

# Portable Fluorometer Fluo-100

## User's Manual

Version 1.0



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## **Foreword**

Thank you for purchasing our Fluorometer. This user manual describes how the instrument works and the operation guide, please read carefully before operating it. Keep user manual for later use in case you meet with difficulties.

## **Opening Check**

Please check the instruments as well as all accessories with packing list when you first open it. If you find anything wrong or missing, please contact distributor or manufacturer.

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# Safety and Operating Precautions

## 1. Safety Information

To assure the safe operation, please read this manual carefully before operating.



**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.



Read this manual carefully before operating the instrument. Only the qualified person who have the skill or experience can operate it.



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. Insert and pull plug with hand. Make sure plug insert to jack completely.



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 ,and make sure it covered with a cloth or plastic paper to prevent from dust.

Pull off the connector plug immediately in following cases, and contact supplier or skilled maintenance to manage:



- There is some liquid flowing into the Instrument.
- Drenched or fire burned.
- Instrument dropping or outer shell damaged.
- Malfunction.

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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, receptor, antibody), nucleic acid, hormone (steroid, thyroid hormones), medicine and microorganism.

Fluo-100 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.

## Chapter 2 Specifications

### Normal Operating Conditions

Ambient temperature: 4°C ~ 45°C

Relative humidity: ≤70%

INPUT Voltage: DC 6~35 V

### Basic Parameters and Performance

Model Parameters	Fluo-100A、Fluo-100B、Fluo-100C
Light source	Monochromatic LED
Power	< 5 W
Linearity	$R^2 > 0.995$
Repeatability	<1.5%
Stability	<1.5%
Sensitivity	Ds DNA: 1ng/ml;
Assay speed	3s (single-pass)
Dimension (W*D*H)	194*155*72.5 mm
N.W. (kg)	0.4Kg

### Models and Specification

Model	Description	Light sources	Excitation wavelength	Emission wavelength
Fluo-100A	Fluorometer	UV LED	365±20nm	420-480nm (60nm)
		Blue LED	460±20nm	525-570nm (45nm)
Fluo-100B	Fluorometer	Blue LED	460±20nm	525-570nm (45nm)
		Red LED	625±20nm	670-725nm (55nm)
Fluo-100C	Fluorometer	Blue LED	460±20nm	525-570nm (45nm)
		Green LED	525±20nm	575-640nm (65nm)



