

# Instruction Manual

## NAHITA BLUE SHAKING INCUBATOR

***REFERENCE: LNB003***



Thank you for choosing Nahita Blue Shaking Incubator. It is widely used in bacterial culture, fermentation, hybridization and biochemical reactions, as well as enzyme and cell tissue research, which have high requirements on temperature and oscillation frequency. It is an important equipment in medicine, biology, pharmaceutical, food, environment and so on.

**Remember:**

**This manual describes in detail the product features, usage methods, precautions, etc. For your better understanding, convenient and safe use of this product, we recommend that you carefully read this manual before using it.**

After you receive the product, please confirm whether it is the same as the one you ordered, and then confirm whether the appearance of the product is intact and the random accessories matches the packing list.

If the product model you received is inconsistent with your booking or the appearance is damaged or there are not enough accessories, please contact your distributor.

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# 1. Safety warning before operation

## Prohibitions

The following items could cause serious injury or death.

1. Read this instruction manual before using the product.
2. Do not put volatile, flammable and explosive material in the machine, otherwise could cause explosion or fire.
3. Do not place the incubator in a place exposed to rain, moisture, or splashing, as this may result in electrical leakage, short circuit, or electric shock.
4. Non-professional persons 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.

## Recommendations

The following items may cause personal injury, equipment damage and related property damage.

1. This equipment should install on the firm ground, otherwise could cause staff injury because of drop down of the equipment.
2. Please use the special power supply that indicated one the nameplate. This equipment must install 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 repair and maintain the equipment in case of injury.
6. Do not to damage the power cord or use the non - specified power cord, do not connect the power cord in the middle section and use long soft wire, otherwise it may lead to electric shock or fire.
7. Do not remove the power plug during the operation, do not pull the power cord by pulling the power cord.
8. If you find that the equipment is running abnormally, unplug the power plug immediately and stop the equipment.
9. If the equipment is idle for a long time in the unsupervised area, please ensure that the equipment door is completely closed.

## Necessary considerations

The following items could cause staff injury or equipment.

- ❖ Adjust the feet so that the equipment is installed horizontally, and all four feet should be close to the support surface. There must be no vacant or false.

- ❖ Use a separate power outlet fitted with a grounding wire. Tight the power plug when in use.
- ❖ Put off the power plug, before removing the equipment.
- ❖ Carefully touch the inner wall of the door, which may be hot.
- ❖ Nonprofessional technical staff could not disassemble the machine privately, professional 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 do not know setting operation.
- ❖ The installation location of the equipment must be longer than 20 cm from the wall and from the object.
- ❖ Open or close the door gently. Rudely 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 main features

1. The large screen LCD displays the temperature, speed and working time continuously, accurately and in real time, and the menu operation interface is easy to operate.
2. Microcomputer controlled temperature and oscillation frequency, with timing function, built-in power failure protection function, can automatically resume operation after normal power supply.
3. The unique air duct of the workshop has a gentle breeze circulation, good temperature uniformity, large observation window design, convenient observation of samples, convenient opening and closing.
4. Speed control: DC brushless motor intelligent feedback control, high speed accuracy. Slow start design, when the speed is out of control, automatic locking, adjustable start speed, prevent the sudden start of the shake flask liquid spatter, effectively ensure the accuracy of the quantitative experiment.

### 3. Technical parameters

Model / Code		642 / LNB003	
Shaking Mode		Cyclotron Oscillation	
Function	Amplitude	Φ20mm (orbital movement)	
	Temp. Resolution	0.1℃	
	Temp. Motion	±0.1℃	
	Temp. Uniformity	±1℃	
	Temp. Range	RT+5~65℃	
	Rotary Speed	30~300rpm	
	Rotary Speed Precision	±1rpm	
Structure	Chamber Material	Mirror Stainless Steel	
	Outer Shell	ABS	
	Observation Window Material	Resin	
	Thermal Insulation Material	Polyurethane	
	Cooling System	No	
	Coolant	No	
	Heater	Stainless steel heating tube	
	Drive Mode	Three-axis level	
	Oscillating Plate	Spring Wire Rack	
	Air Circulation Mode	Horizontal convection	
	Power Rating	0.6kW	
Controller	Temp. Control Mode	LCD PID intelligent control	
	Cyclotron Control Mode	Automatic changes of rotation direction	
	Setting Mode	Touch button setting	
	Temp. Display Mode	LCD display	
	Speed Display Mode		
	Timer	0~9999min	
	Operation Function	Fixed value operation, timing function, bidirectional automatic switchover, auto stop, quick stop start	
	Temperature Sensor	Pt100	
	Speed Sensor	Hoare	
	Gating System	Yes	
Additional Function	Deviation correction, menu keys locked, power-off memory		
Safety Device		Over temperature alarm, menu locked, gating system, power-off protection, plugging turn protection	
Specification	Inner Chamber Size (W*L*H) (mm)	455x380x290	
	Exterior Size (W*L*H)(mm)	500x640x480	
	Packing Size (W*L*H)(mm)	550x690x530	
	Shelf Size (mm)	380x320	

