

# Operation Manual

V1.0

## Fluo-200 Portable Fluorometer



### Version modification Record:

Version No.	Date	Modification Description
V1.0	2022.04.01	➤ Initial Release

## **Foreword**

**Thank you for purchasing our Fluorometer. This Manual describes the function and operation of the instrument. In order to use the instrument properly, please read this manual carefully before using. Keep it for later use when you meet with difficulties.**

### **Opening Check**

**Please check the Instrument and Accessories according to the packing list when you first open the packing case. If anything wrong or missing, please contact the distributor or the manufacturer.**

# Safety and Operating Precautions

## 1. Safety Information

Users should have a clear understanding of how to use this instrument before operation, please read this manual carefully prior to operation.



NOTICE: Operation before reading the Manual is forbidden, otherwise instrument in operating may cause injury or electric shock. Read the guidelines and directions below and carry out countermeasures according to them.



**For Research Use Only. This instruments is not a medical device and is not intended to be used for clinical test.**

## 2. Operating Precautions

Operation, maintenance and repair of the instrument should comply with the basic guidelines and remarked warnings below. Otherwise, warranty and working life of the instrument may be influenced.



This instrument conform to I class B type common equipment of standard GB9706.1. Indoor use only.



CAUTION: Biological Contamination

All test sample, quality control sample, calibration sample, and components contaminated by these sample are deemed to be infectious. Please wear the gloves before touching.



Disassemble the instrument without permission is forbidden, except the parts that could be disassembled in the manual. Or you will lose the warranty qualification, and may have the risk of electric shock.



Do not cover anything on power wire in operating. Do not put power wire in the place where personnel ambulates. Hold the plug part when inserting, and make sure the plug completely insert to the jack. Not pull the power wire when unplugged.



The Instrument should be put in dry place, less dust, far away from water and high-intensity light. What's more, the place should be well ventilated, no corrosive gas or strong magnetic interference, far away from heater, stove or any other heat.



Power off when you finish your work. Pull off the connector plug if the instrument stopped working for a long period of time, and make sure it covered with a cloth or plastic paper to prevent from dust.

Unplug immediately in following cases, and contact supplier or skilled maintenance to manage:



- Liquid enters into the Instrument.
- Instrument was rained or watered.
- Instrument dropping or outer shell damaged.
- The function has obviously changed.

# Warranty

## Warranty content

One month from the date of delivery, in case of faults due to material and manufacturing defects, our company will be responsible for replacement.

Twelve months from the date of delivery, provide warranty for faults due to material and manufacturing defects. During the warranty period, our company will selectively repair or replace instrument that are proved to be defective.

The products under warranty must be delivered by customer to the repair department designated by our company. The freight of the instrument from the user to the maintenance department shall be paid by the user. Our company shall bear the freight of returning the instrument to the user.

For repairs beyond the warranty, our company will charge appropriate maintenance costs.

## Warranty scope

The above warranty is not applicable to the damage caused by users' improper maintenance, use under non-conforming conditions, repair or modify without authorization.

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# Chapter 1 Introduction

Fluoroimmunoassay (FIA) technology has advantages of high specificity, sensitivity and utility. Therefore, it is used for detecting biological active compounds of low concentration, such as protein (enzyme, receptors, antibody), nucleic acid, hormone (steroid, thyroid hormones), medicine and microorganism.

Fluo-200 fluorometer is based on fluoroimmunoassay to detect the luminous intensity of fluorescent reagent in immunoassay (IA). Under the condition of low concentration, the sample concentration is linear to fluorescence intensity. Thus, the testing sample can be analyzed in qualitative and quantitative analysis.

## Characteristics:

- 7 inch color LCD display, easy to operate;
- Fast and accurate detection of DNA, RNA and protein within 5s;
- Low sample consumption, only need to use 1-20 $\mu$ L sample, can achieve accurate quantification;
- With data saving function, can save up to 10000 pieces of data;
- Data can be printed and exported;
- Customized sample standard curve;
- Reagent calculator, easy to configure the reagents needed;
- With automatic sleep function.