# 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:

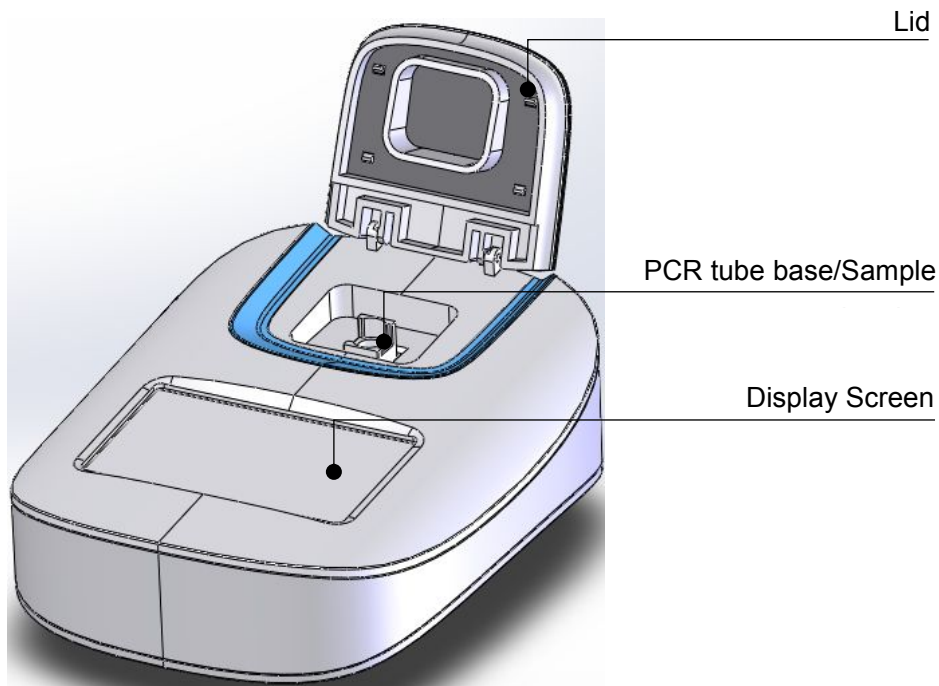


Fig3.1 Structure1

## Structure 2:

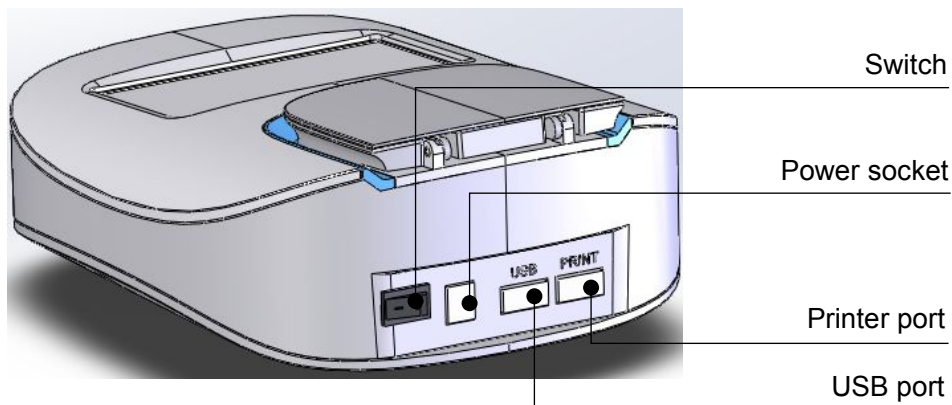


Fig3.2 Structure2

## Chapter 4 Installation

### 4.1 Opening Check

Each Fluo-100 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. Switch off the instruments with the button on the back of instrument. Take out the 12V 1A power adapter and plug it into the socket on the back of instrument. Then connect another side to AC100~200V power supply.
3. Instrument will start to self-testing after power on, then get ready for assay.

### 4.4 Operating Considerations

Cuvettes, 0.2ml fluorescence PCR tube and 0.5ml fluorescence PCR tube can be used for sample test on Fluo-100.

**NOTE:** Fluorescence PCR tube should be used with tube base together.

Sample test steps:

1. Insert PCR tube base first, as fig4.1.
2. Insert fluorescence PCR tube into tube base.
3. Close lid;Click “detecting” for testing.

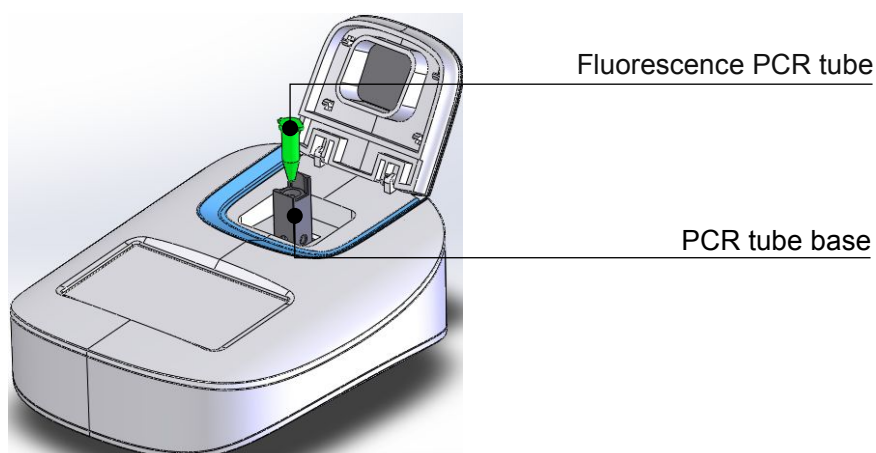


Fig4.1 Sample Test Steps

To insure the effect of test results, volume of sample should be 3ml for cuvette, 0.1ml for 0.2ml fluorescence PCR tube, and 0.2ml for 0.5ml fluorescence PCR tube.

Please use corresponding solvent diluting sample to reach the require volume if sample is not enough. Pay attention to that concentration range should be within the limit of detection, and the sample volume should be equal to volume of standard curve.

# Chapter 5 Software Introduction

## 5.1 Self Testing

Instrument will start self testing once powered on.



Fig5.1 Starting Interface

## 5.2 Home Interface

Instrument enters into below home interface after self testing finished.



Fig5.2 Home Interface


There are three function icons on the top of the interface. Touch each icon into corresponding interfaces.



