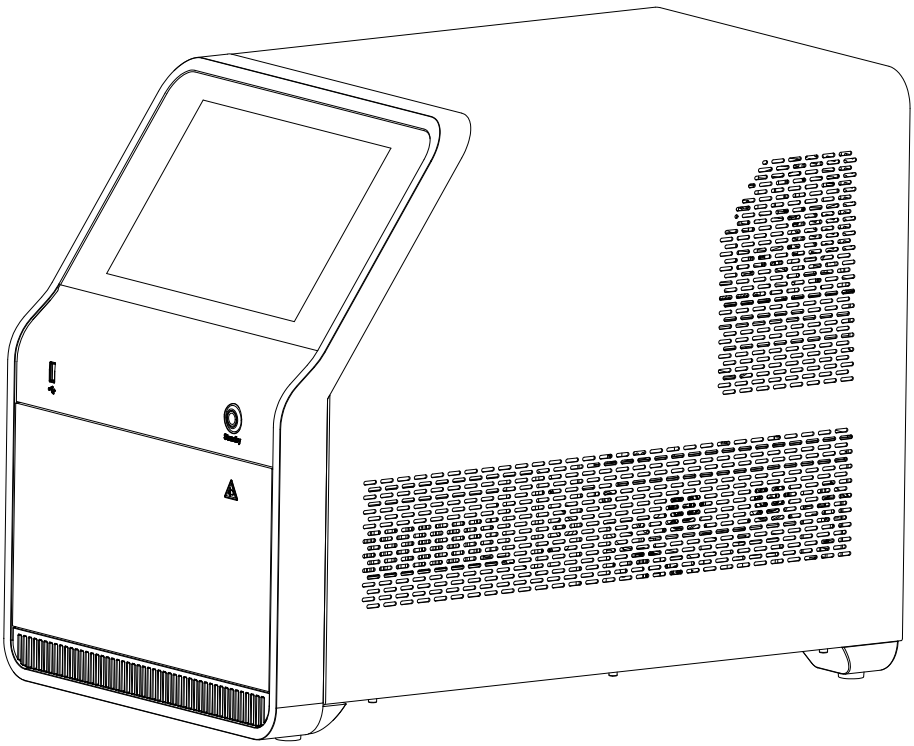
FOUR E'S®
SCIENTIFIC

Real-Time Fluorescent Quantitative PCR System

User Manual



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CONTENTS

Chapter 1 Safety instructions

For your safety, please carefully read the instructions in this chapter and make sure you understand them thoroughly before operating the instrument.

1.1 Definitions of symbols

The following symbols will appear throughout this user manual.

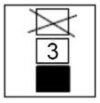
Symbol	Title	Description
	Caution/Warning	This symbol is used to inform you of incorrect operations that could result in physical injury or damage to the instrument. When the Caution or Warning sign appear, please read the corresponding text, in order to understand the type of potential danger and any solutions that have to be taken.
	Prohibition	This symbol indicates prohibited behaviors. Continuation of such behaviors could result in the destruction of the instrument, or even injury and death to the user.
	Pinch Points	Watch your hands at areas on the instrument with this sign.
	Biological Hazard	During the operation of the instrument, the user might be exposed to or left over with substances that are harmful or infectious to organisms. The operator should acknowledge its danger.

The following symbols will appear on the instrument.

Symbol	Title	Description
	Hot Surface	This sign is presented on areas on the instrument that would emit high heat during operation. Be warned of burns.
	Pinch Points	Watch your hands at areas on the instrument with this sign.
	Biological Hazard	During the operation of the instrument, the user might be exposed to or left over with substances that are harmful or infectious. The operator should acknowledge its danger.
	Protective Conductor Terminal	This symbol is affixed next to a protective conductor terminal on the instrument.

	Carefully read this User Manual	Presented on the name plate of the instrument.
	CE logo	Presented on the name plate of the instrument. It indicates that the instrument fulfills the requirements of relevant European directives.
	In vitro diagnostic medical device	Presented on the name plate of the instrument.
	WEEE (Waste from Electrical and Electronic Equipment)	Presented on the name plate of the instrument. The instrument abides by the European WEEE directives and is not allowed to be disposed into the public waste disposal system.
POWER	Power Switch	The power switch of the instrument is near the position where the label is pasted.
Standby	Standby Button	The standby button of the instrument is near the position where the label is pasted.
	USB Port	The USB port is near the position where the label is pasted in the instrument.
	Network Cable Port	The network cable port is near the position where the label is pasted in the instrument.
250V T10AL	Fuse specifications	It is pasted at the position of the fuse of the instrument, and the symbol marks the fuse specifications.

The following symbols will appear on the packaging box of the instrument.

Symbol	Title	Description
	This side up	Indicates that the correct position of the transport package is upwards.
	Fragile, handle with care	The transport package contains fragile components, need to be handled with care.
	Keep dry	The transport package need to be kept dry, avoid rain.
	Stacking limit	Indicates that the packages are not to be vertically stacked higher than 3 layers (does not include the bottom package) during static storage and transportation.

	Temperature limit	The transport package has to be kept and handled within the temperature range of -20 °C to 55 °C.
	Humidity limitation	The transport package has to be kept and handled within the humidity range of 0% to 85%.

1.2 Precautions

1.2.1 Transportation

Please store and transport the targets in strict accordance with the following requirements, the company will not assume any responsibility for any problems caused otherwise.

(1) Packaging Requirement

- The packaging uses the double layered five-layer corrugated cardboard outer carton box with an aluminum inner box. The aluminum box uses EVA material filling. And the carton box uses EPE material filling, which is designed as a bottom plate with an upward pull-out box. The size of the outer box is about 865 mm (L)× 740 mm (W) × 625 mm (H).
- There are shipping labels on the outside of the carton, including: instrument name, model, manufacturer name, address, external size, gross weight etc.
- There are storage and transportation symbols specified according to ISO 780 on the carton, including: “This side up”, “Fragile”, “Keep dry”, and “Stacking limit”, “Temperature limit”, “Humidity limitation”, “Atmospheric pressure limitation”, etc.
- All storage and transportation conditions are stated on the outer box.
- Packaging should conform to the requirements in “ASTM D4169: 2016 standard practice for performance testing of shipping containers and systems”.

(2) How to open the package

Move the packaged instrument to its operating site, and to prevent condensation, the instrument should be left in its protective plastic packaging until it reaches ambient temperature. According to the upward arrow on the transport package, carefully disassemble the instrument and accessories, and place the instrument on the laboratory table.

Caution	Do not touch or release any screws or parts, except as specified in the instructions, unless it may cause deviation and make the warranty terms invalid.

Please keep the original packaging for future transportation. The packaging is designed to ensure safe transportation and minimize damage. Use of alternative packaging materials may invalidate the warranty. Please also keep all instrument related documents provided by the manufacturer for future use.

If you need to relocate or transport the instrument, please refer to the “packaging requirements” above.

(3) Transportation and storage requirements

- Only transport or store the instrument when it is correctly packaged. Place it in the orientation indicated by the symbol on the carton, avoid rain, and handle it with care.
- Modes of transport: air, railways, road vehicles, and by ferry.
- Transportation and storage temperature: -20 °C to 55 °C (No condensation).
- Transportation and storage relative humidity: ≤ 85%.
- The transport package has to be kept and handled within the atmospheric pressure range of 50 kPa to 106 kPa.
- The environment during transportation and storage should be free of acid, alkali, or corrosive gases.
- Maximum of 3 layers of stacking during static storage; Maximum of 3 layers of stacking during transportation;
- Store in a ventilated and dry warehouse, outdoor stacking is not allowed.
- The maximum storage life is 1 year.

(4) Requirements for working environment

- Ambient temperature: 10-30 °C
- Ambient relative humidity: 20%-85% without condensation
- Operation Altitude: ≤ 2000 m
- For indoor use only. The environment should be free of strong light, strong air flow, strong vibration, strong electromagnetic interference and corrosive gas.
- Power supply: 100-240 V～, frequency 50 / 60 Hz, power voltage fluctuation ±10%

1.2.2 Safety

The following basic safety measures must be observed during all phases of operation, maintenance and repair of the instrument. Failure to comply with them or the attention and warning notes in this guide may affect the basic protection by the instrument. At the same time, it may reduce the safety level of the product and affect the normal use of the instrument.

We shall not be liable for any consequences arising from the failure use by the user not the following requirements.

·The instrument is in line with the IEC 61010-1 standard of class I equipment, with

Caution

overvoltage categoЄry II, pollution degree 2 and protection level IP20.

·The instrument complies with the following standards: IEC 61010-1, IEC 61010-2-101, IEC 61010-2-010, IEC 61010-2-081, IEC 61326-1 and IEC 61326-2-6.

·The instrument is for indoor use only.

(1) Instrument grounding

To avoid electric shock, the input power cord for the instrument must be properly grounded. The instrument uses a three-prong grounded plug with a third (ground) pin that can only be used with a grounded power socket. It is not only a safety device, but also a necessary condition ensuring the normal operation of the instrument. If the plug cannot be inserted into the socket, please ask the electrician to install the correct one. Don't let the grounded plug lose safety protection

(2) Keep away from energized circuit

Operators are not allowed to disassemble the instrument. Replacing components or adjusting certain parameters inside the machine must be accomplished by the certified maintenance professionals. DO NOT replace components while the instrument is powered on.

(3) Power supply

Before switching on the power, always check if the voltage of the power supply matches the required power (100-240V～, 50/60Hz), and make sure that the rating load of the power socket is not less than that of the instrument 750W.

(4) Power cord

This instrument should normally be used with the supplied power cord. If the power cord is damaged, it must be replaced and cannot be repaired. When replacing, the new power cord used must be of the same type and specification. When using the instrument, do not place anything on the power cord, and avoid placing the cord in areas with high personnel traffic flow.

(5) Plug

When the power cord is inserted or pulled, be sure to hold the plug with your hand in the correct position. While inserting, ensure the plug fully and firmly inserted into the socket. While disconnecting the power cord, do NOT pull the line but the plug out from the socket.

(6) Placement of the instrument

- The instrument must be installed in a place, where the power supply is easy to be cut off.
- The instrument should be placed in a clean, tidy workbench or table with little dust and a place far away from the water source, such as pool, pipe, etc. The room ought to be well ventilated, having no corrosive gas or interference of a strong magnetic field. The table for the instrument must be stable with the horizontal top.
- The instrument's vents are designed for ventilation loops. To avoid overheating the instrument, do not block or cover these vents. When a single instrument is used, the distance between the ventilation holes around the instruments and the closest object must be more than 30 cm.
- Excessive ambient temperature can affect the instrument's test performance or cause a malfunction. Do not use this instrument in places exposed to sunlight and strong light sources, so as not to affect the instrument's fluorescence detection and should be kept away from heating, stoves and all other heat sources.
- When you stop working, you'd better turn off the power. If the instrument is set aside for a long time, it is recommended that the user disconnect the power supply, pull out the power plug, and cover the instrument with a soft cloth or plastic film to prevent the entry of dust and other foreign matter.

(7) Electromagnetic compatibility

Declaration: The equipment conforms to the emission and immunity requirements specified in IEC 61326-2-6.

Warning

·The user is responsible for ensuring the electromagnetic compatibility environment of the equipment so that the equipment can work normally.

·It is recommended to evaluate the electromagnetic environment before using the device.

·Do not use the device near strong radiation sources (such as unshielded radio frequency sources). Otherwise, normal operation of the device may be affected

·The equipment is designed and tested according to the class A equipment standard in CISPR 11.

(8) Operation notes:

- During the experimental operation, avoid the liquid dripping on the instrument. The consumables, reagents, and other wastes used in the test should be disposed of in accordance with the relevant requirements, and should not be discarded or dumped at will.
- If there are hazardous substances used in the test, the user must be trained before operation.
- Hazardous substances after use should be properly handled and preserved in strict accordance with their instructions for use.

- The user who operates the instrument needs the relevant training and the relevant qualifications.
- Do not place your hand nearby when the tray is in motion to avoid a harm.
- After the use of the instrument is complete, the door should be closed in time to prevent accumulation of dust
- The instrument needs to be disinfected before it is discarded at the end of its service life.
- When the PC terminal is connected to the instrument for use, the user needs to turn off the sleep function of the computer.

 **Caution**	In the following cases, the user should immediately cut off the power, disconnect the instrument's power plug from the socket, and contact the supplier or ask the qualified maintenance personnel for processing. ·Liquid is spilled into the instrument. ·The instrument is sprinkled or drenched; ·The instrument is malfunctioning, giving off abnormal sound or odor; ·The instrument is dropped or its shell is damaged ·There is an obvious function change to the instrument

 **Caution**	When handling potentially infectious materials (such as human samples or reagents), please ware the protective gloves and other protective measures, if there has the possible contact with the skin.

(9) Connect with other devices

The instrument can be interconnected with computers, USB memory, and USB scanners through the USB interface and network port. The interconnected equipment and related connecting lines should comply with CCC certification or other relevant safety standard certification.

(10) Re-transportation

If the instrument needs to be transported again, before transportation, the block well and its instrument should be fully cleaned and disinfected.

1.2.3 About the software

The company provides technical support for the use of this product software, and provides software upgrade service.

Caution

- This product has an automatic power-off recovery function. If the power-off time is too long, the reaction reagent may fail and the experimental results may be invalid.
- Please back up the experimental data in the instrument and hard disk regularly to avoid data loss.
- The software interface of this product only provides English display.

1.3 Aftersales service

Please refer to the warranty document for details of the warranty content and scope.

Caution

- Please check and accept the instrument according to packing list at once after open the package. If anything is damaged or missing, please contact with supplier immediately.
- Please store the packing box and packing materials properly for use for future repairing.
- The instrument must be disinfected before it is sent to the aftersales service department.
- After being delivered to the aftersales service department, the service engineer must disinfect the instrument immediately after unpacking.
- If the instrument is damaged on the way to the aftersales service department because of the poor package, we will undertake no responsibility for free warranty service.

Chapter 2 Overview

2.1 Instrument introduction

The Real-Time Fluorescent Quantitative PCR System can perform polymerase chain reaction (PCR) to the target gene through temperature control, and carry out real-time monitoring and result analysis of the marked fluorescence of the target gene.

Instrument characteristics:

- The instrument can complete the experimental settings and running individually; Or it can also be connected with the PC software to realize experimental setting, experimental running, data analysis, report editing, etc., with more powerful functions and more user-friendly control methods.
- The instrument has automatic power-off protection function to avoid the loss of experimental data and reagent waste caused by sudden abnormal power failure. After the power supply is restored, it can automatically execute the unfinished experiment.
- The temperature of the block is precisely controlled by the multi-area thermoelectric refrigeration technology, which achieves more accurate and uniform temperature control on the premise of ensuring rapid ramping rate.
- Stable and accurate gradient function of 1–40 °C ensures more optimized PCR conditions.
- The combination of long-life high-power LED excitation light source, precise optical path system and ultra-high sensitivity PMT detector ensures sensitive and stable fluorescence detection performance.
- The instrument has 6 fluorescence channels so that a single tube can detect up to 6 fluorescence at the same time so to test more targets in a single reaction.
- With user access function, it further guarantees the security of data.
- One RJ45 port and multiple USB ports are equipped.

2.2 Intended use

The Real-Time Fluorescent Quantitative PCR System uses fluorescence real-time detection method to analyze the amplification of PCR template. It is suitable for human genome engineering, forensic medicine, oncology, population biology, paleontology, zoology, botany and other research fields.

2.3 Main specifications

- Product name: Real-Time Fluorescent Quantitative PCR System

- Product model: 960406
- Product size: 525 mm (L) × 320 mm (W) × 420 mm (H)
- Product weight: 27 KG
- Power supply: 100-240 V～, 50 / 60 Hz, 750 W
- Fuse specifications： T10AL 250V
- Usage period: 5 years; The service life of this product is determined according to GB/T 34986-2017 "Product Accelerated Test Method" and GJB/Z 299C-2006 "Electronic Equipment Reliability Prediction Manual". During use, users should maintain, care for, and repair the product according to the instructions provided in the product manual. After maintenance, care or repair, products that are confirmed to still maintain basic safety and effectiveness can be used normally.
- Production date: See product label for details.

Chapter 3 Product performance

Target		Parameter					
Sample capacity		96 wells (12 × 8)					
Applicable consumables		PCR single tube and strip of 0.2 ml, 96-well half skirted / no skirted plate PCR single tube and strip of 0.1 ml, 96-well no skirted plate					
Sample repeatability		CV of Ct value ≤ 3%					
Fluorescence intensity detection repeatability		CV ≤ 3%					
Detection location		Top					
Multiple detection		Simultaneous detection of up to 6 fluorescence in a single tube					
Fluorescence interference of different channels		Automatic crosstalk correction					
Configuration of fluorescence detection channel	Detection of the channel	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6
	Fluorescent dyes	FAM/ SYBR Green I	JOE/HEX/ TET/VIC	TAMRA/ Cy3/ NED	ROX/ Texas Red	Cy5	Cy5.5
	Excitation light wavelength	480nm	523nm	543nm	571nm	624nm	675nm
	Detection light wavelength	520nm	564nm	584nm	612nm	675nm	725nm
Excitation light source		LED					
Detector		PMT					
Heating and cooling rate of the block		6 °C/s (MAX)					
Block temperature range		4 - 105 °C					
Block temperature control accuracy		≤±0.1℃(55℃)，≤±0.15℃(72℃)，≤±0.2℃(95℃)					
Block temperature accuracy		≤±0.1℃(55℃)，≤±0.2℃(72℃)，≤±0.3℃(95℃)					
Block temperature uniformity		≤±0.1℃(55℃)，≤±0.25℃(72℃)，≤±0.4℃(95℃)					
Block temperature control mode		Block mode, analog Tube mode					
Block gradient temperature range		30 - 100 °C					
Block gradient temperature difference		1 - 40 °C					
Hot lid temperature range		35 °C - 110 °C (default 105 °C)					
Other function		Power-off protection function, data can be restored after power-on.					
Ports		USB Type-A port × 2, USB Type-B port, RJ45 port					

Chapter 4 Structures

4.1 Main components

The Real-Time Fluorescent Quantitative PCR System mainly consists of control block, temperature control block, photoelectric block, mechanical block, power block, shell, and software (including embedded software, Android client software, and PC software).

4.2 Accessories list

No.	Name	Unit	Quantity
1	Power cord	pc	1
2	USB data cable	pc	1
3	Network cable	pc	1
4	Fuse	pc	3
5	USB flash driver	pc	1
6	Code scanner	pc	1
7	Flat-blade screwdriver	pc	1
8	Capacitance pen	pc	2

Chapter 5 Instrument startup and shutdown

5.1 Wire connection

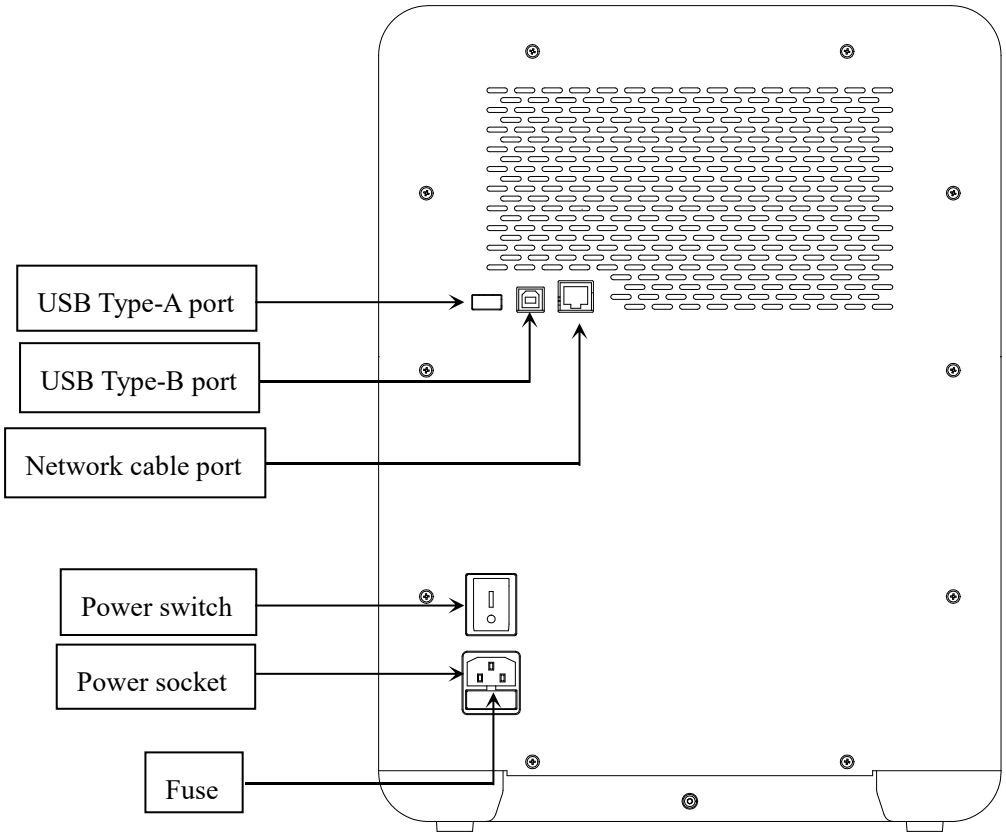
As shown in the figure below, before using the instrument, connect the power cord to the socket and turn on power supply.

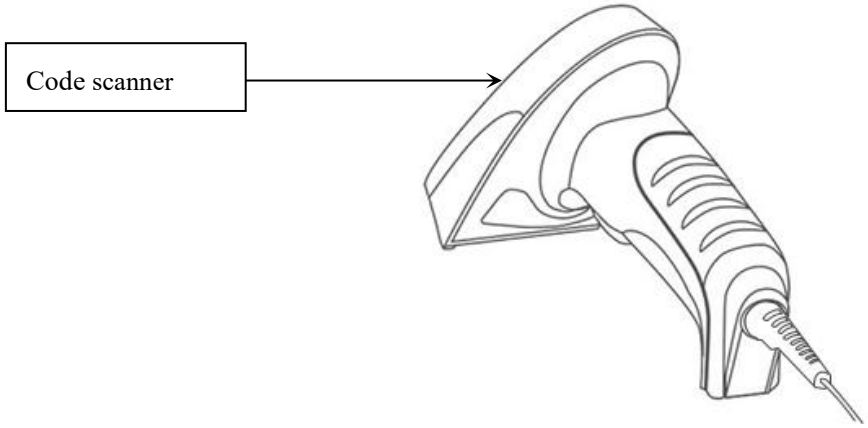
Power cord connection: The power cord attached to the instrument should be used. When connecting, the power switch of the instrument should be turned off; after connecting, check the tightness of the power cord and the power socket of the instrument. If it is loose, please replace it.

Network cable connection: The network cable attached to the instrument should be used. After connecting, check the tightness of the network cable and the instrument network cable port. If it is loose, please replace it.

USB port: For external connection of USB devices.

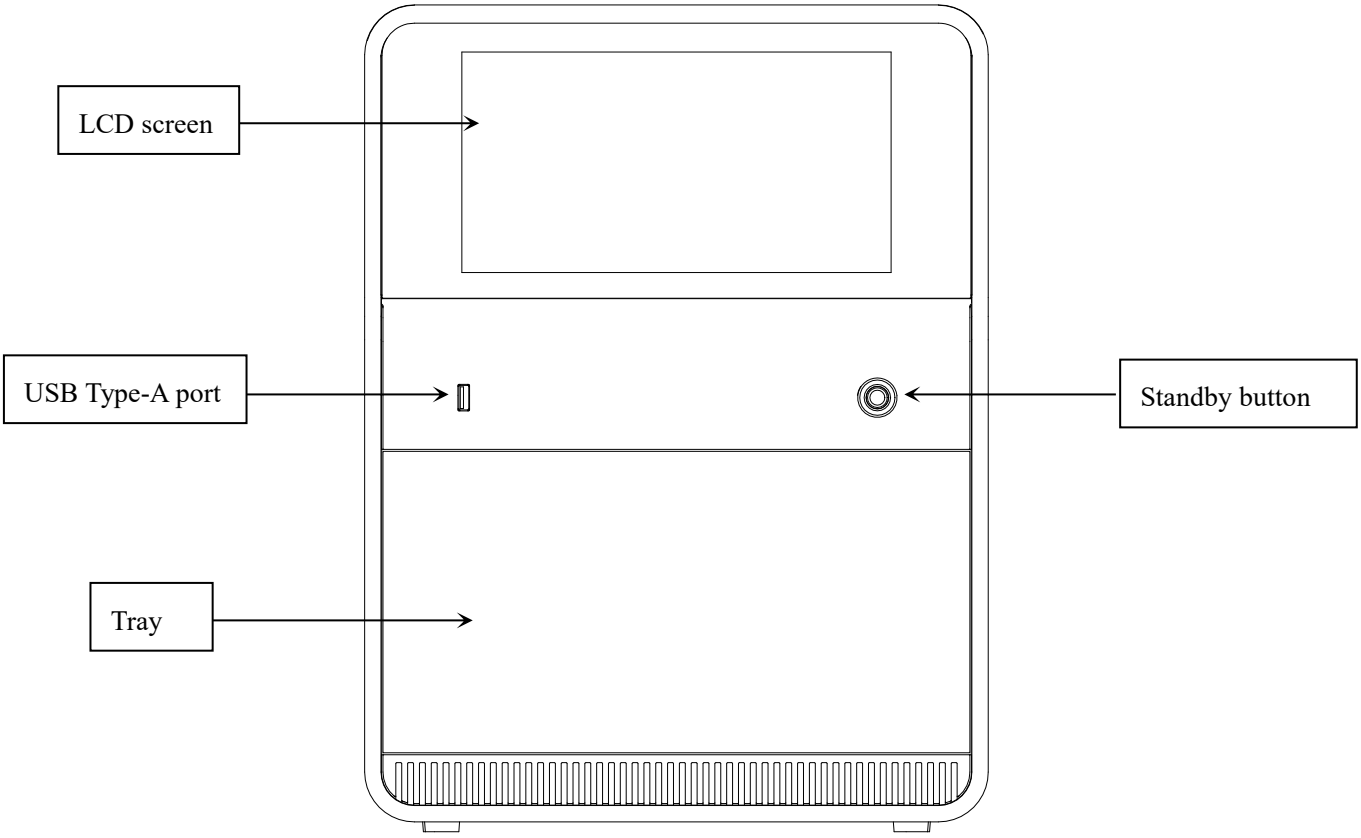
Code scanner：Before using the instrument, connect the code scanner with the data line, and then insert it into the USB interface of the computer.





5.2 Instrument operation instructions

- Check whether the working environment meets the requirements of the working environment of the instrument before using it (refer to 1.2).
- Please place the instrument on a horizontal workbench.
- The main view of the instrument is shown in the figure below.



No.	Description
1	LCD screen: fixed on the front top of the instrument. The user can touch the screen for a series of operations.
2	USB port: to connect to external USB driver, when connected, it can performance the functions like data import, export or software upgrade.
3	Standby button: When the instrument is powered on, press the button to open/close the instrument
4	Tray: It can be opened/closed by instrument terminal or PC terminal software for placing/taking out samples. The tray must not be blocked when it is opened and closed.  Do not block the tray with the hands when opening/closing, as this may cause accidental injury.

5.3 Check before startup

Please check whether the working environment, power supply and instrument placement meet the requirements (refer to chapter 1.2.2 and chapter 2.3)

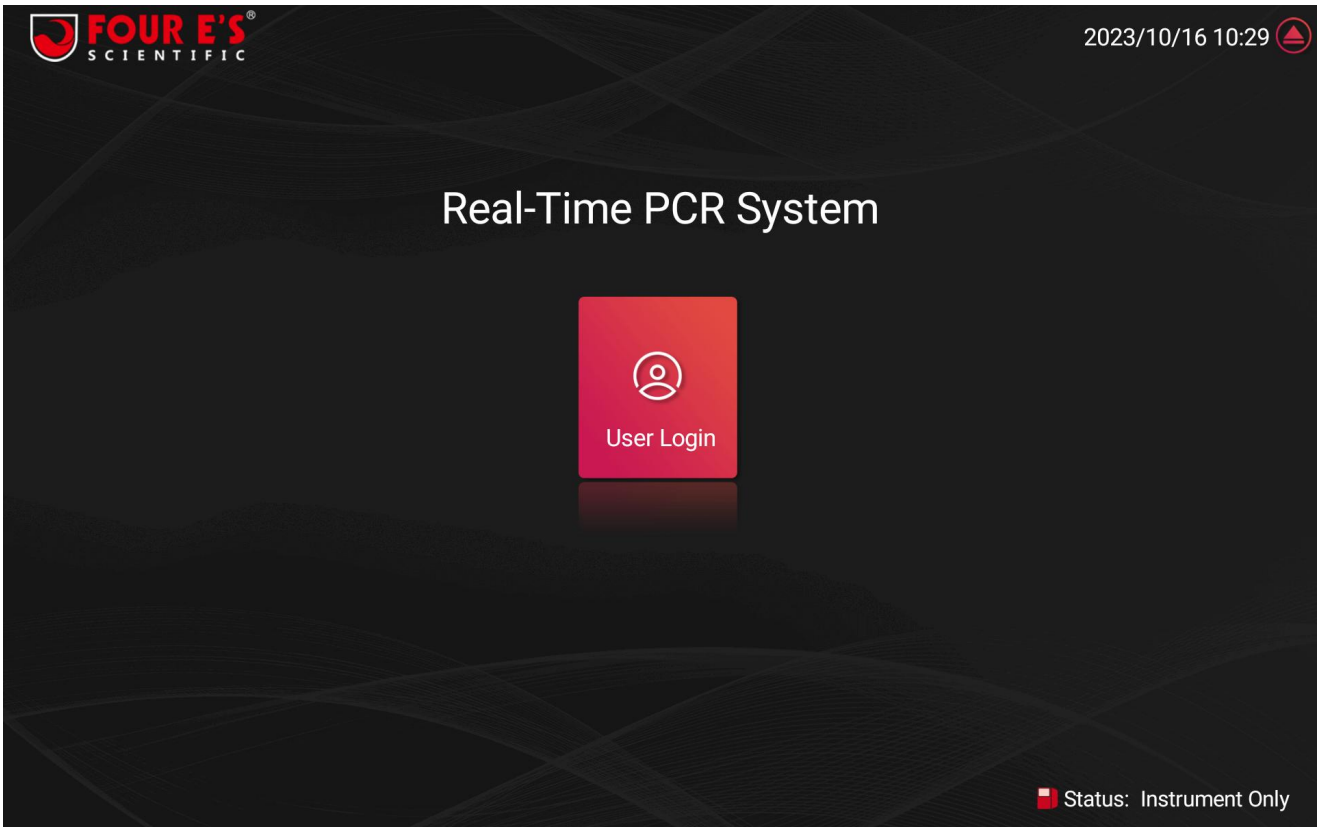
5.4 Instrument startup

Press the power switch on the back of the instrument to the "I" position to connect to the power;

Press the standby button on the front of the instrument to turn on the instrument;

The LCD screen of the instrument lights up and it can enter the login interface. Entre the username and password to log in to the instrument terminal.

When using the instrument for the first time, the user needs to set the initial password of the admin account through the instrument terminal in the instrument and log in, then it can be used. When it is not used for the first time, it can be used directly online through the PC, and it does not need to login the instrument terminal.



5.5 Check before shutdown

- Whether all test tubes and 96-well plates in the block of the instrument have been removed;
- Whether the inside of the hole in the instrument module has been cleaned;
- Whether the tray is completely closed.

5.6 Instrument shutdown

- Press the standby button on the front of the instrument to turn off the instrument;
- Press the power switch on the back of the instrument to the " O " position to disconnect the power supply.
- If contaminants are spilled on the instrument, wipe it with 75% ethanol by a soft cloth.

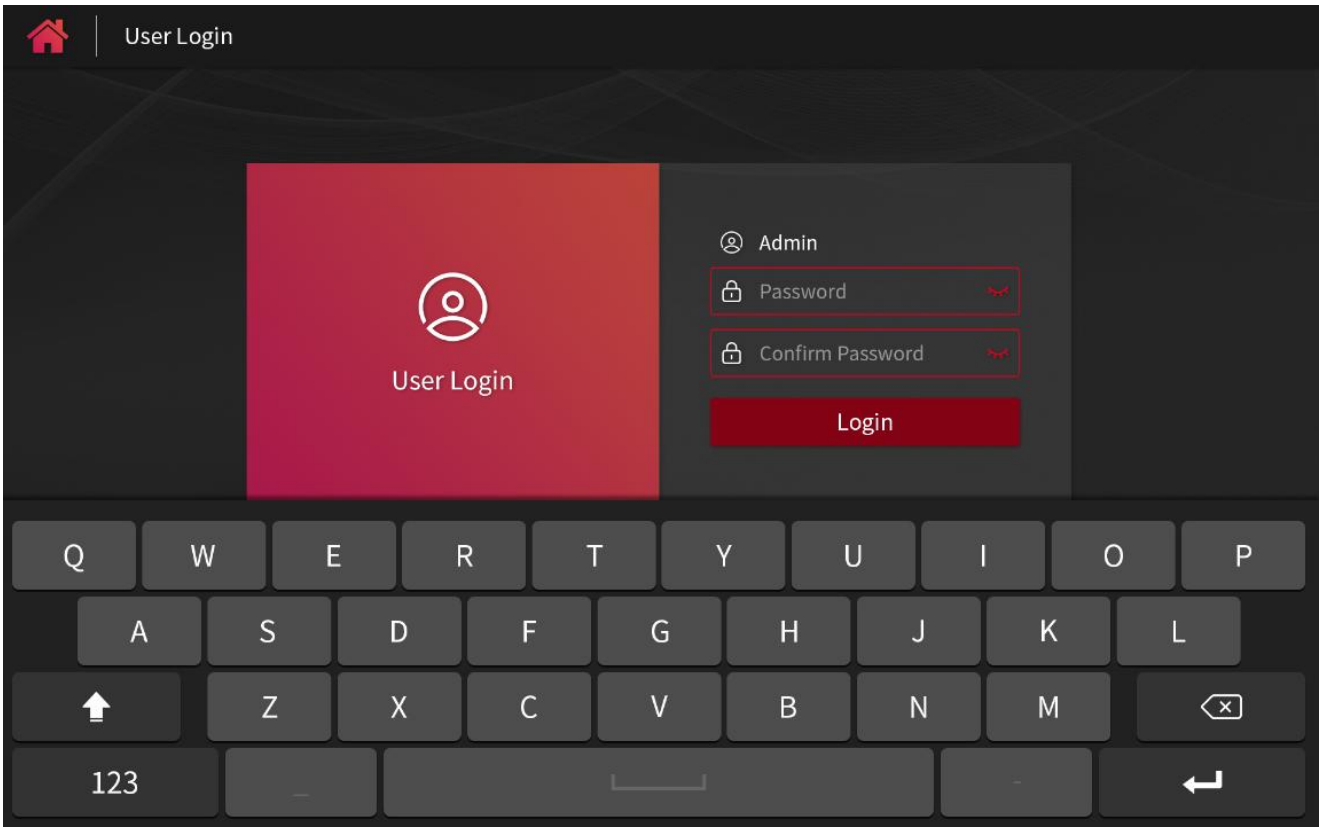
Chapter 6 Instrument software operation guide

After startup, the instrument enters the initialization and self-checking, checking the functions of temperature control, optical detection, motor activity, positioning, communication and so on. If there is any abnormality, an alarm will be given. After passing the self-check, it will enter the user login interface automatically.

6.1 User login

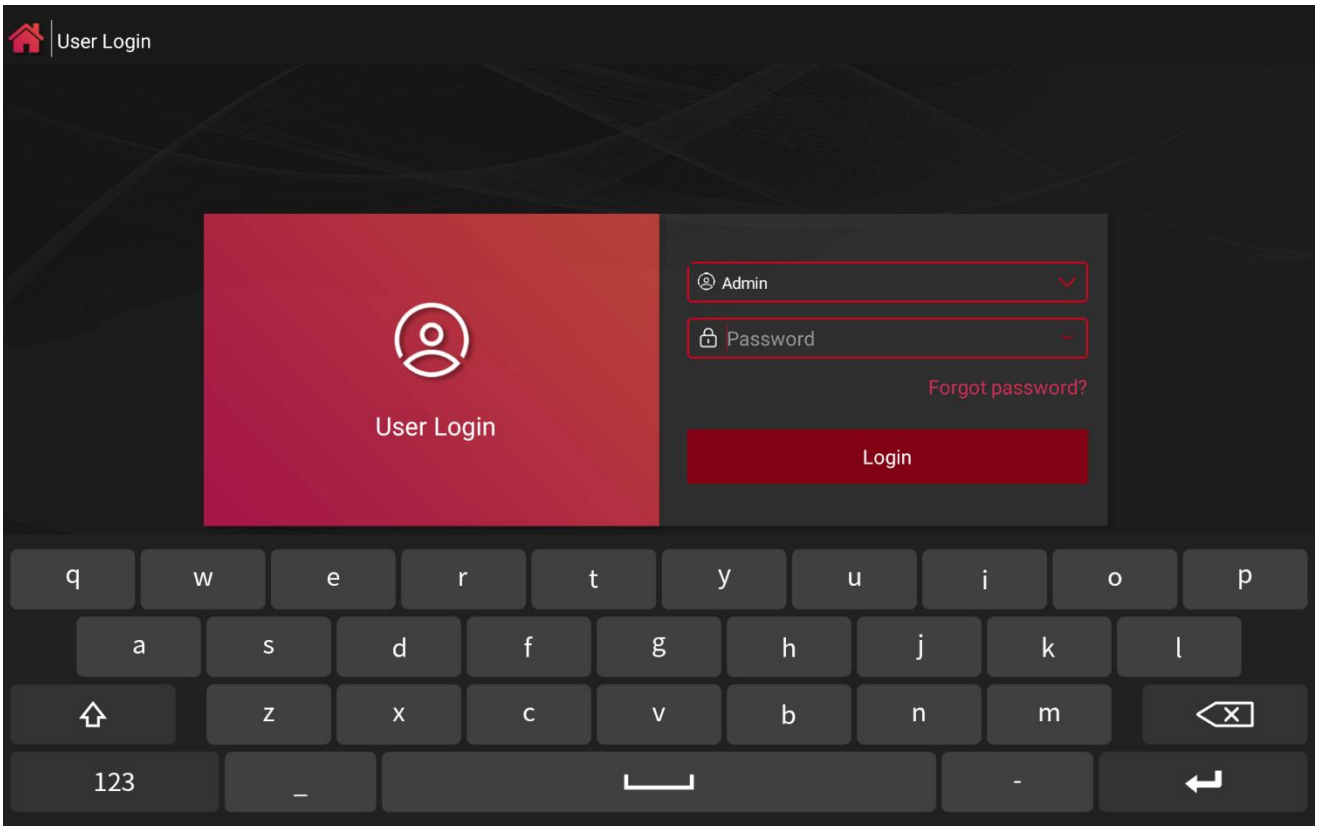
6.1.1 Initial login (Instrument only)

Before firstly using the instrument, the initial password of the administrator account must be set through the instrument software (that is, the initial password must be confirmed and login on the instrument terminal, so it can be used online in the PC terminal for the first time, and then the subsequent functions like creating a new user and deleting a user of the instrument can only be performed on the PC terminal).

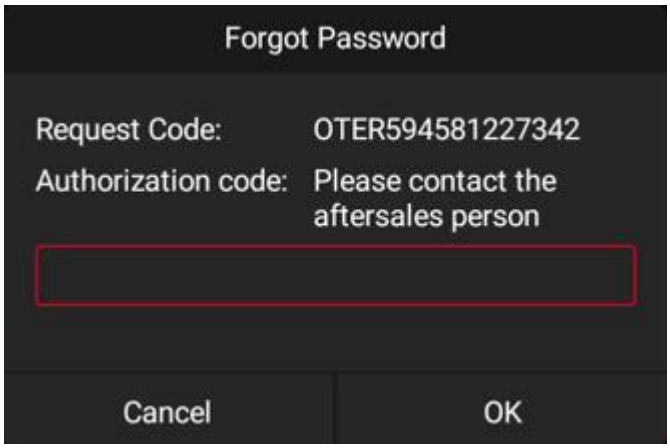


6.1.2 Routine login (Instrument only)

If the instrument is not used for the first time, after it is powered on, enter the user login interface, click the "User Login", and enter any user name and password under the instrument for login:



If you forget the password when logging in to the administrator account, click the "Forget password" to generate an "Request code". The user can apply to get an authorization code from the after-sales personnel to reset the password of the administrator account:



If the common user forgets the password, he can reset the password by using the user management function of the administrator account on the PC (for details, see 7.1.2). The renewed password is 888888.

After login, the user enters the main interface of instrument terminal software, which includes:

- User Logout
- Template Library
- Import

- Quick Run
- Real-Time Graphics
- Experiment Library
- Settings

Instrument terminal can not only run a experiment directly, but also import, export and view file, or set the system. In 6.2 of this chapter, it will introduce the operation of running experiments in the instrument terminal firstly. In 6.3-6.9, it will introduce the operation guide of 7 functional modules on the main interface in details one by one.