## Chapter 2 Specifications

### 2.1 Basic parameters

Parameters	Specifications
Ambient temperature	10°C~40°C
Relative humidity	≤70%
Input	24VDC 2A
Display	7 inch touch screen
Dimension(W×D×H)	161mm×287mm×61mm
N.W.(kg)	1.6kg

### 2.2 Performance parameter

Parameters	Specifications
Dynamic range	5 orders of magnitude
Light sources	Blue LED Red LED
Excitation wavelength	Blue 460±20nm Red 625±20nm
Emission wavelength	Green 525–570nm Red 670–725nm
Stability	≤1.5%
Detector	Photodiodes; measurement capability from 300–1000 nm
Assay speed	5s(single-pass)
Calibration type	2- or 3-point standard
Tube type	0.5mL colorless transparent tube

## Chapter 3 Instrument Structure

This chapter introduces the structure of instrument. If it is used for the first time, please read this chapter carefully to make a better preparation.

### Structure 1:

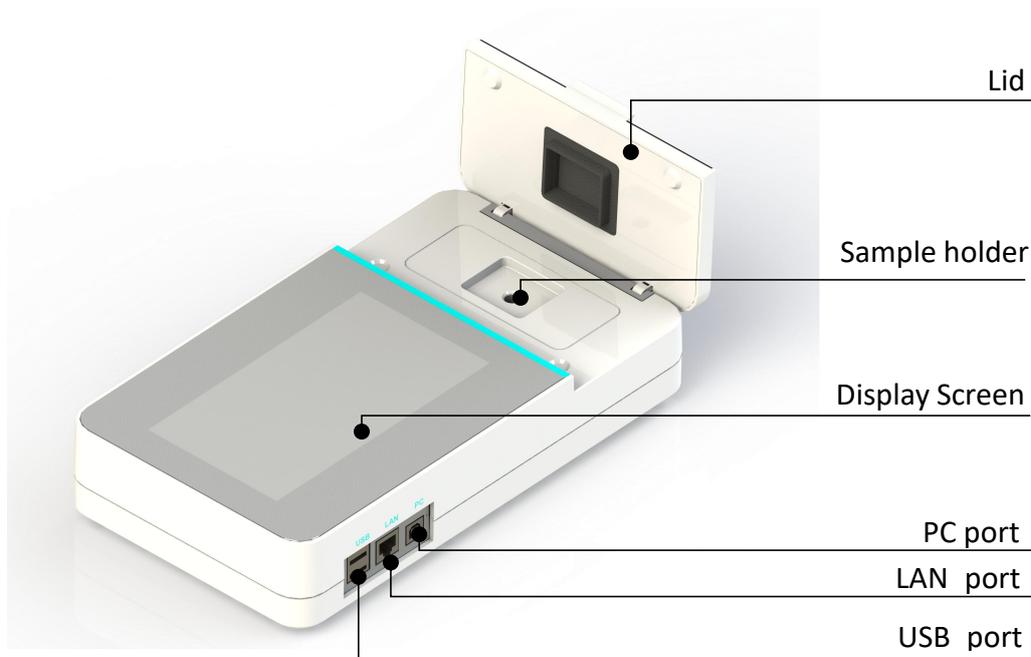


Fig 3. 1 Structure 1

### Structure 2:



Fig 3. 2 Structure 2

## Chapter 4 Installation

### 4.1 Opening Check

Each Fluo-200 has been inspected strictly before packing and transportation. Please check again when you receive it. Contact with your local distributor or manufacturer in case of:

- The package inverted or deformed;
- The package has an obvious stains of water;
- The package has marks of impact;
- The package has been opened.

Please check instrument and accessories if package is sound and intact.

- Check all accessories according to the packing list;
- Check instrument appearance if there is cracks, damage or deformation.

### 4.2 Installation Conditions

- Put on the dry, clean and horizontal worktable.
- Working conditions:  
Clean air without corrosion steam or dust.  
Temperature between +10°C to +40°C.

### 4.3 Installation Steps

- ① Take out the instrument on the worktable slowly and gently.
- ② Take out the 24V 2A power adapter and plug it into the socket on the back of instrument. Then connect another side to AC100~240V power supply.
- ③ Instrument will start to self-checking after power on, then get ready for testing.

