        | ±1.1 °C        | ±1.5 °C        |
| Dimension (w x d x h mm)   |            | 280x280x155          | 330x330x155    | 430x330x155    | 630x330x155    |
| Max consumption            |            | 1.2 kW (5.5 A)       | 1.5 kW (6.8 A) | 1.8 kW (8.2 A) | 1.8 kW (8.2 A) |

## Controller

|                             |                    |            |                                                     |
|-----------------------------|--------------------|------------|-----------------------------------------------------|
| Control                     | Display            | Resolution | Timer                                               |
| PID Control,<br>Auto-tuning | GLCD (Graphic LCD) | 0.1 °C     | Wait on / off or Run Start<br>(99 hr 59 min 59 sec) |

## Electric supply

|                          |               |
|--------------------------|---------------|
| Power                    | Power line    |
| Phase, 220 VAC, 50/60 Hz | Standard Plug |



## 생산물배상책임보험 증권

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| 가입기간                 | 2014년 04월 10일 00:00 ~ 2015년 04월 09일 24:00<br>(증권발행자의 표준사 기준) |                                                                                                     |                 |
| <b>[계약일반사항]</b>      |                                                              |                                                                                                     |                 |
| 제품종류(명)              | 각종실험기기                                                       |                                                                                                     |                 |
| 소급일                  | 2014년 04월 10일                                                |                                                                                                     |                 |
| 재판관할지역               | 대한민국                                                         | 보험액                                                                                                 | ₩ 2,882,000,000 |
| <b>[가입조건]</b>        |                                                              | <b>[사용약관]</b>                                                                                       |                 |
| <b>[생산물배상책임]</b>     |                                                              | 생산물배상책임(PL)단종보험 공제약관<br>생산물배상책임보험(PL) 보통약관 - 피보험기구기준<br>납입인식오류 부담보 추가약관<br>품질지침부담보험약관<br>재정위반부담보험약관 |                 |
| 대인, 대물 일괄 연간 총 보상한도: | ₩ 100,000,000                                                |                                                                                                     |                 |
| 대인, 대물 일괄 1회구당 보상한도: | ₩ 100,000,000                                                |                                                                                                     |                 |
| 자기부담금:               | ₩ 1,000,000                                                  |                                                                                                     |                 |
|                      |                                                              | <b>[보험료 납입]</b> 일시납                                                                                 |                 |
|                      |                                                              | 총 보험료 : ₩ 1,827,000                                                                                 |                 |
|                      |                                                              | 납입보험료 : ₩ 1,827,000 (2014년 04월 09일)                                                                 |                 |

이 보험은 전기 취급금이 없는 소별상 상품입니다.

문의처 : 중소기업중앙회  
손해공제부 (www.pikorea.com)

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2014년 04월 09일  
중소기업중앙회  
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# Memo

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## **Jumbo Hotplate User Guide**

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