Max. capacity of shelf (ml/pc)	100mlx16, 250mlx10, 500mlx6
Number of flask clamp as standard (ml/pc)	250mlx8
Inside Volume	50L
Shelf Load Bearing	≤10kg/layer
Shelf Layer	1
Power Supply (50/60Hz)	AC220V/2.5A
NW/GW (kg)	25/35

## 4. Operation and display instructions



Shift key: left arrow, click Select to move to the left. Return to the head and return.

Reduce the key: down arrow, press the parameter value to reduce one number, hold down this key, and the parameter value decreases continuously.

Increase the key: the upward arrow, press the parameter value to add a number, hold down this key not to put, the parameter value continues to increase.

Time function key: Dial symbol, press enter timing parameter setting state, and press... Until it returns to the normal interface.

Temperature function key: thermometer symbol, press enter temperature parameter setting state, then click return to normal interface.

Speed function key: with arrowhead circle, press enter speed parameter setting state, then press back to return to normal interface.

Bactericidal function key: purple with light symbol, long press 3 seconds, sterilize lamp light; and then press for 3 seconds, sterilization lamp extinguished.

Lighting function key: bulb symbol, press the light to turn on and then close.

Operation start / stop key: press the device to start running; then click stop.

## 1. Temperature internal parameters setting

Press the "temperature" key for about 3 seconds, the temperature display area displays the password prompt "Lc", and the speed display area displays the password value.

By adding keys, reducing keys and shift keys, modify to the required password value. Then click the "temperature" key, if the password value is not correct, the controller automatically returns to the normal display state; if the password value is correct, then enter the temperature internal parameters setting state, and then click "temperature" key to modify each parameter in turn. After modification, press the "temperature" button for 3 seconds and exit the internal parameter setting state, and the parameter value is automatically saved.

**Internal parameter table -1**

Parameter indication	Parameter name	Parameter function description	(Range) Factory Value
Lc	Password	The parameter value can be viewed and modified when "Lc=3".	0
AL-	Upper deviation Over temperature alarm	When the "temperature measurement > temperature setting value +AL", the alarm light is turned on, the buzzer calls, and the heating output is disconnected.	(0~20.0℃) 5.0
Ct-	Compressor start delay	Compressor start delay protection time, the minimum time interval from compressor stop to restart.	(0~600s) 180
uP-	compressor Start threshold	When the compressor is working in an intermittent manner, If the "temperature measurement value $\geq$ temperature set value + uP" and the compressor start delay time is up, start the compressor. Note: This parameter is valid only in the manual start and stop compressor mode, and is invalid in the automatic mode.	(-10.0~10.0℃) 0.4
dn-	Compressor Closing the threshold	When the compressor is working in an intermittent manner, Turn off the compressor if "temperature measurement value $\leq$ temperature set value + dn". Note: This parameter is valid only in the manual start and stop compressor mode, and is invalid in the automatic mode.	(-10.0~(uP-0.1)) 0.2
Lt-	Floodlight off-delay	The light is opened and the time delay Lt time is automatically closed. "Lt=0", the delay is invalid, the lights must be turned off manually.	(0~9999min) 0
St-	Sterilizing lamp off-delay	The sterilization lamp is opened and the time delay St time is automatically closed. "St=0", the delay is invalid and the lamp must be manually closed.	(0~9999min) 0
T-	Control cycle	Heating control cycle.	(1~60s) 5
P-	Proportional band	Time proportional adjustment.	(0.1~50.0) 15.0
I-	Integration time	The integral function is adjusted.	(1~2000s) 380
d-	Differential time	Differential action regulation.	(0~2000s) 100