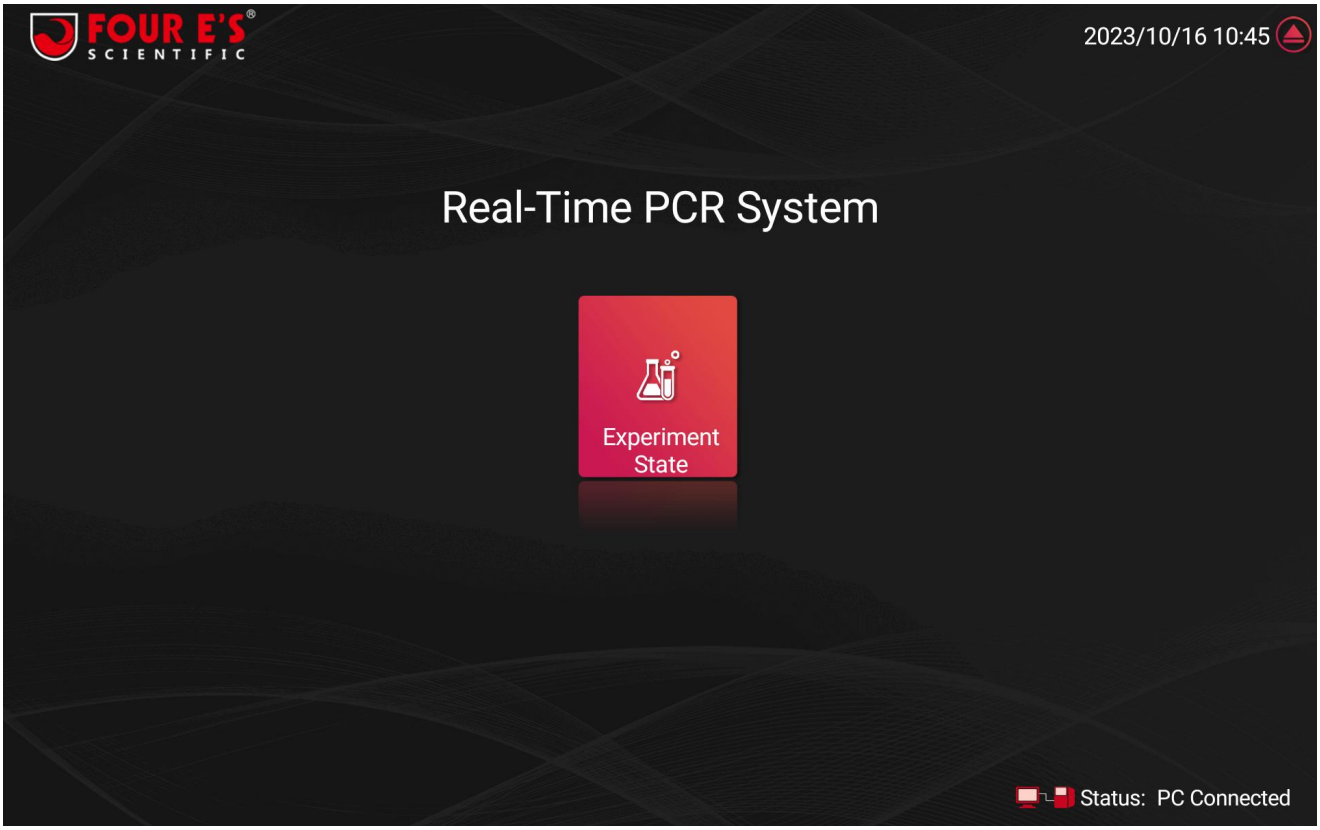
In the single-stand mode, if there has a PC applying for connection to the instrument, the pop-up box on the instrument terminal interface will prompt, the user can select to cancel or confirm:

- **If the user select to cancel, the online status of the instrument changes to " Connected, Not Controlling ". In this state, data can only be transmitted between the PC and the instrument, but the operation of the instrument cannot be controlled.**
- **If the user select to confirm, the online status of the instrument changes to " Connected, Controlling ". In this state, the PC can control the instrument, and only the experimental status can be viewed on the instrument end.**

6.1.3 No need to login (PC Connected)

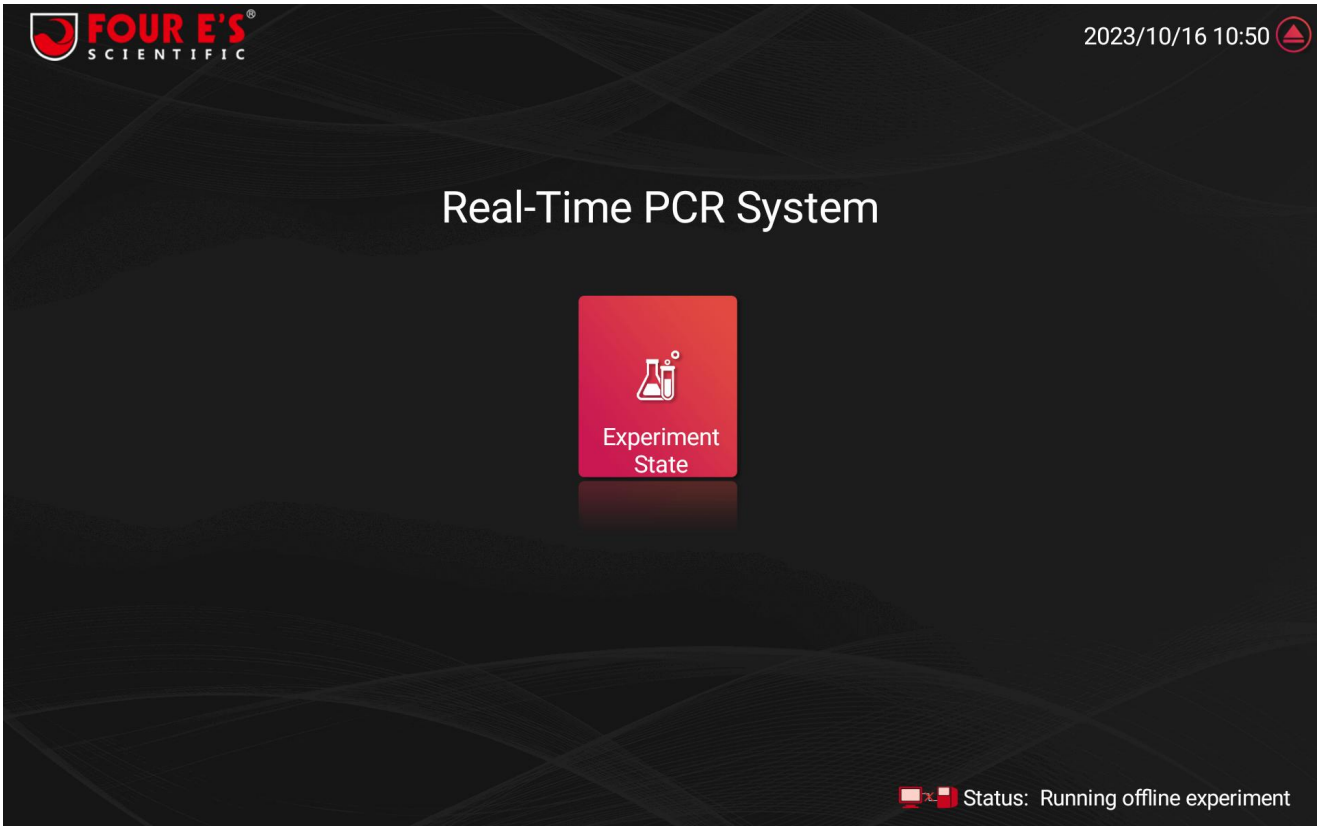
If it is not used for the first time and the instrument has been connected through PC (see Chapter 7 for details of PC

connection operation), there is no need to log in the instrument terminal and only the viewing the experiment state function is effective. In the online mode, the instrument terminal automatically jumps to the online interface of experiment:



If the experiment is running in the online mode, click the button on the home page to view the current experiment state:

If the online mode is disconnected while the experiment is running, the instrument status on the home page will change to: online disconnected, running offline experiments.



Click the home button to enter the experiment status interface. The user manually stops the offline experiment or when the offline experiment is completed, the interface will jump to the user login (stand-alone mode).

After reconnecting to the PC, the user can view the running experiments or instrument experiment files to view the experiments that were running before the disconnection.

6.2 Run an experiment

Instrument terminal can run an experiment in the following two ways:

- Via the template

  Template → Click any template file → Plate settings → Open module → Place samples → Close module → Next → Method settings → Gain settings → Start run

- Via the quick run

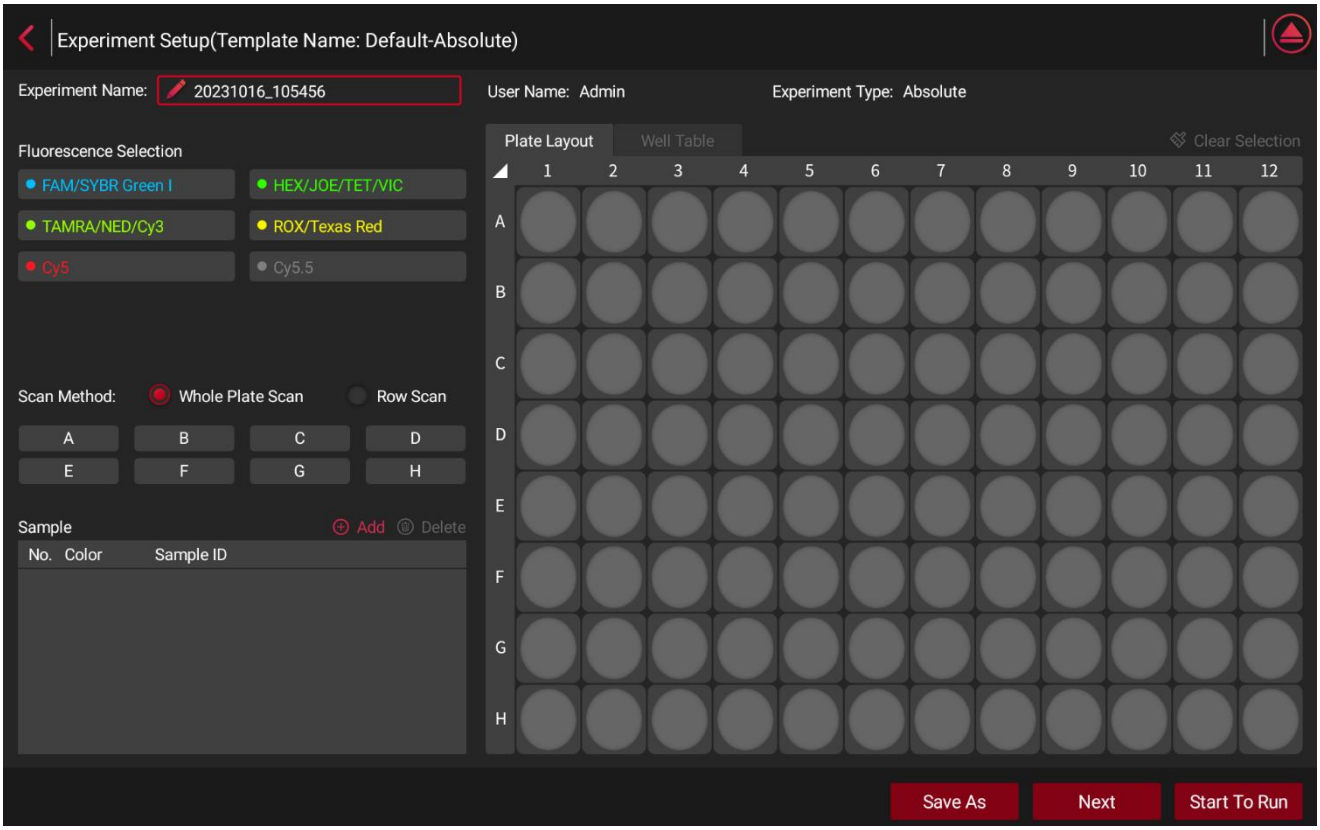
  Quick run → Template selection → Open module → Place samples → Close module → (Plate settings → Next → Method settings →) Start run

This section mainly introduces the main operation steps of running an experiment: plate settings, sample preparation, method settings and start running.

6.2.1 Plate settings

(1) General settings of plate

After selecting the template, jump to the plate settings, which can set the experiment name, target, sample, and select the plate:



a) Select the plate: the required hole in the plate can be directly selected through the plate layout or well table on the right.

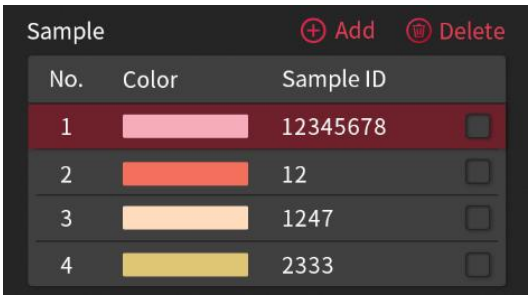
b) Clear selection: the selected plate hole can be quickly cleared by clicking the "Clear selection" button in the upper right corner.

c) Experiment Name: the creation time is the default name, or click to manually edit the name.

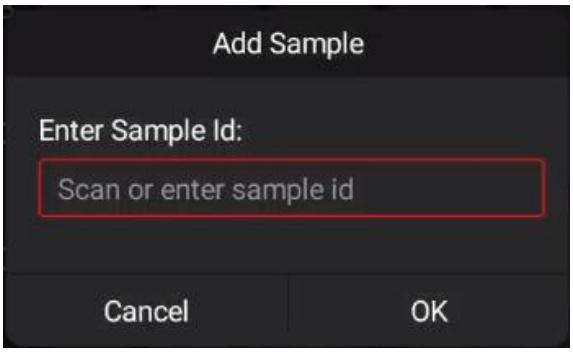
d) Fluorescent selection: select the fluorescence channel

e) Sample: it can add or delete the sample information. After selecting the well location of the plate, click the

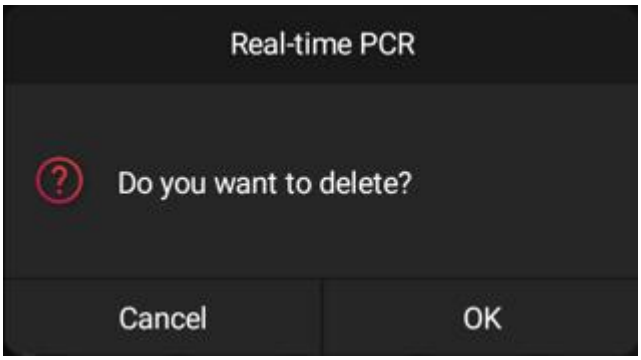
check box next to the sample ID to add the sample to the plate.



Click the "Add" button to add sample information. The sample ID can be added by manual or by external code scanner:



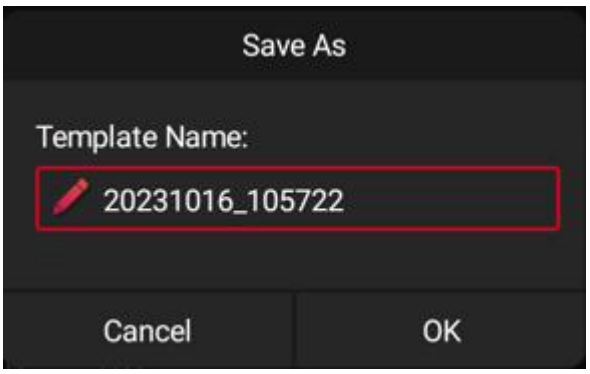
Select a certain sample information and click the “Delete” to delete this sample information. If the sample information has been selected on the plate, the system will pop up to prompt you before deleting:



(2) Switch between Plate and Table: you can switch the display of well plate through plate or table.

(3) Plate information save as

After setting the plate, click the "Save As" to save the information settings as a new template file:

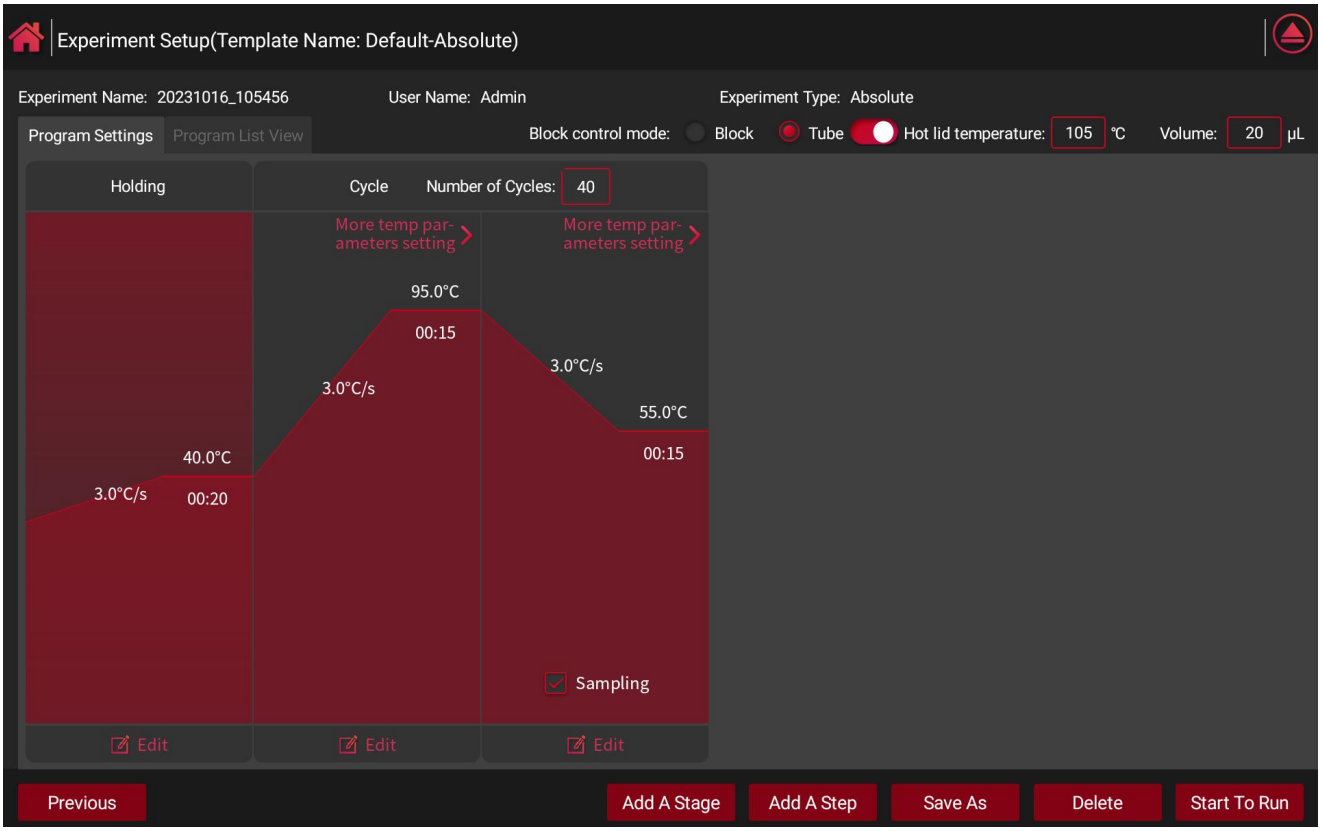


6.2.2 Sample preparation

After setting the plate information, click the icon on the upper right of the plate setting to open the module, and place the samples into the module according to the configured plate layout. Click the icon again to close the module.

6.2.3 Experiment setup

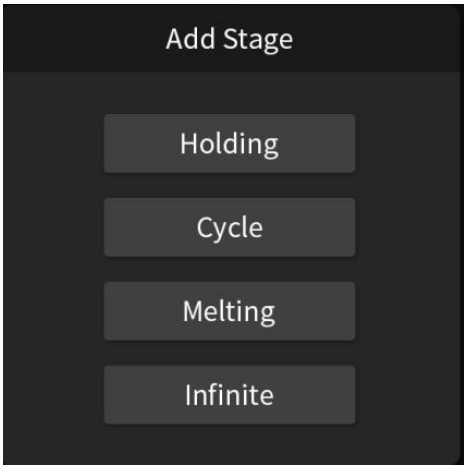
Click the "Next" of plate setting interface to jump to the experiment setup interface:



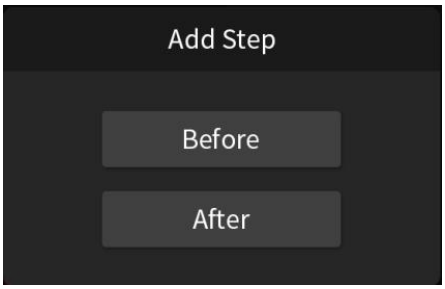
Click the "Previous" to return to the plate setting interface to reconfirm. The experiment setup interface can set the specific running program, select run mode, set the hot lid temperature and liquid quantity, and also can save the file as a template file.

(1) Method View: add stage, add step, delete stage, delete step and set the temperature & time of each program stage.

a) Add Stage: click to select a holding stage, cycle stage, melting stage or infinite stage.

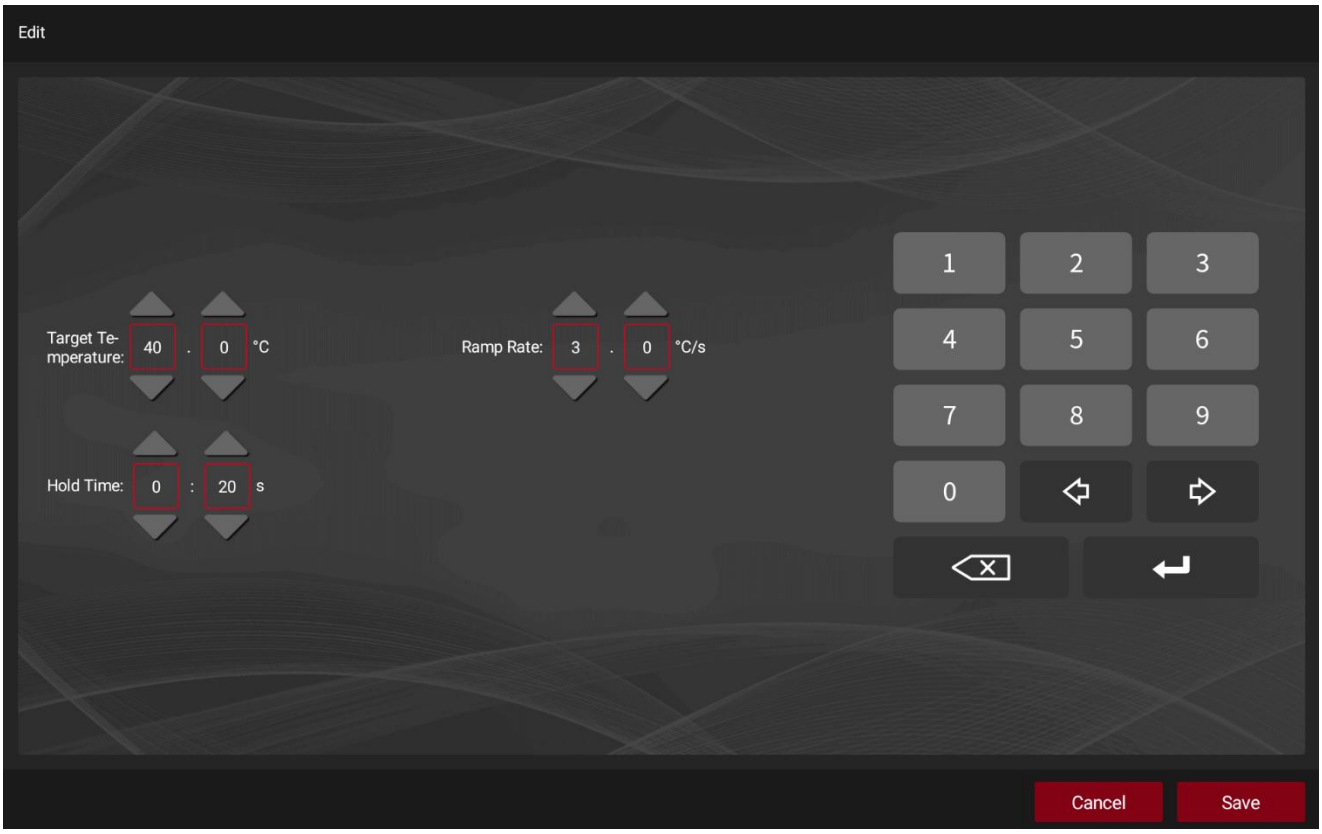


b) Add Step: click to add a step before or after the current step

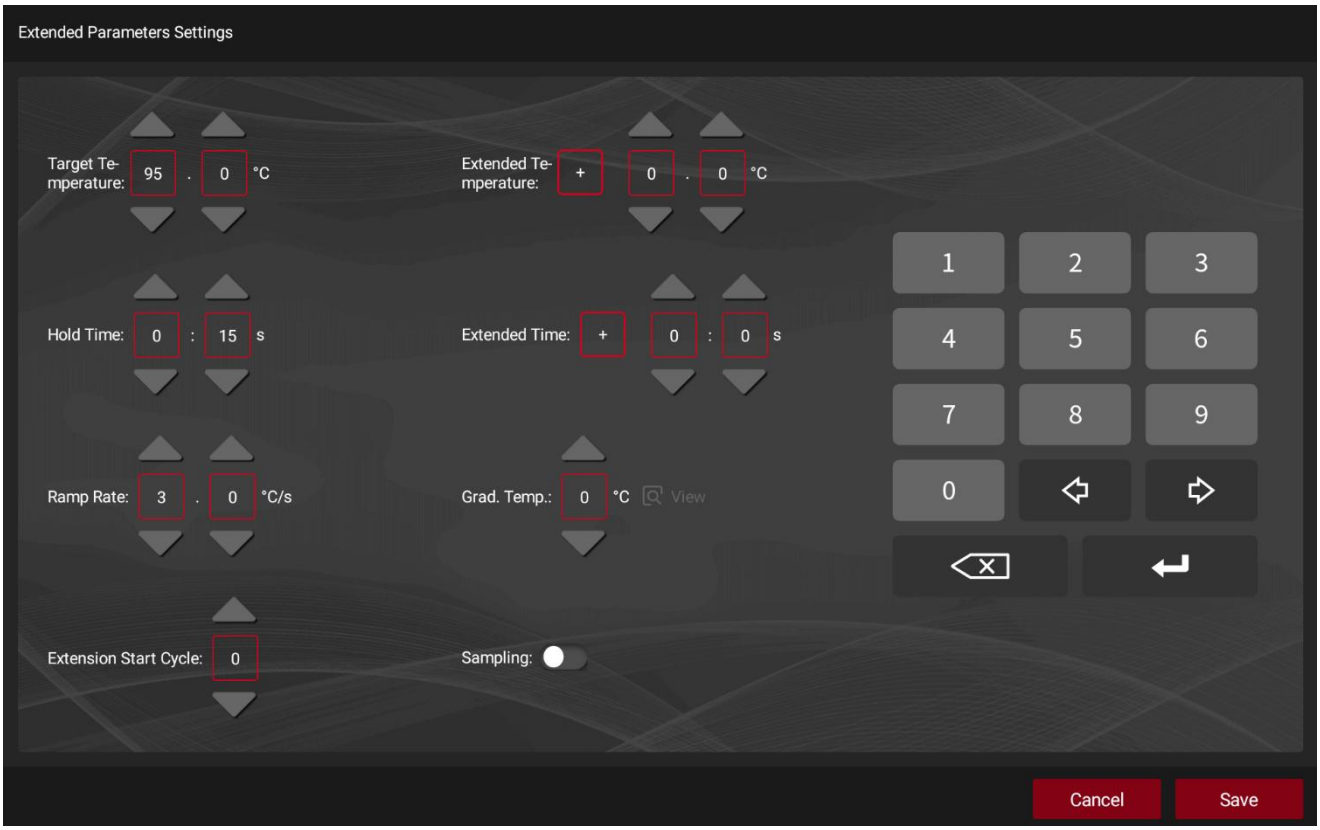


c) Delete: it can delete selected steps or stages.

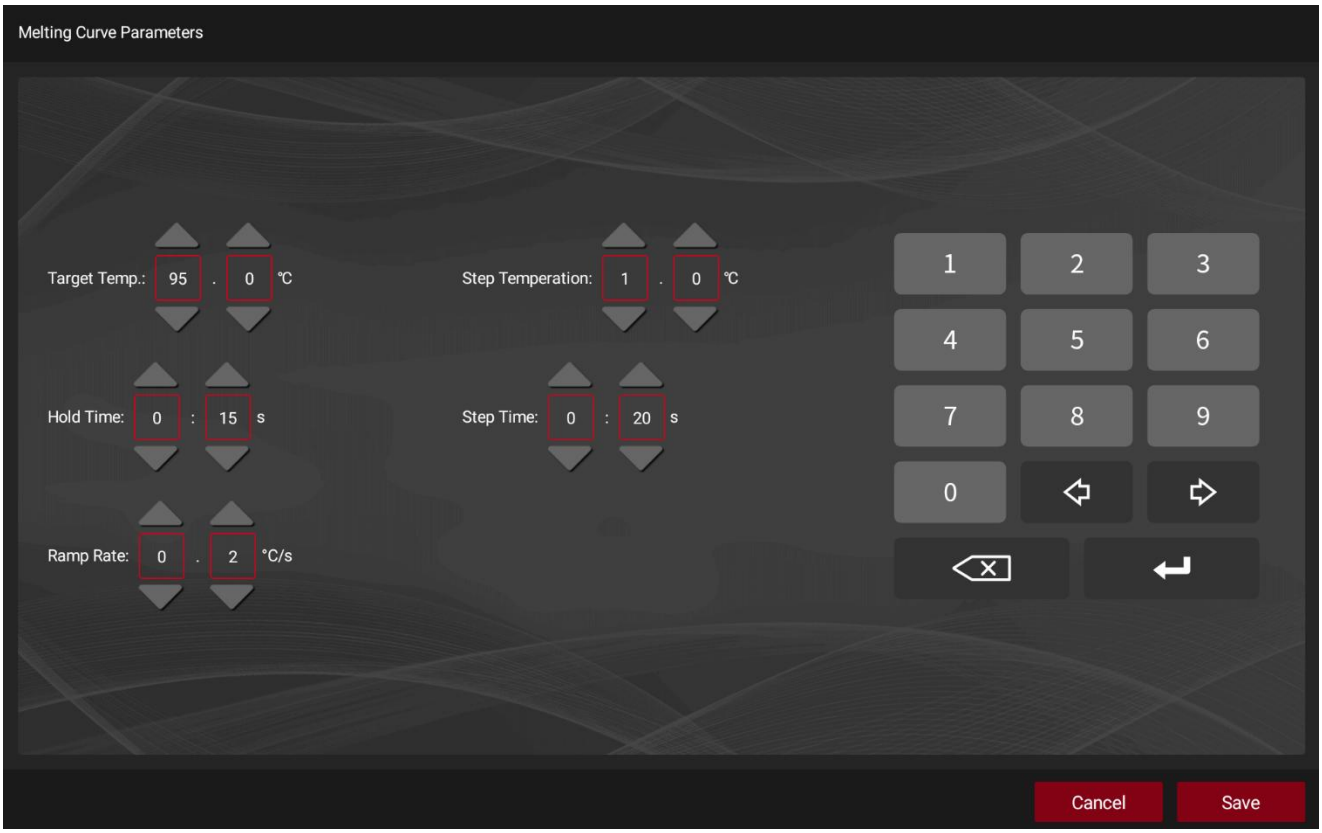
d) Modify: it can set the target temperature, ramp rate, step hold time, and whether to sample the fluorescence in the selected step. (Only one step of the loop step can be set to sample the fluorescence)



e) More temperature parameter settings: the extended parameters of each step can be set in the cycle stage.



f) Melting Parameters: the melting parameters can be set in the last stage of melting.



g) Settings of cycle number: click the cycle number box of the cycle stage to manually edit the cycle number.

(2) Run Mode: Block or Tube temperature control mode can be selected.

(3) Hot-lid Temp: if the function of hot lid temperature is enabled, the heating temperature of hot lid can be set, ranging from 35 °C to 105 °C.

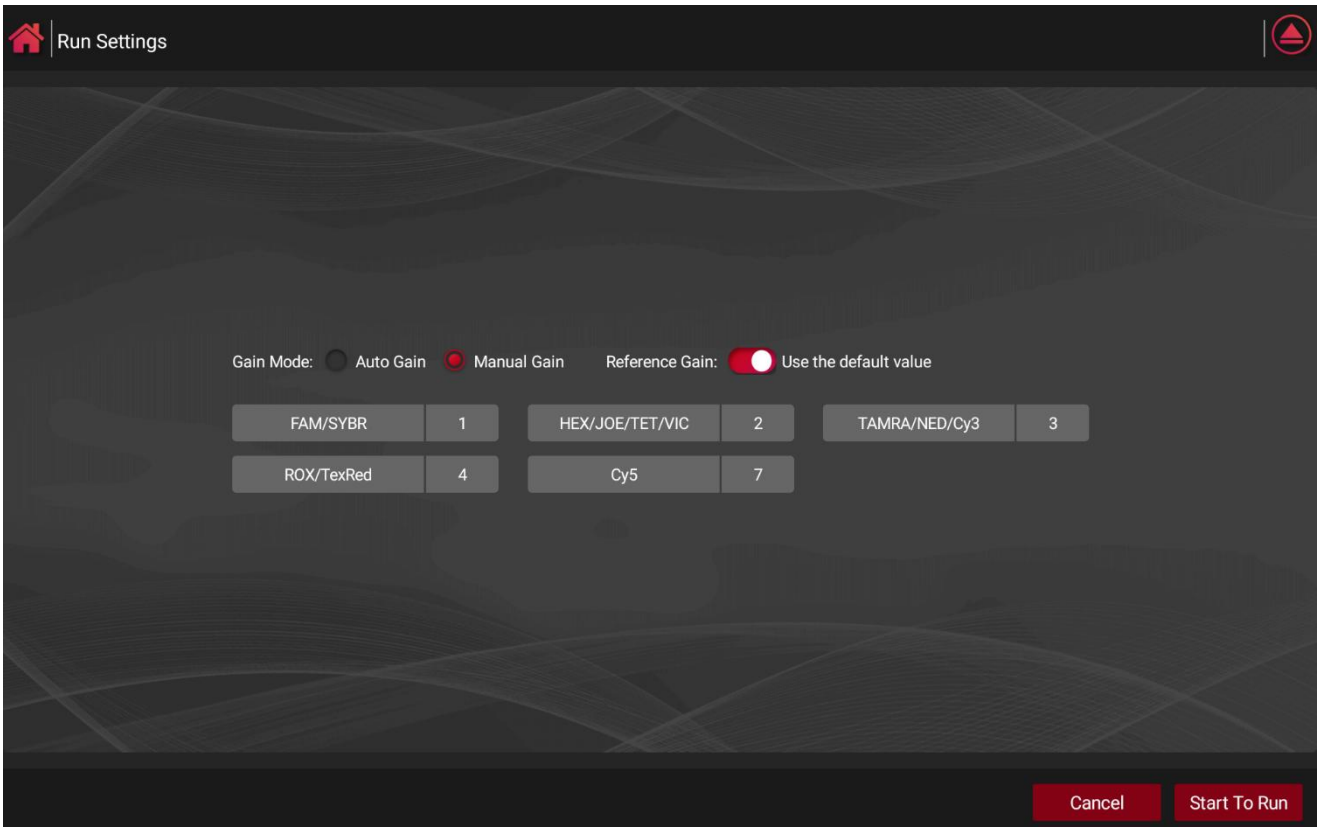
(4) Liquid Quantity: set the liquid volume, and the default is 20 μl.

(5) List View: switch to the list mode to view the running program.

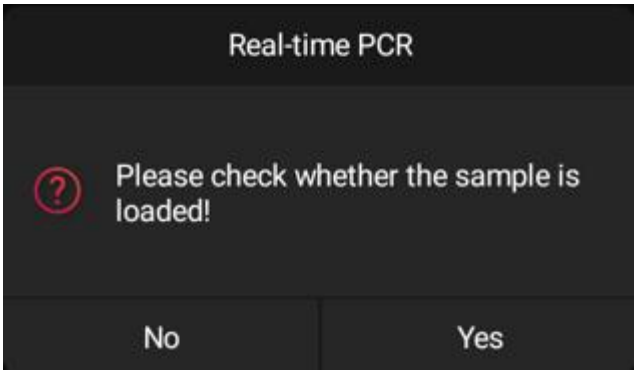
(6) Save As: click the "Save As" to save the setting information as a new template file.

6.2.4 Start run

Click the "Start Run" to jump to the Run Confirm interface, where to select the gain mode and setting the gain value:

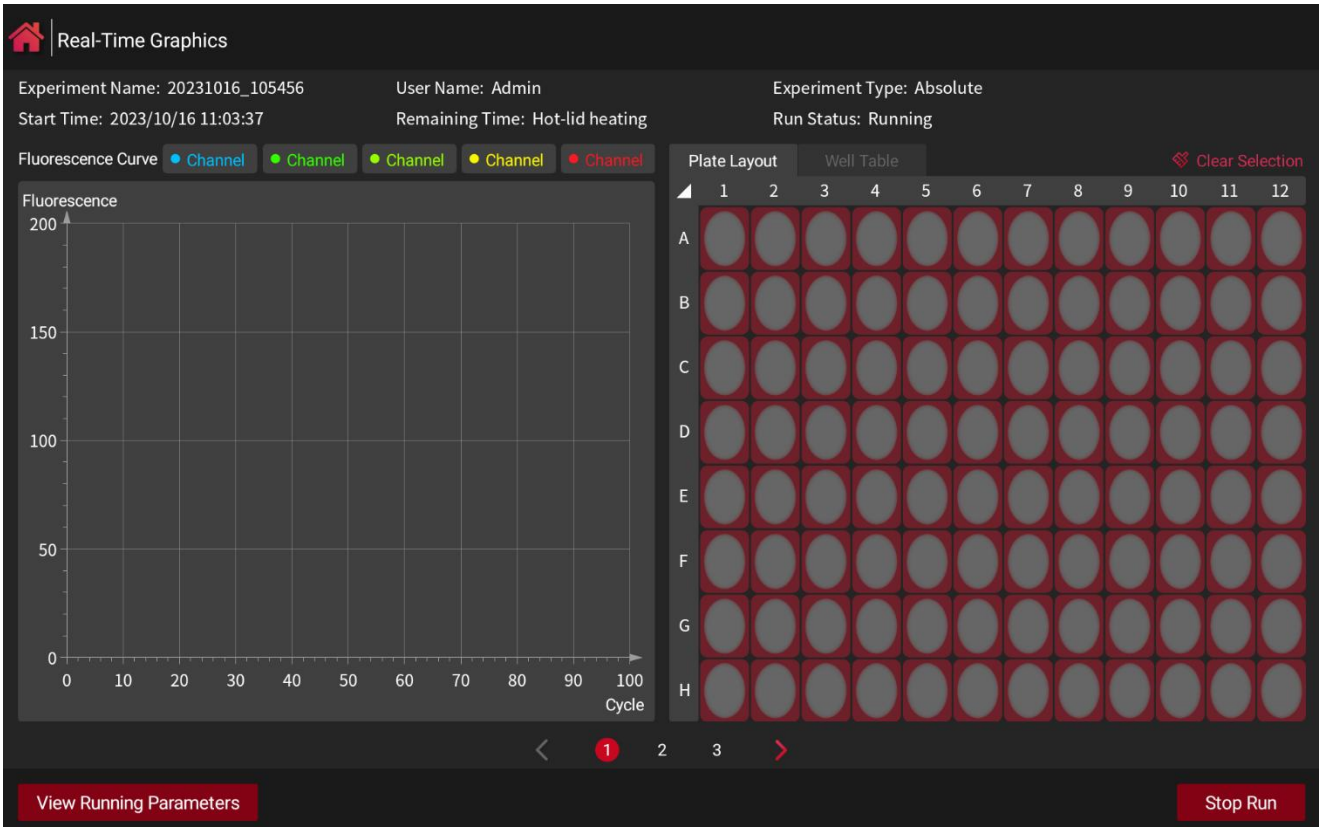


After the gain setting is completed, click the "Run", the system will prompt "please check whether the sample is loaded." Again.



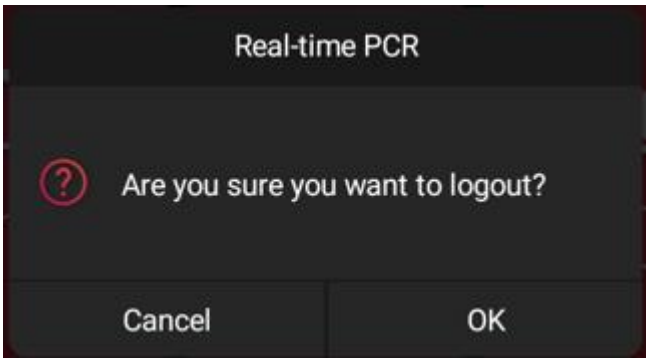
If no sample is placed, click the "Cancel" button to return to the Run Confirm interface, click the icon on the interface to open the module, and place the sample into the tray according to the plate layout. Then click the icon again to close the module.

If you confirm that the samples are placed into the block, click the "OK" to the experiment begins and it will enter the real-time graphics interface.

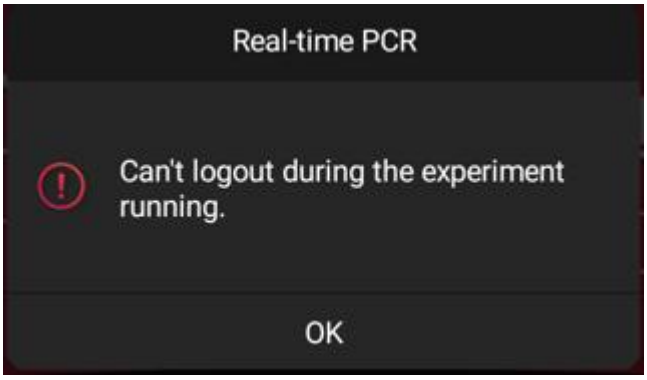


6.3 User logout

Click the “User logout” and confirm to exit the current user interface:



It cannot logout the current user when the experiment is running, a dialog box will prompt to pause the experiment, or log out after the experiment is done.

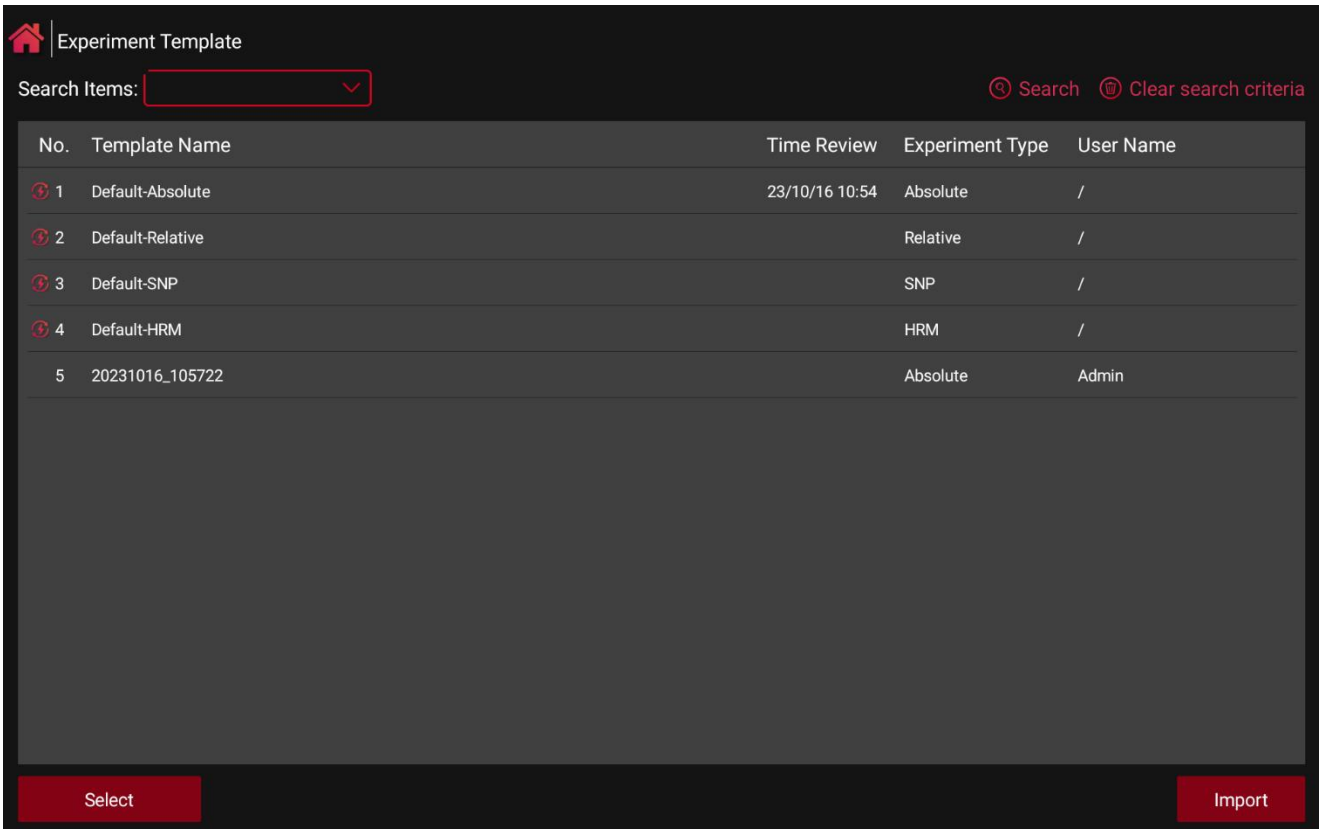


6.4 Template library

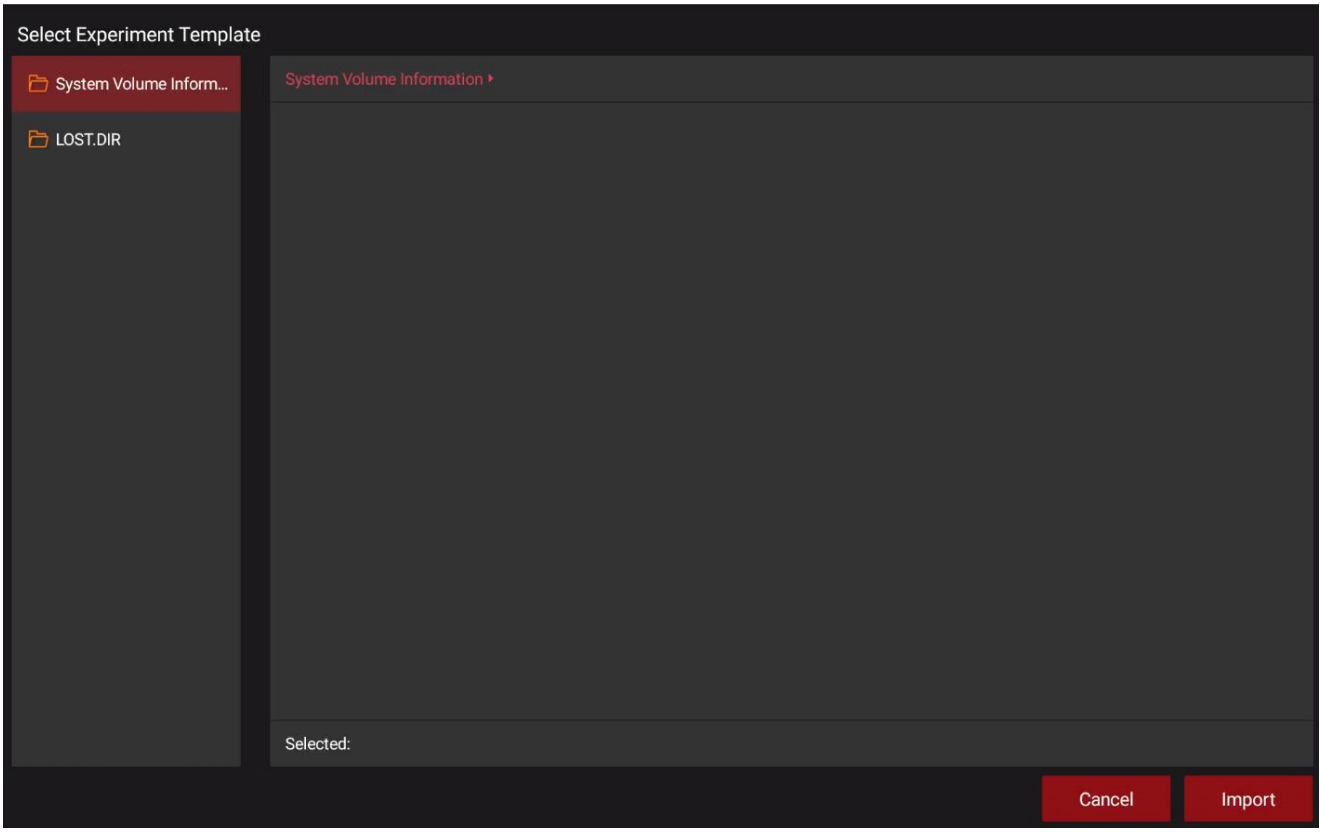
It can review all template files (When using for the first time, the administrator account has 4 types of experiments by default. Each type of experiment can be set as an initial template, which can be saved as a new template after setting the preset template, or import the template file with the same user name on PC into the Instrument terminal), open, search, select, export or delete a file.