### 4.4 Operating Considerations

Fluo-200 use 0.5ml fluorescence PCR to test sample.

Sample test steps:

- ① Insert fluorescence PCR tube into sample hole;
- ② Close lid; Click detecting button on the interface for testing.

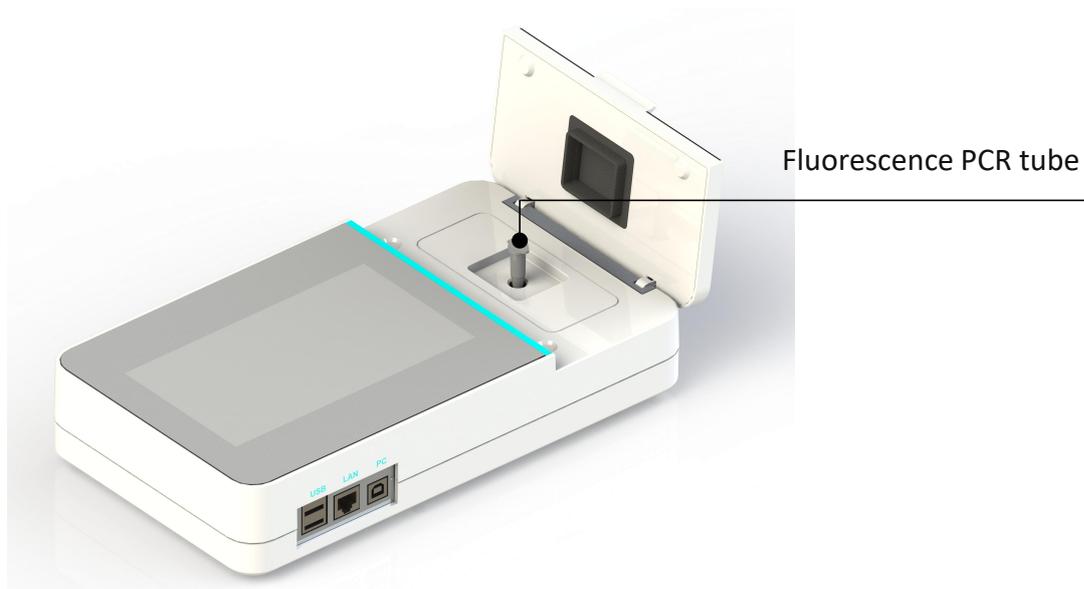


Fig 4. 1 Instrument operation diagram

## Chapter 5 Software Introduction

### 5.1 Self checking

This chapter mainly introduces fluo-200 program operation. After connect power supply, turn on the switch on the back of instrument. The instrument power on and enter into self checking interface, then into Login interface.

