

REFRIGERATED BATH CIRCULATOR



Instruction Manual



**Covers model :
LRBC-13C / LRBC-22C**

Please read this manual carefully before using the instrument

Related Products

Model	Descriptions	Capacity	Control Range
LRBC-13C	Refrigerated Bath Circulator	13 Liter	-20°C ~ 120°C
LRBC-22C	Refrigerated Bath Circulator	22 Liter	-20°C ~ 120°C

Labnics Equipment

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CHAPTER 1. BEFORE USE:-

Thank you for choosing Labnics Laboratory Products

Please read this operation manual carefully before use for your safety and optimum operating performance.

If you have any question, please contact sales representative or service engineer.

CHAPTER 2. SAFETY PRECAUTION:-

This manual contains important operating and safety information. You must carefully read and understand the contents of this manual prior to the use of this equipment.



Warning:-

Warning alert you to a possibility of personal injury



Caution:-

Caution alert you to a possibility of damage to the equipment.

2.1 Power Connection:-



Caution

- Your Refrigerated Bath Circulating Bath is designed for 220VAC 50Hz or 60Hz 1P
- Check electrical requirement on the name plate before use.
- Connect to receptacle with ground connection.
- Be sure to supply enough electrical current.

2.2 Installation:-



Caution

- Do not use in high humid environment
 - May cause Electrical leakage
 - Corrosion may occur
- Do not use in room temperature over 25°C or higher. Do not use beside instrument generate heat.
- Place flat, rigid and leveled surface
- When moving Refrigerated Bath Circulator, do not up-side-down
- Do not place any object on the top of Refrigerated Bath Circulator.

2.3 Operation :



Warning

- Hot surface may cause serious injury.
- Hot liquid in the bath may cause serious injury.
- Do not put volatile, flammable and explosive material inside of bath
- Do not put volatile, flammable and explosive material nearby bath
- Cold liquid in the bath may cause serious injury.



Caution :

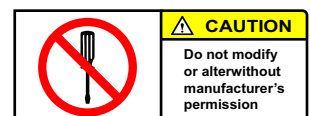
- Be careful not to spill liquid on the control panel
- Water droplet may occur operation under ambient temperature.

2.4. Maintenance:-



Caution

- Do not pour water or any liquid in the control panel when you clean bath.
- Do not use highly organic solvent for cleaning surface of bath
- Do not modify or alter electrical circuit or hardware.



CHAPTER 3. : FEATURE

Labnics LRBC-Series Refrigerated Bath Circulator is.....

ideal for biological, pharmaceutical, chemical engineering, agricultural and medical general laboratory application needs internal and external circulation of liquid temperature range from -20°C to 120°C.

Controller -

- Digital microprocessor PID Controller

Performance -

- Temperature Range : -20°C ~ 120°C
- Resolution : ± 0.1°C
- Accuracy : ± 0.1°C at 0°C
- Uniformity : ± 0.3°C at 0°C

- Circulation Pump : Flow rate up to 12 liters/min
Ultimate Height up to 2.5 meters H₂O
Internal and external circulation
Inlet and Outlet Fitting for easy connection

Material -

- Inner Bath : Stainless Steel 304 (AISI 304)
- Outer Cabinet : Steel with epoxy powder coating
- Circulation Pump Assembly : Seamless Stainless Steel 304

