BioLAB

Operation Manual

BHTC-501

Thermal Cycler

Index

PREFACE

Thanks for choosing Thermal Cycler BHTC-501. This operation manual describes function and operation of the instrument. In order to use the instrument properly, please read this manual carefully before operating the Instrument.

Opening Check

Please check the instrument and appendix with the packing list when you first open the packing case. If anything does not match with the packing list, please contact with the vendor or the producer.

Safety Warnings and Guidelines

1 Important operation information of the security

Users should have an entire conception of how to use the instrument properly before operating it. Please read this operation manual carefully before using the instrument.

⚠ It is forbidden operating before read the operation manual. Read the guidelines and directions below and carry out the countermeasure according to them.

2 Security

The operation, maintenance and repair of the Instrument should comply with the basic guidelines and the remarked warning below. Otherwise, it will affect the scheduled using life of the Instrument and the protection provided.

⚠ This product is a normal and an indoor Instrument which conforms to Standard B style- I type- GB9706.1.
Keep no objects on the bottom and back of the machine to block the exhaust and heat dissipation of the machine.

⚠ Regularly clean the residue accumulated in the block hole to improve the temperature response.

⚠ The operator should not attempt to open or repair the instrument, which would void your warranty and may result in an electric shock. In case of repair, our company will be responsible for the repair.
Before connecting the power supply, make sure that the voltage of the power supply matches the voltage required by the instrument. And make sure that the rated load of the power outlet is not less than the requirements of the instrument.
If the power cord is broken, it must be replaced. Replacement must be replaced with a power cord of the same type and size. Do not press anything on the power cord when the instrument

is in use. Do not place the power cord where people are moving.
Hold the plug with hands when plugging and unplugging the power cord. When inserting the plug, make sure that the plug is fully inserted into the socket. Do not pull the power cord when pulling out the plug.

⚠ This instrument should be placed in a place with low humidity, little dust and far away from water source and avoid direct sunlight and strong light source. The room should be well ventilated and free from corrosive gas or strong magnetic field interference. Keep away from heating, stove and other heat sources. Do not place the instrument in damp or dusty places.

⚠ The power should be turned off when the device stops working. When the device is not used for a long time, the power plug should be removed and the device should be covered with a soft cloth or plastic paper to prevent dust from entering.

⚠ Unplug the instrument from the electrical outlet immediately under the following conditions and contact the supplier or have it attended by trained service personnel:
▪ There is liquid spilling inside the instrument;
▪ The instrument is exposed to rain or water;
▪ The instrument is not working properly, especially if there are any abnormal sounds or smells;
▪ The instrument is dropped or the casing is damaged;
▪ The instrument function has changed significantly.

3. Instrument maintenance

A) Regular cleaning

1. Use a neutral soap solution to clean the holes in the base. (Don't use strong bases, concentrated alcohols and organic solvent solutions)
2. There should be no other articles under the machine and its left and right cooling Windows. After the machine is used for a period of time, some dust will adhere to the heat dissipation window, which should be cleaned up in time. This is very important;
3. The block should be cleaned frequently. Once some reactant residues are accumulated in the module cavity, it will affect the temperature response. It is recommended to wipe it regularly with cotton cloth.

B) Replace the fuse

This machine is equipped with two fuses. Once damaged, you can refer to the following steps to replace them.
1. Set the power switch to the "0" position and remove the power cord;
2. Use a slotted screwdriver to pry open the slot under the power socket and pull out the fuse; after taking out the 8A250V fuse, if it is damaged, replace it with a spare fuse and install it back in place.
Note: If the machine still fails after replacing the new fuse, please notify our company for maintenance.

4. After-sales service

(1) Warranty Description
Within one month of delivery, the company is responsible of exchange for breakdown caused by material or manufacture.
Within 12 months of delivery, the company is responsible of free repair for breakdown caused by material or manufacture. Proven with defect under warranty, the company will exchange the instrument or free repair it alternatively.

(2) Warranty Coverage
Breakdown due to improper use, operation in inappropriate conditions, maintain or refitting without authorization are not in warranty coverage.
Repair after warranty will be charged reasonable cost.

01 Introduction

The gene amplification instrument is mainly used for gene amplification in scientific research, qualitative PCR gene amplification, fluorescence / enzyme immune endpoint quantitative DNA gene amplification, gene chip and other analytical applications of gene amplification, etc.

