

MultiCycler™ series

MultiCycler™ 248 and MultiCycler™ 332 **Multi-block Thermal Cyclers**

User Manual



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Please read the manual carefully before using the Thermal Cycler!

Purpose of This Manual This manual provides instructions on how to set up and use the Thermal Cycler. We reserve the right to modify this manual at any time without prior notice.

Writing Conventions This manual uses the following conventions:

- **Bold** text indicates user operation.

For example:

Touch **OK** to accept changes and return to last screen.

- **Note:** Provides instructions that draw your attention or may be helpful.

For example:

Note:

When the instrument is set aside for a long time, disconnect the power cable from the socket.

- **IMPORTANT!** Provides information that must be read carefully. Failure to follow the information will possibly result in damage to the instrument or the user.

For example:

IMPORTANT!

Turn the lid knob anticlockwise to loosen the lid before opening to prevent damage to the lid.

IMPORTANT!

To prevent electric shock, please turn off the power and disconnect the power supply prior to cleaning.

A Instrument Overview

1. Instrument Component

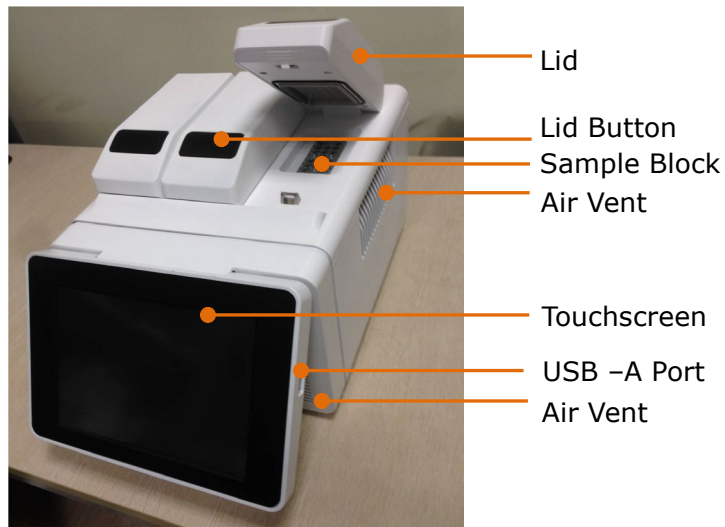


Figure 1.a Front View of Thermal Cycler with Three Blocks



Figure 1.b Front View of Thermal Cycler with Two Blocks

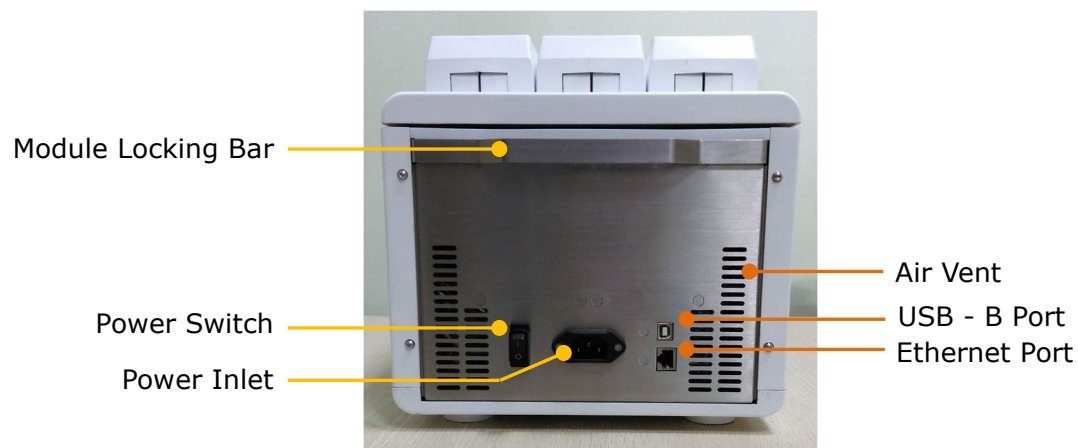


Figure 2 Rear View of the Thermal Cycler

Table 1 Function of the Thermal Cycler Components

Component	Function
Lid	Heats the top surface of reaction vessels to prevent reaction sample evaporation and condensation.
Lid Button	Push the button to open the lid (Thermal Cycler with three blocks).
Lid Handle	Open and close the lid (Thermal Cycler with two blocks).
Sample Block	Holds reaction vessels (tubes or microplates).
Air Vents	Allows for ventilation.
Touchscreen	Views and controls the instrument. For optimum screen performance and visibility, the angle of the touchscreen can be adjusted.
USB - A Port	Connects to a USB.
USB - B Port	Connects the Thermal Cycler to a computer.
Ethernet Port	Network control multiple Thermal Cyclers by a computer.
Module Locking Bar	Locks the block module in place.
Power Switch	Powers on (1) and powers off (0) the instrument.
Power Inlet	Connects the instrument to a socket via supplied power cable.

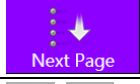
2. Menu Overview

Table 2 and Figure 3 describe buttons and virtual keyboard common to many of the screens.

IMPORTANT!

Do not use any sharp object (e. g., a pencil) to touch the touchscreen as it may cause damage.

Table 2 Buttons in the screens of the Thermal Cycler

Button	Function
	Return to the Home screen.
	Closes current screen and returns to previous screen.
✓	Accepts present parameter settings and closes the screen.
✕	Closes current screen without changing any parameters.
 	Moves between pages (i. e., Page Up and Page Down).
	Scrolls left or right to view graph or curve.

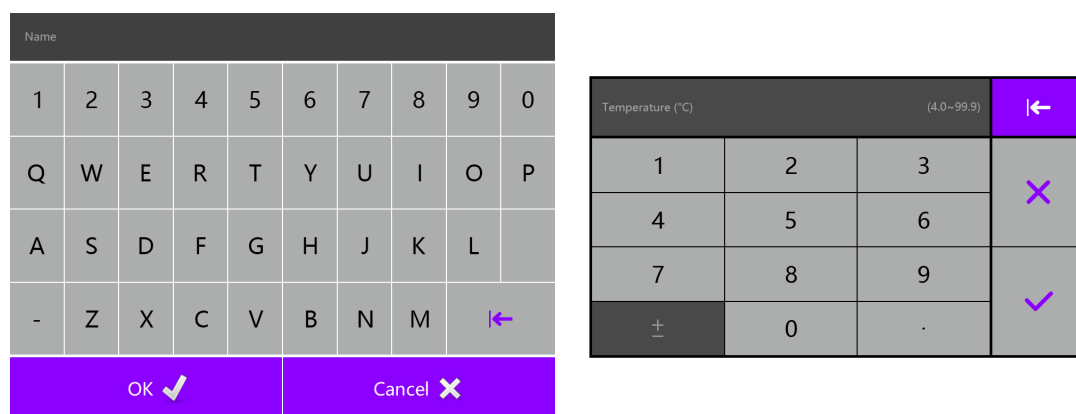


Figure 3 Virtual keyboard in the screens of the Thermal Cycler

Text entered with virtual keyboards:

To...	Touch...
Enter a letter/number	A letter/number button.
Join several words	Hyphen -
Delete the last character in an input field	

B Getting Started

1. Install the Thermal Cycler

1.1 Site Requirements

The Thermal Cycler is intended for indoor use. Ensure that the installation site meets conditions below.

