

# DH Series INCUBATOR

(Intelligent PID temperature controller)

## User Manual



# **1.Safety warning before use**

- 1.Do not store volatile, flammable or explosive materials in the equipment, otherwise it may cause explosion or fire.
- 2.Do not place the equipment in a place that is wet, wet or may splash water, otherwise it may lead to accidents such as leakage, short circuit or electric shock.
- 3.Non-professional technicians shall not disassemble, repair or modify the equipment, otherwise it may cause fire or electric shock accidents due to improper operation.
- 4.The equipment should be installed on a solid ground. If the ground is not solid enough or the installation site is not suitable, injuries may be caused by the equipment tipping over.
- 5.The equipment should be installed on a solid ground. If the ground is not solid enough or the installation site is not suitable, injuries may be caused by the equipment tipping over.
- 6.Before any repair or maintenance of the equipment, be sure to disconnect the power supply to prevent electric shock or personal injury.
- 7.Be sure to wear gloves when performing equipment repair or maintenance to prevent injury caused by touching edges or sharp corners.
- 8.If the equipment is found abnormal operation, immediately unplug the power plug, stop the operation of the equipment. Operation under abnormal conditions may cause electric shock or fire.

# **2.Main features of product**

1. Natural convection circulation of hot air in the product studio, large area of mica electric film heating at the bottom, uniform temperature distribution in the working room.
2. Digital tube display microcomputer intelligent PID temperature controller, with over temperature alarm, sensor fault alarm, fixed value operation, timing operation, deviation correction, menu lock and other functions.
3. New panel 5° inclination design, new glass inner door knob switch, comfortable and convenient operation.
4. Double-layer door structure, the inner door adopts high-quality tempered glass to facilitate the observation of samples, the outer door adopts magnetic rubber strip, easy to open and close, good sealing, with the function of opening and closing.
5. The studio is made of high-quality mirror stainless steel or high-quality anti-corrosive galvanized sheet, and the corner arc transition is easy to clean.

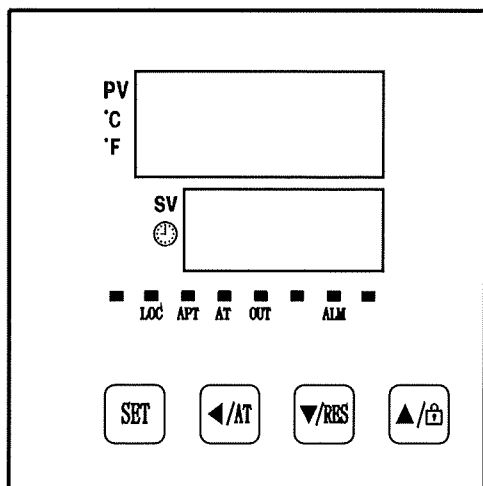
### 3. technical specification

Model		DH3600 II		DH4000 II	DH5000 II	DH6000 II	
		DH3600B II		DH4000B II	DH5000B II	DH6000B II	
Cycle Mode		Natural convection					
Funct ion	Temp. Range		RT+5-70℃				
	Temp. Resolution Ratio		0.1℃				
	Temp. Motion		±0.5℃				
	Temp. Uniformity		±1.5℃				
Struc ture	Inner Chamber		B :mirror stainless steel; without B : High strength galvanized sheet				
	Outer Shell		Cold rolling steel electrostatic spraying exterior				
	Insulation layer		High quality foam board				
	Heater		Mica electrothermal film				
	Power Rating		0.35kW	0.45kW	0.6kW	0.7kW	
	Exhaust hole		φ35mm top with function of test hole				
Contr oller	Temp. control mode		PID Intelligent				
	Temp. setting mode		Touch button setting				
	Temp. display mode		Measuring temperature: LED upper row; setting temperature: the lower row				
	Timer		0-9999min (with timing wait function)				
	Operation function		Fixed temperature operation, timing function,auto stop.				
	Additional function		Sensor deviation correction, temperature overshoot self-tuning, internal parameter locking, power-off parameter memory				
	Sensor		PT100				

Safety device		Over temperature sound-light alarm			
Specification	Inner Chamber size(W*L*H)(mm)	350*350 *350	400*350 *450	500*450 *550	600*580 *600
	Exterior size (W*L*H)(mm)	525*480 *620	575*480 *720	675*580 *820	775*710 *870
	Packing size (W*L*H)(mm)	595*562 *795	645*562 *885	745*662 *990	845*792 *1040
	Volume	45L	65L	125L	210L
	Shelf number	7	10	13	14
	Load per rack	15kg			
	Shelf space	35mm			
	Current rating	AC230V/ 1.1A	AC230V/ 1.1A	AC230V/ 2.3A	AC230V/ 2.7A
	NW/GW (kg)	27/40	32/45	45/60	55/70
Accessory	Shelf	2			
optional accessories		Shelf			

