Laboratory Equipment Pty Ltd

INSTRUCTION MANUAL
ECONOMY REFRIGERATED INCUBATORS

Laboratory Equipment Pty Ltd
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1. SAFETY WARNINGS

1. Read the product instruction manual before using this product.

2. Do not put volatile, flammable, and explosive materials in the machine. This could result in explosion or fire.

3. Do not expose the device to rain, moisture, or splashing, as this may result in electrical leakage, short circuit, or electric shock.

4. Non-professional technicians must not disassemble, repair, or modify the equipment, otherwise it may cause fire or electric shock to personnel due to improper operation.

5. Do not damage the power plug or the power cord. If it is damaged, the power cord must be replaced. Otherwise, it may cause fire or electric shock.

IMPORTANT

1. Install the equipment on solid, level ground only.

2. Use only the power supply indicated one the nameplate. This equipment must be installed on the ground, otherwise could cause electric shock and fire because of electric leakage.

3. Do not touch the power plug with wet hands, otherwise there is a risk of electric shock

4. Before any repair or maintenance is carried out, the power must be disconnected to prevent electric shock or injury.

5. Please wear gloves when repairing and maintaining the equipment in case of injury.

6. Do not to damage the power cord or use a non - specified power cord, do not use an extension cord or double adapter.

7. Do not remove the power plug during the operation, do not pull the power cord by tugging on the cord.

8. If you find that the equipment is running abnormally, unplug the power plug immediately and stop the equipment.

- ❖ Adjust the feet so that the equipment is installed level, and all four feet are in contact with the ground.
- ❖ Use a separate power outlet fitted with a grounding wire.
- ❖ Turn off the off the power plug, before removing the equipment.
- ❖ Carefully touch the inner wall of the door, which may be hot.
- ❖ Nonprofessional technical staff should not disassemble the machine privately, only LABEC staff should repair and replace parts.
- ❖ The internal parameters must be set by the specific management person to prevent the function of the controller program from being disturbed by human error.
- ❖ The installation location of the equipment must include at least 20cm clearance on all sides.
- ❖ Open or close the door gently. Roughly opening or closing the door can easily cause damage to the equipment.
- ❖ The surface of the equipment must not be exposed to volatile chemicals such as gasoline or thinner.
- ❖ Keep the inside and outside of the box clean, often cleaning debris and smudges

2. PRODUCT FEATURES

1. Unique internal air circulation structure design, fan breeze circulation, uniform temperature distribution in the working room.

2. Large-screen LCD display, multiple sets of data on one screen display, intelligent PID temperature control system, equipped with PT100 high-precision sensor, high temperature control accuracy.

3. Double-layer door structure, the inner door is made of high-quality tempered glass for easy observation of the sample, and the outer door includes a magnetic rubber strip, which is convenient to open and close and has good sealing performance.

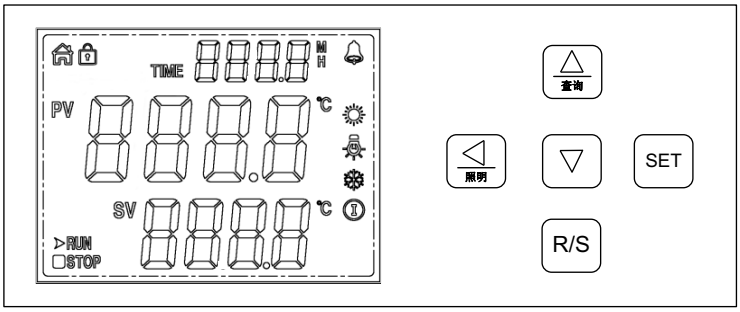
4. Intelligent frost function ensures long-term frost-free operation of the equipment, standard electronic independent temperature limiter, double protection experiment safety.

3. SPECIFICATIONS

Model		SPX-70BIV	SPX-150BIV	SPX-250BIV
Cycle Mode		Forced convection		
Function	Temp. range	0～65℃		
	Temp. Resolution Ratio	0.1℃		
	Temp. Motion	High Temp.：±0.5℃		
		Low Temp.：±1℃		
	Temp. Uniformity	±1℃		
Structure	Inner Chamber	Mirror Sainless Steel		
	Outer Shell	Cold rolling steel electrostatic		
		spraying exterior		
	Insulation layer	Polyurethane		
	Heater	Stainless steel heater		
	Power rating	0.8kW	1.0kW	1.2kW
	Compressor	Air cooled hermetic compressor		
	Cryogen	R134a		
	Defrost structure	Automatic control intelligent		
		defrosting		
	Test hole	Stainless steel inner diameter		
		50mm(one)		
	Controlled external	Universal socket (one)		
	power supply			
	Temp. setting mode	Touch button setting		
	Temp. display mode	Measuring temperature: LCD upper screen;		
		setting temperature: the lower row		
	Timer	BIV model：0～99.9h		
		BL model：0～99.9h×30 Segment		