Power supply

The Thermal Cycler has a universal, 100-240V power supply and is supplied with an appropriate plug. Be sure that the instrument is connected to a reliable power outlet that is rated to handle the load of the thermal cycler.

Environmental Conditions

Table 1 Temperature and humidity conditions:

Condition	Acceptable range
Ambient temperature	10 to 30°C (50 to 86°F)
Relative humidity	20 to 80%, non-condensing

Place the Thermal Cycler on a level table or bench. Avoid placing the instrument adjacent to heaters, cooling instruments, water sink or in direct sunlight. Keep away from any equipment that vibrates, such as a refrigerator or centrifuge. The recommended distance between the instrument and the back wall or another instrument is 20 cm and 30 cm (7.9 in / 11.8 in), respectively.

1.2 Unpack

1. Remove the packaging materials and store them in case of shipping damage to the unit.
2. Inspect the instrument for shipping damage.
3. Included in the box should be:
 - The Thermal Cycler and module
 - Appropriate power cable
 - User Manual (this manual) including warranty certificate
 - Performance Test Statement or pass card (if have)

IMPORTANT! If the Thermal Cycler is damaged or some items are missing or damaged, contact our company or local distributor.

4. Move the unit to the desired installation site.

1.3 Power On and Power Off

1. Connect the power cable to the power inlet in the rear of the instrument.
 2. Connect the plug of the power cable to the socket. Make sure the power cable has connected to both power inlet and socket firmly.
- To power on: Turn the power switch to position '1'.
- To power off: Turn the power switch to position '0'.

Note: When the Instrument is not used for extended periods of time, disconnect the power cable from the wall socket.

1.4 Open and Close Lid

The lid of the Thermal Cycler can be adjusted to come into contact with and apply pressure to the tops of the reaction vessels to prevent evaporation. Heating of the lid protects reaction samples from condensation.

IMPORTANT!

Temperature of the lid can be very high (105°C/221°F or higher). Never touch the inner surface of the lid when the temperature is above 50°C.

To open the lid:

For Thermal Cycler with three blocks,

Push the lid button, lid will automatically bounce up.

Lift up the lid until the lid keeps opening vertically. You can then place reaction vessels in the sample block or remove samples from the block.



Press the hot cover button to bounce the open heat cover



Pull up the lid handle to open the lid



Continue pulling the lid handle to make the lid at a vertical position

For Thermal Cycler with two blocks or other types of Thermal Cycler ,

1. Pull up the lid handle, and the lid opens following the handle movement.

To close the lid:

For Thermal Cycler with three blocks,

Hold the lid down and let it touch the chassis until you hear a 'click' sound.

The lid will be locked in place.

For Thermal Cycler with two blocks or other types of Thermal Cycler ,

Grip the lid handle and continue to press the handle until it is at a horizontal position.

1.5 Block Module Exchange

Block module exchange can be performed within seconds without the need for tools.

IMPORTANT!

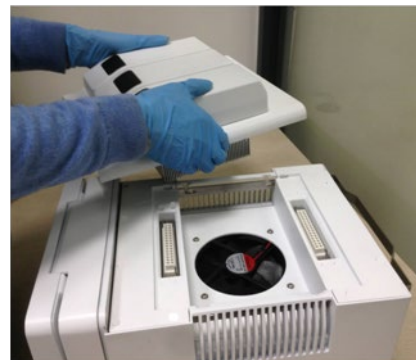
If a program is running, stop the program run first. Then power off and disconnect the power cable from the socket before replacement of the block.

To remove the block module:

1. Pull the module locking bar backwards to unlock and release the block module.
2. Put your hand on the left and right side of the block module and lift it up vertically.
3. Store the block module in a clean, secure box.

To insert the block module:

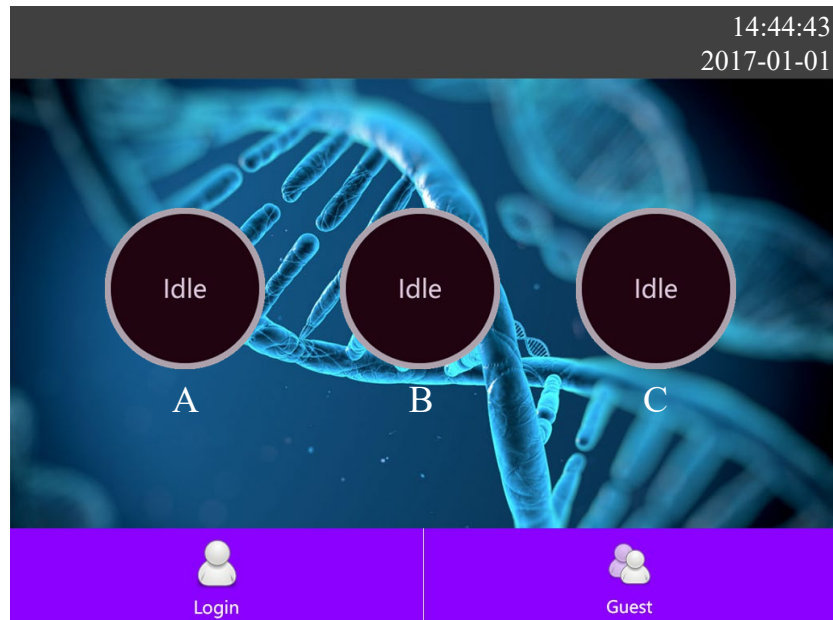
1. Pull the module locking bar backwards firstly. Put your hand on the left and right side of the block module, with the lid button of the block module pointing to the front. Place the block into the hollow cavity of the chassis and press tightly and evenly.
2. Push the module locking bar forward to lock the block module in place.



2. Introduce the Home Screen

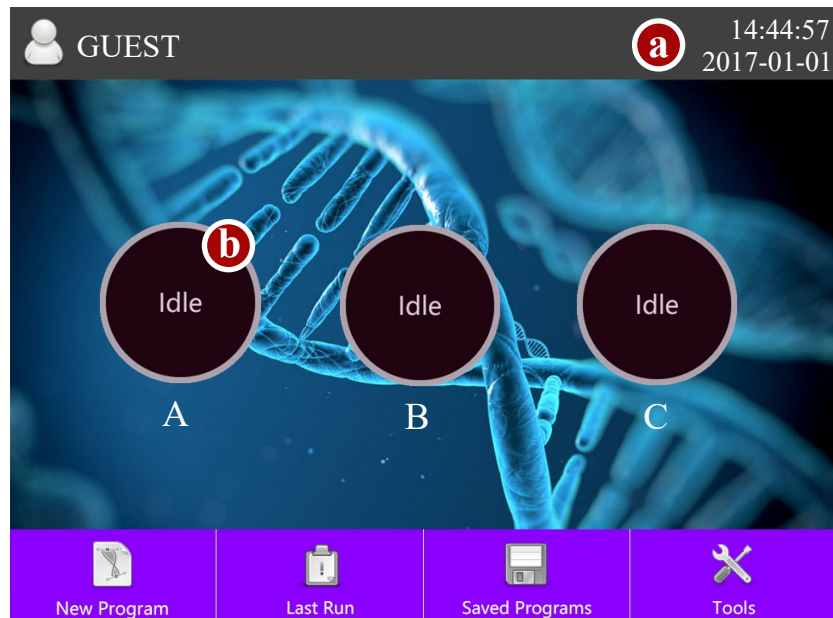
When the instrument powers on, the boot screen is displayed for several seconds. The Home screen is then displayed. The upper-left corner of the Home screen shows the default login user – Guest. Touch Guest to logout the system.