Click any template file to open the template file and enter the plate setting interface. Refer to 6.2.1-6.2.4 for details.

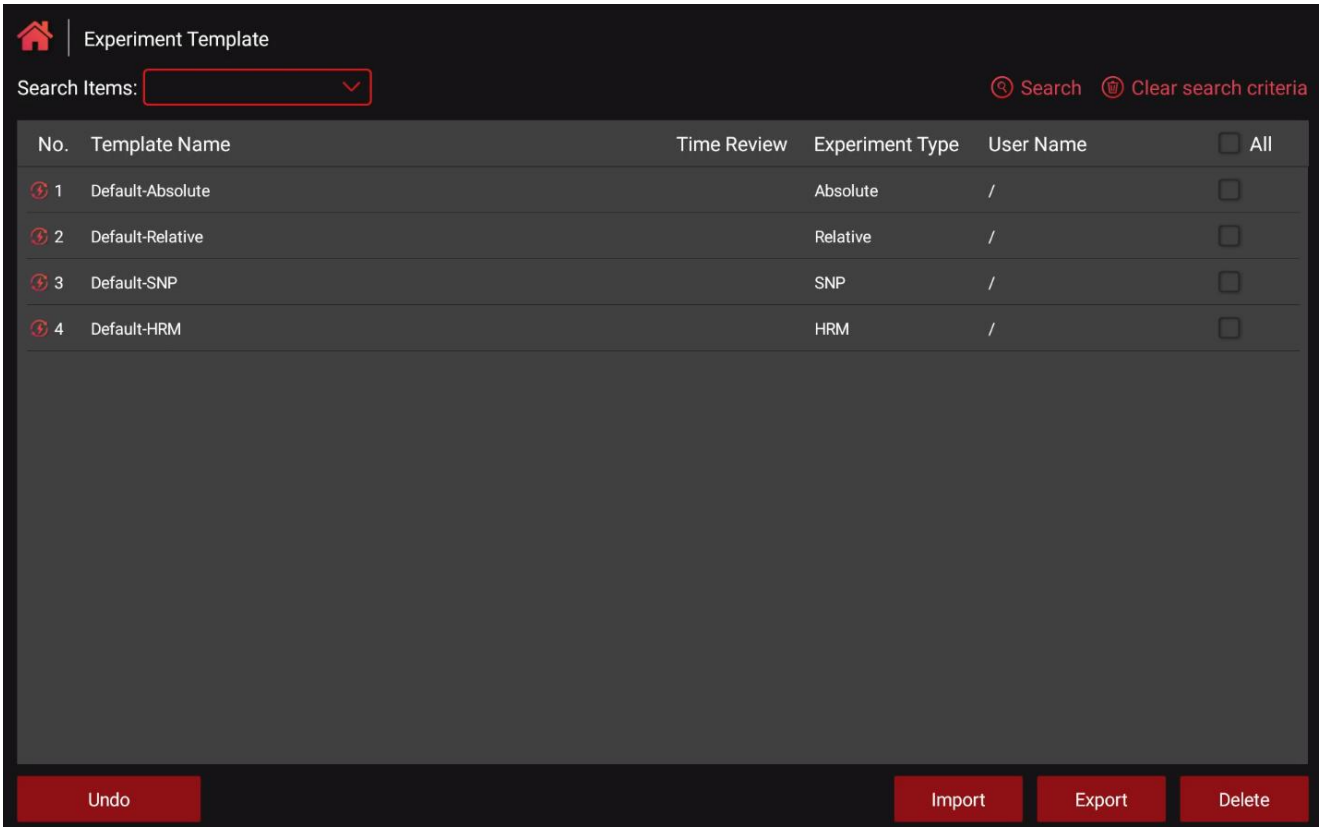
Template files under the instrument can be searched and viewed through template name,time review, experiment type and user name (only the administrator account can view all the files of all users in the instrument, while ordinary user can only view the files under his own name) :



Click Import, it can import the template file from the same user name through the external USB drive:

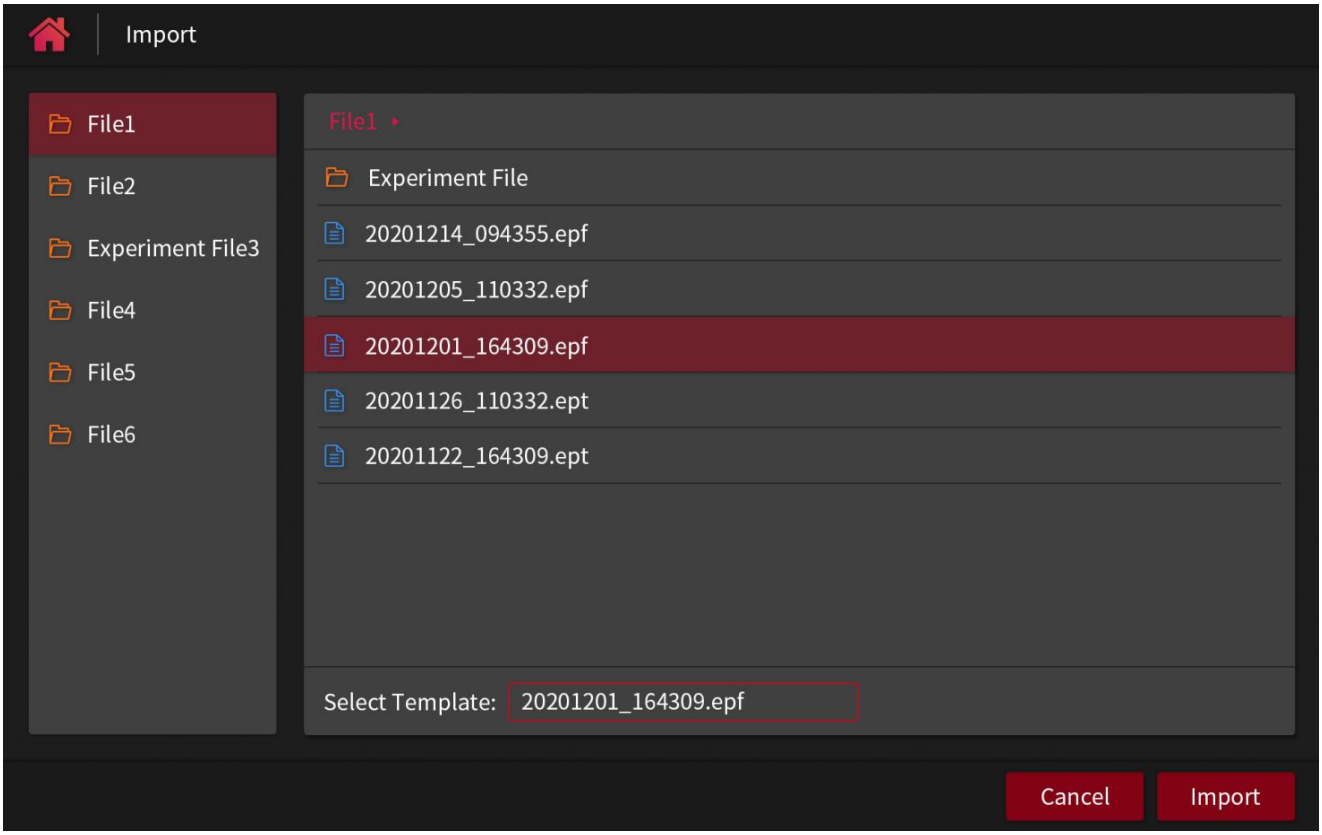


Check the template file to export or delete the selected file:



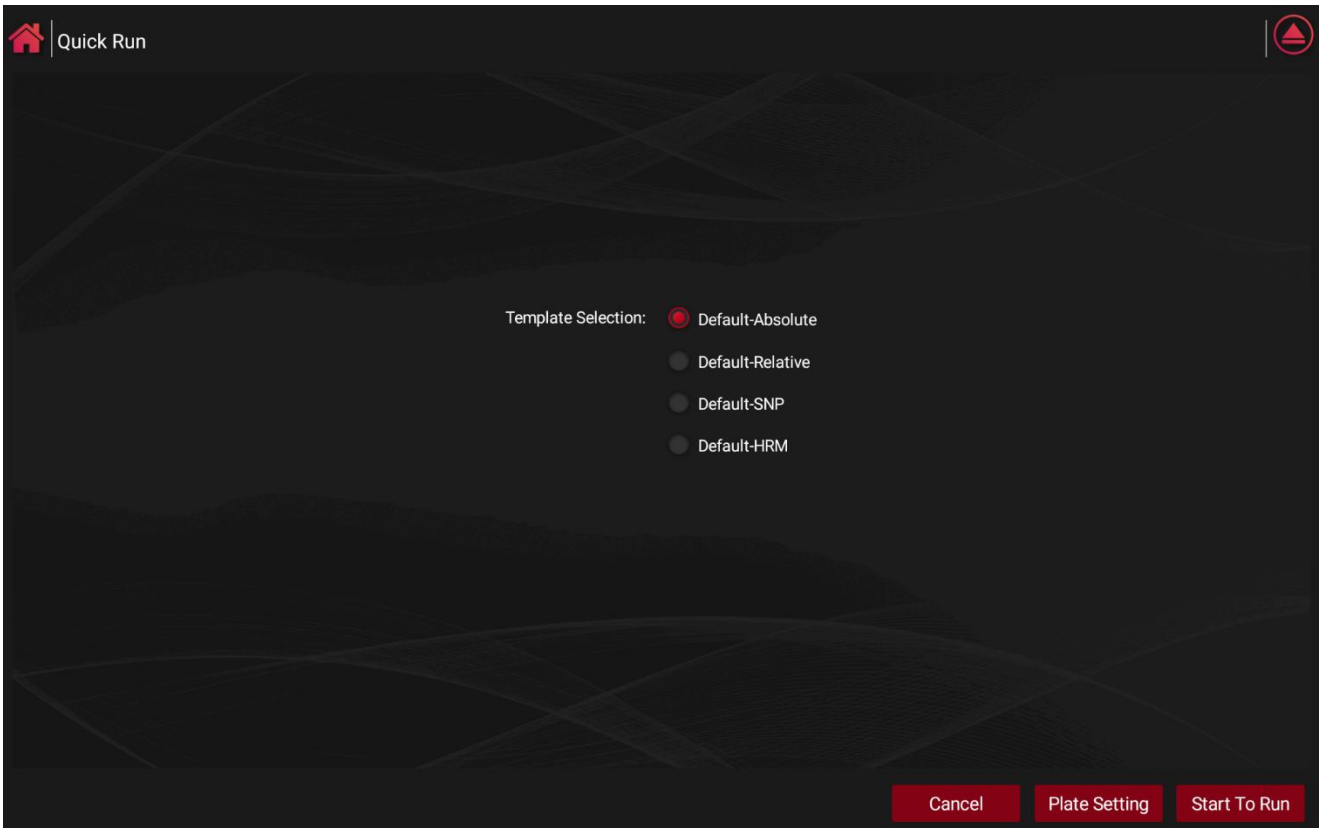
6.5 Import

It can import the template files under the same user name into the Instrument terminal software through the external USB driver.



6.6 Quick run

Click the "Quick Run" to select the preset template (the template file settings and gain settings are introduced in 6.9.3):

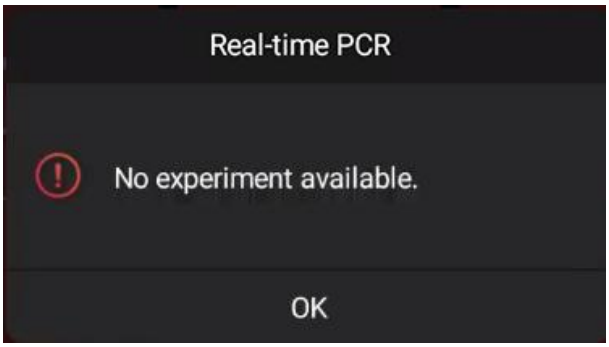


If there is no need to change experiment settings after selecting the template, click the icon on the upper right to open the module and place the samples into the block according to the plate layout. Then click the icon again to close the module and click the "Start Run" button to run the experiment.

If you need to change the relevant experiment settings, refer to Steps 6.2.1-6.2.4 to run the experiment.

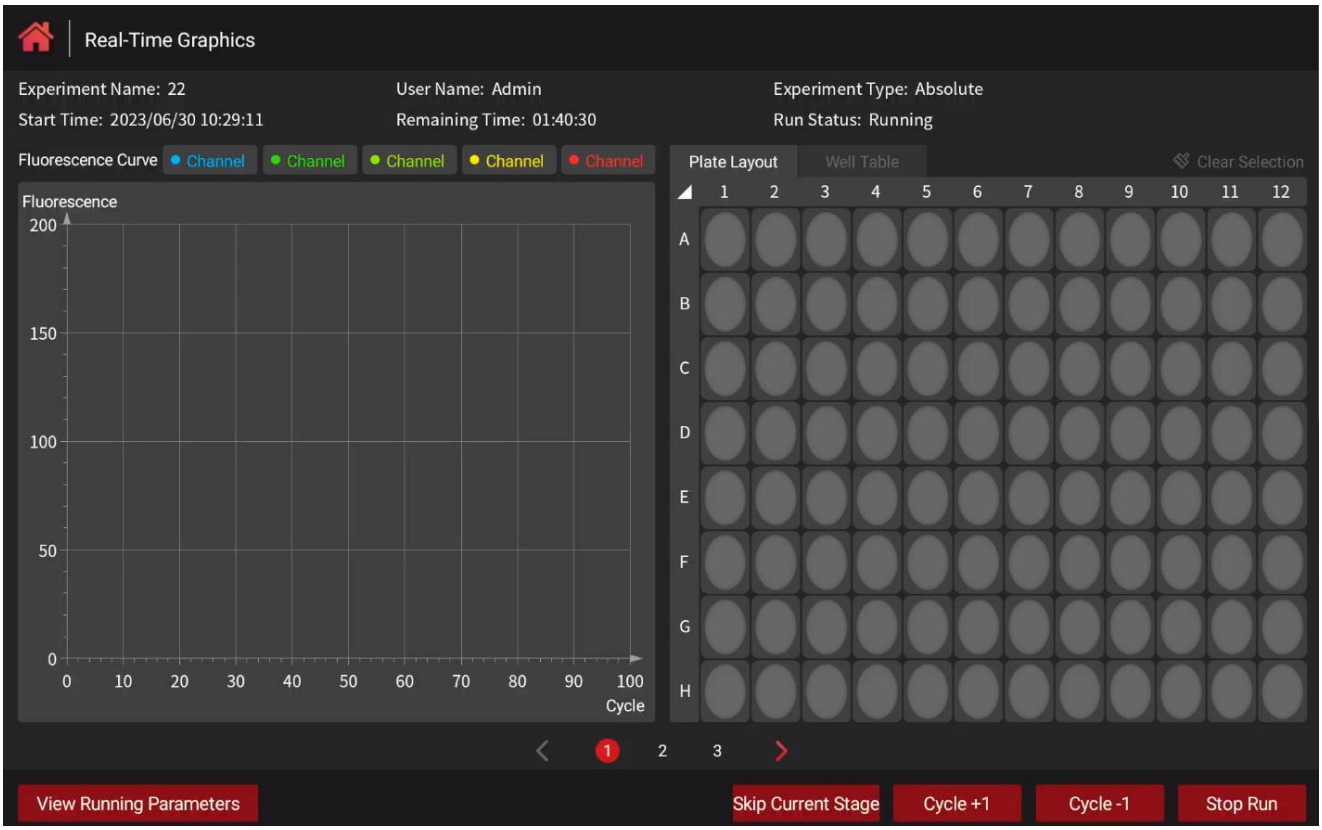
6.7 Real-time graphics

Click Real-Time Graphics. If the program is not running, click the "Real-Time Graphics" and a pop-up prompt will appear:



If the experiment is running or finished, click Real-time graphics to jump to the real-time graphic interface of

experiment:



(1) Experiment running time: the start time of experiment can be viewed at the top of the interface, and the complete time and total running time can also be viewed after completion.

(2) Run status: displaying the running status of experiment.

(3) View experiment data: slide the interface to switch to the viewing interface of different experiment result curves and the viewing interface of running programs.

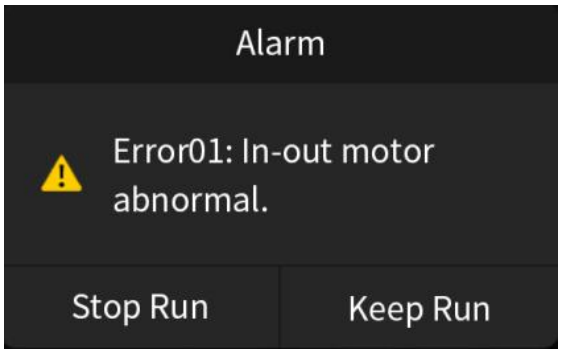
Fluorescence curve viewing: By clicking and selecting different fluorescence names on the right side of the fluorescence curves, different types of fluorescence curves can be displayed; By selecting the well plate layout or different well number in the well position list, the corresponding fluorescence value curve for that well position can be displayed. By default, the fluorescence curves of all detection items in all wells are displayed.

(4) View run parameter: the experiment running parameters of target stage (step) can be checked.

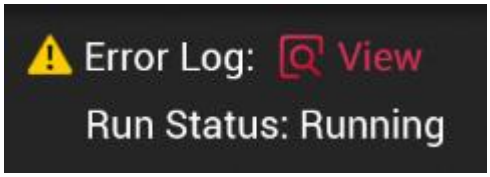
(5) Experiment operations: the "Skip Current Stage" and "Stop Run" can be carried out, and the "Cycle +1" or "Cycle -1" can be operated after entering the cycle stage.

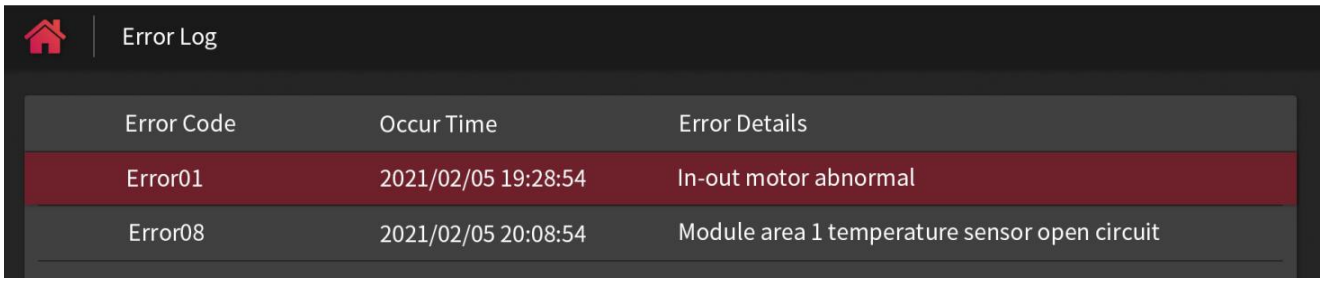
(6) View the error log:

a) If there is an error warning during the running, the interface will pop up a warning box, and the user can decide to stop or continue running according to the warning content:



b) After the running continues, the user can click the "View" next to the error log to check all error logs:

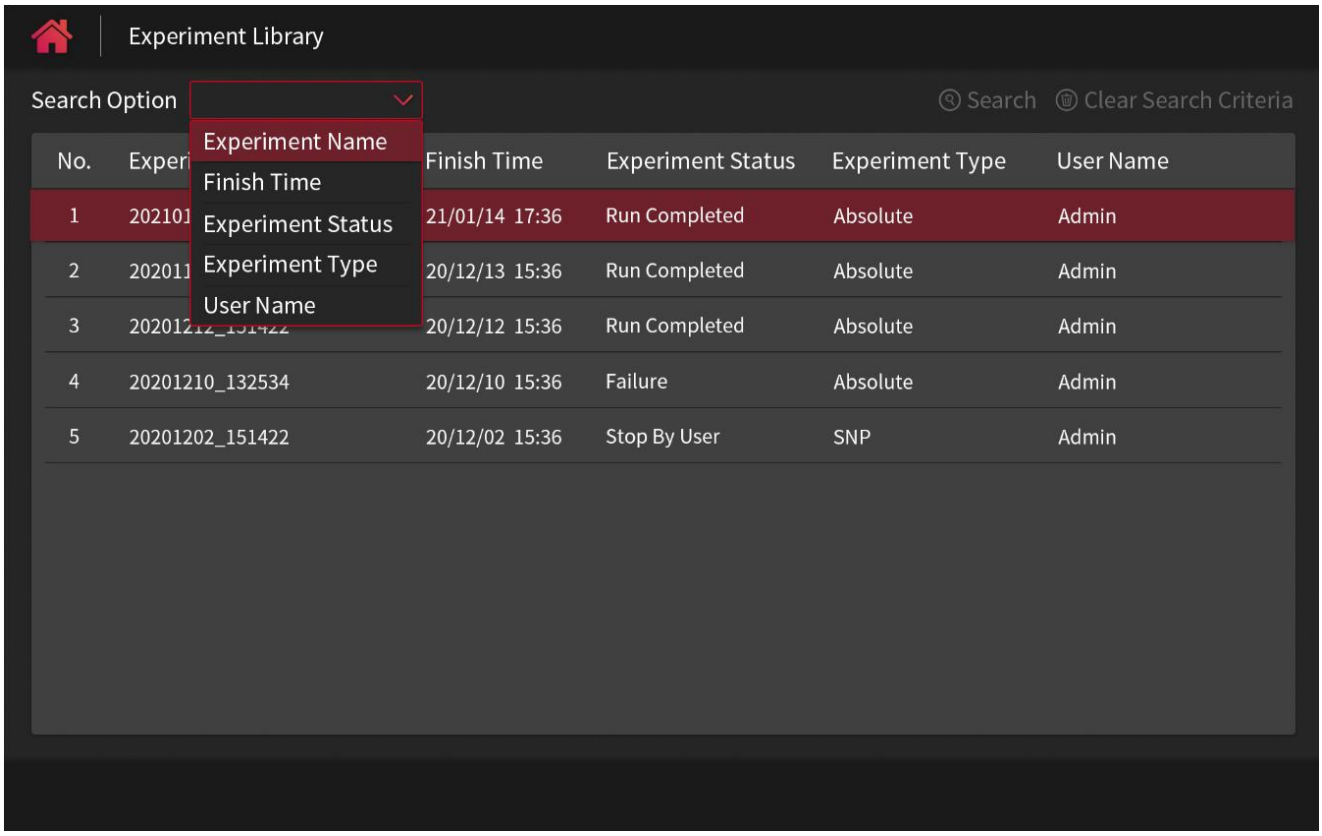




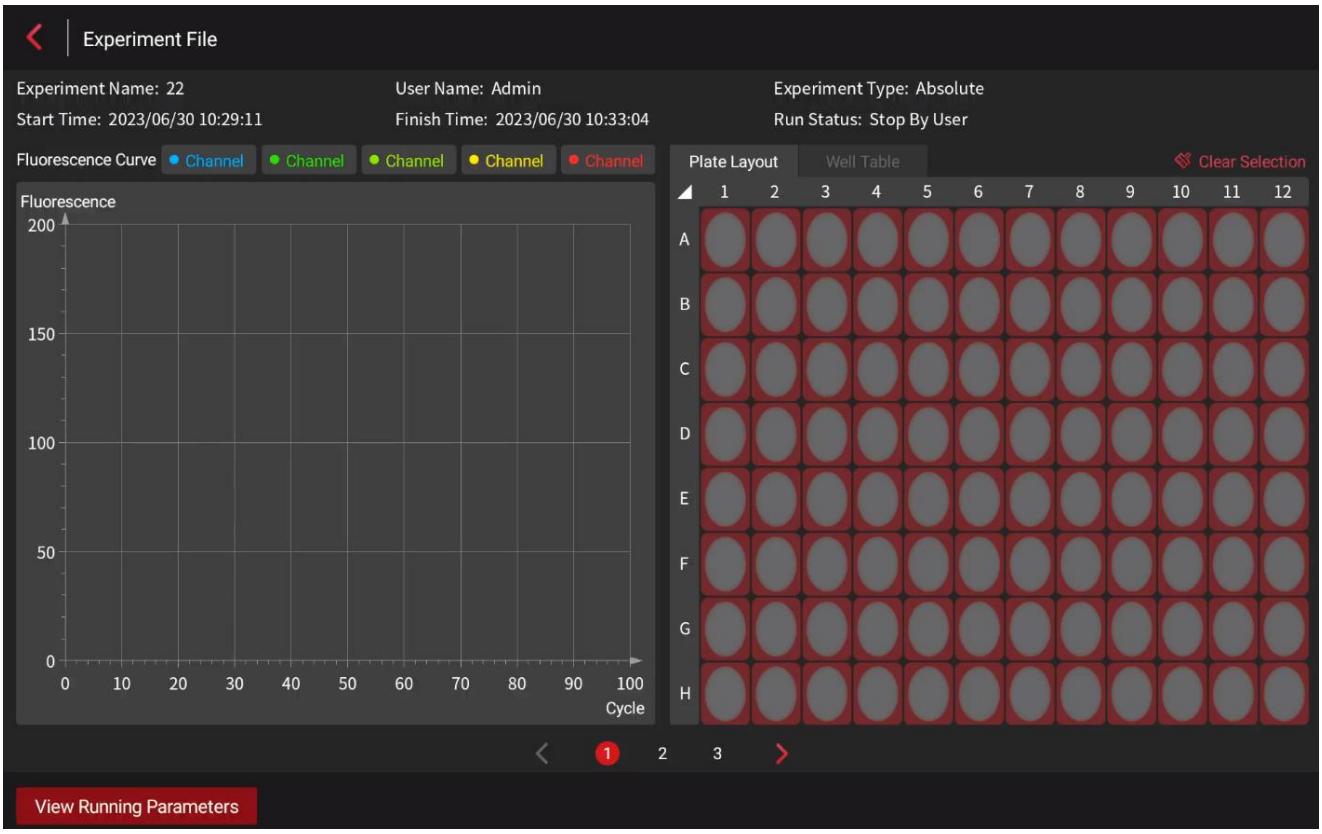
6.8 Experiment library

Review all experiment files under the user name, and search, view, select or export the file.

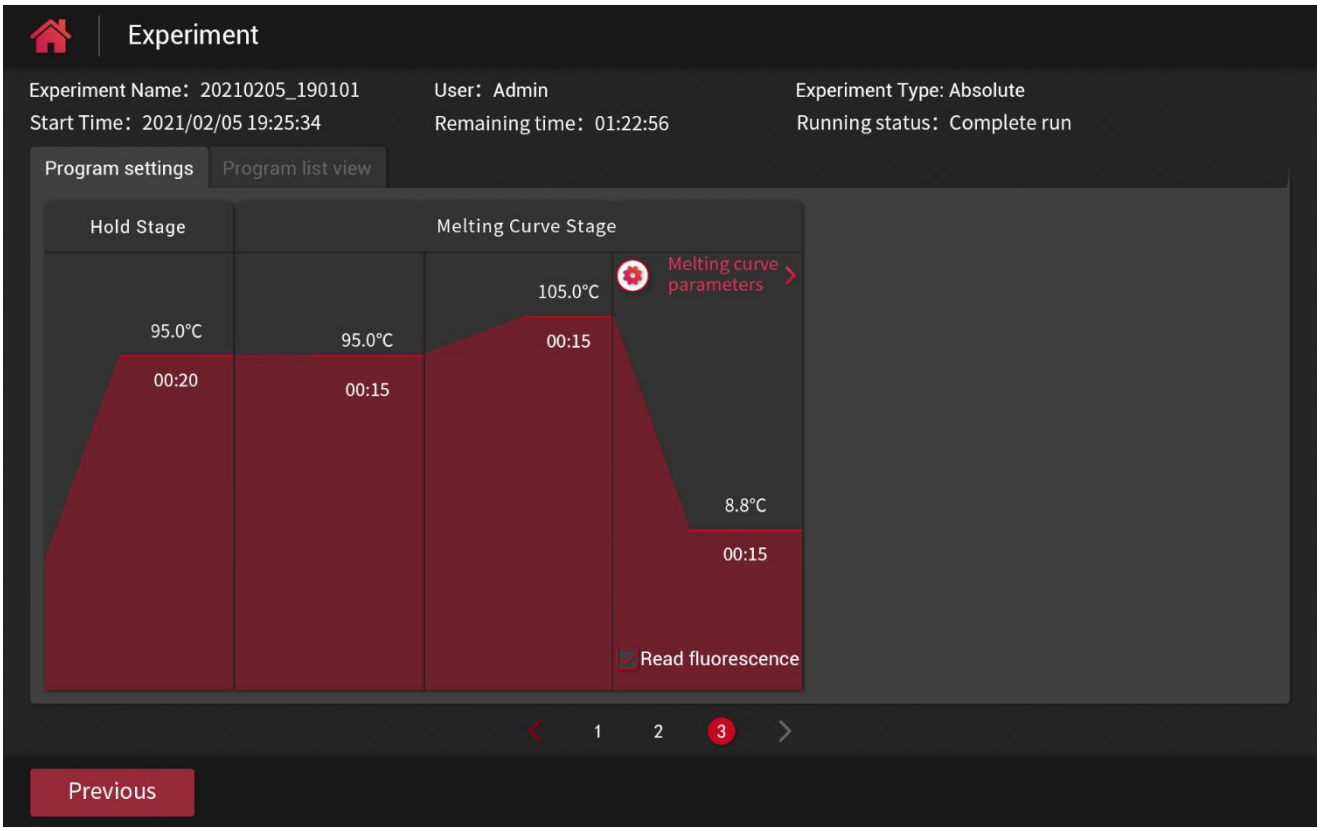
The experiment files in this instrument can be searched and viewed by the experiment name, finish time, experiment status, experiment type and user name (only the administrator account can view all the files with different user names in the instrument, common user can only view the files under their own user name):



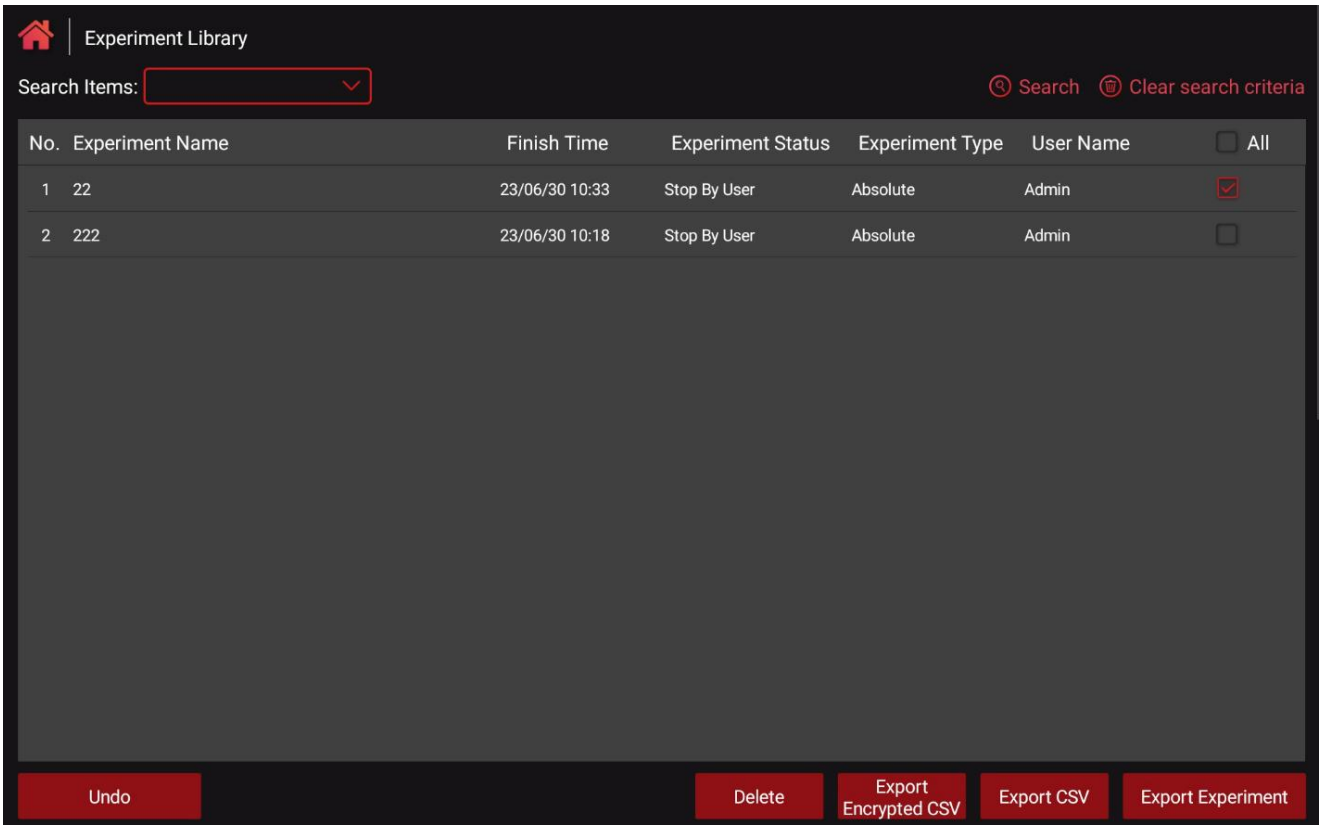
Click the Experiment File directly to view the details:



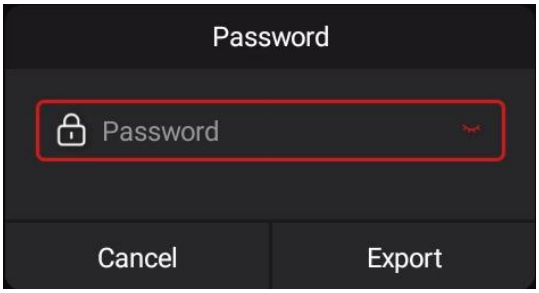
Or click the "View Run Parameter" button at below to switch to view the experimental running parameters:



The experiment files that are selected in the checkbox can be exported as CSV files or directly as .epf format experiment files. The user can also click "Export Encrypted CSV" to encrypt and protect the files that need to be exported, or delete the selected experiment files.



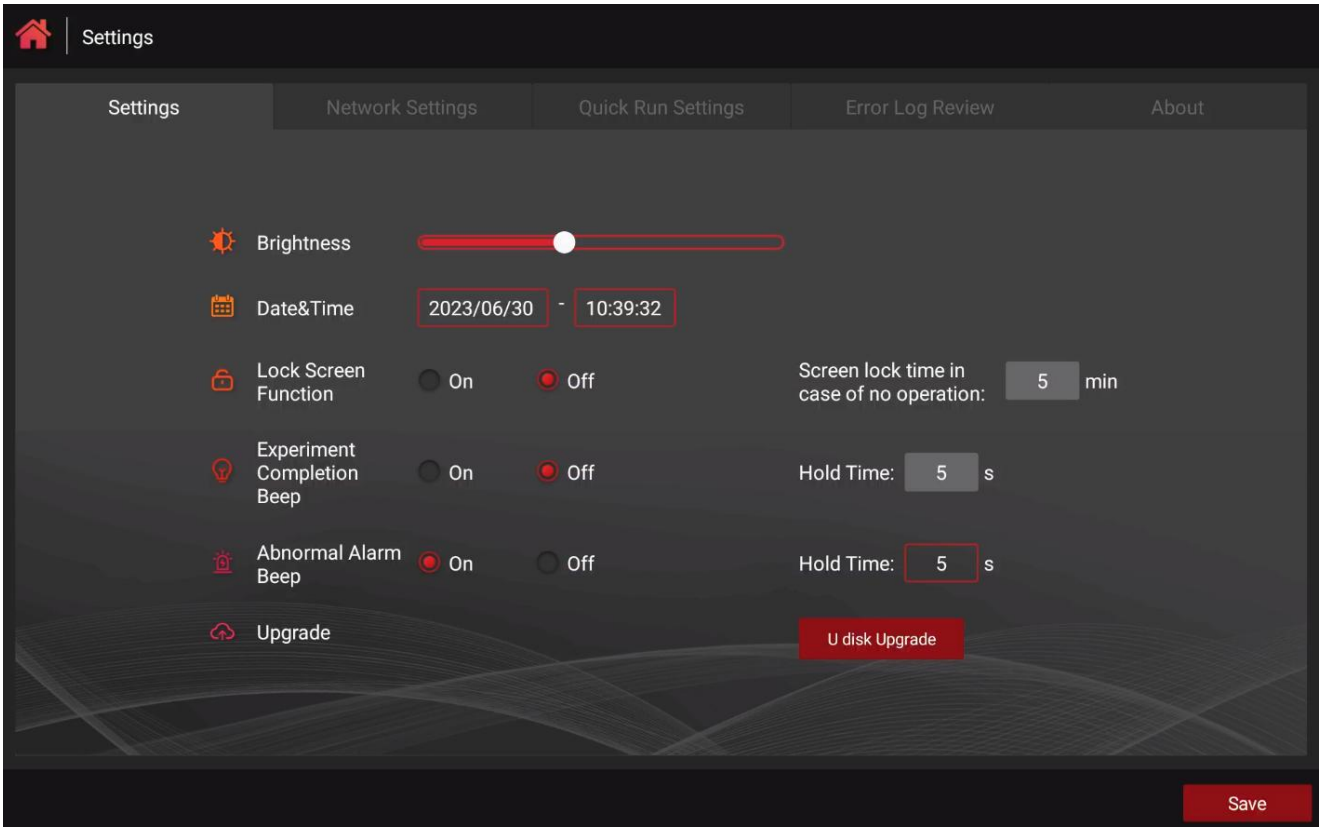
The password needs to be set by yourself. After setting the password, click "Export".



