



Thermal Cyclor (PCR Machine)

Operation Manual

(Please read the instruction carefully before you use the machine)

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1. Important Information

1.1 Essential Safety Operation Information



Warning – Electrical and Operational Safety

- Before operating the instrument, users must have a complete understanding of its functions and working principles.
- Carefully read this manual before operating the instrument.
- Do not operate the instrument without reading the manual.
- Failure to follow the instructions may lead to accidental injury or electric shock.

1.2 Safety



Warning – General Safety

- During operation, maintenance, and repair of this instrument, the following basic safety precautions must be observed. Ignoring these instructions, or the warnings indicated elsewhere in this manual, may compromise the protection provided by the instrument and exceed its intended use.
- This instrument complies with GB9706.1 Standard and is classified as Class I, Type B general equipment.
- For indoor use only.



Warning – Authorized Personnel Only

- The instrument must only be operated by qualified personnel trained in the installation and use of electrical equipment.
- Operators must not attempt to open or repair the instrument. Unauthorized access will void the warranty and may result in electric shock.
- Repairs must only be carried out by the manufacturer or authorized service personnel.



Caution – Electrical Safety

- The power cord must be properly grounded. The instrument uses a three-core grounding plug, and the third pin is for grounding only. It must be used with a grounded socket.
- Ensure the power supply voltage matches the instrument's rated voltage.
- Verify that the socket's load capacity meets or exceeds the instrument's requirements.
- If the power cord is damaged, replace it with one of the same type and specification.



Warning – Power Cord Handling

- Do not place objects on the power cord.
- Do not place the cord in walkways.
- Always pull the plug, not the cord, when disconnecting from power.
- Ensure the plug is fully inserted into the socket.



Warning – Hot Surfaces

- The metal module of the instrument may reach high temperatures during normal operation.
- This may cause burns or boiling liquid to splash.
- Do not touch heated surfaces with any part of the body.



Environmental Requirements

- Place the instrument in a dry, dust-free, well-ventilated room.
- Keep away from water, direct sunlight, corrosive gases, strong magnetic fields, radiators, stoves, and other heat sources.
- Do not place in humid or dusty areas.
- Ventilation openings must remain unobstructed.
- When using multiple units, maintain at least 30 cm spacing between instruments.



Power-Off Precautions

- Switch off the power after use.
- If the instrument will not be used for an extended period, unplug it and cover with a soft cloth or plastic sheet to prevent dust entry.

1.3 When to Stop Using the Instrument

- Immediately disconnect the power plug and contact the supplier or qualified service personnel if:
- Liquid spills into the instrument.
- The instrument is exposed to rain or water.
- Abnormal operation occurs, especially with unusual noises or odors.
- The instrument is dropped or its casing is damaged.
- The instrument shows a significant change in performance.

2. Product Introduction

The Thermal Cycler is the latest generation of fast and practical PCR amplification instruments. It adopts advanced semiconductor chip technology with excellent temperature control performance, supporting more than 1,000,000 thermal cycles. The qualitative PCR functions have been optimized to the extreme, providing powerful performance to meet the demands of advanced laboratory applications.

Product Features

- 1) Compact size, space-saving design, and elegant appearance.
- 2) Six-zone temperature control design with higher precision compared to conventional gradient systems.
- 3) Superior temperature uniformity, minimizing edge effects on the sample block.
- 4) Next-generation semiconductor chip technology with maximum heating/cooling rate of 6°C/sec.
- 5) High-resolution 8-inch color touchscreen (1024×768 pixels) for easy and intuitive operation.
- 6) Industrial-grade operating system with automatic power-off protection. In case of power interruption, the system automatically resumes the unfinished cycle upon power restoration, ensuring safe and reliable amplification.
- 7) Wide gradient range of 42°C, allowing for optimized experimental conditions to meet demanding research requirements.

3. Specifications

3.1 Normal Operating Conditions

- Ambient Temperature: 5°C ~ 30°C
- Relative Humidity: ≤ 70%
- Power Supply: AC 100–240 V, 50/60 Hz

3.2 Technical Specifications

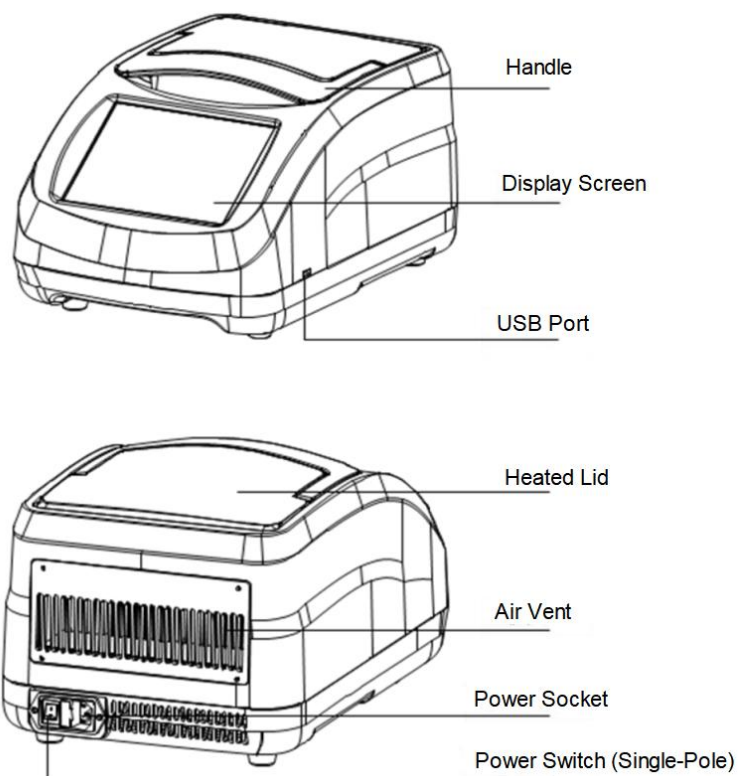
Item	Specification
Temperature Control	Block or Tube
Sample Capacity	96 × 0.2 ml (half-skirt, non-skirt); 12 × 8 tube strips; 8 × 12 tube strips; single tubes (height 20–23 mm)
Intelligent Heated Lid	Automatically turns off when sample temperature < 30°C or program ends
Module Temperature Range	0–105°C
Time Increment/Decrement	-599 to +599 sec
Long PCR Experiments	Supported
Temperature Zones	6
Temperature Change Rate	0.1–6°C/s
Module Display Accuracy	0.1°C
Temperature Increment/Decrement	-9.9 to +9.9°C
Touchdown PCR	Supported
Module Temperature Uniformity	±0.25°C
Display	8-inch, 1024 × 768 pixels
Module Temperature Accuracy	±0.2°C
Program Storage Capacity	>10,000 programs
Single-Step Timing Range	1 sec – 59 min 59 sec / 0 = unlimited
Max. Cycle Number	99
Heated Lid Temperature Range	30–110°C
Max. Step Number	30
Max. Heating Rate	6°C/s
Program Pause Function	Available
Max. Cooling Rate	5°C/s
16°C Holding Function	Unlimited (“Forever”)
Gradient Temperature Range	30–105°C
Real-Time Running Status	Graphic + Text display

