



Low Temp. Circulating Water Bath

User Guide

Model

LC-LT208, LC-LT212, LC-LT222, LC-LT230

LC-LT408, LC-LT412, LC-LT422, LC-LT430

LC-HT412, LC-HT422

LC-LT308

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



[Warning Mark]

This is the mark for the Dangerous Situation.

If users ignore this, it might cause of serious personal injury or damage to products.



[Attention Mark]

This is the mark that comes up with the situation which needs extra care.

When users recognize this sign, they have to operate more carefully.

〔Contents〕

1. Preparation	3
1.1 Introduction	3
1.2 Feature	3
1.3 Structure	4
1.4 Installation	6
2. Operation	7
2.1 Naming and Function of Temperature Controller	7
2.2 Operation Method	9
2.3 Auto-Tuning Function	11
3. Maintenance	12
3.1 Maintenance After Use	12
3.2 Disorder and Solution	12
3.3 After Sales Service	14
4. Specification	15

1. Preparation

1.1 Introduction

This Low-Temperature Circulator is designed for Chemical, Biological, Medical, Pharmaceutical, and many other purposes. This circulator can be used for controlling temperature and cooling. With various functions and safety devices installed, designated for users' convenience and safety as the biggest priority of this circulator.

1.2 Feature

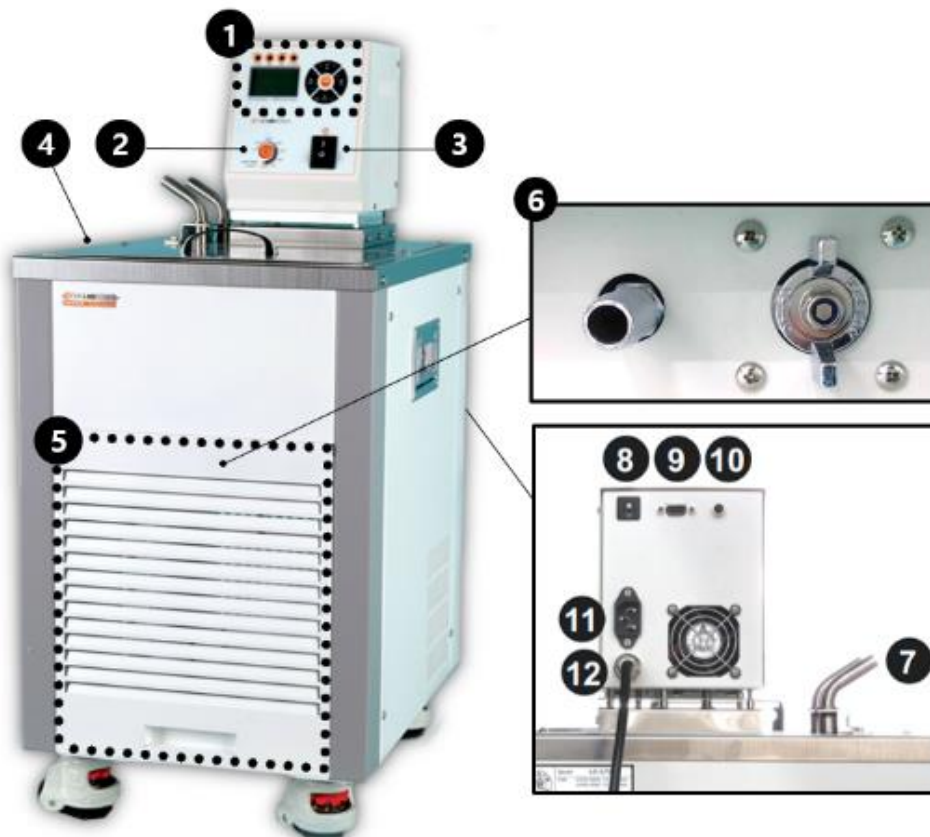
1.2.1 Function and Convenience

- Controlling temperature by external circulation system.
- 1/100°C Temperature control as 1/100 resolutions.
- Temperature control of other equipment available with External sensor.
- Strong hydraulics and flux by BLDC Motor pump.
- Adjustable hydraulic pressures and flux according to the experimental environment through the pump step adjustment
- Operate easily and conveniently with a Graphic LCD Display Controller.
- Programmable temperature control installed (upto 10 steps).
- Auto tuning function installed by self-calculating PID value based on research environment afford easier and more convenient control of temperature.
- Data can be exchanged with RS485 Communication port