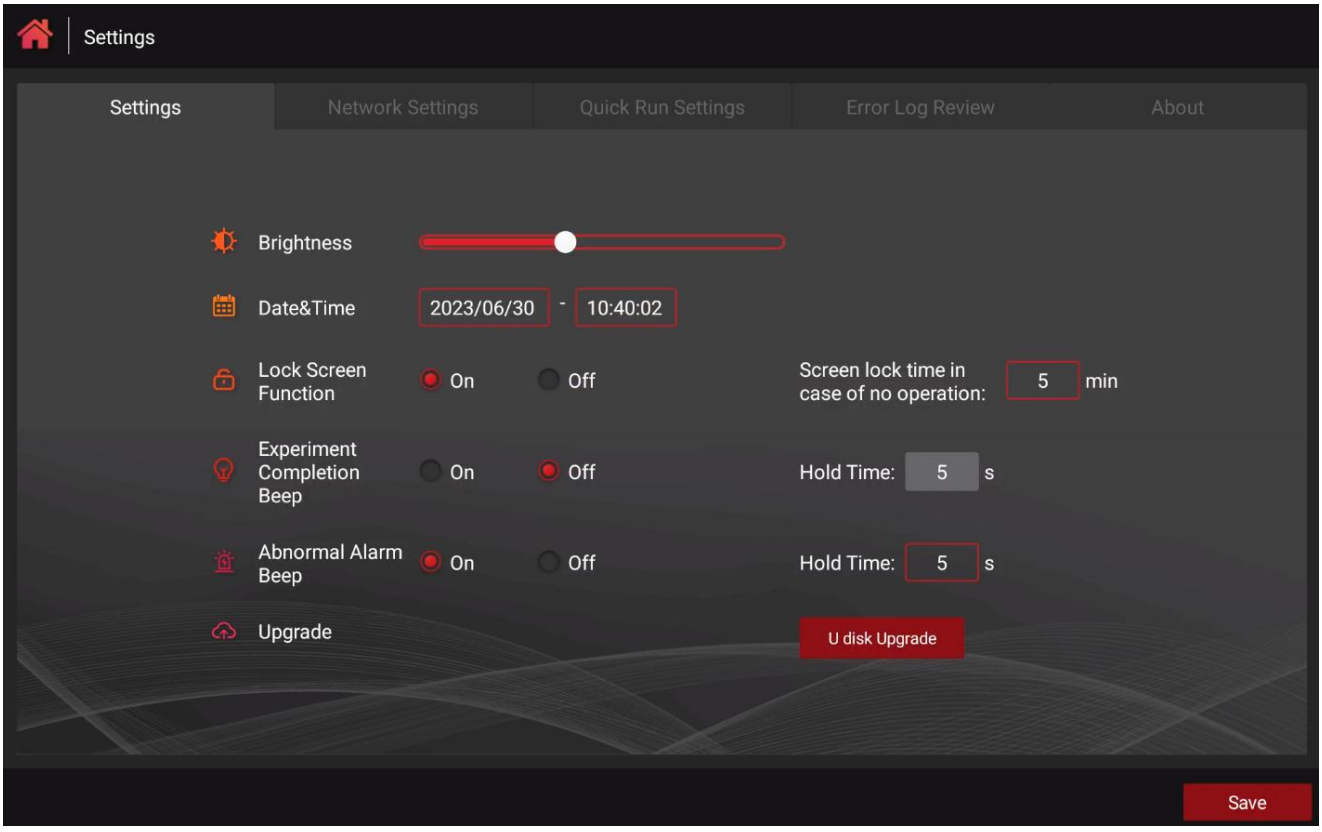
6.9 Settings

6.9.1 Basic settings

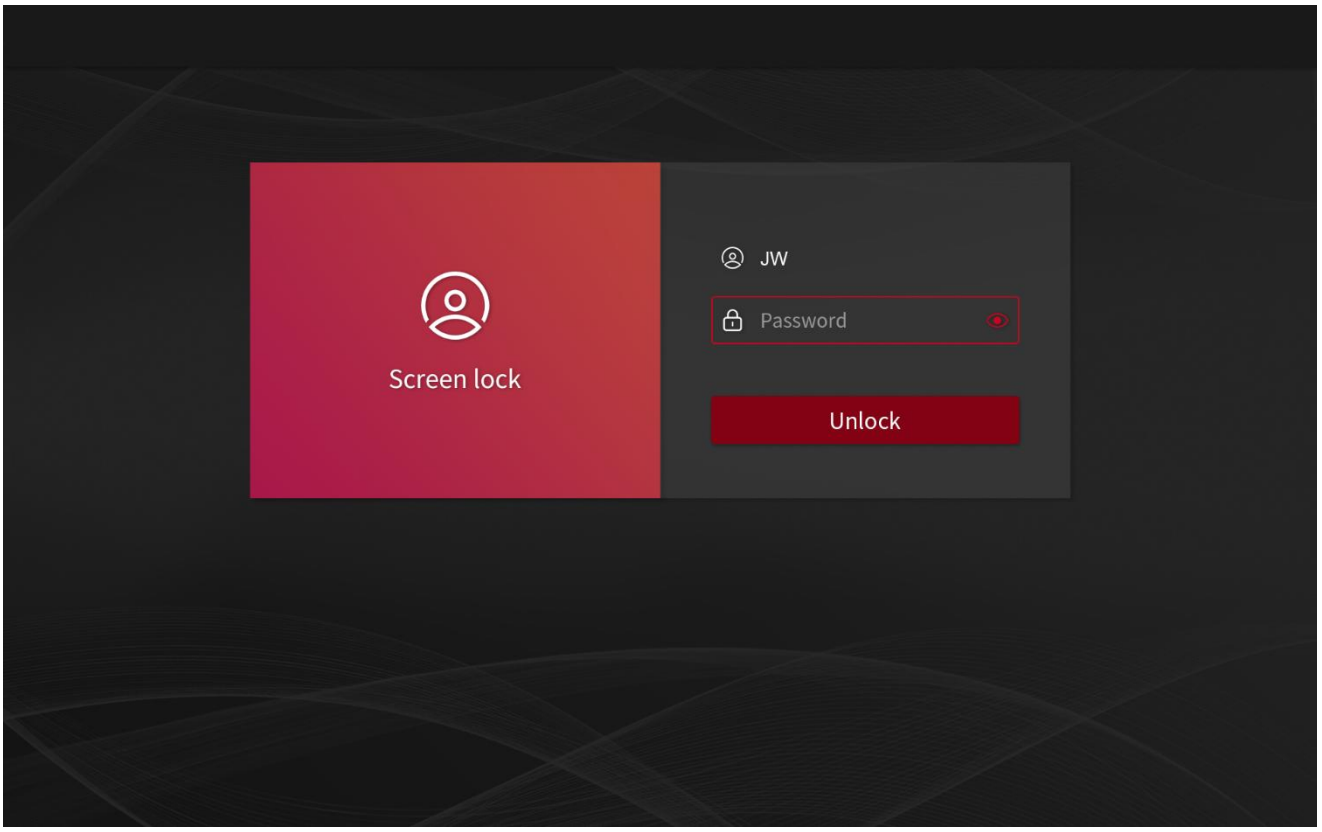
Set screen display brightness, instrument date, lock screen, completion prompt sound, alarm sound, administrator account can also upgrade software through U disk:



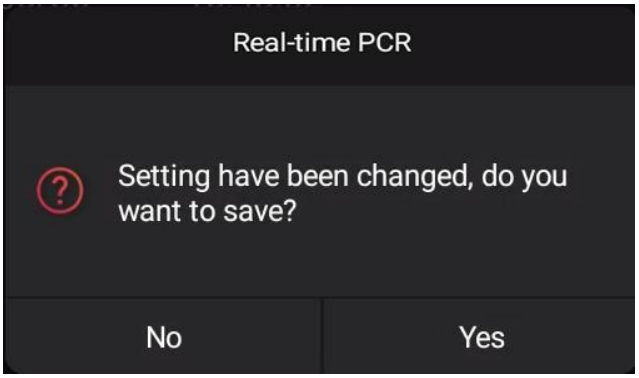
After selecting "Open" at the lock screen function, you can set the lock screen time:



After the instrument locks the screen, you need to enter the login password and unlock:

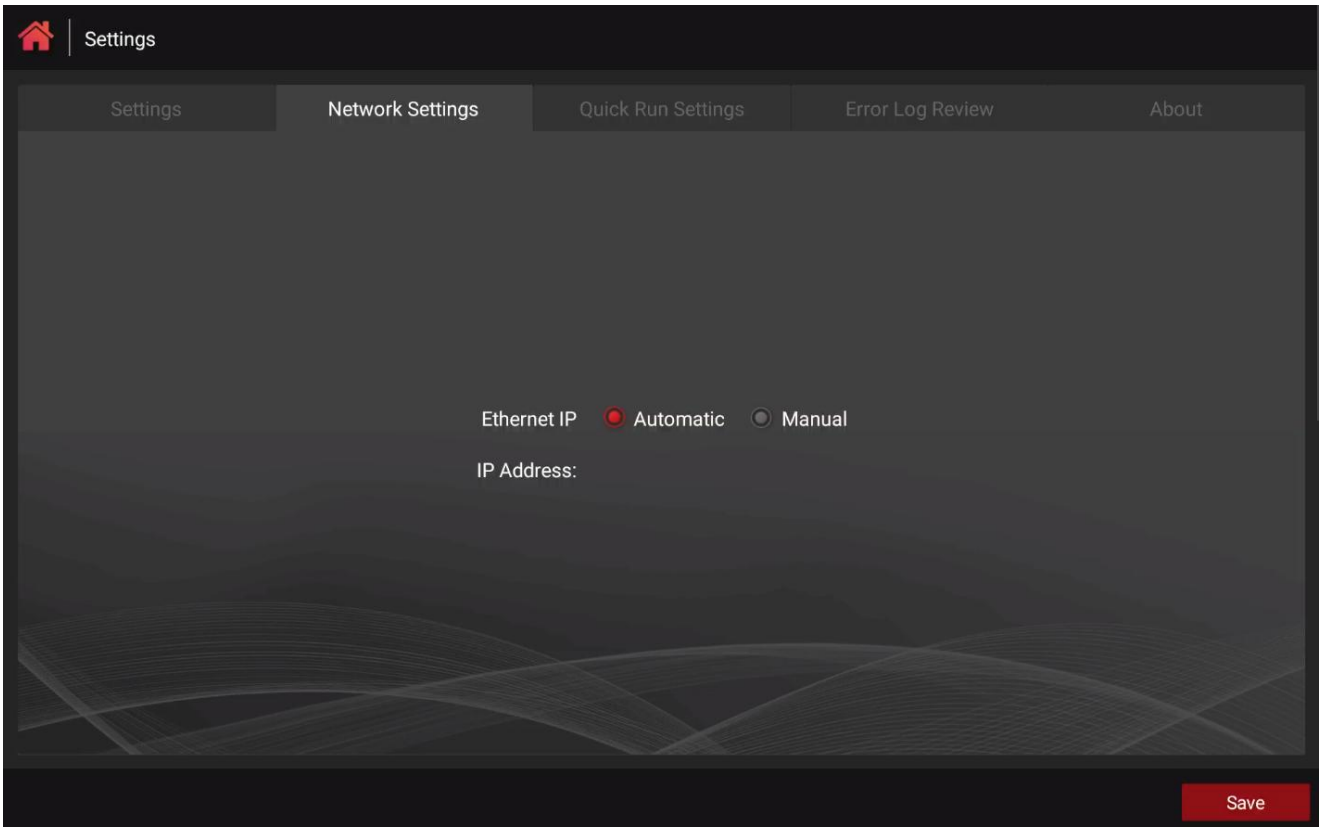


If the user did not click “Save” after modifying the parameters, it will exit the setting interface directly, but the system will pop up a prompt box to ask the user whether save the modified parameters or not.



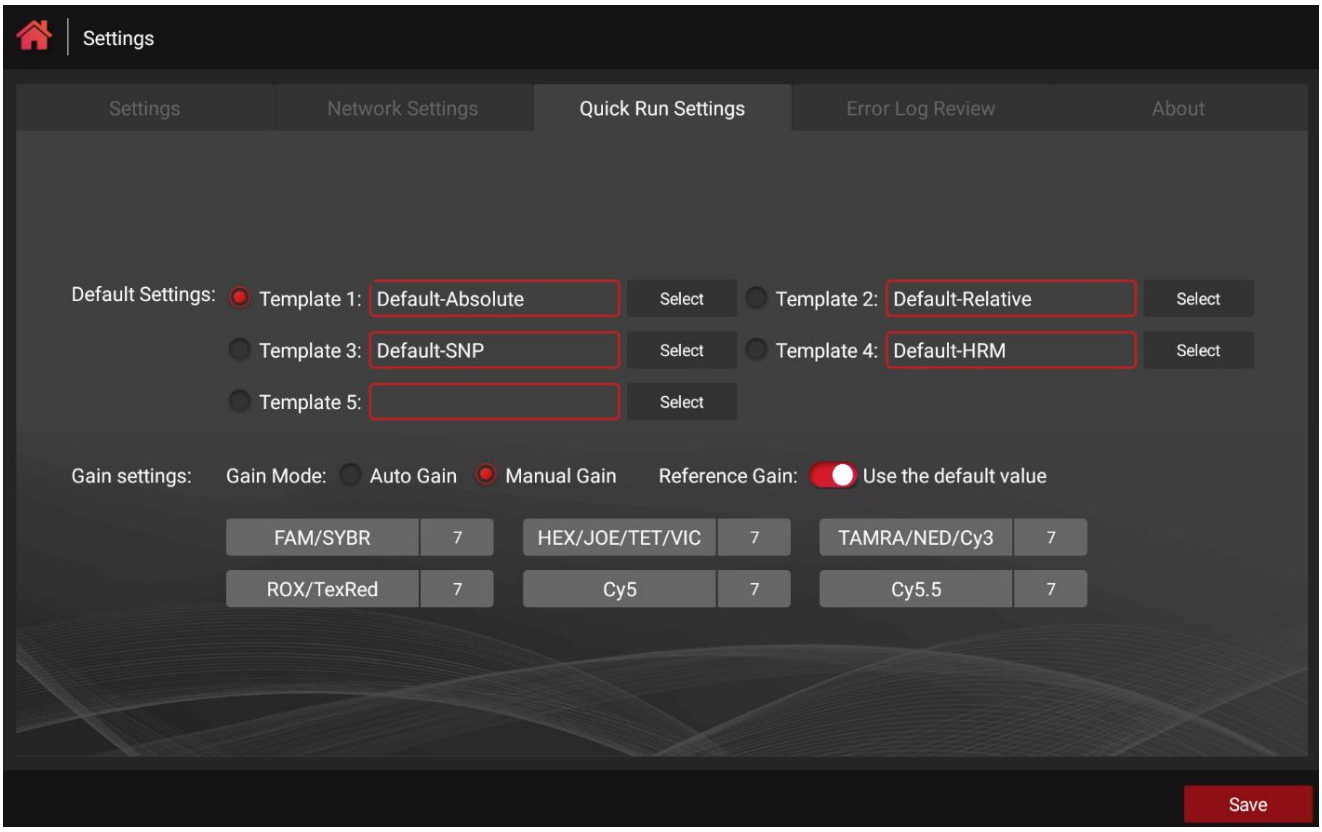
6.9.2 Network settings

By performing network settings, the user can view the IP address of the Ethernet connection.

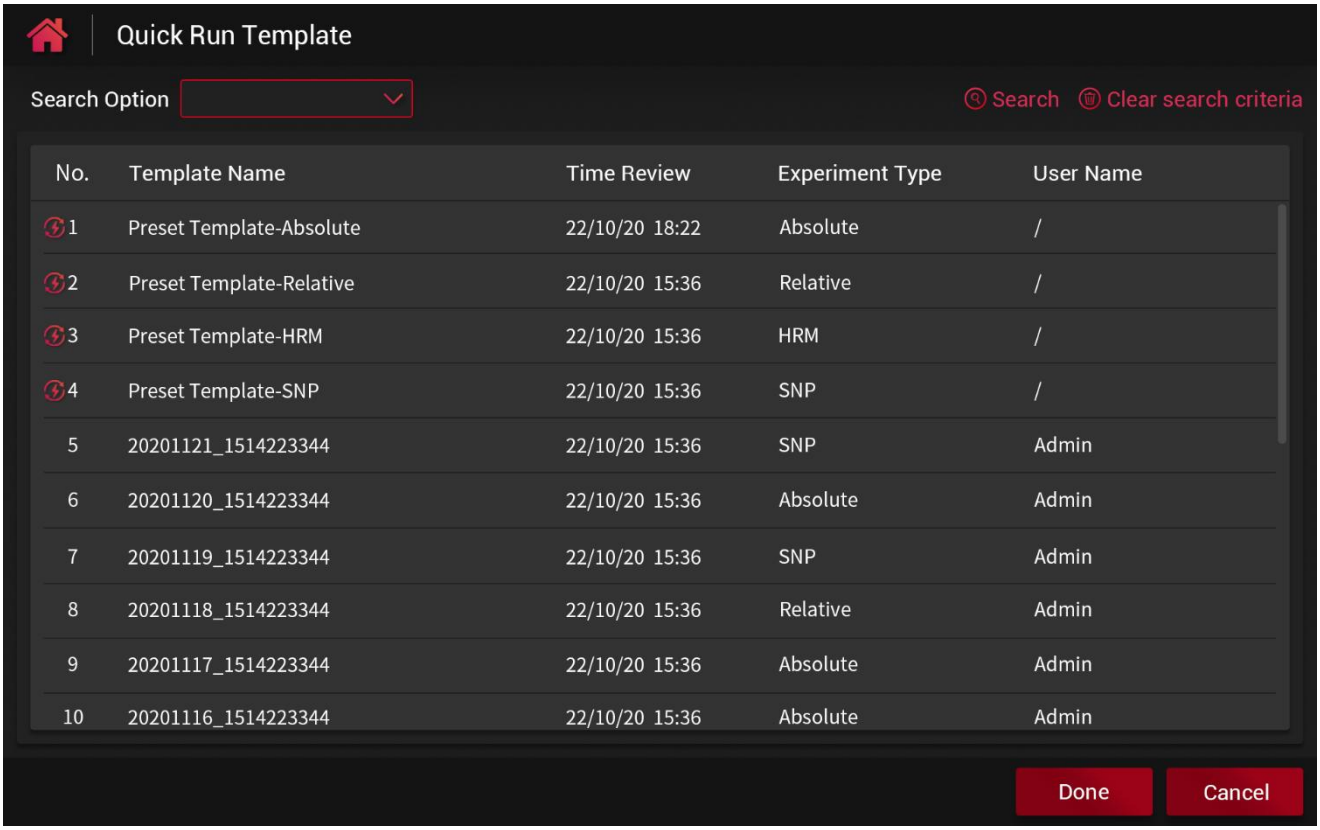


6.9.3 Quick run settings

It can set template files and gain setting parameters for quick run:



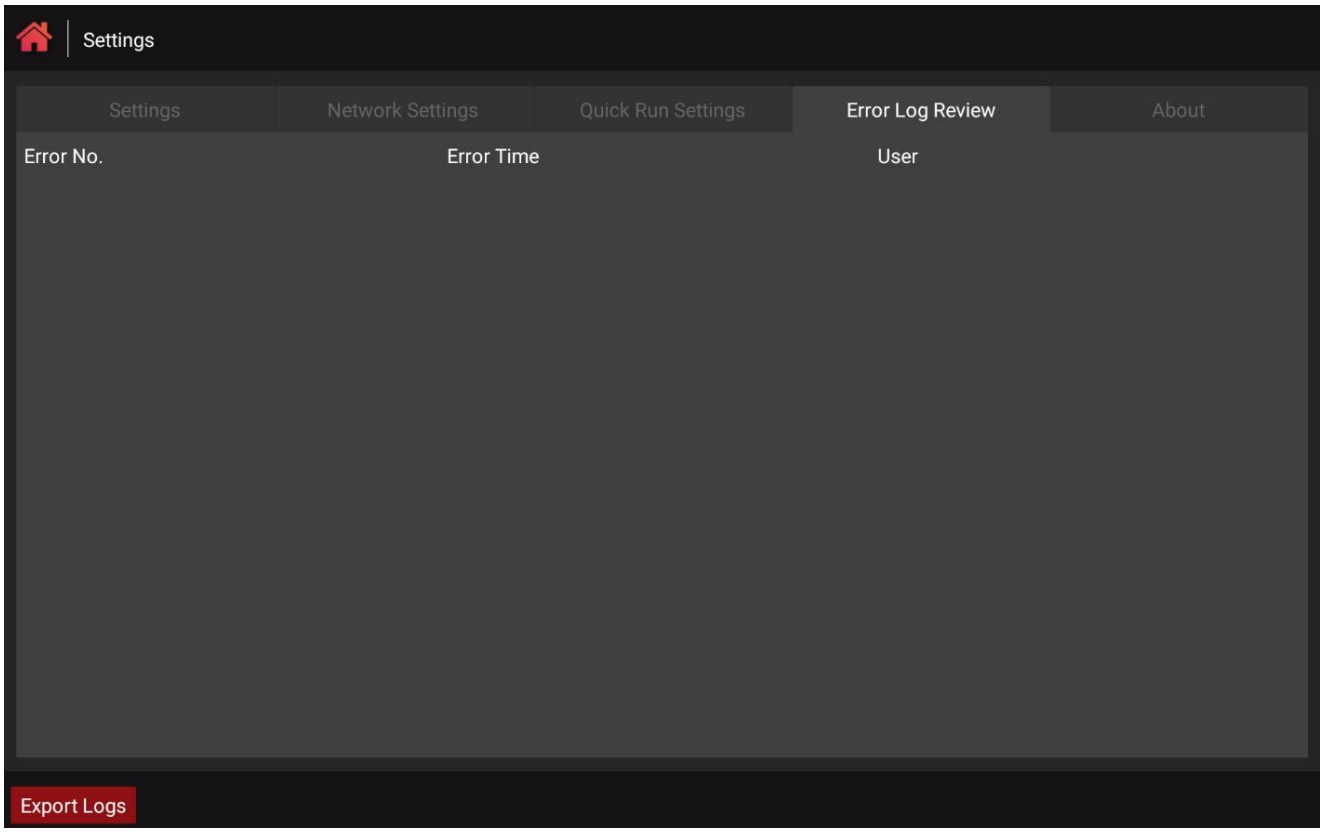
There has up to 5 preset quick run templates, and one of them can be set as the default template. For each template, it can be selected as the template file to run one experiment.



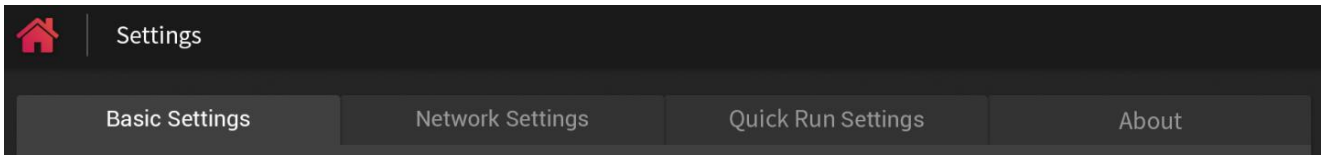
6.9.4 Error log review

The administrator account can view the error log of the instrument (Common users do not have this function), including the error code, time of occur time and user name.

Administrator account exception log viewing interface:

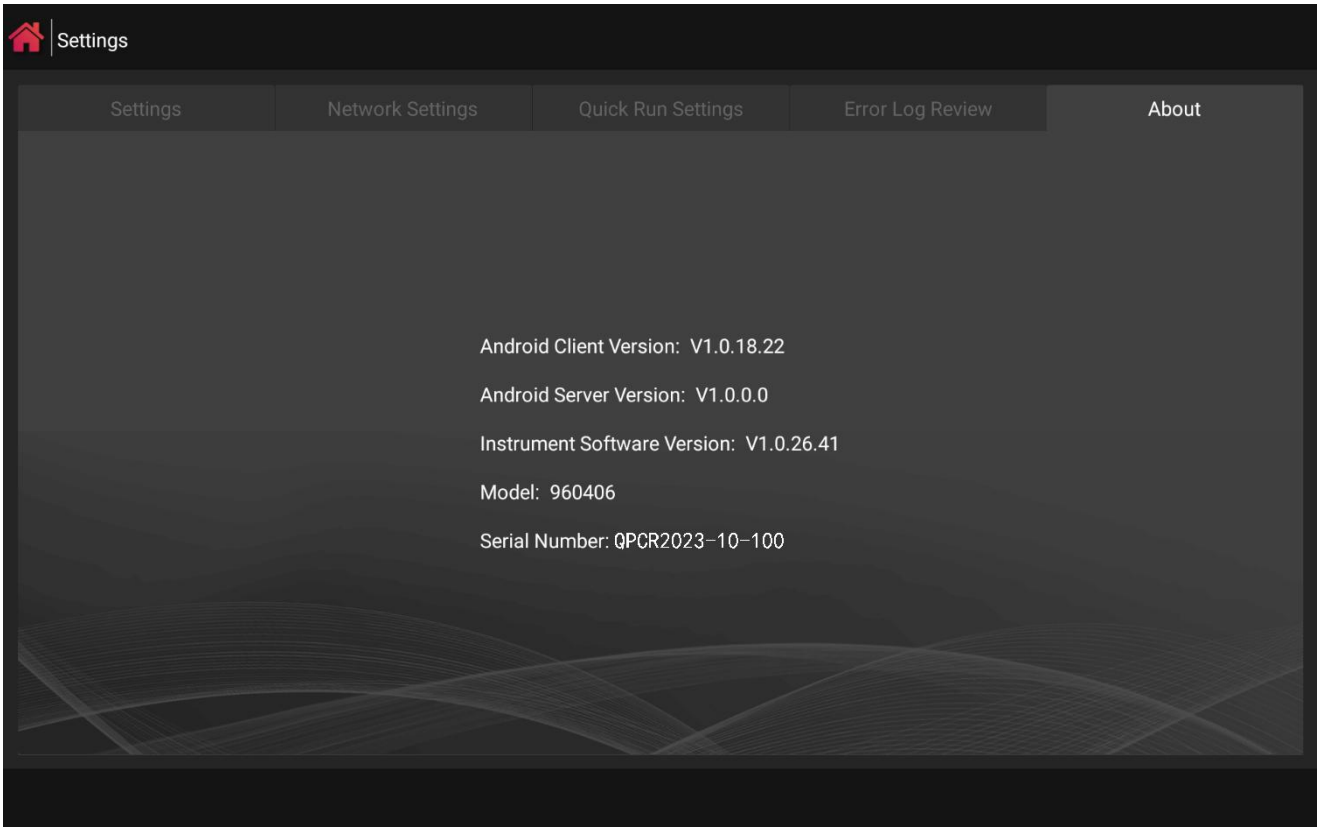


Common user system setting interface (no option of error log review):



6.9.5 About

About includes instrument software version and it's release version, the instrument model and serial number:


Settings
Settings
Network Settings
Quick Run Settings
Error Log Review
About
Android Client Version: V1.0.18.22
Android Server Version: V1.0.0.0
Instrument Software Version: V1.0.26.41
Model: 960406
Serial Number: QPCR2023-10-100

Chapter 7 PC software operation guide

7.1 PC software installation and login

7.1.1 Software installation

(1) Hardware requirements

A computer with at least the following configuration:

-Intel i3 CPU

- 2GB RAM

- 200GB available hard drive space

- At least one USB-A port

- At least one Ethernet port

(2) Software requirements

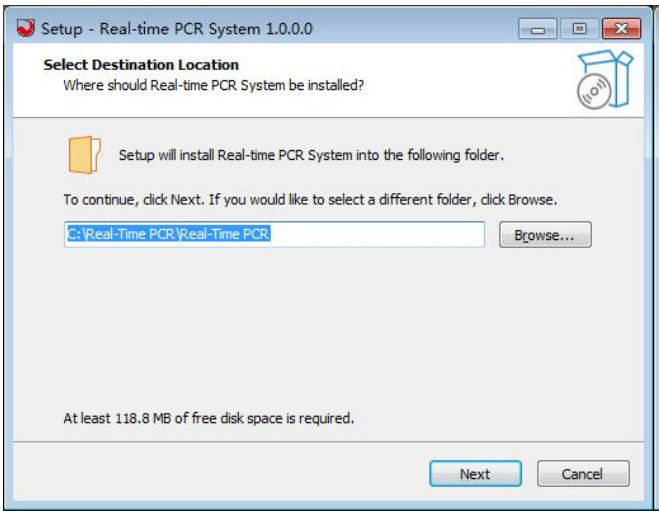
- Windows 8/8.1/10 operating system and compatible versions

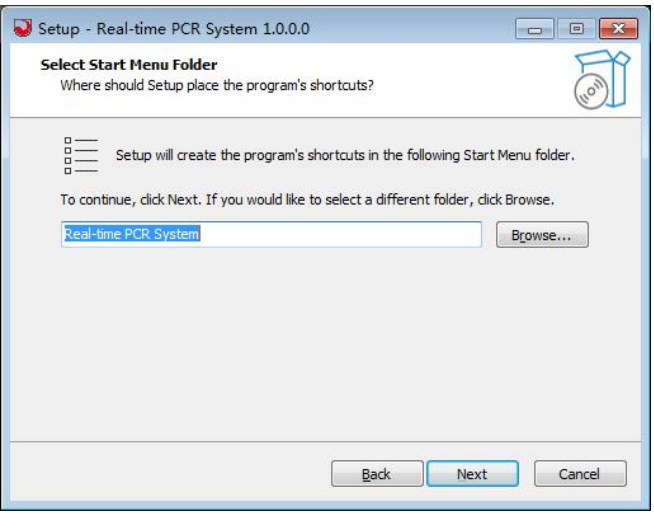
- SQLite 3 database software and compatible versions

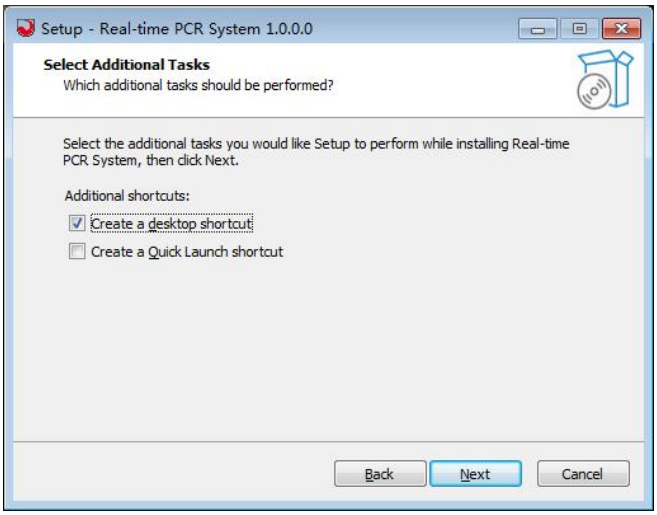
- Net Framework 4.6.1 and compatible versions

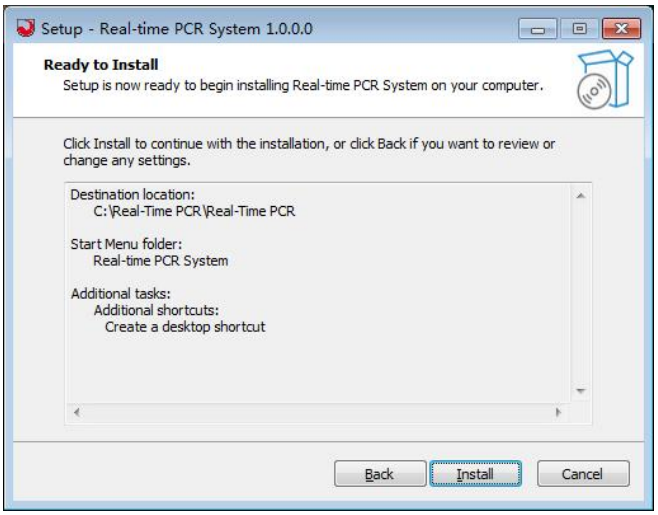
(3) Installation method

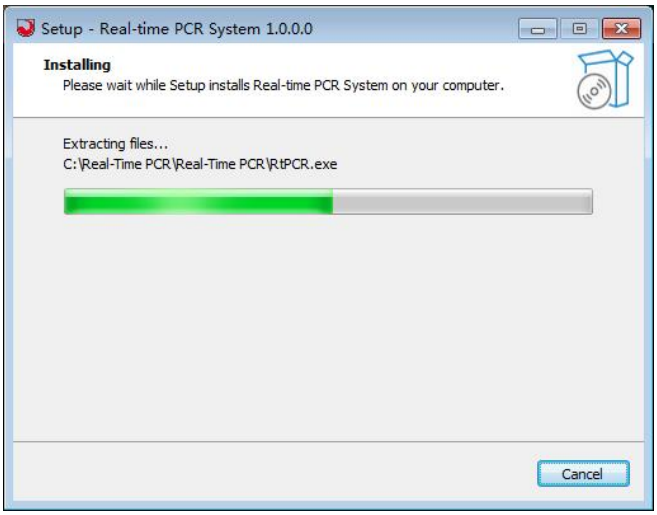
Double-click the setup file（960406.exe）→ select the target folder → select the start menu folder → select additional tasks → prepare the installation confirmation interface → installing → complete

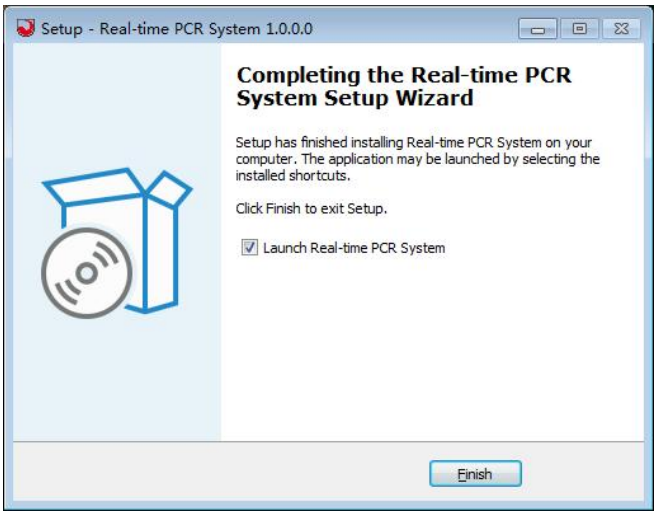

Setup - Real-time PCR System 1.0.0.0
Select Destination Location
Where should Real-time PCR System be installed?
Setup will install Real-time PCR System into the following folder.
To continue, click Next. If you would like to select a different folder, click Browse.
C:\Real-Time PCR\Real-Time PCR
Browse...
At least 118.8 MB of free disk space is required.
Next
Cancel


Setup - Real-time PCR System 1.0.0.0
Select Start Menu Folder
Where should Setup place the program's shortcuts?
Setup will create the program's shortcuts in the following Start Menu folder.
To continue, click Next. If you would like to select a different folder, click Browse.
Real-time PCR System
Browse...
Back
Next
Cancel


Setup - Real-time PCR System 1.0.0.0
Select Additional Tasks
Which additional tasks should be performed?
Select the additional tasks you would like Setup to perform while installing Real-time PCR System, then click Next.
Additional shortcuts:
Create a desktop shortcut
Create a Quick Launch shortcut
Back
Next
Cancel

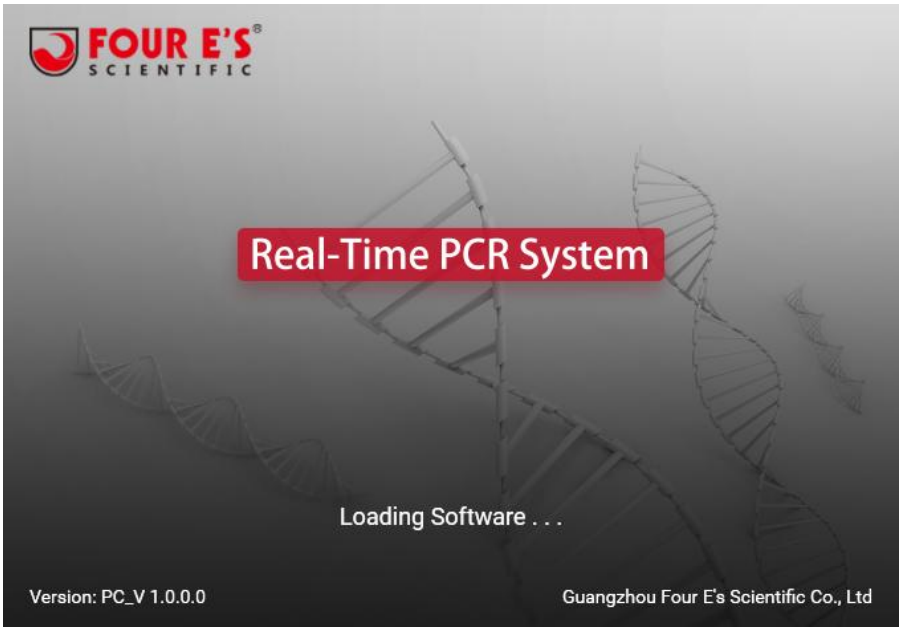

Setup - Real-time PCR System 1.0.0.0
Ready to Install
Setup is now ready to begin installing Real-time PCR System on your computer.
Click Install to continue with the installation, or click Back if you want to review or change any settings.
Destination location:
C:\Real-Time PCR\Real-Time PCR
Start Menu folder:
Real-time PCR System
Additional tasks:
Additional shortcuts:
Create a desktop shortcut
Back
Install
Cancel


Setup - Real-time PCR System 1.0.0.0
Installing
Please wait while Setup installs Real-time PCR System on your computer.
Extracting files...
C:\Real-Time PCR\Real-Time PCR\RtPCR.exe
Cancel


Setup - Real-time PCR System 1.0.0.0
Completing the Real-time PCR System Setup Wizard
Setup has finished installing Real-time PCR System on your computer. The application may be launched by selecting the installed shortcuts.
Click Finish to exit Setup.
Launch Real-time PCR System
Finish

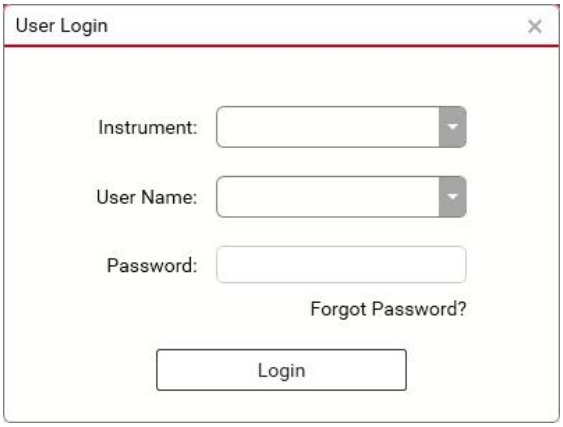
7.1.2 User login

Double-click the 960406 icon on the desktop to start the software. The software automatically initializes the configuration and detects the software operating environment. After the startup is completed, it enters the user login interface of the Real-Time Fluorescent Quantitative PCR System.



(1) Initial login

Login: Enter the instrument serial number, administrator account, and the administrator account password set for the first time on the instrument terminal to log in:

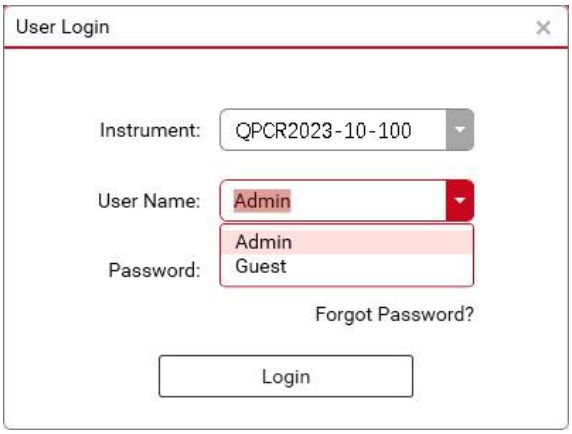


a) When the PC software is used for the first time, if it is not detected that the instrument is connected, a pop-up window will prompt "Instrument not connected!".

b) When the instrument is connected, the PC software reads the administrator password on the instrument. If there is no administrator password, a pop-up window prompts "Please set administrator password on the tablet before login!"

(2) Regular login

After the initial login, multiple user names can be set on the PC side (up to 20, see 7.4.1 introduction for specific operations), and subsequent logins can be logged in with the administrator or common user name and password:



a) **The drop-down box of the Serial No. can display and select the offline instrument number (displayed in black numbers) that has been online on the PC, and the currently searched online instrument number (displayed in purple numbers).**

b) **The user name drop-down box displays the user name list, and the user name is associated with the instrument number. After selecting the instrument number, the optional user name is the user name whose status is "locked" or "available" in the user information of the selected instrument. The user name that has been deleted is not displayed. If a locked user is selected, a pop-up window will prompt "User is locked, please ask administrator to unlock. ". For details, see 7.4.1 User Management.**

c) **After entering the password, click the view button in the password box, the password will display the original text, and the password will be displayed with * after releasing it, and the length is consistent with the length of the original password.**

d) **When you forget the password, you can click "Forgot password?" If the currently selected user is the administrator user Admin, a pop-up window will prompt "Please reset administrator password on the tablet.", For details about how to reset the Administrator Password, see 6.1.2 . If the currently selected user is a normal user, then the pop-up window prompts "Please ask administrator to reset password. ", For details, see 7.4.1 User Management.**

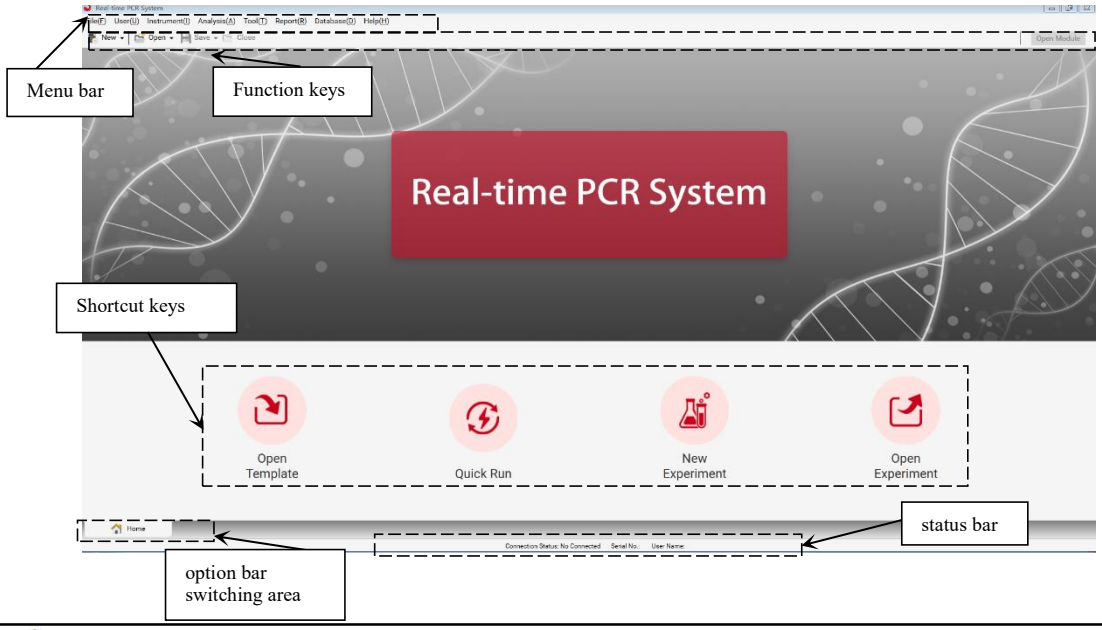
e) **If the entered password is incorrect, a pop-up window will prompt "Wrong password, please try again."; if you enter the wrong password for 5 consecutive times, the user will be locked directly, and the pop-up will prompt "The password does not match too many times, the user is locked. Please ask administrator to unlock!", For details, see 7.4.1 User Management.**

After logging in, enter the main interface of the Real-Time Fluorescent Quantitative PCR System, the main interface includes:

- The top menu bar contains 8 main function buttons, including File, User, Instrument, Analysis, Tool, Report,

Database and Help;

- The function keys below the menu contain 5 buttons: New, Open, Save, Close and Open Module;
- The shortcut keys on the main interface contains 4 buttons: Open template, Quick run, New experiment and Open experiment;
- The status bar at the bottom displays the connection status, instrument serial No., and currently logged-in user name, and the module status is also displayed in the online status;
- The main interface and experiment interface can be switched in the form of option bars in the interface option bar switching area.



In the interface operation, the icon displayed with a frame indicates that it is selected.

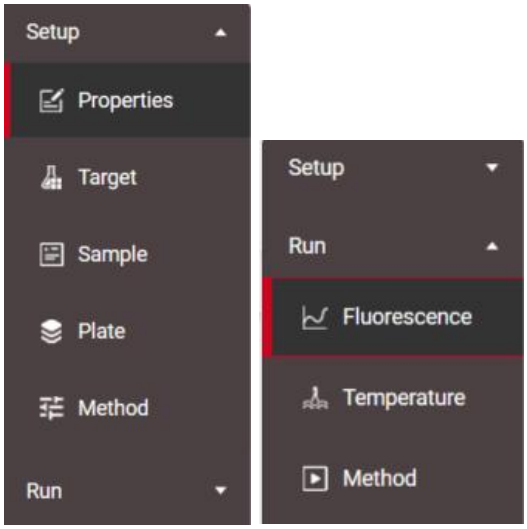
After opening or creating a new experiment file, it can enter the experiment interface. 7.2 of this chapter will introduce the operation of the experiment interface in details.

The function buttons on the top menu bar include all the functions of the instrument, and the functions of the function keys and shortcut keys are also included (except the module control function, which is mainly used in the experiment and will be introduced in the operation of the experiment interface). 7.3-7.10 of this chapter will introduce the operation of each function button in the top menu bar in details.

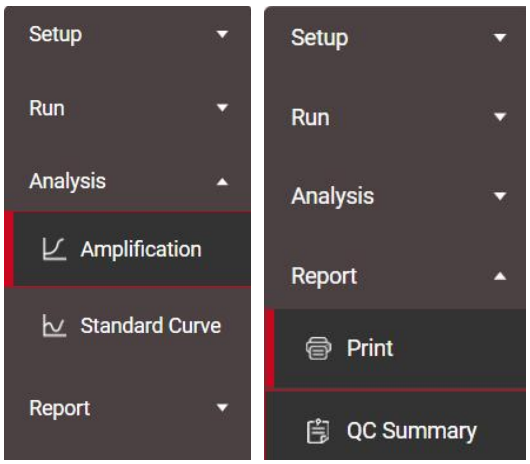
7.2 Experiment interface operation

It can enter the running experiment interface in several ways, which will be explained in 7.3-7.9 later.

The navigation bar of the experiment interface after the initial creation of a new experiment contains two option bars for Setup and Run:



After the experiment is running, the navigation bar of the experiment interface adds two option bars of Analysis and Report:

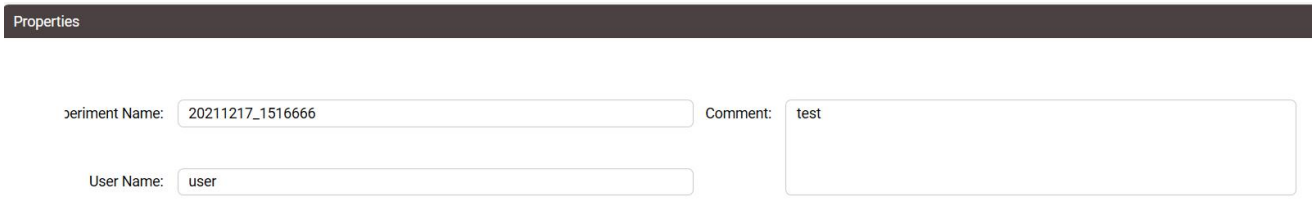


This step mainly introduces the operation of the four option bars and the module control buttons through the sequence of the entire process of the experiment.