Gradient Temperature Difference	0.1–42°C
Communication Interface	USB 2.0
Gradient Temperature Accuracy	±0.3°C
Dimensions (L×W×H)	400 × 260 × 228 mm
Gradient Temperature Uniformity	±0.3°C
Net Weight	8.5 kg
Operating System	Linux
Power Consumption	700 W

4. Operating Instructions

This chapter mainly introduces the structure of the instrument and the preparations before powering it on. When using the instrument for the first time, please make sure to read and familiarize yourself with the content of this chapter before switching on the unit.

4.1 Structural Diagram



4.2 Power-On Display

Connect the power socket of the gene amplification instrument to an AC 100–240 V, 50/60 Hz power supply. Then switch on the power. The instrument will display a startup welcome screen, showing the product name, as illustrated in Figure 1. After a few seconds, the screen will automatically switch to the main interface.



Figure 1 – Welcome Screen

The main interface primarily contains four option buttons: File, Settings, User Management, and Calculate, as shown in Figure 2. The top title bar of the interface simultaneously displays the logged-in user name and the current time. If the title bar shows “Guest”, it indicates that no account is currently logged in.

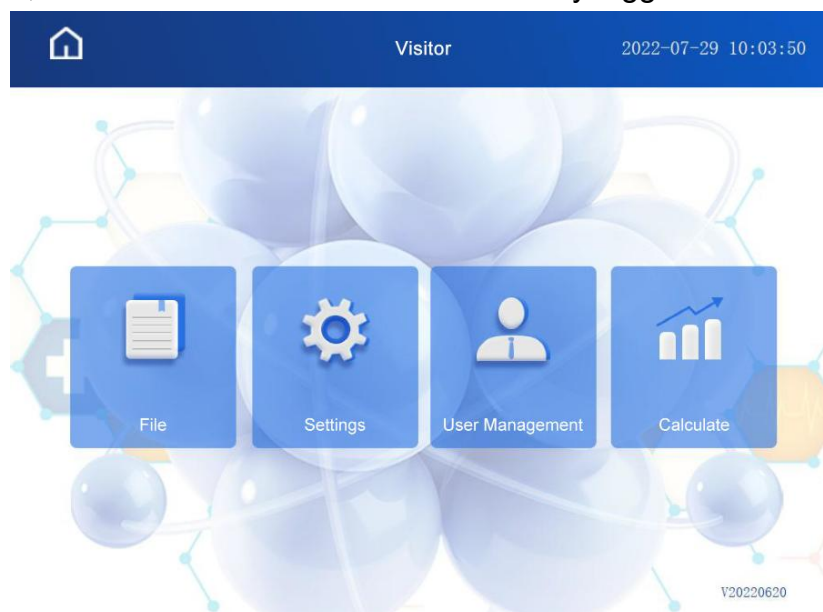


Figure 2 - Main Interface

4.3 File

On the main interface, click the File icon to enter the File window. In the File window, you can see the top title bar, the file browsing pane, the program preview pane, and the bottom button bar.

