



Operation Manual



BIGP-502

General Purpose Incubator

Thank you for Choosing Biolab products. Please read the “Operating Instructions” and “Warranty” before operating this unit to assure proper operation.

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01 The applicability

The new desk-style constant temperature incubator box, which integrated the company's experience for many years, having the properties of high quality, reliability and safety, adopting the manner of air forcing convection with the blower fan, giving help to the scientific research and the production, and providing the most credible guarantees.

02 The technology parameters

Mode	BIGP-502
Power Voltage	AC220±10% 50-60HZ
Range of Controlling Temperature	RT (room temperature) +5°C -- 65°C
Precision of Controlling Temperature	±0.5°C
Output Power	1500W
Volume	620L
Working Size(mm)	840×600×1355
Appearance Size(mm)	980×800×1800

Note:

1. The technology indexes are measured under the condition of 25°C, the relative humidity less than 85% and the constant temperature working;
2. The measuring temperature in door should adopt the mercury thermometer with $\pm 1^\circ\text{C}$, and the mercury sensing temperature head should be place on the geometry center of the workshop.

03 Properties and function of the product

1. Controlled by the microcomputer, having the alarming function when the temperature exceeding.
2. Mirror faces stainless internal bladder, the heating manner with the electrothermal film, quickly heating.
3. Adopting the silicon rubber gland strip there is the glass window on the inner side of the outer door for the convenience of watching. When opening the door of the box, the micro cycling heating will stop, having no the defections of overshoot.
4. The blower fan has the function of automatically changing the rotating speed, which avoiding the static difference as well as delaying the working life.

04 Configuration and operating temperature

Electrothermal constant temperature incubator box (next called the incubator box) is made up of five parts of the body, internal ladder (working room), heating, controlling temperature, and the air cycling. The body is made of the excellent cold rolling board, the surface spraying plastic handling is made, has the bright-color. The internal ladder adopts the semi circular arc internal angel made of the mirror surface stainless steel for the convenience of cleaning, the height of the shelf of the internal ladder could be adjusted, using easily. The fiberglass is filled between the body and the internal ladder to improve the heat insulation and preservation. The heater is made of the electric film which distributing symmetrically on the outer the around the internal ladder which making the production having the character of quickly heating. The blower fan is installed on the back of the internal ladder, together with one wind road board on the back of the working room, which makes the cold and heat air quickly cycle in the working room and improve the degree of uniformity. The controlling temperature function is implied by the controlling temperature instrument, the controlled silicon power tube, and the platinum resistance temperature sensor and so on, those are all

installed on the left and back for the convenience of operating; when the temperature produces the signal of measuring the temperature (resistance value) and inputs into the controlling temperature instrument, comparing with the set signal value, and making the positive warp, then spring the controlled silicon to conduct, and the heating film is heated. When the warp is removed or the negative warp occurs, there is no output on the controlling instrument, and the electrothermal film will not be heated, and then get the aim of controlling the temperature. To improve the precision of the controlling, the digital circuit having the function of PID adjusting is adopted on the controlling temperature instrument, which having the excellence of small volume, high precision, reliability of using, and long working life. On the lines and designs, there are the functions of overriding temperature alarming (cutting the heating output at the same time) and high temperature (when exceeding 70°C in the box, automatically cutting off the temperature delay for heating) safeguard, etc. there are the functions of correcting the linear of the controlling temperature system and adjusting the output function values, etc.