7.2.1 Experiment information settings

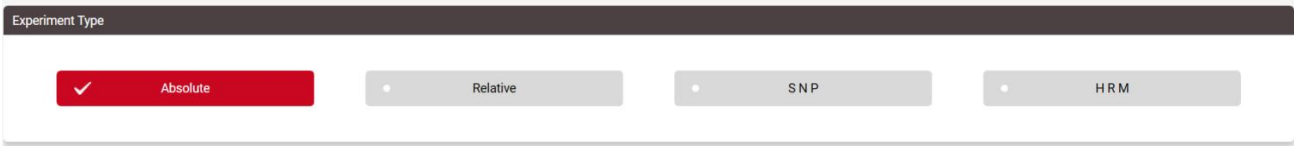
7.2.1.1 Properties settings

a) The "Properties" must include "Experiment Name", and "Experiment Name" defaults to the current time, with a maximum length of 20 characters, and cannot start or end with a space; "Comment" and "User Name" are optional fill in the targets, choose to fill in as needed.

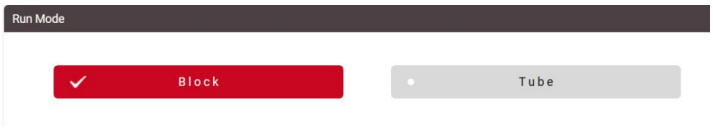


b) Experiment type: Absolute, Relative, SNP or HRM can be selected according to the type of experiment.

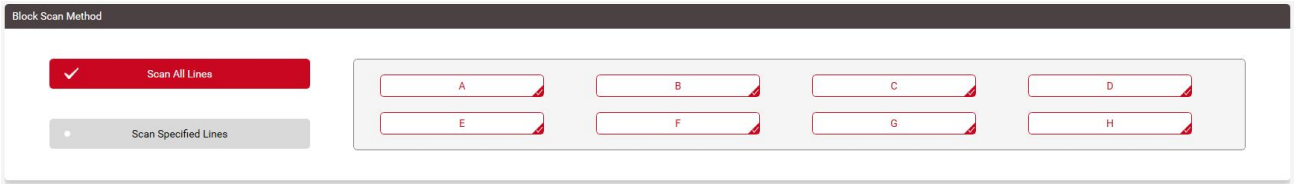
The settings of the experimental information between absolute and relative are in common use. The program settings among absolute, relative and HRM are inconsistent, but the rest settings are common. All settings of SNP are inconsistent with the settings of other experiments, which will be reset to be default when switching to the other.



c) Run mode: Block or Tube can be selected according to experimental needs.



d) Block scan method: According to the sample situation in the experiment, it can choose scan all lines or scan specified lines. For scan specified lines, it can select any required line or multiple lines in A-H to scan (select at least one line to scan).



7.2.1.2 Targets settings

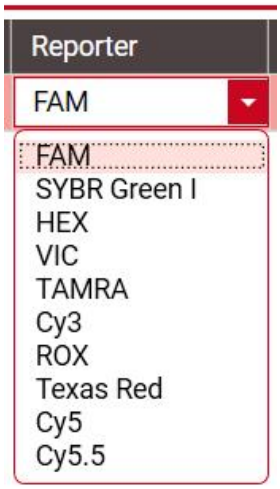
The experiment type is absolute, relative or HRM: the target setting parameters include target name, reporter, color and comment, etc.; the experiment type is SNP: the target setting parameters include target name, allele 1, reporter 1, color, allele 2, reporter 2, color and comment, etc.

a) Click "Add " to add targets one by one (the default is target 1, and the maximum is 100).

b) For each target, click the "Target Name" to edit, click the drop-down "Reporter" to select the dye used in this

experiment (the default is FAM, there has total 10 fluorescent dyes for option), click "Color “to choose different colors (up to 48 colors for option), double-click the "comment" to edit the contents; the Endogenous Control check box can be selected according to the needs of the experiment (only for the relative quantitative PCR experiment use)

- Channel 1：FAM/SYBR Green I;
- Channel 2：JOE/HEX/TET/VIC;
- Channel 3：NED/TAMRA/Cy3;
- Channel 4：ROX/Texas Red;
- Channel 5：Cy5;
- Channel 6：Cy5.5.



c) Click "Save to Library" to add the selected target (the selected target bar turns pink) to the detection target library. The name of the added detection target cannot be the same as the name of the existing detection target in the library.

d) Click "Import from Library" to directly import the existing targets in the inspection target library. The imported inspection target name cannot be the same as the added inspection target name.

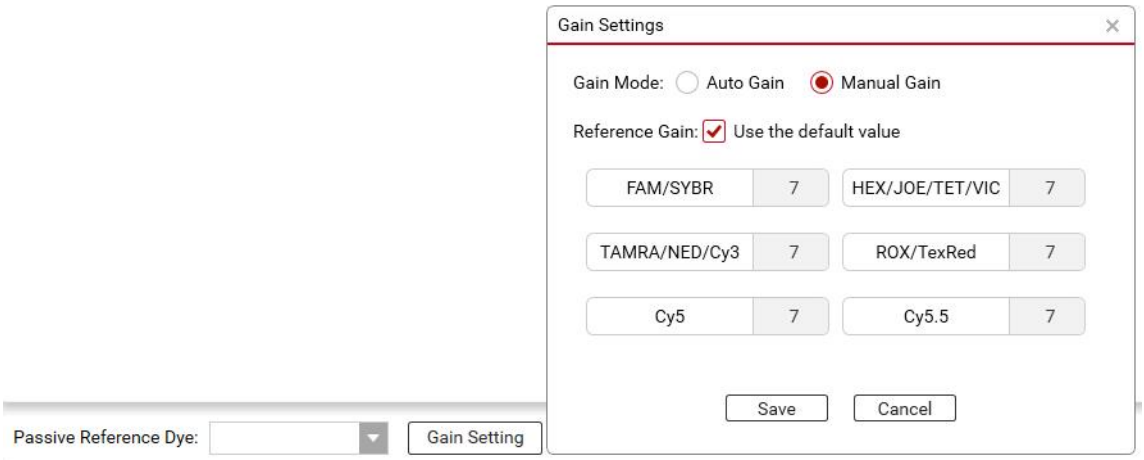
e) Click "Delete" to delete the selected target in the list.

f) Click "Clear All" to delete all targets added this time.

Enter the target library from the “tools”, and it includes create, edit, delete and clear all for the targets.

g) Click the drop-down box of "Passive Reference Dye" to select the reference fluorescence of this experiment.

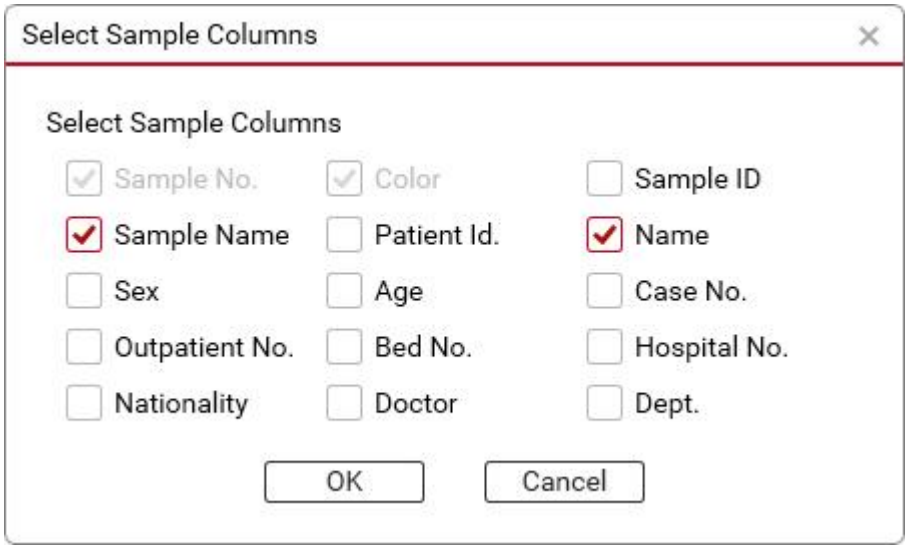
h) Click "Gain Settings" to pop up the interface, it can choose auto gain (500-60000 can be set) or custom gain (1-20 can be set), and then choose whether to use the default value, if not use the default value, manually enter the parameters of each fluorescence channel.



7.2.1.3 Sample information settings

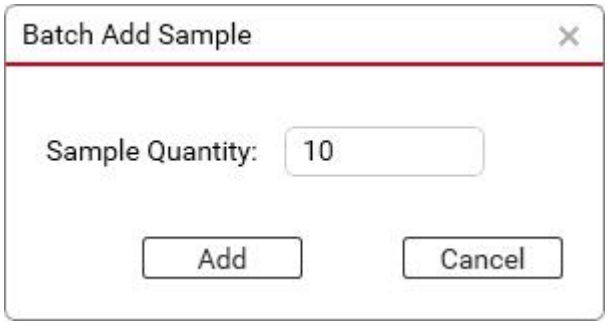
a) Click "Add " to add sample information one by one (add up to 96).

b) For each sample, the corresponding information can be selected in the "Sample Columns" in the toolbar. The color and sample No. are mandatory, and the rest can be edited and filled here when selected.



The input of hospital sample ID and other information can also be scanned and input by connecting a code scanner through the USB interface.

c) Click "Batch add " to pop up the box for adding samples in batches, enter the number of samples that need to be added, and click "Add" to quickly add the corresponding number of samples:



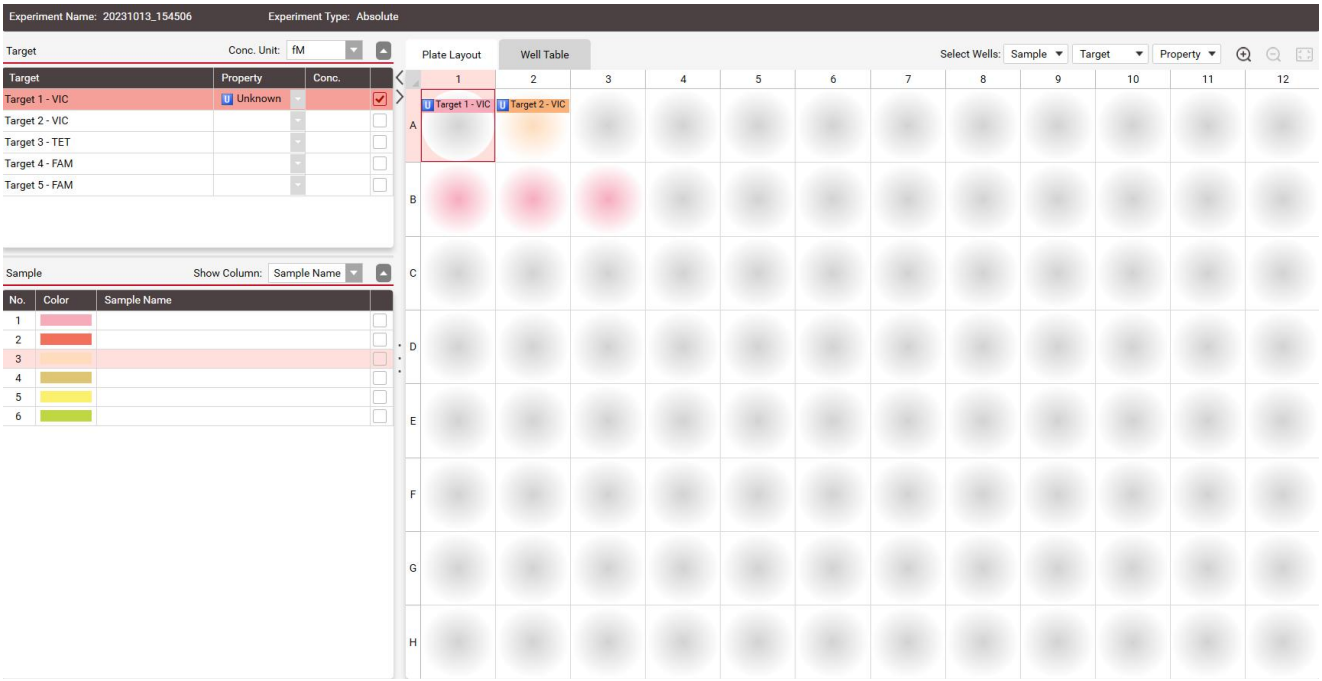
d) Click "Import " to import the sample information file in .xlsx format.

e) Click "Export " to export the sample information file in .xlsx format.

f) Click "Delete" to delete the selected sample information.

g) Click "Clear All" to clear all sample information added this time.

7.2.1.4 Plate settings



a) Click "Plate" or "Table", select the plate wells that needs to be set, and set the target and sample information of these wells on the left.

b) target setting: select 6 different concentration units according to the drop-down box (or not selected); check the concentration box, 4 different attributes can be selected from the attribute drop-down box, after setting the corresponding plate, the attribute identifier and target name will appear on the screen (the table will record the set target information); up to 6 different targets can be set for the same well.

c) Sample information setting: it can be marked by the check box on the right side of the sample name. After checking, the corresponding sample name will appear in the plate, and the background color will change to

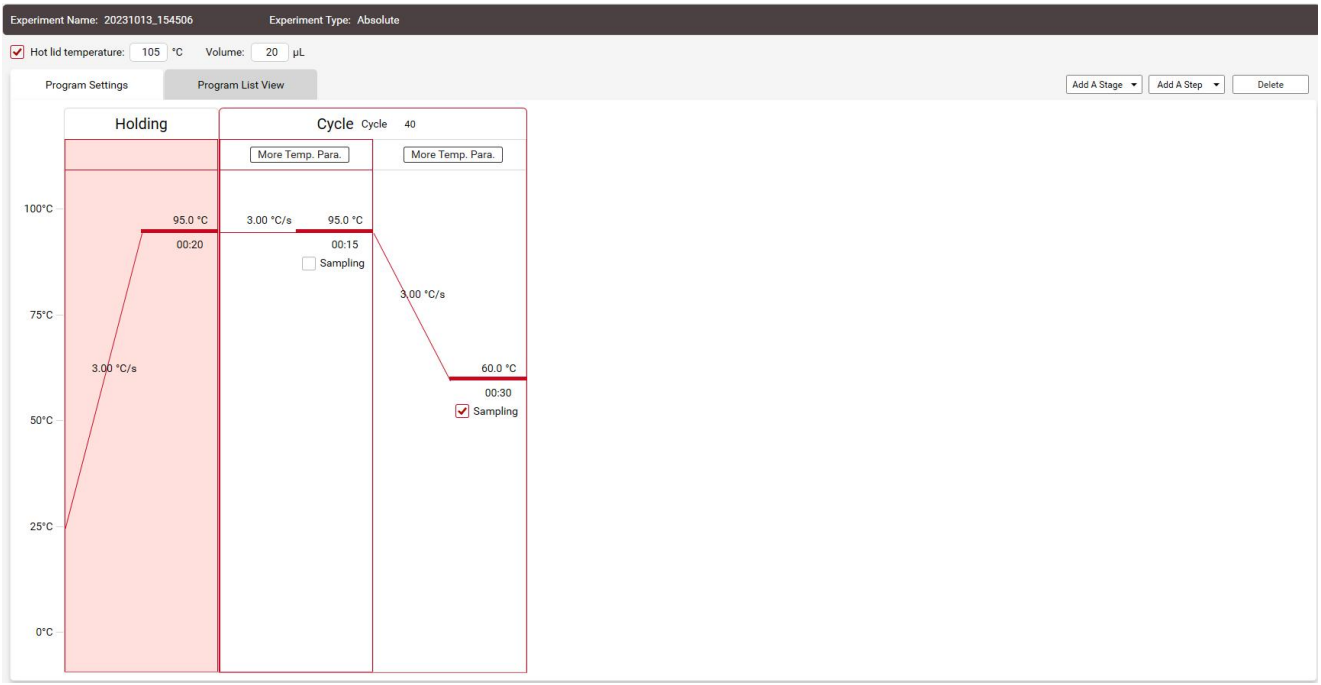
the color corresponding to the sample (The table will record the set sample information).

d) After setting the plate information, select the three drop-down boxes of "Sample", "Target", and "Property" after "Select Wells" at the top right to view the corresponding wells.

e) In the plate interface: click the magnifying glass symbol on the upper right to enlarge the plate layout; click the shrink symbol to reduce the plate layout; click the restore symbol to restore the layout to its original state.

f) In the plate interface: by right-clicking, it can clear the settings of the wells (clear the target settings, clear the sample settings or clear all settings), copy and paste operations.

7.2.1.5 Method settings



Caution	If the user doesn't choose to use hot lid, the reagent surface must be covered with paraffin oil, otherwise it will cause evaporation and condensation of the reagent, which will lead to erroneous experimental results.

a) Hot-lid Temp: check the checkbox to set the heating temperature of the hot lid, the setting range is 35°C-105°C.

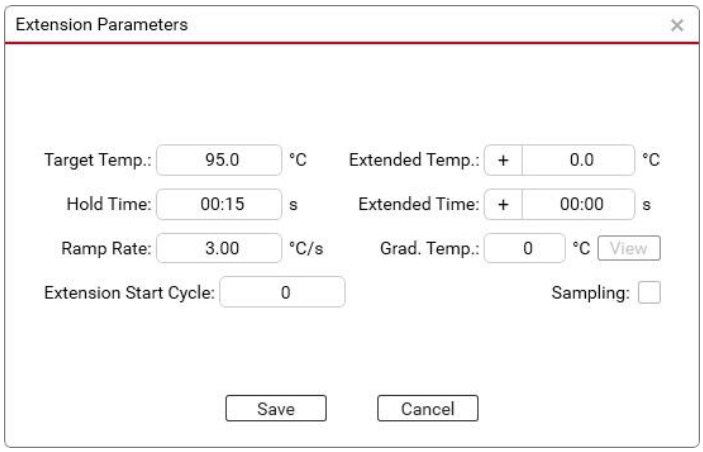
b) Liquid Quantity: set the sample dosing volume

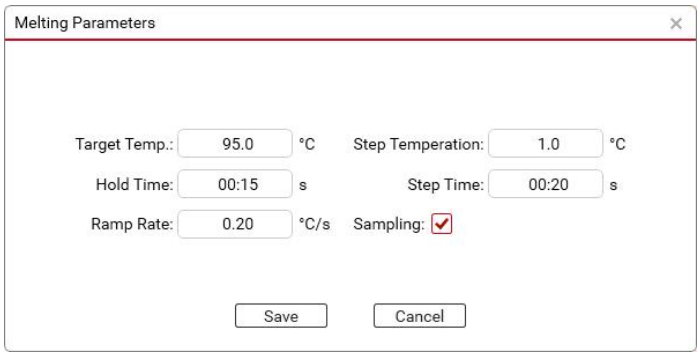
c) Add Stage: The user can create a new Holding stage, cycle stage, melting stage or Infinite stage through the drop-down box (directly click the Add Stage to create a new cycle stage by default)

d) Add Step: the user can add a step before or after the selected step through the drop-down box, (directly click "Add step" to add a new step after the selected step by default, each stage can be set up to 20 steps)

e) Delete: delete the chosen stage or step

f) Parameter setting of holding stage, cycle stage, melting stage or infinite stage. In each stage, the user can set the ramp rate, target temp., step hold time, and sampling fluorescence or not. In addition, the cycle stage can additionally set the extension parameters of each step (extension temp., extension time, grad temp., and extension start cycle). the melting stage can additionally set the melting parameters of the last step of the melting step (melting step temp., melting step hold time)





The user can save the experimental settings after settings completed or during the setting process.

- Click the drop-down “Save” box to “save as experiment file” or “save as template file”.
- Click the “file”, choose to “save as experiment file” or “save as template file”.

7.2.2 Sample preparation

After setting programs and before running, please make sure that the reaction samples are ready:

- Make sure to use appropriate consumables.
- Make sure that the arrangement of the PCR reaction plate is consistent with settings of the above plate.

When ready, click "Open Module" button in the function keys below the menu bar, then place the samples according to the plate layout, insert into the module tray, and then click "Close Module ".

7.2.3 Start to run

a) Start to run: After the preparation, make sure that the PC is connected and the instrument is idle without abnormal alarms, then click Run. On the right side of the "Run Status" box, click the "Start Run" button to start running the experiment. The experiment in running is marked with a green circle.

b) Offline operation: If the connection with the instrument is disconnected during the experiment, the instrument will continue to run the experiment offline. After the operation is completed, reconnect the instrument and the PC software, and the user can go to the menu bar→ view instrument-side experiment files, jump to the instrument-side experiment file library and view the list of experiment files (Refer to 7.5.6 for specific operations).

c) Running status: After the experiment starts, the “Run Status” box will display the experiment starting time, the experiment complete time, the “Run Status” (including 5 states of not run, running, failure, stop by user and run completed), Remaining time, Currently running segment, Cycle, Step, Hot lid temperature, Target temperature, Actual temperature, Gradient temperature.

d) After running, the user can perform "Skip current stage" or "Stop". During the running of cycle stage, the user can operate "Cycle +1" to add one cycle or "Cycle -1" to delete one cycle.

e) Fluorescence curve: the fluorescence intensity will change with cycles. The curve will appear after at least one cycle finished. The well can be selected on the right side. On the left side, the user can set the targets for view and the curve color of the selected well (all displayed by default). the mouse is placed between curve frame and the hole position frame, the user can adjust the display range. the mouse is placed on the curve interface, and the curve coordinates can be zoomed by scrolling the mouse. click on the curve to perform settings of the graph as "Save image", "Copy to clipboard", "Print" and " Fix size".

f) Temperature curve: the temperature changes with the experimental time, and it appears after the running. scroll the mouse to zoom in and out of the curve coordinates. click on the curve to perform settings of the graph, as "Save image", "Copy to clipboard", "Print" and " Fix size".

g) Melting curve (it has no melting curve if no melting stage is set in the running program): the fluorescence intensity changes with the temperature and appears after completing a melting. scroll the mouse to zoom in and out of the curve coordinates. click on the curve to perform settings of the graph, as "Save image", "Copy to clipboard", "Print" and " Fix size".

h) Method: user can view the specific program of this running experiment, but can't modify it.

7.2.4 Analysis

After the running is completed, the analysis bar will automatically appear in the experiment interface, including display option buttons for different result curves, such as amplification curve, standard curve, melting curve, etc

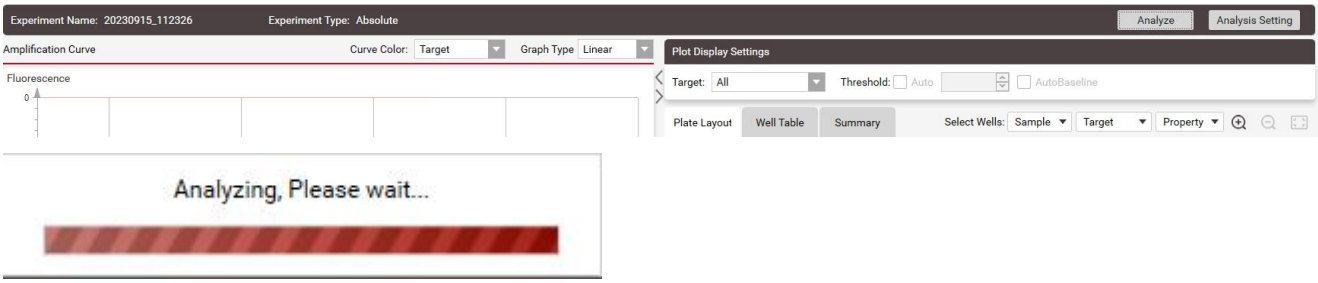
7.2.4.1 Experiment result curve

The analysis functions for different experimental results are as follows:

Amplification curve and amplification analysis result viewing function	The amplification curve and amplification analysis result of the reaction well can be viewed.
Standard curve and standard analysis result viewing function	Check the standard curve, specific parameters and analysis results according to the test target. The user can also view the imported standard curve information, and the user can also export the standard curve or save the standard curve to the standard curve library.
Melting curve and melting analysis result viewing function	The user can view the melting curve and melting result of each test target in each reaction well, as well as the fluorescence curve and derivative curve.
Relative quantitative graph and relative quantitative analysis result viewing function	The user can view the relative quantitative graph and the relative quantitative analysis results.
SNP chart and SNP analysis result viewing function	The user can choose to view the SNP map and SNP analysis results according to the test targets.
HRM curve and HRM analysis result viewing function	The user can view fluorescence curve, derivative curve, normalization curve and difference graph.

7.2.4.2 Analysis

"Analyze" and "Analysis Setting" buttons will appear at the upper right of each curve result interface. Click the "Analyze" button to analyze the experimental results (according to the default parameter settings).

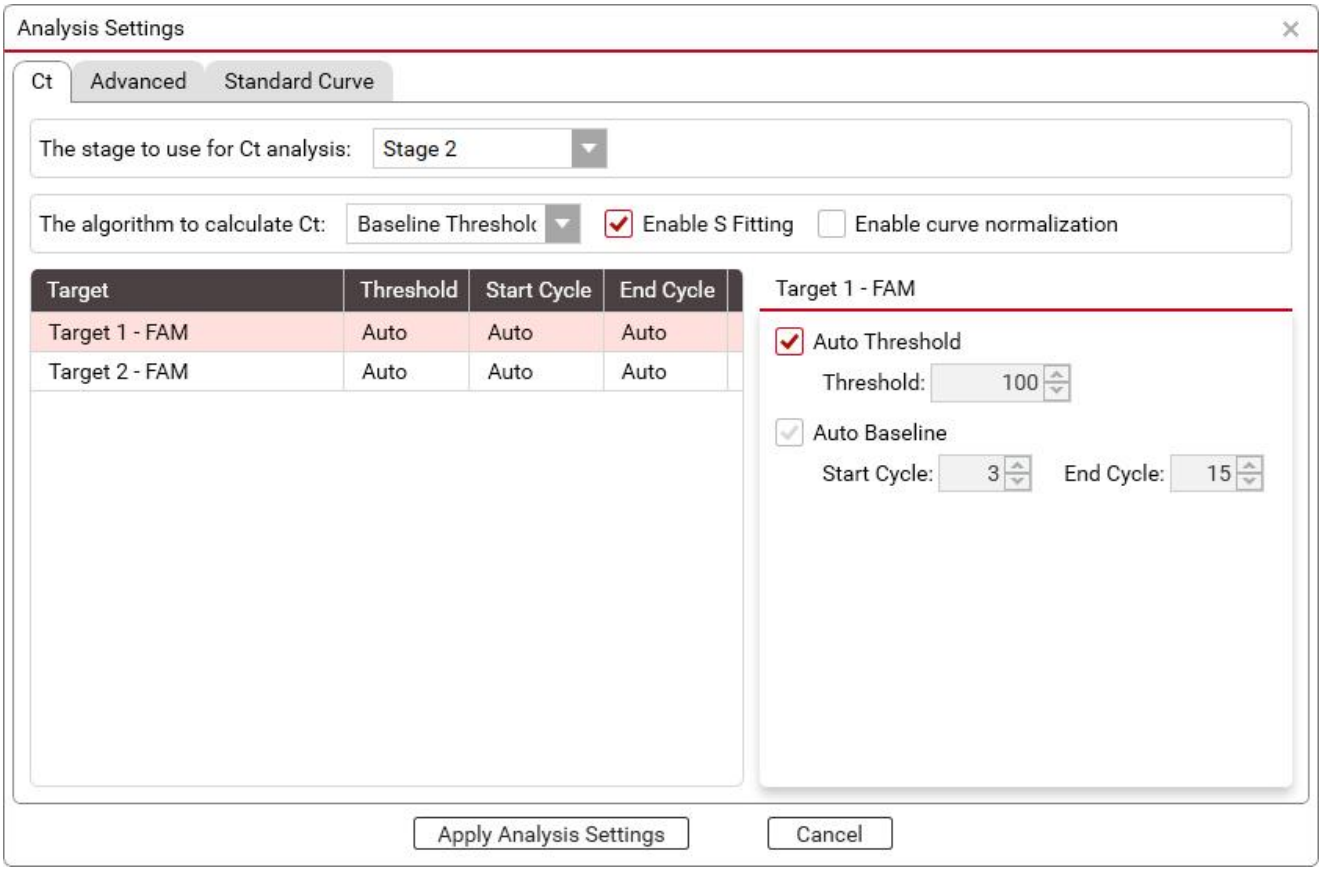


7.2.4.3 Analysis setting

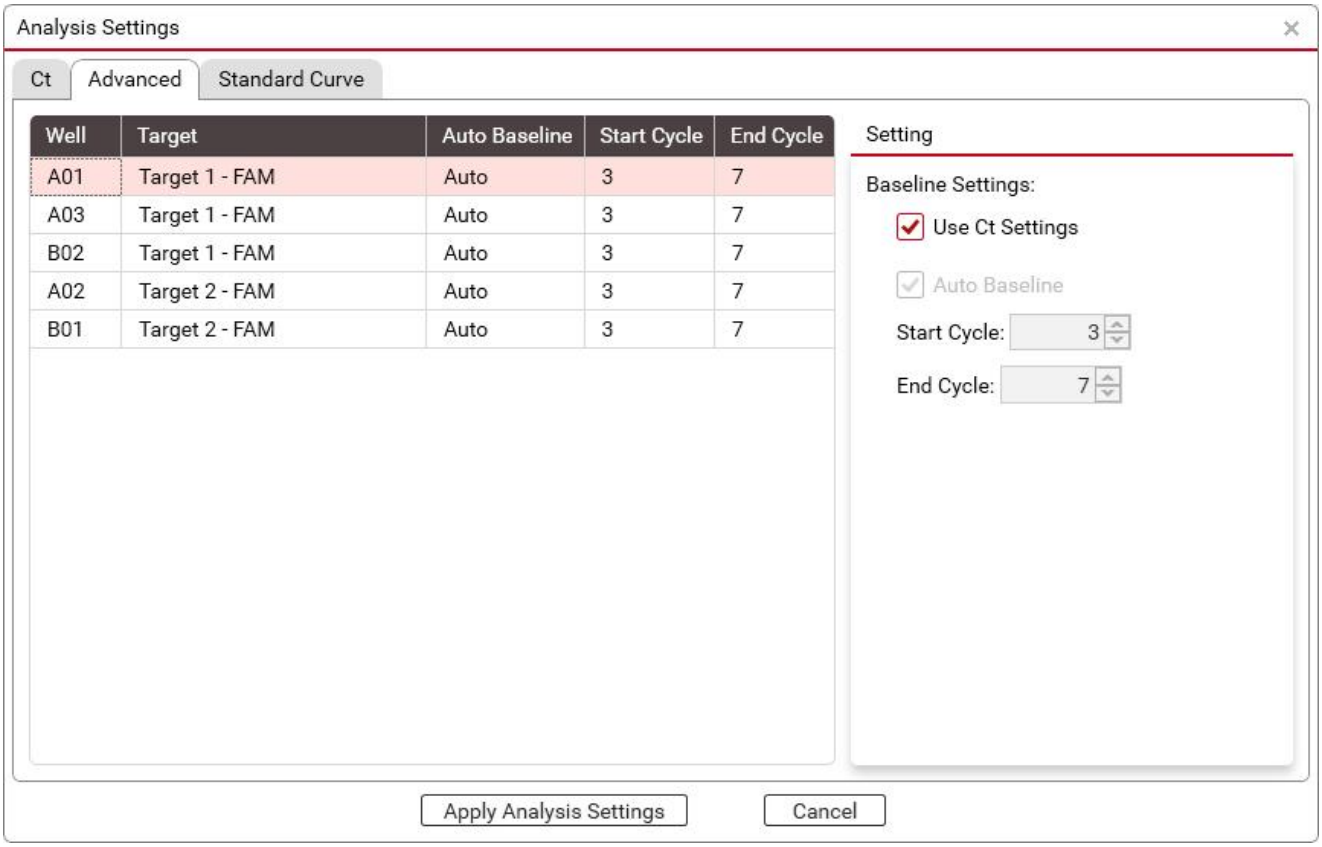
If the user needs to adjust the analysis parameters and re-analyze, click the "Analysis Setting" button to set different analysis parameters, and then click "Apply Analysis Settings" to analyze according to the newly set parameters. Different curve types correspond to different analysis parameter settings:

a) For the amplification curve, there has Ct analysis parameter settings and the advanced parameter settings.

- Ct analysis parameter settings: Select the stage to use for Ct analysis→Select the algorithm to calculate Ct→Select whether to use s-shaped curve fitting→Set thresholds for each target, Start cycle and End cycle.

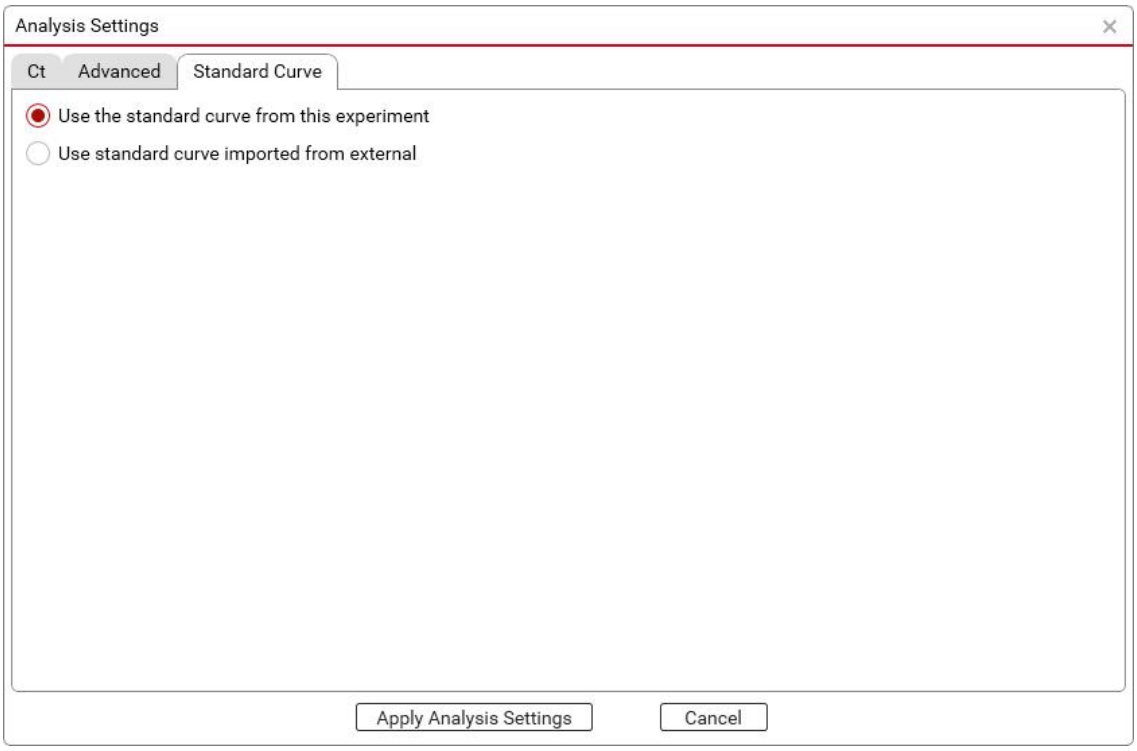


- The advanced parameter settings: Auto Baseline, Start Cycle and End Cycle are set for each target at each well.

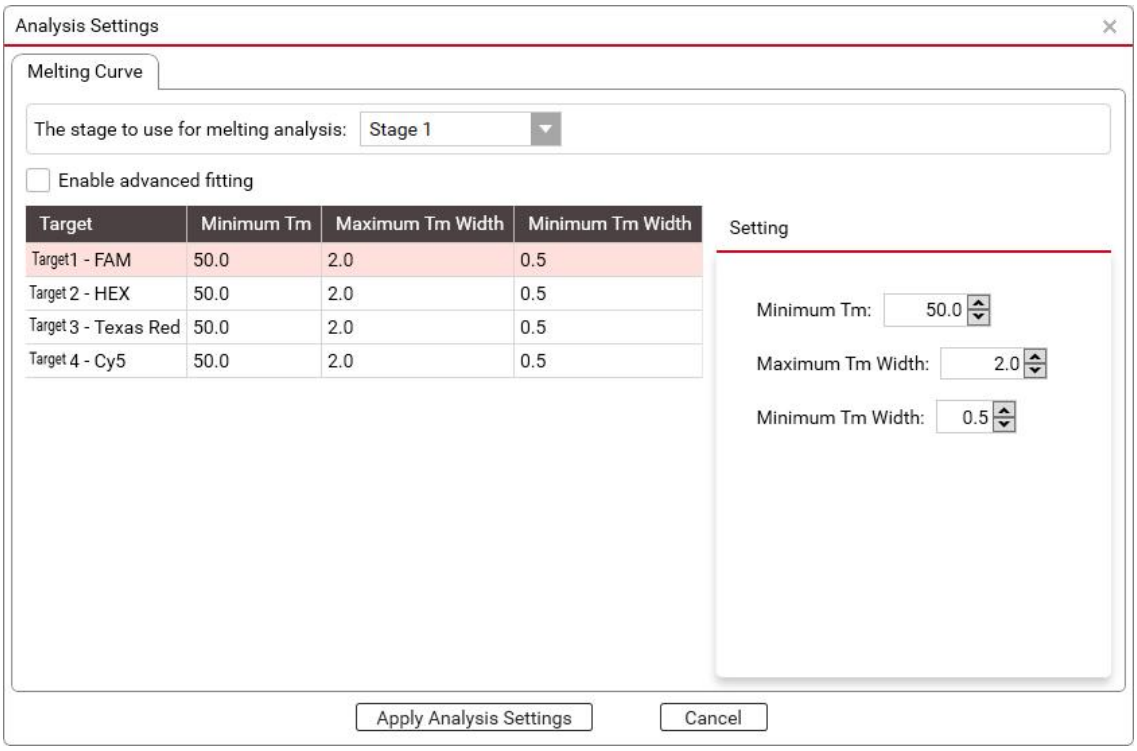


b) The standard curve parameters can be set in the standard curve settings: The standard curve acquisition method is set, and it will use the standard curve from this experiment by default (the standard curve is available only when the test target contains at least 2 standard products with different concentrations; otherwise, the target has no standard curve); If the standard curve imported from external is selected, targets, imported standard curve file and standard curve used need to be set.

- External import standard curve setting：Click the target in an experiment, click "External Import", the selection box of standard curve file will pop up (only the standard curve stored by the current user will be displayed, and all standard curves will be displayed when the administrator logs in)→Select the file that meets the standard file format and click "OK" → drop down to select the detection target in the imported standard curve；
- If the generated sampling number of the imported standard curve is inconsistent with the current sampling number, the statement " Sampling count of imported standard curve is not match to current experiment" The prompt；
- If the generated sampling temperature of the standard curve is inconsistent with the current sampling temperature, the statement " Import failed: sampling Temp. not match. "The prompt；
- If the content of the imported standard curve file cannot be analyzed, the statement " Cannot find valid standard curves."The prompt.

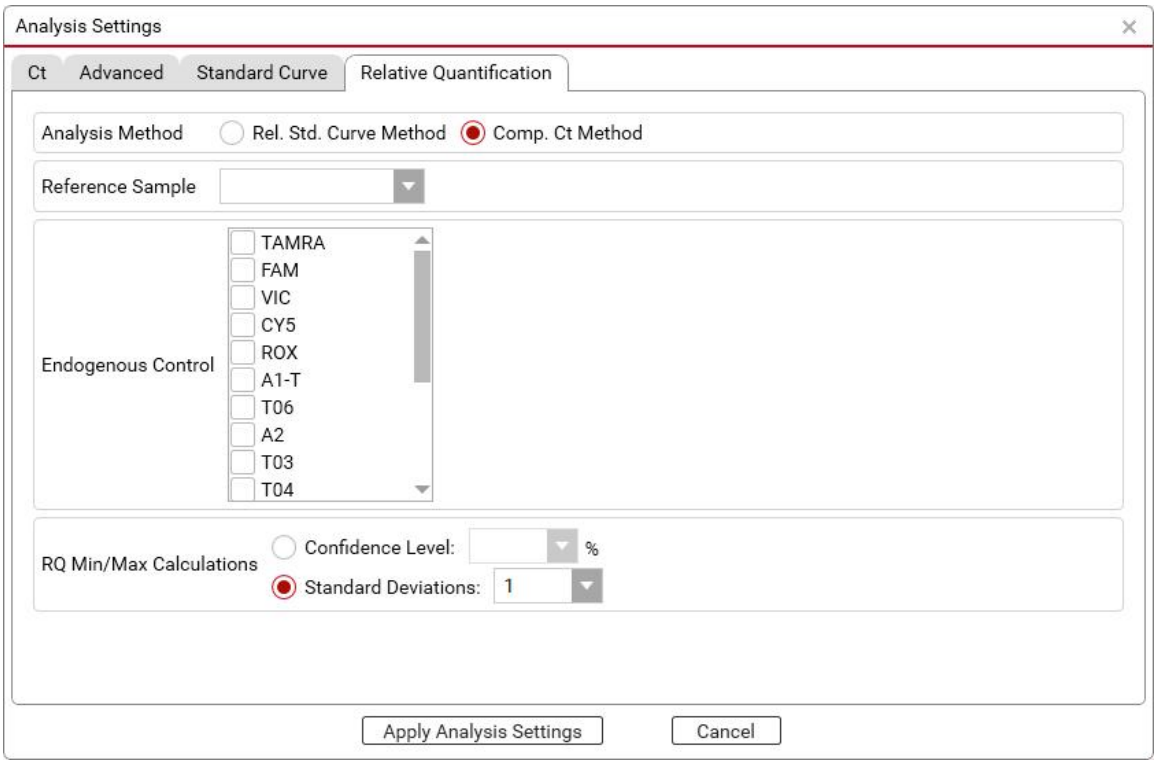


c) It can set the melting curve parameters in the melting curve settings: Select the Melting step to be analyzed→Select whether to enable advanced fitting and set the Min. Tm, Max. Tm Width, and Min. Tm Width for each target

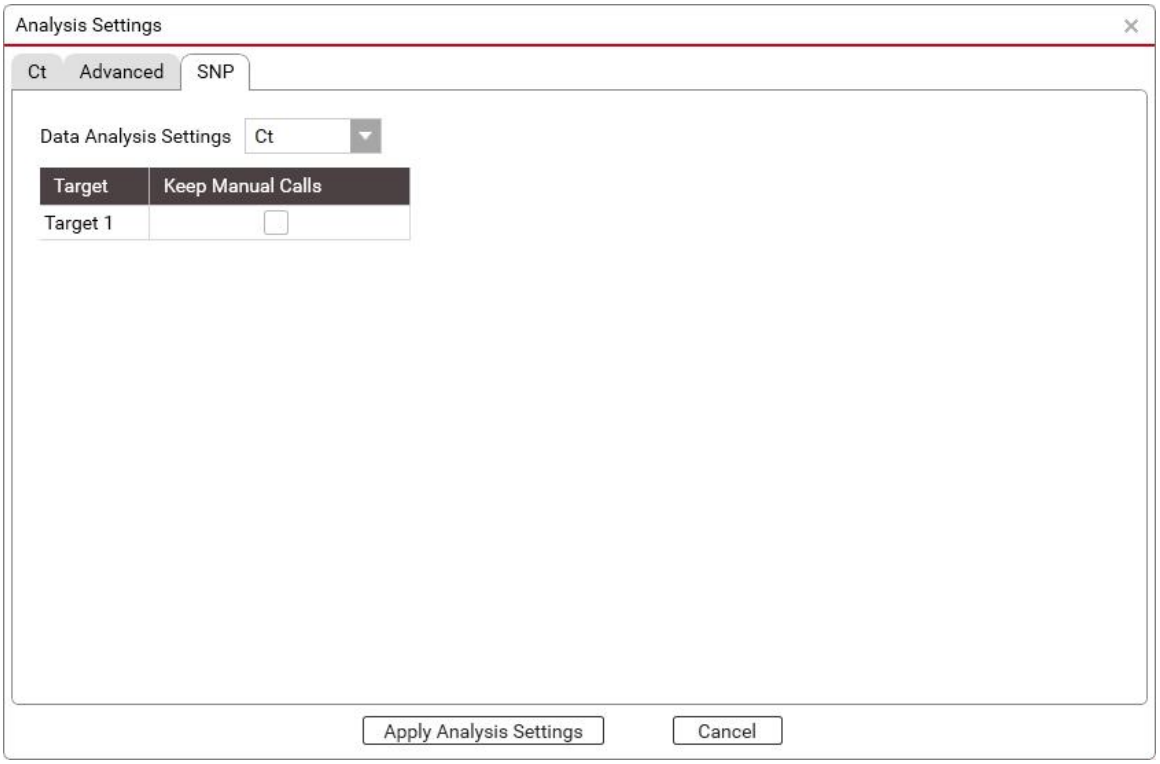


d) It can set the parameters of relative quantitative analysis in the relative quantitative analysis settings: Choose the Analysis Method of Relative Quantification→Select Reference Sample（One, which can be selected

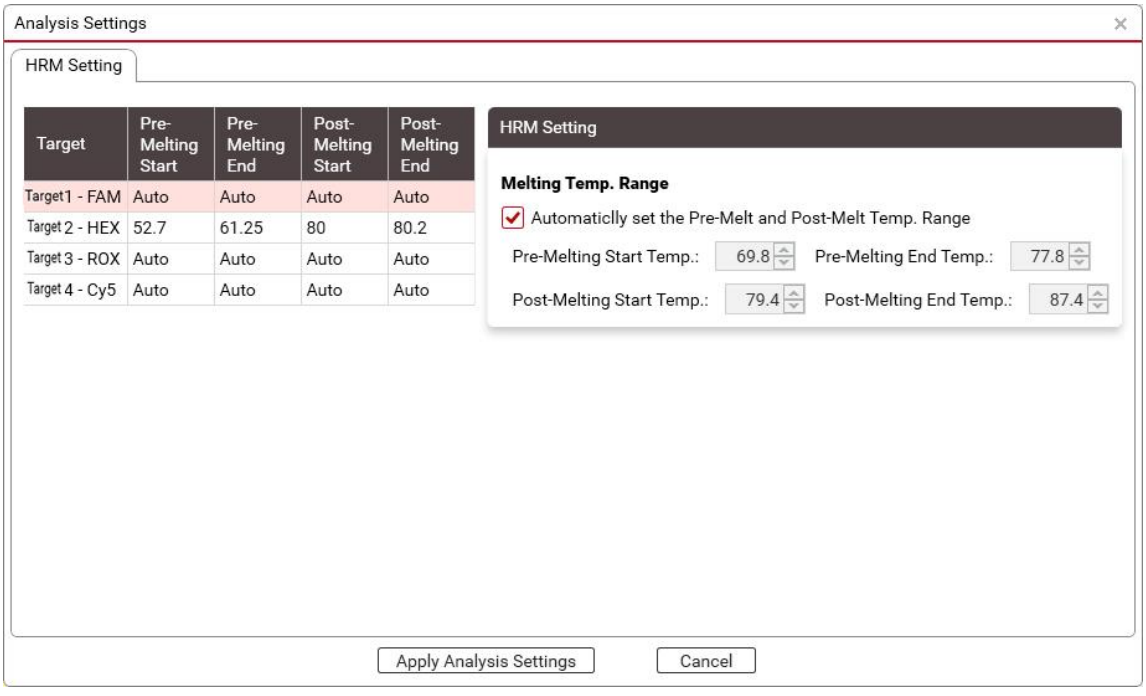
from the Settings sample, or null, which is null by default）→Set Endogenous Control（all targets can be selected, not selected by default）→Select the relative quantitative confidence interval algorithm and set the algorithm parameters（The Confidence Level is given as a percentage， Optional 95.0%, 97.0%, 99.0%, 99.5%, 99.7%, 99.9%; Multiple of Standard Deviations can be 1, 2 or 3）



e) In the SNP settings, it can set the parameters of SNP analysis: Drop - down to select SNP analysis data→Check whether each target keep manual calls.



f) In HRM settings, it can perform the settings of HRM curves: Set Pre-Melting Start Temp., Pre-Melting End Temp., Post-Melting Start Temp. and Post-Melting End Temp. for each target.