Safety -

- Over current cut-off
- Over temperature cut-off

CHAPTER 4.SPECIFICATIONS:-

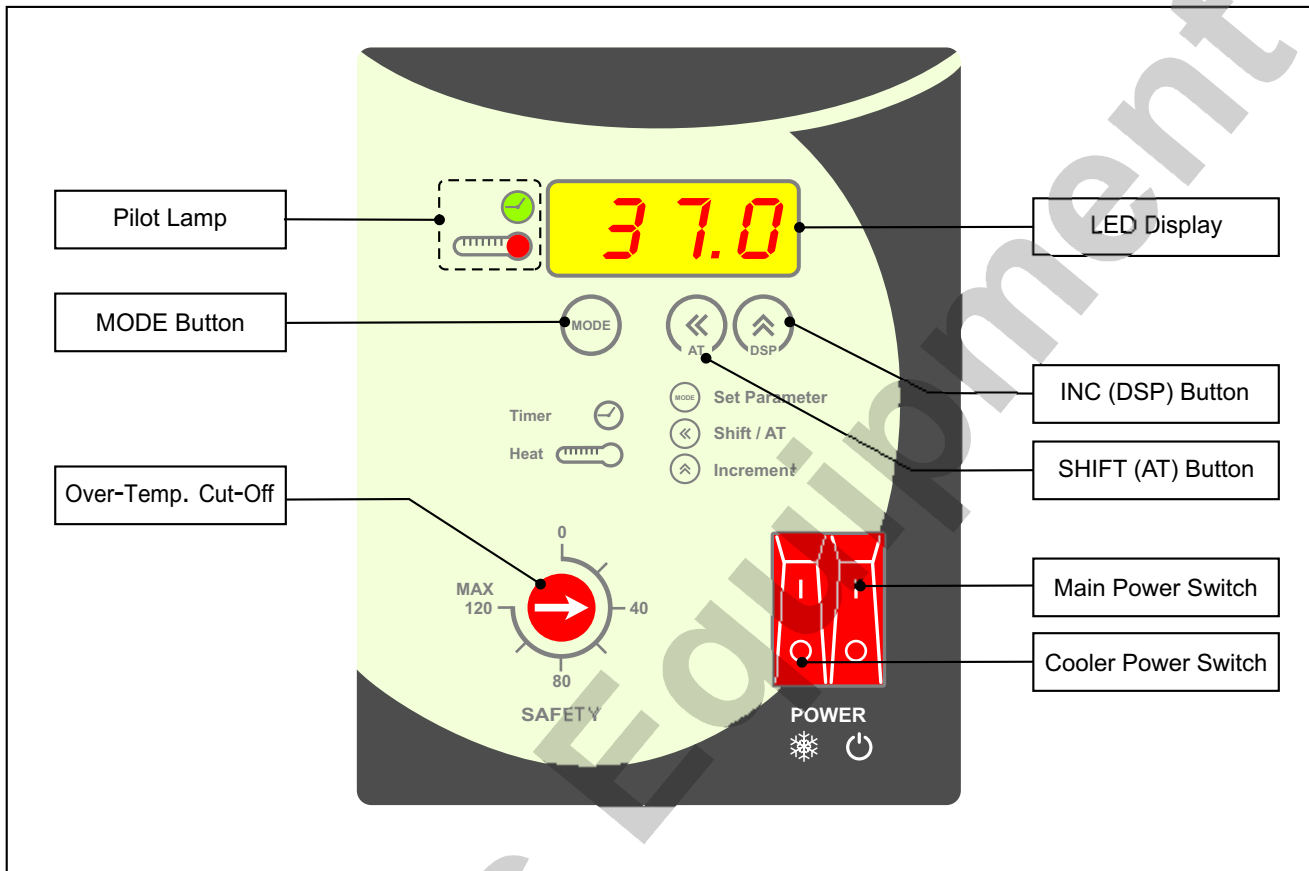
Model		LRBC-13C	LRBC-22C
Bath Capacity (Volume)		13 L	22 L
Dimensions (W x D x H mm)	Inner	240 x 320 x 150	320 x 420 x 150
	Outer	320 x 410 x 730	400 x 510 x 730
	Opening	240 x 150 x 150	320 x 250 x 150
Temperature	Range	-20°C to 120°C	
	Accuracy	±0.1°C	
	Uniformity	±0.3°C	
Controller		Digital PID Controller with Timer and Auto-Tuning	
Wait off Timer		mm:ss / hh:mm / dd:hh / Continuous Selectable	
Sensor		Pt 100	
Cooling System		Hermetically Sealed Compressor	
Safety Device	Temperature	Hydraulic Over Temperature Protection Safety Device	
	EL Leakage	Electronic Leakage Breaker	
Material	Bath	Stainless Steel 304 (SUS304)	
	Body	Powder Coated Steel	
Utility		Drain / INLET-OUTLET Circulation Nipple	
Electrical Requirement		220V, 60 Hz 1P or 220V, 50 Hz 1P	

CHAPTER 5 : PARTS AND DESCRIPTIONS

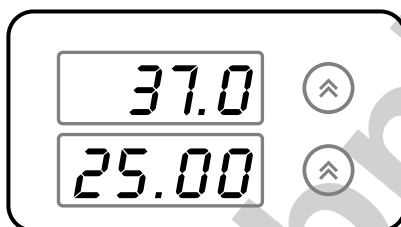


CHAPTER 6 : MAIN CONTROLLER

6.1 Main Controller:-



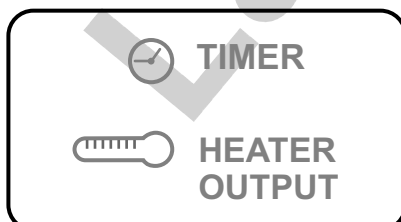
< LED DISPLAY >



Digital LED Display

- Displays current bath temperature when turned on
- Press INC (DSP) button to display temperature and time alternatively