The Login screen is displayed (see below):



Touch **Login**, enter username and password to login the system or touch **Guest** to login system without entering a password.

After Login, the Home screen appears again:



The Home screen is displayed after a user login the system (see below).

Items in the Home screen:

- a. Shows date and time.
- b. Status ring: The number of rings appearing on the Home screen varies with the block module in use.

When a program is running, the status ring displays the sample temperature, the estimated remaining run-time, and the current run status (Lid Preheat, Running, and Pause).

When the block(s) is running another user's program, the corresponding ring(s) will show the sample temperature, the estimated remaining run-time, and the “Lock” icon. The ring(s) cannot be used until the run is finished, the original user logs in and stops to run, or the ADMIN user logs in and stops the programmed run.

When no program is running, the status ring will show 'Idle'.

When an error arises, the status ring will show 'Error'.

Touch a status ring to open the Run Status screen, see “[Chapter E, Perform Run](#)” for details.

Buttons on Home Screen

Button	Function
New Program	Creates new programs.
Last Run	Go to list of the last run eight programs.
Saved Programs	Open and view all saved programs.
Tools	Sets instrument parameters and shows other tools.
	Logout system.

C Manage Folders and Programs

1. Introduce the Saved Programs Screen

In the Home screen, touch **Saved Programs**.

The Saved Programs screen opens.

Saved Programs			
Folders	Files	Preview	
 DEFAULT	 05121210	01 95.0 00:03:00	
 TEMPLATE	 05140910	02 95.0 00:00:30	
	 TEST1	03 40.0 – 60.0 00:00:30	
	 TEST2	04 72.0 00:01:00	
			
			
 Back	 Folder Options	 File Option	 USB
		 Edit	 Run

The screen lists all available folders. Touch **Up Arrow** and **Down Arrow** to move between pages. The following folders are system folders:

DEFAULT: used as the default folder for saving programs.

The TEMPLATE folder contains some preinstalled programs:

- 2000BP, 1000BP, 500BP: for amplifying less than 2kb, 1kb, 500bp nucleic acid templates using three-step PCR.
- 2-STEP: two-step PCR.
- GRADIENT: for optimizing annealing temperature of PCR reaction. This program applies to block with continuous gradient function.
- G53-55, G57-59, G61-63: for optimizing annealing temperature of PCR reaction. These programs apply to block with independent gradient function.
- TD-PCR1 and TD-PCR 2: Touchdown PCR.
- LONG-PCR: for amplifying of extra-long nucleic acid chain.
- RT-PCR: for synthesizing DNA from RNA by reverse transcriptase.
- LIGATION: for connecting segmental DNA with vector DNA at 16°C.
- ENZYME: for ordinary enzyme reaction at 37°C.

Note: System folders cannot be renamed or deleted.

Note: You can add or delete programs in the TEMPLATE folder. If you want to add a program to the TEMPLATE folder, create a new program or edit an old program and then save it to the TEMPLATE folder. Or you can copy a program to the TEMPLATE folder.

USB: The instrument can automatically detect and display a USB button in the screen after inserting a USB disk in the USB - A port. Touch this button to open the USB folder. This folder shows the program stored in U disk. You can copy the program between the U disk and the instrument.

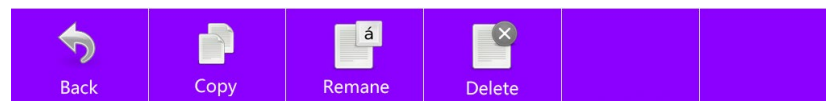
Buttons of Folders Screen

Button	Function
Back	Returns to the Home screen.
Folder Options	Includes three buttons: New Folder, Rename, and Delete. Used to create a new folder, to rename a selected folder or to delete a selected folder.
File Option	Includes three buttons: Copy, Rename, and Delete. Used to copy program file between folders, to rename a selected program file or to delete a selected program file.
USB	Open and view programs that stored in a U disk. Program files can be copied to and from the U disk.
Edit	Views and/or edits program steps.
Run	Runs a selected program.

Folder Options:



File Option



2. Manage Folder

2.1 Add Folder

To add a folder:

1. In the Saved Program screen, touch **Folder Options**, and then touch **New Folder**.
2. Enter a folder name up to eight characters in the pop-up keyboard and then touch **OK**.

2.2 Rename Folder

1. In the Saved Program screen, select a folder, touch **Folder Options**, and then touch **Rename**.
2. Enter a new name in the pop-up keyboard and then touch **OK**.

2.3 Delete Folder

1. In the Saved Program screen, select a folder, touch **Folder Options**, and then touch **Delete**. A pop-up window appears.
2. Touch **Yes** in the displayed pop-up window to confirm.

IMPORTANT!

When you delete a folder, all programs saved in the folder will be deleted at the same time.

3. Manage Program

3.1 Copy Program

1. In the Saved Program screen, select a program file to be copied, touch **File Option**, and then touch **Copy** to open the Paste screen.
2. In the Paste screen, Touch **Select Folder**, select a target folder in the folder list screen, and then touch **OK** to copy the program file.

If you want to:

- a. Rename the program before copy - enter a new name in the New Name field.
- b. Create a new target folder to copy the program to - Touch **New Folder** to open the pop-up keyboard, enter a folder name, and then touch **OK** to return the Paste screen.
- c. Insert a U disk, touch USB button, you can save the program to the U disk.

3.2 Rename Program

1. In the Saved Program screen, select a program file, touch **File Option**, and then touch **Rename**.
2. Enter a new name in the pop-up keyboard and then touch **OK** to accept changes.

3.3 Delete Program

1. In the Files screen, select a program file and then touch **Delete**. A pop-up window appears.
2. Touch **Yes** in the displayed pop-up window to delete the program.

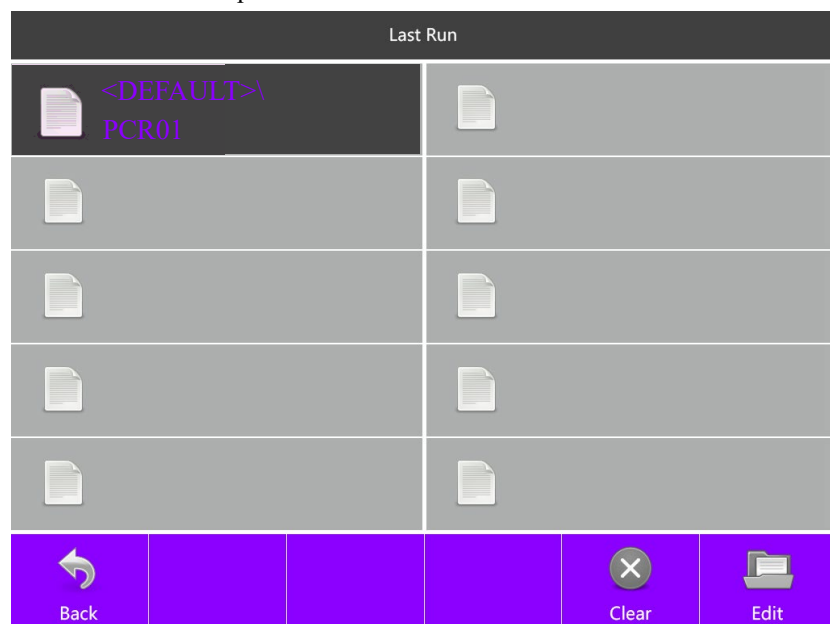
3.4 Edit Program

For editing program, please see [chapter D](#) for details.