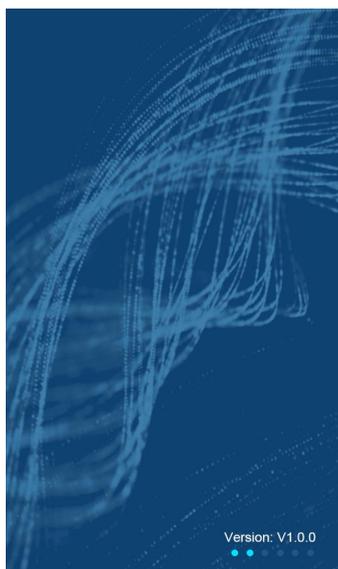


Fig 5. 1 Self checking interface

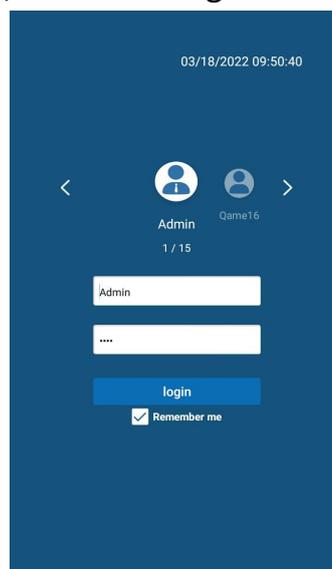


Fig 5. 2 Login interface

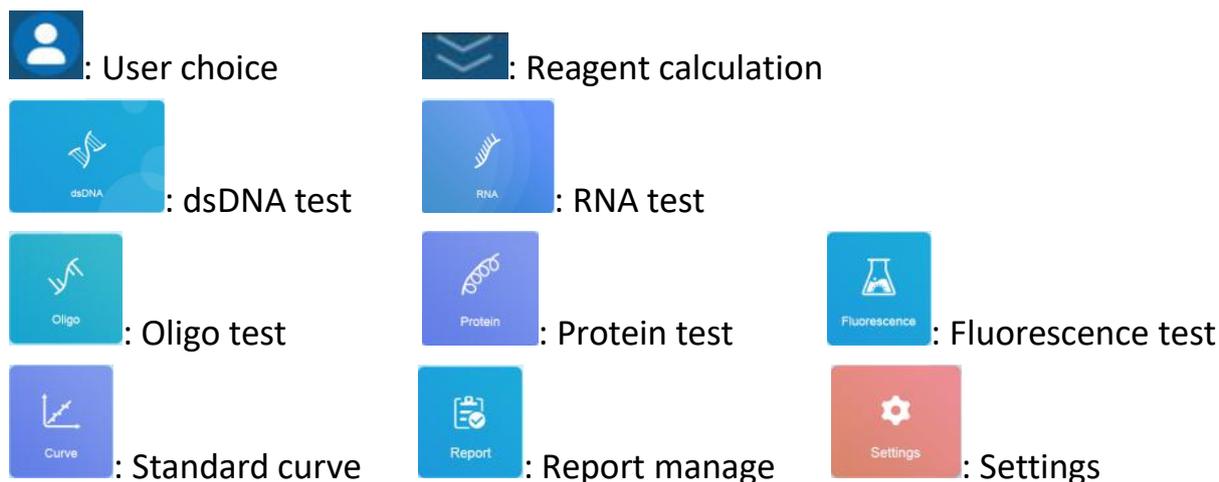
### 5.2 Main interface

After input user name and password, enter into main interface as below figure:



Fig 5. 3 Main interface

Button function in main interface:



### 5.3 dsDNA test

In main interface, click , options pop out, there are three test types: dsDNA: High Sensitivity, dsDNA: Broad Range, 1x dsDNA.

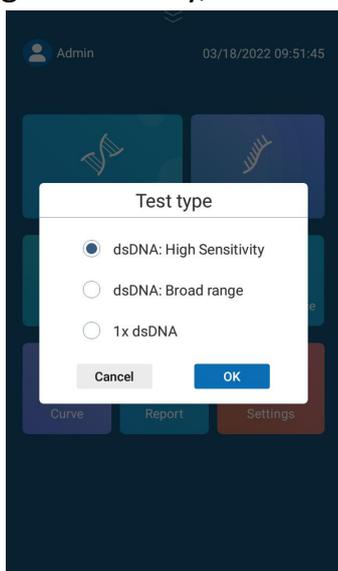


Fig 5. 4 Main interface > dsDNA test type



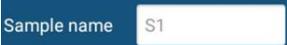
Fig 5. 5 dsDNA test

#### 5.3.1 Test interface

Select one test type, click OK, enter next interface. The following takes dsDNA: High Sensitivity as an example. The interfaces of other options are basically the same.

The specific functions are as follows:

: Select different standard curve;

: Input the sample name;

Unit  : Select different unit: ng/μL, ng/mL, μg/μL, μg/mL, mg/mL;



: Click to check calibration parameters;



: Click to print all current protocol test data;



: Click to test current protocol;



: Click to modify the protocol name;

Volume(μl)  : Set volume of original sample, range 1~20μL;

Original Conc.: Concentration of original sample;

RFU: Fluorescence value.

### 5.3.2 Curve calibration

This function is to use a small number of samples to calibrate the curve in the case of small drift, which can not only improve the accuracy of sample detection, but also save the sample and operation time of establishing standard curve.