<PILOT LAMP >



Pilot Lamps

TIMER : Lamp blink or turned on when wait-off timer activated

- Lamp blinks until temperature reach to operating temperature
- Lamp turned on to start count down

HEATER OUTPUT : Lamp blinks when heater activated

< BUTTONS >



MODE



SHIFT (AT)



INC (DSP)

MODE Button

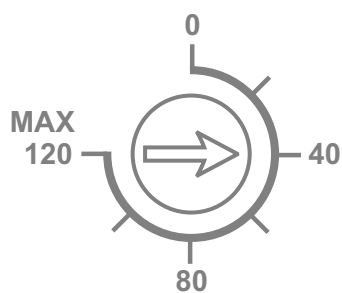
- Push to Change temperature and time setting
- Push to change parameters
Push and hold for 20 seconds to enter parameter mode (Remarks) Operating parameters are set before shipment. Do not change without understanding of each function of parameters.

SHIFT (AT) Button

- Shift to left digit
- AUTO-TUNING Function
Press and hold for 30 seconds to start auto-tuning. Auto-tuning was finished before shipment.

INC (DSP) Button

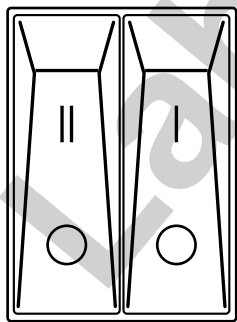
- Increase value when setting temperature and timer
- Press to display temperature and timer alternatively in normal display mode



SAFETY

SAFETY

- Safety dial for over temperature cut-off.
- Set dial 10 ~ 20% higher than operating temperature
- If temperature rise over operating temperature, safety automatically cut-off heater output to prevent over heating.



POWER

POWER SWITCH

Main power switch.

Right Switch : Main Power switch of Refrigerated Bath Circulator

Left Switch : Power switch for Refrigeration System

Remarks : Do not turn switch on the left only.

Chapter 7 : Operation

Before operation

- 1) Check electrical requirement on the name plate before connect to consent.
- 2) Place your Refrigerated Bath Circulator on the flat and level surface
- 3) Remove packing material in the bath.
- 4) Connect power plug between AC inlet consent on the back panel and wall mount receptacle

Getting Started

Refrigeration Liquid Selection

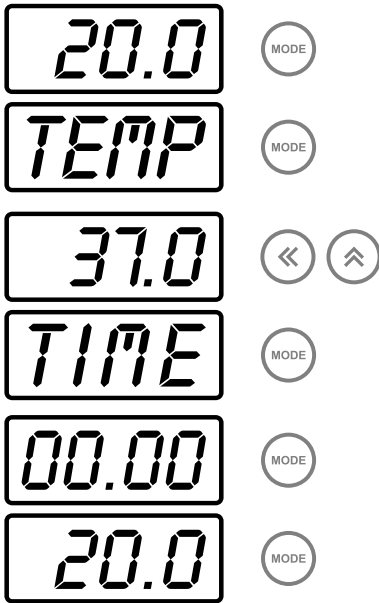
Operating Temperature Range	Refrigeration Liquid	Remarks
-20°C ~ Room temperature	Methanol 99.8 %	Do not use methanol for high temperature application higher than 20°C
	Ethylene Glycol : Water (50% v/v)	Flow rate and ultimate height can be reduced because of high viscosity
Room temperature ~ 80°C	Distilled Water	
80°C ~ 120°C	Ethylene Glycol : Water (50% v/v)	Flow rate can be reduced because of high viscosity

- 1) **Pour liquid into the bath to immerse cooling coil. Do not over fill liquid.**

For internal Circulation

- Inlet and outlet circulation fitting should be closed loop.
- Factory default setting
- For External Circulation
- Connect tubing between outlet fitting and external circulation loop
- Connect tubing between inlet fitting and return line.
- Add more liquid enough to fill circulation loop if necessary.

- 2) **Turn the RIGHT POWER SWITCH on. The Digital LED READOUT displays current temperature of the bath and circulation pump starts**



How to Set Temperature

- 1) Normal display mode (Current Temp. displayed)
- 2) Press MODE button
- 3) LED displays "TEMP" symbol and prompt user input
- 4) Press MODE button again
- 5) LED displays set temperature to operate
- 6) Input new operating temperature by using SHIFT and INC button
- 7) You can input operating temperature range from -20°C to 120°C
- 5) Press MODE button to set timer
- 6) Press model button three times to skip timer setting
- 7) Back to normal display mode and controller starts temperature control

Remarks

- 1) If you operate temperature lower than ambient temperature, turn on LEFT POWER SWITCH to turn on cooling system
- 2) If you use temperature higher than ambient temperature, to not turn on compressor to protect cooling system from over loading.