3.5 View Last Run Programs

In the Home screen, touch **Last Run**.

The Last Run screen opens.



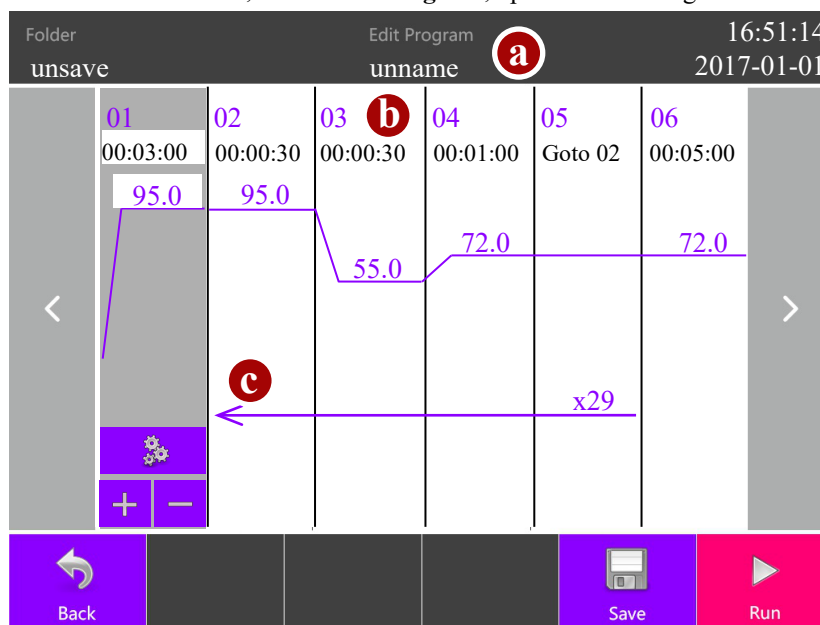
The Last Run screen shows the recently run eight programs for quickly viewed and run again. You can touch **Clear** to clear program list.

D Create and Edit Programs

1. Create New Program

1.1 Introduce the Edit Program Screen

1. In the Home screen, touch **New Program**, open the Edit Program screen.



Items in the Edit Program screen:

a: Program name

b: Step number, step holding time (hour: min: sec), step temperature

c: The start step for cycles

Buttons of Edit Program Screen

Setting steps of a program are carried out via the buttons:

Button	Function
Back	Returns to the Home screen.
Save	Saves the program.
Run	Runs the program.
When you select a step, three buttons appear on the step:	
Options	Edits temperature and time of a selected step; Sets additional parameters for the step.
Add step	Adds a constant temperature step, a gradient temperature step or a goto step after the selected step.
Delete Step	Deletes a step.

1.2 Add Steps

A PCR program comprises several steps. Step types include Constant, Gradient and Goto steps. The maximum amount of steps for a program is 30.

1. In the Edit Program screen, touch anywhere in the column for a step to select it.
2. Touch **Add Step** and the Step N screen opens.

Step 01		
Constant	Temperature (°C) 55.0	Temp.Increment (°C) 0.0
	Time 00 : 00 : 30	Time Extend (s) 0
Gradient	Ramp Rate (°C/s) 0.0	Pause ☐
Goto	Goto Step	Forever ☐
OK ✓		Cancel ✕

- To add a constant temperature step, touch **Constant** label;
To add a gradient temperature step, touch **Gradient** label;
To add a goto step, touch **Goto** label.
- Touch **OK** to add the corresponding step.

1.3 Changing Temperature and Hold Time in a Constant Step

- Select a constant temperature step in the Edit Program screen and then touch **Options**. The Step N screen appears, and the Constant label is selected.
- Touch Temperature field or Time field.
- Enter a value in the pop-up keyboard and then touch ✓.

Step 01			
	Temperature (°C)		Temp.Increment (°C)
	Temperature (°C) 94 (4.0~99.9)		←
1	2	3	✕
4	5	6	
7	8	9	✓
±	0	.	
OK ✓		Cancel ✕	

Note:

Temperature range is from 4°C to 99.9°C, with 0.1°C interval.

Time range is from 0:00:00 to 99:59:59 hour: min: sec.

1.4 Changing Temperature and Hold Time in a Gradient Step

Gradient Temperature Step is only available with Gradient Type Thermal Cycler.

1. Select the gradient temperature step in the Edit Program screen and then touch **Options**. The Step N screen appears, and the Gradient label is selected.

Step 01		
Constant	Ramp Rate (°C/s)	Temp.Increment (°C)
	Time (HH:MM:SS)	Time Extend (s)
Gradient	00 : 00 : 30	0
	Gradient Temp. (°C) 50.0 -- 65.0	Pause ☐
Goto	Goto Step	Forever ☐
	OK ✓	
Cancel ✕		

To change temperature value:

2. In the Step N screen, touch Gradient Temp. field to open Gradient screen.
3. Taking the Thermal Cycler with three blocks as an example,

- For block with continuous gradient function (Models 248 and 332):

Gradient (°C)	
1 2 3 4	A 65.0
A	B 64.2
B	C 62.4
C	D 59.0
D	E 56.0
E	F 52.5
F	G 50.7
G	H 50.0
H	

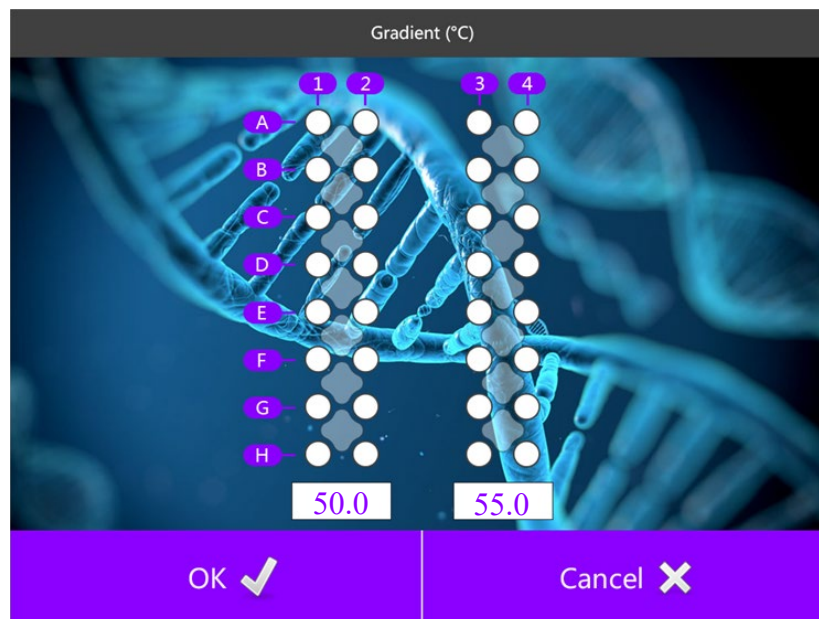
Back

OK ✓

Cancel ✕

The arrangement of sample wells is displayed on the left side of the screen, and the gradient temperature distribution is displayed on the right side.