1. This product has the following characteristics:

1. Exquisite appearance, exquisite processing, clever heat dissipation design.
2. Using the latest generation of imported semiconductor technology, excellent amplification performance, effectively eliminating the edge effect of module heat conduction, and excellent module temperature uniformity. Optional test tube temperature control mode and module temperature control mode to meet more different experimental needs.
3. 8-inch TFT high-definition full-touch color screen can be used to edit the required files quickly, the temperature curve is intuitively displayed, the setting is convenient and quick, and the temperature curve and the operating process status of the instrument are accurately displayed in real time.
4. The system has a built-in gradient calculator, which can easily obtain accurate annealing temperature for different experimental samples to optimize PCR reaction conditions. Real-time display of gradient distribution and real-time temperature display are more conducive to controlling sample temperature.
5. User login, authority management, password protection function to ensure data security, the administrator can clear users, large data storage capacity, the maximum storage file in the machine is more than 100.
6. Efficient thermal module: Seiko manufactures high-quality aluminum modules processed by surface anodizing technology, which not only retains rapid thermal conductivity, but also has sufficient corrosion resistance.
7. The ingenious design of the hot cover can effectively control the heat in the hot cover, and the effect of preventing evaporation is excellent; the stepless adjustable hot cover can adapt to most test tubes in the market. The temperature of the hot lid and the working mode of the hot lid can be set, and the hot lid can be switched on and off.

8. Built-in independent rapid constant temperature incubation function to meet the experimental needs of denaturation, enzyme digestion/enzyme connection, and ELISA.

9. Insert the mouse into the USB port to operate the instrument, and support importing and exporting programs from U disk and updating the system.

2. Examples of technology applications

Research areas: Gene cloning, DNA sequencing, mutation analysis, gene recombination and fusion, identification of the DNA sequence of regulatory proteins, mapping of transposon insertion sites, detection of gene modification, construction of synthetic genes, construction of clones or expression vectors, and detection of a gene's content Dicer polymorphism, etc.;

Clinical diagnosis: Bacteria (spirochetes, mycoplasma, chlamydia, mycobacteria, rickettsia, diphtheria, pathogenic Escherichia coli, Shigella, Aeromonas hydrophila and Clostridium difficile, etc.); viruses (HTLV, HIV, HBV, HCV) , HPVS, EV, CMV, EBV, HSV, measles virus, rotavirus and parvovirus B19, etc.); parasites (malaria, etc.); human genetic diseases (Lesh-Nyhan syndrome, thalassemia, hemophilia, BMD, DMD and cystic fibrosis, etc.);

Immunology: HLA typing, T cell receptor or antibody diversification qualitative, autoimmune disease gene mapping, lymphokine quantification, etc.;

Human Genome Engineering: Use of interspersed repetitive sequences to generate DNA markers, construction of genetic maps (detection of DNA, polymorphism or sperm mapping), construction of physical maps, sequencing, expression maps, etc.;

Forensic: Analysis of crime scene specimens, HLA-DQ classification, etc.;

Tumor: Pancreatic cancer, rectal cancer, lung cancer, thyroid cancer, melanoma cancer, hematological malignancies, etc.;

Organization and population biology: Genetic clustering research, evolutionary research, animal protection research, ecology, environmental science, experimental genetics, etc.;

Paleontology: Archaeological and museum specimen analysis, etc.;

Fauna and Botany: Diagnosis of animal infectious diseases, detection of plant pathogens, etc.