Home Interface, as default interface after self-testing.

 Report

Report Interface, for looking up all history test datas according to different sorts.

 Settings

System Settings Interface, do a series of normal settings.

In the interface of home interface, there are six icons:



Fluorescenter: Fluorescence detection;



dsDNA: dsDNA detection;



RNA: RNA detection;



Protein: Protein detection;



Oligo: Oligo detection;



Custom: Custom detection;

Click Fluorescence Detection icon; Choose fluorescence channel to fluorescence detection. There is only fluorescence detecting without curve building or concentration analysis. But you can set and calibrate standard curve, detect sample by clicking the other five icons. The function of the five icons is same. It is convenient for you to manage datas of different kinds of sample.

## 5.2.1 Fluorescence Detection

Click icon “Fluorescence” to enter fluorescence detection interface (as Fig5.3):

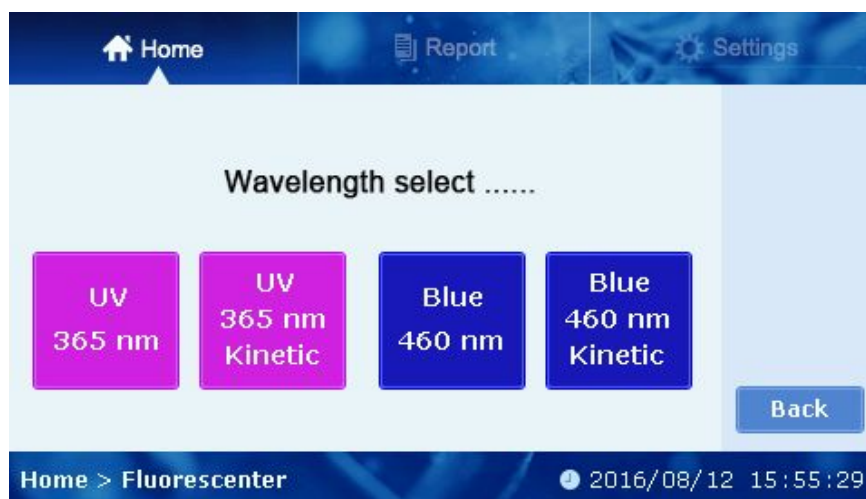


Fig5.3 Home>Fluorescenter

In this interface fluorescence detection channel is optional. There are two detection modes in each channel: normal (single) detection mode and kinetic (continuous) detection mode.

**NOTE:** There are two channels in the device, thus detection channel should be selected before detecting. Choose the detection channel according to excitation and emission

wavelength ,otherwise you can't get the right result.

Blue  
460 nm

460nm Normal Detection Mode. Click the button to enter normal detection mode of fluorescence detection(Fig5.4).



Fig5.4 Home>Fluorescenter>Blue 460nm

Blue  
460 nm  
Kinetic

460nm Kinetic Detection Mode. Click the button to enter 460nm kinetic detection interface as below (Fig5.5):



Fig5.5 Home>Fluorescenter>Blue 460nm Kinetic

You can set interval time and total run time via click “-” and “+” of kinetic detection. Then click “Detecting” to run kinetic detection (Fig5.6).



Fig5.6 Home&gt;Fluorescenter&gt;Blue 460nm Kinetic&gt;Detecting

Click **Stop** to stop kinetic detection;

Click **Curve** to check the kinetic curve (Fig5.7).



Fig5.7 Kinetic Detection Curve

NOTE: Different channel has different excitation and emission wavelength, see the details in Chapter 2.

### 5.2.2 dsDNA Detection

NOTE: The software functions of dsDNA, RNA, Protein, Oligo and Custom are same, so this manual only introduce the software function of dsDNA detection.

Click “dsDNA” to enter the interface as below (Fig5.8):





Fig5.8 Home&gt;dsDNA



Detecting

Sample Detecting. Choose standard curve to detect fluorescence value and calculate concentration of the sample.

**NOTE:** If there is no standard curve, this item is not available.



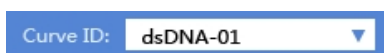
Standard Curve

Standard Curve. Use standard sample to build standard curve for calculating sample concentration.



Calibration

Calibration Curve. Calibrate standard curve to eliminate deviation of instrument in drifting.



Name of Curve. There are five default names of curves: dsDNA-01—dsDNA-05. Click pull-down menu to build new curve or choose the existing curve (Fig5.9).