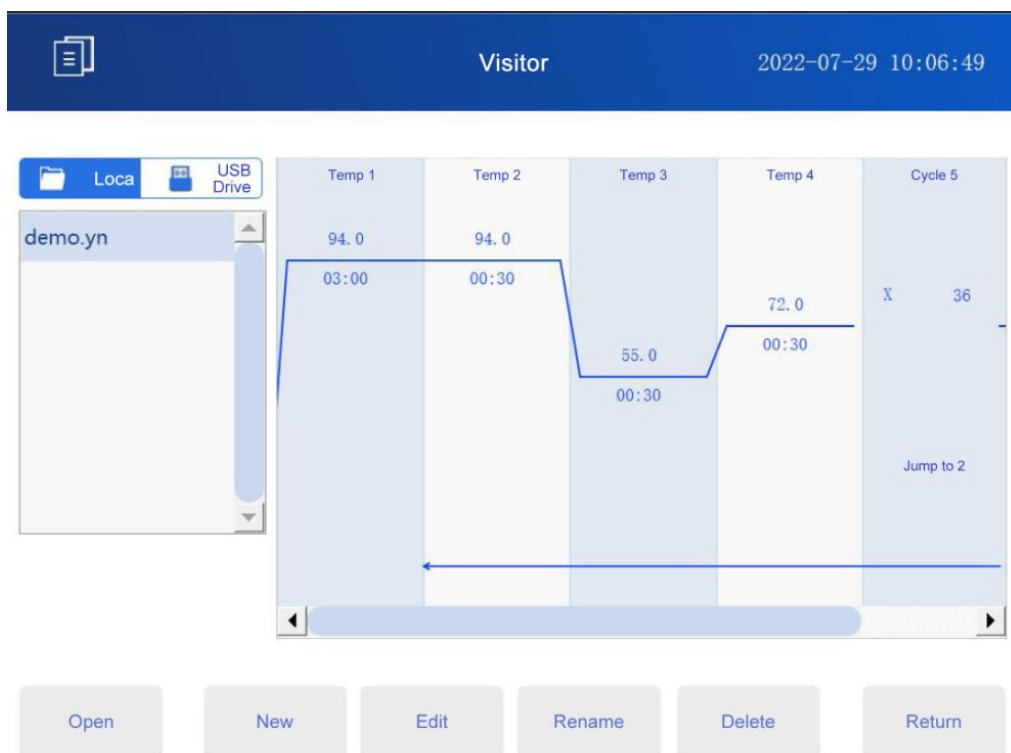


Figure 3 – File Management Window

(1) File Browsing Pane

The browsing pane allows you to view PCR amplification program files with the “.yn” extension stored on the local device or a USB drive.

Click the Local button above the browsing pane to display local files. Selecting a file will simultaneously display its program steps in the preview pane. You can scroll horizontally in the preview pane to view all steps.

If a USB drive is connected to the instrument, a “Backup to USB” button will appear below the browsing pane. Clicking this button backs up the selected program to the USB drive.

When a USB drive is inserted, the browsing pane displays the PCR program files stored on it. Select a file and click the “Backup to Local” button below the browsing pane to copy the selected program to the local device. When the browsing pane switches back to local view, you will see the newly backed-up files.

(2) Program Preview Pane

The preview pane allows you to view the setup of the selected program. Each program supports a maximum of 30 steps, and the scroll bar in the preview pane can be used to navigate through all steps.

(3) Button Bar

The button bar includes Open, New, Edit, Rename, Delete, and Return buttons. The first five buttons operate on the program file selected in the browsing window. The Return button takes you back to the main interface.

4.4 Creating a New File

In the file management window, click the “New” button in the button bar to open the program creation and editing interface. The interface is shown in Figure 4. The central display box shows the program list, where program steps and cycle steps can be added or deleted.

(1) Adding to the Program List

To add a program step, first select the position in the program list where you want to insert it. (Note: the program defaults to Program List 1. When selecting a list position, avoid clicking on the temperature or time number display areas above or below the temperature curve, or you will enter the parameter modification mode and a corresponding input keyboard will pop up.) Then click the “Temperature” and “Cycle” buttons in the button bar to add a program step after the selected list position.

(2) Deleting from the Program List

Select the program list you want to delete, and click the “Delete” button in the button bar to remove the selected program list.

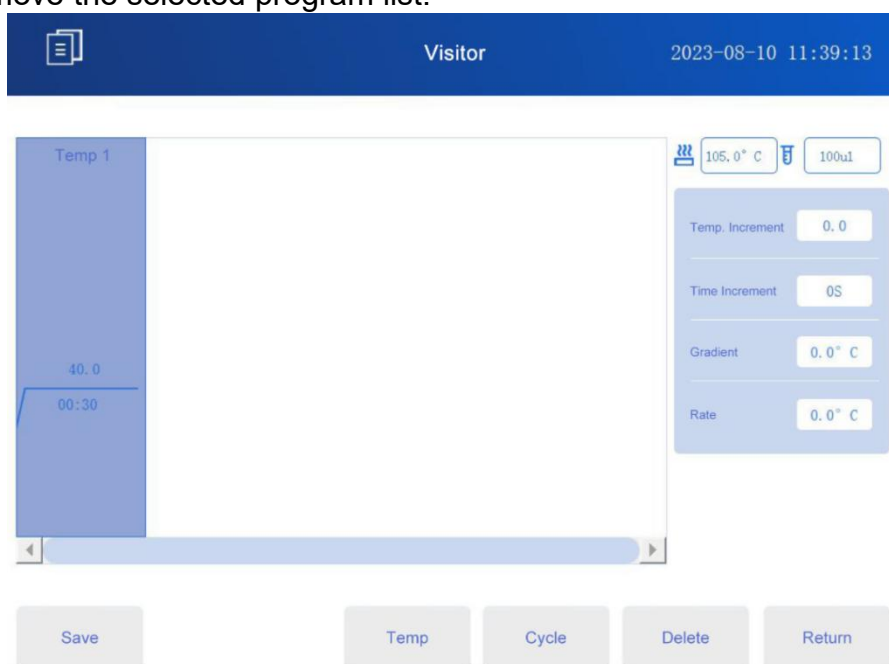


Figure 4 – Program Editing Interface

(3) Modifying Program Step Parameters

Above the temperature line in the program list are the temperature set values, and below it are the time set values. Click on the temperature or time number display area to bring up the input keyboard.

The temperature modification range is 0.0–105°C. The temperature modification interface is shown in Figure 5. On the keyboard, the “Clear” button clears the numbers in the input box, the “Enter” button confirms and saves the modified value to the program list, and the “Return” button closes the keyboard without making any changes, leaving the program list parameters unchanged.