7.2.5 Report

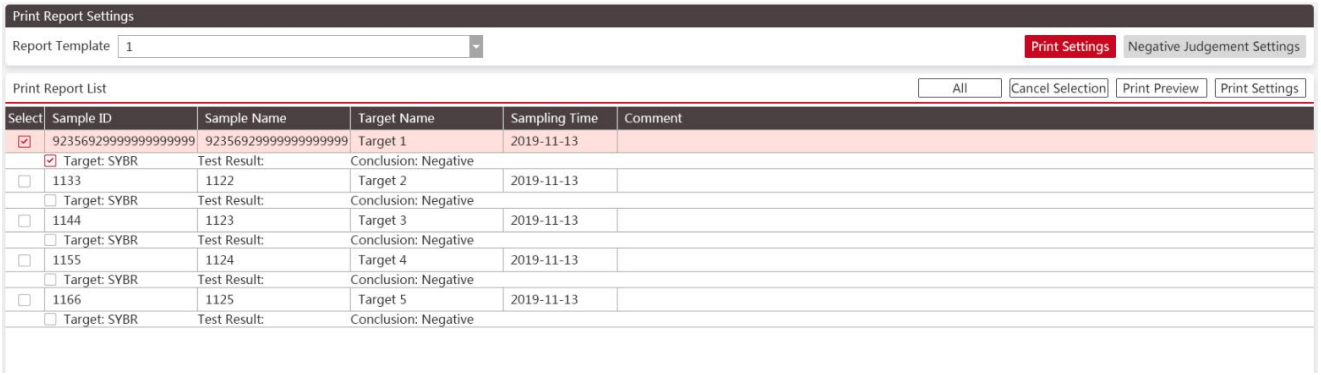
After the running is completed, the report column will automatically appear in the experiment interface, including the

Print and QC Summary tabs.

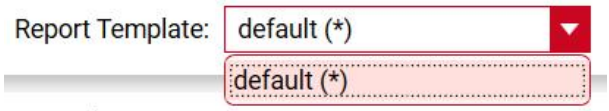
7.2.5.1 Print

Only when the experiment is absolute quantification or SNP, and the status of experiment file is completed, the report can be viewed and printed.

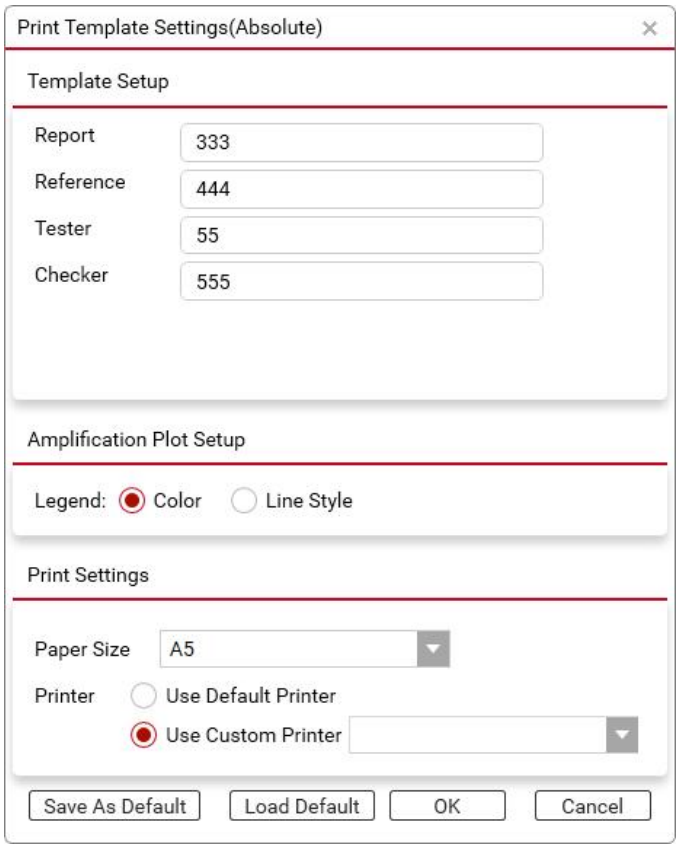
The interface on the right side of the printed report displays the judgment result corresponding to each sample and its target. When viewing the report for printing, the analysis results of each target in each well are arranged by default according to the well number.



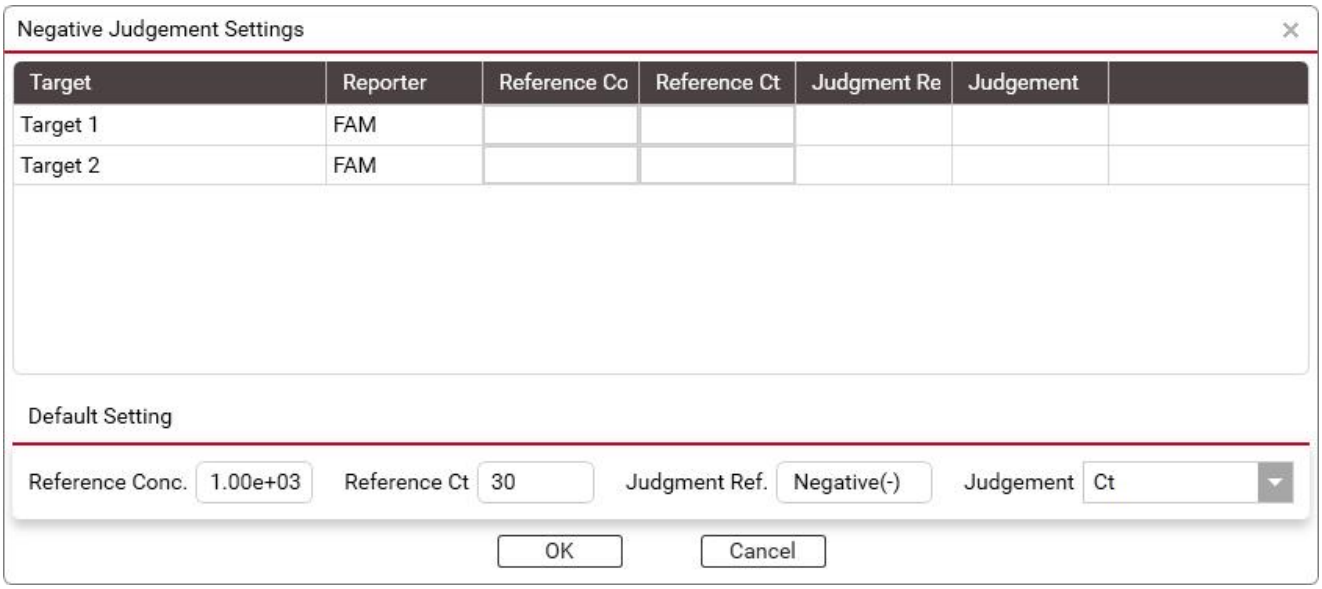
a) Report Template: drop down the selection box to select the report template to be printed, and the report will be printed in the form of a print report template.



b) Print Settings: Click this button to pop up the print settings dialog box, enter the content required in the report template.



c) Negative Judgment Settings: Click this button, the negative judgment setting dialog box will pop up, and the user can set the negative judgment parameters.



d) All: select all information targets in the list for printing, and the tick box in front of all information targets are automatically selected.

e) Cancel Selection: Click this button, all the selected information targets in the list will be canceled.

f) Information targets tick: the user can print each target of each sample. All can be ticked or canceled

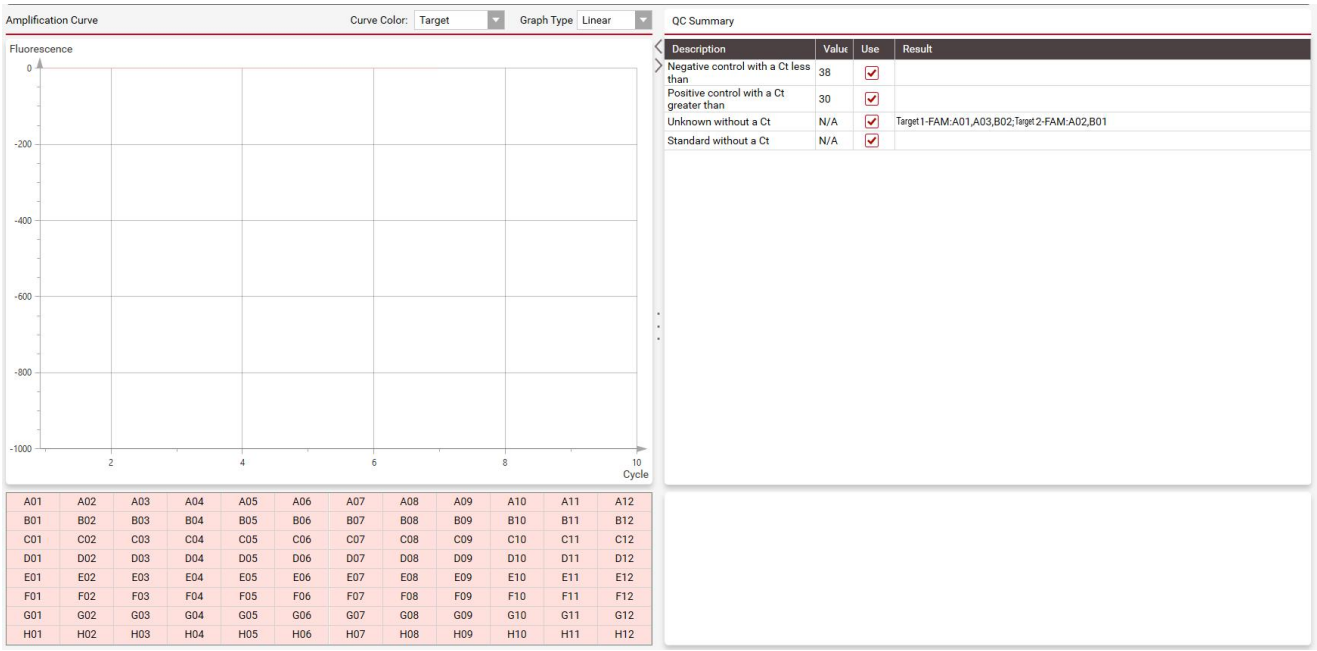
automatically, or manually ticked or canceled individually.

g) Print Preview: Click to pop up the print preview dialog box for reviewing.

h) Print Settings: Click to pop up the Windows print setting interface. After setting parameters, such as the number of copies, click to print the report in the form of the report template.

7.2.5.2 QC Summary

In the quality control summary interface, the user can view the amplification curve, the user can select the well to view the corresponding curve of the well, and the user can also select the Curve Color, Gragh Type, and displayed fluorescence channel of the Amplification Curve. The user can view the results of QC information (displaying the unknown samples and standards of the specific non-amplified).



a) Curve Color: drop-down box to select and set the curve color.

b) Graph Type: drop-down box to set the amplification curve style.

c) QC Summary bar: If the QC information is ticked to be used here, it will display the wells that meet to the rules in the result bar on the below.

d) QC summary result bar: it displays the wells that meet to the selected QC information rules, and the format is displayed as "test target 1: well 1, well 2, ... test target 2: well 1, well 2, ..." ;

e) Display the amplification curve: After selecting the well, the corresponding curves will be displayed.

f) QC information results: display the unknown samples and standards of the specific non-amplified.

7.3 Menu bar functions description: File

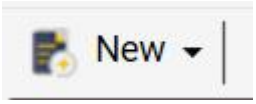
7.3.1 New

7.3.1.1 New experiment

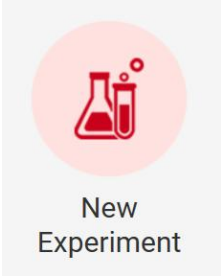
File→New→New Experiment, create a new experiment (default named as current time), and then turn to the experiment interface. For specific operations on the experiment interface, please refer to 7.2 of this chapter.

To create a new experiment, the user can also:

- Click "New" directly in the function keys below the menu

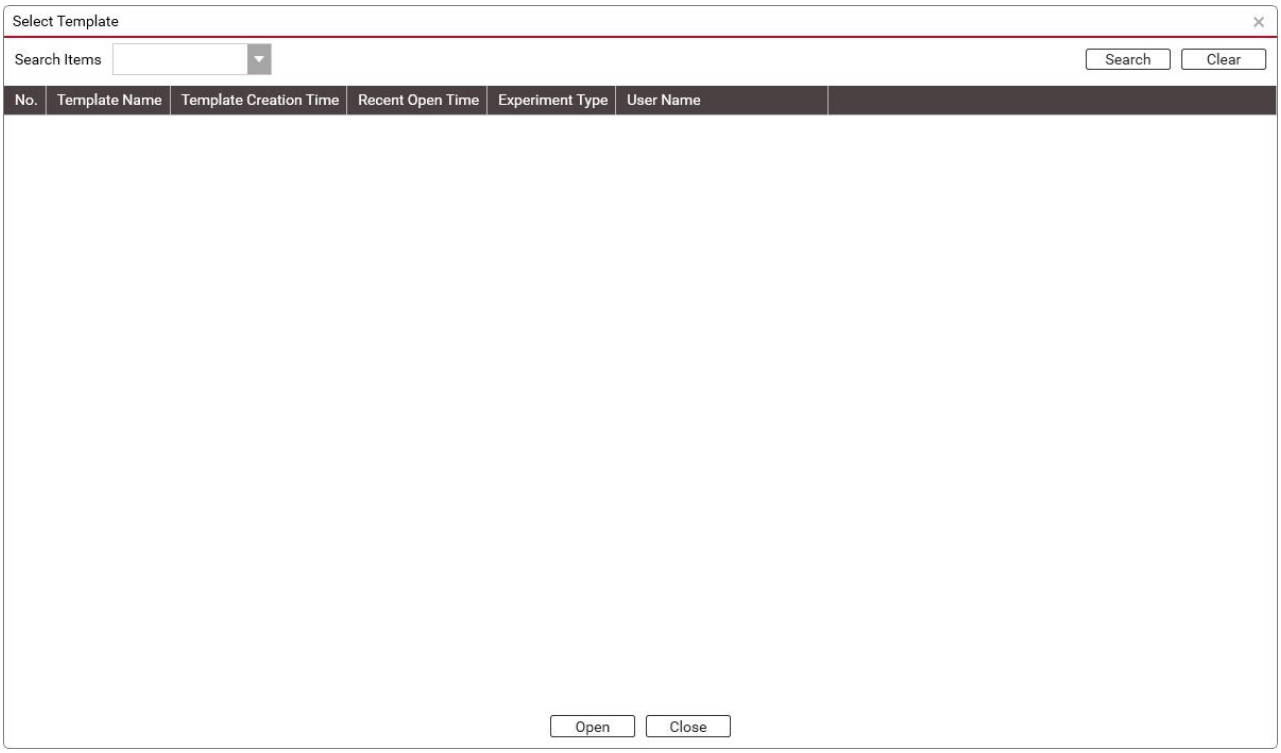


- In the main interface, directly click the shortcut key of "New Experiment":



7.3.1.2 New experiment from template

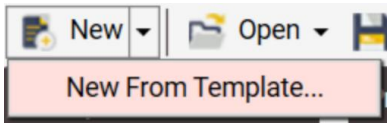
File→ New→ New from template, the "Select Template" box will pop up:



Select and open any template file in the Template Library, the system will automatically generate a new experiment file (default named as current time), and then turn to an experiment interface which saves the setting data in the template, and the user can directly run the experiment according to the settings in the template, and the user can also refer to the operations in 7.2 of this chapter to make new settings for each interface.

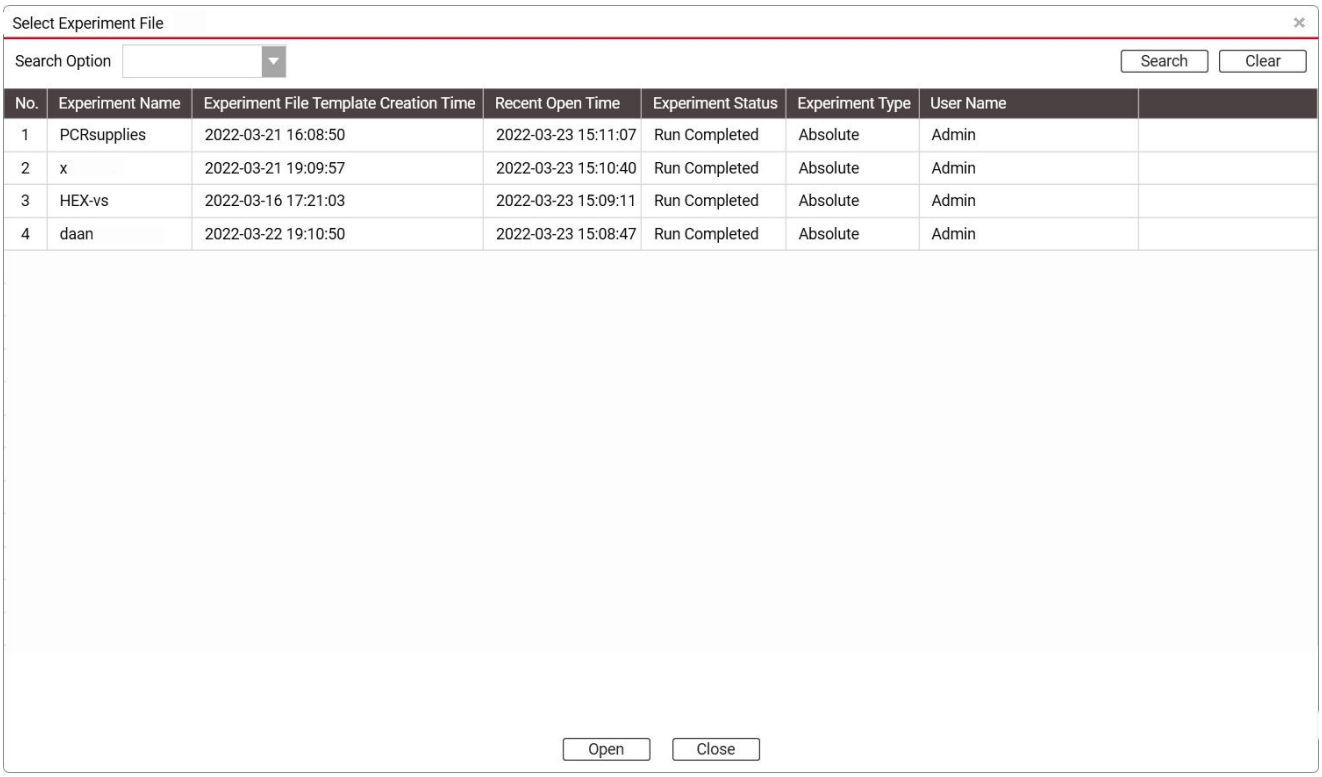
To create a new experiment from a template, the user can also:

- Click the drop-down box of "New " in the function keys at the bottom of the menu



7.3.2 Open (Experiment file)

File → Open → Turn to the "Select Experiment File" box:

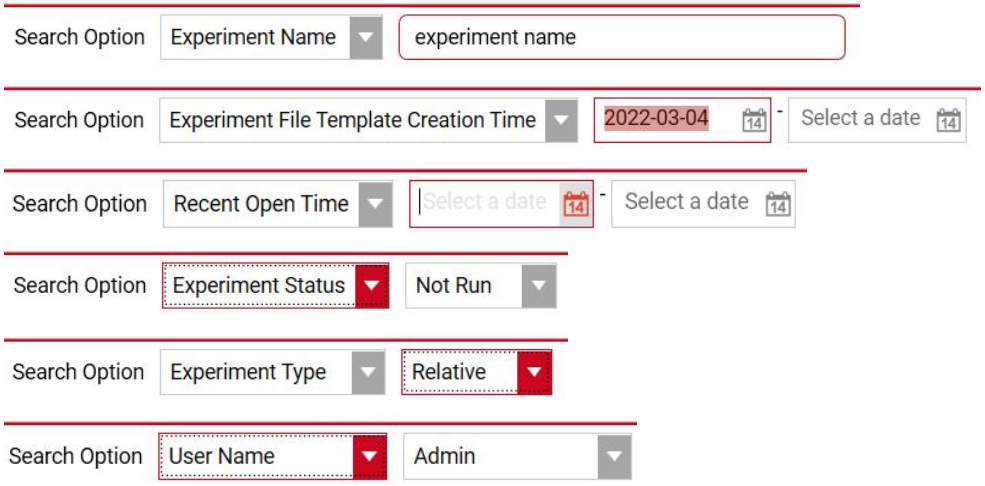


This interface displays the list of all experiment files, the user can sort, search, open and close the experiment files. the specific operations are as follows:

(1) Sort: click the head of the list to sort the experiment files.

(2) Search:

a) Search drop-down box: click the drop-down box of the Search Option, and the user can select the experiment name, Experiment File Template Creation Time, Recent Open Time, Experiment Status, Experiment Type, User Name (only the administrator account can view all files of all users in this instrument, ordinary users can only view the files of their own user name) to search for experimental files. When searching, up to 4 search targets, and the selected search targets cannot be selected again.



b) Search: click this button to search the experimental file library with the set search conditions.

c) Clear. click this button to clear all the contents in the search options.

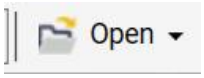
(3) Open: Select an experiment in the experiment file list, and then click this button to open the selected experiment. Only one experiment file can be selected each time.

After the file is opened, jump to the experiment interface of the file: the experiment interface of the experiment file that is not run contains two tabs: setup and run, you can re-run the experiment according to the operation in 7.2; The experimental interface of the experiment file that has been run contains four tabs: setup, run, analysis and report. It cannot be run repeatedly, but the results can be re-analyzed. In case of relative quantitative and SNP experimental results, the report can also be printed to view and print.

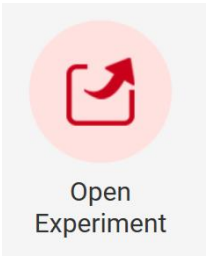
(4) Close: click to close the " Select Experiment File " interface.

To open the experiment file from here, the user can also:

- Directly click "Open" in the function keys below the menu:

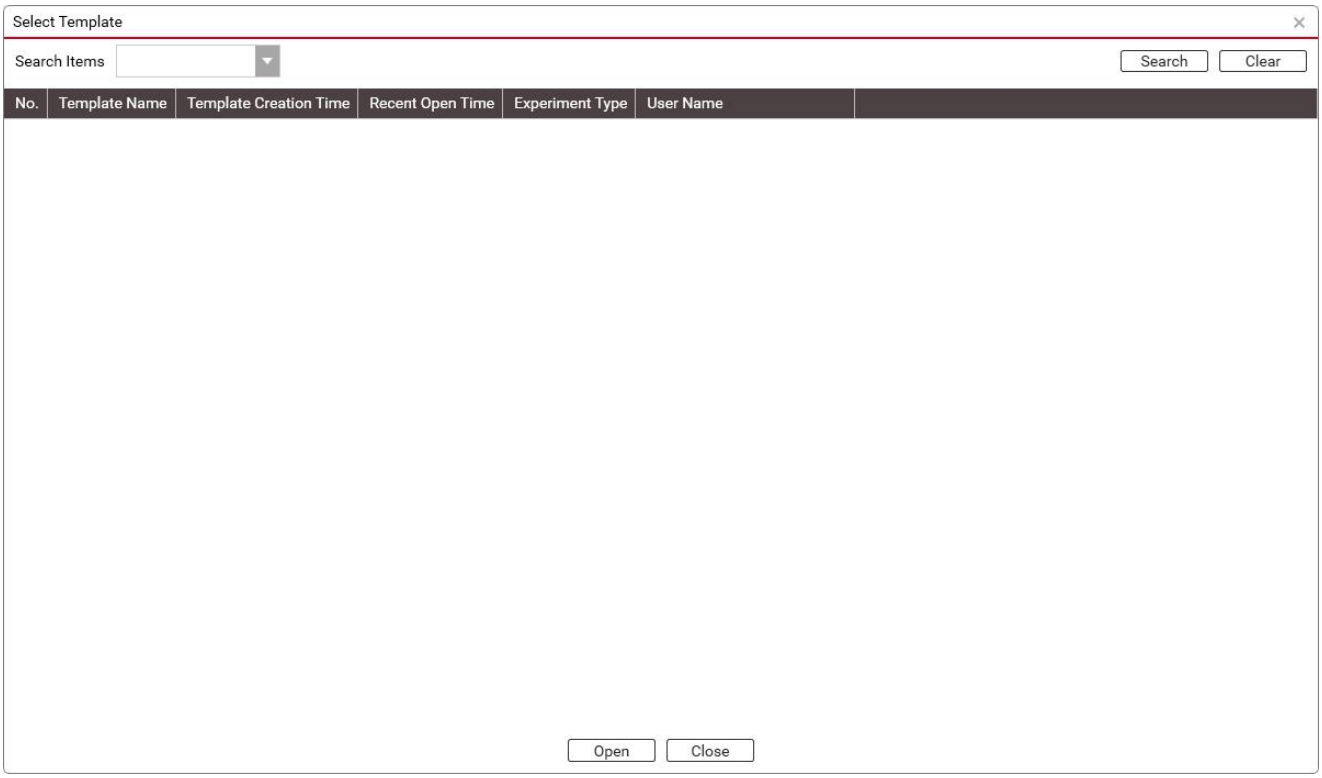


- Directly click the shortcut key "Open experiment" on the main interface:



7.3.3 Open template (File)

File → Open from template → Turn to the "Select Template" box:

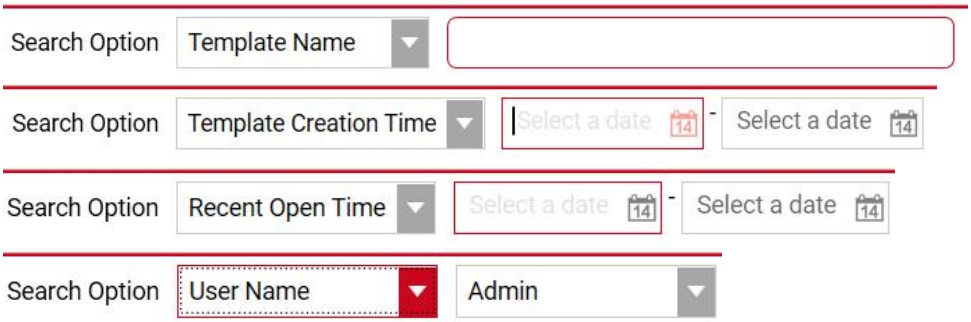


This interface displays the list of all template files, and the user can sort, search, open and close with the specific operations as follows:

(1) Sort: Click on the head of the list to sort the template files.

(2) Search:

a) Search drop-down box: Click the drop-down box of the search option, and the user can search for template files by the Template Name,Template Creation Time, Recent Open Time, User Name (only the administrator account can view all files of all users in this instrument, ordinary users can only view the files of their own user name).



b) Search: click to search the template file library with the set search conditions.

c) Clear. click to clear all the contents in the search options.

(3) Open: select an experiment in the template file list, and then click this button to open the selected template file, and automatically create a new experiment every time the user can open one file (default named as current time), and turn to the experiment interface. For specific operations of experiment interface, please refer to 7.2.

(4) Close: click to close the "Select Template" interface.

To open the template file, the user can also:

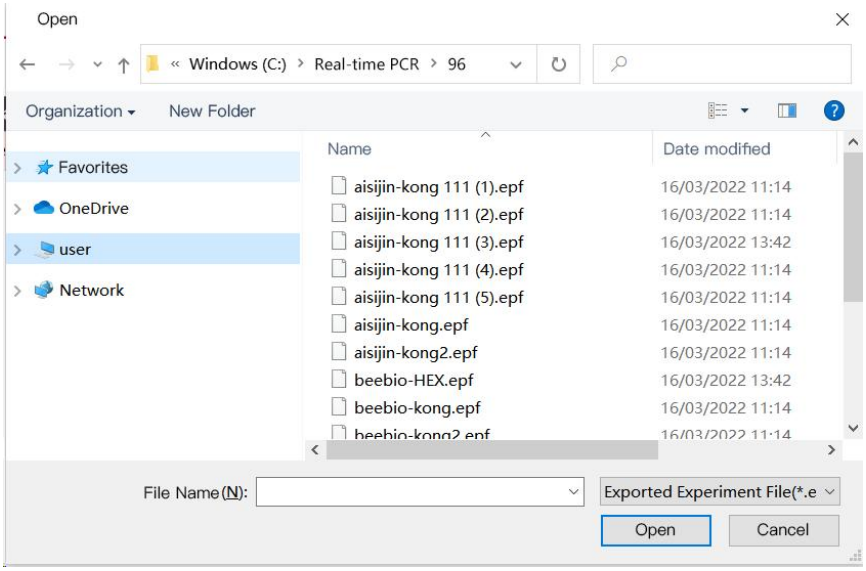
- Click the drop-down box of "Open" in the function keys below the menu:

- Directly click the shortcut key "Open template" on the main interface:

7.3.4 Import experiment file

Import the experiment file from outside:

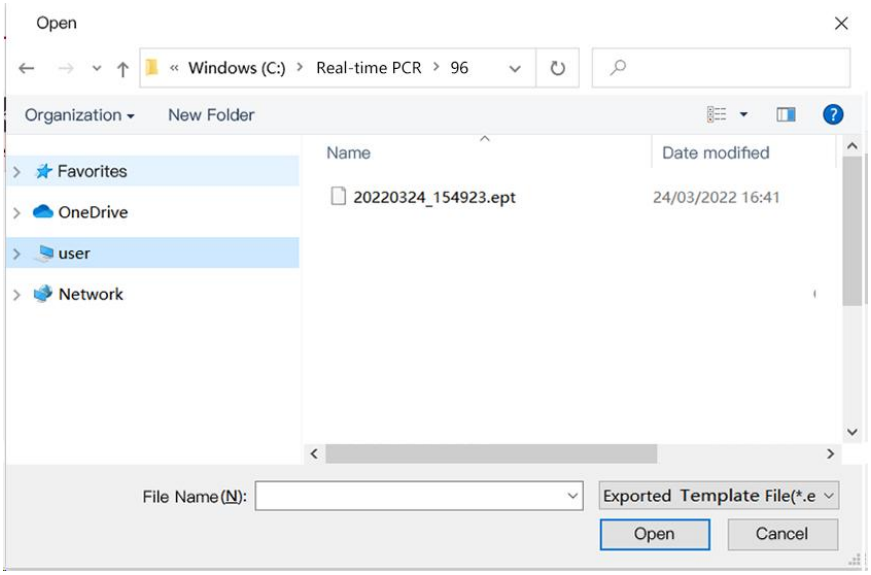
File→Import experiment file→Import file selection box pops up (the file opening dialog box of Windows system)→Select the file in the format of .epf→Open



7.3.5 Import template file

Import the template file from outside:

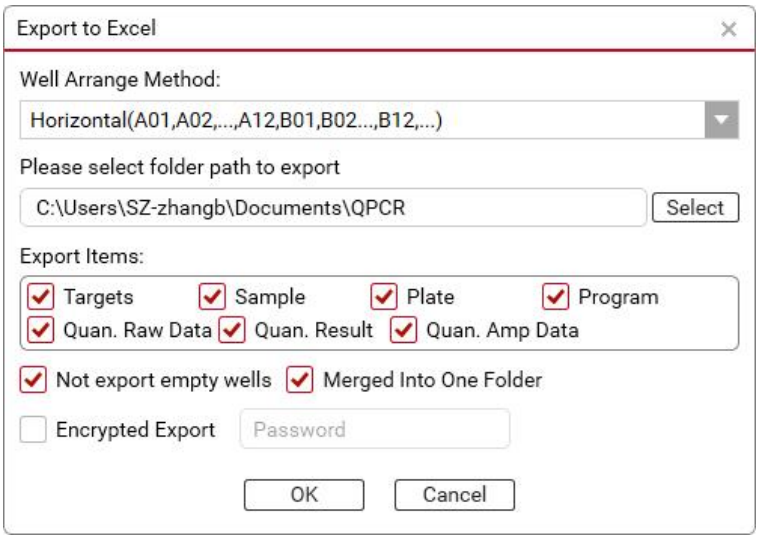
File→Import template file→Import file selection box pops up (file opening dialog box of Windows system)→Select the file in the format of .ept→Open



7.3.6 Export Excel

Export Excel data:

File → Export to Excel→ Select hole arrangement → Select Export path → Select Export content → Click OK. If you want to encrypt the exported Excel, you can check "Export Encrypted" and set a password to encrypt the exported Excel;



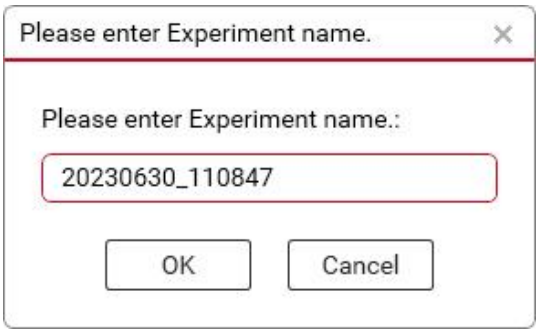
7.3.7 Save

Save the modified information of the experiment interface to a file:

(1) If the user opens an experiment file and modify it, click “Save” to save the modified information to the original experiment file.

(2) If the user opens a template file and modify it, click “Save” to save this file as an experiment file, and a prompt

box will pop up, and the user need to enter a new experiment file name:



To save file information, the user can also:

- Directly click "Save" in the function keys below the menu:

7.3.8 Save as (Experiment file)

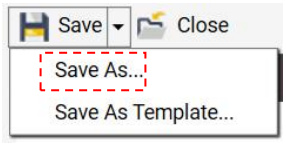
Save the file as an experiment file.

In the experiment interface: File → Save As → Enter the experiment file name (default named as creating time) → save as an experiment file.

- ✧ **The format of the experiment file name: numbers, uppercase and lowercase letters, spaces, underscores, minus signs, Chinese characters, but cannot start or end with a space. A string of 1 to 20 characters (one Chinese character counts as one character). The experiment file name is unique.**

To save as experiment file, the user can also:

Click the drop-down box of "Save" in the function key area below the menu:



7.3.9 Save as template (File)

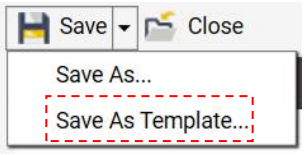
Save the file as an template file.

In the experiment interface: File→Save As Template→Enter the template file name (default named the file creation time)→Save as template file

- ✧ **The format of the template file name: numbers, uppercase and lowercase letters, spaces, underscores, minus signs, Chinese characters, but cannot start or end with a space. A string of 1 to 20 characters (one Chinese character counts as one character). The template file name is unique.**

To save as a template file, the user can also:

Click the drop-down box of "Save" in the function key area below the menu:



7.3.10 Export standard curve

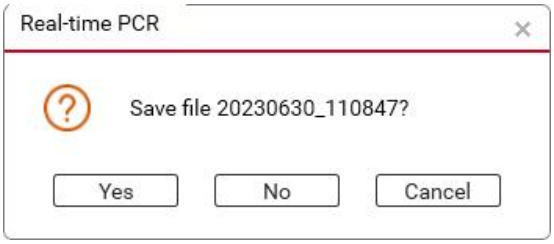
Save experimental information as a standard curve file: Only the opened experimental file has been run with the standards set, it can it be operated.

File→Export standard curve→Enter the file name of standard curve→Save

7.3.11 Exit

Exit the Real-Time Fluorescent Quantitative PCR System directly: File→Exit

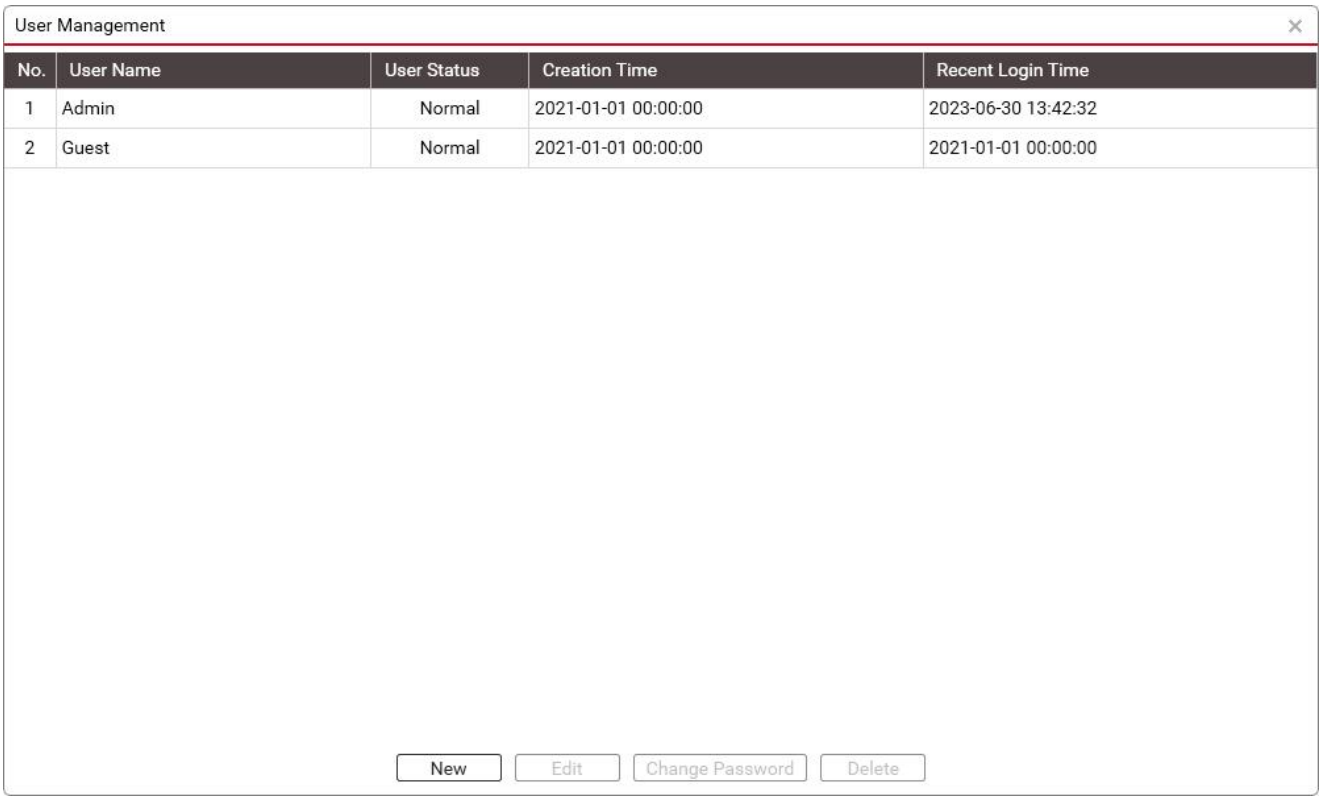
If there is still an experimental interface that has not been closed, it will prompt:



7.4 Menu bar functions description: User

7.4.1 User management

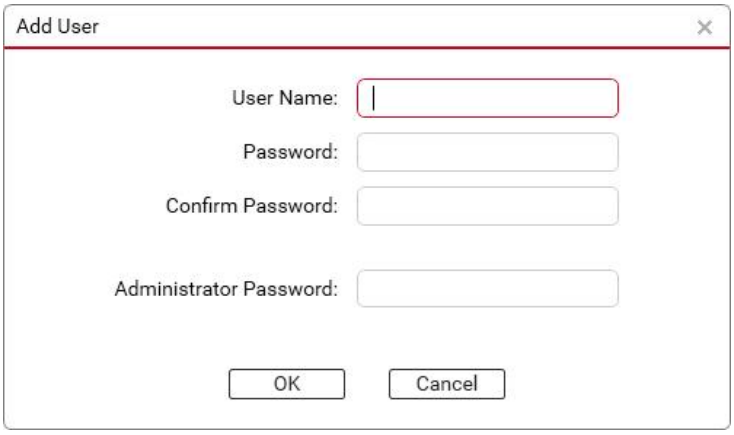
When the instrument is connected, User Management can be performed. It will display the list of user information including No., User Name, User Status, Created Time, Last Login Time of the user, and current user status.



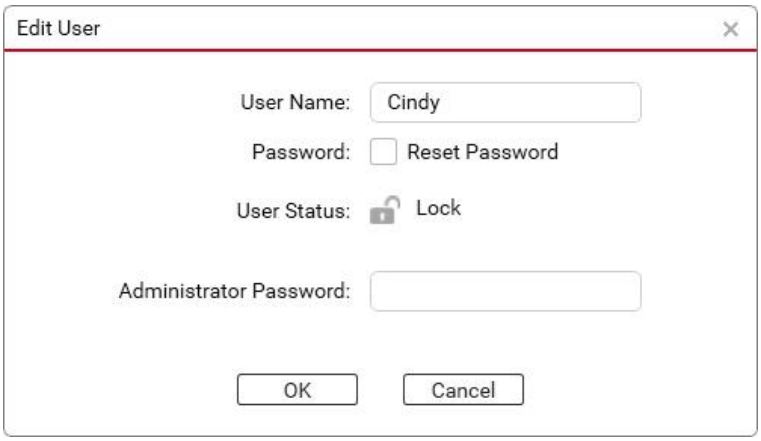
Common users can only view their own information and modify their own passwords; administrators can view all user information under the instrument but can only modify its own passwords. At the same time, the administrator account also has the authority to create a new user, edit users and delete users.

