Anodizing Plate

Over Temp. Limiter

Jumbo hotplate

User Guide

Version 1.0

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

LK LAB KOREA

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]

Contents

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

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

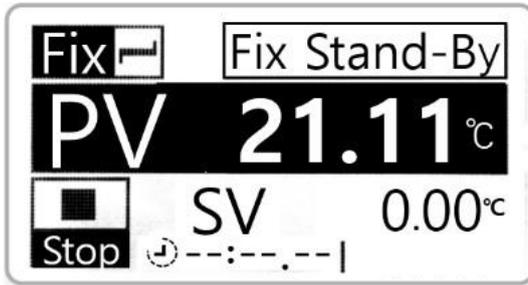 Display target temperature the user set

[15] TIMER Display

  Timer display remaining time for operating "--.--.--" means timer off.

[16] RUN / STOP Display

  Display the status RUN or STOP
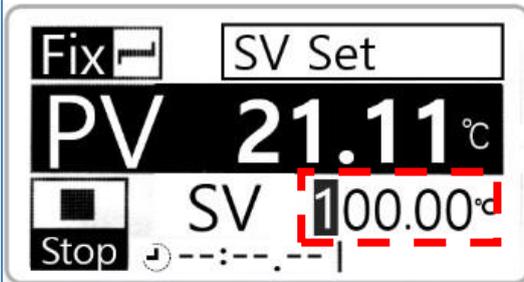
2.2 Operation Method

2.2.1 Setting

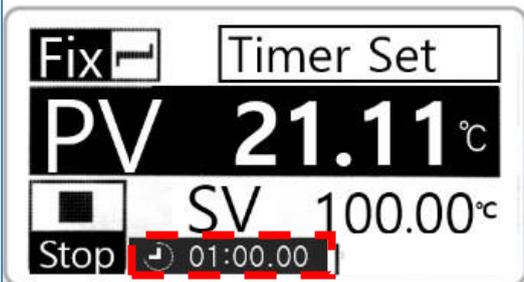– Main menu display

  Mode Key

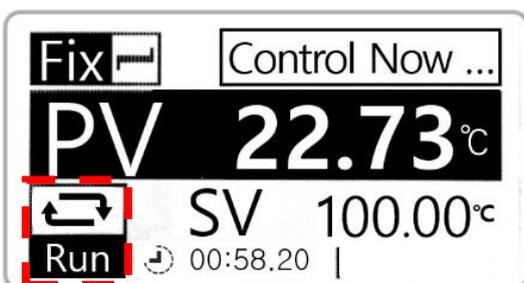– Temperature (SV) Setting

  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.
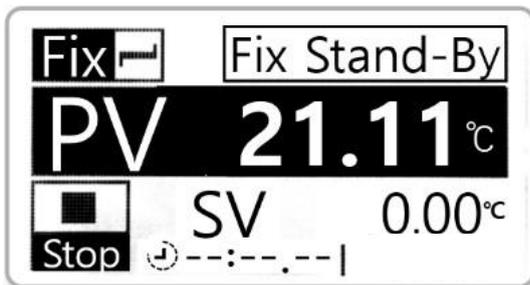
* Fix Control Mode

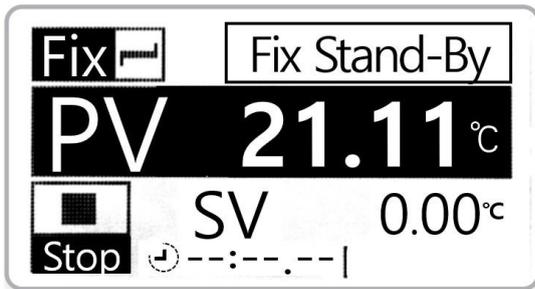 y   (Press both buttons for 3 seconds)
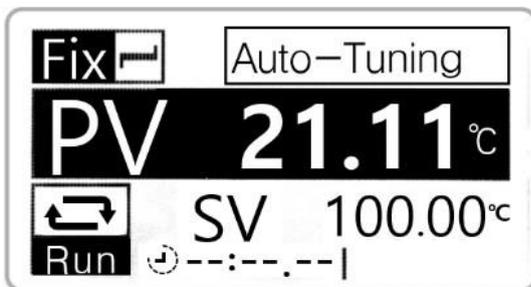
* Start with Auto-Tuning message.