1.2.2 Safety

- Low Water Alarm inform when the level of water is too low.
- Double over temperature safety device installed.
(1st Controller Alarm, 2nd Over temperature shutdown circuit)
- Abnormal Situation Occurs, buzzer and message will notice the situation to user.

1.3 Structure



[Low Temp. Circulating Water Bath]

[1] Temperature Controller

Use for controlling the temperature

[2] Over Temp. Limiter

If the temperature is going over the set temperature, shut out the power of the heater immediately to prevent overheating, a user needs to set a 10% higher temperature from the actual treat

[3] Power Switch

ON/OFF switch for the main power.

[4] Bath Cover

Must be closed during operating at high or low temperatures.

[5] Bottom Cover

A Drain and freezer condenser are installed inside of the bottom cover .

[6] Drain

Use for draining solutions inside the bath.

[7] Circulation IN/OUT

Fitting of entering and exiting the solutions during circulation.

[8] Circuit Breaker

Breaker of overcurrent protection

[9] Communication Port

RS485 communication Port.

[10] External Sensor Port

Port for connecting with the external sensor.

[11] Power Cord

Supply the power to the equipment.

[12] Compressor Cable

Compressor power cable.

1.4 Installation

1.4.1 Component

Main Body 1ea, User Guide 1ea, Compressor Cable 1ea

1.4.2 Installation Environment

- Avoid direct light.
- Place where with less vibration and flat surface.
- Avoid the 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.
- Avoid the place where may occur corrosive gas or dust
- Avoid the place where an enclosed.
- Secure a space of about 20CM around the product.



- Place where temperature between 5°C to 40 °C
- 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.

1.4.4 Initial Setting

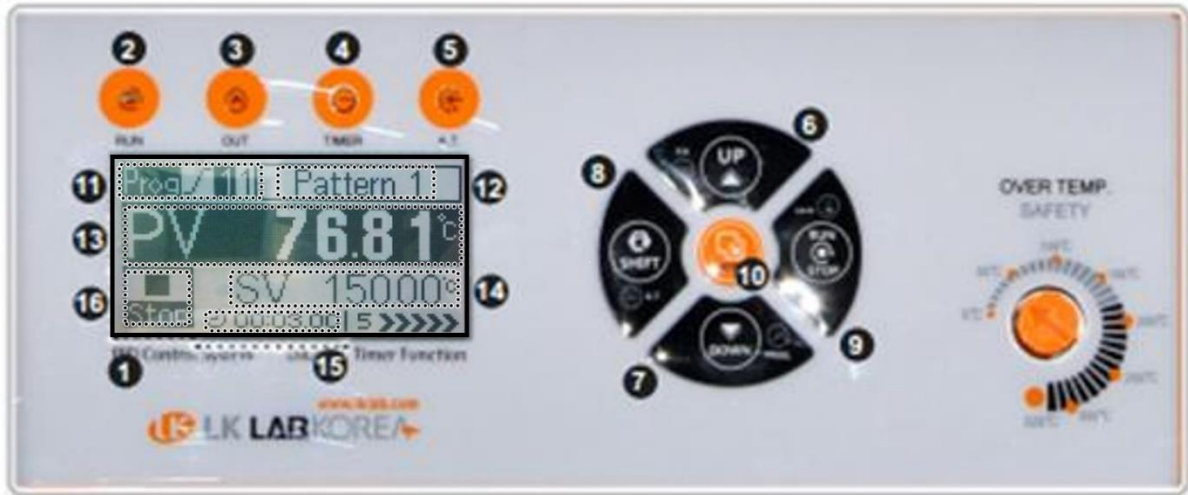
- Fill the inside bath with solvent (Distilled Water, Oil, Alcohol)
- Connect Circulation IN/OUT
- Set the Over Temp. Limiter



Using the solutions with affordable viscosity of circulation.
Using high viscosity solution may cause failure of the equipment.