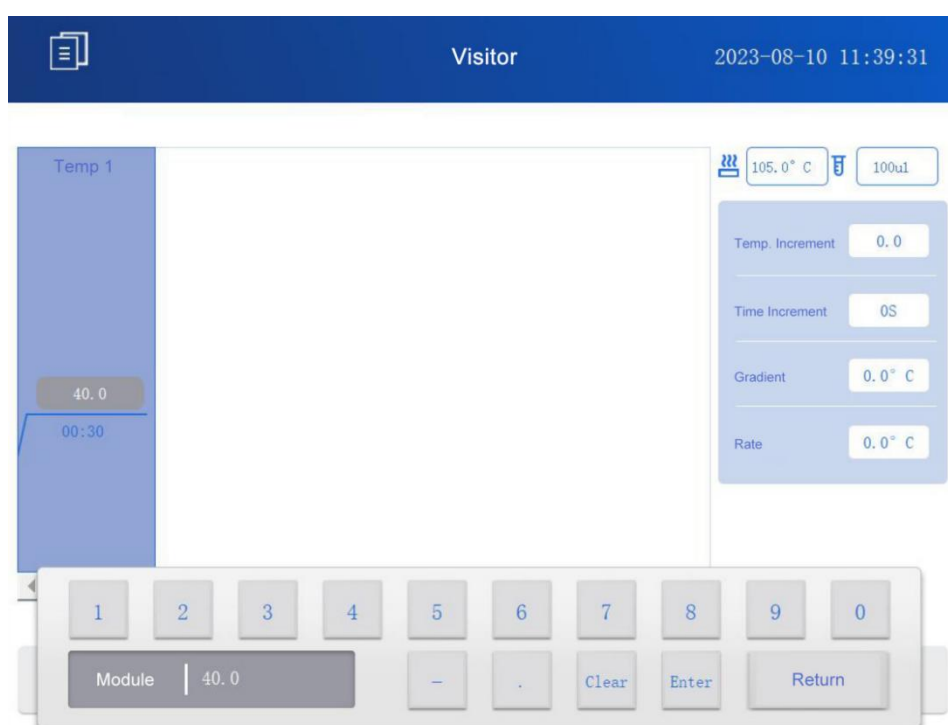


Figure 5 – Temperature Modification Keyboard

The time modification range is 00:00–59:59. Pay attention to the input format “xx:xx,” where each “x” can be any number from 0 to 9 (do not enter values outside this range). No digits can be omitted. For example, to enter 6 seconds, input “00:06” on the keyboard. After entering the first two digits “00,” the colon “:” will be automatically added, so you do not need to enter it manually. Continue entering “06” and finally press “Enter” to complete the input. The time modification interface is shown in Figure 6.

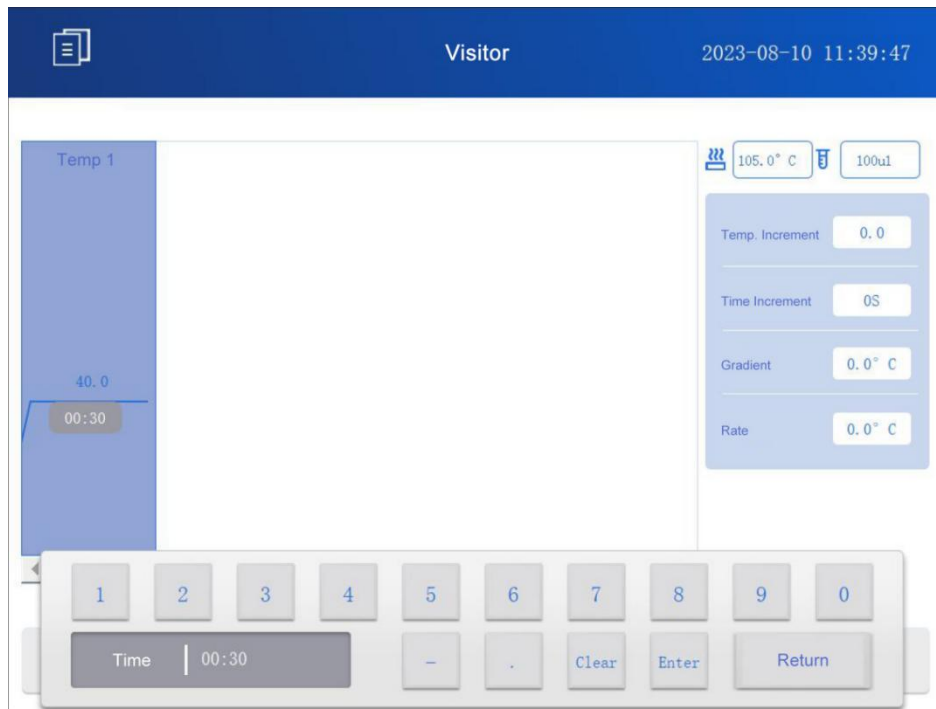


Figure 6 – Time Modification Keyboard

In a cycle step, the number following the “x” symbol represents the cycle count, and the number following “Jump” indicates the jump step number. To modify the cycle count, click on the cycle number, and the cycle input keyboard will automatically appear. Enter the desired number of cycles on the keyboard and press the “Enter” button to confirm. Press the “Return” button to cancel the current modification and return to the program list interface. The modification interface is shown in Figure 7.