Enter Running interface, when first time to click run button, curve calibration box will pop up:



Fig 5. 6 Curve Cali. box



Fig 5. 7 First Cali. point

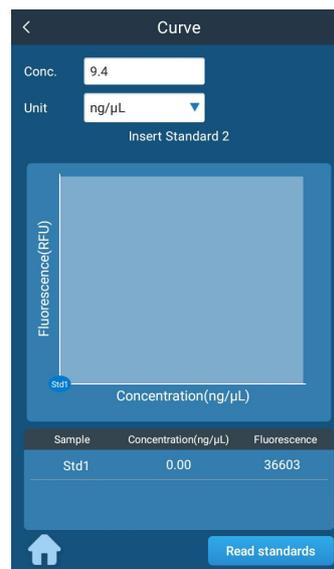


Fig 5. 8 Second Cali. point

If calibration has been carried out recently, the last set data can be selected; If recalibration is required, select the calibration button to calibrate.

Enter into calibration interface, insert information of standard sample 1 and then sample 2, click read to calibrate, then finish calibration.

### 5.3.3 Test

After calibration, input volume of the sample, click , start to test, it will display original concentration and RFU after testing; Swipe right or click the button at the bottom of the screen to view more samples' result, click the name of sample to modify this sample's name.



Fig 5. 9 Testing interface



Fig 5. 10 Testing result



Fig 5. 11 Modify name of sample

Function of buttons in testing result interface:



: Delete selected testing result;



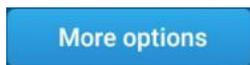
: Export all result of current testing;



: Print all result of current testing;



: Click to select calculator of Molarity or Normalization;



: Click to enter the application interface of kit number and

sample ID of the sample.

### 5.3.4 Molarity calculator

Click , select Molarity calculator, enter Molarity calculator

interface.

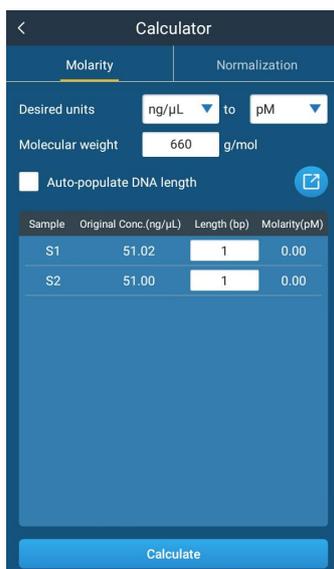


Fig 5. 12 Calculator selection box



Select the conversion unit, range: ng/μL, ng/mL, μg/μL, μg/mL, mg/mL;  
After conversion, the unit selection range is M, mM, μM, nM, pM.



Input Molecular weight, DsDNA is 660g/mol by default and can be changed manually.



Input DNA length, when tick Auto-populate DNA length, all lengths will automatically filled according to the length of the first sample.

### 5.3.5 Normalization calculator

Click Normalization button, enter Normalization calculator interface:

In the interface, it can choose the type of Normalization, For example molality, weight concentration, weight; And set final sample molarity, and final sample volume. After input parameters, click calculate to result interface.

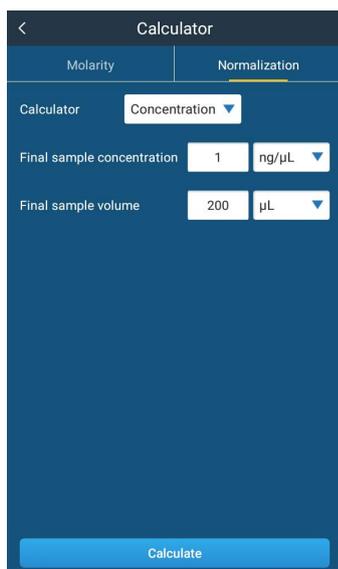


Fig 5. 13 Normalization calculate interface



Fig 5. 14 Result interface

The normalization result interface can be switched by clicking the button at the top TAB. The first interface shows the sample volume and buffer liquid volume to be added. On the second interface, if secondary dilution is required, the dilution ratio and the concentration after dilution are displayed. The final interface shows the concentration of the original sample.