02 Product Features

1. Normal working conditions

Ambient temperature：4℃~ 45℃
Recommended ambient temperature：15℃ ~35℃
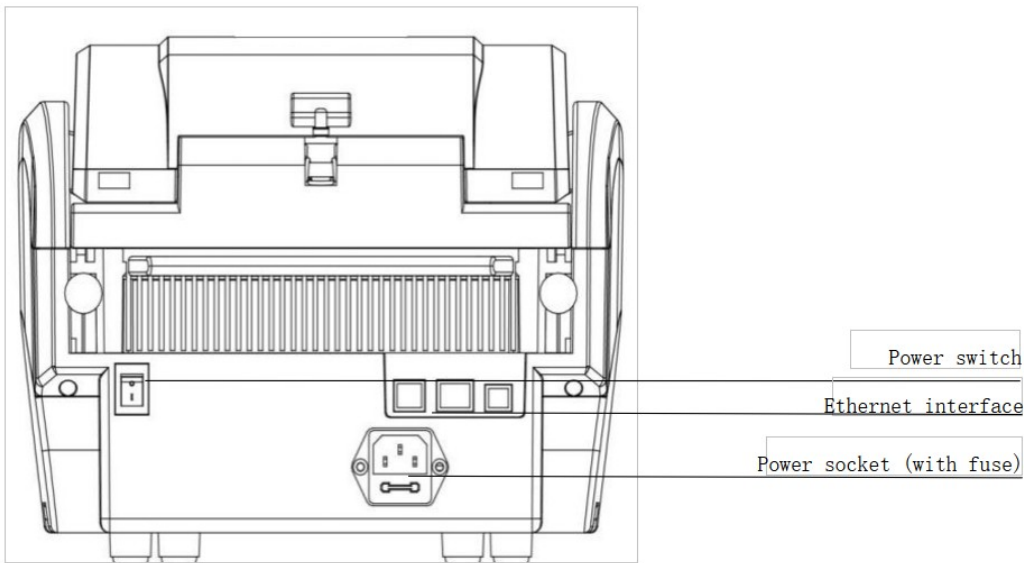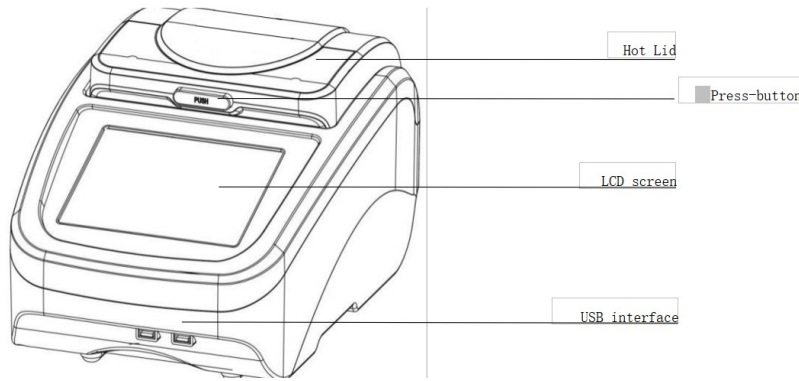Relative humidity：≤70%
Power Supply：100~240V AC6.6~3.1A 50/60Hz

2. Basic parameters and performance

Model	BHTC-501	Thermal lid temp. range	30～110℃
Temp. range	4~99.9℃ (can constant at 4℃)	Max. steps of the program	30
Single step time range	1~59min59s(∞is forever)	Program max. cycle numbers	99
Sample capacity	96×0.2ml	Time increment / decrement	-599～ 599s
Max. heating rate	4.5℃/s	Temp. increase / decrement	-9.9～9.9℃
Max. Cooling rate	4℃/s	Program pause function	Yes
Temp. uniformity	±0.25℃	16℃ insulation	Forever
Temp. accuracy	±0.2℃	LCD screen	8 inches, 1024×768 pixels
Temp. change rate	0.1～5.0℃	Program storage quantity	＞100
Temp. display resolution	0.1℃	Communication Interface	USB2.0, LAN
Temp. control method	Block/Tube	Input power	100~240VAC6.6~3.1A 50/60Hz
Gradient temp. uniformity	±0.3℃	Dimensions	W.390 x D.270 x H.255mm
Gradient temp. accuracy	±0.3℃	Net weight	8.5kgs
Gradient Temp. range	30～99.9℃	Fuse	250V, 8A Φ5x20
Gradient temp. difference range	0.1～30℃	Heat cover height adjustment	Stepless adjustable

03 Basic operating instructions

This chapter mainly introduces the structure of the instrument and the basic operation of the instrument, as well as preparations before starting the machine. When using the instrument for the first time, you should be familiar with this chapter before starting up.