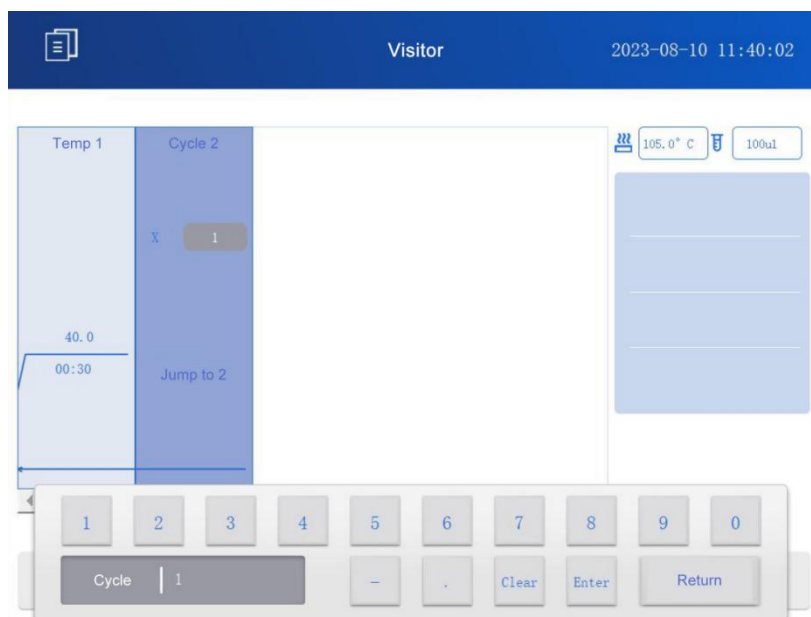


Figure 7 – Cycle Step Cycle Count Setting

To modify the jump step number, click on the jump step number, and the jump step input keyboard will automatically appear. Enter the desired jump step number on the keyboard and press the “Enter” button to confirm. Press the “Return” button to cancel the current modification and return to the program list interface. The modification interface is shown in Figure 8.

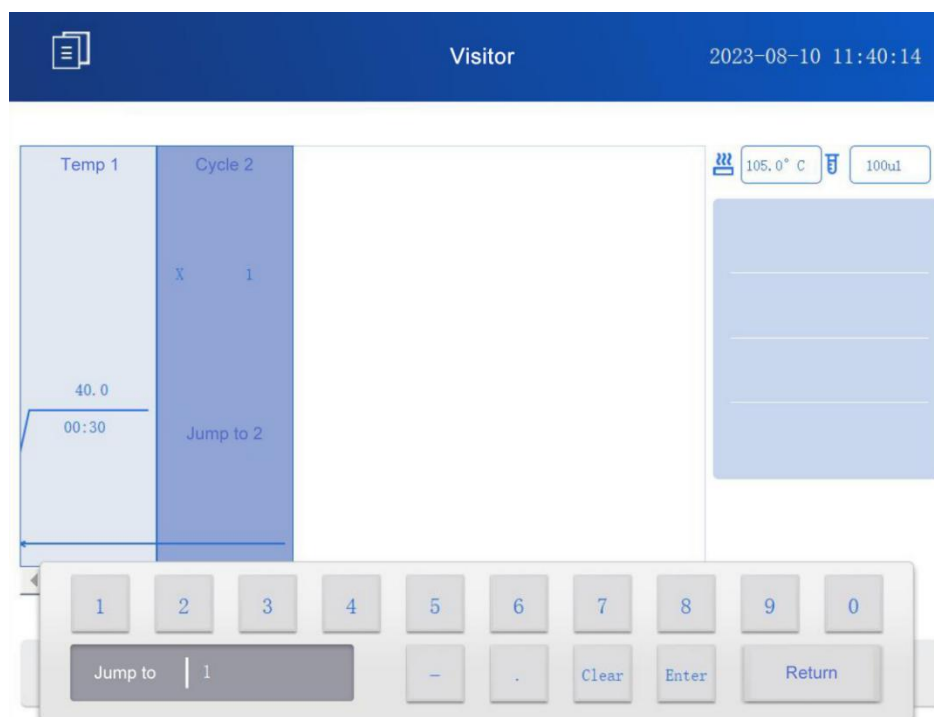


Figure 8 – Cycle Step Jump Step Number Setting

(4) Other Parameter Settings

When setting a temperature step, you can also adjust “Temperature Increment,” “Time Increment,” “Rate,” and “Gradient” on the right side of the display box. Temperature Increment and Time Increment take effect during temperature cycling control. To set these parameters, click on the display box to bring up the input keyboard, and enter the desired values. The default values for Temperature Increment, Time Increment, Rate, and Gradient are all zero. When the Rate parameter is zero, the instrument operates at maximum speed.

(5) Saving a Program

After setting the temperature steps, cycle steps, and parameters, click the “Save” button to automatically open the program name editing interface. The interface is shown in Figure 9. The default name for a new program is “test.” You can modify the program name or change it to the original name of an existing program. The program

name can be up to 10 characters long. On the keyboard, the “del” button clears all input characters, the “Caps” button toggles between uppercase and lowercase letters (blue background with white text indicates uppercase, gray background with blue text indicates lowercase), the “BS” button deletes one character, and the “Enter” button confirms and saves the entered file name.

Figure 9 – Program Name Input Interface

4.5 Running a File

In the file browsing window, select the program you want to run and click the “Open” button in the button bar to open the program. The interface is shown in Figure 10.

In this interface, you can view the heated lid working temperature and tube volume for the selected program. Each file can be set individually. The heated lid can be set between 30–110°C, and the tube volume can be set between 0–100 µL. To make changes, click the “Edit” button in the interface to modify the program again.

After setting the working mode and parameters, click the “Run” button in the button bar to start the program.

During program execution, flashing segments indicate the current program step and status. A slanted line indicates that the program is transitioning between the previous step and the current step. A horizontal line indicates that the program temperature is

stably operating at the current step.