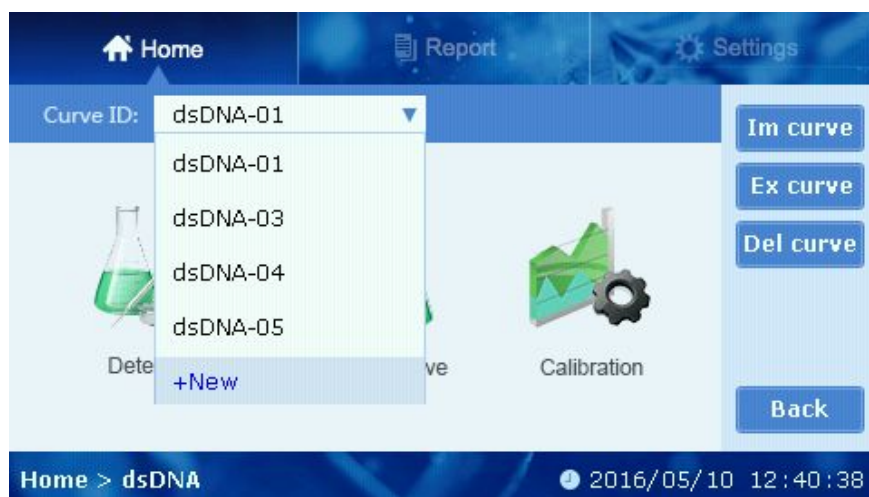


Fig5.9 Curve ID

**Im curve** Import Curve. Import curve to Fluo-100 via U flash disk which was exported from Fluo-100 to the U flash disk before. Click “Im curve” to choose the curve data you want to import (Fig5.10).

**Ex curve** Export Curve. Export curve which is useless for the moment to U flash disk. Click “Ex curve” to export curve data you need (Fig5.11).

**Del curve** Delete Curve. Click “Del curve” to delete curve data (Fig5.12).

**Back** Back to the main interface.



Fig5.10 Import Curve



Fig5.11 Export Curve



Fig5.12 Delete Curve

### 5.2.2.1 Standard Curve

Choose a Curve ID or create a new curve to enter “Standard Curve” interface (Fig5.13). In this interface, there are three icons: Parameter, Curve Fitting, View Curve.



Fig5.13 Home&gt;dsDNA&gt;Standard Curve

## 1. Parameter



Click Parameter and set excitation or emission wavelength and concentration unit of curves(Fig5.14).



Fig5.14 Home&gt;dsDNA&gt;Standard Curve&gt;Parameter

## 2. Curve Fitting



Click “Curve Fitting” and standard samples are detected to fit standard curve. You can set concentration of standard sample in this interface, then check the fitting curve,

concentration and fluorescence values (Fig5.15).