Click Export to export current data to USB disk.



Fig 5. 15 Secondary dilution



Fig 5. 16 Concentration of the original sample

**Note: As the software function of dsDNA, RNA, Protein, Oligo are same, Only the dsDNA testing are described in detail in the operation manual.**

## 5.4 Fluorescence

In main interface, click , the options box is displayed, showing three test types: Blue 470nm, Red 635nm, Blue&Red.

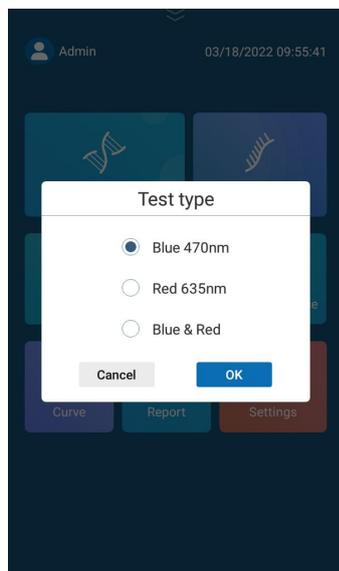


Fig 5. 17 Fluorescence test type



Fig 5. 18 Blue 470nm test



Fig 5. 19 Blue&amp;Red test

Blue 470nm and Red 635nm are single wavelength test, Blue&Red is dual-wavelength test.

Single wavelength test interface is almost same. Take Blue 470nm fluorescence test as an example. Click , start testing, after test, original fluorescence value is displayed, and several tests value displayed at the bottom; It is also do delete, export and print data according to the buttons in the upper right corner.

Dual-wavelength test interface is a little different, click  to start testing, after test, display two channel original fluorescence values. Other functions are basically the same as single wavelength.

## 5.5 Calculator

Pull the upper button , enter calculator interface:

Buffer configuration calculator: Input the number of samples, standard samples, choose whether to include overage samples; After input the corresponding

parameters will automatically calculate the required dye and buffer liquid volume.

Test range calculator: By selecting test type, measurement unit, and original sample volume, the range of test can be calculated automatically.

The two calculator interfaces can be switched by swiping left or right, slide up  to return to the previous page.

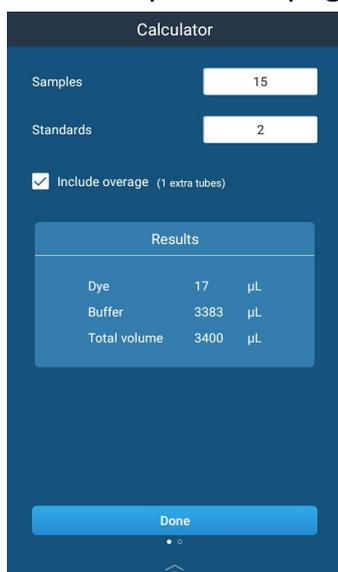


Fig 5. 20 Buffer configuration calculator

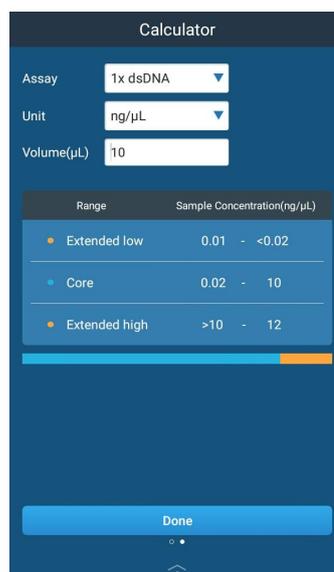


Fig 5. 21 Test range calculator

## 5.6 Standard curve

In the main interface, click  to enter standard curve interface:

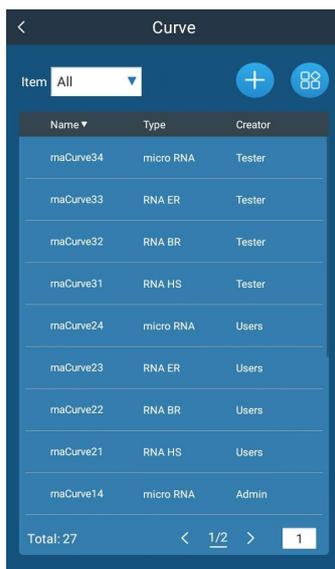


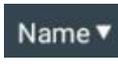
Fig 5. 22 Standard curve interface

Function of buttons in current interface:

: Filtered against item, such as dsDNA, RNA, Oligo, Protein;

: New standard curve;

: Manage standard curve;

: Filtered against name;

: Filtered against type;

: Filtered against creator.

