User Manual

![DRAWELL - Artist of Science]

Please read operating manual before installation and operation.

Drawell International Technology Limited

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Thanks for purchasing the equipment, please carefully read the manual before operating.

1. General information

The incubator adopts adopts high efficiency, low consumption far-infrared heating technology, which has good effects on fast drying work and sample test. The product is widely used in laboratories of industrial, agricultural, medical and scientific research field. The heating temperature can be freely selected and the radiation performance is not degraded for long-term use, reliable and easy for operation.

2: Technical specifications

1) Power supply: AC 220V ± 10%; 50Hz ± 1%
2) Working temperature: Room temperature +10~300°C
3) Temperature fluctuation: ±1 °C
4)Temperature uniformity: ±3% °C
5) Far infrared radiation wavelength: 2.5~6μm
6)Spectral emission coefficient: 0.92

3. Operation

1.Place the sample in the chamber, close the inner glass door and the outer door, open the cover on the top of the incubator in half.
2. Turn on the incubator,in order to shorten the heating time, turn the temp. switch to the second level.

4、1.Panel Instructions

Indicator definition:

1.Lock：it's lighted on in the lock screen state, otherwise it's off.

2. [At] : It flashes during temperature self-tuning, otherwise it's off.

3. [Alarm] :It's lighted when there is a temperature deviation or abnormal temperature measurement. When there is a low temperature deviation, this light flashes. Under normal conditions, the light is off.

4. [Heating]: It's lighted when there is heating output, otherwise it is off.

5. [A] : It's lighted when there is timing reservation, otherwise it is off.

6. [Run / Stop] : Only stop lighted after timingfinished,in normal status, Run is on.

7. [↑ / → / ↓] : Flashes during temperature rise, keep constant temperature and temperature drop.

Key definition:

SET: In the display of main interface, press this key to enter the temperature and time setting state, long press this key for 3 seconds to enter the internal parameter setting state.

【◄ /AT】: Press this key in the setting state to shift and modify to set value.

In the display of main interface, long press this key for 6 seconds to enter

the temperature self-tuning state.

▼/RES : In the setting state, click or long press this key to decrease the set value.

at the end of operation main interface, long press this key for 3 seconds

to restart operation.

:Add / lock the screen: Click or long press this key in the setting state to increase the set

value,If the screen lock function is selected, click this key to lock or unlock the

【▲/🔒】 screen at main interface .

IV. Operation Method

1. General information for use

1) Put the sample to be dried into the drying oven and close the door.

2)Set the required working temperature and working time according to the operating instructions of the temperature controller.

3)The equipment will automatically work under the settings. When drying process finished, turn off the power and take out the articles.

If the operating temperature is too high (higher than 70 ℃), please wait until the equipment is cooled before taking out the articles.

2. Setting for temperature and time

1) Temperatue set without timing function:

Press "Set" key to enter the temperature setting state, the upper PV row shows the current actual temp. and the lower SV row displays the temperature setting value, modify to the required setting value by AT, increase and decrease key; then press the "Set" key again,keep"0000" at time zone, press set key agin to exit the setting state and the modified temp.setting value will be saved automatically.

2）With timing function:

Press "Set" key to enter the temperature setting state, the upper PV row shows the current actual temp. and the lower SV row displays the temperature setting value, modify to the required setting value by AT, increase and decrease key; then press the "Set" key again to enter the time setting state, the TIME zone displays "0000",modify to the required time by AT, increase and decrease key. After time setting,press "Set" key again to exit the setting state, the modified setting value will be automatically saved.

When the time is set as "0000", it means there is no timing function and the instrument runs continuously and the temperature setting value is displayed in the lower row. When the setting time is not "0000", the operation time is displayed in the lower row, when the timing finished, the instrument stops working, "End" will displayed on the screen and the buzzer sounds. After the timing operation, long press the "decrease/RES" key for 3 seconds to restart the operation.