	Operation function	BIV model：Fixed value operation、		
		timing function,auto stop.		
		BL model：Program operation		
	Sensor	PT100		
	Additional funciton	BIV model：LED light, Deviation correction,		
		Menu key lock, Power failure parameter memory		
		BL model additional character：		
		UV light, loop self diagnosis		
Safety device		Over temperature alarm, mechanical		
		temperature limiter		
Specification	Inner Chamber size (W*L*H)(mm)	420*350*500	500*500*600	600*500*840
	Exterior size (W*L*H)(mm)	580*610*1190	660*760*1290	760*760*1530
	Packing size (W*L*H)(mm)	708*716*1368	788*866*1468	888*866*1708
	Volume	70L	150L	250L
	Load per rack	15kg		
	Shelf number	9	12	18
	Shelf space	35mm		
	Power Supply	AC220V/	AC220V/	AC220V/
	Current rating	2.3A	3.6A	5.5A
	NW/GW (kg）	69/92	86/114	100/139
Shelf		2		
optional accessories		Shelf, Touch screen controller, RS485 interface,		
		Printer, Recorder, Remote control, Wireless SMS		
		alarm, USB data storage		

4. OPERATION AND DISPLAY



SHRHB-D6006

1.【⌂】: Lighting when normal

2.【RUN】: Lighting when controller working

3.【STOP】: Lighting when controller stopped

4.【🔔】: Lighting when upper temp. Deviation alarm or Abnormal temperature measurement

Twinkle when lower deviation alarm

5.【☼】: Lighting when power output

6.【❄】: Lighting when cooling output Twinkle when delay start

7.【⏻】:Lighting when illumination output

Operation and usage

1. Turn on the power: PV show "Sr6P", SV Show "v03", enters the normal display state.after 3 seconds

2. Parameter

Press Set Key for 3 seconds, show Lc on the PV Line

Set Lc=1 --- PV Show Cc (cycle) , SV show the value, Press ▲ ◁ ▽ to change the value;

Press Set Key, PV show Sen (Segment) SV show the Value, **Press** ▲ ◁ ▽ to change the value;

Press Set Key for 3 seconds, save the change and log out.

3. Setting Temp. And Timer

Cc=1, Sen=1

Press Set Key to set the Temp.

Press Set Key again, to set the timer

SEn≠1

Press Set Key, to set the Temp and Timer of the first segment

Press Set Key for 3 seconds, save and log out

4. Parameter table

Parameter	Name	describe	Factory Default
Lc	password	“Lc=3”	0
ALH	Upper deviation Over Temp. Alarm	Measurements Temp.＞Setting Temp.+ ALH	(0～50.0℃) 5.0
ALL	Lowwer deviation Over Temp. Alarm	Measurements Temp. ＜Setting Temp.+ ALL Note: invalid when ALL=0	(-50.0～0℃) 0
Ct	Compressor start delay	Compressor start-up delay protection time, the minimum time interval between stop and restart of compressor.	(0～600 秒) 180
FIL	Filter coefficient	Temperature measurements filter coefficients.	(1～200) 50
Lt	Floodlight off-delay	When the light is turned on, it will automatically close after delaying the Lt time. If "Lt = 0" delay is invalid, the illumination lamp must be manually turned off.	(0～30 分) 2
Cnd	Compressor Start-stop mode	Only the compressor intermittently working, it can be effective! 0: Automatic start-stop compressor (judged automatically by controller) 1: Manual start-stop compressor (using uP and DN values)	(0～1) 0
uP	Compressor boot threshold	Only the compressor works intermittently and "Cnd = 1" is effective!	(-10.0～10.0℃) 0.4
dn	Compressor Closing threshold	If the "temperature measurement value (> temperature setting value + uP) and the starting delay time of the compressor arrives, start the compressor. If "temperature measurement value < temperature setting value + dn", close the compressor.	(-10.0℃～uP) 0.4
P	Proportional band	Time proportional effect regulation	(0.1～80.0℃) 10.0
I	Integration time	Integral action regulation	(1～2000 秒) 500
d	Differential time	Differential action regulation.	(0～1000 秒) 200
T	Cycle	Heating control cycle.	(1～60 秒) 5
Pb	Correction of Measuring Temp Deviation	usually used to correct the errors in cryogenic measurements. Lead = Actual Temperature - Instrument Measurements	(-50.0～50.0℃) 0
PL	Correction of Measuring Temp Slope	usually used to correct errors in high temperature measurement. PL= 1000* (Actual Temperature Value - Instrument Measured Value) Instrument Measured Value	(-999～999) 0