Pb-	Zero adjustment	Correction of errors caused by sensor (low temperature) measurement. Pb= actual temperature value - instrument measurement value	(-99.9~99.9℃) 0
PK-	Full degree adjustment	Correct the error generated when the sensor (high temperature) is measured. PK=1000* (actual temperature value - meter measurement value) / meter measurement value	(-999~999) 0

**Internal parameter table -2**

Parameter indication	Parameter name	Parameter function description	(Range) Factory Value
Lc	Password	When "Lc=9" ,the parameter values can be viewed and modified.	0
rES	Power down memory function	0: No power down memory function 1: Power-down memory function	(0~1) 0
FAn	Fan Type selection	0: The fan is a short axis fan 1: Fan is a long shaft fan	(0~1) 0
ndc	Compressor Operation mode	0: the compressor is only working in a discontinuous type. 1: compressor according to the value of CP (see below) to determine the balanced or intermittent work of the compressor. 2: compressor according to the value of Htd (see below) to determine the balanced or intermittent work of the compressor.	(0~2) 0
CP-	Compressor working mode fixed switching	When "ndc=1", If the "temperature set value $\geq$ CP", the compressor works in an intermittent manner, and vice versa.	(0~100.0℃) 30.0
Htd	Compressor working mode automatic switching point	When "ndc=2", If the "temperature set value $\geq$ ambient temperature + Htd", the compressor works in an intermittent manner, and vice versa.	(-50.0~50.0℃) 0.0
Crc	Compressor Start and stop mode	When the compressor is working in an intermittent manner, 0: Automatically start and stop the compressor (according to the ambient temperature and set value); 1: Manually start and stop the compressor (according to the values of uP and dn in internal parameter table-1);	(0~1) 0
Cnp	Prohibit compressor Working temperature point	When "temperature set value $\geq$ Cnp", the compressor is prohibited from working. Note: This mode of operation has the highest priority, that is, the controller executes this command first, and then judges the balanced or intermittent operation of the compressor.	(0~100.0℃) 42.0

nP-	Maximum power	The maximum power percentage of the heating output.	(0~100%) 100
Co-	Turn off the heating	When the "temperature measurement value $\geq$ temperature set value + Co", the heating output is turned off.	(0.0~20.0°C) 5.0
SPL	Lower temperature setting	Lower limit of temperature set point	(-50.0~100.0°C) 0.0
SPH	Upper temperature limit	Upper limit of temperature set point	(SPL~100.0°C) 60.0
Adr	mailing address	The local communication address.	(1~16) 1

### Internal parameter table -3

Parameter indication	Parameter name	Parameter function description	Factory value
Lc	Password	The ambient temperature can be viewed when "Lc=18".	
Ht	Ambient temperature	The ambient temperature at which the controller is located.	

## 2. Speed internal parameters setting

Press and hold the "Speed" button for about 3 seconds. The temperature display area displays the password prompt "Lc". The speed display area displays the password value. You can change the password value to the required password value by adding the key, decreasing key and shift key. Then click the "Speed" 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 speed internal parameter setting state, and then click the "Speed" button to modify each parameter in turn. After the modification, press and hold the "Speed" button for 3 seconds to exit the speed internal parameter setting state, and the parameter value is automatically saved.

Note: The speed parameter is forbidden to be modified during the running of the controller. If it needs to be modified, please stop the controller and then modify it.

### Speed---internal parameter table (1)

Parameter indication	Parameter name	Parameter function description	(Range) Factory Value
Lc	Password	The parameter value can be viewed and modified when "Lc=3".	0
Pd-	Proportional	Speed proportional gain.	(1~100) 10

	gain		
Id-	Integral coefficient	Speed integral coefficient.	(1~100) 5
InT	Acceleration time	The time it takes for the motor to accelerate to the new setpoint.	(1~60) 10
dET	Deceleration time	The time it takes for the motor to decelerate to the new setpoint.	(1~60) 10
SdL	Speed setting lower limit	Minimum value of speed setpoint	(20~6000) 20
SdH	Speed setting upper limit	Maximum speed setting	(SdL~6000) 600