1. Structure

Hot Lid
Press-button
LCD screen
USB interface

Power switch
Ethernet interface
Power socket (with fuse)

(Note 1: If the number of samples in your experiment is less than the number of cone holes of the block, please try to distribute the sample test tubes evenly when inserting the test tubes to ensure that the hot lid can be smoothly pressed on the top of the test tube when the file is running. At the same time, make the load of the block is uniform, and the temperature change of each test tube is uniform and consistent.）

04 Operation Guide

1. Start up

After the instrument is powered on, press the power switch, the buzzer will emit a beep, the LCD screen will light up, and the instrument will display the welcome interface. After skipping the welcome interface, the instrument will enter the main interface, as shown in the figure below.
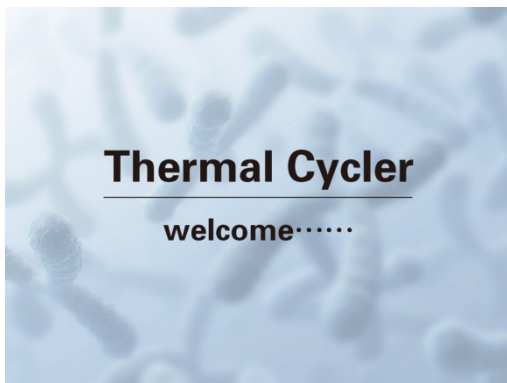
Start the self-check interface   Main interface

2. File operations

The run file is the PCR amplification program. The run file is composed of temperature steps and cycle steps. Each file can contain up to 30 steps and can be nested in two levels at most.
1）File library
Click the "File" icon in the main interface to enter the file library interface. The left column shows the file list, the right shows the specific file information and file preview of the selected file, and the bottom is the function button. As shown below:

When you select a file, you can edit, rename, copy, and delete the file.

After inserting the U disk, the "Import file to U disk" button is displayed. At this time, select the file in the local file and click this button to import the file to the U disk; select the file in the U

disk file, and this button will switch to "Import" File to local" button, click this button to import the file to the local. After inserting the U disk into the computer, you can view and edit.
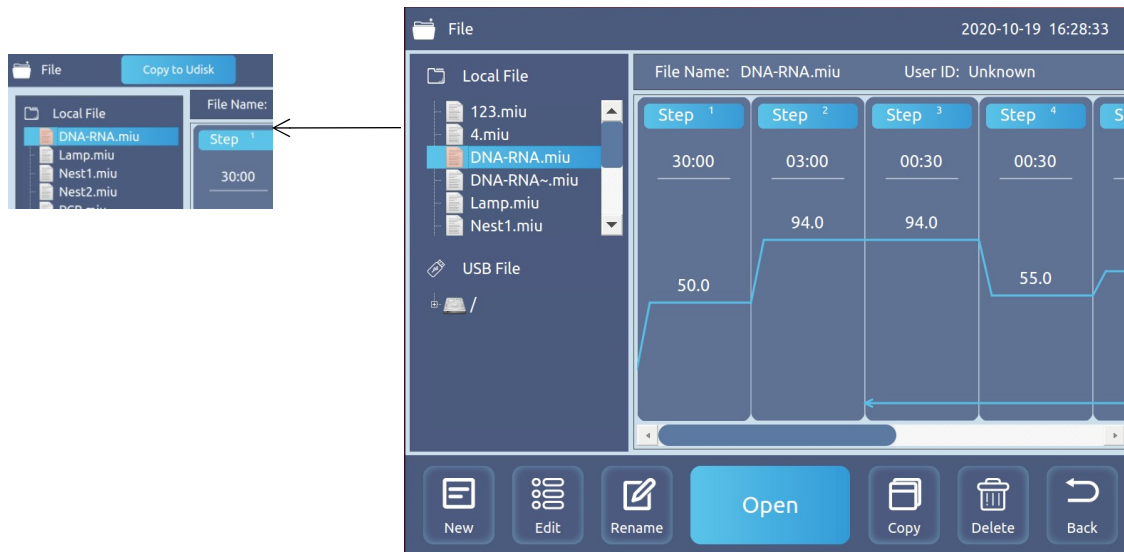
2）Create a new file

Click the "New"/"Edit" button to enter the new/edit interface. The figure below shows the temperature step including all parameters. Temperature includes parameters such as temperature, time, temperature increase, time increase, gradient, and speed rate. Clicking on the parameter will pop up the numeric keyboard, and the user can input the parameter.

Click the "+Temperature" button and the "+Cycle" button to add temperature steps and cycle steps. (Note: The maximum number of steps is 30, and the maximum can be two-level nesting).