Pon	Power failure protection	When this function is enabled, the controller will be able to continue running with the parameters set before it is powered on again after power failure.	(0～1) 1
Adr	Address	communication address.	(1～32) 1

If the total number of cycles is set to zero, it means continuous operation; if the total operation cycle is set to "Cc > 0", when the end of operation, the lower row of the display screen shows "End", and the Buzzer beeps continuously. Modification of the total number of cycles and segments should be carried out at the end of operation.
For example, if you need to control the temperature of three sections, the setting temperature of the first section is 30.0 ℃ and the running time is 10 minutes; the setting temperature of the second section is 50.0 ℃ and the Running time is 20 minutes; the setting temperature of the third section is 20.0 ℃ and the running time is 30 minutes; and the operation is stopped after five cycles.

The setting method is:
The first step, in the stop state, enter the cycle and segment number setting (password 1), set Cc = 5; SEn = 3;
In the second step, set SP01=30.0; St01=10; SP02=50.0; St02=20; SP03=20.0; St03=30;**5.**

Temperature measurement abnormal alarm

If the second row of the display window displays “----”, it indicates that the temperature sensor is faulty or the temperature exceeds the measurement range or the controller itself is faulty. The controller automatically turns off the heating output, the buzzer sounds continuously, and the alarm light is always on, please carefully Check the temperature sensor and its wiring.
When the upper limit is over-temperature alarm, the buzzer sounds and the beep sounds, the “🔔” alarm light is always on, and the heating output is turned off; when the lower deviation over-temperature alarm occurs, the buzzer sounds and the beep sounds, and the “🔔” alarm light flashes; If the over temperature alarm is generated due to changing the temperature setting value, the "🔔” alarm light does not light and the buzzer does not sound.

7. When the buzzer sounds, press any key to silence.

parameter and setting of internal parameters
In the normal display state, long press the [SET] button for 3 seconds, the second row of the display window displays the password prompt "Lc", and the third row displays the password value, through [Add], [Decrease] and [Shift] Modify to the required password value. Then click the [Set] button. If the password value is incorrect, the controller will automatically return to the normal display state. If the password value is correct, it will enter the internal parameter setting state, and then click the [Set] button to modify each parameter in turn. Press and hold the [SET] button for 3 seconds to exit this state and the parameter values are automatically saved.
Internal parameter table -1

Internal parameter table -2

Parameter	parameter name	Parameter function description	(range) factory value
Lc	Password	“Lc=9”	0
ndA	Temperature Alarm mode	0: Only temp.over deviation alarm 1: there is Temp. up and down deviation over Temp. Alarm at the same time	(0～1) 0
FCH	Fan type	0: long axis fan; 1: short axis fan Note 1	(0～1) 0
ndc	compressor Way of working	0: The compressor only works intermittently; 1: The compressor judges the balanced or intermittent operation of the compressor according to the value of CP (see below); 2: The compressor judges the balanced or intermittent operation of the compressor according to the value of Htd (see below).	(0～2) 0
CP	Compressor working mode fixed switching point	When "ndc=1", If the "temperature set value ≥ CP", the compressor works in an intermittent manner, and vice versa.	(0～200.0℃) 30.0
Htd	Compressor working mode automatic switching point	When "ndc=2", If "temperature set value ≥ ambient temperature + Htd", the compressor works intermittently, and vice versa.	(-50.0～50.0℃) 0.0
AnP	Prohibit compressor Working temperature point	When "temperature measurement ≥ AnP", the compressor is absolutely prohibited.	(0～200.0℃) 60.0
CnP	Do not open the compressor Working temperature point	When "temperature set value ≥ CnP", the compressor is turned on only when the temperature measurement value is higher than the temperature set value.	(0～200.0℃) 42.0
Hn	Timing unit	0: minute timing; 1: hour timing	(0～1) 0
SPd	Constant temperature deviation	The temperature measurement value is within the range of SPd from the set value, and enters the constant temperature phase. Note: When this value is 0, the timing does not need to judge the constant temperature condition.	(0～50.0℃) 0