3) Abnormal temperature measurement alarm

If "----" is displayed on the upper PV zone, it means that the temperature sensor is faulty or the temperature exceeds the measuring range or the instrument itself is faulty, the instrument automatically stops heating, the buzzer continuously sounds and the alarm light is always on. Please carefully check the temperature sensor and its cables.

4) The instrument will alarm when over temperature, the buzzer beeps, "ALM" light is always on and stop heating. When lower temperature deviation, the buzzer beeps and "ALM" light flashes. If over temperature alarm caused due to change of temperature setting

value, the "ALM" lights on, but the buzzer does not sound.

5)When the buzzer sounds, press any key to silence.

6) "Shift" key: Press this key in the setting state to make the set value shift for modification; long press this key for 6 seconds to enter the temperature self-tuning selection state in the normal display state.

7) "Dec" key: Press this key to decrease the setting value in the setting state, long press this key for continuous decrease the setting value. In the normal display state, when the timing operation is finished, long press this key for 3 seconds to restart the operation.

8) "Inc" key: Press this key to increase the setting value in the setting state step by step, long press this key to make the setting value continuously increase. Press this key to turn on or off the backlight of the LCD screen in the normal display state.

V: System self-tuning

When the temperature control effect is not ideal, the system can be self-tuning. In the process of self-tuning, the temperature will have a large overshoot. Please carefully consider this before the user carries out the system self-tuning.

Long press the "shift" key for 6 seconds in the non setting state to enter the system self-tuning selection state. The upper row displays "AT, the lower row displays "OFF", can select the display to "on" or "off" by increase or decrease key. When "on" is displayed, press "Set" key to enter the system self-tuning state ,【AT】 indicator flashes and the self-tuning is performed. When self-tuning completed, 【AT】indicator stops flashing, the controller will get a better set of PID parameters and the parameters will be automatically saved. Long press the "shift" key for 6 seconds to stop the self-tuning.

In the process of system self-tuning, if there is upper deviation over temperature alarm, "ALM" light is not on and the buzzer does not sound, but the heating alarm relay will be automatically disconnected. The "set" key is invalid during system self-tuning. In the process of system self-tuning, whether there is constant temperature time setting or not,

the lower row always displays the temperature setting value.

VI. Setting for temperature parameters

Long press the setting key for 3 seconds, the password prompt "LC" will be displayed on the upper row and the password will be displayed on the lower row. Modify to the required password through the increase, decrease and shift keys, then press setting key again, if the password is not correct, the instrument will automatically return to the normal display state. If the password is correct ,will enter the internal temperature parameter setting state. Click the setting key again to modify each parameter in turn. Long press the setting key for 3 seconds to exit the state and the setting parameters will be saved automatically. See the table below for details:

Internal parameter table

Symbol	Name	Description	Factory set value
Lc	Password Lock	The parameter value can be viewed and modified when "LC = 3"	0
ALH	Over temperature alarm	when "temperature measurement value > temperature setting value + HAL, there will be upper deviation overtemperature alarm	(0～100.0℃) 20.0
ALL	Lower deviation temperature alarm	When the temperature measurement value < temperature setting value - ALL, there is a lower deviation temperature alarm	(0～100.0℃) 0
P	Proportional	Time proportional function adjustment.	Note 1
I	Integral time	Integral action adjustment.	(1～2000 seconds) 200
d	Differential time	Differential action regulation	(0～1000 seconds) 200