After setting the parameters, click the "Save" button, and the interface will switch to the file name input interface. As shown below.

If it is a new file, you need to enter the file name and click "OK" to return to the file library interface. The file creation is now complete.

If you are editing a file, click "OK" to return to the file library interface, and the file editing is now complete. If you enter a new file name, click "OK" to return to the file library interface, and a new file will be created at this time.

3） Open a file

Select the file you want to open in the file library and click "Open". After the file is opened, as shown in the figure below, you can edit the opened file at this time. You can also open or close the hot cover.


Click "Run" and the file starts to run. As shown below:

When the file is running at a certain step, the temperature curve will flash to indicate that it is running; during the running process, you can click "Pause" to pause the operation, and click "Continue" to resume operation; click "Skip" (click until the specified temperature is reached, in the temperature rises stage, you cannot click), you can directly run the next step; click "Stop" to terminate the file operation.

When the file running is completed, enter the 16-degree low-temperature storage function. At this time, the total time displays "Completed", click "End" to terminate the file running.

Note: If the block temperature is below 30 degrees, the hot lid will stop temperature control, and if the block temperature is above 30 degrees, the hot lid temperature will start to control the temperature.
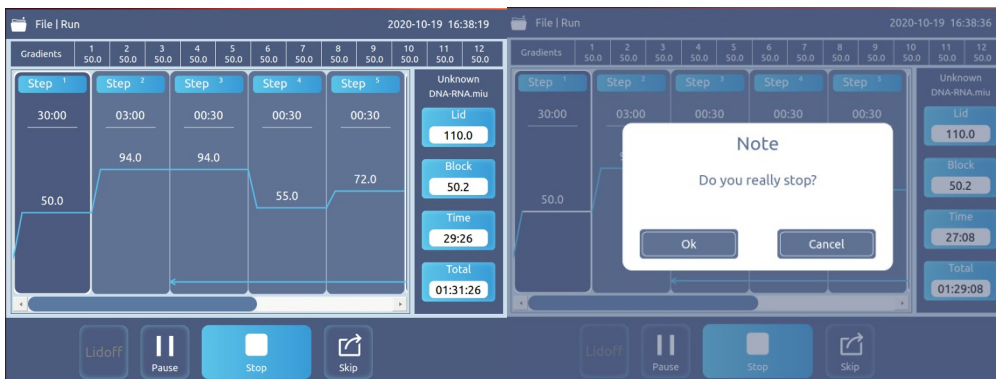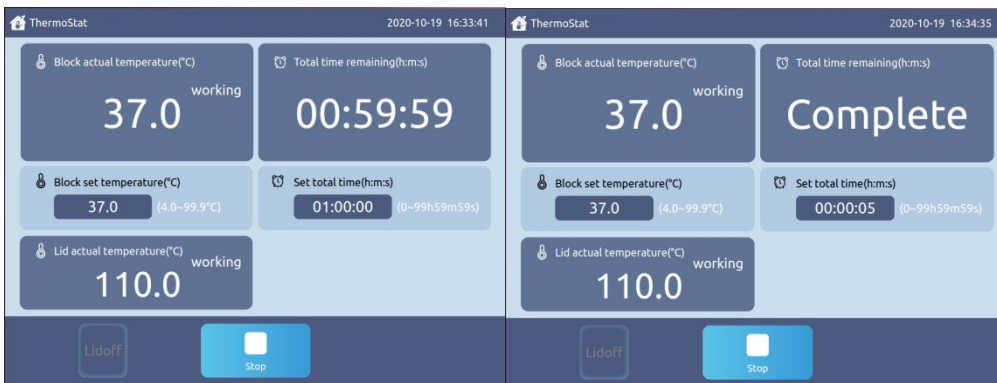
3. Gradient calculation

Click the "Gradient Calculator" icon in the main interface to enter the gradient calculation interface. As shown below

4. Thermostat

Click the "Thermostat" icon in the main interface to enter the constant temperature incubation interface. As shown below:


Click "Lid on" or "Lid off" to open or close the hot lid.
Click "Lid on" or "Lid off" to open or close the hot lid.
After setting the temperature and time parameters, click "Run", the instrument starts to work, the temperature reaches the set temperature, and the countdown begins. During the running process, you can click "Stop" to terminate the file running. When the operation is over, the remaining total time displays "Complete"; click "End" to terminate the file operation.