05 Operating method

The procedures of operating:

1. The operator must carefully read the operating specification, and known and familiar with the incubator, and then make the operation.
2. When operating the equipment, the requirement to the surrounding temperature:
 - A. Surrounding temperature: 5 ~ 40°C;
 - B. There should be no the strong illumination, no violence causticity air, and the draught must be well and the relative humidity must be under 85%.
 - C. Using power: AC220±10%, 50-60Hz, should have the reliable power outlet to ensure that the common working and the safety.
3. After checking there is no damage in the transportation, the following operation procedures should be made:
 - A. After installing the equipment in position, if the table-board of the ground is not even, it should be leveled up.
 - B. Switching on the power: inserting the three cores power outlet into the socket, and adjusting the power switch on the console to the position of "ON", at this time, the power indicating light will be light, the number displaying will be on the temperature controller (PV display is to measure the temperature, and the SV is to set the temperature), which indicating the equipment has been the working state. When the left AL2 yellow lamplight, it indicates the blower fan is been the high speed working state.
 - C. If the setting temperature is 37°C, the heating lamp will be light, coming into the process of heating and temperature rising, after some time, the appearing value approach to the setting temperature, the heating lamp will light and ran out suddenly, repeating some times. In the common conditions, after heating for

90min, the temperature controlling will come into the constant temperature state.

D. When the required temperature is lower, the two times setting manner could be adopted, if the required temperature is 37°C, the first time, the 35°C could be set, and when temperature overshoot begin dropping, the second setting could be 37°C, which could reduce or stop the temperature overshoot, and come into the constant temperature state as quickly.

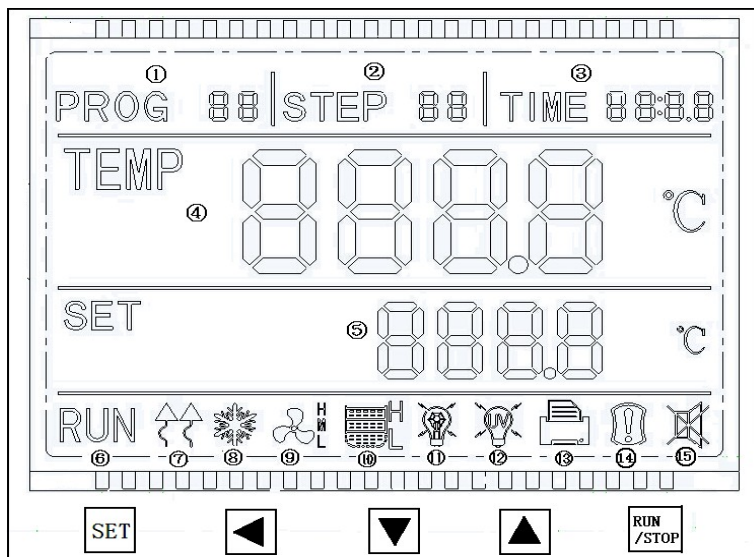
E. When opening the glass door and sampling, the heater and the cycling blower fan will stop, and when closing the glass window, the heater and the blower fan begin running in gear, which avoid the opening doors heating and closing door overshoot.

F. During the incubating, not open the glass inner door, especially opening the inner door for long time to affect the temperature in the box, unless placing or taking the things in the box. If opening or closing inner door of the box for a long time, the temperature will fluctuate, and this is natural.

G. According to the requirement, choosing the incubating time, after the incubating, turn the power switch to the "OF", if don't take the things away, please not to open the door of box.

06 Operating method to the intelligent temperature controller

1. Energization to start up



- 1). PROG area: Showing program work group or setup group.
 - 2). STEP area: Showing number of section in operation or parameter code
 - 3). TIME area: Showing running time and parameter value.
 - 4). PV area: Display measuring temperature.
 - 5). SV area: Display setting temperature.
 - 6). RUN: When the controller is working the light up, AT is flashing, stopping the lights off.
 - 7). Heating lamp: It lights up when the heating output.
 - 8). Cooling lamp: It lights up when the cooling output.
 - 9). Output and setup of circulating fan: when blinking, high, medium or low speed is set up; when lighting, high, medium or low speed output is achieved by the circulating fan in operation.
 - 10). Indication of water level: high indication stands for low water level.
 - 11). Illumination output: it lights when illumination output is available.
 - 12). UV output: UV sterilization lamp will light when output is available.
 - 13). Print function: it lights when print output is available.
 - 14). Alarm lamp: It lights up when alarm light.
 - 15). Mute indicator lamp: It lights up when the alarm and press any key mute.
- Key description.