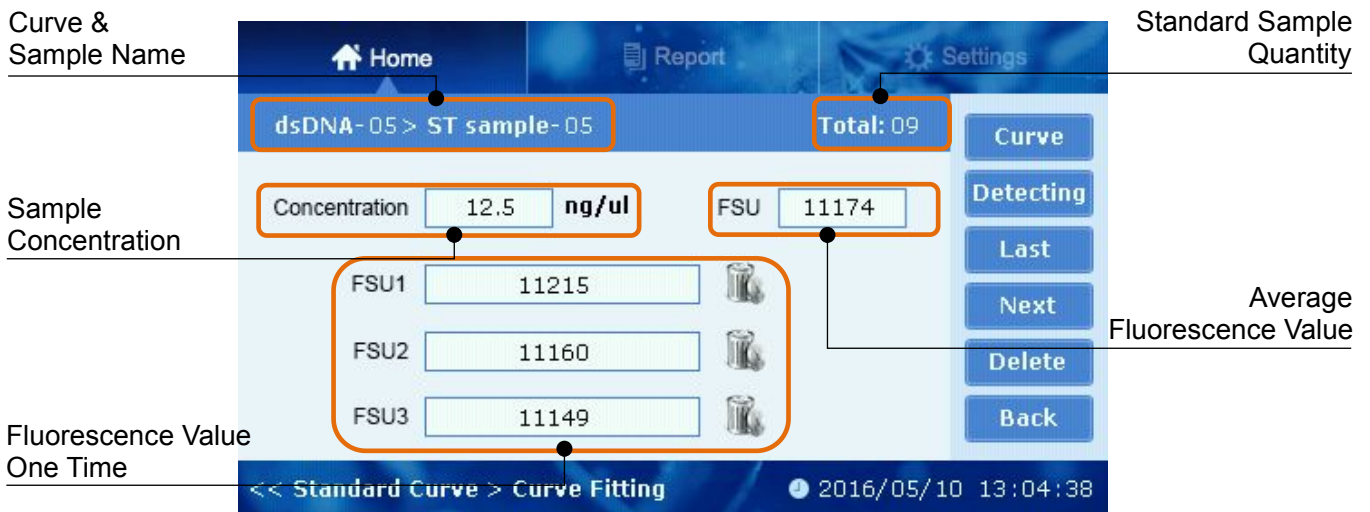


Fig5.15 Home>dsDNA>Standard Curve>Curve Fitting

NOTE: Fluorescence detection without setting concentration is available while the fluorescence value will not be saved. There are at most three average fluorescence values that can be used for fitting standard curve and one average value at least.

**Curve** Check standard curve. Check standard curve when fluorescence values of standard sample are over three(Fig 5.16).

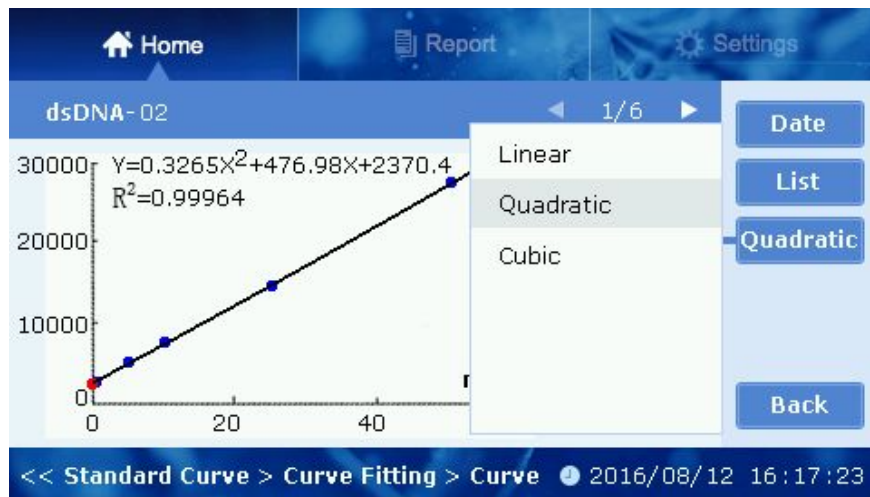


Fig5.16 Curve Checking

Click **Date** to check current curve, sample number, concentration and corresponding fluorescence values.

Click **List** to check list of concentration and fluorescence values of standard sample.

Click **Quadratic** to choose the mode of curve fitting. There are three modes: Linear, Cubic

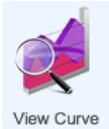
and Quadratic.

**Detecting** Detecting the fluorescence value of sample.

**Next** **Last** Check the previous sample; Check the next sample.

**Delete** Delete the current standard sample data.

### 3. View Curve



View concentration, fluorescence values and equation of current curve (Fig5.17).

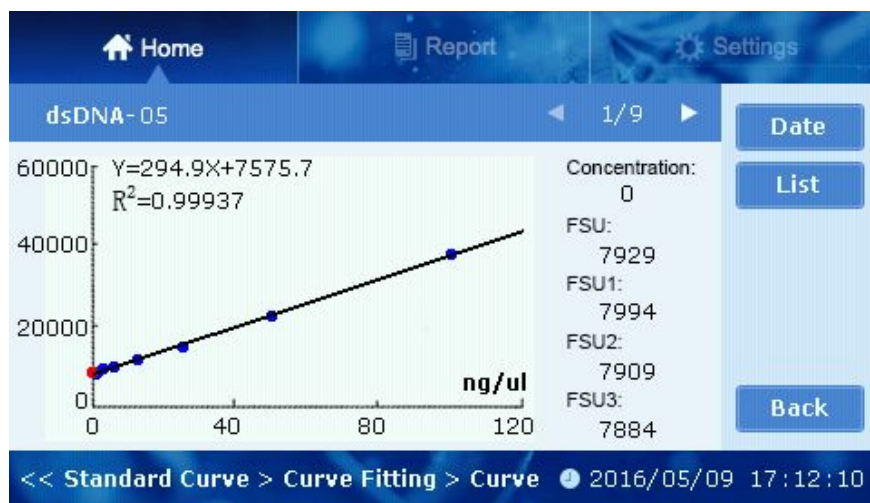


Fig5.17 Home>dsDNA>Standard Curve>View Curve

Click **Date** to view excitation or emission wavelength and setting time of the curve .

