User's Manual to the Dhelix-Q5 Isothermal Fluorescence PCR Detection System

（Product Model：Dhelix-Q5）

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Introduction

Dear users,

Thank you for purchasing this Dhelix-Q5 Isothermal Fluorescence PCR Detection System launched by Guangzhou Double Helix Gene Technology Co., Ltd., whose Ronda R1 Constant Temperature Fluorescent Molecular Detection Reagent can be fully applied to detect the biological factors on food safety, and the test results are presented to the users directly and accurately with its fastest speed and accurate accuracy. Some technical features are as follows:

1. Simpler

Real-time Fluorescence Detection, Catching Each Signal

Dhelix-Q5 applies real-time fluorescence detection to record the signals released in the whole process in real time to gain the most objective results for judging. Meanwhile, cross-contamination is avoided owing to its closed-tube detection.

Easy to Operate

The touch screen operating system provides you with the most comfortable operation. The test results are easy to understand through only four steps.

2. Faster

High Throughput

Fourteen samples as well as five items can be detected simultaneously in a single experiment.

Fast

Positive results can be detested within 15 minutes while the negative results within 60 minutes.

3. More Professional

Intelligent System, the Smartest Assistant in Your Lab

Separate System, Screen Operation: the instrument can be served the storage, export, analysis, statistics and report associated with its data, connected to the computer, which can be operated with its exclusive detection and analysis software.

The exclusive Shiantong built-in system is able to apply national regulations and standards at anytime and anywhere

Precautions

The Dhelix products are safe and reliable. If used correctly (in accordance with the text shown) and in full compliance with the following precautions, it will not cause any harm to humans. The users must be aware of the hazards that may be caused by the instrument and its accessories.

Warning: Failure to obey the follows may lead to incidents!

Warning: It is forbidden to open the cover during the operation of the instrument, which is likely to cause misjudgment of the test results and whose laser may injure users' eyes.

Warning: Do not use the instrument around sites with flammable or explosive gas.

Warning: Do not touch the sample holder and the heat cover after turning on/off the instrument until it cools down, or may result in burns.

Note: Failure to obey the follows may lead to damage to the instrument!

Note: This equipment is not equipped with spare parts and not allowed to be disassembled without authorization, or its warranty will be void.

Note: Care should be taken during the utilizing, storage or transportation of instrument to avoid dropping, or heavy objects are not allowed to place on the instrument and its adapter.

Note: The instrument should be placed on a horizontal, hard and stable tabletop. The distance between the front and rear vents of the instrument and the nearest item should be no less than 10 cm; it is forbidden to move the instrument during use.

Note: Do not place the instrument in an environment with extreme temperature and humidity as well as static electricity. And the instrument should be stayed away from direct sunlight when working or shutting down.

Note: Please use the instrument in a stable power supply environment. When there are

such interference devices as high-power motors in the same circuit, please use UPS or other regulated power supply.

Note: Please do not change the default settings of the instrument. Please update the software under the guidance of our technicians.

I Dhelix-Q5 Isothermal Fluorescence PCR Instrument

1.Dhelix-Q5 Isothermal Fluorescence PCR Instrument

Isothermal Fluorescence PCR Instrument (Product Model: Dhelix-Q5)

1.1 Overview to Product

【Product Name】Isothermal Fluorescence PCR Instrument

【Model specifications】Dhelix-Q5

【Scope of Application】This product is suitable for constant temperature amplification, detection and analysis of nucleic acid samples.

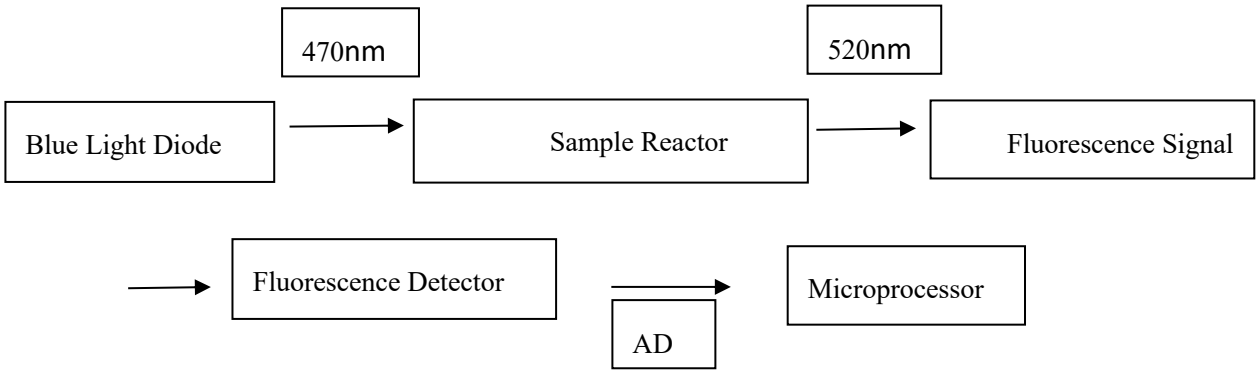
【Manufacturer and After-sales Service】Guangzhou Double Helix Gene Technology Co., Ltd.

Add: Room 302, Floor 3, Building 3, Phase 2, Standard Industrial Unit, No. 7 Luoxuan 4th Road, International Biological Island, Guangzhou, Guangdong, China

Tel: 020-85671013 Zip Code: 100081

Fax: 020-34037175 Website: http://www.dhelix.cn/

1.2 Working Principles



The nucleic acid fragment is specifically amplified under the constant temperature conditions provided by the instrument, and its amplified fragment is combined with the fluorescent dye to generate a 520nm fluorescent signal under excitation of a 470nm light. The fluorescent signal is detected by a fluorescent detector and processed by a microprocessor, and then the amplification curve is plotted as well as the negative or positive result is automatically determined based on the threshold.

1.3 Technical Parameters

(1) Sample Capacity: 16 holes

(2) Reaction Temperature: 63 ° C

(3) Detection Channel: FAM/SYBR

(4) Dimensions: length 300 mm × width 260 mm × height 150 mm

(5) Rated voltage: 19V ⎓ 6.32A

1.4 Installation and Use

(1) The rated input power of the instrument: 19V6.32A. Please use the power adapter of the instrument for power input.

(2) Optimum ambient temperature: 4~30 °C.

(3) Optimum relative humidity: 20% to 70%.

(4) Avoid sharp changes in temperature and direct sunlight.

(5) There is no strong vibration, dust, corrosive gas, strong electric field or strong magnetic field nearby.

2. Operation Process

2.1 Boot

Place the instrument stably and click the power button to start the instrument after the power is turned on. After a brief initialization and calibration of the test system, the instrument enters the experimental interface of the test software. The experimental interface is shown in Figure 2.1 below:

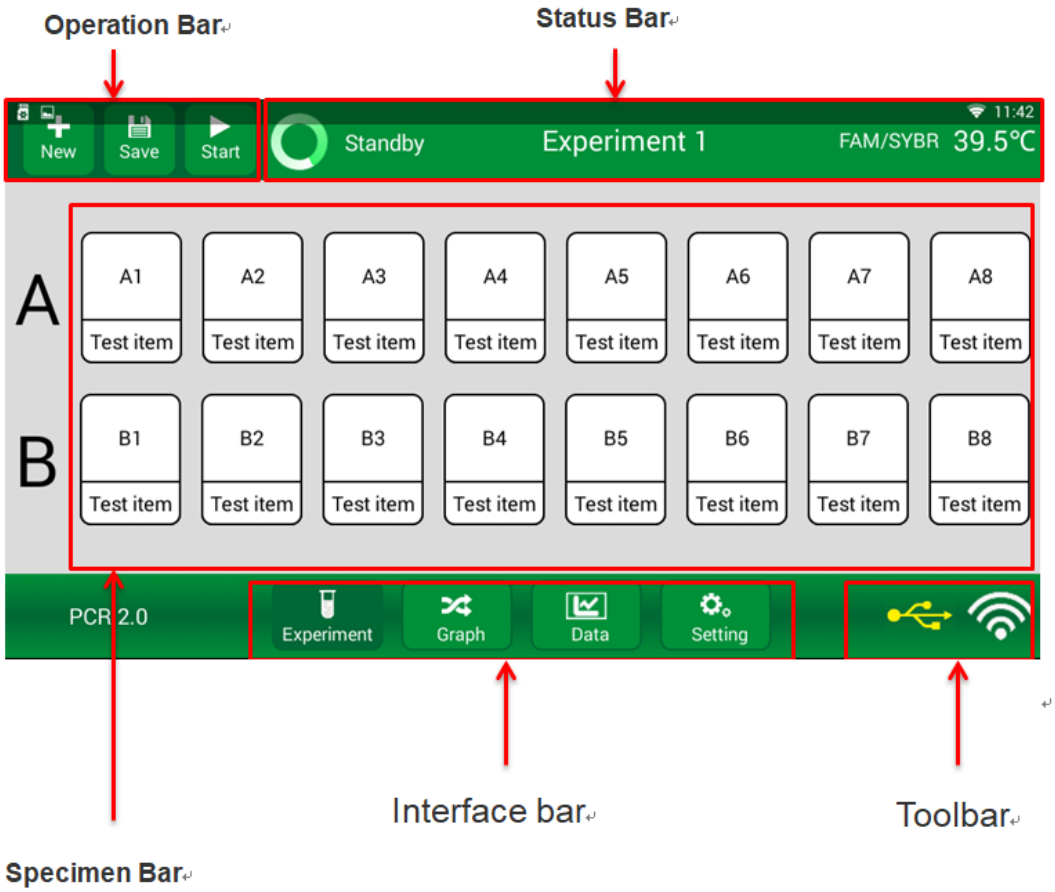
Action Bar: In this column, you can click the button to create a new experiment, save the data, and start/stop the current experiment.

State Bar: Displays current instrument state, experiment progress, experiment name, detection channel, and real-time temperature.

Sample Bar: The sample information for each hole can be edited here. The sample detection results are displayed during the experiment.

Interface bar: Interface can be switched here .