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

Displaying output of the heater with flashing.

[4] Timer Lamp

Light on during the equipment operates with timer.

[5] A.T Lamp

Light on during the equipment operates with auto tuning.

[6] Up Key

Use for increasing of set value and setting of Fix Mode.

[7] Down Key

Use for decreasing of set value, setting 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

Users can select one between FIX(one temp.) and Program(multiple temps.) Mode.

[12] Message Displaying Window

Display of the message-related status of the product.

[13] PV Display

Display the current temperature of equipment.

[14] SV Display

Display the target temperature the user set.

[15] TIMER Display

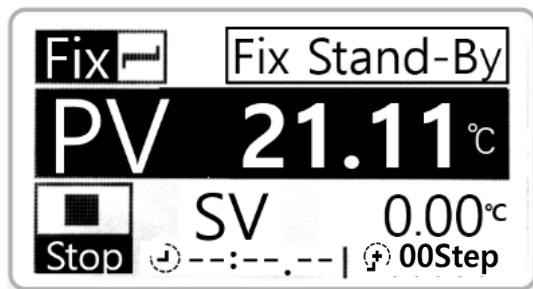
Timer display remains a time for the operation.

“--.--.--“means timer “off”.

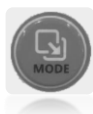
[16] RUN / STOP Display

Display the status RUN or STOP.

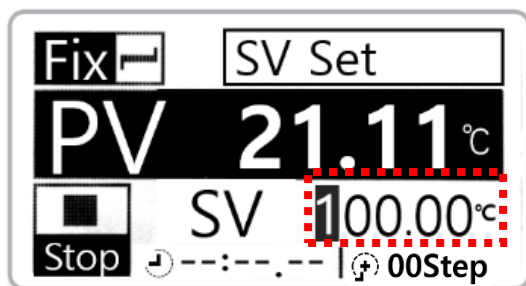
2.2 Operation Method



– Main menu screen



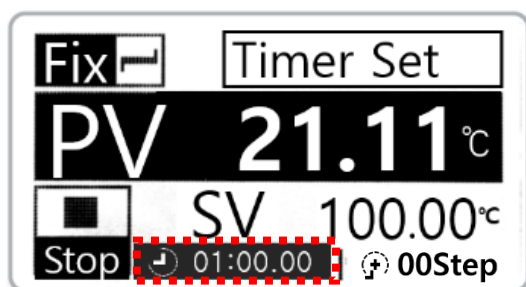
Mode Key



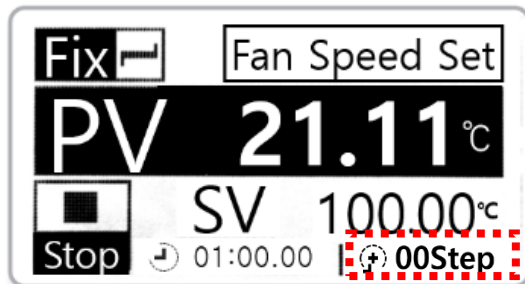
– Set the temperature (SV)



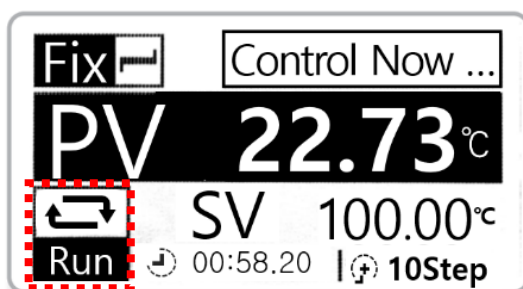
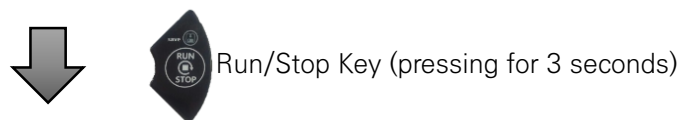
Run/Stop Key