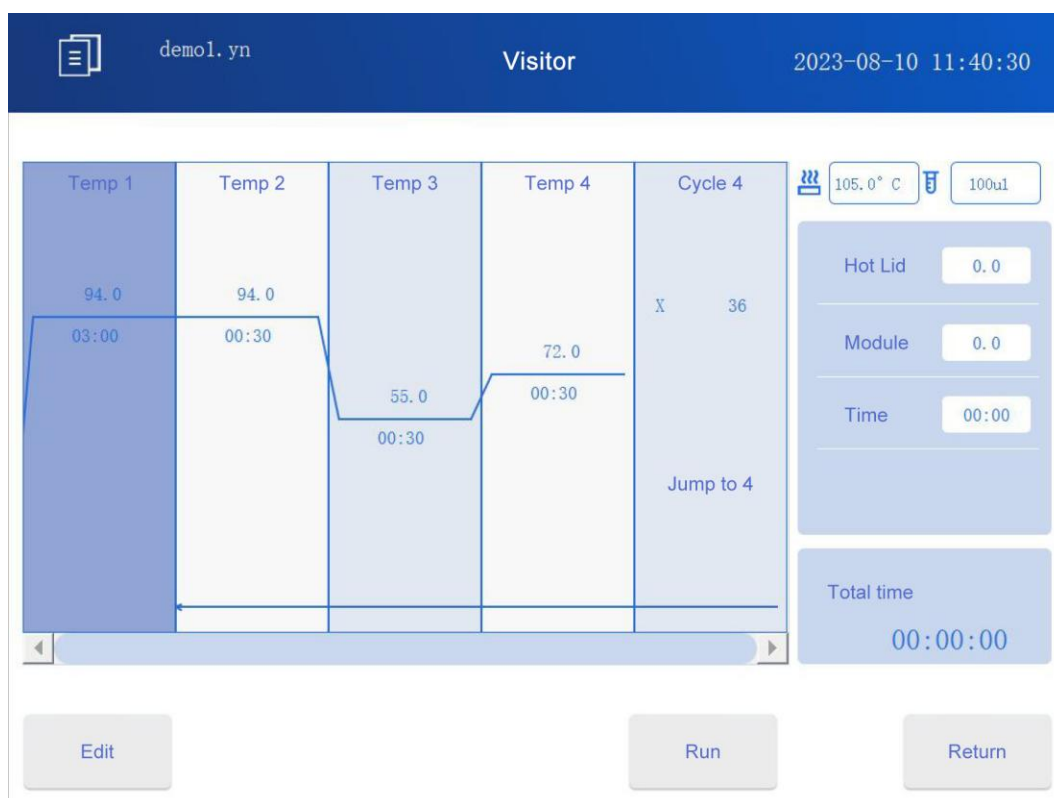


Figure 10 – Program Open Interface

During program execution, you can click the “Pause” button in the button bar to bring up the pause confirmation dialog. In the dialog, select “Yes” or “No.” Click “Yes” to pause the program countdown; click “No” to cancel the pause and continue the countdown. After pausing, click the “Continue” button to resume the countdown.

Click the “Skip” button to bring up the skip function dialog. In the dialog, select “Yes” or “No.” Click “Yes” to skip the current program step and proceed to the next step. Click “No” to cancel the skip operation, and the instrument will continue operating at the current program step.

Click the “Stop” button to bring up the stop function dialog. In the dialog, select “Yes” or “No.” Click “Yes” to stop the program and halt instrument operation. Click “No” to cancel the stop operation and continue running the program.

The program running interface is shown in Figure 11.

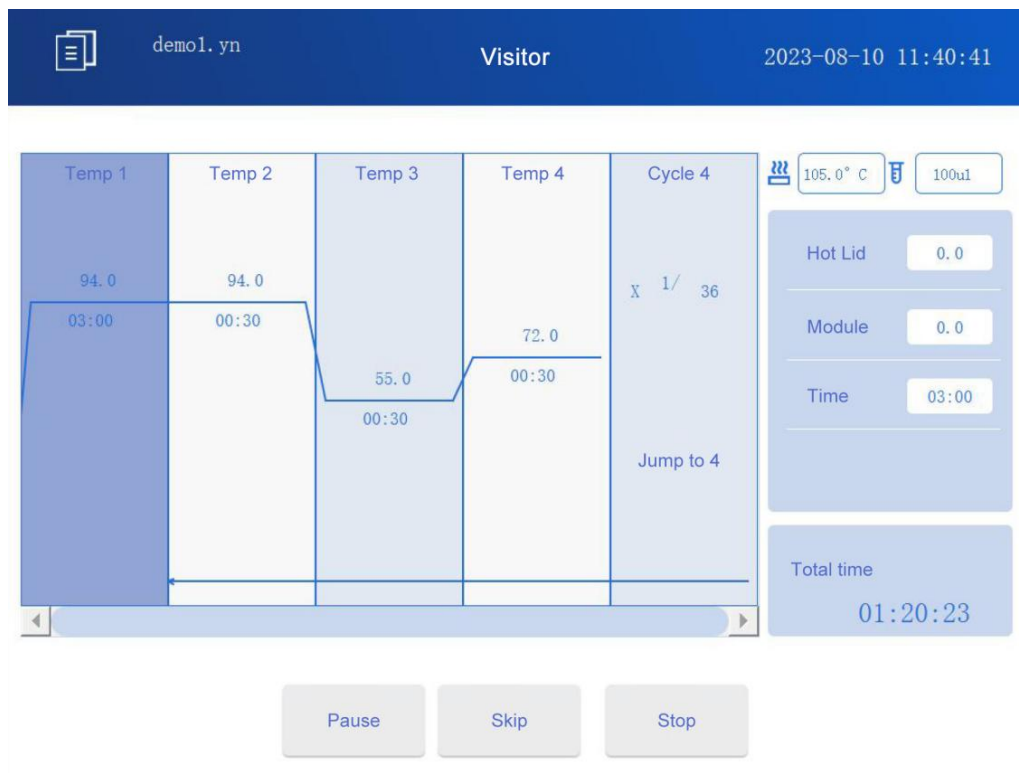


Figure 11 – Program Running Interface

4.6 Settings Interface

On the main interface, click the “Settings” icon to open the settings interface. The main functions in the settings interface include adjusting the heated lid mode, time, heated lid temperature, sound prompt, software upgrade, and touch calibration button. The interface is shown in Figure 12.