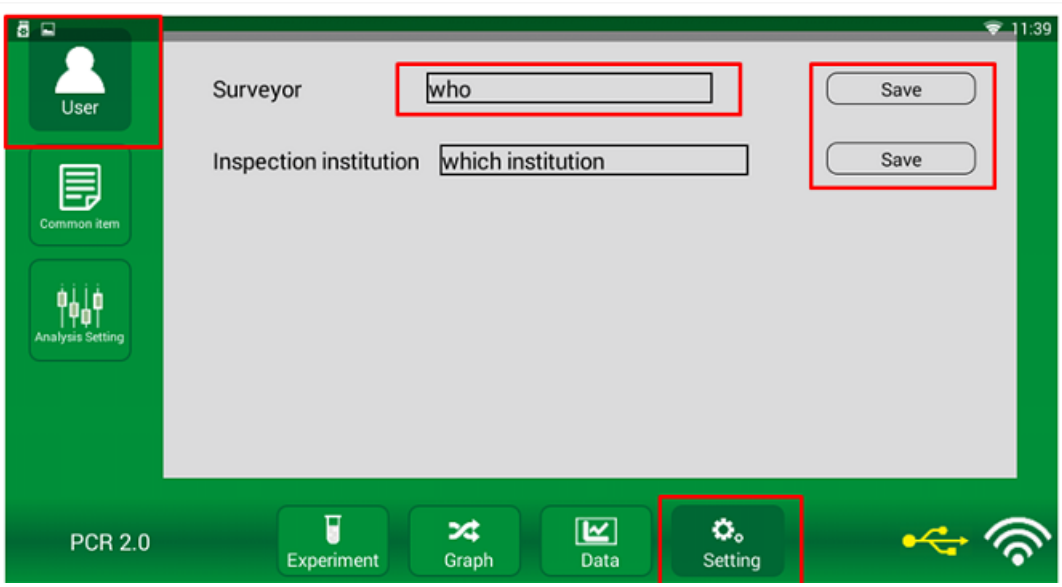
Toolbar: WiFi can be connected through WiFi button and USB connection state also displays on the toolbar.



2.1.1 "Experiment" Interface

2.2 System Settings

(1) Switch the interface bar to the setting interface and then click the user information button. On this page, personal information and enterprise information can be modified through the “Modify Detector”/“Modify Enterprise” button. Click "Save" to save the information when it is done. The information of the users and the enterprises which are optional will be reflected in the detection report.



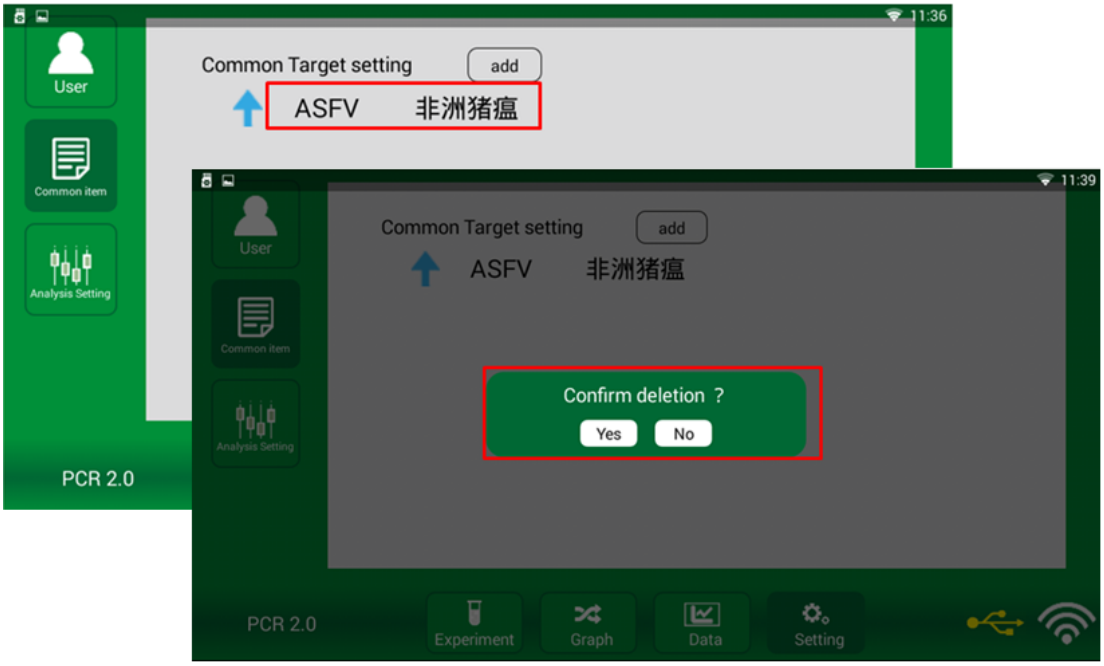
2.2.1 Editing User Information

(2) Click the common detection item editing button. On this page, the users can click the "Add" button and create a new detection item in the pop-up dialog box, whose content in the code will be reflected in the detection item column of the detection report. When there are multiple detection items, the users can use the click ↑ to make the corresponding detection items top.

The dialog box is used to modify the personal information and enterprise information. After the modification is completed, click "Save" to save the information. The information of the users and the enterprises which are optional will be reflected in the detection report.

2.2.2 Adding Detection Items

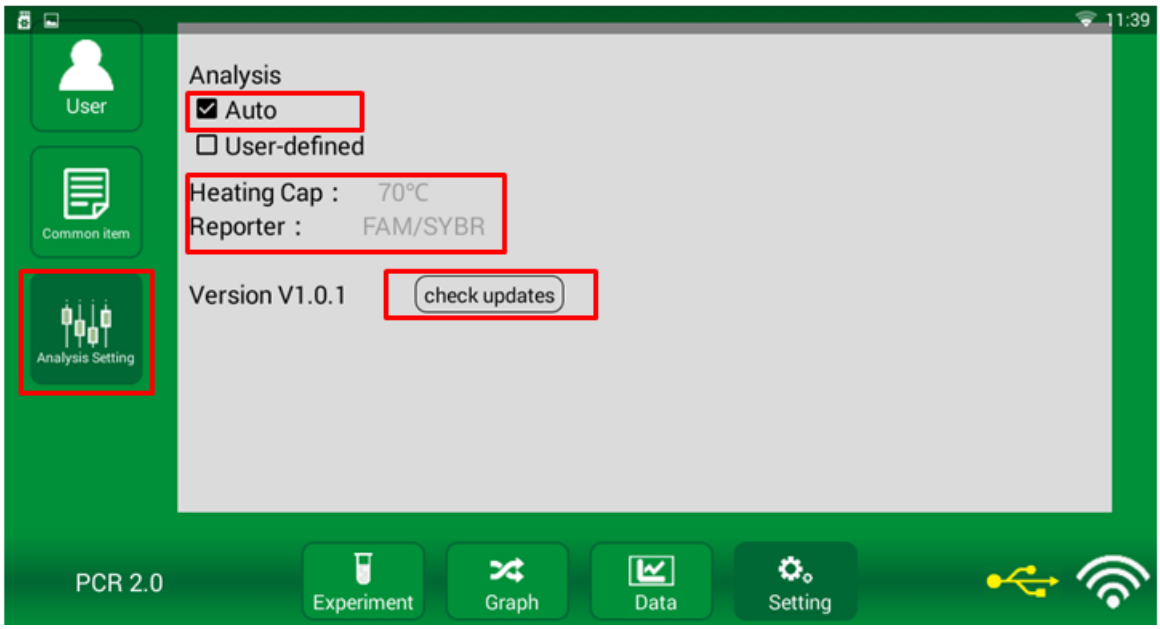
To delete an added detection item, long press the corresponding detection item to delete it.



2..2.3 Deleting Detection

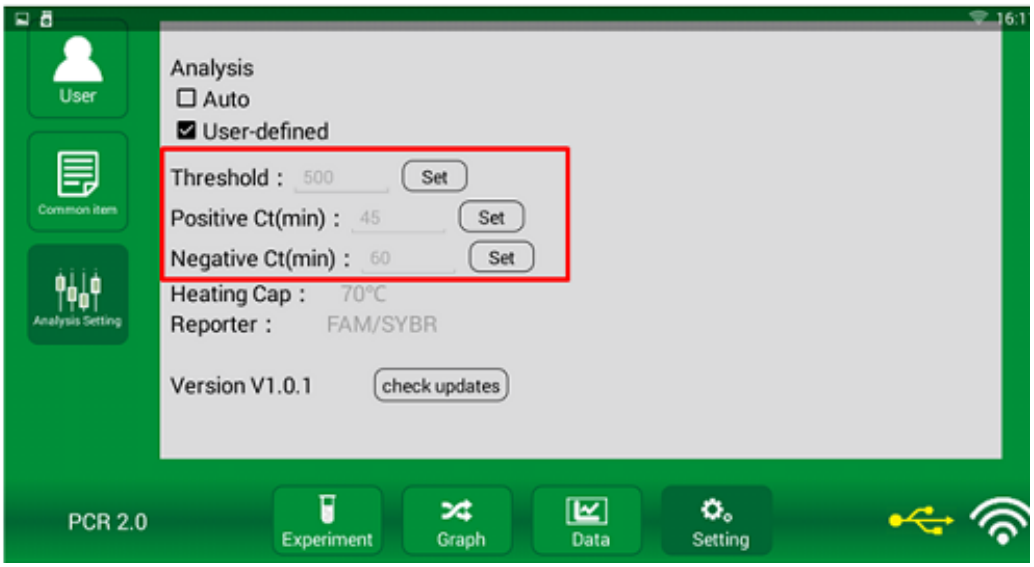
(3) Click the system setting button, and the instrument can be set to interpretation mode. If the "automatic interpretation" mode is selected, the default experimental temperature is 63 ° C as well as the detection time is 45 min, and the negative or positive detection is performed according to the exponential linear fitting degree of the amplification curve.

The temperature of the top cover and detection channel are locked parameters and are not adjustable. In the case of a network connection, the software can be updated through the update button .



2.2.4 System Settings

If the interpretation mode is "custom" mode, the experimental time and experimental temperature can be set by users. In the "custom" mode, the threshold, the positive Ct value, and the negative Ct value are needed to be preset.



2.2.5 Custom Mode

(4) In the custom mode, the parameters should be set according to the instructions of the detection reagent used and the results of the positive control experiment.

Threshold: The fluorescence value that the amplification curve must reach when the sample

of a hole is positive. It is recommended to use 1/10 of the fluorescence peak of the positive control amplification as its threshold. The threshold should be greater than the maximum fluorescence value of the negative control.

Ct value: The abscissa of the intersection of the sample amplification curve and the threshold line is Ct value.

Judging Ct value: If the sample Ct value < the positive Ct value, the sample is judged to be positive.

Negative Ct value: If the sample Ct value > the negative Ct value, the sample is judged to be negative.

If the Ct value of the detection sample is between the Ct value and the Ct value, it is considered suspicious; it is recommended to retest. If the Ct value of the retest result sample is still <the negative Ct value, the sample is recommended to be judged as positive.