### Speed---internal parameter table (2)

Parameter indication	Parameter name	Parameter function description	(Range) Factory Value
Lc-	Password	The parameter value can be viewed and modified when "Lc=9".	0
EAr	Gear ratio	Big gear diameter / pinion diameter.	(1.0~10.0) 3.2
PoL	Motor pole number	DC brushless motor pole pairs.	(1~32) 4
dIF	Motor rotation Reference direction	dIF=0: Specifies that the clockwise direction of rotation is positive dIF=1: Specifies that the counterclockwise direction of rotation is positive	(0~1) 0
FdS	Speed feedback value	Speed feedback coefficient value	(0.1~10.0) 1.0
FdC	Current feedback value	Current feedback system value	(0.1~10.0) 1.0
FrE	Carrier frequency	Frequency modulation frequency of brushless motor carrier Note: when the carrier frequency is changed, the controller needs to be restarted.	(5~15) 15
Po-	Motor power	Brushless motor power Note: users adjust this parameter according to the actual power of the motor.	(1~400) Low voltage driver: 80 High voltage driver: 200
CL-	Overflow multiple	Allowable current multiplier for overcurrent protection of motor	(1.0~10.0) 5.0
Fr-	Rotation direction selection of motor	0: The motor only runs in forward rotation; 1: The motor only runs in reverse; 2: The motor can run in reverse direction;	(0~2) 0
db-	Display	Speed display insensitive area	(0~100) 2

	Insensitive area		
dF-	False display interval point	When the speed set value $\geq$ dF, both the speed set value and the speed display value are false display values.	(0~6000) 6000

### 3. Time setting

1. When Fr is set to “0” or “1” in “Speed---Internal Parameter Table (2)”, it can only be forwarded or reversed: press the “Time” button, the number on the right side of the time display area will flash. Use the “◀” shift button, “▼” decrease button, “▲” increase button to set the running time, press the “Time” button again to return to the work interface, and the time display area displays the set total. Timing time, the number decreases with the running time, and the integer stops. Finally, it stops and the buzzer sounds. Press any key and the buzzer will stop.

2. When Fr is set to "2" in "Speed - Internal parameter table (2)", there is a positive and negative function: Click the "Time" button to enter the total timing setting state, and the time display area flashes. You can use the '◀' shift key, '▼' decrease key, '▲' increase key to modify the desired set value; then click the “time” key to enter the forward rotation time (the prompt Fd is displayed on the right). ) Set the status, modify the desired setting value by shifting, reducing, increasing, etc.; then click the “Time” button to enter the stop timing time (the right display prompt p-) setting status, Also modify to the desired setting value; then click the “Time” button to enter the reverse timing time (the right display prompt Rd) setting state, also modify to the desired setting value; then click the “Time” button , returns to the normal display state. Complete the time setting.

Note: The total time can be selected in minutes and hours; the forward, stop, and reverse timings are minutes.

3. Press and hold the “Time” button for about 3 seconds. The temperature display area displays the password prompt “Lc”, and the speed display area password value is modified to the required password value by the increase, decrease and shift keys. Then click the “Time” 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 time internal parameter setting state, and then click the “Time” button to modify each parameter in turn. Press and hold the “Time” button for 3 seconds to exit this state and the parameter values are automatically saved.




#### Time---internal parameter table




Parameter indication	parameter name	Parameter function description	(Range) Factory Value
Lc-	Password	The parameter values can be viewed and modified when "Lc=3".	0

ndt	Timing mode selection	0: Start timing after running, running time is up, only stop speed, non-stop temperature 1: Start timing after running, run time arrives, stop speed and temperature simultaneously 2: The temperature starts to count after reaching the set value. The running time is up, only stop speed, non-stop temperature. 3: When the temperature reaches the set value, the timing starts, the running time arrives, and the speed and temperature are stopped at the same time. When the timing starts, “m” or “h” starts to flash, and after the time is over, the time display area displays “End”. Note: This parameter is prohibited from being modified during operation.	(0~3) 1
Hn-	Total timing Timing mode	0: Timing is measured in minutes 1: Timing is measured in hours Note: This parameter is prohibited from being modified during operation.	(0~1) 0
rT-	Total timing Time correction	Correct the total timing timing error, Correction value = [run time (seconds) - actual time (seconds)] * 10 / actual time (minutes)	(-999~999) 0

#### 4. Buttons and operation instructions

1. Power on: Turn on the power, the controller is powered on, the temperature display window displays “HY-2”, the speed display window displays “8888”, the time display window displays “8888”, all the identifiers light up, and enters after about 3 seconds. Normal display status.