- For block with independent gradient function (not available for 248 and 332):



The block shown on the screen is divided into two small pieces, each piece can set temperature independently.

4. Enter temperature value(s) and touch **OK**.

Note different Thermal Cycler has different gradient temperature ranges.

To change hold time:

5. Touch Time field.
6. Enter value in the pop-up keyboard and then touch ✓.

1.5 Temp. Increment, Time Extend, Ramp Rate and Pause/Forever

To add dTemp, dTime, Ramp Rate and Pause to a constant temperature step:

1. In the Edit Program screen, selects a constant temperature step. Touch **Options** to open the Step N screen and the Gradient label is selected.
2. To edit an item, touch the appropriate field.
3. Enter a value in the pop-up keyboard and then touch **OK**.

- **Temp. Increment (Δ Temp):** adds temperature increments to step with each cycle.

Touch $\pm$ in the keyboard to shift between “+” and “-” (to increase or decrease temperature for each cycle), and then enter the number of degrees of temperature. The allowable temperature range is 0.1°C - 9.9°C.

Note: Parameters cannot be set that would cause a step to fall outside of the operating range of the instrument (i.e. below 4°C or above 99.9°C).

- **Time Extend (Δ Time):** adds time increments to the holding time within the step for each cycle.

Touch $\pm$ in the keyboard to shift between “+” and “-” (to increase or decrease time for each cycle), and then enter the seconds. The allowable time range is 1 sec - 120 sec.

Note:
Parameters cannot be set that would allow the dwell time to fall below zero.

-
- **Ramp Rate:** Adjust the average heating or cooling rate.

To set the Ramp Rate function:

Enter the value of ramp rate in the keyboard. Input range is 0.1 ~ 3.0°C /sec.

Note: The actual maximum average heating or cooling rate varies with block module type. Refer to the instrument specifications for the maximum value. If a value larger than the block's maximum average rate is entered, the block's maximum average rate will be used. If you do not want to slow the running, leave this option empty.

- If you touch **Pause/Forever**, the program will automatically pause as soon as the desired step temperature is reached and the instrument will beep twice. Touch **Resume** will continue the program running. Pause can be used to add reagents (i.e. hot start) or when adding or removing tubes during a step. **Forever** is used to hold indefinitely at low temperature after real PCR reaction.

Note: You can also add Pause or dTime as you need to a gradient temperature step.

4. Touch **OK** to accept changes and close the Step N screen.

To remove the dTemp, dTemp, Ramp Rate and Pause,

- 1.1 In the Step N screen, touch one of these fields. Delete the old value in the pop-up keyboard or enter "0" and then touch ✓.
- 1.2 Uncheck the **Pause** check box.
2. Touch **OK** to accept changes and close the Step N screen.

1.6 Exchange between Constant Step and Gradient Step

Gradient Temperature Step is only available with Gradient Type Thermal Cycler.

To change a constant step to a gradient step:

1. In the Edit Program screen, selects a constant temperature step. Touch **Options** to open the Step N screen.
2. Switch to the **Gradient** label.
3. Change front row and back row temperature value and hold time value as you need. See section 1.4 "Changing Temperature and Hold Time in a Gradient Step" for details.
4. Touch **OK** to accept changes and close the screen.

To change a gradient step to a constant step:

1. In the Edit Program screen, selects a gradient temperature step. Touch **Options** to open the Step N screen.
2. Switch to the **Constant** label.
3. Change the temperature value and hold time value as you need.
4. Touch **OK** to accept changes and close the screen.

1.7 Set Cycle

1. In the Edit Program screen, select a goto step. Touch **Options** to open the Step N screen and the Goto label is selected.

Step 05		
 Constant	Temperature (°C)	Temp.Increment (°C)
	Time [] : [] : []	Time Extend (s)
 Gradient	Ramp Rate °C/s	Pause/Forever ☐
	 Goto	Goto Step 2
		Number of Repeats 29
OK 		Cancel 

2. Touch Goto Step field, enter the start step number of the cycle in the pop-up keyboard and touch  .
The steps between the last step and the start step will run repeatedly for the specified cycle numbers.
3. Touch Number of Repeats field, enter additional cycle numbers in the pop-up keyboard and then touch  .

Note:

Allowable entered cycle numbers range: 1 - 99.

The actual cycle numbers will be 'N+1' where N stands for the entered cycle numbers. To perform a PCR reaction with 30 cycles, you should enter 29 as the number of repeats.

4. Touch **OK** to accept changes and close the screen.

1.8 Delete Step

1. In the Edit Program screen, touch a step to select it.
2. Touch **Delete Step** to delete this step.

1.9 Save Program

1. In the Edit Program screen, touch **Save** to display the Save screen.

2. The current date and time are used as a default name. A new name up to eight characters can be entered.
3. Touch Select Folder field to select a folder to save the program to.
 - To create a new folder to save the program, touch **New Folder** button, and enter a folder name up to eight characters.
 - Touch **USB** to export the program file to a U disk after inserting a U disk.
4. Touch **OK** to save the program.

2. Edit Program

To edit a program:

1. In the Home screen, touch **Saved Programs**.
2. In the Saved Program screen, select a folder and then select a program to be edited, touch **Edit**.
4. In the Edit Program screen, you can edit the program and then save and/or run it following the instructions described above.

E Perform Run

1. Load Samples

1. Place PCR tubes or microplate in the sample wells of the sample block.

IMPORTANT!

Do not touch the surface of the sample block or lid surface because they may be very hot (105°C/221°F or higher)!

Note:

- The caps of tubes or film on microplate must be sealed tightly to prevent sample evaporation. Tubes or microplate should have heat resistance of up to about 120°C.
- For best results, use thin walled tubes designed for PCR.
- The sample wells of the sample block should keep clean.
- The height of tubes should be the same so that the lid can keep stable and gives even pressure on each tube.

2. Close the lid.

2. Select Program to Run

To create a new PCR program or Incubation program to run,

- Touch **New Program**, create a new program and then touch **Run**.

To select a recent run program to run,

- From the Home screen, touch **Last Run**, select a program and touch **Edit**, and then touch **Run**.

To select a program saved in a folder to run,

- From the Home screen, touch **Saved Programs** to open Saved Program screen. Select a folder and then select a program file, touch **Edit**. In the edit program screen, touch **Run**.

1. After you touch **Run**, the Run Options screen opens.

Running Options		
Parameters		Select Block
Name 01291032		
Sample Volume (µL) 20	☒ Fast mode ☐ Standard mode	
Lid Temperature (°C) 105 ☐ Off		
 Home	 Back	 Start

-
2. In the Run Options screen, edit sample volume and lid temperature.