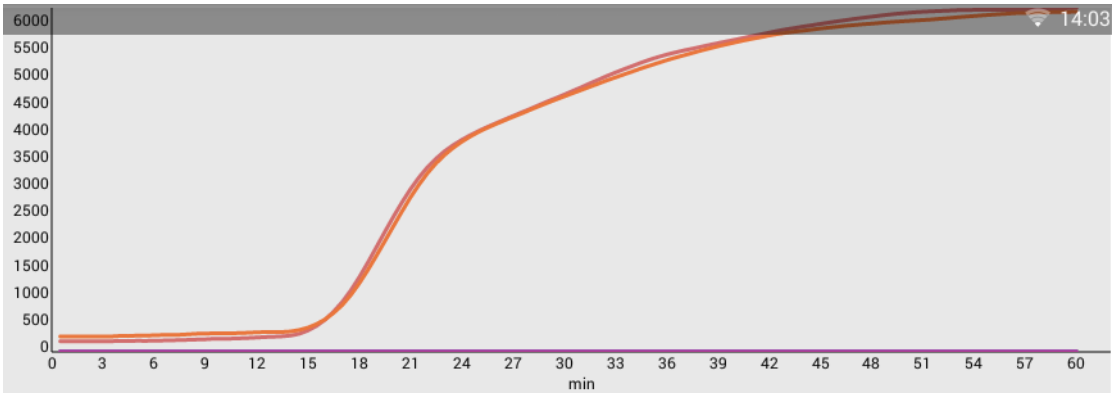
Example: A detection reagent specification is as follows

The test sample has no Ct value or ≥45, and the curve is straight or slightly oblique. There is no “S” type amplification curve, and the sample can be reported as negative, not containing XX or the content is lower than the detection limit;

The test sample Ct ≤ 40, the curve is an "S" type amplification curve, which can directly report the sample positive, containing XX;

The test sample 40<Ct<45, a repeated experiment is required, the Ct value is still between 40 and 45 and the "S" type amplification curve is obtained, and the results of various experimental controls are normal, and the report sample is positive, otherwise the report sample is negative.

The positive control results are as follows. After normalization (elimination of background), the plateau fluorescence value is 6000, and the negative control fluorescence value is 0:

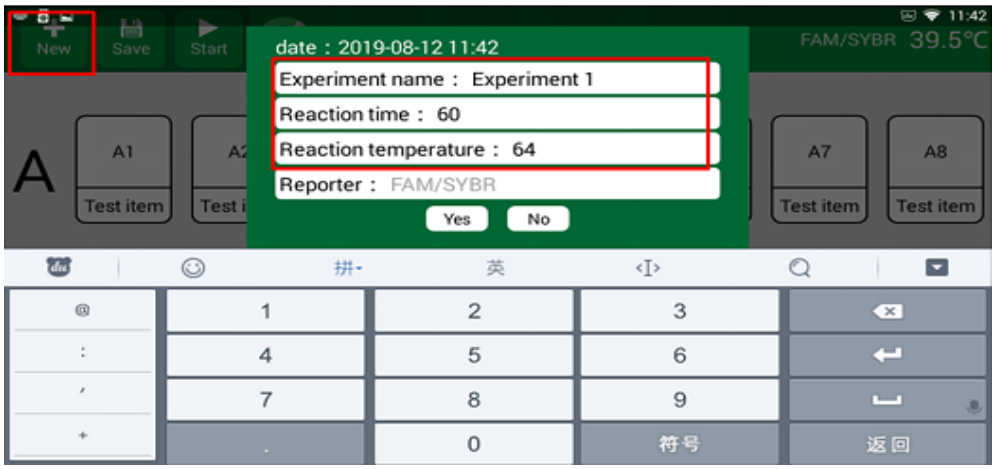


At this time, it is recommended to set the threshold to 1000, the positive Ct value to 40, and the negative Ct value to 45.

2.3 Experimental Setup

(1) Click the "Create" button in the operation bar on the experiment interface, edit the experiment name, reaction time and reaction temperature of this experiment in the new window, and click "OK" to create a new experiment.

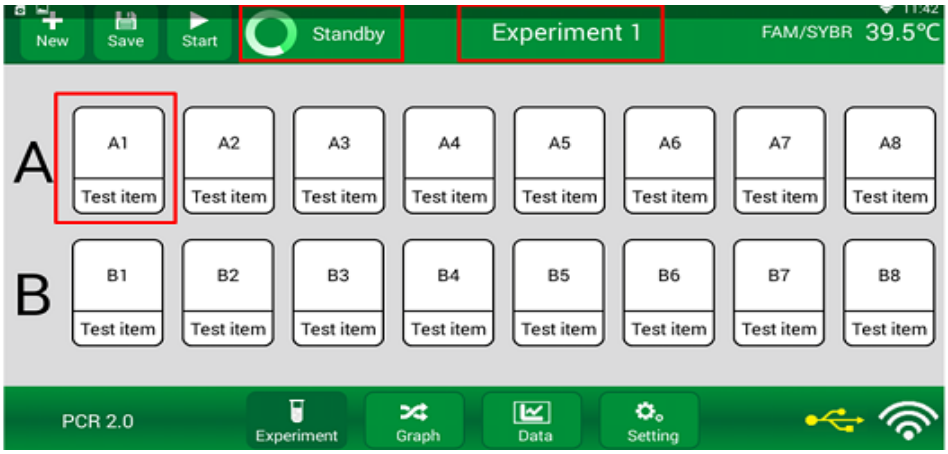
Note: The experimental time is the system time of the current instrument. The default detection channel is FAM; the information in the original experiment interface will be formatted after the new experiment created; if the interpretation is set to "automatic judgment", the time and temperature setting window will not be displayed.



2.3.1 Creating New Experiment

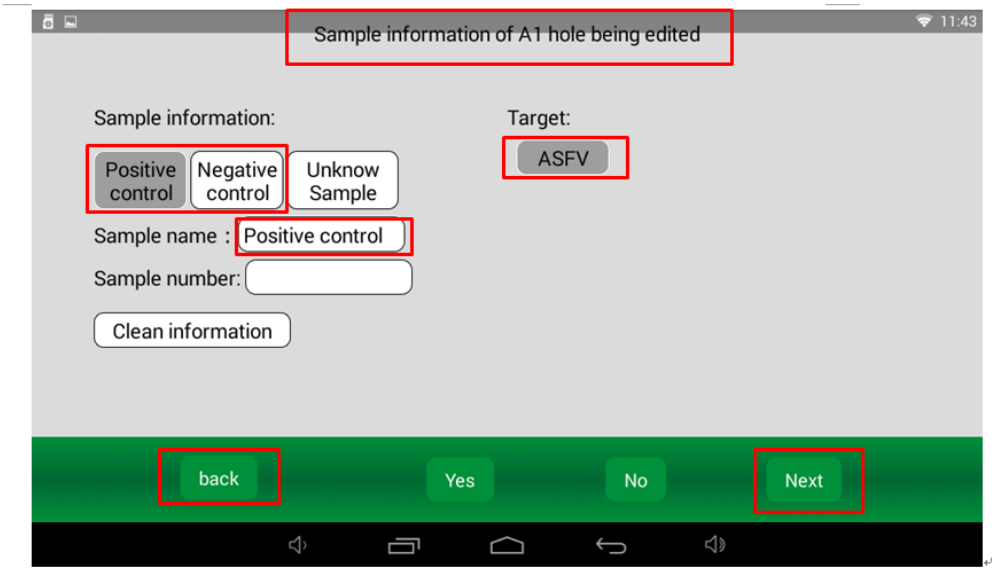
(2) After creating the experiment, the instrument state bar will display the name of the newly created experiment. When the experiment is not started, the instrument state is still in standby. At

the moment, the information of each hole on the sample bar can be edited.



2.3.2 Experimental Preparation

(3) After clicking the sample hole, it will enter the information-editing page. The top of the page shows which hole is currently being edited; the sample information can be selected: positive control, negative control and samples. When a positive or negative control is selected, the sample name will automatically synchronize the selected item, such as selecting the sample to display the hole number. The detection item selected can reflect the detection item information in the report. When the current hole is edited, click “Next Hole” to edit the information of the next hole.

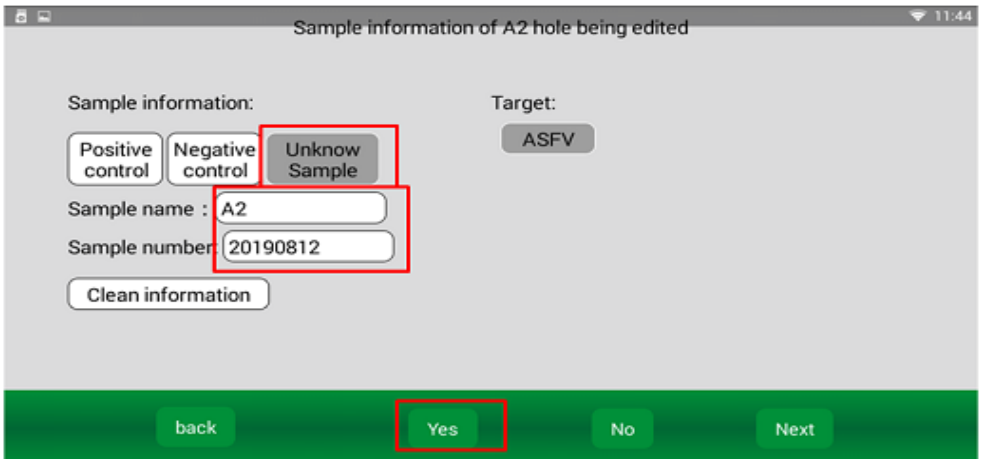


2.3.3 Editing Hole Information

The sample name and sampling code can be input independently when a sample is selected, whose information will be reflected in the detection report. When the hole information is edited,

click “OK” to complete the edit (click “Cancel” not to save the currently edited information) and return to the experiment interface. .