(1) Heated lid mode has four options

A. Off: The heated lid is turned off, and it does not operate while the PCR instrument is running.

B. On: When the instrument is turned on, the heated lid begins preheating according to the set temperature.

C. Run Program with Heated Lid On: When starting a PCR program, the program can run without waiting for the heated lid to reach the set temperature.

D. Heated Lid First: When starting a PCR program, the heated lid is first controlled to reach the temperature set in the settings interface, and then the PCR program begins. During the time the heated lid is heating to the set temperature, the module temperature is automatically maintained at the value set in the settings interface.

(2) Time Setting

To set a time parameter, first click on the position of the time number, and a blinking cursor will appear. Adjust the value by clicking the triangle “▲” or “▼”. Clicking “▲” once increases the value by 1, and clicking “▼” once decreases the value by 1, until the desired value is reached.

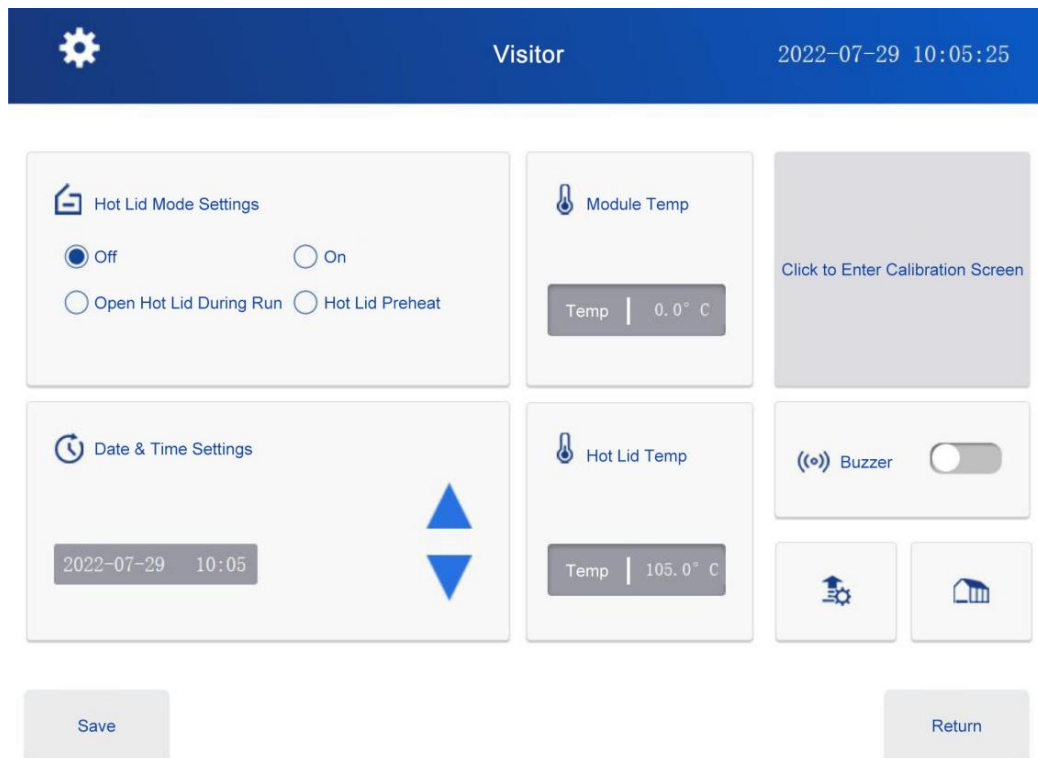


Figure 12 – Settings Interface

(3) Module Temperature

The module temperature setting takes effect when the heated lid mode is “Heated Lid First.” During heated lid heating, the module maintains the set temperature. To set it, click on the module temperature display box, and the input keyboard will automatically appear. Enter the desired module temperature and press the “Enter” button to confirm. The default module temperature is 30°C.

(4) Heated Lid Temperature

To set the heated lid temperature, click on the temperature display box, and the input keyboard will appear automatically. Enter the desired heated lid temperature and press the “Enter” button to confirm. The default heated lid temperature is 105.0°C.

(5) Sound Prompt

When the sound setting button appears gray, the sound is off; when it appears blue,

the sound is on.

(6) Software Upgrade

Copy the upgrade package to a USB drive, insert it into the instrument's USB port, and click the upgrade button. A dialog box will appear with a progress bar. Once the upgrade is complete, the instrument will restart automatically.

4.7 User Management

The User Management function allows each user to manage their own PCR amplification programs independently. Users cannot browse, modify, or delete other users' programs, ensuring program security.