Click **List** to view the data list of standard curve (Fig5.19).



Fig5.18 View Curve Data



No.	FSU	Concentration( ng/ul )
ST Sample-01	7929	0
ST Sample-02	7771	0.8
ST Sample-03	8022	1.6
ST Sample-04	8761	3.12
ST Sample-05	11174	12.5
ST Sample-06	14525	25

Fig5.19 View Curve List

### 5.2.2.2 Detecting

You can use the standard curve to detect the sample. Click “Detecting” to enter the interface (Fig5.20).

Fig5.20 Detecting Interface

You can set the volume of original sample in the PCR tube, thus the concentration of the original sample will be calculated after detecting. Click “-” or “+” to set the volume.

NOTE: Sample volume is 200uL for 0.5ml qPCR tube,100uL for 0.2ml qPCR tube; Range of sample volume is 1-20uL.

Click “Detecting” to detect after putting test tube into instrument. Fluorescence value will be displayed after detecting,and concentration will be calculated according to standard curve.

Detecting data will be saved automatically after detecting. You can delete the useless data. It can save 30 data of each sample detecting at most. Once it is full, the earliest data will be covered. The data can be checked in “Report”.

### 5.2.2.3 Calibration

You can calibrate the instrument via using a small amount of samples (1-3) to improve the accuracy of detection (Fig 5.21). It also helps to save time and samples of setting standard curve.

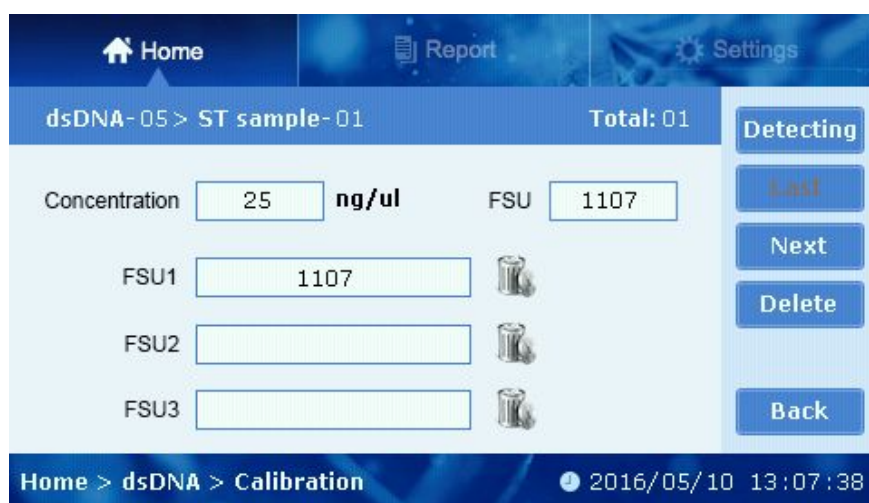


Fig5.21 Calibration Interface

NOTE: You can prepare 1-3 samples to calibrate the instrument according to the below principles:

1. Single point calibration, using blank solution to calibrate.
2. Two point calibration, using a high and a low concentration sample to calibrate.
3. Three point calibration, using a high, middle and a low concentration sample to calibrate.

Normally, two point calibration is enough.

## 5.3 Report

Click “Report” to enter the report interface (Fig5.22).