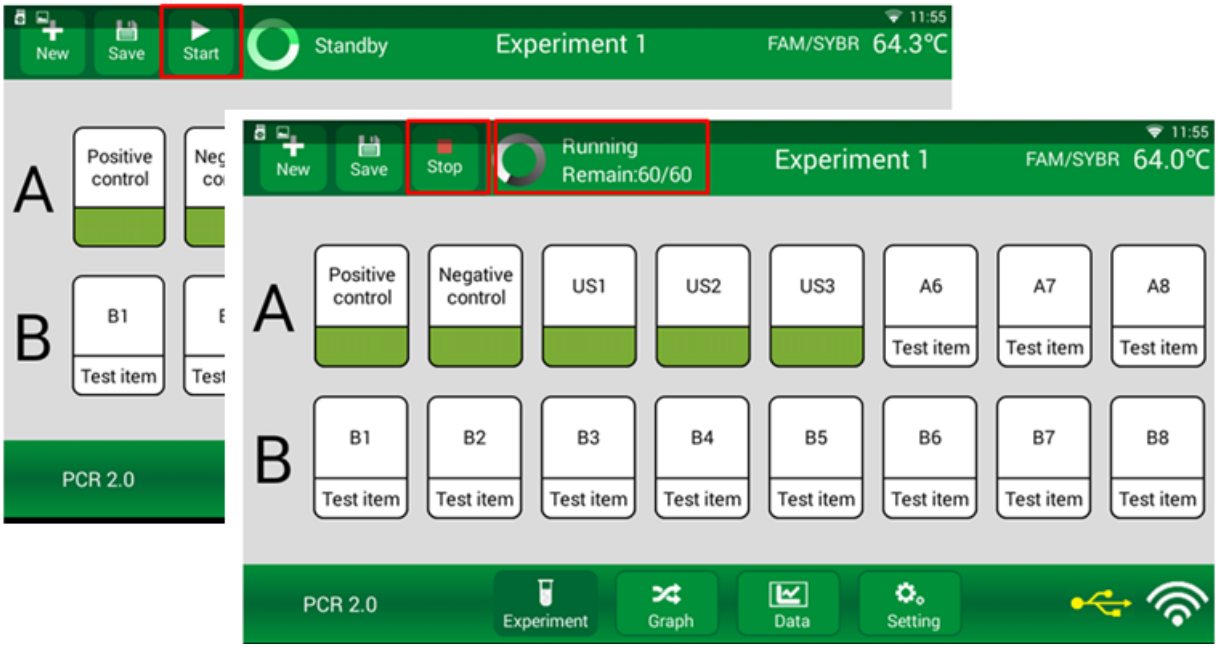
Note: If the information of any hole is not edited, the instrument will not be able to start the experiment; the unedited hole will not display the amplification curve, and its detection result will not be reflected in the experiment report; the information of the samples can be edited after starting and ending the experiment.



2.3.4 Editing Hole Information

2.4 Operating Experiment

(1) When the hole information is edited (at least one hole), click the “Start” button to start the experiment. After the experiment starts, the instrument state in the state bar will be changed to in service and the remaining time will be displayed (example: 51/60: 51 minutes remaining, the total duration of the experiment is 61 minutes). The real-time temperature of the instrument is displayed on the right side of the state bar. The current experiment can be stopped by clicking the “Stop” button during the running process.



2.4.1 Experimental State

(2) The instrument will update the experimental process interpret the positive positive of each detection hole and update the amplification curve in real time during its running in real time; on this interface, click the “Original Value/Normalization” button to switch to display the original curve and normalized curve. the curve can be shown or hidden through clicking the sample hole.

Note: Holes that have not been edited with sample information will not display results and curves.

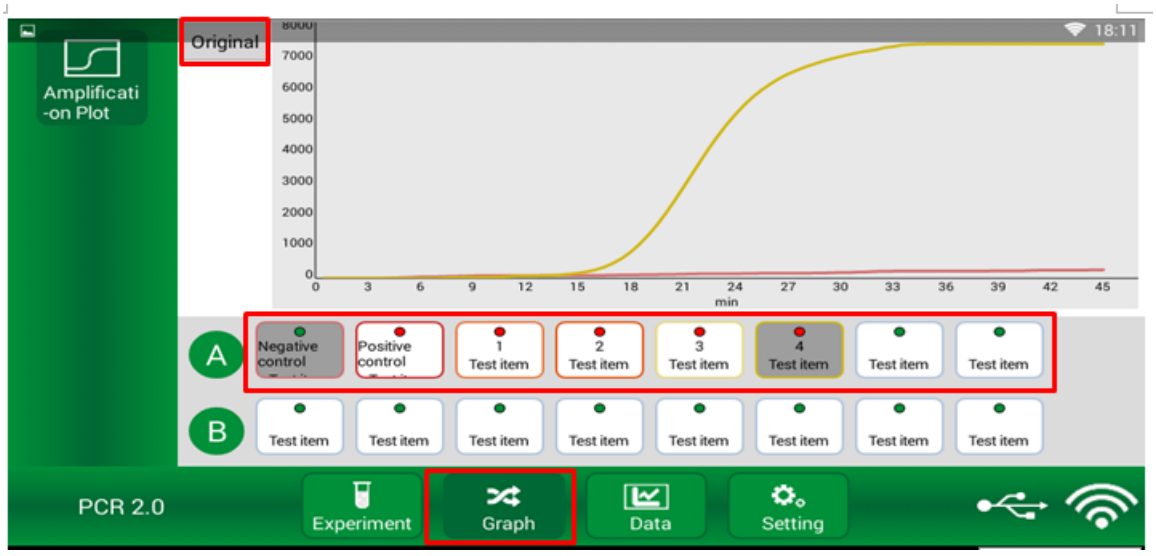
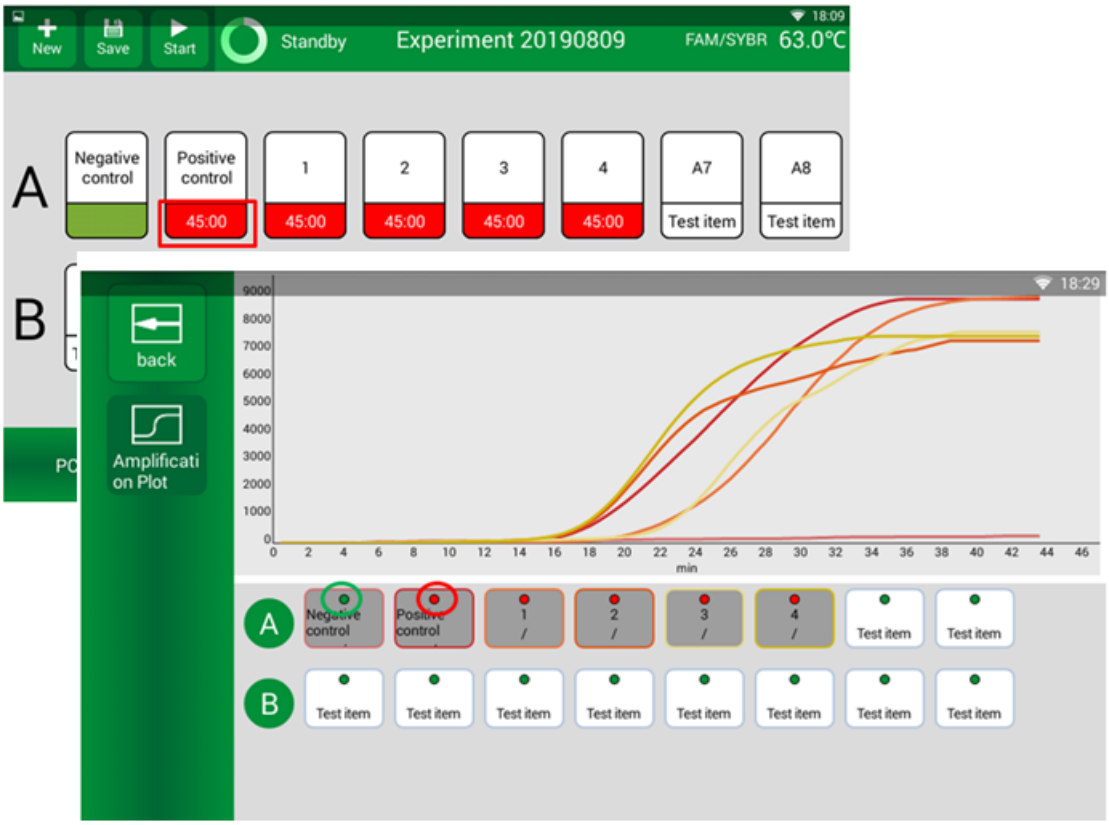


图 2.4.2 曲线界面

2.4.2 Curve Interface

2.5 Interpretation of the Detection Results

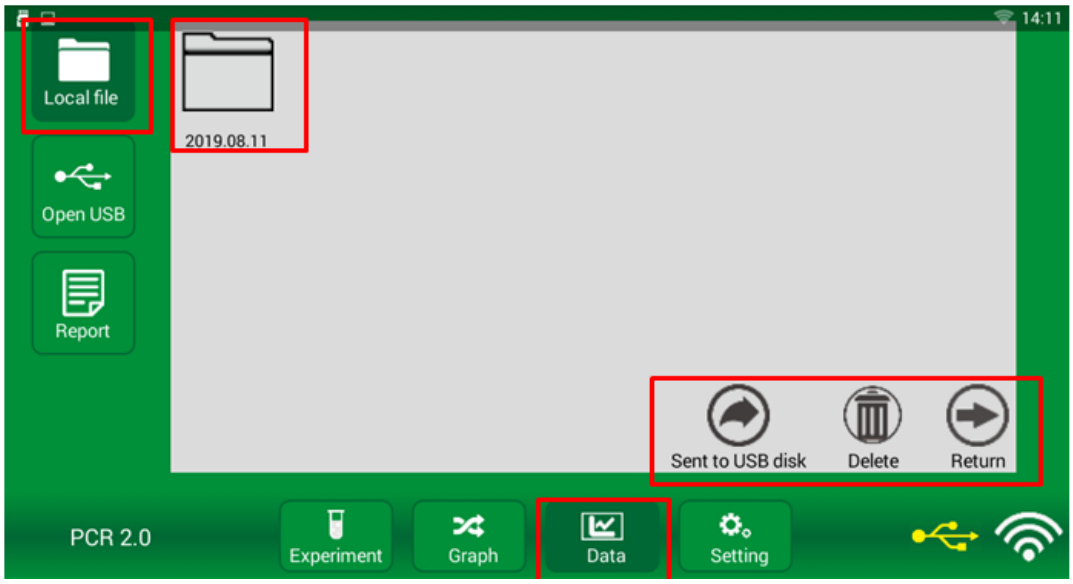
When a positive determination occurs in the sample, the color block below the sample interface corresponding to the sample hole will change from green light to red, and the Ct value will be displayed; the green dot above the sample hole corresponding to the curve interface will turn red. If the result of the sample determination is negative, it is always displayed in green.