1 SET key: Used to set the value to modify or enter the internal parameter settings, press set button for 2 seconds or more to exit the parameter setting in the state.

2 Shift: Used to set the value, internal parameter and check the room temp.

3 Reduce key: Used to set the value and modify the parameter or start/stop AT.

4 Add key: Used to set the value and modify the parameter or check the remaining period

5 RUN/STOP: Press 2 mins the controller will be start and stop.

2. Description of functions

1). After self-inspection of energization of the controller, Time area will show the time; PV on the LC screen will display the measured temperature while SV the set temperature under the standard state;

2). Setup of preset start time: when the controller is in a shutdown state, Kb parameter in the user's parameter area is set as 1 first and after returning to the standard interface, click and press SET key, TIME indicator will blink, prompting setup of the preset time. After setup of the preset time by pressing shift key, plus key or minus key, confirm by pressing SET key and start as preset. The time display area will blink between the countdown time and End repeatedly. After the countdown time becomes 0, auto-start will be set up in line with KA of the user's parameter area (After preset start is launched, KA parameter cannot be set as 0, otherwise when preset time is up, shutdown state will remain).

3). Setup of program section: when controlling for the program, click and press SET key and then PROG lights, the first bit of PROG area will blink; select the setup group to be revised by pressing plus or minus key and then click and press SET

key, PROG will blink, STEP will display 1, prompting what is revised is the parameter of Section 1 of the setup group. TIME area blinks, prompting revision of time; press plus or minus, shift key to adjust the setup time of Section 1 of the group; then click and press SET key once more and circulating fan will display area blinking, prompting revision of the circulating air volume of Section 1; press plus or minus key to set up the circulating air volume of the section as H high speed, M medium speed or L low speed or no fan; then click and press SET key and SV area will blink, prompting revision of the set temperature; press plus or minus, shift key to set up the set temperature of Section 1 of the group. Then press SET key again and the second number of STEP area is 2, prompting start of changing the program setting of Section 2. Then repeat the above-said methods to set up the time of each section of the group, circulating air volume and set value of temperature. If you press SET key constantly or not press the key for long, initial interface will come back automatically. If the time of Section 1 is set as 0, it will automatically be changed to irregular fixed value control; if the time of other section is set as 0, then the section will be an end section and the program will come to an end when operating to the section.

4). Selection of a work group: The SET can be selected only when in the shutdown state. Two methods are available to select a required work group. (1) In the standard state press SET key for 2 seconds to go in for setup of work group. Then the first bit of PROG and PROG area will blink. Press plus or minus key to set up a work group and press SET key to confirm exit. (2) In the user parameter area find GP parameter and revise it directly.

5). Switching of program and fixed value: If the controller has the program function, but the user requires fixed value control, three methods are available for fixed value control:

(1) The time of Section 1 of the work group is set as 0 and then the temperature of Section 1 will be the target temperature of fixed value, the output of circulating fan is the circulating air volume of Section 1. But the method has no timing function and the controller is in operation all the time.

(2) The work group is set to Group 8, namely, fixed value control. Then set up running time, target temperature and circulating air volume respectively.

(3) Press the shift key plus RUN/STOP for 3 seconds simultaneously and PROG indication will disappear, prompting the change from the program to fixed value control; then press the shift key plus RUN/STOP for 3 seconds simultaneously, PROG will display, prompting the change from fixed value control to the program control.

The above three methods have to be used in the shutdown state.

6). Setup of fixed value control: If the controller has the fixed value control function only, click and press SET key to set up time, circulating air volume and temperature respectively. If you press SET key constantly or not press any key for long, initial interface will come back automatically.

7). Door control function: when door control is turned on, all the outputs will be closed automatically. When turned on, door will be open; when turned off, door will be closed.