Sample Volume:

Allowable entered range: 0 - 100µl .

The maximum volume of samples that can be accommodated is determined by the depth of the sample wells of each type of sample block.

When a sample volume between 1 and 100µl is entered, the Sim-tube mode will be used. When a sample volume of 0µl is entered, the Block mode will be used.

Note: Temperature control mode

Sim-tube mode: This mode controls the process of heating the sample block to include the sample volume factor in the equation (i.e. a larger sample volume requires a longer time to reach temperature).

Block mode: This mode does not consider sample volume factor and simply heats the block to the set temperature.

Sim-tube mode is the preferred control method, especially when steps hold time is 30 seconds or less. It is important to input correct sample volumes for the most accurate dwell time.

Lid Temperature:

Allowable entered range: 30-112°C.

For lid temperature, it is recommended to select a temperature five to ten Celsius degrees above the highest temperature of the program steps (e. g., the pre-denaturation step) to protect sample from evaporation and condensation.

Note:

The lid heating will automatically turn off when block temperature is below 30°C. The lid will heat to the specified temperature before the actual program starts running. Setting a lid temperature below ambient will cause the program to stall.

3. Select one or multiple blocks to run the program:

Touch the ring corresponding to each block which you want to perform the run on. Only blocks that are available (not running a program now) can be selected.

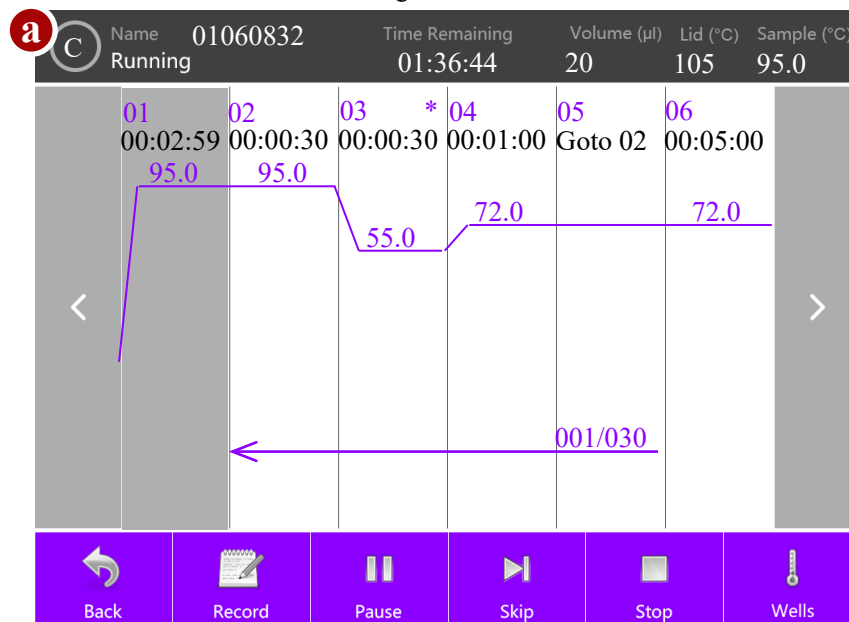
4. Touch **Start** to begin the run. The Run Status screen opens.

3. View Run State and Control Run

3.1 View Run State

Introduce the Run Status Screen

You can view the status of run using the Run Status screen below.



The items displayed on the Run Status screen:

a: The number of sample block.

Name: the program name

Status: the current status: Running, Pause, Idle

Time Remaining: the estimated remaining time

Volume: the sample volume

Lid: the lid temperature

Sample: the sample temperature (when the Sim-tube mode is used) or the block temperature (when the Block mode is used).

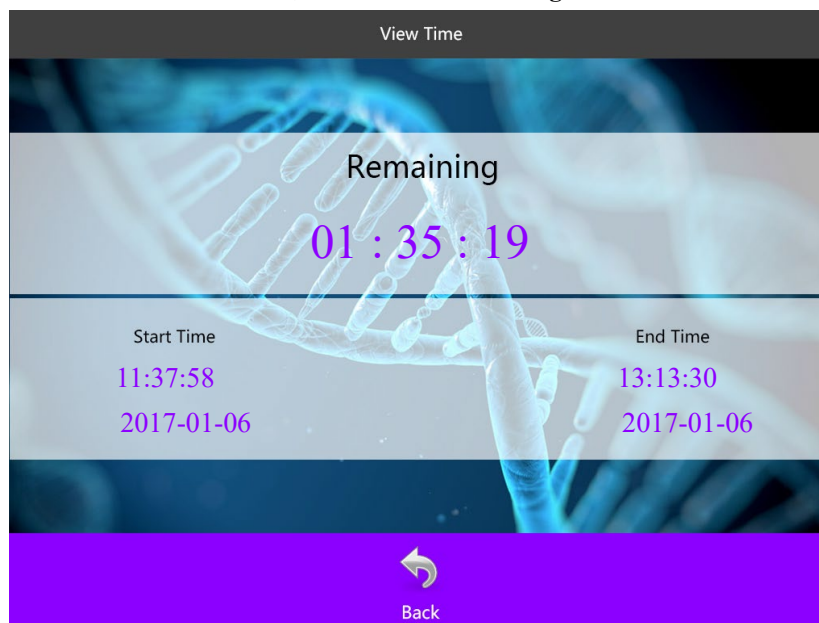
*: Options symbol: indicating that a step has been set with some options (Δ Temp, Δ Time, Ramp Rate, and Pause) other than the temperature and time value. Touch this symbol to show options for the step.

Buttons on the Run Status screen:

Button	Function
Record	Views the run record.
Pause/Resume	Pauses and Resumes run.
Skip	Skips run step.
Stop/Run	Stops run/Runs program again.
Wells	Views temperature value of each row of sample block.

View Run Time

1. In the Run Status screen, touch **Time Remaining** field to view the run time.



2. Touch **Back** to return to the Run Status screen.

View Run Record

1. In the Run Status screen, touch **Record** to view the run record.
2. Touch **Back** to return to the Run Status screen.

View Sample Block Temperature

1. In the Run Status screen, touch **Wells** to view the temperature of each sample well in real-time.
2. Touch **Back** to return to the Run Status screen.

3.2 Control Run

Pause Run

In the Run Status screen, touch **Pause** and the system will beep twice.

Note:

The temperature will continue increase or decrease until it reaches the setting temperature of a step.

After paused, the Pause button changes to Resume button, and you must touch **Resume** to continue the program.

Skip Run Step

In the Run Status screen, touch **Skip** to skip the current running step and run the next step.

Stop Run

In the Run Status screen, touch **Stop** and then touch **Yes** in the displayed pop-up window.