– Set the Timer



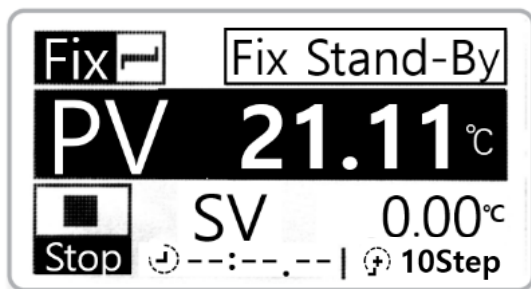
– Set the Pump (Recommend to set 10 steps)



– Start RUN mode

2.3 Auto Tuning Function

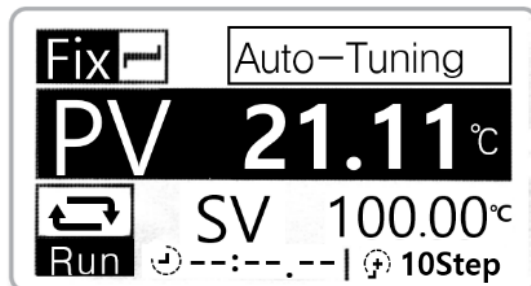
Auto Tuning provides the best value for P.I.D Gain after calculation by considering the treat environment automatically, so that the user can experiment more accurately and quickly. The calculated Gain value is saved automatically, if the user wishes to do the same experiment once again, the user needs only tuning once. Auto Tuning is only available during RUN session.



* Fix Control Mode



Key (pressing at once for 3 seconds)



* Start with Auto tuning message

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

* In case stop Auto-Tuning, apply Shift and RUN/STOP at the same time.



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

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.
- To clean once a month for the Compressor inside lower cover increase refrigeration efficiency.



- 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 the 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 the main body.
- 5) Please check the earth leakage breaker on the outlet connected to the main body is "ON"
- 6) Please contact our technical support department if still not working despite all actions taken.

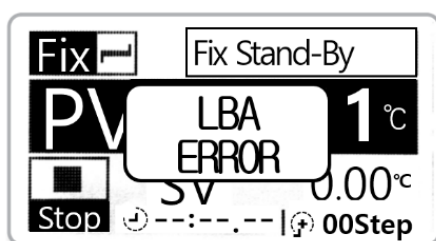
3.2.2 Earth Leakage Breaker is keeping short continuously

- Contact our technical support department.

3.2.3 Temperature Control Disorder

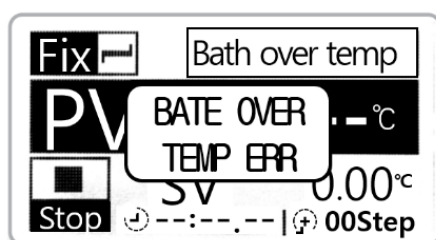
- 1) Please check if the Over Temp. Limiter set 10% higher than treat value.
- 2) Please check if the compressor cable is fully connected.
- 3) Please operate Auto-Tuning
- 4) Please set the pump speed as 10 steps.
- 5) If still not working after those solution above, contact our Technical Support Department

3.2.4 Error Message



〈 LBA; Control Routine Breaking Down Alarm 〉

Please Set the Over Temp. Limiter 10% above the experimental temperature value. If the error message still comes up, contact our technical support department.



〈Over Temp. Error〉

Occurs when the machine is overheated beyond the operating temperature range. Stop the instrument and wait for the temperature to drop. The temperature will return to normal if press the Mode Key after the temperature drops.



– In case apply after-sales service, the user has to inquire to our technical support department or supplier of the equipment. If the user randomly disassembles or changes parts inside, repair of equipment cannot be available.

3.3 After Sales service

3.3.1 Warranty

The Warranty period is expired by 1 year after purchasing equipment. After 1 year, cannot get warranty repairing service. The user has to pay for replacing parts or repairing work. Within the warranty period, the user can get service from LK Lab Korea's Technical Support Department or the Supplier of the equipment.