## 4. Instrument operation and display instructions

The panel indication



#### Key defines

1. **【Set】** : Set key, in the main screen state, click this key to enter the temperature and time target value Setting state, long press this key for 3 seconds to enter the internal parameter Setting state.
2. **【◀/AT】** : Shift / Auto-tuning, in the Setting state, click this key to change the Setting value. In the main screen state, long press this key for 6 seconds to temperature auto-tuning selection state.
3. **【▼/RST】** : Decrease / rerun key. In the Setting state, click or long press this key to decrease the Setting value. In the main screen state, long press this key for 3 seconds to restart the run.
4. **【▲/LCK】** : Increase / lock screen key. In the Setting state, click or long press this key to increase the Setting value. In the main screen state, click this key to lock or unlock the screen.

#### LED indicator Defines

1. **【AT/F】** indicator : The lamp will be on when the temperature unit is degree Fahrenheit .The lamp will flash in auto-tuning, it will flash. In other states, it will be off.
2. **【TIM】** indicator : The lamp will be on when there is a timing Setting, it will flash in reservation timing, it will be off when no timing function.
3. **【OUT】** indicator : The lamp will be on when there is heating output , otherwise it will be off.
4. **【LOC】** indicator : The lamp will be on when the screen is locked, otherwise it will be off.
5. **【SIN】** indicator : Invalid reservation
6. **【ALM】** indicator: The lamp will be on when there is temperature deviation alarm or abnormal temperature measurement. It will flash when there is temperature deviation alarm. Under normal condition, it will be off.

#### V. Operations and usages

##### 1. Controller power on display

After all the display are on for about 3 seconds, PV area displays SV displays version number for about 1 second and then enters the normal display state.

##### 2. Reference and Setting of temperature and time

###### 1) No-timing function:

In the main screen state, click the **【Set】** to enter the temperature Setting state, the PV area displays prompt SP, and the SV area displays the temperature Setting value, which can be modified to the required Setting value through the **【shift】**、**【increase】**、**【decrease】**, then click the **【Set】** to exit the Setting state, and the Setting value will be saved automatically.

###### 2) Timing function:

In the main screen state, click the **【Set】** to enter the temperature Setting state, the PV area displays the prompt SP, the SV area displays the temperature Setting value, and the modification method is the same as above; then click the **【Set】** to enter the time Setting state, the PV area displays the prompt ST, TIME area displays the time Setting value; then click **【Set】** to exit the Setting state, and the Setting value will be saved automatically.

When the Setting time is "0", it means continuous operation. When the Setting time is not "0", before the timing starts, if the timing direction is count-down, the TIME area will display the timing time; if the timing is count-up, the TIME area will display "0". When the timing starts, "indicator" will flash. When the time is up, the operation will end. The TIME area will display End, and the buzzer will beep for EST seconds (see 7. Parameter TABLE-1). At this time, long press the **【decrease】** for 3 seconds, the operation can be restarted.

##### 3. Reservation function (see 7. Parameter TABLE-6)

When an reservation time is Set, heating operation is prohibited.

1) PC-D9000 type: In reservation timing, A indicator flashes, and the count-down TIME area displays the reservation running time.

2) PC-E9000: In reservation timing, TIM indicator flashes, and the count-down TIME area

displays the reservation running time.

4. Abnormal temperature measurement alarm

If the PV area displays "----", it means that the temperature sensor is faulty or the temperature exceeds the measuring range or the controller itself is faulty. The controller will automatically disconnect the heating output, the buzzer will sound continuously and the alarm light will be on. Please check the temperature sensor and its wiring carefully.

5. Deviation over temperature alarm (see 7. Parameter TABLE-1)

6. When the upper deviation over temperature alarm occurs in process, the buzzer beeps, the alarm light is continuously on, and the heating output is disconnected. When the lower deviation over temperature, the alarm will occur and flash. If the over temperature alarm is generated due to changing the temperature Setting value, the alarm light will be on, but the buzzer will not sound.

7. Lock screen function.

8. Three screen locking modes are provided. See [7. Parameter TABLE-1] for details.

9. Password unlocking: In the lock screen state, click the **【increase】**, the input password prompt PA is displayed in PV area, and the password is displayed in SV area. After entering the correct password, click the **【Set】** to unlock.

10. 7. When the buzzer sounds, press any keys to silence.

11. VI. Auto-tuning system

12. When the temperature control effect is not ideal, the system can be auto-tuning. There will be a large overshoot in the process of auto-tuning. Please take this factor into consideration before system auto-tuning.

13. In the running state and the main screen state, long press the **【shift】** for 6 seconds to enter the system auto-tuning selection state. The PV area displays the auto-tuning prompt AT, and the SV area displays "0". You can click the **【increase】** or **【decrease】** to select the display "1", and then click the **【Set】** to enter the system auto-tuning state. The AT light flashes. After the auto-tuning is completed, the AT light stops flashing. The controller will get a better set of PID parameters and save them automatically. In the process of system auto-tuning, long press the **【shift】** for 6 seconds to stop the auto-tuning program.