EST	End of program Prompt time	When the program ends, the buzzer prompts for the time. Note: When "EST=9999", it means permanent prompt.	(0～9999 秒) 60
nP	Maximum power output	The maximum power percentage of the heated output.	(0～100%) 100
Lco	Low temperature control Heat off deviation	When the "temperature measurement value ≥ temperature set value + Lco", the heating output is turned off. Note 2	(-10.0～10.0℃) -0.5
SPL	Minimum temperature Set value	The minimum value of the temperature set point.	(-90.0～50.0℃) 0.0
SPH	Maximum temperature Set value	The maximum value of the temperature set point.	(SPL～200.0℃) 80.0

Note 1: If the fan used in the equipment causes the temperature of the controlled object to rise due to its own heat, please select the short-axis fan.

Note 2: Only valid when the compressor is working intermittently and "temperature set value <ambient temperature".

Internal parameter table -3

Parameter	**parameter name**	**Parameter function description**	**(range) factory value**
Lc	Password	LC=18	0
Ht	Ambient temperature	Display the ambient temperature of the current controller	
HPb	Ambient temperature Deviation correction	HPb = actual ambient temperature - display ambient temperature Ht value	(-50.0～50.0℃) 0

Internal parameter table -4

Parameter	**parameter name**	**Parameter function description**	**(range) factory value**
Lc	Password	LC-27	0
ndH	Alarm relay function selection	0: The alarm relay is an alarm output function; 1: The alarm relay is a timing end prompt function.	(0～1) 0

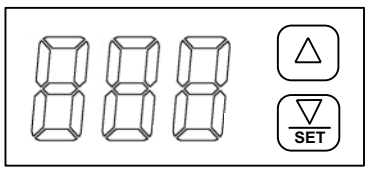
ndu	Relay Operating mode	0: Work according to the set value: When the "temperature set value ⩾ dP", the relay normally opens. At the "temperature set value <dP", and the "temperature measurement value <dP+3.0 ° C" relay is normally open. 1: Working according to the measured value: When the "temperature measurement value ⩾ dP", the relay normally opens. The relay normally opens at the "temperature measurement value <dP". 2: Solenoid valve pressure relief function, duL and duH values are valid.	(0～2) 0
dP	Demarcation point	The temperature indexing point is selected according to the ndu parameter.	(-90.0～200.0℃) 15.0
duL	Pressure relief solenoid valve Start threshold	When the compressor is working in a balanced mode, if the “temperature measurement value ⩽ temperature set value + duL”, the pressure relief solenoid valve is activated; When the compressor is operating in the open mode, if the compressor stops working, the pressure relief solenoid valve is activated.	(-5.0～0.0℃) 0.0

duH	Pressure relief solenoid valve Closing threshold	When the compressor is working in a balanced mode, if the “temperature measurement value ≥ temperature set value + duH”, close the pressure relief solenoid valve; When the compressor is operating in the open mode, if the compressor starts to work, close the pressure relief solenoid valve. Note: When the compressor is working in a balanced mode, if “duL=0” and “duH=0”, the pressure relief solenoid valve is always closed.	(0.0～5.0℃) 0.0
ndF	Evaporator Defrosting method	0: no defrosting function; 1: electromagnetic valve defrosting; 2: electric heating tube defrosting; 3: double electromagnetic valve defrosting;	(0～3) 0
FSv1	Defrost Interval point one	When the "temperature set value ≤ FSv1", it is the first interval of defrosting.	(-90.0～200.0) 8.0℃
dT1	Defrost interval 1	The defrosting interval of the first interval of defrosting. Note: 0 means no defrosting in this section	(0～240 小时) 12
FT1	Defrost time 1	The defrosting opening time of the first interval of defrosting.	(0～600 秒) 30
FSv2	Defrost Interval point 2	When the "temperature set value ≤ FSv2", it is the first interval of defrosting.	(-90.0～200.0) 16.0℃
dT2	Defrost interval 2	The defrosting interval of the second interval of defrosting. Note: 0 means no defrosting in this section	(0～240 小时) 24

FT2	Defrost time 2	The defrosting opening time of the second interval of defrosting.	(0～600 秒) 30
FSv3	Defrost Interval point three	When "FSv2 <temperature set value ≤ FSv3", it is the third interval of defrosting.	(-90.0～200.0) 20.0℃
dT3	Defrost interval 3	The defrosting interval of the third interval of defrosting. Note: 0 means no defrosting in this section.	(0～240H) 48
FT3	Defrost time 3	The defrosting opening time of the third interval of defrosting.	(0～600S) 30

Parameter	**parameter name**	**Parameter function description**	**(range) factory value**
Lc	Password	“Lc=567”	0
rST	restore Factory default	0: Cancel the factory reset value; 1: Confirm the factory default value.	(0～1) 0

Digital Temperature Limiter Panel Instructions



Button function

1）【▲】: “INC” button. In the setting state, click this button to increase the set value. If you keep pressing this button, the value will increase continuously.