2. Temperature: Press the “Temperature” button, the number on the right side of the temperature display area flashes, use the “” shift button, “” decrease button, “” increase button to set the desired temperature, then press the “Temperature” button exits the temperature setting state, and the set temperature value is automatically saved, and the instrument operates according to this temperature value.

3. Speed: Press the “Speed” button, the number on the right side of the speed display area flashes, use “” shift button, “” decrease button, “” increase button to set the required speed, press again the “Speed” button exits the speed setting state, and the set speed value is automatically saved, and the instrument runs at this speed value.

4. Time: When the total timing is set to “0”, it means that there is no timing function and the equipment is running continuously. The timing function setting is set by referring to the description in item 8 above.

5. Sterilization: When “St=0”, long press the “sterilization” button for 3 seconds, the identifier “STERILIZE” under the interface lights up, the UV lamp is turned on, the device is in sterilization operation; and then press the “sterilization” button. In 3 seconds, the identifier "STERILIZE" is extinguished and sterilization is stopped. The sterilization lamp off delay setting is set by referring to the description of "Temperature - Internal Parameter Table (1)".

6. Operation control: Press the “Start/Stop” button, the identifier “RUN” at the lower right of the interface will light up and start to turn; press the “Run/Stop” button again, the identifier “STOP” at the bottom right of the interface will light and stop rotating.

7. Gating: During operation, open the door, the interface identifier “OPEN” lights up, the rotation stops, the door is closed, the identifier “OPEN” goes out, and the rotation continues.

8. Lighting: When “Lt=0”, click the “Lighting” button to turn the light on and off. The illumination off delay setting is set by referring to the description of “Temperature---Internal Parameter Table (1)”.

## **5. Function setting description**

### **1. Timing function**

When the total timing time is set to “0”, it means that there is no timing function, the device runs continuously; when the total timing time is not “0”, the timing is started according to the timing mode, “m” (time in minutes) or “h” (timed by hour) flashes, the motor stops when the timer ends, the time display area displays “End” , the buzzer sounds, and the “start/stop” button is clicked to restart the operation.

Notes: 1) If the set value of the timing time is changed during the running, the controller restarts the timing according to the new set time.

2) The timing mode can be selected by modifying the "ndt" value in the "Time--Internal Parameter Table".

3) The timing mode can be selected by modifying the "Hn" value in the "Time - Internal Parameter Table".

### **2. Power failure memory function**

You can select whether there is a power-down memory function by modifying the value of “rES” in “Temperature-Internal Parameter Table (2)”.

1) No power-down memory function (rES=0): the controller is powered off after power failure, and the speed is stopped.

2) There is power-down memory function (rES=1): the controller is powered off after power-off, and the speed is in the running state at the last power-off.

## **6. Alarm and shutdown**

1. When the power module failure (Er-1), Er-2, Holzer error (Er-3), busbar undervoltage (Er-4), busbar overvoltage (Er-4), busbar overvoltage (Er-5), communication fault (Er-6), the identifier "ALM2" is lit, the controller is automatically stopped and the buzzer calls. Please turn off the power when the fault occurs, carefully check the wiring of the motor, and make sure it is correct again.

2. When the over temperature alarm occurs, the buzzer sounds and the "ALM1" identifier

lights up. If an over-temperature alarm occurs due to changing the temperature set value, the "alarm" light is on, but the buzzer does not sound.

