Operation Manual

BIGP-503

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-501	BIGP-502	BIGP-503
Power Voltage	AC 220±10% V 50-60HZ		
Range of Controlling Temperature	RT (room temperature) +5°C -- 65°C		
Precision of Controlling Temperature	±0.5°C		
Output Power	1100	1400	2200
Volume	420L	620L	1000
Working Size (mm)	640×585×1355	840×600×1355	1000×600×1600
Appearance Size (mm)	780×750×1880	980×800×1880	1140×800×2150

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 ±1°C, and the mercury sensing temperature head should be place on the geometry center of the workshop.

03 Properties and Functions 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 Principle

1. 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.
2. The body is made of the excellent cold rolling board, the surface spraying plastic handling is made, has the bright-color.
3. 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.
4. The fiberglass is filled between the body and the internal ladder to improve the heat insulation and preservation.
5. 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.
6. 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.
7. 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.

8. 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.
9. 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.
10. 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 kw on 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 thedraught must be well and the relative humidity must be under 85%;

C. Using power: AC220 V, 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. Temperature setting

(1) Pressing the button of the "Set" down, the instrument will be in the setting mode, at this time, the first position will be high light on the right of the SV window, and the other position will be glint.

(2) Pressing the moving button down to move the high light to the requiring position.

(3) Pressing the plus button or the minus button to the number setting to the requiring value.

(4) Pressing the "SET" button for two times, the setting will be finished (note: when pressing the "SET" button for one time, the PV Screen displaying the ST indicating the timing function, when ST=0, the timing function will not be booted) . The PV screen is for the temperature measuring in the box, and the SV is for the new setting temperature.

D. 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 temperate state.

E. When the required temperature is lower (i.e. the setting temperature is closed to the RT +5°C) , 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.

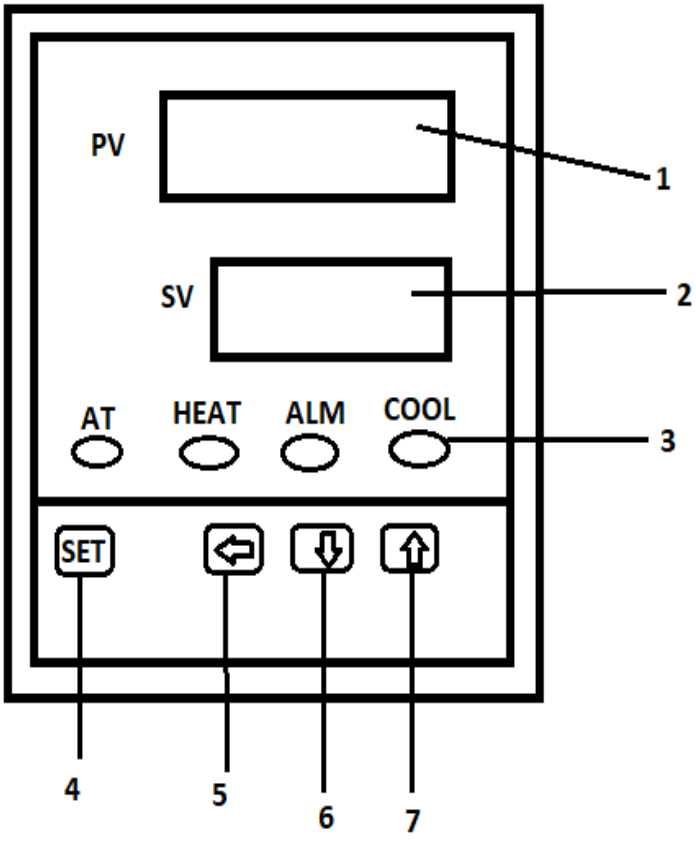
F. When the incubator coming into the state of PV=SV+AL2, the blower fan will change automatically from the quickly rotating to the slowly rotating (at this time, the left yellow light will ran out) , which eliminates the "static difference" occurred by the running temperature of the blower fan, at the same time, the working life of the blower up will be extended largely.