Run Program Again

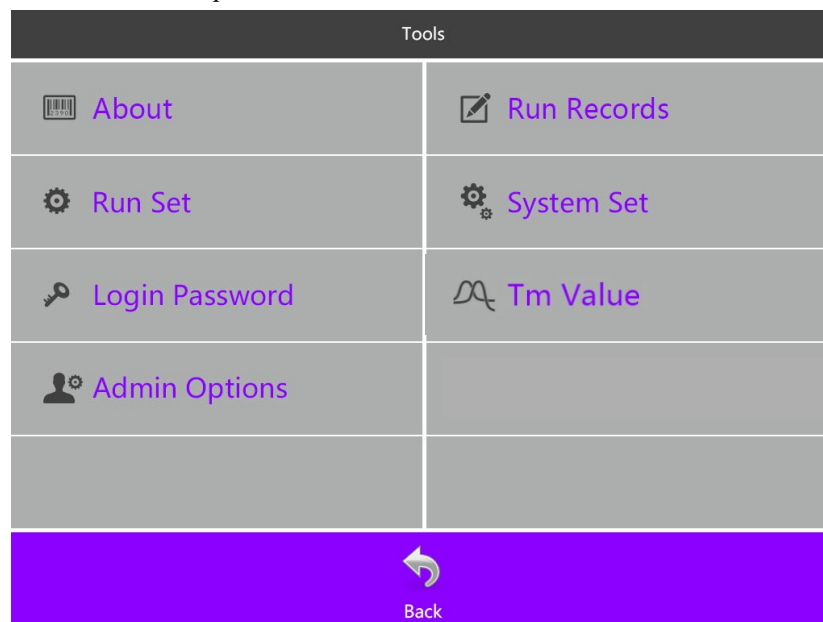
In the Run Status screen, if the running program stopped, touch **Run** to run it again.

F Tools

1. Introduce the Tools Screen

In the Home screen, touch **Tools**.

The Tools screen opens.



Buttons of Tools Screen

Button	Function
About	Views product information about the Thermal Cycler.
Run Records	Views stored run records.
Run Set	Configure parameters for run.
System Set	Sets instrument parameters.
Login Password	When a user other than "Guest" login, the Login Password appears. The user can edit his (her) login password using this function.
Tm Value	The Tm Value button appears when a user other than the administrator user is login. Touch this button to calculate the Tm value of a primer pair.
Admin Options	When "ADMIN" login, the Admin Options appears. Use this function to manage users, reset to factory settings, backup and restore data.

2. About

To view product information about the Thermal Cycler:

1. In the Home screen, touch **Tools**.
2. In the Tools screen, touch **About** and the About screen appears.
3. When you finish, touch **Back** to return to the Tools screen.

3. Run Record

1. In the Tools screen, touch **Run Records** to open the screen:

Run Records		01/01
 2015-09-25 13:34:04 09291032 [B]	 2015-09-25 10:15:09 PCR01 [A]	
		
		
		
		

 Back	 Clear	 Delete	 Open	 Last Page	 Next Page
--	---	--	---	---	---

2. Select a record and touch **Open** to open the Run Record screen.
3. After you finished, touch **Back** to return to the Run Records screen.
4. In the Run Records screen, you can touch **Clear** to clear all records, touch **Delete** to delete a selected record.
5. After you finish, touch **Back** to return to the Tools screen.

4. Run Set

This function is used to set parameters for run.

1. In the Tools screen, touch **Run Set** to open the screen:

Run Set	
Lid Temp.when running (°C) 105 ☒ On	Default Sample Volume (µL) 20
Lid Idle Temperature (°C) 105 ☐ On	Block Idle Temperature (°C) 20.0 ☐ On
If Step Temp.below : 30.0 Lid Auto Shut Off.	
OK 	Cancel 

- Enter 'Lid Temp. when running' to pre-heat lid to a desired temperature when running a program. We recommend you select a temperature five to ten Celsius above the highest temperature of the program steps (e. g., the denaturation step) to protect sample from evaporation and condensation. If you deselect 'On', the lid heating function will be disable when a program is running.

- Enter most frequently used sample volume value in the 'Default Sample Volume' field.
- Enter 'Lid Idle Temperature' to let the lid heating to the desired temperature when no program is running. If you deselect 'On', the lid heating function will be disabled when no program is running.
- Enter 'Block Idle Temperature' to let the block heating or cooling to the desired temperature when no program is running. If you deselect 'On', the block heating or cooling function will be disabled when no program is running.

For 'Block Idle Temperature', we recommend you select a temperature below 20°C so that when a program starts run, the block temperature will maintain below 20°C while the lid is heating to the specified temperature before the actual program starting running. Because the sample temperature does not increase, so the activity of DNA polymerase is inhibited, the likelihood of nonspecific primer binding and the yield of unwanted products such as primer dimers are decreased.

- Enter 'If Step Temp. below: Lid Auto Shut Off' to automatically turn off the lid heating function when block temperature below a value.

Touch **OK** to accept changes.

5. Tm Value

The Tm Value is used to calculate the Tm (melting temperature) and Ta (annealing temperature) for a primer pair.

1. In the Tools screen, touch **Tm Value** to open the screen.

2. Enter the salt concentration and the primer concentration.
3. Enter each primer sequence and then touch **Calculate** to view the Tm value of each primer, the average Tm value and the Ta value.
4. After you finish, touch **Back** to return to the Tools screen.

6. System Set

The System Set is used to set system parameters.

To use System Set functions:

1. In the Tools screen, touch **System Set** to open the screen:

System Set	
Date/Time 2015-09-29 13:45:05	Language English
Screen Luminance ☒ High ☐ Medium ☐ Low	
OK ✓	Cancel ✕

To set date/time:

1. In the System Set screen, touch Date/Time field.
2. Enter today's date and current time in the pop-up keyboard.
2. Touch ✓ to accept changes and return to the System Set screen.

To adjust the screen luminance:

Select "High", "Medium", and "Low" to set high, medium and low luminance.

Touch **OK** to accept changes.

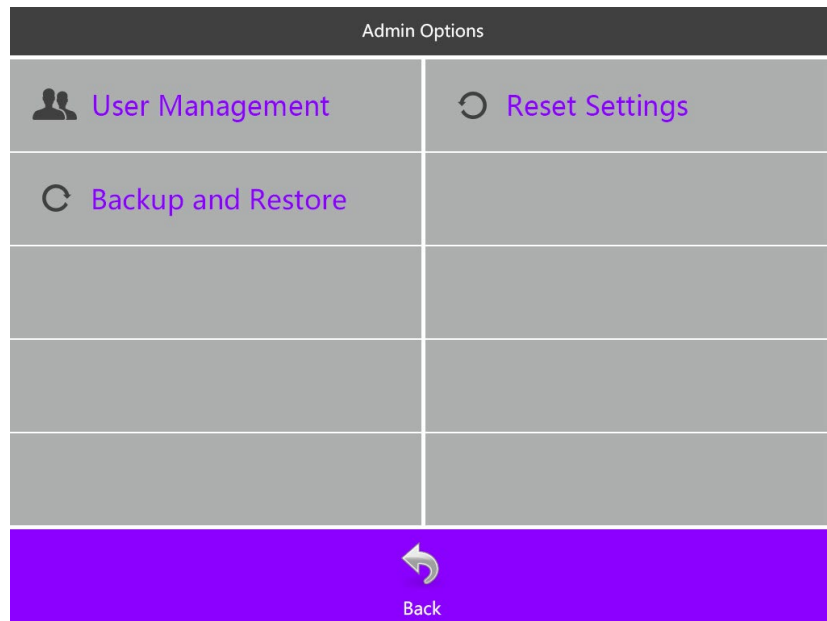
7. Admin Options

The Admin Options is used to manage user accounts, reset to factory settings, backup and restore data. This function is only available when login as 'ADMIN'.