5. System settings

Click the "System Settings" icon in the main interface to enter the system settings interface. As shown below:
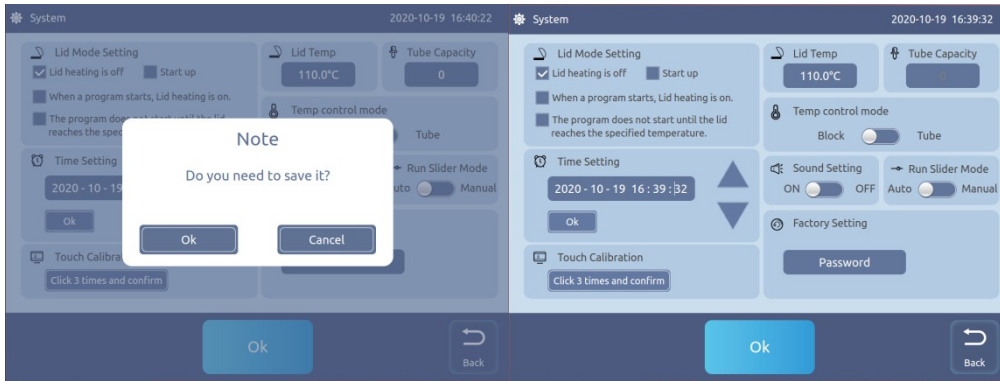
Can set the hot-lid mode, hot-lid temperature, test tube capacity, as well as the system time and sound.
If you feel the touch is not sensitive during the use of the instrument, you can touch to calibrate it.
After setting, click "OK" to save the setting. Click "Return" to return to the main interface. If the parameters are modified, the dialog box "Need to save?" will pop up.

6. User Management

Click the "User" icon in the main interface to enter the user list on the user management interface. As shown below:
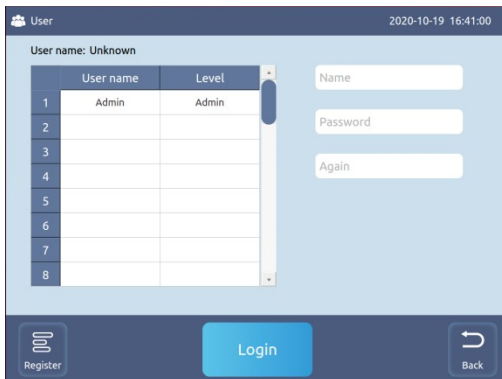
Click "Register" to enter the registration interface, enter the user name and password, and click "OK" to complete the registration.
Click "Login" to enter the login interface and enter the password to complete the login. In the logged-in state, press "Logout" to log out the currently logged-in user.
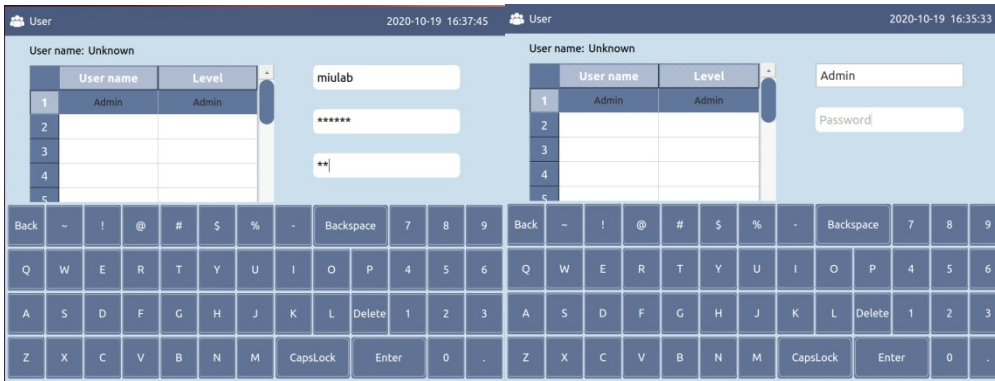
When the administrator is logged in, select a user in the list and click "Delete" to delete it. Click "Return" to return to the main interface.