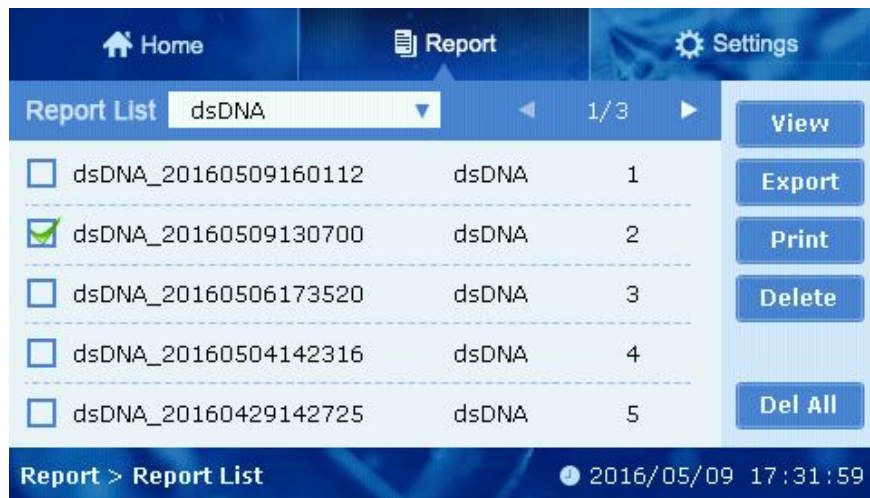


Fig5.22 Report Interface

You can view, print, export and delete the detected data.

**Report List** dsDNA Click the drop-down list of “Report List” to select the different kinds of test data (Fig5.23).



Fig5.23 Report List

**View** View the selected results. Delete and print the selective data. In the view interface, “Concentration” is the concentration of original sample; “Volume” is the volume of original sample added to the test tube (Fig5.24).

**Export** Export all the detecting data to the U disk.

**Print** Print the detecting data you choose .

**Delete** Delete the detecting data you choose .

**Del All** Delete all the detecting data.



NOTE: Once the data is deleted, it can not be recovered.



The screenshot shows the 'Report' view interface. At the top, there are navigation tabs for 'Home', 'Report', and 'Settings'. Below the tabs, the current report details are shown: 'ITME: dsDNA' and 'Unit: ng/ml'. A table with 6 rows of data is displayed. The table has columns for 'NO.', 'Concentration', 'Volume', 'FSU', and 'Time'. The first row is selected with a checkmark. To the right of the table are buttons for 'Print', 'Delete', and 'Back'. At the bottom, there is a status bar showing 'Report > Report List > View' and the date/time '2016/08/12 16:21:48'.

NO.	Concentration	Volume	FSU	Time
<input checked="" type="checkbox"/> 1	1.27E+3	2	8496	16:20:55
<input type="checkbox"/> 2	515	5	8566	16:20:59
<input type="checkbox"/> 3	506	5	8466	16:21:04
<input type="checkbox"/> 4	1.26E+3	2	8479	16:21:07
<input type="checkbox"/> 5	631	4	8446	16:21:18
<input type="checkbox"/> 6	634	4	8480	16:21:25

Fig5.24 View Interface

## 5.4 Settings

You can set “Time”, “LCD”, “Print” and “Update” in settings interface(Fig 5.25).



Fig5.25 Settings Interface

### 5.4.1 Time

Click “-” or “+” button to set the date and time (Fig5.26).



Fig5.26 Settings&gt;Time



Save the date and time you have setted and back to the “Settings” interface.



Give up setting and back to the “Settings” interface.

## 5.4.2 LCD

Click “LCD” to set the screen (Fig5.27).

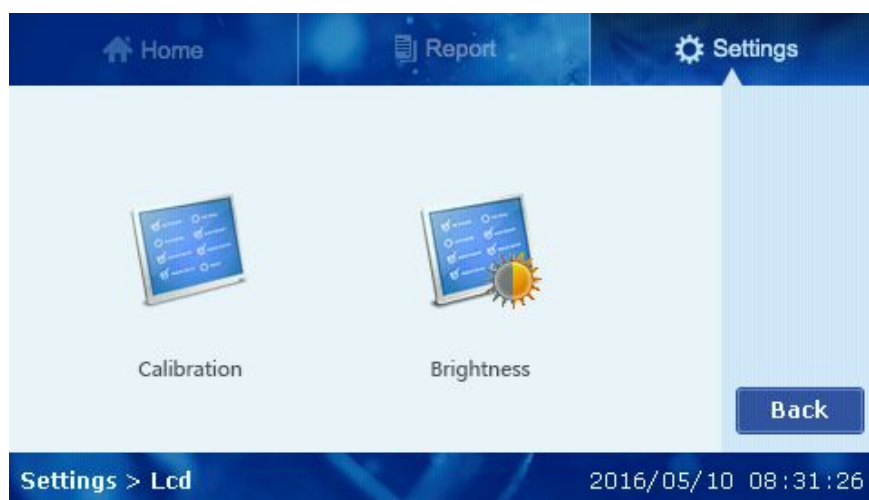


Fig5.27 Settings&gt;LCD

“Calibration”: According prompt message to calibrate accuracy touch spot of the screen (Fig 5.28).