(1) Modify Password: change the password of your own account.

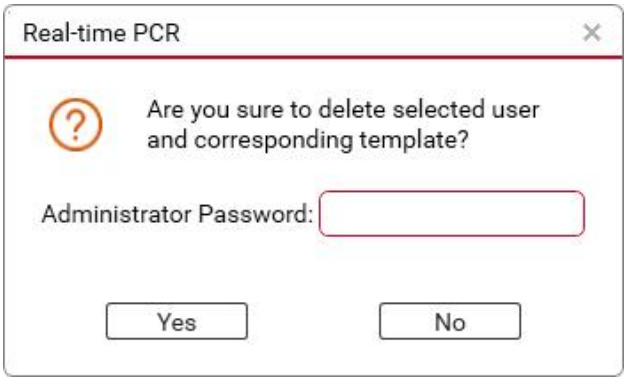
(2) New: to create a new user information, it needs to set a user name and password:



(3) Edit: to edit a user, it can reset the existing user password and unlock or lock the user status. The reset user password is unified as: 888888.



(4) Delete: deleting user information will delete the user name and all templates under this user name in this machine.



a) User name format requirements: numbers, uppercase and lowercase letters, spaces, underscores, minus signs, Chinese characters, but cannot start or end with a space. A string of 1 to 15 characters (one Chinese character counts as one character). Used user name cannot be used again (for the same instrument batch number).

b) Password format requirements: numbers, uppercase and lowercase letters, the length is 6 to 12 characters.

c) If there are 20 users whose status is not "deleted", the "New" button is not selectable.

d) To create, edit and delete users, it needs to enter the administrator to get administrator authentication. If the administrator password is not entered, a pop-up window will prompt "Please enter the administrator password!"; If the administrator password is entered incorrectly, it prompts " Wrong Admin Password!" automatically; If the password is entered incorrectly for 5 consecutive times, it will automatically end the current operation (close the relevant pop-up box) and prompt " Administrator authentication failed, operation failed!"

7.4.2 User login

For user login and switch user to login

User→User Login→Enter the login interface: select the instrument serial number, user name, and password→click Login→Enter the new user interface

✧ **If it is viewing a file or running an experiment, click "User Login" and a pop-up prompt will appear.**

For details about the login and possible problems, see 7.1.2 User Login.

7.5 Menu bar functions description: Instrument

Instrument includes connecting the instrument, disconnecting the instrument, viewing the instrument information, setting the instrument alarm sound, viewing, running and importing the experiment, including the firmware upgrade.

7.5.1 Connect

If the instrument is online, it will automatically connect to the instrument when logging in; if the instrument is not online when logging in, and the instrument is set to automatic connection when online, it will automatically search to check whether the instrument is online and will connect to the instrument after it is online. Otherwise when selecting the instrument connection, it will try to connect to the current instrument.

It can set the automatic connection or manual connection, and the priority of connection between the USB port or network port.

Instrument → Connect→ select port or auto-match port

After the connection is successful, the status bar becomes: Connected. At this time, according to the controllable state of the instrument, it can be divided into two online states:

- "Connected,Not Controlling": When the instrument terminal is logged in online and the instrument terminal rejects PC control, data can only be transmitted between the PC and the instrument terminal, but not the operation of the instrument.
- "Connected,Controlling": When the instrument terminal is not logged in or the instrument terminal is controlled by the PC, the PC can control the instrument in this state, and the instrument terminal can only view the experimental status.

7.5.2 Disconnect

Instrument → Disconnect → Disconnect the currently connected instrument

If the instrument is running the experiment, it cannot be disconnected. Click "Disconnect" and the following prompt will pop up:

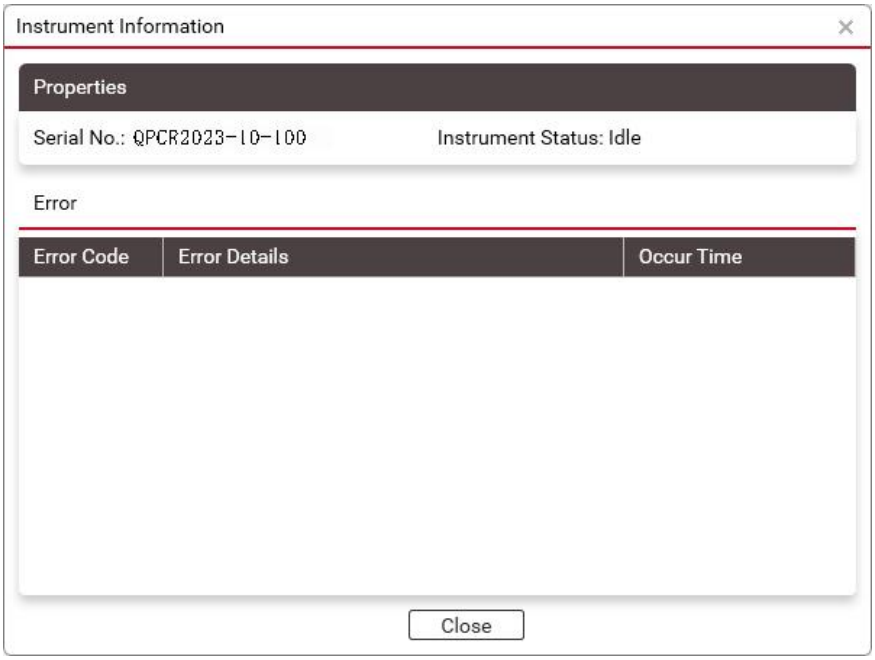
After disconnection, the status bar becomes: No Connected.

7.5.3 Instrument information

When the instrument is connected, you can view the information of the currently online instrument, including basic instrument information and instrument abnormal information:

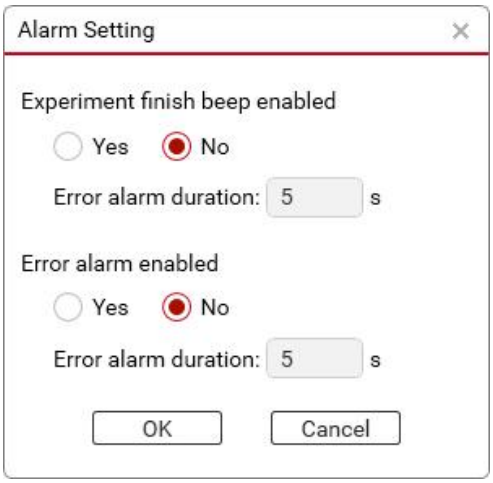
Basic instrument information: instrument batch number and current instrument status

Instrument abnormal information: recent abnormal operation log, such as: Abnormal No., Abnormal Specific Contents, and The Time When The Abnormity Happens.



7.5.4 Alarm

View and change the settings of the current instrument alarm sound.

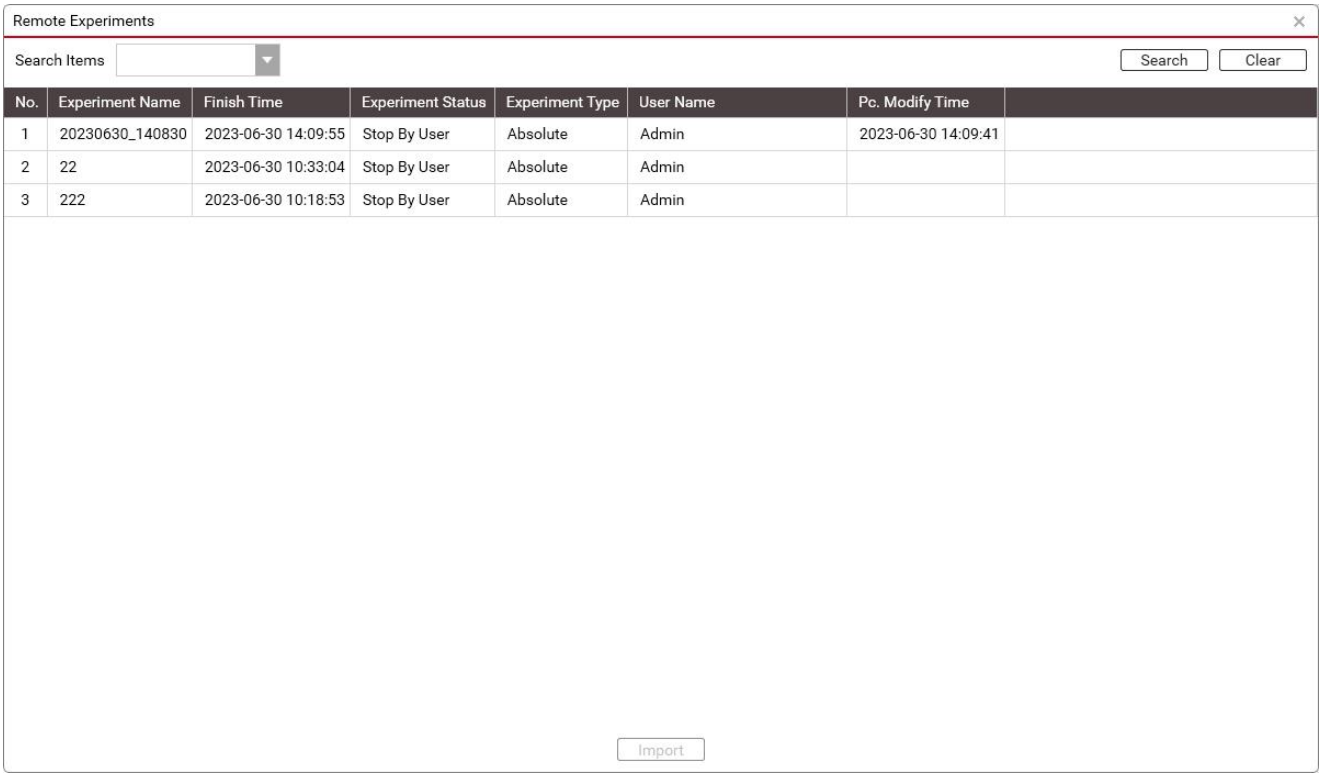


7.5.5 Show running experiment

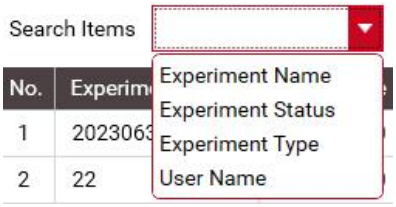
When the instrument is running an experiment, click this button to quickly jump to the running experiment interface.

7.5.6 View instrument-side experiment files

Jump to the instrument-side experiment file library to view the list of experiment files:



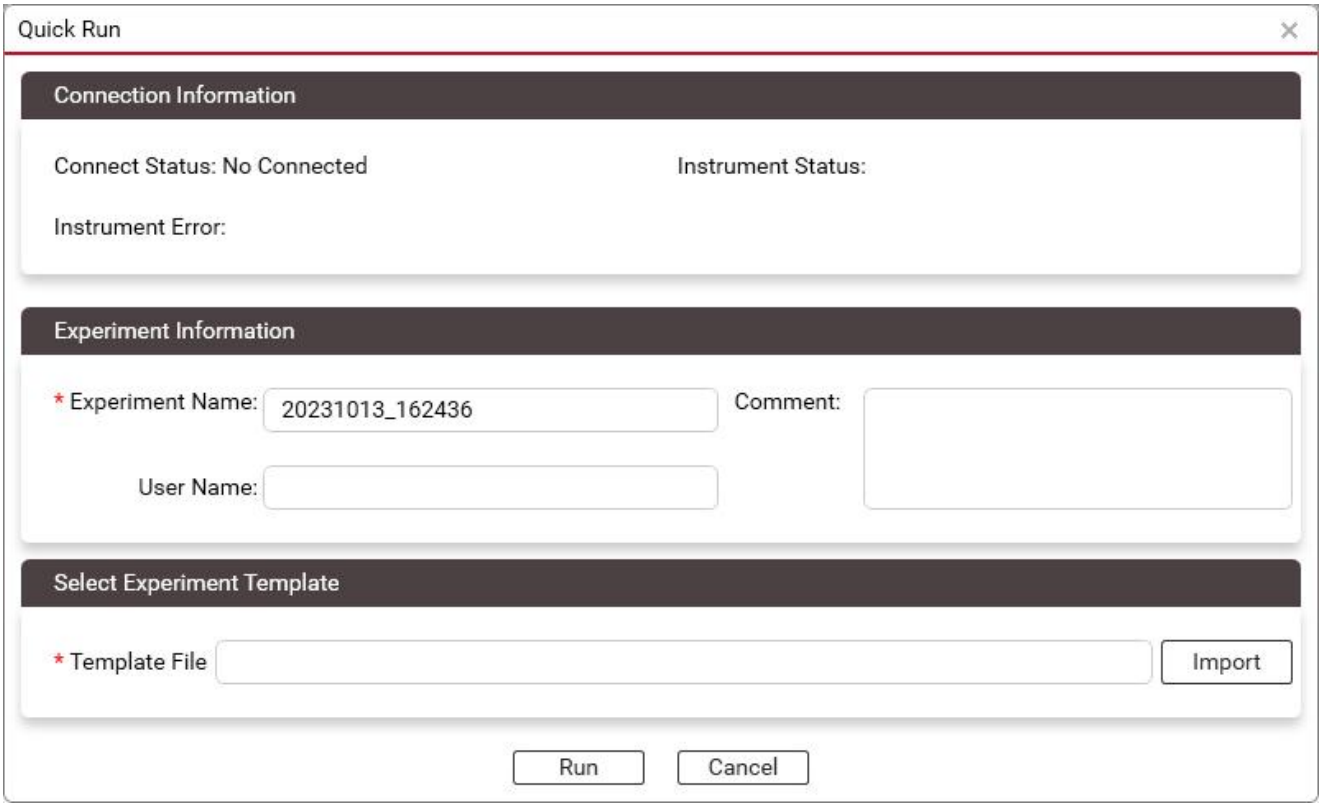
The user can search by experiment name, experiment status, experiment type and user name. After searching, select the required file, and then import the selected experiment file from the instrument to the PC.



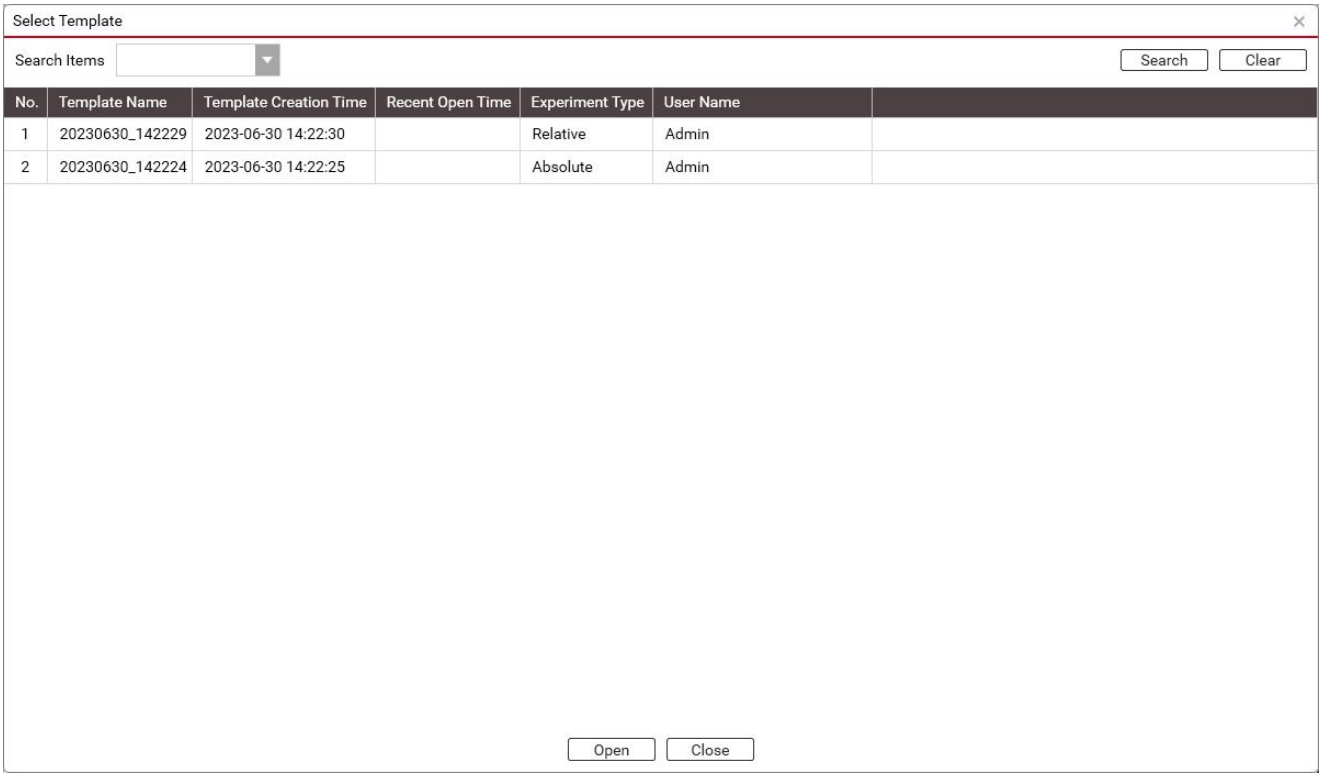
7.5.7 Quick run

In the controllable state of the online instrument, and the template file has been stored in the template library (the plate information has been set), you can quickly create an experiment and start the run through the “Quick run” button.

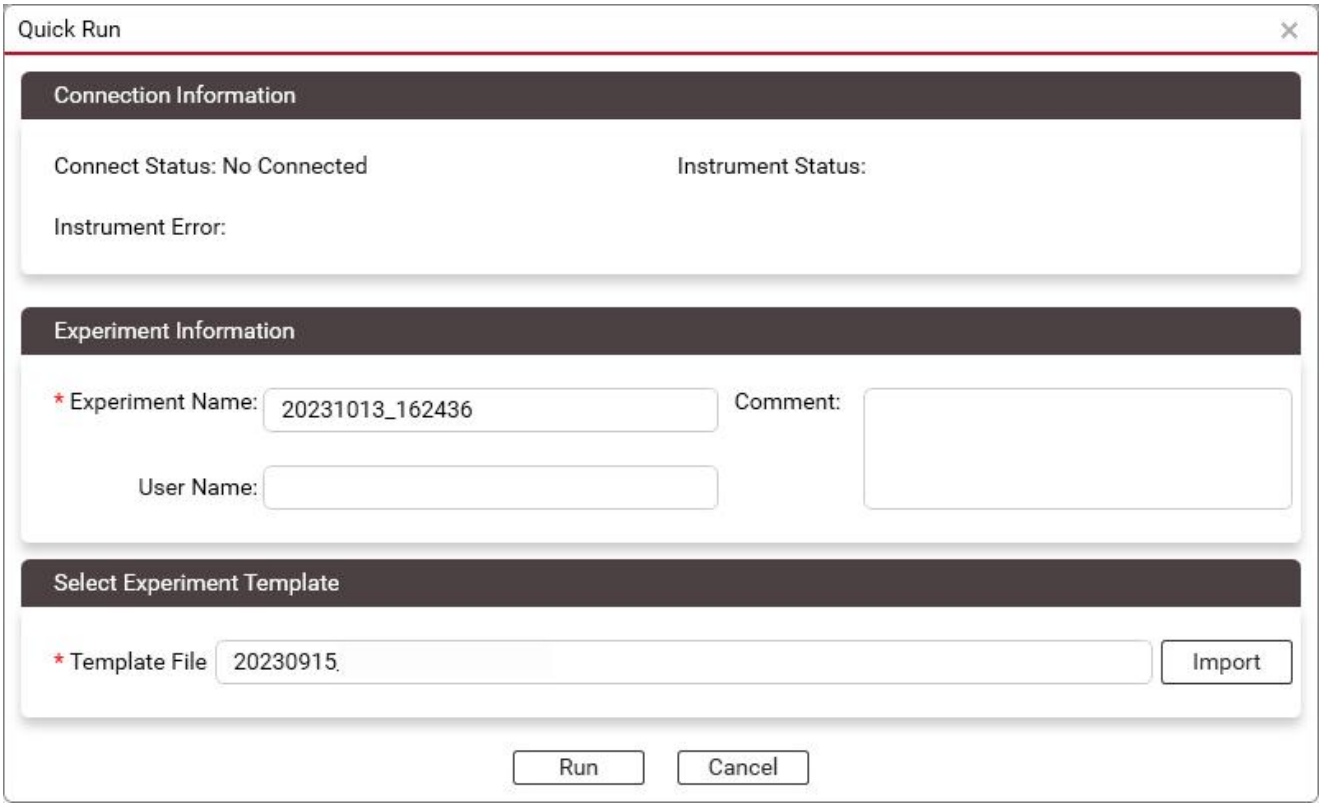
The "Quick Run" under the instrument in the top menu has the same function as the shortcut key "Quick Run" on the main interface. Click to jump to the "Quick Run" interface, where you can edit the basic information of the experiment and click to import the template:



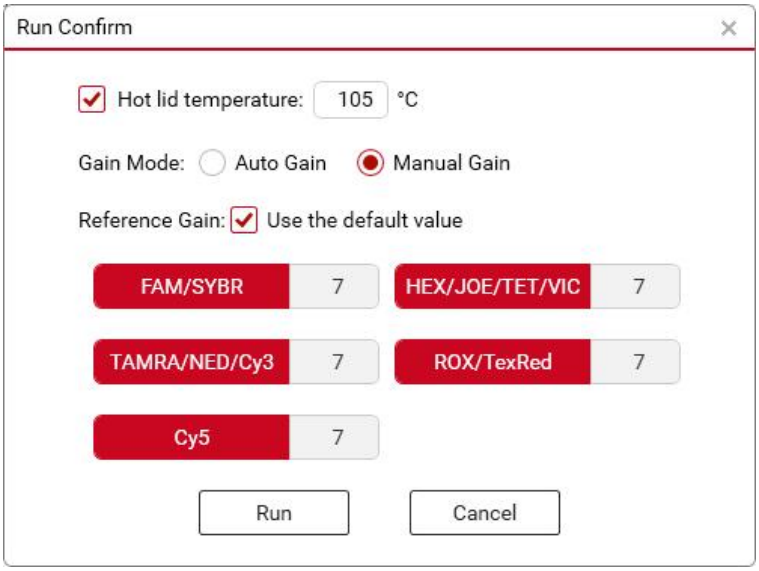
Select the file in the template library and open it:



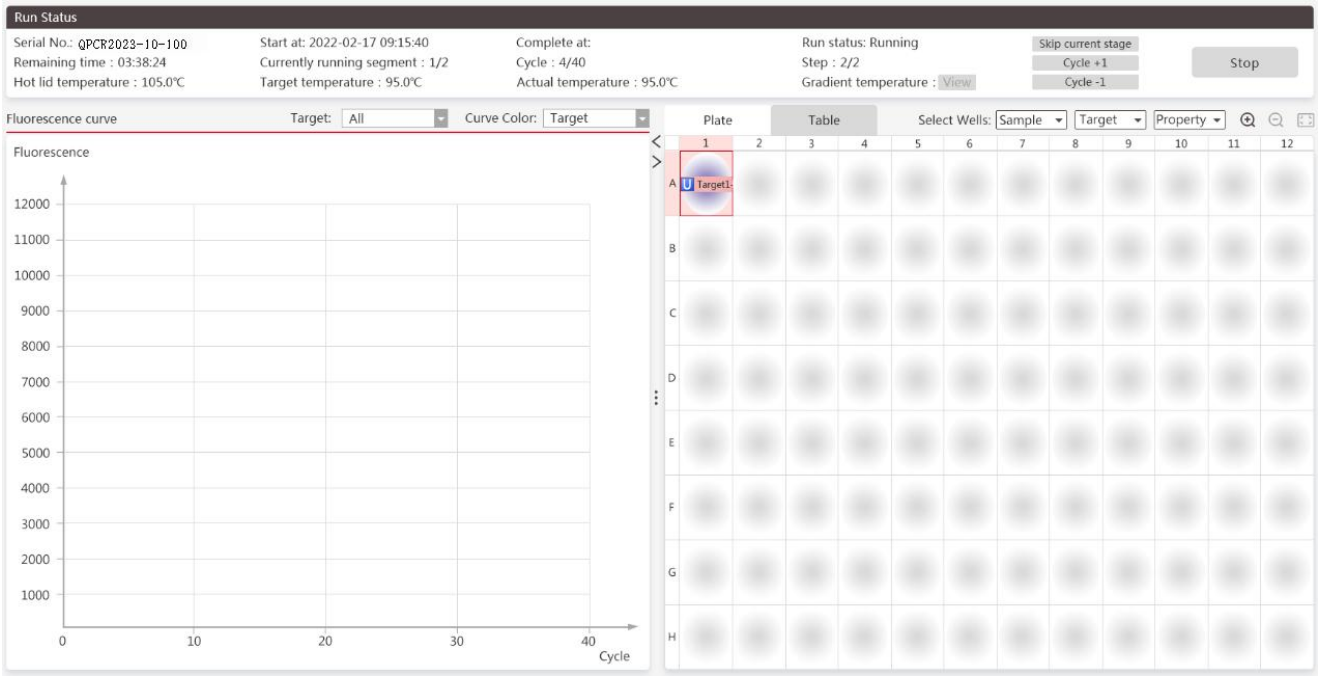
After confirming, click to start running:



Confirmation of running parameters:



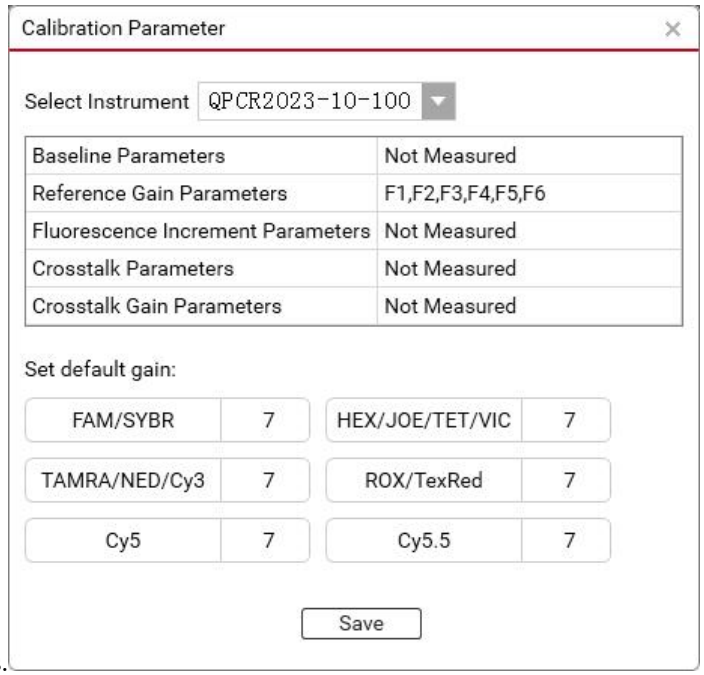
After confirming, click "Run" to enter the experiment running interface:



7.5.8 Calibration

7.5.8.1 Calibration instrument

The user can view the calibration status data, gain values and other information of the online



instruments.

7.5.8.2 Baseline calibration

Instrument→Calibration→Baseline Calibration→Refer to the contents in "7.2.1" to set relevant information as required and run the experiment. After the operation is completed, the baseline calibration data of the online instrument will be output.

- **Only administrator can have this function.**
- **This function can be selected only when the online instrument is in idle state, and the calibration experiment cannot be resumed if power failure and recovered.**
- **If the calibration procedure is not completed normally, the current calibration will be invalid and the calibration data will not be saved.**

7.5.8.3 Reference gain calibration

Instrument-Calibration-Reference Gain Calibration-Refer to the "7.2.1 " to set relevant information and run the experiment as required. After the operation is completed, the reference gain calibration data of the online instrument will be output.

- **Only administrator can have this function.**
- **This function can be selected only when the online instrument is in idle state, and the calibration experiment cannot be resumed if power failure and recovered.**
- **If the calibration procedure is not completed normally, the current calibration will be invalid and the**

calibration data will not be saved.

7.5.8.4 Fluorescence increment calibration

Instrument-Calibration-Fluorescence Increment Calibration-Refer to the "7.2.1 " to set relevant information and run the experiment as required. After the operation is completed, the fluorescence incremental calibration data of the online instrument will be output.

- **Only administrator can have this function.**
- **This function can be selected only when the online instrument is in idle state, and the calibration experiment cannot be resumed if power failure and recovered.**
- **If the calibration procedure is not completed normally, the current calibration will be invalid and the calibration data will not be saved.**

7.5.8.5 Crosstalk calibration

Instrument-Calibration-Crosstalk Calibration-Refer to the "7.2.1 " to set relevant information and run the experiment as required. After the operation is completed, the crosstalk calibration data of the online instrument will be output.

- **Only administrator can have this function.**
- **This function can be selected only when the online instrument is in idle state, and the calibration experiment cannot be resumed if power failure and recovered.**
- **If the calibration procedure is not completed normally, the current calibration will be invalid and the calibration data will not be saved.**

7.5.8.6 Crosstalk gain calibration

Instrument-Calibration-Crosstalk Gain Calibration-Refer to the step "7.2.1 " to set relevant information and run the experiment as required. After the operation is completed, the crosstalk gain calibration data of the online instrument will be output.

- **Only administrator can have this function.**
- **This function can be selected only when the online instrument is in idle state, and the calibration experiment cannot be resumed if power failure and recovered.**
- **If the calibration procedure is not completed normally, the current calibration will be invalid and the calibration data will not be saved.**

7.6 Menu bar functions description: Analysis

7.6.1 Analysis

After the experiment is completed, click to the analysis or report column of the experiment interface, the analysis function key in the menu bar is available, and the function is the same as the analysis button of the experiment interface. For specific operations, see "7.2.4 (2) Analysis".

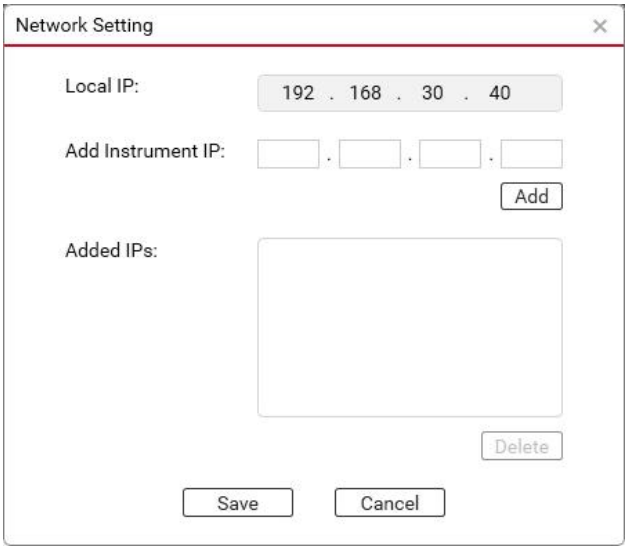
7.6.2 Analysis settings

After the experiment is completed, click to the analysis or report column of the experiment interface, the analysis setting function key of the menu bar is available, and the function is the same as the analysis setting button of the experiment interface. For specific operations, please refer to "7.2.4 (3) Analysis Settings".

7.7 Menu bar functions description: Tool

7.7.1 Network configuration checking and setting

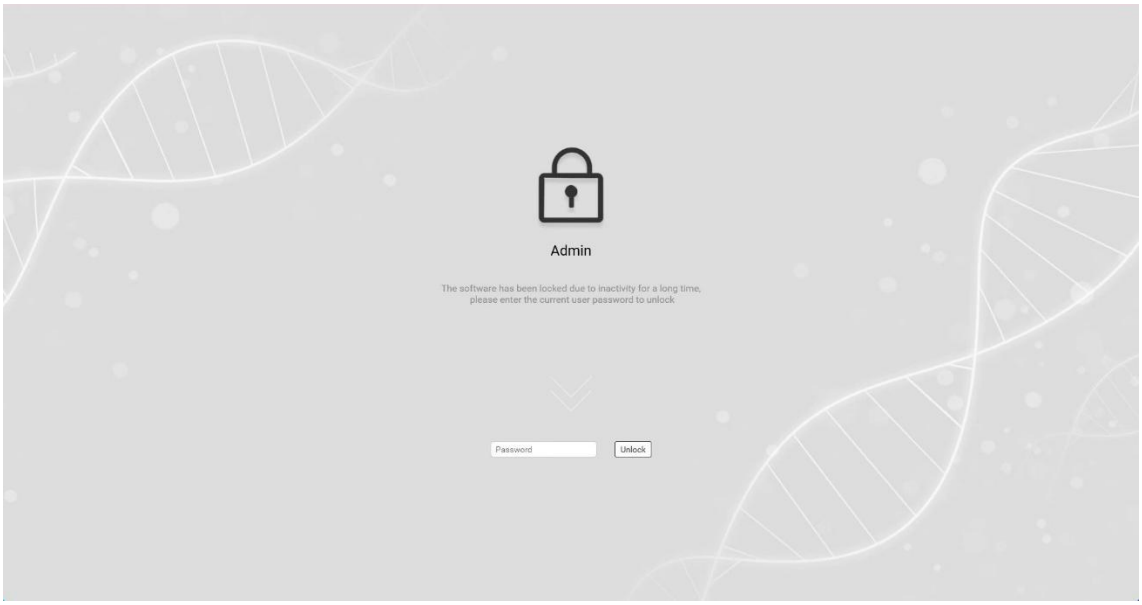
The user can view the local IP of the instrument, add the IP of the instrument, and communicate when the two are on the same network end.



7.7.2 Automatic Lock Settings

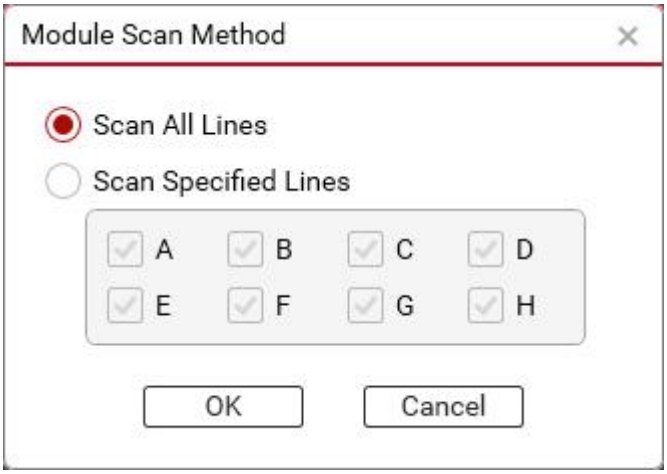
After automatic lock is enabled, you can set the automatic lock waiting time;

If you do not perform any operation within the specified time, the PC will be automatically locked and you need to re-enter the current user password to unlock the PC



7.7.3 Scan method

Select the module scan method of “Scan All Lines” or “Scan Specified Lines” (it can select any required line or multiple lines in A-H to scan, by default all lines A-H are selected and scanned)

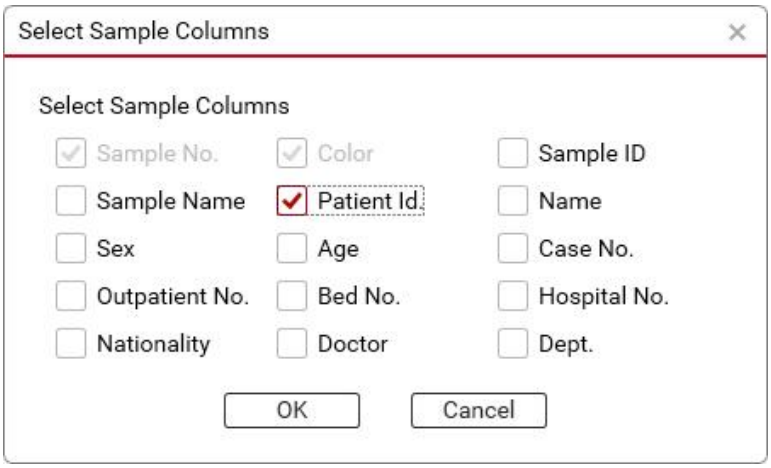


7.7.4 Run mode

Block mode or Tube mode can be set for temperature control

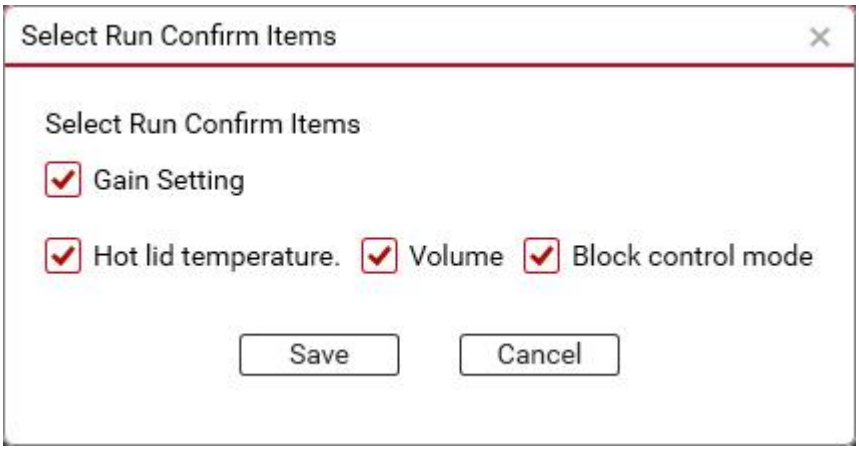
7.7.5 Sample columns

It can tick the required sample columns, among which "Sample No." and "Color" are mandatory by default.



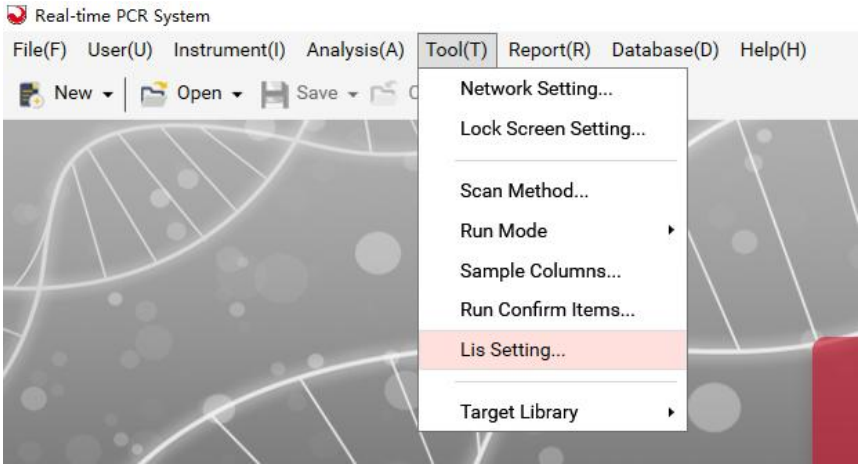
7.7.6 Run confirm Items

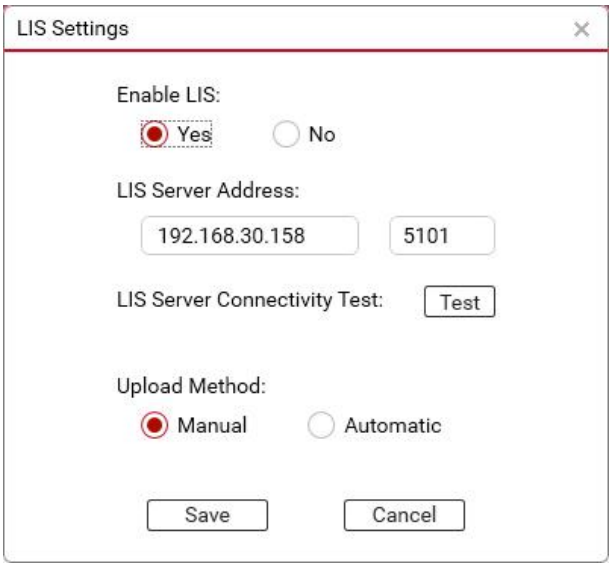
Select to confirm again the key information before running the experiment file. Before running, several ticked targets will be judged. If the information is not complete, the experiment cannot be started.



7.7.7 Lis settings

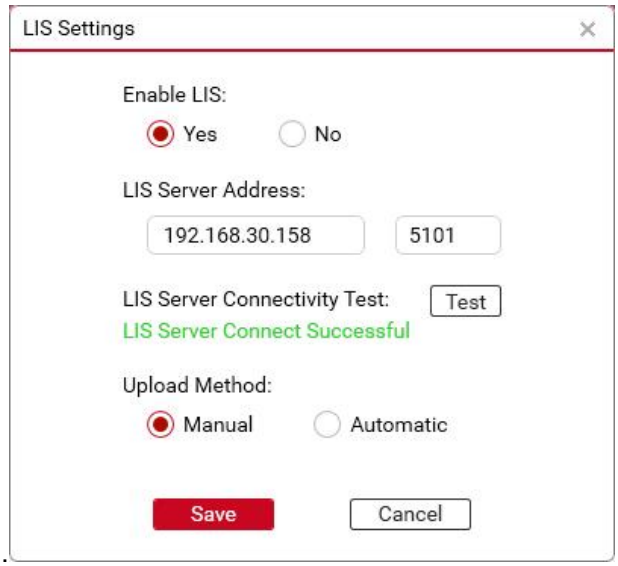
Click “Lis Settings” from “Tool” to enter into the setting interface of LIS.





Select "Yes", input the server IP address and port number in “LIS Server Address”. Click “Test”, when “LIS Server Connect Successful” appears, it means the connection is successful.

There has two data uploading methods, one is “Manual” upload and another is “Automatic” upload. After selection, click the “Save” button when the connection is successful.



.

If “Automatic” upload is selected, then

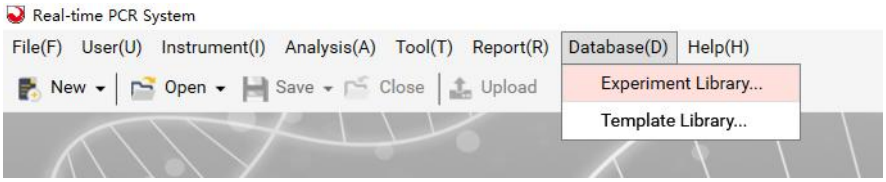
a) The instrument will automatically query whether all the experimental results have been uploaded to the LIS system when booting, and will upload the data automatically if there is any unsent data until all the data has been uploaded. (Note: Only those experiments completed or imported into PC when LIS automatic upload function is turned on, will be entered to the automatic upload queue, and the history experimental files will not be automatically uploaded).

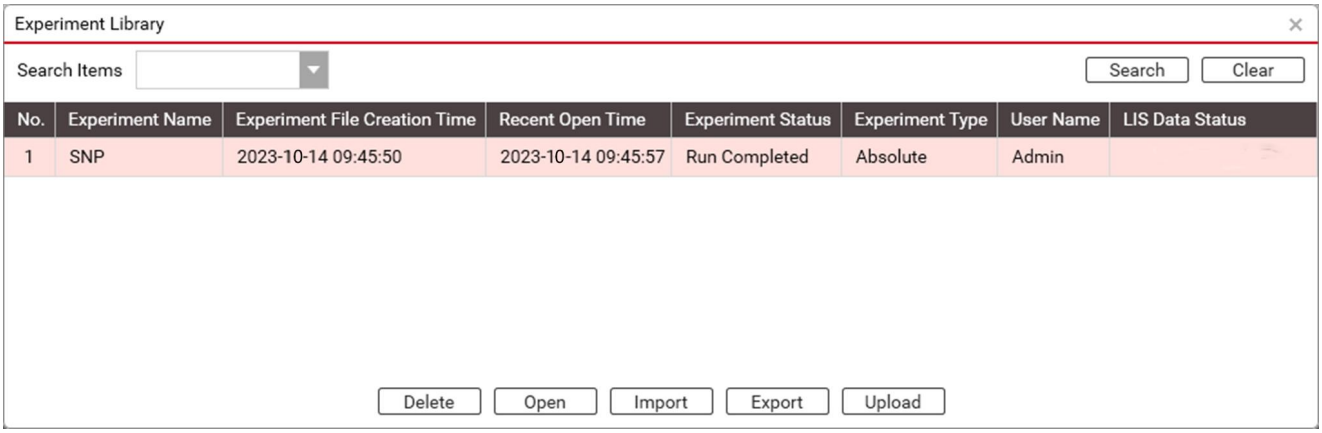
b) If the data upload fails, the machine will try to upload again every 30 minutes until all data uploads completed.

c) When the machine is connected to the PC online, the data needs to be uploaded automatically after the experiment is finished and the automatic analysis results are produced.

d) After PC synchronizes the experimental files from the instrument, the instrument will check whether the synchronized experimental files contain the analysis results. If not, it will need user manually analyzes the results and record them in the experimental files. After having the experimental results, the machine will check whether the data has been uploaded. If not, it will upload automatically.