3.3.2 Exceptional Case of Warranty

Damage or defective by fire or inundation, carelessness usage, do not use standard liner power supply recommended, operation at abnormal condition, misuse or unskilled usage cannot get warranty service.

3.3.3 Applying After Sales Service

Firstly, contact our Technical Support Department or Supplier of the products and inform detailed symptoms with the contact of the user by mail or fax. After receipt of after-sales service inquiry, our technician quotes and the user decides after getting quoted. In case of not responding after 2 weeks from receipt of the after-sales service inquiry, the product will be returned to the user.

LK Lab Korea After-sales Service: +82-(0)31-572-4952

4. Specification

Low Temp. Circulating Water Bath

Cat. No.	Model	Capacity	Temp. Range
B04-91-410	LC-LT208	8 L	-20 °C to +150 °C
B04-91-420	LC-LT212	12 L	
B04-91-430	LC-LT222	22 L	
B04-91-440	LC-LT230	30 L	

Low Temp. Circulating Water Bath

Cat. No.	Model	Capacity	Temp. Range
B04-91-510	LC-LT408	8 L	-40 °C to +150 °C
B04-91-520	LC-LT412	12 L	
B04-91-530	LC-LT422	22 L	
B04-91-540	LC-LT430	30 L	

Low Temp. Circulating Water Bath

Cat. No.	Model	Capacity	Temp. Range
B04-91-560	LC-HT412	12 L	-40 °C to +250 °C
B04-91-565	LC-HT422	22 L	

Low Temp. Circulating Water Bath

Cat. No.	Model	Capacity	Temp. Range
B04-91-610	LC-LT308	8 L	-20 °C to +150 °C

Controller	Control	PID Control, Auto-tuning
	Display	GLCD (Graphic LCD)
	Resolution	0.01 °C
	Timer	Wait on/off or Run Start (99 hr 59 min 59 sec)
Power		1 Phase / 220 VAC / 60 Hz
Material	Interior	304 Stainless Steel
	Exterior	Powder Coated Steel
Safety		Over Temp. & Current Protection, Automatic Fault Sensing System

생산물배상책임보험 증권

증권번호	P151400668		
계약자	(주)엘케이테크리아		
주소	[136-075] 서울특별시 성북구 계문사길 57 - 3(안암동5가)		
피보험자	(주)엘케이테크리아		
주소	[136-075] 서울특별시 성북구 계문사길 57 - 3(안암동5가)		
가입기간	2014년 04월 10일 00:00 ~ 2015년 04월 09일 24:00 (증권발행자의 표준시 기준)		

[계약일반사항]			
제품종류(명)	각종실험기기		
소급담보일	2014년 04월 10일		
재판관할지역	대한민국	배출액	₩ 2,662,000,000

[가입조건]		[사용약관]	
[생산물배상책임]		생산물배상책임(PL)단채보험 공제약관	
대인, 대물, 물상, 연건 총 보상한도:	₩ 100,000,000	생산물배상책임보험(우) 보험약관 - 배상청구기준	
대인, 대물, 물상 1청구당 보상한도:	₩ 100,000,000	날짜인식오류 부담보 추가약관	
자기부담금:	₩ 1,000,000	품질저하부담보험약관	
		과채위반부담보험약관	

[보험료 납입]	
총 보험료:	₩ 1,827,000
납입보험료:	₩ 1,827,000 (2014년04월09일)

이 보험은 만기 환급금이 없는 소멸성 상품입니다.

문의처 : 중소기업중앙회
손해공제부 (www.plkorea.com)

전화번호 : 1666 - 9988
팩스번호 : (0502) 397-0200

2014년 04월 09일
중 소 기 업 중 앙 회
회장 김 기 분



Low Temp. Circulating Water Bath User Guide

77-9, Toegyewon-ro, Toegyewon-eup,
Namyangju-si, Gyeonggi-do, South Korea

Tel. 031-573-4952

Fax. 031-527-4958 www.lklab.com