### 5.6.1 New standard curve

Click new icon, The new curve category selection box is displayed, select item and test type, and input the name of curve; Click OK after confirmation, enter new curve interface.

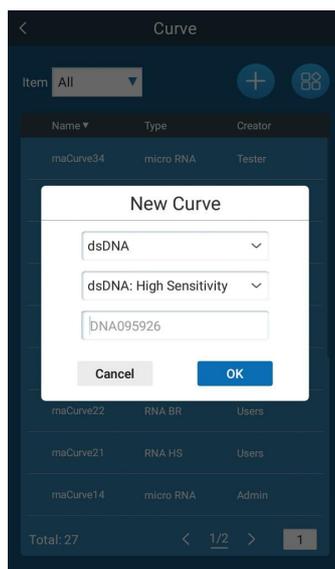


Fig 5. 23 New curve category selection box

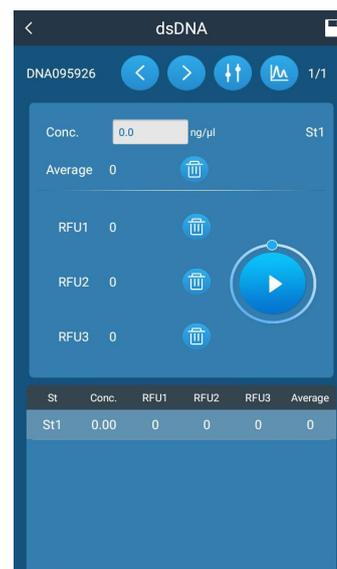


Fig 5. 24 New curve interface

Function of buttons:

: Click to check last point data;

: Click to view data of next point or add sample point;

: Click to enter parameter settings;

: Click to fit the current standard curve;

: Click to delete data of RFU1/RFU2/RFU3 or delete sample point;

: Click to test fluorescence value;

**Note:** For each standard sample, the average of fluorescence values from up to 3 tests can be used for curve fitting, less than 3 tests, no limit; For more than 3 tests, the top fluorescence value will be removed, and the latest test will be shown at the bottom. At least one fluorescence value can be used for curve fitting.

## 5.6.2 Curve manage

Click  to enter curve manage interface:

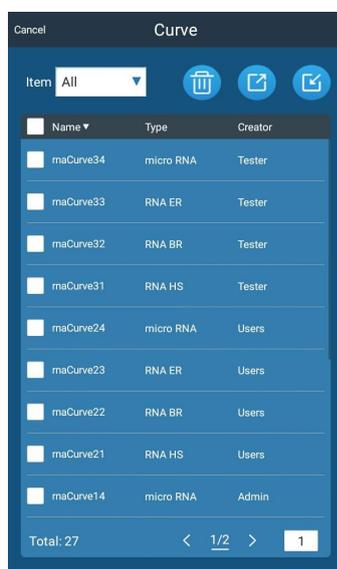


Fig 5. 25 Curve manage interface

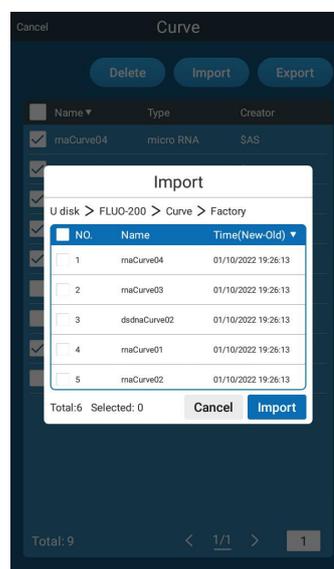


Fig 5. 26 Import curve

Function of buttons:

: Delete selected curve;

: Insert U disk, and import curve from U disk to instrument;

: Insert U disk, and export curve from instrument to U disk.