To use Admin Menu functions:

In the Home screen, touch **Tools**, then **Admin Options**.

The Admin Options screen opens.

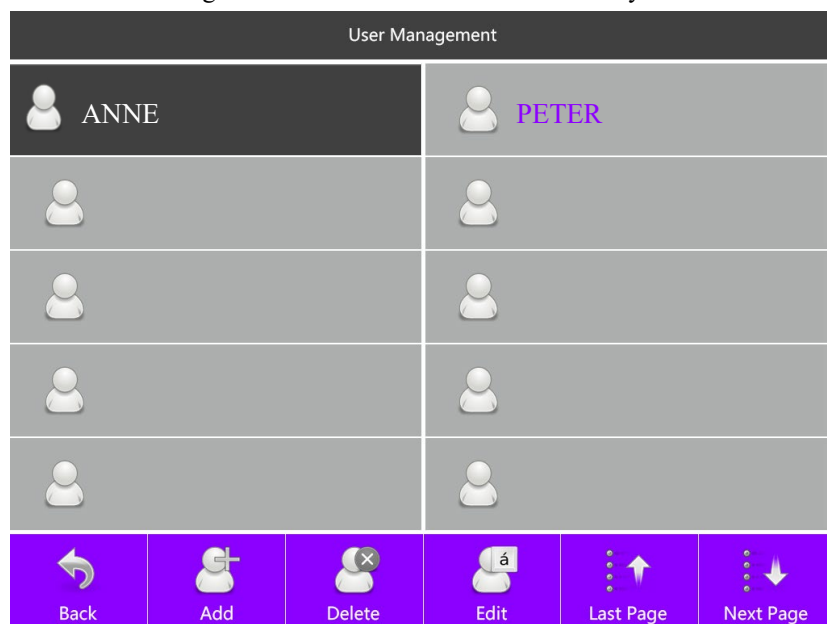


7.1 Manage Users

The User Management function is used to manage user accounts.

To manage user accounts, login as “ADMIN”:

1. In the Admin Options screen, touch **User Management**.
2. The User Management screen lists all accounts currently available.



Account authority:

- “ADMIN”: control all functions in the Admin Options screen. The default password for ADMIN is ADMIN.
- Normal user account: can create, rename and delete non system folders; can create, rename, copy, modify, save, delete and run programs; can modify his or her login password (in the Tools>Login Password screen after login).
- “Guest”: has the same levels of user account privileges as normal user but can login system without entering password.

In the User Management screen:

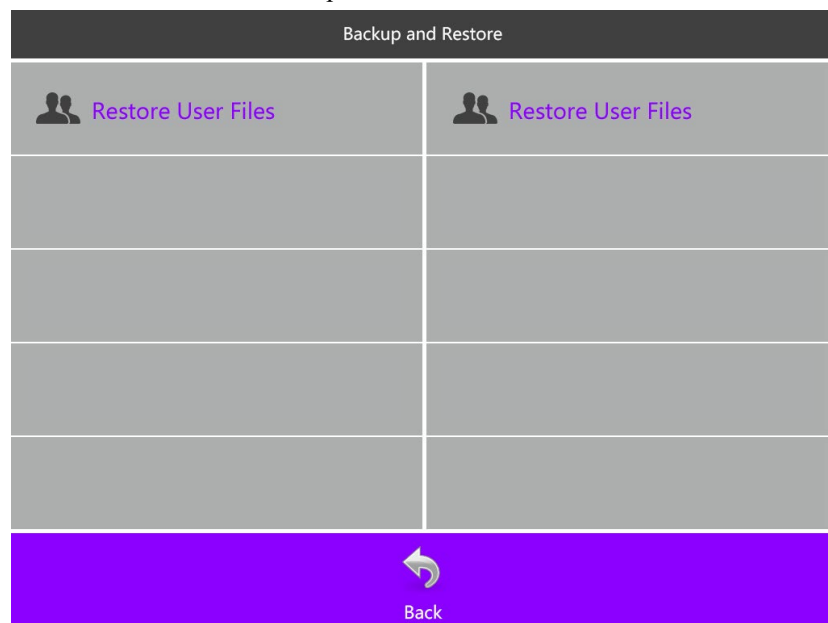
- a. To create a new user account, touch **Add** to open the New User screen. Enter username and password of no more than eight characters.
- b. To edit user, select a user and then touch **Edit** to open the Edit User screen. Enter new user password and touch **OK**.
- c. To delete a user account, select a user and then touch **Delete**. Touch **Yes** in the displayed pop-up window to delete the user.

7.2 Reset Settings

Use this function to reset system to factory settings.

7.3 Backup and Restore

User these functions to backup and restore data.



To backup data,

1. Insert a U disk into the USB - A port on the front of the instrument.
2. In the Backup and Restore screen, touch **Backup User Files**.
3. The screen will display a pop-up window until the backup is complete.
4. After you finished, touch **Back** to return to the Admin Options screen.
5. Remove the U disk.

You can restore User Files from a U disk.

To restore data,

1. Insert a U disk containing the backup data into the USB - A port on the front of the instrument.
2. In the Backup and Restore screen, touch **Restore User Files**.
3. The screen will display a pop-up window until the restore is complete.
4. After you finished, touch **Back** to return to the Admin Options screen.
5. Remove the U disk.

[APPENDIX I] Troubleshooting

Problem	Cause	Possible Remedies
No display and no fan moving sound when power on	No line voltage	Wait for power restore
	Power cord unreliable	Check power cord and plug
Abnormal vibrating noise	Unstable bench	Move to a stable bench
	Uneven foot	Move to a stable foot
	Loose case screw	Fasten the screw
Normal display but can't heat or cool	Heat pump fails or no current is supplied	Shut off the power and call service
No display but fan is moving when power on	LCD fails or LCD related circuit fails	Shut off the power and call service
When power on, a message: "Power failure during running!"	Lost power or power off the cyclor when the last program is still running	Touch OK to cancel the message. Stop the last program
Water accumulated in sample wells	The cyclor is running under 4°C for a long time while the ambient humidity is high	Running the block temperature to 93°C for at least 30 minutes. Recommended to raise the storage temperature to 10°C.
U disk is not recognized	The U disk is incompatible with the cyclor	Try another U disk.
Tubes are deformed	Tubes are poor in quality, too soft or bad heat resistance.	Use good quality PCR tubes.
Sample loss because of evaporation	Heat lid didn't heat or the set temperature of lid is too low.	Turn on the heating of lid and set the temperature to above 105°C.
	Tubes, strips or microplate are poor in quality	Change tubes, strips or microplate.
	Sample volume is too small	Sample volume should above 10μl
Sample block temperature (view via Wells screen of run status screen) is abnormal	Heat pump fails	Shut off the power and call service
System clock is abnormal	System clock should be reset	Adjust date and time via Tools>System Set screen
	The battery in the cyclor should be changed	Shut off the power and call service
Warning message: "Instrument failure! Error code: xx"		Shut off the power and call service