8). Auto-tuner function: If temperature control effect is not desirable, stare auto-tuner please. In the standard state, press minus key for over 5 seconds and the centigrade indicator light in PV area will blink and the controller enter into self-tuner. After the temperature goes through three fluctuations, self-tuner will come

to an end automatically. A new group of PID parameter will be obtained and the controller will exercise control by the new PID parameters. In auto-tuner operation, pressing minus key for long will permit an exit from auto-tuner. 9). When the controller is in a shutdown state under a standard mode, pressing shift and set keys for over 3 seconds will permit a switch from the program to the fixed value.

- The modification of the temperature controlling parameters

Due to the products have been strictly tested before leaving factory, it is not necessary of making modifying, but it will bring the error of displaying value of temperature and the actual temperature in the box under the condition of the first using, or the using in the wicked surrounding, or the temperature changing before and after using, if it exceeds the technology index range, the specific modifying Pb.

10. Setup of internal parameters

In the standard state, press SET key for long and LCD screen will display LK code. Setting a password will permit entry to the parameter setup stratum interface.

(1) When LK shows up in the output area of LCD screen, pressing plus or minus key to make LK=3, clicking and pressing SET key will permit entry to the user parameter stratum setup;

Prompting symbol	Name	Setting range	Description	Initial value
KA	Boot mode	0~1	when KA=0, after open the power, the controller in a stopped state, by long press star/stop key is up and running when KA=1, after open the power, the controller will be running ; when KA=2, running from last power began to run	
SE	Revision of RT	-80-80	When the actual RT differs from that shown by the controller, adjust the value accordingly.	
Pd/Pb	Zero point adjust (intersection)	-100-100 -100.0-100.0	When the zero error comparatively smaller and the full point error comparatively larger, to update this value should be needed. Ordinary for pt100, updating this value is rarely needed..	
PE/PK	Full point adjust(intercept)	-1000-1000 seconds	When the zero error comparatively larger and the full point error also comparatively larger, to update this value should be needed. PK=4000×(setting value-actual value)/actual value. For pt100 adjusting this value is need at first time.	

2) When LK shows up in the output area of LC screen, pressing plus or minus key to make LK=18, clicking and pressing SET key will permit entry to the user parameter stratum setup;

Sym bol	Name	Setting range	Description	Facto ry set value
AL/ AL	Alarming setting	0-Full Range 0.0-Full Range 1-	When temperature is beyond SP+AL, the ALM indicator turns on. The buzzer sounds and the heating power turn off.	
CL/ CL	Refrigeratio n control setting	0-Full Range 0.0-Full Range 2-	When the temperature less than SP+COL, the refrigeration point is turn on to drive the compressor.	with out this func tion
CT/ CT	Refrigeratio n control delay	(0~3600)s	When measured value reaches to alarm value, the alarm relay will not output before it passes CT time.	with out this func tion
P/P	Proportional Band	1-Full Range 1.0-Full Range	Proportional control action. If P is larger, then the gain of system is lower. It only use on the heating side.	
I/ I	Integral Time	0-3600 seconds	Integrated time constant. I larger, then the integrated action is smaller.	
D/d	Derivative Time	0-3600 seconds	Derivative time constant. D larger, then the derivative action is also larger D can overcome overshoot. I=0and D=0 is called half proportional control.	
Ar/Ar	Overshoot Control(re-setting)	1-100%	At on-off PID control, the value of Ar is a constant which equals 1.5-2times of the ratio of on time to the on-off period in the equilibrium state, In the half proportional control, the Ar equals coefficient/P.	
T/T	Heating period	1-300seconds	For the thyristor output it is about 1-3seconds.For those equipment that the superfluous power provided is comparatively larger, select larger T would decrease the stable error caused by PID control.	