## 5.7 Report

In the main interface, click  to enter report interface, input keywords in

the search box to quickly find the test report.



Fig 5. 27 Report interface



Fig 5. 28 Quickly search

Click report to check tested data, click the sample again to view the detailed test data.



Fig 5. 29 Tested data



Fig 5. 30 Detailed test data

## 5.8 User manage

Click  in the main interface, display    ;

 : User settings, Administrators can manage common users, add, delete, modify the number and password of common users; Common users can only change their own passwords.

 : User switch, Click to enter login interface, and can switch user.

## 5.9 Settings

Click  in the main interface, enter settings interface;

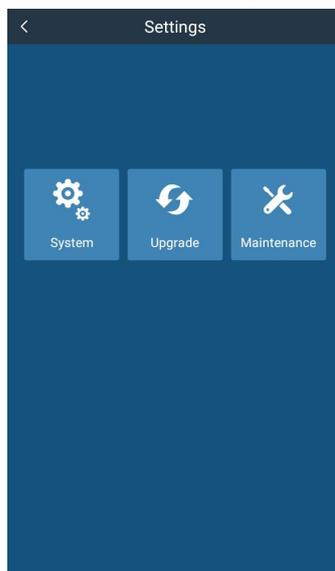


Fig 5. 32 Settings interface

Function of buttons:



system settings



Upgrade



Maintenance

### 5.9.1 System settings

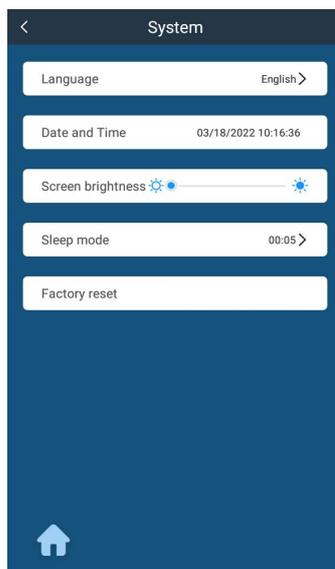


Fig 5. 32 System settings



Click  to enter system settings:

Language: Select Chinese or English;

Date and time: Set system date and time;

Screen brightness: Adjust screen brightness;

Sleep mode: Turn on or off sleep mode, set sleep time;

Factory reset: After click, option box pop-up, it can choose the content to restore factory Settings, such as user, standard curve, report.

### 5.9.2 Upgrade



Click , enter upgrade interface, display version of software and firmware.

Insert U disk with new one, click the software or firmware to upgrade.



Fig 5. 33 Upgrade interface

### 5.9.3 Maintenance



Click , input password, enter maintenance interface:

## Chapter 6 Maintenance, Storage & Transportation

### 6.1 Maintenance

- Keep storage environment dry and clean to prevent from moisture, corrosion, strong electromagnetic interference sources.
- Instrument already calibrated before delivery. User is not allowed to disassemble the instrument. Any deficiency occurs, please contact manufacturer.
- Continuous emergency turning on/off is not allowed.
- The power supply voltage must meet the specified range.

### 6.2 Storage and transportation

- Storage in the room temperature of  $-10^{\circ}\text{C} \sim 40^{\circ}\text{C}$ , relative humidity less than 80%, without corrosive gas and with good ventilation.
- Avoid strong shock, vibration, and humidity during transportation.

## Chapter 7 Fault Analysis and Treatment

### Fault Analysis and Solutions:

No.	Fault phenomenon	Possible Causes	Solutions
1	Instrument can not start	Power defective	Check the power supply; Check whether the plug is loose
2	Light source can not light up	Power of light source failure; Module poor contact	Check the power; Check whether the module is loose, if loose Contact with distributor or manufacturer
3	Measurement not stable	PCR tube isn't in place	Check the PCR tube and press it in place
4	Measurement not accuracy	Linear of standard curve is bad; Instrument drifting	Check standard solution and reset standard curve; Calibrate standard curve

## Memo