How to Set Timer

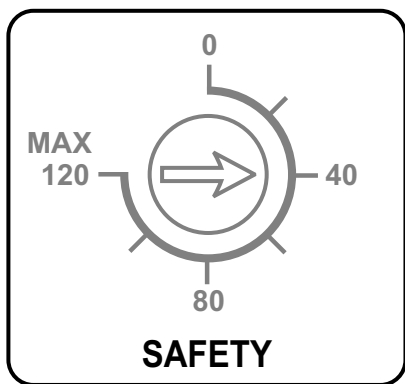
- 1) Press MODE button three times to set timer
- 2) LED displays "TIME" symbol and prompt user input
- 3) Press MODE button again
- 5) LED displays current timer setting (ex. 00:00)
- 5) Input new wait-off timer value by using SHIFT and INC button
- 6) Default time scale is HH:MM
- 6) For continuous operation set timer at 00.00
- 4) You can input timer range from 1min to 99hr 59min.
- 6) Press MODE button back to normal display mode

(Remarks) Timer can be changed in different scale by changing parameter

- | | | |
|----|---------|-------------|
| 1) | mm : ss | 99min 59sec |
| 2) | hh : mm | 99hr 59min |
| 3) | dd : hh | 99day 23hr |

refer parameter setting to change time scale
 MODE 0, N1 : time scale selection parameter

- 0 : MM:SS
- 1 : HH:MM
- 2 : DD:HH



Over Temperature Protection

User must set the over temperature protection before operation. Turn over temperature protection dial with screw driver Set temperature about 10~20% higher than the operating (user set) temperature.

If over-temp. protection value is under the operating temperature, temperature cannot be reach up to operating temperature

Temperature range of Safety Thermostat is 0 - 40 - 80 - 120 Max.

Start Temperature Control

1. After setting temperature and timer, Bath start heat up or cool down liquid in the bath to operating temperature
2. Put samples in the bath
3. Close lid if necessary

Cooling & Heating System Performance

1. It will takes about 1:30 Hr to cooling down to -20 from ambient temperature (25) in ideal operating condition.

Temperature	Elapsed Time (hh:mm)	Ambient Temp.
25.0°C	00:00	25°C
-10.0°C	01:00	25°C
-20.0°C	01:30	25°C

-20.0°C	00:00	25°C
-10.0°C	00:05	25°C
-0.0°C	00:10	25°C
10.0°C	00:10	25°C

Chapter 8 : Frequently Asked Question

8.1 Temperature keep increasing and decreasing under operating temperature

Cause : SAFETY setting is lower than operating temperature

Solution : Turn SAFETY setting clockwise higher than operating temperature

8.2 LED displays uuuu and beep

Cause : Over heat higher than 100°C. Check water level.

Solution : Your water bath cannot be used over 100°C

If temperature increase over 101°C, controller warning high temperature and cut-off heater

Chapter 9 : Trouble Shooting

Error Symbol	Cause	Solution
uuuu	Over heat higher than 100°C	Call for Service
nnnn	Sensor disconnection	Call for Service

Chapter 10 : Setting Parameter

10.1 Parameter 1

To set parameters, press and hold MODE Button for 5 seconds.

Press SHIFT and INC Button to change values.

Press MODE Button to go next parameter.

To escape from Parameter mode to normal display mode, press and hold MODE Button for 5 seconds.

Parameter

Symbol	Name of Parameter	Setting Range and Descriptions	Factory Default	User Value
ALH	Alarm Limit High	00.0 ~ 99.9°C	2.0	
ALL	Alarm Limit Low	00.0 ~ 99.9°C	21.0	
HYS	Hysteresis	00.0 ~ 99.9°C	0.2	
BEEP	Beep On Time	0 ~ 9999 Sec.	30	
ADJ	Temperature Calibration	-99.9 ~ 299.9°C		
LOC	Key, Data, Parameter Lock	0000 ~ 1111	0000	

10.2 Parameter 2

To set parameters, press and hold MODE Button for 30 seconds.

LED Display turn to ALH after 5 seconds. Keep press the button 25 seconds.

Press SHIFT and INC Button to change values.

Press MODE Button to go next parameter.