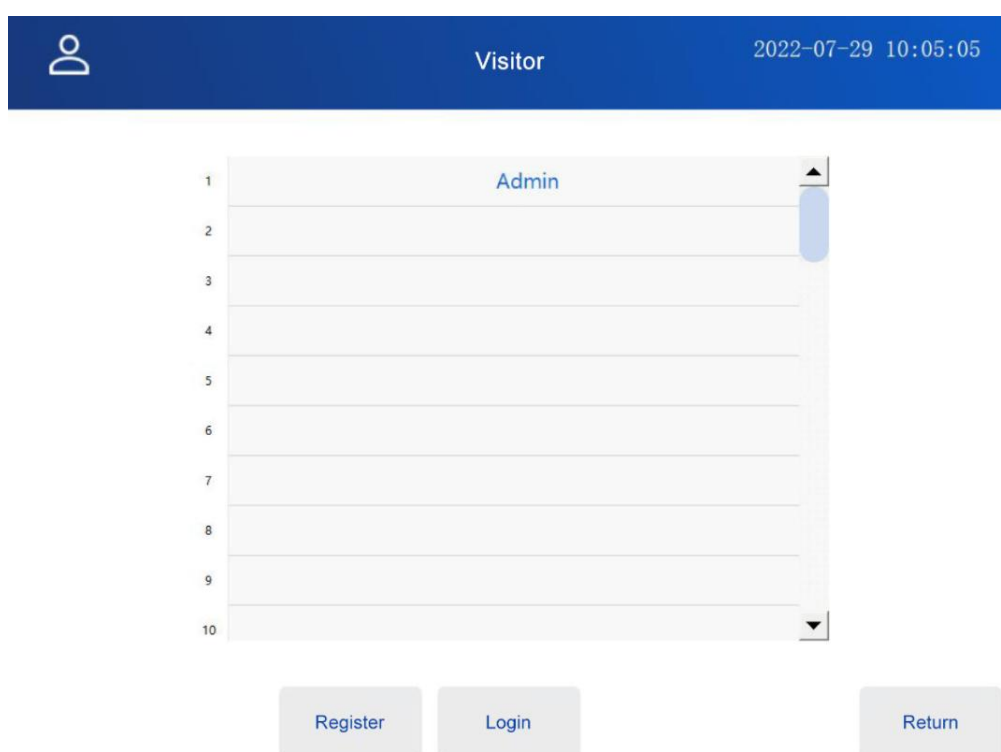


Figure 13 – User Management Interface

On the main interface, click the “User” icon to enter the management interface. In user management, the administrator “admin” account has the highest management level and can modify passwords of other registered users and delete users. Other accounts do not have the ability to modify the administrator or other users' passwords, nor to delete users.

In user management, click the “Register” button to enter the user registration interface. Enter the username and password on the interface, then click the “Enter” key on the keyboard area to complete the registration. After a user is registered, they are logged in by default. At this time, return to the file management interface. In file

browsing, there are no files, so running a PCR amplification program requires creating new files or importing from a USB drive.

After a user logs in, restarting the instrument requires re-login, and users can also log out manually. To log out manually, enter the user management interface and click the “Exit” button in the button bar; the user will then log out of the account.

Once a user is registered, they can directly select the username in the user directory, click the “Login” button in the button bar, enter the password in the password input box, and press the “Enter” button on the keyboard to log in to the user account.

4.8 Gradient Calculator

On the main interface, click the “Gradient Calculator” icon to enter the gradient calculation interface. The interface is shown in Figure 14. In this interface, the module input box allows entry of values within the temperature range of 30–69.9°C, and the gradient input box allows entry of values within the gradient range of 0.1–42°C. After entering the values, click the “Calculate” button in the button bar to determine the temperatures of the 12-column wells on a 96-well plate.



Figure 14 – Gradient Calculator Interface

5. Fault Analysis and Troubleshooting

No.	Fault Phenomenon	Cause Analysis	Solution
1	After turning on the power, the display does not show anything or is black	Power not connected	Check the power connection and connect properly
		Power damaged	Replace the power supply
		Switch damaged	Replace the switch
		Other	Contact the supplier or manufacturer
2	Block temperature significantly deviates from the actual temperature	Sensor circuit or Peltier circuit damaged	Contact the supplier or manufacturer
3	Block does not heat	Temperature sensor circuit or Peltier circuit damaged	Contact the supplier or manufacturer
4	Touch screen not working	Touch screen damaged	Contact the supplier or manufacturer
5	Heated lid does not heat	Heating film or heating circuit damaged	Contact the supplier or manufacturer
6	Heated lid temperature too high	Heating circuit or temperature detection fault	Contact the supplier or manufacturer
7	Cooling fan does not operate	Fan damaged or control circuit fault	Contact the supplier or manufacturer
8	Interface displays “ERR1.xx: Sensor open circuit”	Temperature sensor open circuit fault, “xx” indicates the channel	Contact the supplier or manufacturer
9	Interface displays “ERR2.xx: Sensor short circuit”	Temperature sensor short circuit fault, “xx” indicates the channel	Contact the supplier or manufacturer
10	Interface displays “ERR3.xx: Sensor overtemperature”	Temperature sensor overtemperature fault, “xx” indicates the channel	Contact the supplier or manufacturer

6. Maintenance

The instrument should be regularly cleaned using a lint-free cloth lightly moistened with anhydrous alcohol to wipe the conical wells on the module. This ensures proper contact between the test tubes and the conical walls, maintains good heat conduction, and prevents contamination. If there are stains on the instrument surface, they can be cleaned with a lint-free cloth moistened with cleaning paste.



When cleaning the instrument, the power must be turned off. When cleaning the conical wells on the module, it is strictly forbidden to allow cleaning agents to drip into the wells. Corrosive cleaning agents must never be used on the instrument surface.

7. Warranty

Warranty is effective from the date of purchase and is non-transferable.

For more details about the warranty, please refer to the link below:

stonylab.com/pages/warranty

For any inquiries or assistance, feel free to contact us:

Company: StonyLab Inc.

Email: support@stonylab.com

Phone: 631-406-6080

Website: stonylab.com

This instruction manual is subject to change without prior notice.