If “Manual” upload is selected, user can click “ Database” and select to enter into the “Experiment Library”. The user can select one or more experimental data and click “Upload” to transfer to LIS system. Note: only the data under the "Run Completed" state can be transferred to LIS, and other states are not allowed.

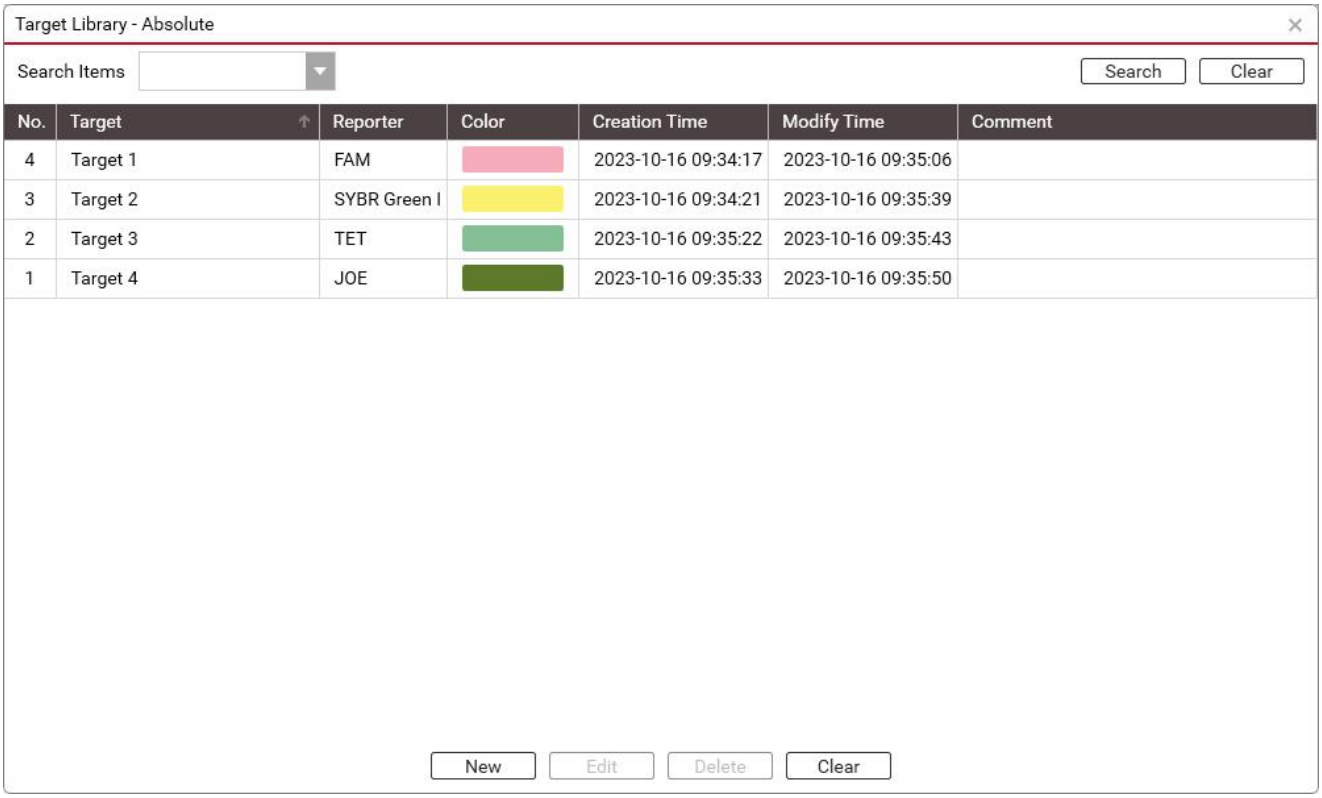




After uploading, user can view the experimental data in the LIS system.

7.7.8 Target library

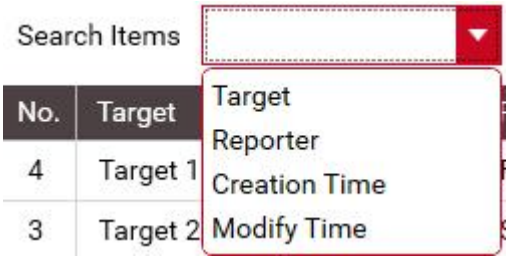
Create, edit, delete and clear the targets files of four kinds of experiments: "Absolute ", "Relative ", "SNP" and "HRM".



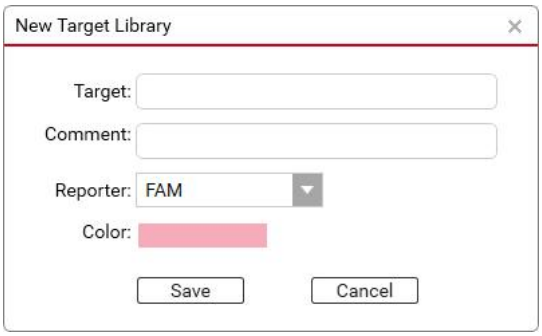
(1) Sort: Click the header of the list to sort the corresponding tests

No.	Target	Reporter	Color	Creation Time	Modify Time	Comment
4	Target 1	FAM		2023-10-16 09:34:17	2023-10-16 09:35:06	
3	Target 2	SYBR Green I		2023-10-16 09:34:21	2023-10-16 09:35:39	
2	Target 3	TET		2023-10-16 09:35:22	2023-10-16 09:35:43	
1	Target 4	JOE		2023-10-16 09:35:33	2023-10-16 09:35:50	

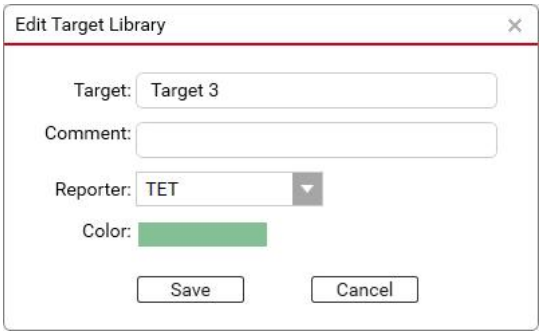
(2) Search: search by Creation Time, Target, Reporter and Modify Time



(3) New: create a new target



(4) Edit: Edit the selected target



(5) Delete: delete the selected target (multiple targets can be deleted at the same time)

(6) Clear: delete all targets

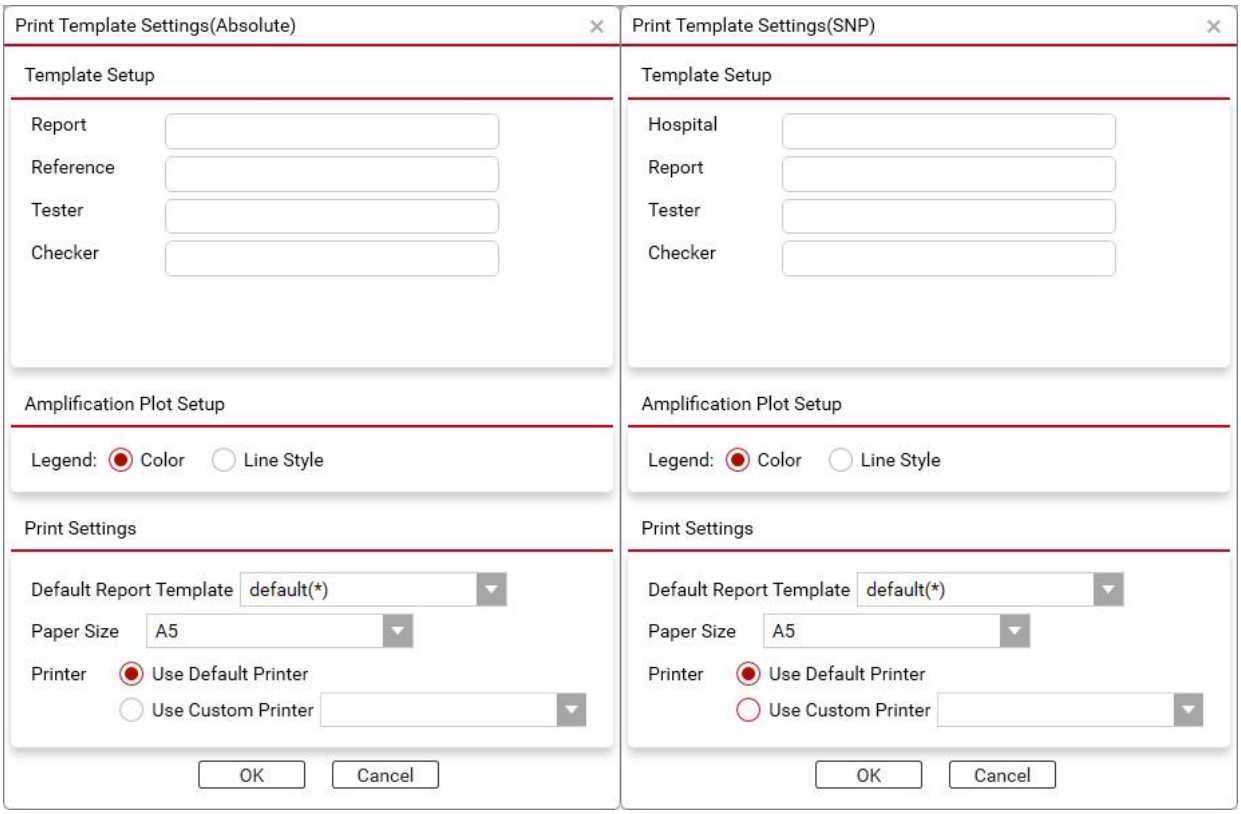
7.8 Menu bar functions description: Report

7.8.1 Select default template

The default print report for absolute and SNP type experiments can be selected, and the report format can be previewed.

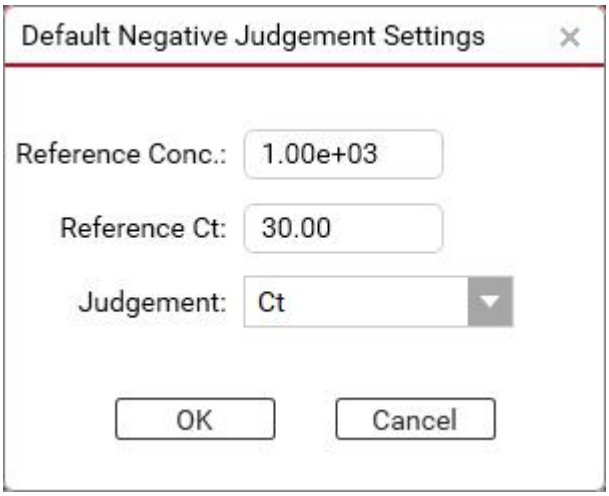
7.8.2 Print template

It can set the manual editing items for printing report template of the absolute and SNP type experiment, and select the printing paper and printer.



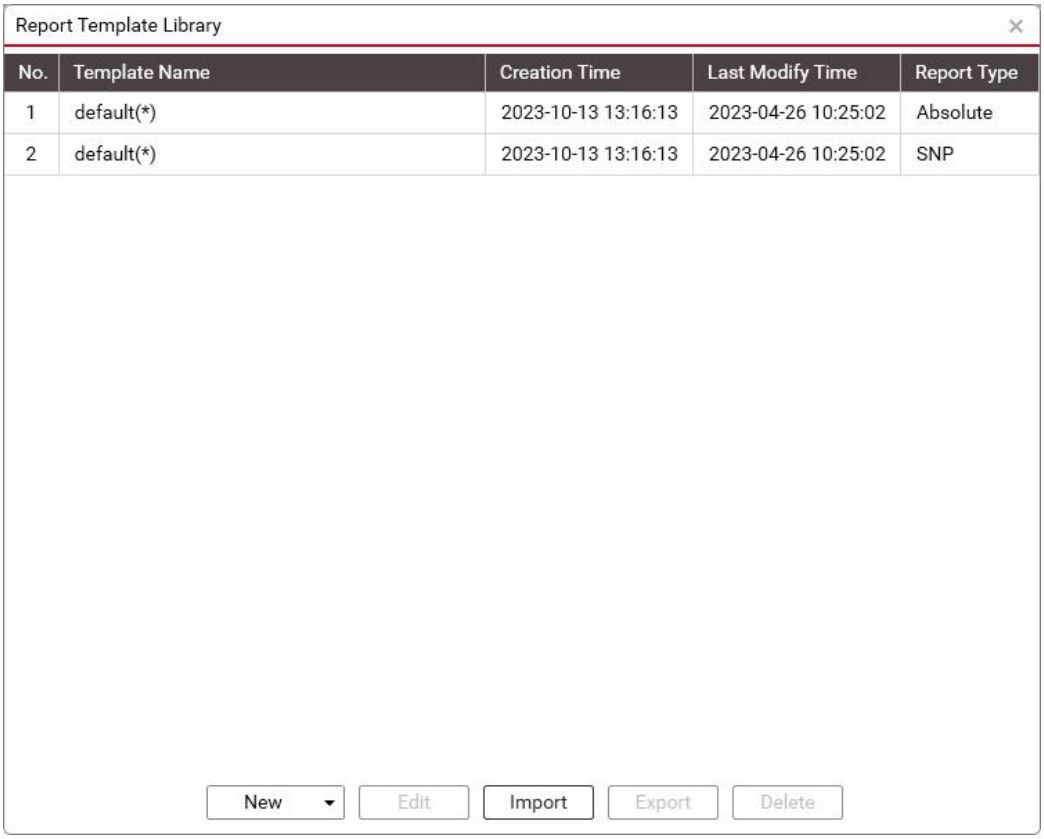
7.8.3 Default negative judgment

Set the default negative judgment parameters



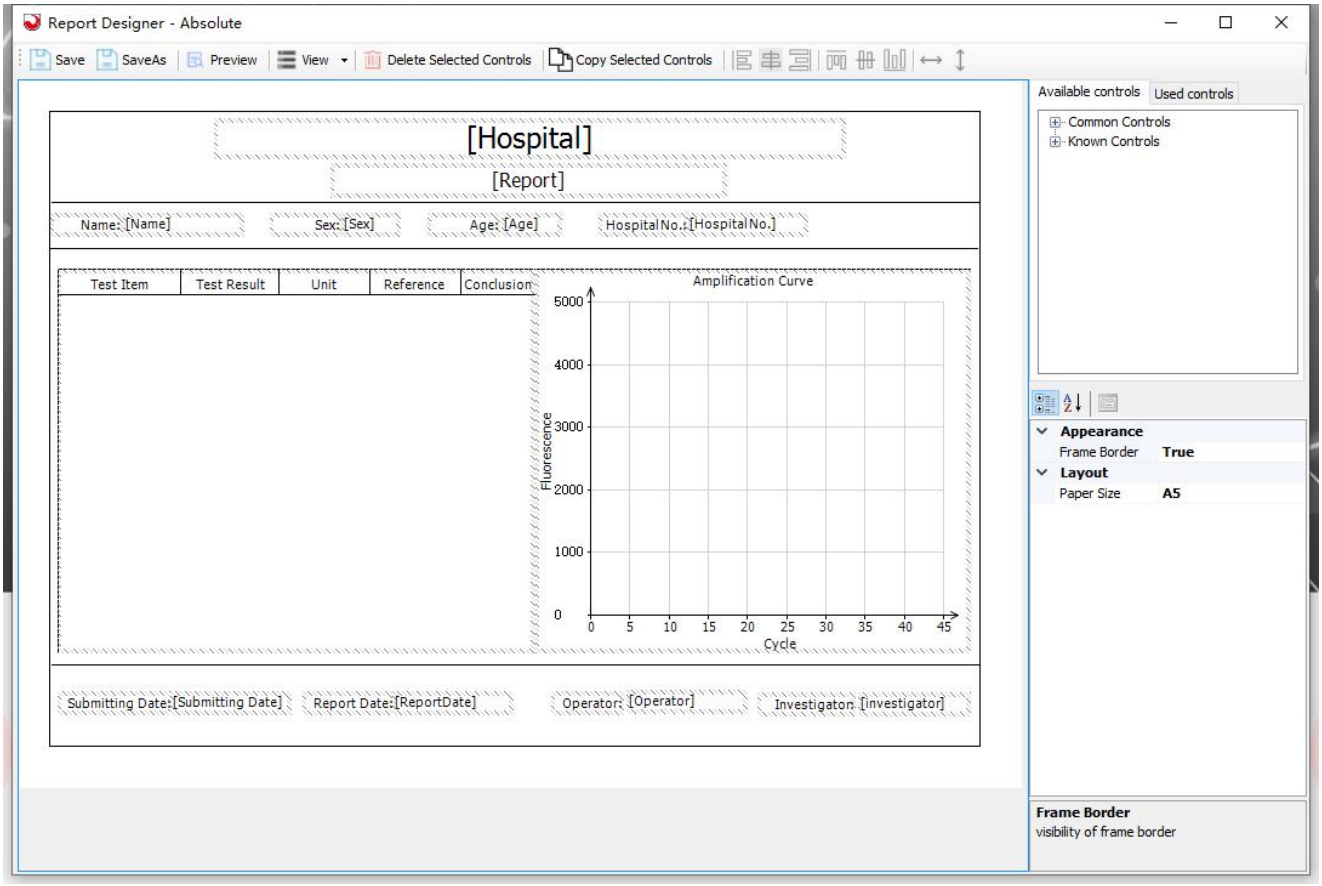
7.8.4 Report template library

Management of the report template library. It displays the list all report templates, and can create a new template, edit the existing template, import a template, export the template and delete templates.

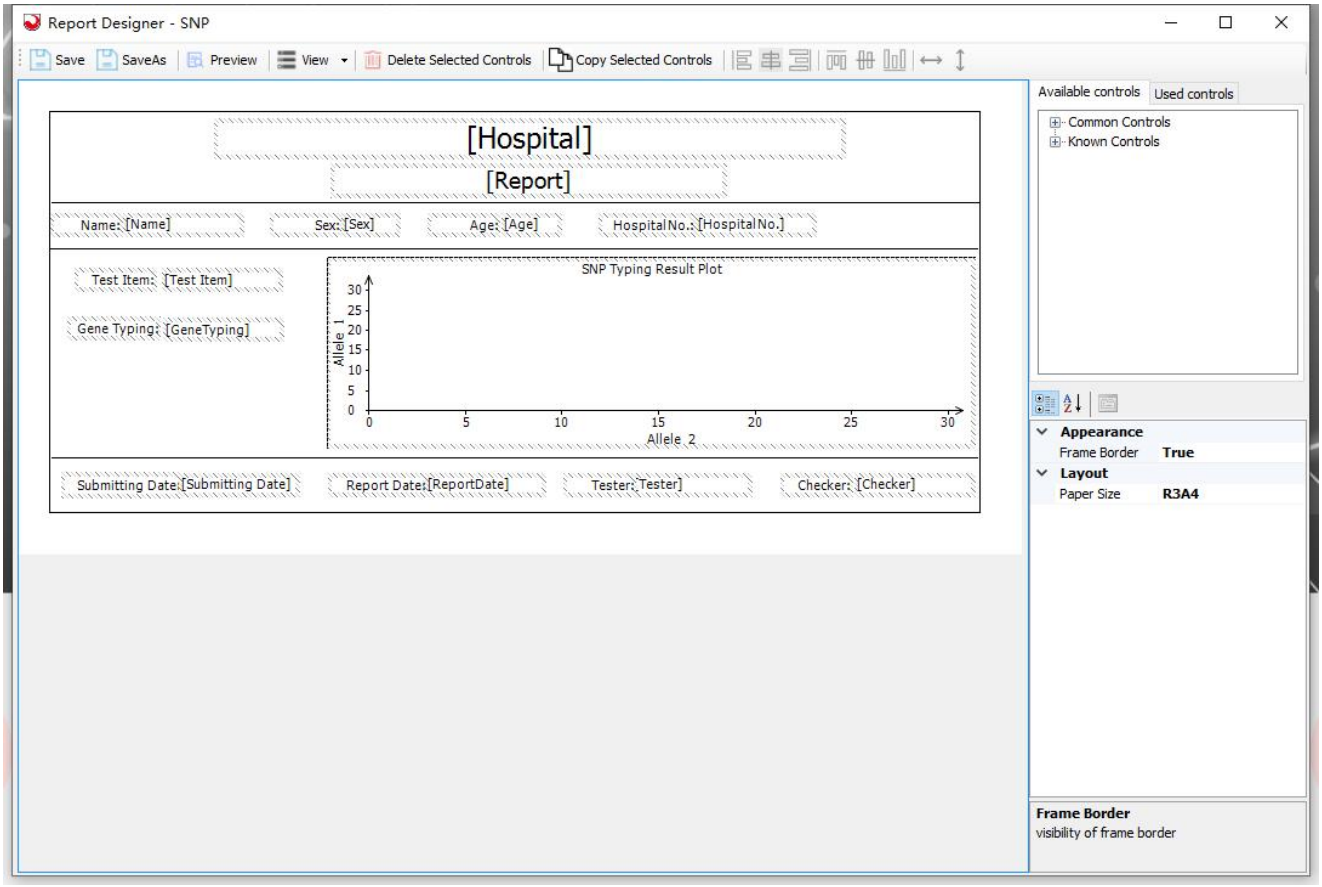


(1) New: for absolute quantification and SNP only, it can create a new absolute or SNP report from the drop-down box.

a) Designer of absolute report template:



b) Designer of SNP report template



(2) Edit: to edit the selected report template, the interface is the same as “New”.

(3) Import : import report template file from outside, the supported file format is .rpt.exp.

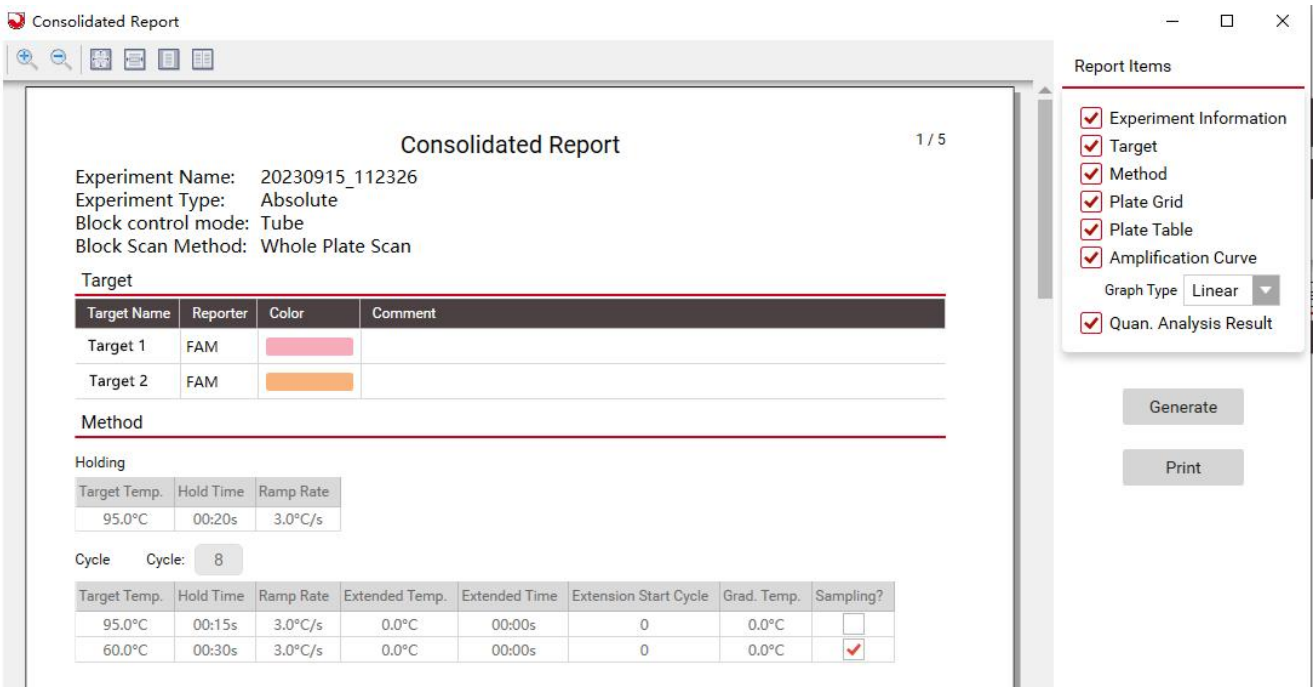
(4) Export: export the selected report template, and the exported file format is .rpt.exp.

(5) Delete: delete the selected report template.

7.8.5 Consolidated reports

Open the experiment file that has been run and click "Consolidated Report" to view and print the consolidated report of the experimental results (the report will take some time to generate, please wait patiently).

(1) Generate report: The user can set the report items in the "Report Items" on the right side. After resetting each time, click "Generate" to regenerate a consolidated report again (the default report contains all report items when entering):

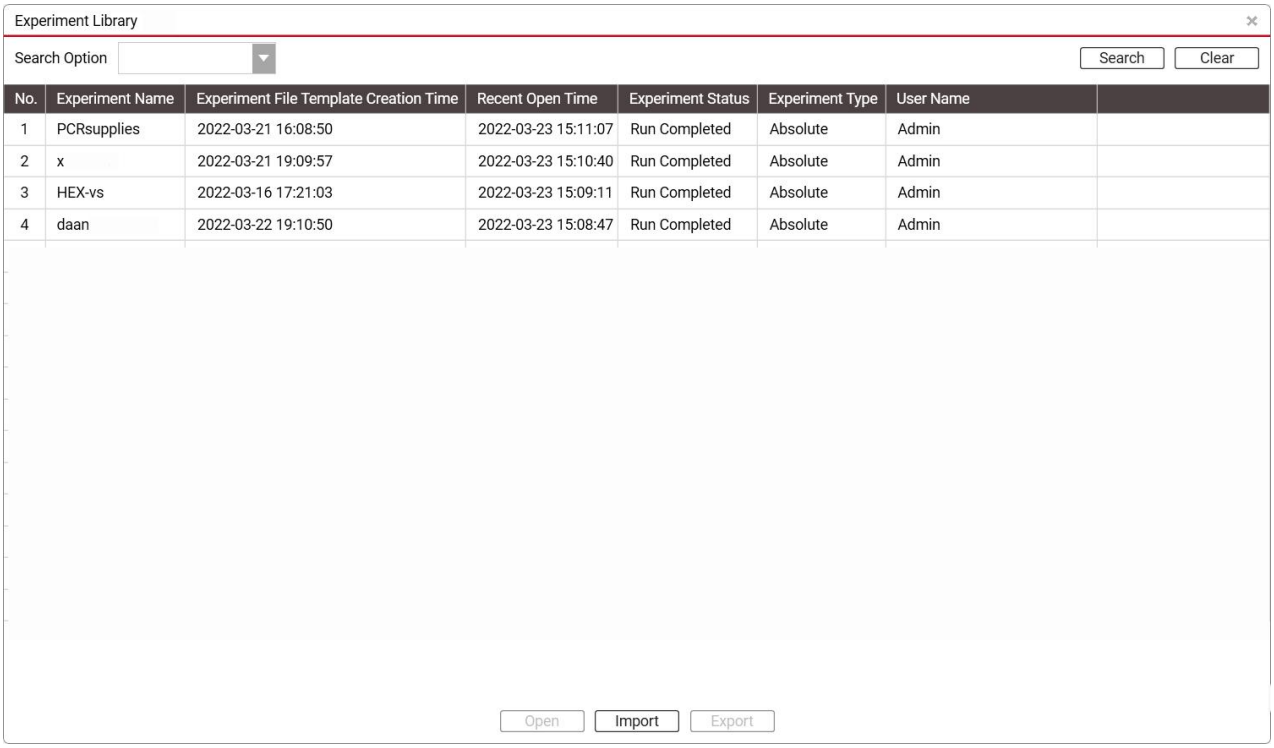


(2) Print: it will use the computer's print settings to print the generated report.

7.9 Menu bar functions description: Database

7.9.1 Experiment library

The user can view experiment file library, and at the same time sort, search, open, import, and export them.



(1) Sorting: Same as the sorting operation of 7.3.2;

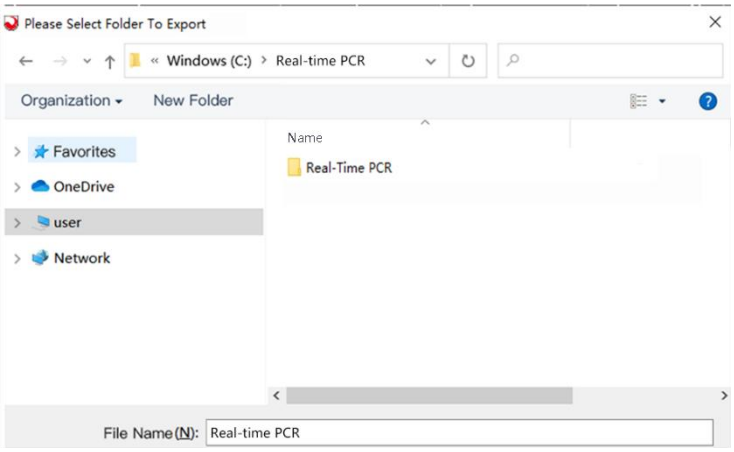
(2) Search: Same as the search operation in 7.3.2;

(3) Delete: delete the selected experiment file. The user needs to confirm again before deleting;

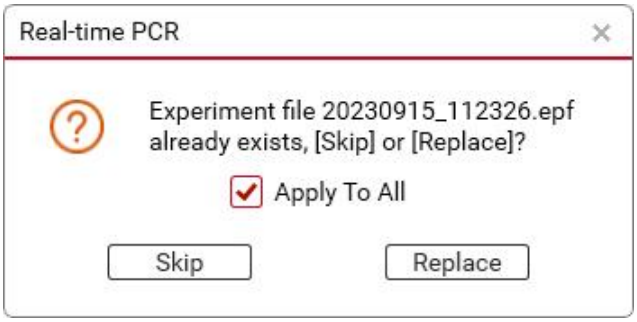
(4) Open: Same as the search operation in 7.3.2;

(5) Import: Same as the import operation in 7.3.4;

(6) Export: Select one or use the shift + ctrl keys of the keyboard to select multiple files. Click export, and select the target folder to export the data to the target directory:

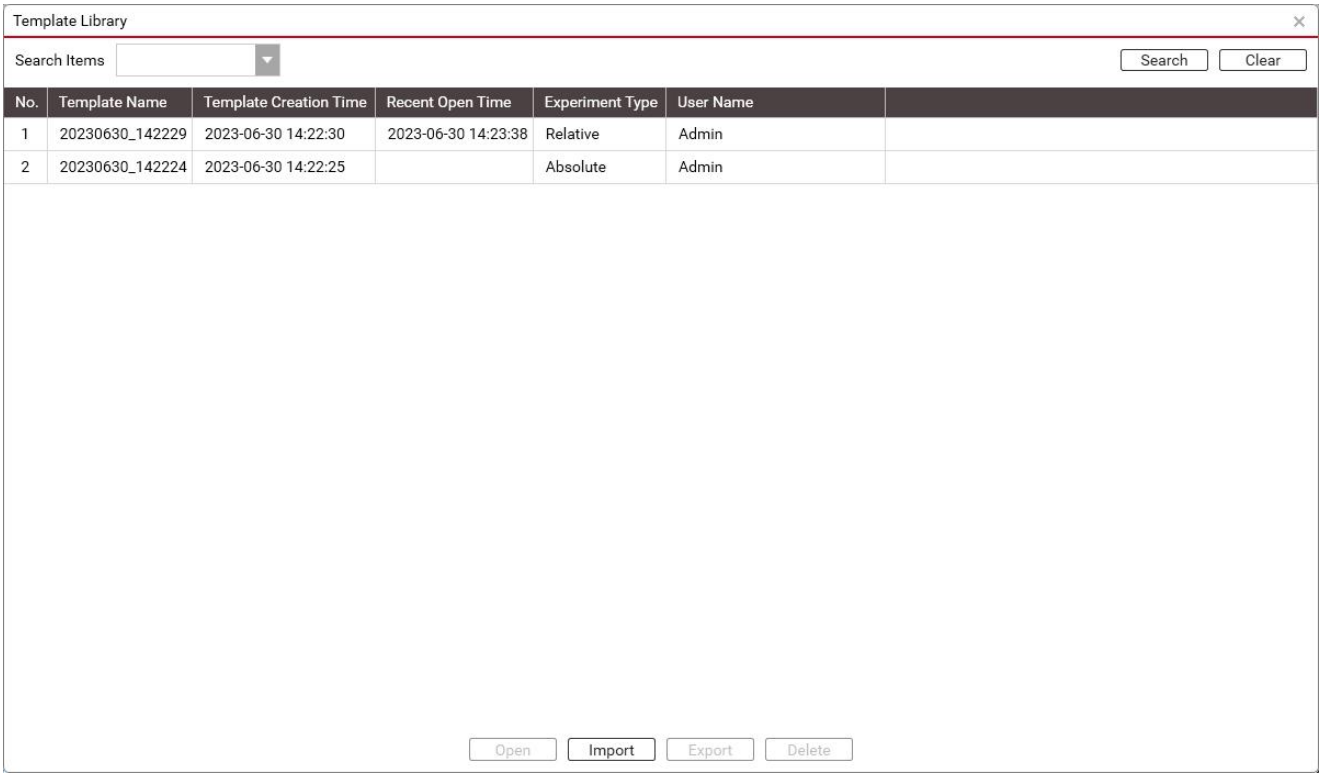


If the selected file(s) to be exported already exist(s) in the target directory, the user can skip or overwrite.



7.9.2 Template library

The user can view template file library, and at the same time sort, search, open, import, export and delete them.



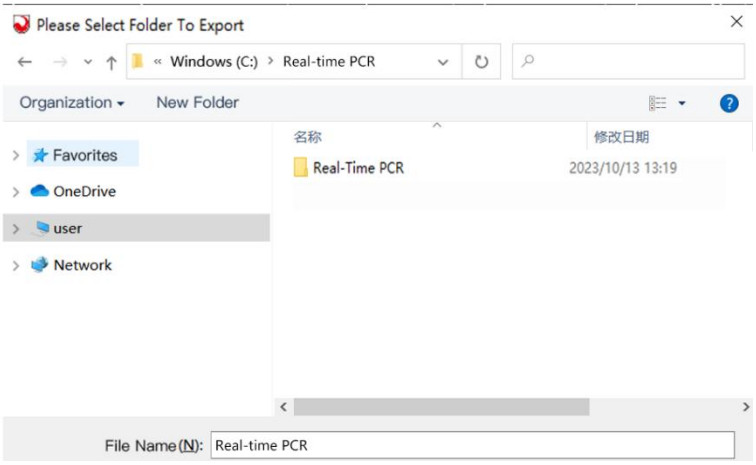
(1) Sorting: same as the sorting operation of 7.3.3;

(2) Search: same as the search operation in 7.3.3

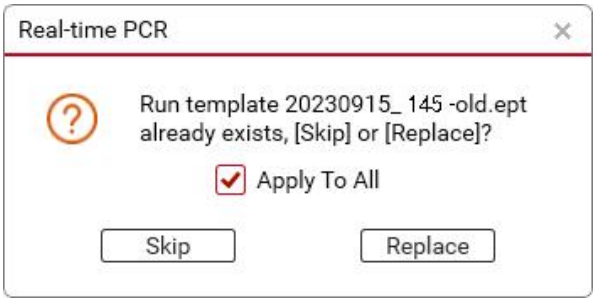
(3) Open: same as the search operation in 7.3.3;

(4) Import: same as the import operation in 7.3.5;

(5) Export: select one or use the shift + ctrl keys of the keyboard to select multiple files, click “Export”, and select the target folder to export the data.



If the selected file(s) to be exported already exist(s) in the target folder, the user can skip or overwrite.



(6) Delete: delete the selected template file. The user needs to confirm again before deleting.

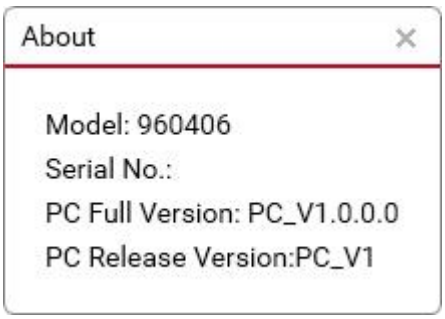
7.10 Menu bar functions description: Help

7.10.1 Documentation

The user can consult the software and the operating manual matched with the instrument. Before using the instrument, the novice can view the operation process in the "Documentation". This process can help the user quickly become familiar with the experimental operation.

7.10.2 About

The user can view information such as instrument model, serial number, PC full version and PC release version.



Chapter 8 Instrument maintenance

 **Warning**	■ Turn off the instrument and unplug the power cord before cleaning the instrument. Failure to turn off the power may result in electric shock. ■ Samples may be attached to the outer surface of the instrument or inside the well block, so please wear protective gloves or use other protective measures when performing instrument maintenance.

8.1 Instrument cleaning

 **Warning**	■ When cleaning the conical holes of the block, it is strictly forbidden to drip the cleaning agent into the hole. ■ It is strictly forbidden to clean the surface of the instrument with corrosive cleaning agents. If there are doubts about the compatibility between the disinfectant or cleaning agent and the equipment components or materials contained in the equipment, please consult the manufacturer or its representative. ■ It is forbidden to use any sharp and hard object reaching into the well of block to avoid scratching or damaging the optical components inside.

8.1.1 Cleaning of instrument shell

If the surface of the instrument is splashed with contaminants, please use a dust-free cloth dipped in 75% ethanol to wipe the surface of the instrument, and wipe back and forth twice each time.

8.1.2 Cleaning the block wells of instrument

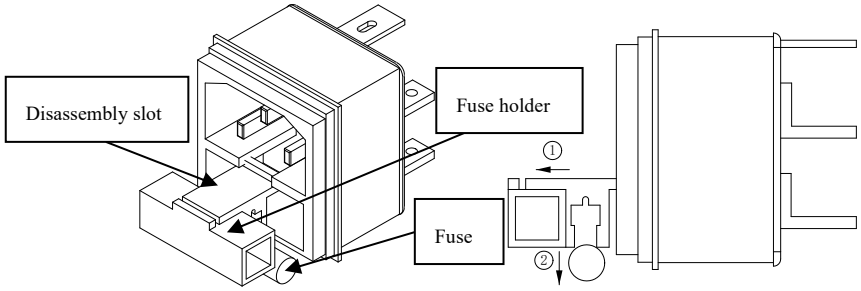
If liquid or other contaminants enter the block well , please use a medical cotton swab soaked in 75% ethanol and put it into the block well and gently rotate it 5-10 times, cleaning 3 times each time.

8.2 Routine maintenance

Routine maintenance includes but is not limited to the following:

- Check regularly whether the operating environment and placement of the instrument comply with the requirements in chapters 1.2.2 and 2.3.Run the experiment regularly to avoid the instrument not being turned on for a long time.
- Clean regularly according to the method in chapter 8.1.

8.3 Fuse replacement



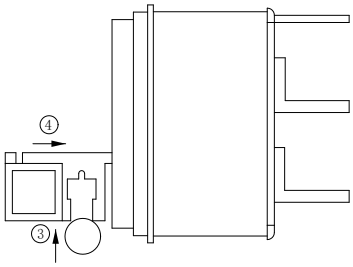


Figure 8-1 Figure 8-2 Figure 8-3

When the fuse is damaged, the user can replace the fuse as follows:

(1) As shown in Figure 8-1, use a flat-blade screwdriver (or other objects) to insert into the disassembly slot. Move in the direction of arrow①, and remove the fuse holder.

(2) As shown in Figure 8-2, remove the fuse in the direction of arrow ②.

(3) As shown in Figure 8-3, in the direction of arrow ③, press the new fuse into the slot

(4) As shown in Figure 8-3, in the direction of arrow④, press the fuse holder into the power holder to complete the installation.

Warning The user must turn off the power and unplug the power cord before replacing the fuse.

Chapter 9 Fault analysis and troubleshooting

There are alarm signals and failures. Please refer to the corresponding methods for troubleshooting.

Alarm signal/instrument failure	Cause analysis	Solution
Error01: In-out motor abnormal. Please contact after-sales personnel for overhaul.	Instrument failure.	Please contact the supplier or manufacturer.
Error02: Up-down motor abnormal. Please contact after-sales personnel for overhaul.	Instrument failure.	Please contact the supplier or manufacturer.
Error03: X axis motor abnormal. Please contact after-sales personnel for overhaul.	Instrument failure.	Please contact the supplier or manufacturer.
Error04: Y axis motor abnormal. Please contact after-sales personnel for overhaul.	Instrument failure.	Please contact the supplier or manufacturer.
Error05: Circular channel motor abnormal. Please contact after-sales personnel for overhaul.	Instrument failure.	Please contact the supplier or manufacturer.
Error06: Fluorescence detection abnormal.	1. Instrument failure. 2. Fluorescence signal is too low, no test tube or empty tube may be placed.	1. Please contact the supplier or manufacturer. 2. Check whether the plate placement is consistent with the plate layout in the program.
Error07: Module temperature sensor short/open circuit. Please contact after-sales personnel for overhaul.	Instrument failure.	Please contact the supplier or manufacturer.
Error08: Module heating function abnormal. Please contact after-sales personnel for overhaul.	Instrument failure.	Please contact the supplier or manufacturer.
Error09: Module cooling function abnormal. Please contact the after-sales personnel for overhaul.	Instrument failure.	Please contact the supplier or manufacturer.
Error10: Hot-lid temperature sensor short/open circuit. Please contact after-sales personnel for	Instrument failure.	Please contact the supplier or manufacturer.

overhaul.		
Error11: Hot-lid heating function Abnormal. Please contact after-sales personnel for overhaul.	Instrument failure.	Please contact the supplier or manufacturer.
Error12: Radiator temperature sensor short/open circuit. Please contact after-sales personnel for overhaul.	Instrument failure.	Please contact the supplier or manufacturer.
Error13: The heat dissipation function of the radiator is abnormal. Please contact after-sales personnel for overhaul.	Instrument failure.	Please contact the supplier or manufacturer.
Error14: |The module is unplugged, and the experimental data is invalid.	The block is pulled out during runtime.	Check the module status, relocate the sample and restart the experiment
Error15: The firmware upgrade failed. Please upgrade again!	1. The power is cut off 2. The PC is disconnected from the instrument terminal.	1. Power on and start online again. 2. Reconnect.
Error16: Communication failure of Firmware!	1. Communication data error. 2. Instrument failure.	1. Reconnect. 2. Please contact the supplier or manufacturer.
Error17: Instrument disconnected!	Instrument on-line disconnection.	Reconnect.

Warning Before maintenance, the power must be turned off and the power cord must be unplugged.

Non-maintenance personnel are prohibited from dismantling the instrument without authorization.

Chapter 10 Emergency

10.1 Emergency handling

If there is any abnormality when operating the instrument, such as liquid splashing inside the instrument, please follow the steps below:

- Press the standby button in front of the instrument, turn off the instrument.
- Unplug the power immediately.
- Take appropriate corrective actions, such as a soft cloth dipped in 75% alcohol will be sputtered liquid wipe clean, but do not disassemble the instrument.
- If the measures are invalid, please contact our company.