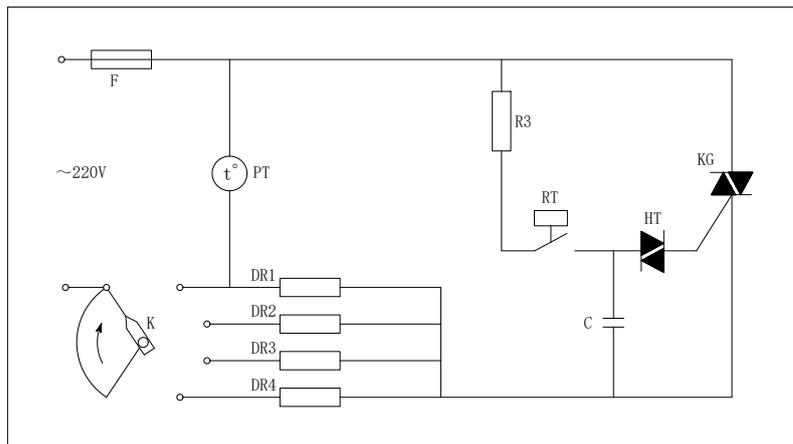| T	Control time	Heating control time	(1～60 seconds) Note 2
Pb	Correction of temperature measurement deviation	It is usually used to correct the error in low temperature measurement.	(-50.0～50.0℃) 0
PL	Temperature measurement slope correction	It is usually used to correct the error in high temperature measurement. PL = 1000 * (actual temperature value - instrument measurement value) ÷ instrument measurement value	(-999～999) 0
Addr	Communication	Reservation, invalid.	(1～32) 1
Loc	Setting Lock	0: the temperature or time setting value can be modified;	(0～1) 0

Note 1: CU50 type: (0.1-100.0 ℃) 20.0; others: (0.1-300.0 ℃) 35.0

Note 2: the factory default value of the relay output control cycle is 20 seconds, others are 5 seconds.

List of specifications

Model	DW-LIO-300	DW-LIO-400	DW-LIO-500	DW-LIO-600
Packing size(cm)	64×50×60	73×53×69	78×69×80	88×73×95
Chamber size(cm)	35×35×35	45×40×45	50×50×55	60×60×70
shelf	2	2	3	3
Input Power W	1400	2000	2800	4000

6、Electrical diagram

K: Temp. Switch   KG: Two-way thyristor

PT: Temp. controller   F: Fuse tube

HT: Two-way trigger.   DR1-DR4 :Heater

R3: Resistor   C：Capacitor

7、 Matters needing attention ：

1. The drying oven shell must be effective grounding, to ensure the safety in use.

2. The drying oven should be placed in good indoor ventilation, around its do not place flammable items.

3. The drying oven no explosion-proof device, and may not be in the inflammable and explosive goods and dry.

4. Items placed in the not too crowded, especially surrounding the temperature sensor, must make room, hot air circulation.

5. Box should be always kept clean inside and outside, not for a long time should be set good plastic dust cover, put in the dry room.

6. Use of the abnormal phenomenon, please cut off the power supply and promptly get in touch with our company!

8、Fault handling：

phenomenon	principle	Deal
No resource	No power supply socket	Replace the socket
	Good is not plugged in or disconnected	Insert the plug or good pick up line
	Fuse open	Change the fuse
	The power switch is not closed	Close the power switch
The temperature in the cabinet does not rise	Set temperature low	Adjust the set temperature
	Electric heater is bad	In electric heater
	Temperature controller is bad	Change the temperature controller
	The temperature sensor cable is loose	Tighten the sensor connecting nut
The great error in the set temperature and the temperature in the cabinet	Temperature sensor is bad	In the temperature sensor
Temperature is out of control	Temperature sensor is fixed	Fixed temperature sensor
	Temperature controller is bad, silicon controlled rectifier	In the temperature sensor, silicon controlled rectifier

9、 After-sales service

Our company guarantees the incubator (repair, replacement or return), warranty period is one year (in addition to the heating element). Warranty for damage occurred all non-artificial factors or doesn't work, our company is responsible for free repair or replacement parts; After a year in line with the spirit of service to users, try our best to provide convenience for the user.

Packing list

Item No.	Description	Category	Unit	Qty.	Remarks
1	Far Infrared Fast Drying Oven	Main body	pc	1	
3	This manual	Document	Copy	1	
4	Warranty	Document	Copy	1	
5	Quality certificate	Document	Copy	1	
6	Packing list	Document	Copy	1	
7	fuse	Spare parts	pc	1	

The items listed in the packing list are in accordance with the actual parts packed in the carton..

Packing & QC:

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