7. Help

Click the "Help" icon in the main interface to enter the help interface. As shown below:
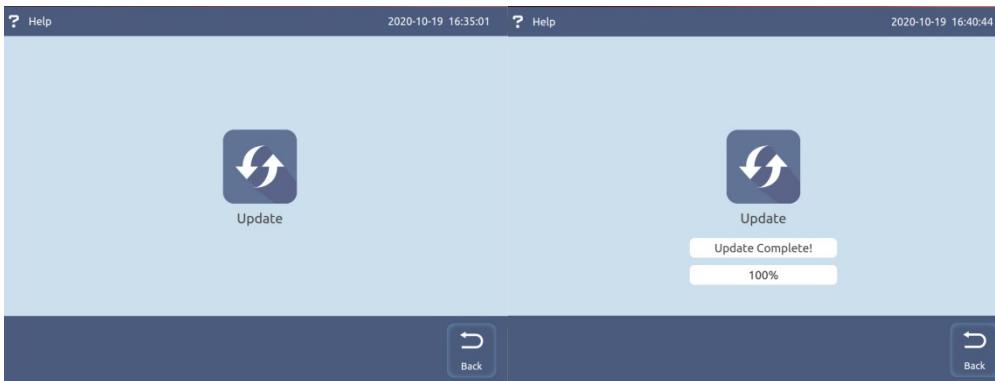
Insert the U disk with the system files and click "Update" to upgrade the system.

05 Fault analysis and processing

Fault analysis and processing method

No.	Error message	Possible causes and corresponding countermeasures
1	The display shows an error code	The sensor is open or short, return to the factory for repair
2	The display is not bright or abnormal	Hardware failure, return to factory for repair
3	Touch failure	Hardware failure, return to factory for repair
4	Block does not heat	Hardware failure, return to factory for repair

5	Block temperature is too high/too low	Hardware failure, return to factory for repair
6	Hot lid does not heat	Hardware failure, return to factory for repair
7	Heat lid temperature is too high	Hardware failure, return to factory for repair
8	The fan does not turn	Hardware failure, return to factory for repair

Annex A BHTC-501 Thermal Cycler Wiring diagram

(Below diagram is just for reference. It is subject to change without prior notice.)
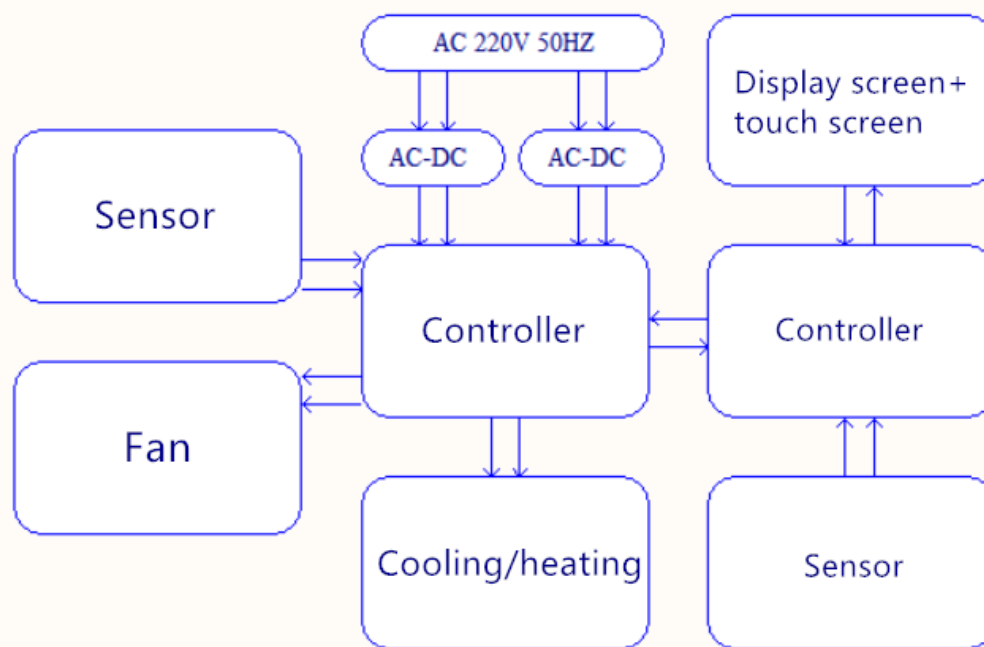
Email: info@biolabscientific.com
Website: www.biolabscientific.com