G. 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.

H. 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.

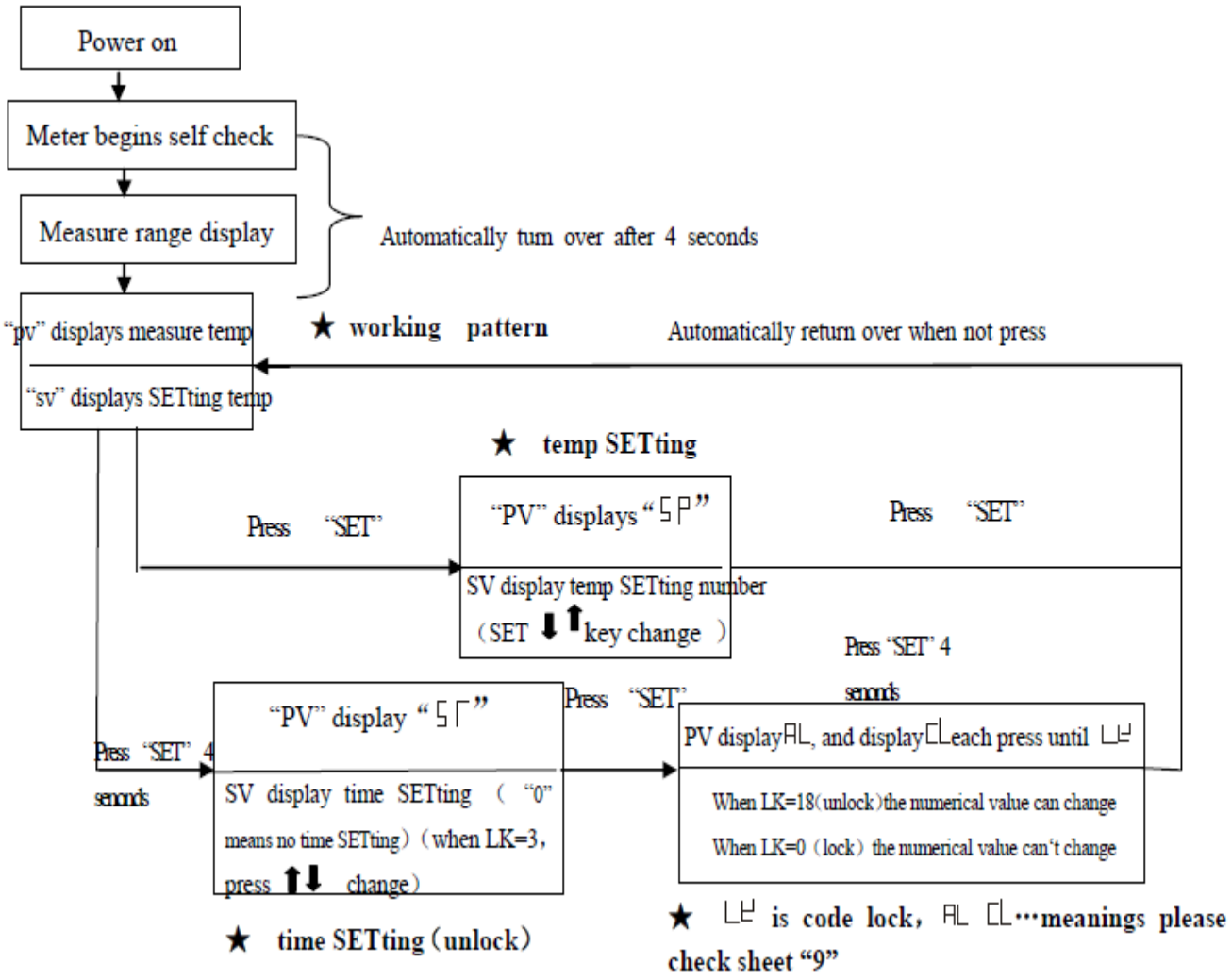
I. According to the requirement, choosing the incubating time, after the incubating, turn the power switch to the "OFF", if don't take the things away, please not to open the door of box.

06 Operating Method to the intelligent temperature controller



1. PV display(Red)
Displays measured value or the various characters depending the statue of the instrument
2. SV display(Green)
Displays the set value or the timing and rated parameters
3. Indicators
AT working indicator (Green), Flashes during auto-tuning execution
HEAT heating output lamp (green) It shines when working for output.
ALM alarming indicator (Red), turned on
(Note: COLD cooling function)
4. Function Key
Used for displaying the change and confirm of the parameters
5. Shift key shifting the set value or observing
6. And 7. Add or Subtract key for changing the digital code and/or the key to express entering the auto-tuning state. Used for adjusting the digital code displayed or entering the auto-tuning state.