2.5.1 Interpretation of the Detection Results

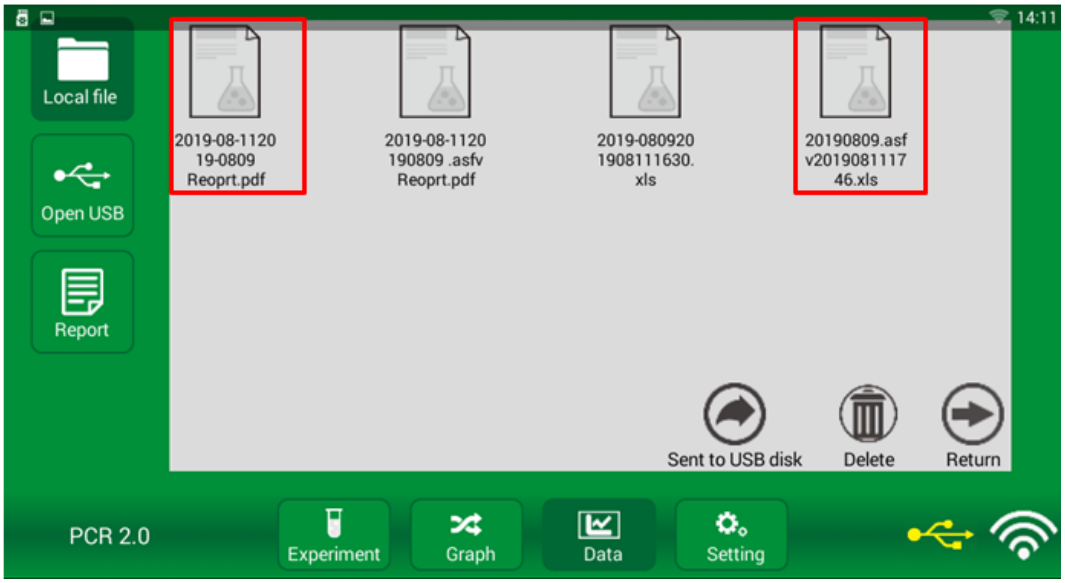
2.6 Data and Reports

(1) After the experiment is completed, the experimental data will be automatically saved in the corresponding date folder in the data interface/local file page; on this page, the folder can be opened, or pressing and holding the operation button in the lower right corner can export, delete data and etc; click “Back” to return to the previous page or deselect.



2.6.1 Local File Page

The date-named folder stores the current experimental data file and its exported report. Data files display the experimental results. If the experimental report cannot be opened, which can only be exported and viewed using a computer.

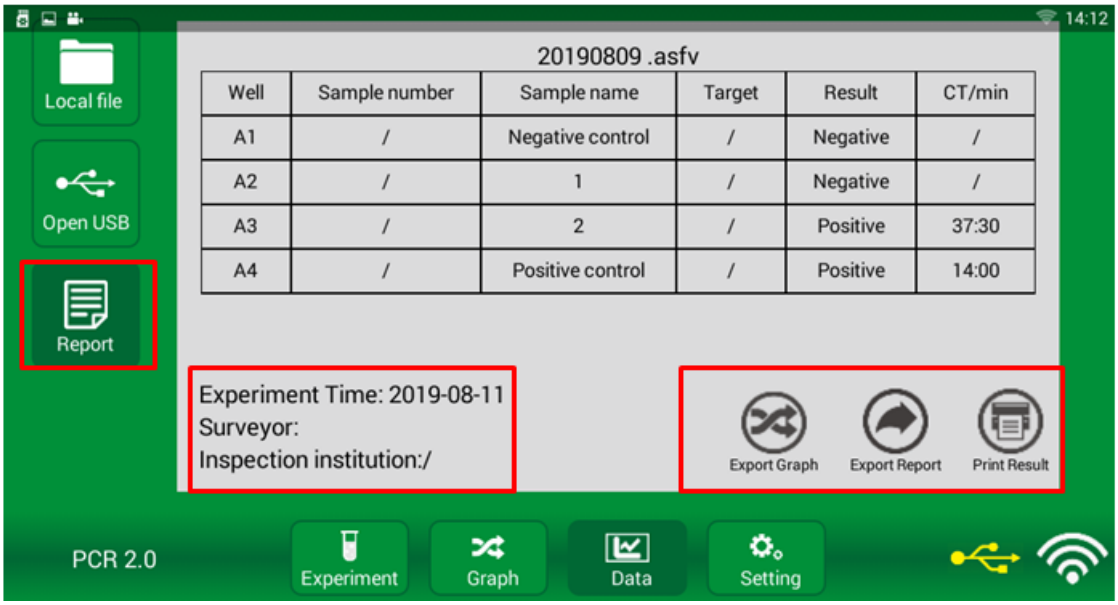


2.6.2 Experimental Data Folder

(2) After opening the experimental data, the software will switch to the report page. The report page shows the result list of the experiment. The lower left corner shows the information of the users and the detection enterprises set by the system. The detection time is the date when the experimental data is generated. The operation bar in the lower right corner has the function of viewing the amplification curve of the experiment and generating the PDF report; if equipped with

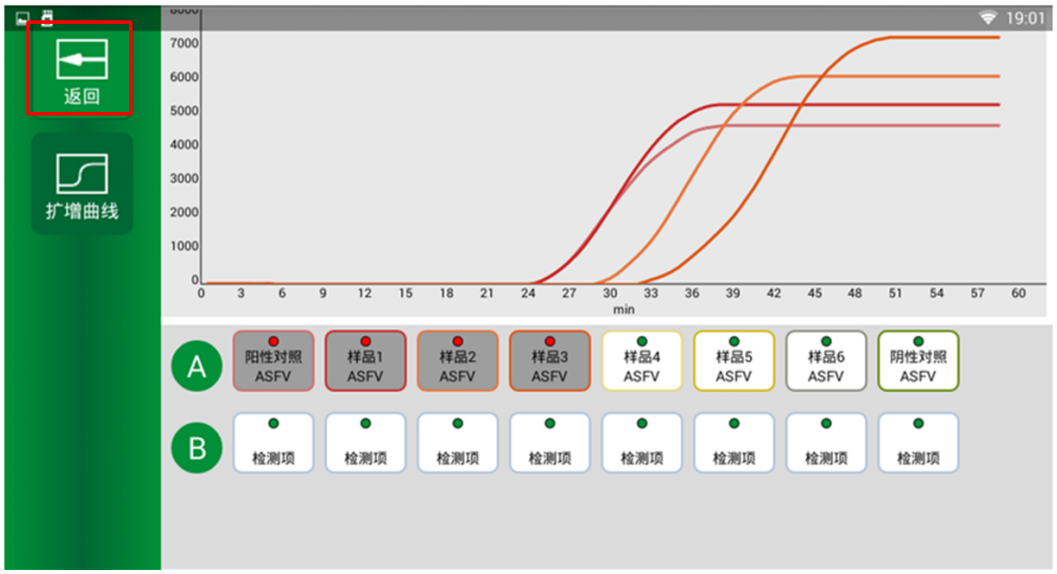
certain thermal printers specified by our company, the list of experimental results can be directly printed.

Note: If the experiment data is not open, do not click the action bar button.



2.6.3 Report Page

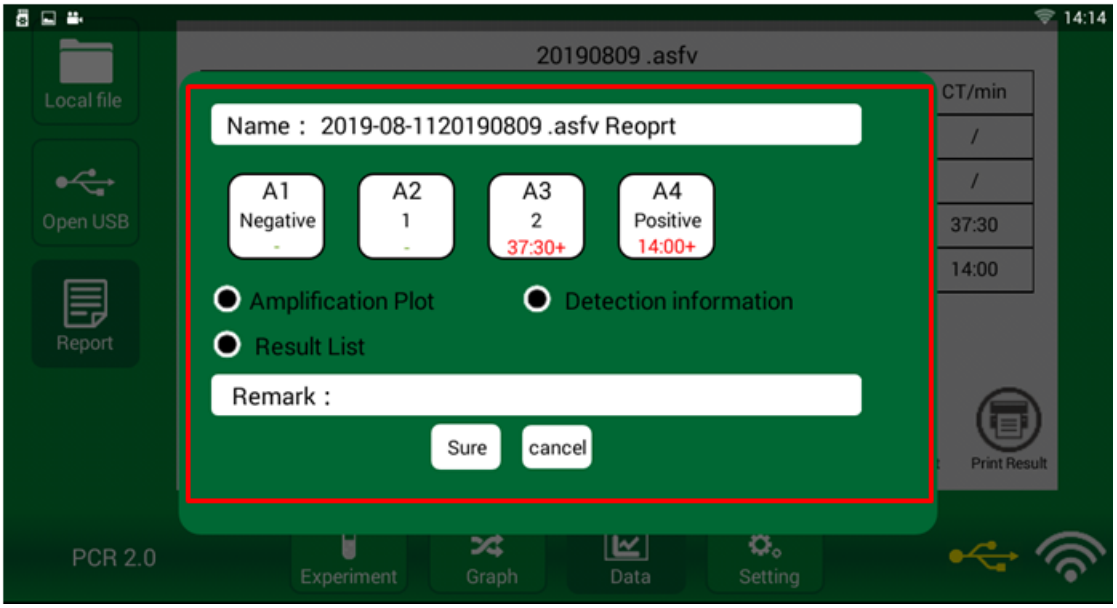
Click “View Image” to enter the curve interface of this experiment. The default is the normalized curve. Click the "Back" to return to the report page.

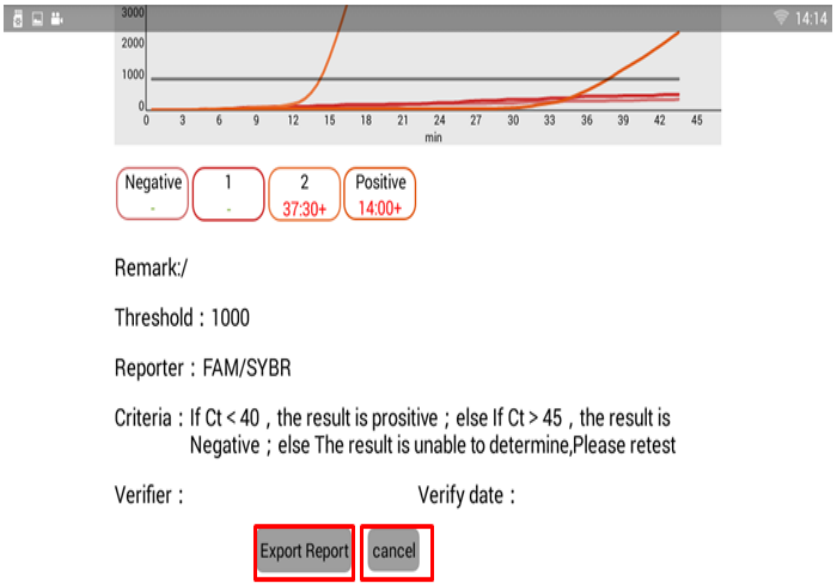


2.6.4 Report Page, View Image

(3) After clicking the report, a selection box will pop up to select the information that needs to be displayed in the report (the default is all selected); on this page, the report name can be

modified and comment content input, etc. Finally, click “OK” to generate report template, drag it to the bottom of the report template, click Export Report to export the PDF report to the folder where the experiment data is located.