Notes while using:

1. Due to the products have been strictly tested before leaving factory, it is not necessary of making modifying, you should check the precision of the incubator box and so on in the condition of the first using, or the

- reusing when not using for a long time, or the temperature changing in using, or the season changing.
2. When the working temperature in the box is set at 37°C, if the temperature of the surrounds is over than 32 °C, the incubator should better be placed the indoor surroundings with air condition surrounding which makes the working temperature is under 32°C.
 3. After setting, set the Lck to the 2, all data will be saved for a long time, at this time; the incubator comes into the rising temperature, the heating indicating lamplights. When the temperature indoor is closed to the setting temperature, the heating light will on or out suddenly, and repeat some times, the controlling comes into the rising temperature. After constant for 90 minutes, the temperature in box is basally stabilization.

07 Precaution and Maintenance

1. The outer shell of the incubator box must be grounding in effect to ensure the safety.
2. The incubator box should be placed indoor with good draught, and there should be not the tinder and the easily bursting things near it.
3. The incubator box has no the device defending exploding, and the tinder and the easily bursting things should not be placed in it.
4. The things placed in the box should not be over crowded, and some space must be remained for the convenience of the air cycling
5. The outer and inner of the box should be clear. If there is long time not using, the neutrality grease or the Vaseline should be brushed on the electroplated parts to preventing from rusting, the plastic anti air cover should be placed on the box, and place the incubator box in the dry room to avoid hurting the temperature controlling instruments for the humidity.
6. If the relative humidity in the incubator box is not enough when incubating, a water dish could be placed in it, and the water will vaporize naturally, the relative humidity will get 90%.
7. In summer, the surrounding temperature is relative high, when the setting temperature is lower than 40 °C, the air condition should be adopted to drop the surrounding temperature to remain 25°C ~ 28°C, to avoid the temperature losing controlling and producing the static difference.
8. The instrument should not be used in the condition of the high voltage, huge current, strong magnetic field to avoid interrupting the temperature controller and electric shocking;
9. When plating the parts and the surface painting, should remain clean, if not using for a long time, the neutrality grease or the Vaseline should be brushed on the electroplated parts to preventing from rusting, the

plastic anti air cover should be placed on the box, and place the incubator box in the dry room to avoid hurting the temperature controlling instruments for the humidity.

08 Trouble removal

S.N	Failure	Reason for presuming	The handing ways for failure
1	No power when starting	The power outlet has no current or badly connecting	Checking and repairing
		Coming line interrupting of power.	Changing it
		Switch of the power doesn't open or run	Open (closing) the switch, changing it
		Not installing the cartridge fuse or burn out	Installing the right cartridge fuse, and checking the reason, then starting after repairing
2	PV screen displaying....	The instrument or the sensor Pt100 does not work	Changing it, Pt100=0°C ,it is 100 Ω
3	The temperature not rising or after at some degree, not ring, but dropping	The setting temperature is lower the RT (surrounding temperature)	Resetting $SV \geq RT + 5\text{ }^{\circ}\text{C}$
		The timing of the instrument booting $T \neq 0$	Setting $T1=0$
		The inner glass window is closed, but not closing the switch of the door	Adjusting the inner door's locking
		The "heating light" temperature controller is on	The controlled silicon or the integrated piece does not work, changing it
		There is voltage between two sides of the heating tube	The connector of the heating tube is hurt or dropped.
		When over 60 °C, temperature suddenly not rising	The heat protection of the temperature relay, after nature cooling, it could restore.
4	Big difference of the displaying and actual temperature		Refer to the specification, and repair it.

5	Producing the static difference	Displaying temperature > setting temperature	Reducing the RT temperature, and modifying the "OUT-",
		Displaying temperature < setting temperature	Increasing the "OUT-"
		Blower fan does not run	Repairing it
		The sensor (Pt100) connects not well	Connecting it once more.
7	The noise of the motor is big	The vane of blower fan touching the wind way board	Placing the gasket to increasing the height.
		The motor is blocked or no grease	Change it
6	Temperature could not be controlled	The heating light of temperature controller is on and not off	Changing the temperature controller
		When heating light of temperature controller is off, but the temperature is still rising	Changing the dual controlled silicon BTA16



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