- **Operating Flow**



- 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 step as following:

  After pressing the function button SET for 5 seconds, when the "AL1" is displaying on the PV screen, releases it, one parameter will change on the PV screen for each pressing, until the "LCK" is displayed on the PV screen. Changing the "2" to "0" on the SV screen with the minus button, and pressing the SET for some times until the required parameter is displayed on the PV screen, and then making the modifying the parameters with the plus and minus button as above manners. After finishing all parameters required modifying, then change the "LCK" to the "2" (i.e. Locked) from the "0", at this time the instrument will automatically save the new modified parameters.

For example:

1. The over difference of the controlling temperature precision (the difference of the displaying value and the actual value)

A. Recording the △=actual temperature value– displaying value on the PV screen of the constant temperature.

B. Modifying the SC to the SC= the set value origin of factory +△ if it could not be modified well one time, the repeating modifying could be made to get the standard.

2. The temperature "Overshoot" or producing the static difference:

A. Changing the P smaller and I larger, the D will adjust with the I, <d=1/4~1/5I>

B. At the same time, adjusting the output power, and setting the parameter of "OUT-", when the temperature could not get (producing the static difference), the value of "OUT-" should be increased; when the "overshoot" occurs, the value of the "OUT-" should be reduced.

- Description to the timing setting:

Setup of time

1 After pressing SET key for 4 seconds and PV screen displays "ST" character and SV screen displays"0", it shows the timing function has not be set up (status of delivery).

2. Press SET key several times till PV screen displays "L K", press ⬆ key to make SV screen display 3 (timed unlocking) and press SET key once more, PV screen will return to " ST ". Press the key ⬆ to set up the value required for timing (timing scope: 1~9999 minutes), and after pressing SET key for another 4 seconds, the temperature control will return to operating mode and timing will begin at once. Then AT lamp will flash and enter the calculation time. At the end of timing, PV and SV windows will display "End" and AT lamp will be out. The buzzer will buzz four times for prompting;

3 Resumption of timing: Press ⬆ key till the instrument enters the operating mode and run as the timing set up originally;

4 Upon start of timing, no self-tuning is allowed. If it is necessary to observe the operating time, press ⬆ just once and SV screen will display the value of residual time. (Note: Total time should be determined by **combined calculation** of the **temperature rise** and **constant temperature**);

5 During the timed operation of the product, timing of "ST" may be revised and the previous accumulated operating time is remembered and run to the new timing. The product will cease heating and the buzzer will buzz. (when the new timing is less than the previous accumulated operating time, heating output will be closed at once and the buzzer will buzz.)

6 In case of power failure in operation or energization after re-startup, timing should be set up again.

The function of auto adjusting: generally not used (omitted);

The TEMP parameter table.

Parameter	Setting range	Definition of parameter	Setting of leaving factory
ST	1-9999 min	The setting value of timing	
AL1	0-100%FS	The setting value of upper difference alarming (AL1)	
AL2	0±1°C	The indicating setting of the blower fan	
SC	±20°C	The difference amending for the displaying value	
ATU	0-1	Self adjusting commands (0: OFF, 1: ON)	
P	0-100% (°C)	More Proportion, more P, lower the system plus, more stability, the precision of system is improved, eliminating the static difference	
I	0-4320 sec.	integral time, the I bigger, the integral smaller, which reducing the "Overshoot"	
d	0-1200 sec.	Differential coefficient time, generally is (1/4 ~ 1/5) I	
T	0-60	Cycle time, adopting controlled silicon as the output power, generally is 2~3 second.	
HL/HL	0.50~1.500	Ensuring the temp display resolution which is unanimous in the range of testing.	
OUT-	(10~200) %	The output power consumption can be adjusted when the heater showed the Proportional Band (P)	
GC	(OFF~5)	Let the red parameters	
Lk	0-255	Locking (LK=18 (unlock) the numerical value can change, LK=0 (lock) the numerical value can 't change)	

Notes while using:

1. Due to the products have been strictly tested before leaving factory, it is not necessary to make any modification, 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 lamp lights. 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 Precautions and Maintenances

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 the product is not used for long time then 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 PST00 does not work	Changing it, PST00=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≥RT+5 °C
		The timing of the instrument booting T≠0	Setting ST=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 fun does not run	Repairing it
		The sensor (PST00) 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.