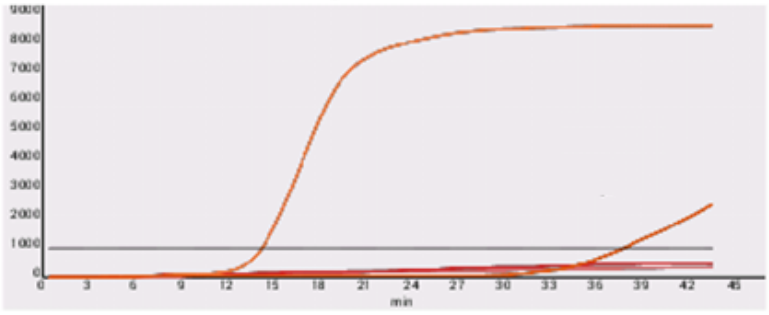
2.6.5 Report Page, Export Report

The report template is as follows:

Experiment result

Well	Sample number	Sample name	Target	Result	Ct/min
A1	/	Negative control	/	Negative	/
A2	/	1	/	Negative	/
A3	/	2	/	Positive	37:30
A4	/	Positive control	/	Positive	14:00

Amplification Plot



Remark:/

Threshold：1000

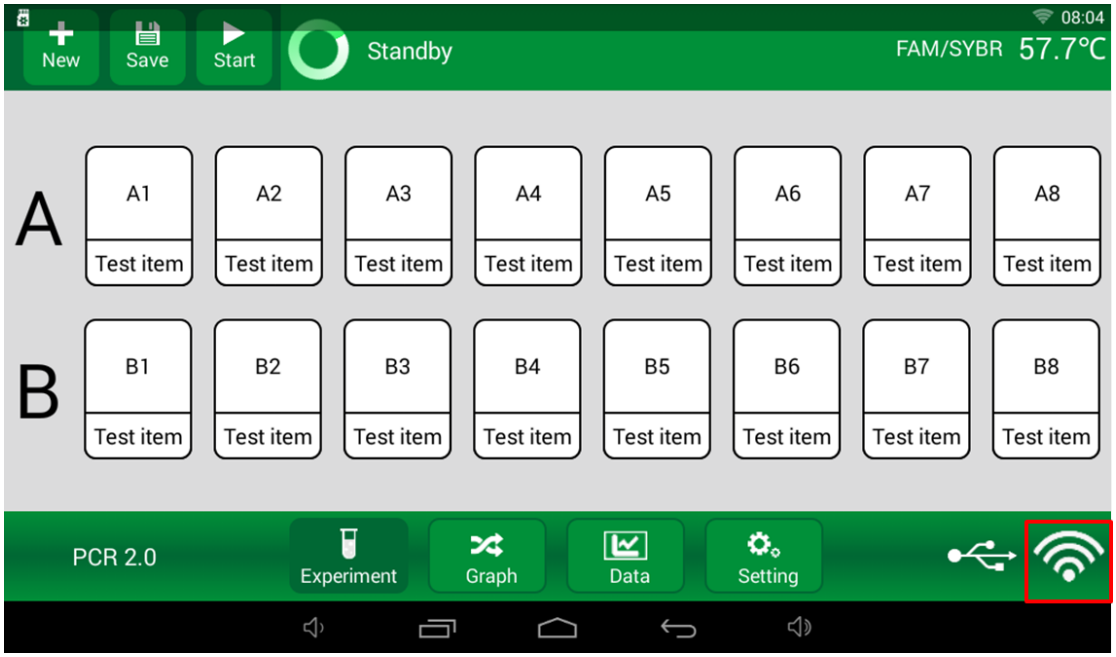
Reporter：FAM/SYBR

Criteria：If Ct＜40，the result is prositive；else If Ct＞45，the result is Negative；else The result is unable to determine,Please retest

Verifier：　　Verify date：

2.7 Software Upgrade

（1）Click the “Wifi” button.



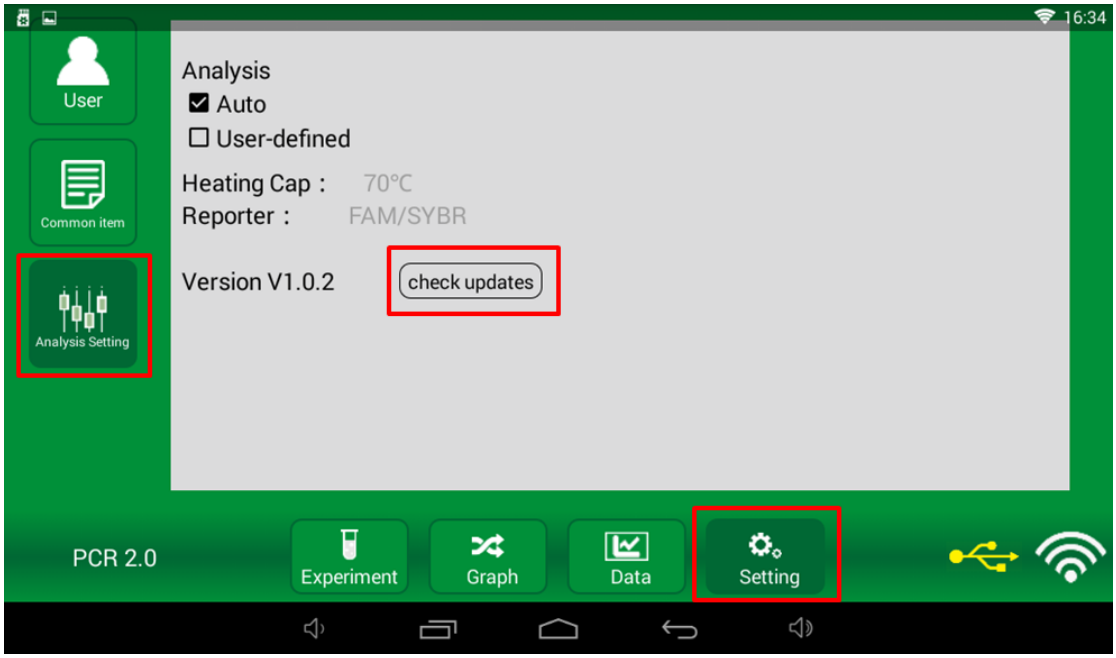
2.7.1 Wifi button

Then Select the wifi you want to connect and Enter a password.

2.7.2 connect to wifi

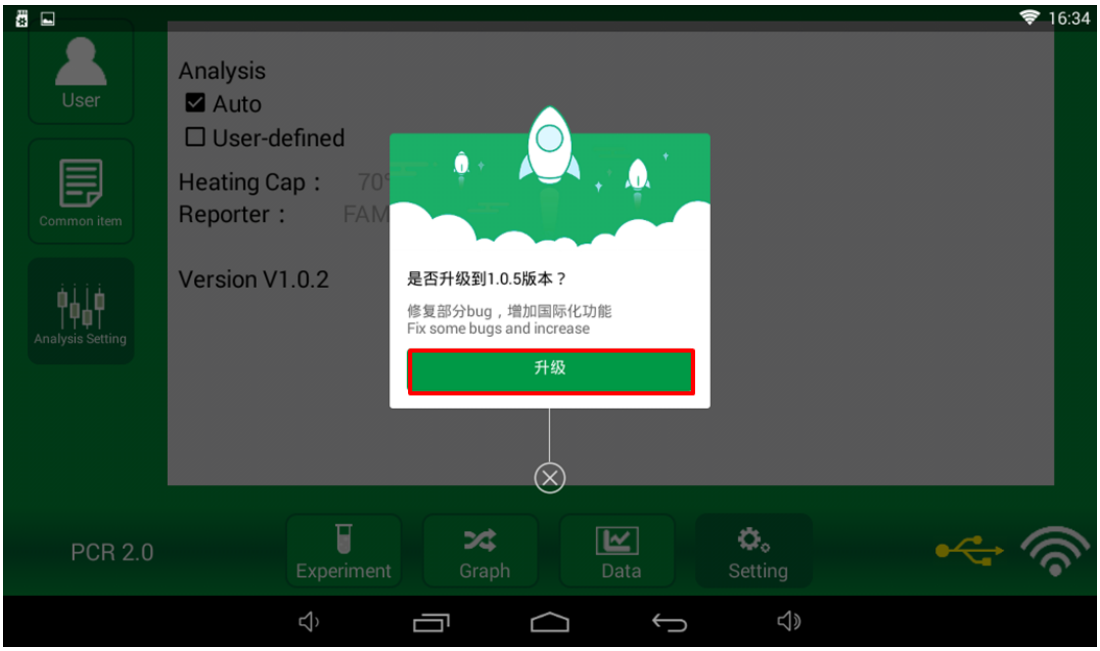
(When wifi status is shown as connected, it means the wifi has completed the connection)

（2）In the “Setting/Analysis Setting” interface of the software, click “Check updates”, and the updates box will pop up.



2.7.3 Setting/Analysis Setting

Then click the "升级” button in the updates box. Please wait a moment, the system will automatically download the latest software upgrade package.



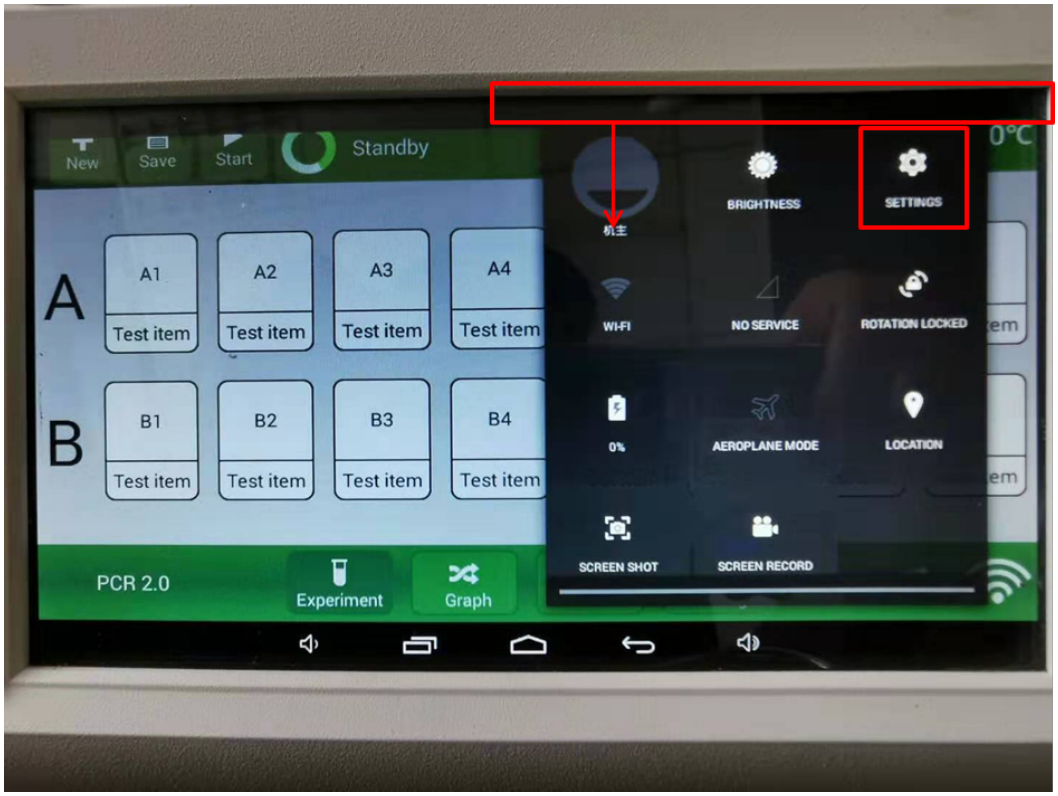
2.7.4 The updates box

（3）When the system downloads the installation package, the installation operation box will pop up, click “安装” (Install). After the installation is complete, click “打开” (Open) to enter the software. (If you click “完成” (Finish), go to the desktop).