In the process of system auto-tuning, if there is an over temperature alarm of upper deviation, the alarm light will not be on and the buzzer will not sound, but the alarm relay will be automatically disconnected. In the process of system auto-tuning, the **【Set】** is invalid.

**VII. Seven The internal parameters of the temperature are seen and Set.**

In the main screen state, long press the **【Set】** for 3 seconds, the password prompt LC will be displayed in PV area, and the password will be displayed in SV area. Modify the required password through **【increase】**、**【decrease】** and **【shift】**, and then click the **【Set】**. If the password is incorrect, the instrument will automatically return to the main screen state. If the password is correct, enter the internal parameter setting state, and then click the **【Set】** to modify each parameter in turn. In this process, long press the **【Set】** for 3 seconds to exit this state, and the parameter value will be saved automatically. See the table below for details:

**Parameter TABLE-1**

The Indicat	Parameter Name	Description of the parameter function	(Range) Initial value
Lc	Password.	Lc=3, parameter values can be viewed and modified	0

<b>ALH</b>	Upper Deviation Over-temperature Alarm	$PV > SP + ALH$ , over-temperature alarm of upper deviation	(0~100.0℃) 20.0
<b>ALL</b>	Lower Deviation Over-temperature Alarm	$PV < SP - ALL$ , over-temperature alarm of lower deviation <b>Description: ALL=0, the lower deviation alarm is invalid</b>	(0~100.0℃) 0
<b>Pb</b>	Temperature Measurement Deviation Correction	Used to correct errors in temperature measurement. $Pb = \text{Actual temperature} - PV$	(-50.0~50.0℃) 0
<b>PL</b>	Temperature Measurement Slope Correction	It is commonly used to correct errors arising from high temperature measurement. $PL = 1000 * (\text{Actual temperature} - PV) \div PV$ <b>Description:</b> <b>In Parameter 【TABLE - 4】 , En = 1</b>	(-999~999) 0
<b>ndT</b>	Timing Mode	0: No-timing; 1: Constant temperature timing; 2: Run timing.	(0~2) 1
<b>Tdn</b>	Timing Direction.	0: Count-up; 1: Count-down	(0~1) 0
<b>Hn</b>	Time Unit.	0: Minute; 1: Hour	(0~1) 0
<b>SPd</b>	Constant Temperature Deviation	$SP - SPd \leq PV \leq SP + SPd$ , Enter a constant temperature state.	(0.1~50.0℃) 0.5
<b>EST</b>	End Timing Prompt Time	When the timing is over, the buzzer will prompt the time. Note: EST = 9999, indicates a permanent prompt.	(0~9999s) 60
<b>EH</b>	End Timing Constant Temperature Controller	0: Turn off the heating output after timing; 1: Keep constant temperature controlling after timing	(0~1) 0
<b>LF</b>	Lock Screen Function	0: Lockless screen function; 1: Lock screen function, unlock without password. 2: Lock screen function, need password to unlock	(0~2) 0
<b>LdT</b>	Lock Screen Delay	In the main screen state, if no key is pressed in the delay LDT time, the controller will automatically lock the screen. <b>Description: LDT = 600, the delay screen locking function is invalid</b>	(10~600s) 30
<b>PAd</b>	Unlock Password	The password must be entered to unlock it.	(0~9999) 1
<b>Add</b>	Mail Address	Local Address <b>Description:</b> PC-E9000 has no communication function.	(1~32) 1

Argument TABLE -2

The Indicator	Name	Description of the parameter function	(Range) Initial value
Lc	Password	Lc=567,parameter values can be viewed and modified	0
rST	Factory Reset	0:Cancel; 1: Confirm	(0~1) 0

## 5. Instrument wiring diagram

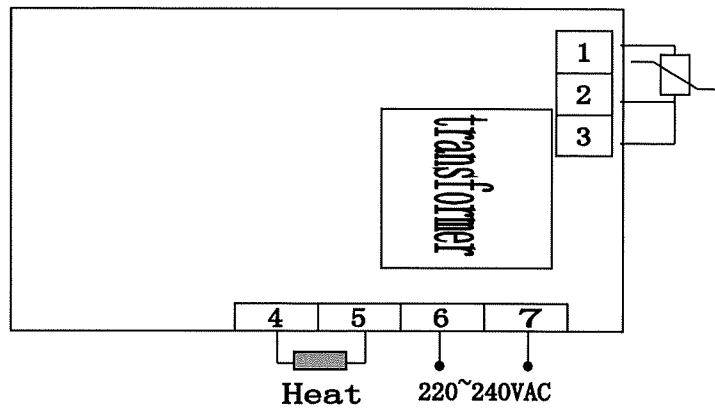


Figure 1 (TS-1xx0)