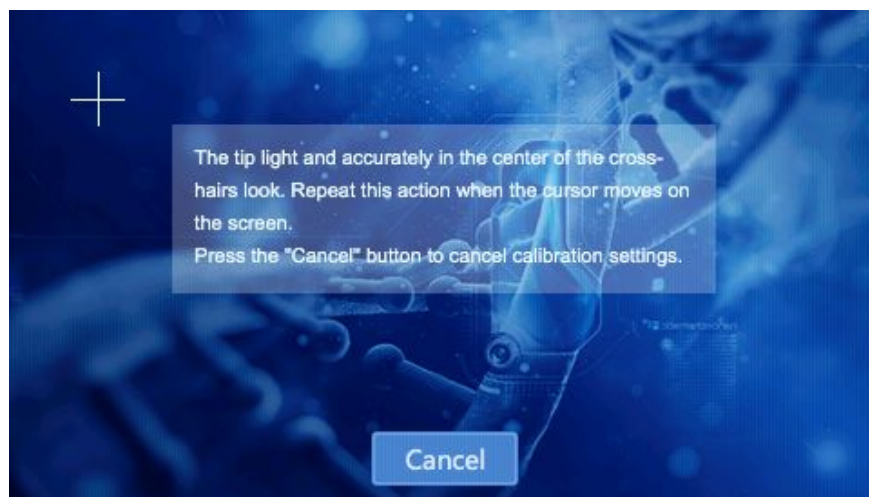


Fig5.28 Settings&gt;LCD&gt;Calibration

“Brightness”: Click “—” or “+” button to set the screen brightness (Fig5.29).

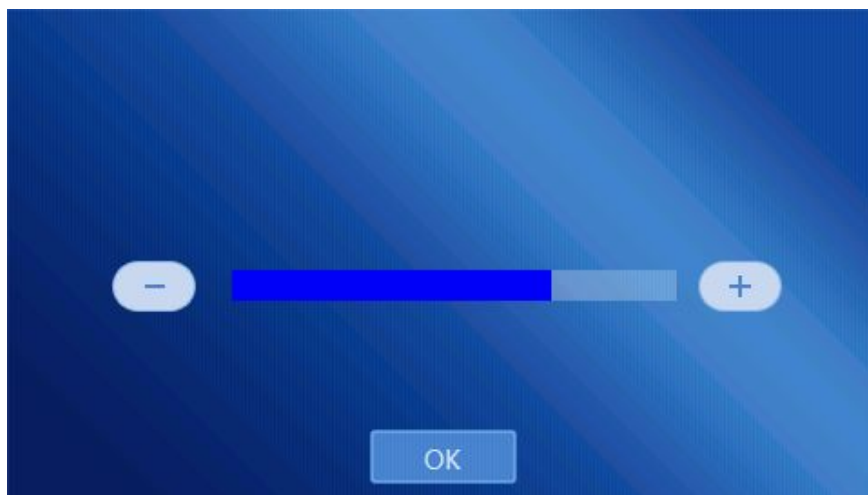


Fig5.29 Settings&gt;LCD&gt;Brightness

### 5.4.3 Print

This instrument is equipped with a thermal printer via “USB” to connect with. Click “Print” to enter the setting interface (Fig5.30).



Select the mode of auto print, it will print the detecting data after you detect sample every time.



Save the setting and back to the “Settings” interface.



Back to the “Settings” interface.



Fig5.30 Settings&gt;Print

#### 5.4.4 Update

Insert the U disk which has stored new version of software and click “OK” button to update the instrument (Fig5.31). You need to restart the instrument to complete update.



Fig5.31 Settings&gt;Update

# Chapter 6 Maintenance, Storage and Transportation

## 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.
- Make sure apply the device with correct input voltage scope.

## 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

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
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	Reset standard curve; Calibrate standard curve

## Chapter 8 Accessories

No.	Item	Unit	Qty	Remark
1	Power adapter	EA	1	9V 1.5A
2	Touch pen	EA	1	
3	0.5ml PCR tube holder	EA	1	
4	User manual	EA	1	
5	Usb stick	EA	1	8 GB

**Memo:**









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