2.7.5 Installation operation box

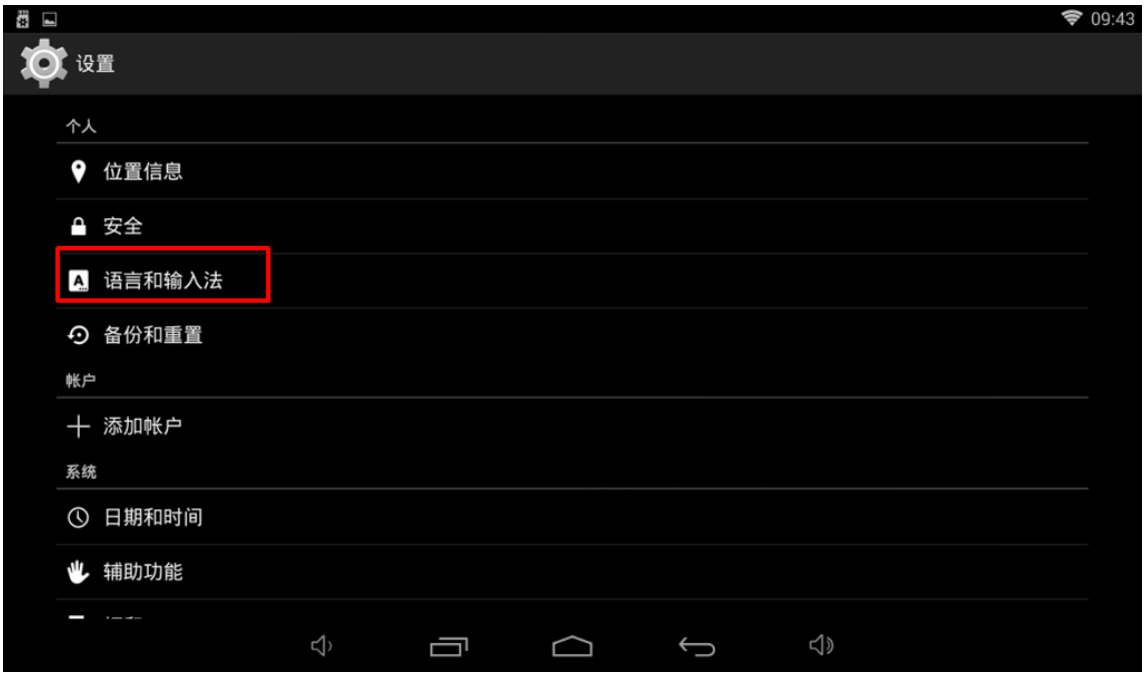
2.8 Language Switcher

（1）Click the upper-right edge of the screen within about 0.5cm to wake up the status bar. Click the drop-down button to bring out the common tools of the system and select “设置”(SETTINGS）.



2.8.1 Wake up status bar

（2）Under the setting page, slide up and down to find ”语言和输入法”（Language & input）, and click to enter the setting interface of Language and input.



（3） After clicking “语言”(Language), in the language menu, sliding from English or ไทย to switch the system to English or Thai. Then return to the settings page and restart the instrument to complete the setup.

2.8.2 Select Language

3. Maintenance

3.1 Daily Maintenance

(1) The machine is powered on and immediately heated. It needs to wait for 10 minutes and the temperature is stable at 63±0.1°C. It can conduct detection. Please turn off the machine as soon as possible after the detection is finished, let the instrument automatically cool down to extend its service life.

(2) When not using the instrument for a long time, unplug the power supply and cover the instrument with a soft cloth or plastic paper to prevent dust.

(3) When the instrument is placed with low humidity, less dust and away from water sources (such as near pools, water pipes, etc.), the room should be well ventilated and free from corrosive gases or strong magnetic fields. Do not place the instrument in a damp or dusty place.

(4) The openings on the instrument are designed for ventilation. To avoid overheating, do not block or cover these vents or use them on a soft surface. The distance between the front and rear vents of the instrument and the nearest items should be no less than 10 cm.

(5) Do not use the instrument in direct sunlight, and keep away from heat, stoves and all other strong light sources or heat sources.

3.2 Instrument Maintenance

(1) Immediately unplug the instrument from the power outlet under the following conditions, and contact the supplier or have it handled by qualified service personnel:

a) liquid spilled into the instrument;

b) the instrument is exposed to rain or water;

c) the instrument is not working properly, especially if there is any abnormal sound or smell;

d) the instrument is dropped or the casing is damaged;

e) significant changes in instrument function.

(2) When the temperature of the detection module exceeds 90 °C, the instrument will

automatically power off (this is a normal phenomenon, because the instrument has an over-temperature protection device). When the temperature of the instrument drops below 55 °C, the instrument can be restarted, and then the detection can be restarted. .

(3) This instrument should be used with the supplied power cord. If the power cord is damaged, it must be replaced and repaired. Replace the power cord with the same type and specification when replacing it; do not press any objects on the power cord when the instrument is in service. Do not place the power cord where there are a crowd of people.

(4) The users shall not open the instrument without authorization; the replacement of components or adjustment of the machine must be completed by professional maintenance personnel; it is forbidden to replace the components with the power cord connected.

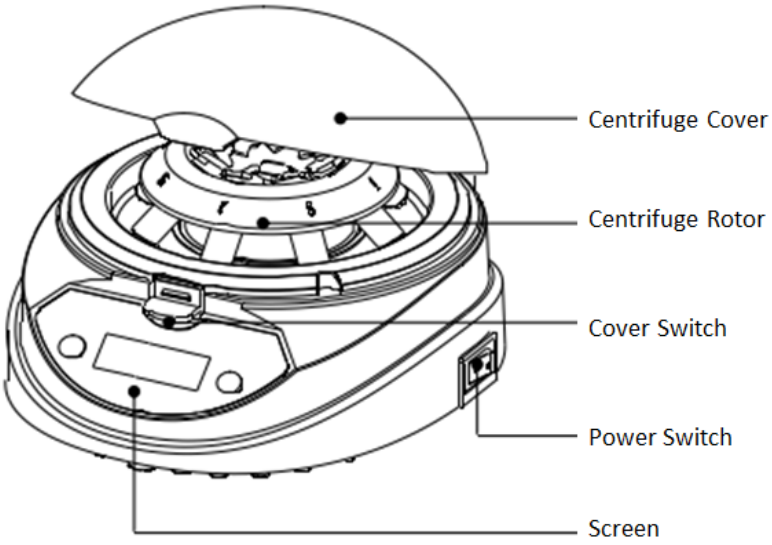
(5) When an alarm code, black screen or abnormal noise occurs, please contact our technical support for problem elimination.

II Mini Centrifuge

1. Mini Centrifuge

1.1 Overview to Product

Mini Centrifuge is suitable for 0.2ml centrifuge tubes, and eight centrifugal tubes can be centrifugal at a time. If formed a complete set with 0.5 ml centrifugal tubes sleeve and 0.2 ml PCR tubes，Mini Centrifuge is also suitable for 0.5 ml centrifugal tubes and 0.2 ml PCR tubes，so it can be used in microcentrifugation and cell separation tests.



Instrument Parameters：

Dimensions：175X155X118（mm）	**Power Rating：≤45W**
Power Input：AC110/220V，50/60Hz	**Fusing Current：1.0A**
Rotate Speed：10000 rpm/min	**Centrifugal Force (RCF) ： 7500 g**

2. How to use

2.1 Schematic Diagram of Operation Panel

“Time Setting” button can be used to set the centrifugal time, whose range is from 1 second to 9999 minutes. Press and hold the “Up” and “Down” buttons for 6 seconds

2.1 Schematic Diagram of Operation Panel

2.2 Time Setting

a. Turn on the power switch, the instrument will enter initialization with the sound of "di"；

b. After 2 seconds, the value of the screen is the previous run time setting；

c. Press □ or □ to set the time value to increase or decrease. If you press and hold one of the buttons for more than two seconds, the time value you set will change faster；

d. Press □ and □ at the same time, and hold it for 6 seconds, the time will switch time unit from seconds to minutes, and vice versa. If the time unit is switched to minutes, the minute indicator will be turned on, and it will be turned off when the time unit is switched to second.

e. When “0000” displays on the screen, the time setting is infinite.

2.3 Start/Stop

When the power switch for centrifuge is turned on, the centrifuge will start running after the centrifugal cover is closed and stop when the timer is stopped or the Centrifugal cover is open.

Attention：The centrifuge will not operate when the centrifugal cover is open！

3. Announcements

（1）Warning; Violations of the follows may result in incidents！

1. Do not open the centrifugal cover until the head is completely stopped;

2. The centrifugal tube shall be placed symmetrically in an equal amount, and the weight of each centrifugal tube shall not exceed 3.0g;

3. If excessive noise or abnormal noise is found after starting up, stop the machine immediately to check the cause;

4. Do not move the instrument during centrifugation;

5. The instrument should be placed on a horizontal and solid working platform; Using the instrument on non-horizontal surfaces is prohibited.

（2）Attention: the instrument may be damaged if the following operations are violated:

1. Do not run the instrument without turning head;

2. It is forbidden to transfer liquid and add a sample in the centrifuge to avoid corrosion of turning head, etc.;

3. Do not immerse the instrument in liquid or wet the instrument with liquid.

（3）Equipment Maintenance：To ensure the service life of the instrument, please clean the instrument according to the following operation：

Clean the inner wall of the centrifuge with a clean soft cloth and non-corrosive washing solution with PH=7±1, and then use soft cloth and 75% alcohol to dry the inner wall of the centrifuge at the end of experiment. Make sure the centrifuge is free of contaminants and other liquid residues.