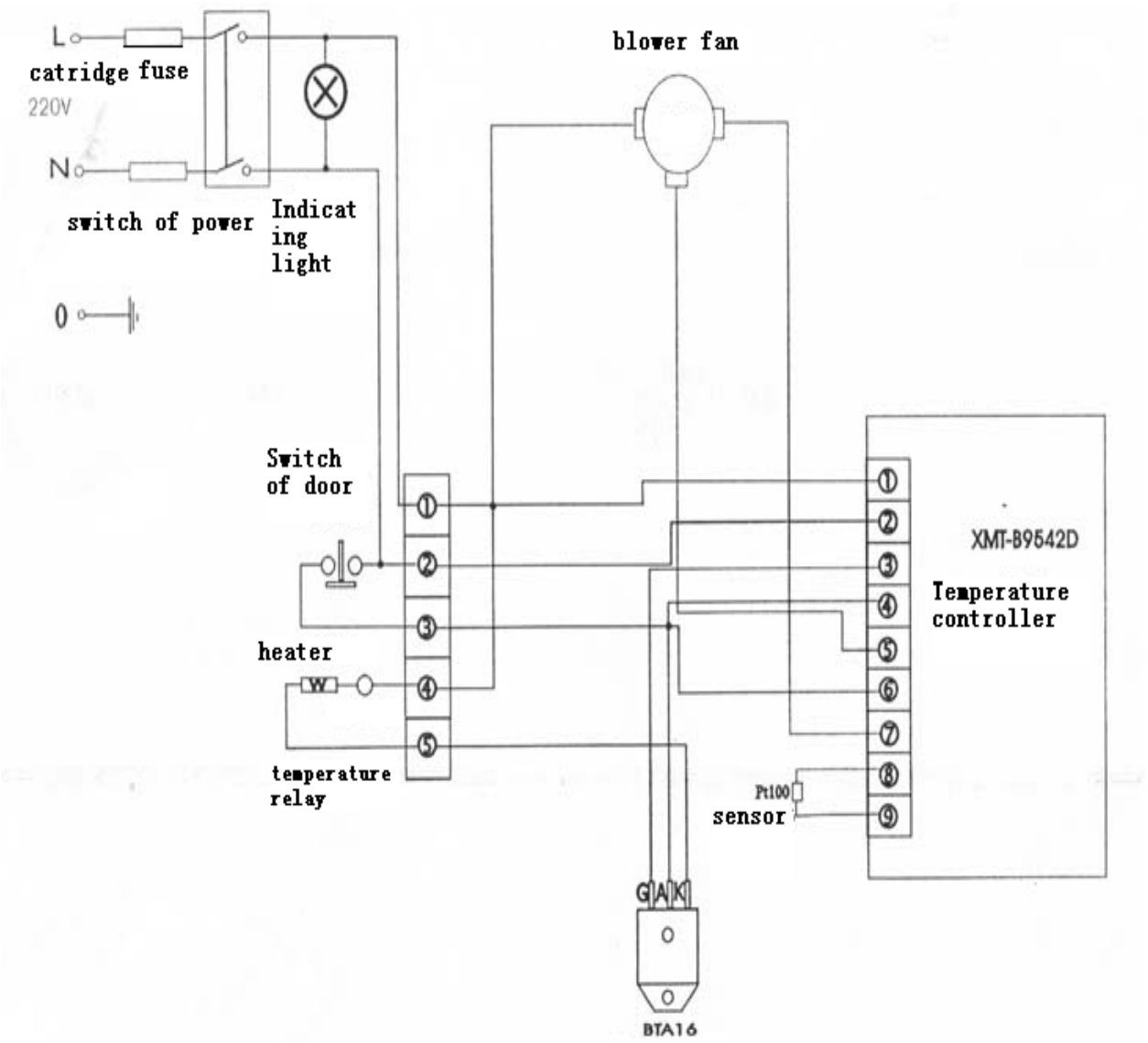
		The motor is blocked or no grease	Change it
6	Temperature could not be controlled	The heating light of temperature controller is on and not off	Changing the temperature controller
		When heating light of temperature controller if off, but the temperature is still rising	Changing the dual controlled silicon BTA16

Packing list

S.N.	Class	Name	Unit	Amount	Remark
1	File	Operating specification	Set	1	
2	File	Packing list	Set	1	
3	Spare parts	Shelf	Piece	2	
4	Spare parts	Core for the fusible cutout	piece	2	

09 Electric Illustrative Diagram

We will keep the right to inform you any further modification regarding this item



Dual directions controlled silicon

The electric illustrative and wiring diagram of the electronic heating incubator box

BIOLAB SCIENTIFIC LTD.
3660 Midland Avenue, Suite 300, Toronto, Ontario M1V 0B8 Canada
Email: contact@biolabscientific.com Tel: +1 707 533 1445
Website: www.biolabscientific.com