2) 【▼/SET】: “DEC” button. In the setting state, click this button to reduce the set value. If you keep pressing this button, the value will reduce continuously.
It has the setting function when modifying internal parameters.

1. Operation and using

1-1. When the controller is switched on, display window shows the version number for 2 seconds, then it starts running.

1-2. Alarm temperature setting

Under the normal state, window displays temperature alarm set value. Click the “INC” or “DEC” button, the set value starts flashing, at this point, the required temperature alarm setting can be modified through the “INC” and “DEC” button. About 2 seconds after stopping operation, the controller will return to the normal state, the set value will be saved automatically.

1-3. View temperature measurement

In the normal state, press the “INC” and “DEC” button for about 3 seconds, The right decimal point will light up. At this point, the window displays the measured temperature value. Click the “INC” or “DEC” button again, the controller will return to the normal state.

1-4. Over temperature alarm

In the normal state, when the temperature measurement exceeds the alarm temperature setting value, the window alternately displays " - A - " and alarm setting value, the controller will cut off the output automatically, the buzzer beeps.

1-5. Abnormal temperature measurement alarm

If the window show the prompt “**---**”, it indicates that the temperature sensor has faults or temperature exceeds the measuring range or the controller itself is faulty, the controller will cut off the output automatically, the buzzer will sounds continuously. Please check the temperature sensor and its wiring carefully.

1-6. When the buzzer sounds, press any button to mute.

2. View and set internal parameters

In the normal state, press the “INC” and “DEC” button for about 6 seconds, the window alternately displays "Lc" and password value, the required password value can be modified only by the “INC” button. Then click the “DEC” button, the controller will enter the internal parameters setting state. Press the “DEC” button for 3 seconds, it will return to the normal state, the set value will be saved automatically.

Parameter table

Prompt	Name	Function description	(Setting range) Factory value
Lc	Password key	When “Lc=3”, enter the next parameters.	0
Pb	Temperature deviation correction	It is usually used to correct errors in low temperature measurement. Pb = Actual value – PV	(-50～50℃) 0
PL	Temperature slope correction	It is usually used to correct errors in high temperature measurement. PK = 1000 × (Actual value – PV) ÷ PV	(-199～199) 0
SPH	Max set value	The maximum temperature set point value.	(0～400) 400

5.FAULTS AND TROUBLESHOOTING

Phenomenon	Cause analysis	Treatment
Power director does not show	Without power	Inspect the plug
	Fuse broken	Change fuse
Temp. Controller shows“□□□□”	Sensor broken	Change sensor
	Controller broken	Change controller
Evaporator frost or Chamber with frost	Open the door frequently when doing the Low-Temp. test	Over 50 degrees make dry and reduce open door
	Left hole with bad seal	Inject the inner hole by rubber
	Door opening	Close the door
Hard to make the Temp. down	Evaporator frost	Dry the chamber
	Environment Temp. too high	Down environment Temp.

	Fan works or not	Check fuse and fan
	Compressor works or not	Change Compressor
	Compressor works but not refrigeration	Check the cryogen Check the ice or oil block
	Specification mixed	Setting correct and restart
Temp. up continue	Evaporator frost	Dry the chamber
Abnormal Knocking	Circle Fans loose	Check and adjust
	Condenser, Fan, compressor loose	Check and adjust or contact with us
Bad evenness degree	Sample hot	Reduce sample quantity
	Evaporator frost、wind block	Dry the chamber、Restart
Controller instability	Power do not match	Change the Power
	Voltage instability	Make sure stability voltage
Hard make Temp. up	Over-Temp. setting too low	Adjust the Temp. correct
	Meter setting too low	Set the Temp. correct
	Meter heating director on but without input function	Change the meter
	Meter heating but the heater doesn’t work	Change the heater
	Fan doesn’t work	Change fan or fuse
	Sensor broken	Change sensor
Temp. over bigger than setting	Meter setting incorrect	Set again and the manual
	Heater working do not stop	Change Controller