3.1 Problems and Solutions

Problem	Cause	Solution
The instrument does not run after starting	1. The power cord is not plugged in properly	Plug the power cord properly
	2. The power socket has no power supply	Make sure that the power socket has the power supply
	3. The power switch hasn't turned on	Turn on the power switch
	4. Centrifugal cover hasn't closed to be locked	Press down the centrifugal cover to lock it
	5. Fuse failure	Please contact our technical support
Running with violent vibration, and its running noise is loud	1. The instrument is not placed on a firm and horizontal table	Place the instrument on a firm horizontal table
	2. The centrifugal tube is not placed symmetrically	Place the centrifugal tube symmetrically
	3. The volume of liquid in the centrifuge tube is unequal	Equalize the volume of liquid in the centrifuge tube
	4. The centrifugal tube is not covered properly and samples were thrown out	Cover the centrifugal tube properly and add liquid for balance
	5. Centrifuge rotor was dated or broken	Stop using immediately, replace a new centrifuge rotor
	6. Centrifuging centrifugal tubes of different specifications at the same	Use the centrifugal tubes of the same specifications

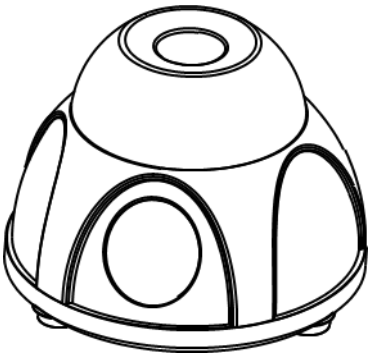
	time	
	7. The cover of the centrifuge is broken or deformed	Pay attention to the maintenance, and a new cover is needed

III Vortex Mixer

1. Vortex Mixer

1.1 Overview to Product

Vortex Mixer is attractive, designed for mixing small test samples with a touch function, which is used as small containers up to 30 mm in diameter, e.g. test tubes, centrifuge tubes and PCR tubes.



1.1 Vortex Mixer

Features：

1. Small, compact and reliable

2. Excellent mixing action

3. The upper casing and the test tube surface are made from inert plastic. The bottom section is thick and firm.

4. Includes light 12 V power pack set.

Instrument Parameters：

Dimensions：110×110×86（mm）	**Weight：1.5 kg**
Power Input：AC110—220V，50/60Hz	**Speed Fix：4000 rpm/min**
Power Rating：≤10W	

2. How to use

Vortex Mixer should be placed on a horizontal working table when it is in use. Plug the power

cord properly and make sure that the power socket has a power supply. Then, the instrument will be operated automatically when the centrifugal tube is pressed in the center of the rubber cap.

3. Announcements

（1）Warnning; Violations of the follows may result in incidents！

1. It is forbidden to use this product to conduct vortex vibration operation on inflammable, explosive or highly corrosive objects;

2. The instrument should be placed on a horizontal and solid working platform; Using the instrument on non-horizontal surfaces is prohibited.

3. Do not move the instrument during centrifugation;

（2）Equipment Maintenance：To ensure the service life of the instrument, please clean the instrument according to the following operation：

Clean the inner wall of the centrifuge with a clean soft cloth and non-corrosive washing solution with PH=7±1, and then use soft cloth and 75% alcohol to dry the instrument at the end of experiment. Make sure the centrifuge is free of contaminants and other liquid residues.

4. Problems and Solutions

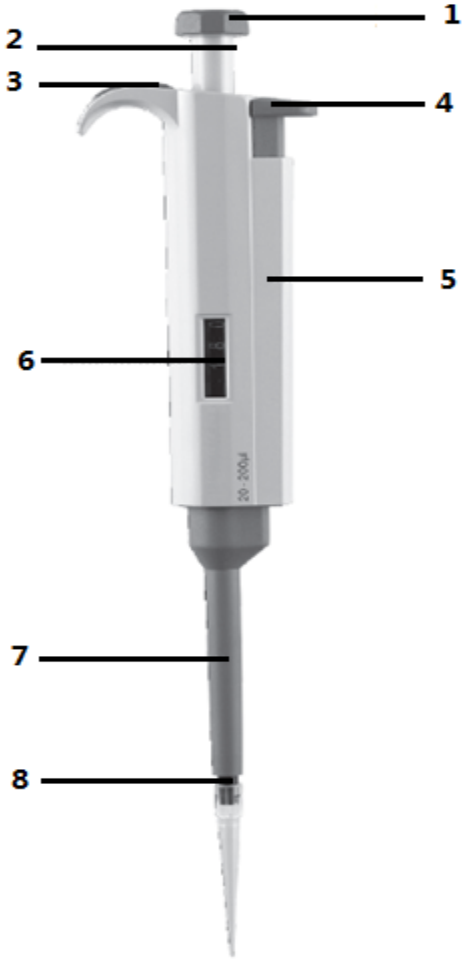
Plug the power cord properly, if the instrument still can't start, please contact our technical support.

IV Single-channel Pipettes with Variable Volume Setting

1. Single-channel Pipettes with Variable Volume Setting

1.1. Introduction

This series of products is a piston-stroke pipette for aspirating and dispensing liquids. The pipette operates according to the air cushion principle. A suitable pipette tip must be fitted before use. There are four specifications of the models: 0.5～10μl, 5～50μl, 10～100μl, 100～1000μl.



1: Single-channel Pipette

1. Color Cap	**2. Dispensing Button**
3. Handle Cover	**4. Ejector**
5. Hand Shank	**6. Display Screen**
7. Ejector Sleeve	**8. Tip Cone**

2. Parameter Index

Range	Increment	Pipette Tip
0.5-10	0.1μl	10μl
5-50	0.5μl	200μl
10-100	1μl	200μl
100-1000	5μl	1000μl

2.1 Installation

2.1.1 Range Setting

2: Range Setting

The display window of the handle clearly shows the amount of liquid transferred by the pipette. The amount of fluid can be set by turning the operation button clockwise or counterclockwise.

Attention：

(1) Rotate to the desired range.

(2) The number is in the center of the display screen.

(3) The range is within the range of pipette.

(4) Turn the button out of range, or it will jam the mechanism and damage the pipette.

(5) Attaching the pipette tips

Fig. 3: Attaching the Pipette Tips

Gently insert the tip cone into the pipette tip

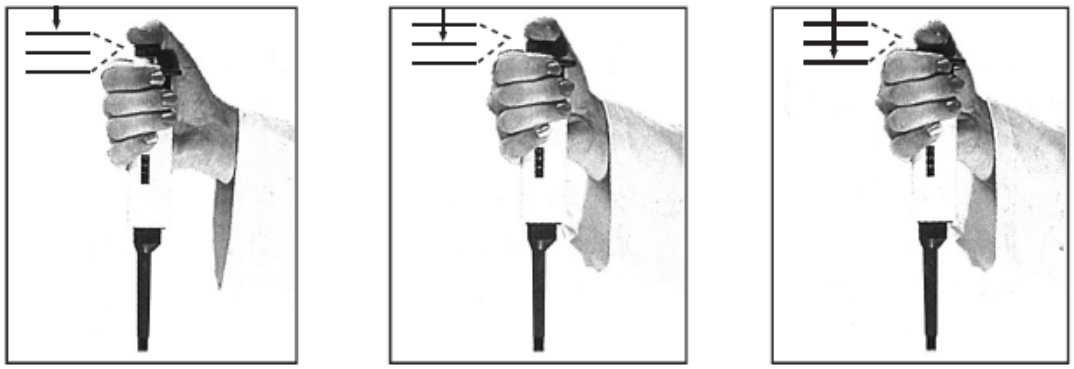
Attention：

(1) Make sure the suction head connection is clean before fitting the nozzle.

(2) The pipette tips are single-use items.

(3) Attach the nozzle tightly to the suction head of the pipette to ensure that the seal is intact. The mark is to form a clear sealing ring between the nozzle and the black suction head.

(4) Forward pipetting



A **B** **C**

4: Forward Pipetting

(1) Press down the dispensing button to the first stop(Fig. 4B). Immerse the pipette tip vertically in the liquid. Maintain the immersion depth and let the dispensing button slide back slowly(Fig. 4A). Wait until the liquid has been aspirated. Remove the pipette tip from the liquid.

(2) Place the pipette tip on the tube inner wall at a steep angle. Slowly press down the dispensing button to the second stop(Fig. 4C). Wait until the flow of liquid has been stopped.

(3) Press the ejector and the pipette tip is ejected(Fig. 5).

5: Press the Ejector

3. Attention：

3.1 Note that Instrument Damage May Occur if the Following Operations Are Violated：

(1) Do not adjust the pipette out of range；

(2) It is forbidden to absorb liquid without the suction head. After the liquid enters, it may cause contamination and corrosion of the pipette cavity. Please stop using it immediately and clean and recalibrate the cavity.

(3) Do not immerse the pipette into the liquid or use the wet pipette.

(4) When installing the suction head, please do not swing from side to side, forcefully insert, repeatedly knock and etc. This series of operations may lead to wear of the sealing ring, bend or tear of the suction nozzle.

3.2 Cleaning, Failure to Follow the Following Procedures Will Shorten the Service Life of the Instrument：

(1) After the pipette is used, adjust the knob to the maximum range；

(2) Regularly wipe the pipette surface with 75% ethanol；

(3) Replace the filter element regularly and calibrate the pipette.

4. Problems and Solutions

Problem	Cause	Solution
Residual fluid in the nozzle.	The nozzle doesn't fit.	Use the original nozzle.
	Uneven wetting of the nozzle plastic.	Reinstall a new nozzle.
Fluid leakage.	The nozzle is not fitted properly.	Firmly attach the pipette tip.
	The nozzle doesn't fit.	Use the original nozzle.
	There is a foreign body between	Clean and install the new nozzle.

	the nozzle and the connector.	
	The pipette is contaminated.	Clean and lubricate o-rings and pistons, clean nozzle connections.
	Insufficient silicon oil on piston or o-ring.	Coated with silicone oil.
	O-ring and piston are not fastened or o-ring is damaged.	Replace the o-ring.
	Misoperation.	Follow the instructions carefully.
	The density of the liquid to be calibrated or moved varies greatly from water.	Recalibrate.
	The pipette was damaged.	Send to repair.
Buttons get stuck or don't move well.	Piston contaminated.	Clean and lubricate o-rings and pistons, clean nozzle connections.
	Aerosol penetration.	Clean and lubricate o-rings and pistons, clean nozzle connections.
The pipette is blocked and the suction volume is too low.	The liquid seeps into the nozzle and dries.	Clean and lubricate o-rings and pistons, clean nozzle connections.
The nozzle puller is stuck or does not move well.	Contamination of nozzle connection or nozzle pusher loop.	Clean nozzle connector and nozzle pusher loop.