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

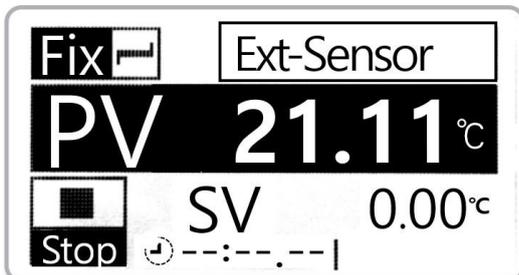* In case stop Auto tuning, apply Shift and RUN/STOP for 2 seconds at the same time.

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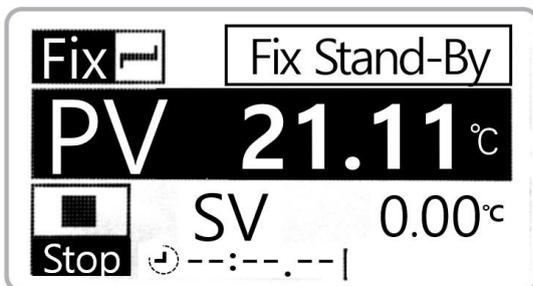
2.4 External Sensor Mode

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 | Fix Stand-By
PV **21.11**℃
■ SV 0.00℃
Stop ⏱--:--.--|

* Fix Control Mode

⬇ [buttons: FIX / UP / Ext.S. / RUN STOP]

Fix | Ext-Sensor
PV **21.11**℃
■ SV 0.00℃
Stop ⏱--:--.--|

* Ext. Sensor Mode

⬇ [buttons: PROG. / DOWN / Int.S. / RUN STOP]

Fix | Fix Stand-By
PV **21.11**℃
■ SV 0.00℃
Stop ⏱--:--.--|

* 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.
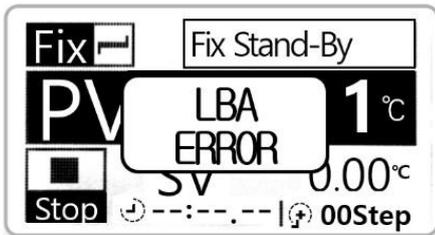
3.2.2 Circuit Breaker is keep short continuously

– Contact our Technical Support Department.
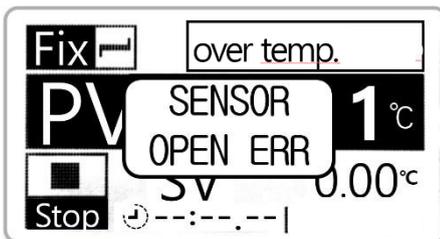
3.2.3 Temperature Control Disorder

– 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.

Technical Team : +82-31-572-4952

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 (at 100 ℃)	**Range**	Ambient +5 to 320 ℃			
	Accuracy	±0.8 ℃			
	Uniformity	±1.5 ℃	±1.7 ℃	±1.9 ℃	±2.4 ℃
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 (at 100 ℃)	**Range**	Ambient +5 to 320 ℃			
	Accuracy	±0.3 ℃			
	Uniformity	±0.8 ℃	±1.0 ℃	±1.1 ℃	±1.5 ℃
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, Auto-tuning	GLCD (Graphic LCD)	0.1 ℃	Wait on / off or Run Start (99 hr 59 min 59 sec)

Electric supply

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

KBIZ 중소기업중앙회

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회장 김 기

Memo

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