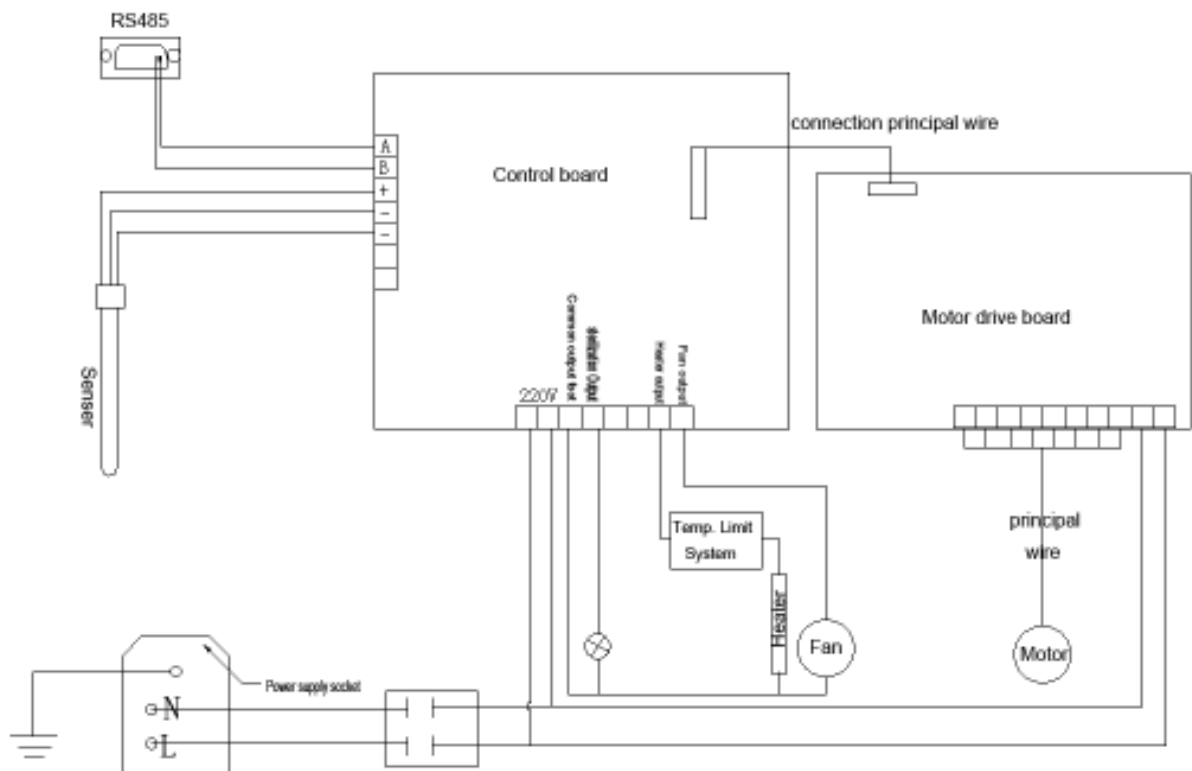
3. When the buzzer sounds, you can press any key to stop.

4. If there is no key pressed within 1 minutes in setting state, the controller will automatically return to the normal display state.

5. If the display window of the controller shows "-" to indicate the fault of the temperature sensor or the controller itself, please check the temperature sensor and its wiring carefully.

6. When you turn off the machine, press the "Start / Stop" button to stop turning, then turn off the power switch on the right side of the instrument, and turn off the whole machine.

## 5. Electric diagram



## 6. General failures and troubleshooting

Failure phenomenon	Fault analysis	Troubleshooting
Open machine without display	Power supply is not connected	Check if the power outlet with voltage
	The power plug is not plugged in	Check the reliability of the contact between the power plug and the socket
	The power switch is not open	Turn on the power switch on the right side of the instrument
	The damage of the fuse on the box	Replacement of a power fuse with the same specification
Rolling plate does not rotate	Door switch does not work	Check whether the door is closed or not.
	The bottom of the rolling plate is stuck with foreign objects	Remove foreign body
	Belt damage	Notify distributor to replace the belt
	Control circuit fault	Notify distributor to repair
Instability of rolling plate	The instrument is not placed smoothly	Adjust the foot of the instrument to make the instrument smooth
	Foreign body barrier at the bottom of the plate	Remove foreign body
	Control circuit fault	Notify distributor to repair
The measured temperature is higher than the set temperature or the instrument enters the high temperature alarm state	The door is not closed well	Close the door well
	The instrument has not yet entered the state of constant temperature	Wait for a moment to observe again
	Damage of circulating fan	Notify distributor to replace the fan
The noise of the incubator is too loud	The incubator is not placed smoothly	Adjust the foot to make the incubator smooth
	Flask clamp fixing screw loose	Remove the rocker with the tool fasten screw
	Shake plate loosening	Tighten the fixing screws at the four corners of the rocking plate
	Bump on the bottom of the plate with foreign objects	Remove foreign body
	Mechanical failure	Notify distributor to repair