To escape from Parameter mode to normal display mode, press and hold MODE Button for 5 seconds.

Parameter Symbol	Name of Parameter	Setting Range and Descriptions	Factory Default	User Value
rnt	Maximum temperature limit to set	-99.9 ~ 299.9°C	251	Do Not Change
ACTP	Temp. where timer activate (Parameter can be changed only when the N2 value of Mode0 is 1) Timer starts count down when, (current temp.- set temp.)>ACTP	-00.0 ~ 99.9°C	0	
Prd	Period (Output Interval)	1 ~ 99 sec.	2	Do Not Change
P	Proportion	0 ~ 6999	Auto-tuned value	Do Not Change
I	Integral	0 ~ 6999	Auto-tuned value	Do Not Change
A	Anti-Intergran	0 ~ 6999	Auto-tuned value	Do Not Change
D	Differential	0 ~ 6999	Auto-tuned value	Do Not Change
Mode0	Operating Mode Control 0 N3 0 = KS, JIS Pt 100 1 = DIN Pt 100 N2 0 = ALH (Relative) 1 = AALH (Absolute) N1 0 = ALL (Relative) 1 = AALL (Absolute) N0 0 = 000 1 = Decimal display (000.0)	N3 N2 N1 N0 0 0 0 0 1 1 1 1	0001	Do Not Change
Mode1	Operating Mode Control 1 N3 0 = PID Control 1 = ON/OFF Control N2 0 = Timer Disable 1 = Timer N1 0 = Time Scale (mm:ss) 1 = Time Scale (hh:mm) 2 = Time Scale (dd:hh) N0 0 = Power on restore disable 1 = Power on restore	N3 N2 N1 N0 1 1 1 1	0111	
Mode2	Operating Mode Control 2 No Function	N3 N2 N1 N0 0 0 0 0 1 1 1 1	0000	Do Not Change
DrAn	Fix drift of temperature display within the set value Temperature drifts during operation owing to several reasons. To eliminate temperature drift, set DrAn value to fix temperature within the value		0.5	
LbAT	No Function		0000	

- 1) **RNT** : Maximum temperature limit to set.
User cannot set temperature higher than this value.
Do not alter the value. Factory default is 100

- 2) **ADJ** : Temperature adjustment.
Sometimes the actual temperature of the water is slightly the different from displayed temperature.
User can adjust the displayed temperature by compensate the difference by Adj value.

Example:

- 1) Measure temperature of Water Bath with calibrated thermometer.
- 2) Read LED display
- 3) Change Adj value

Thermometer Temperature Reading	Controller Temperature Reading	Adj Value
38.0°C	37.0°C	1
36.0°C	37.0°C	- 1

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Inspection Log For Refrigerated Bath Circulator

Model # : _____ Serial # : _____ Client : _____

Date & Time: _____ Amb. Temp. : _____ Electricity : VAC Hz

LRBC Pretest check list (Initial after each Checkpoint)
If Non-Applicable enter N/A

Termination of each electrical connections		Surge protection termination	
No Water Leakage		Control panel key switch tight	
Equipped with proper accessories		Esthetics ok	

LRBC TEST AREA, TEST LOG (NOTE) If units fails any portion of the test enter "NG" in the blank space adjacent to that check point

Technician		Setpoint security verified	
Volts at plug / terminal strip / Hz		Labeling on components correct	
Cut in voltage		Molded plug not overheated	
Surge		Leak check while running	
Verify over temp. protection			
Temperature Stability @ -10.0 ?	± °C		
Temperature Stability @ 37.0 ?	± °C		
Maximum Temperature 120.0 ? within 1:00 hr			
Minimum Temperature -20.0 ? within 1:30 hr			
Circulation Pump Noise during operation			
No impeller contact			
No motor blade contact			
Internal / External Circulation			
No Ref. Gas Leakage			
Correct blade of condenser motor			
Insulation tight			
No water droplet on the refrigeration system			

Released from test by :

From#QCF001frm

Approval :

Revision 01/01/05

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Maintenance and Service Check List

Model	LRBC-			
Descriptions	Refrigerated Bath Circulator			
Serial No.				
Date	Check	Technician	Remarks	Sign
200	Shipment			

Article	Every 6 Mo.	○ Check	⊙ Clean-Up	● Replace
		Every Yr.	Every 2 Yr.	
Controller		○		
PT Sensor		○		
Heater		○		
TRIAC		○		●
OPT		○		●
MAIN S/W		○		
Circulation motor		○		
Pump Assembly		○		
Cleaning Codensor	⊙			
Compressor	○			