Kalstein®

Portable Fluorometer

YR412

Instruction User Manual

Thank you very much for purchasing our Portable Fluorometer YR412.

Please read the “Operating Instructions” and “Warranty” before operating this unit to assure proper operation. After reading these documents, be sure to store them securely together with the “Warranty” at a hand place for future reference.

 Warning: Before operating the unit, be sure to read carefully and fully understand important warnings in the operating instructions.

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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 instrument is not a medical device andis 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 conforms 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 inthe place where personnel ambulate. 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.

Contents

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, ectosome, antibody), nucleic acid, hormone (steroid, thyroidhormones), medicine and microorganism.

YR412 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℃ ~ 45℃

Relative humidity：≤70%

INPUT Voltage： DC 6~35 V

Basic Parameters and Performance

Model / Parameters	YR412A、YR412B、YR412C
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
YR412A	Fluorometer	UV LED	365±20nm	420-480nm (60nm)
		Blue LED	460±20nm	525–570nm (45nm)
YR412B	Fluorometer	Blue LED	460±20nm	525–570nm (45nm)
		Red LED	625±20nm	670–725nm (55nm)
YR412C	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 readthis chapter carefully to make a better preparation.

Structure 1：

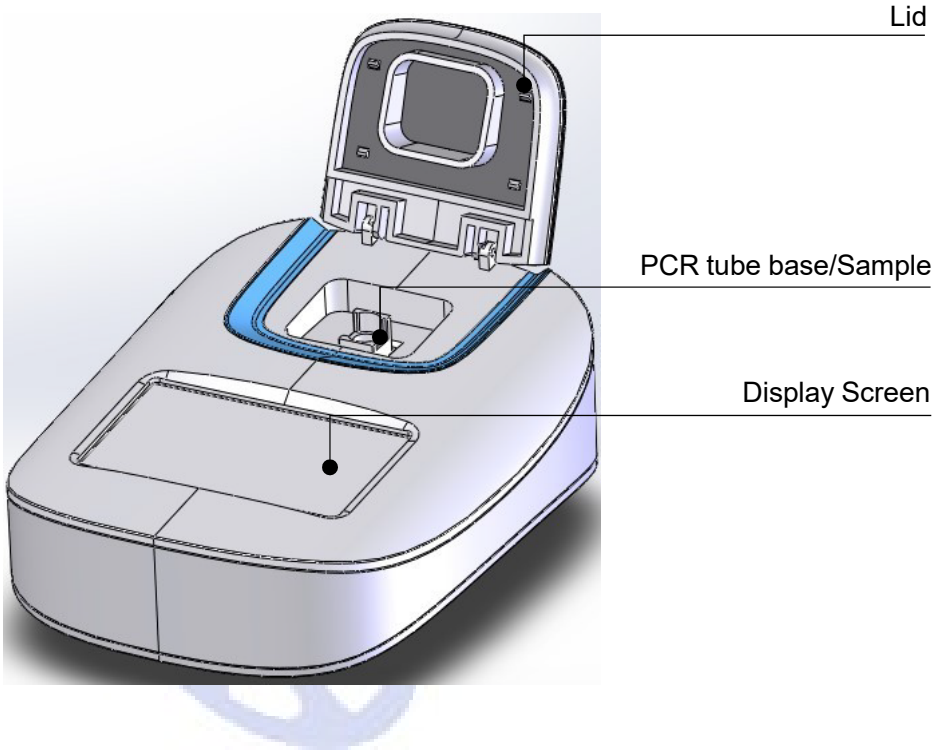

Fig3.1 Structure1

Structure 2：

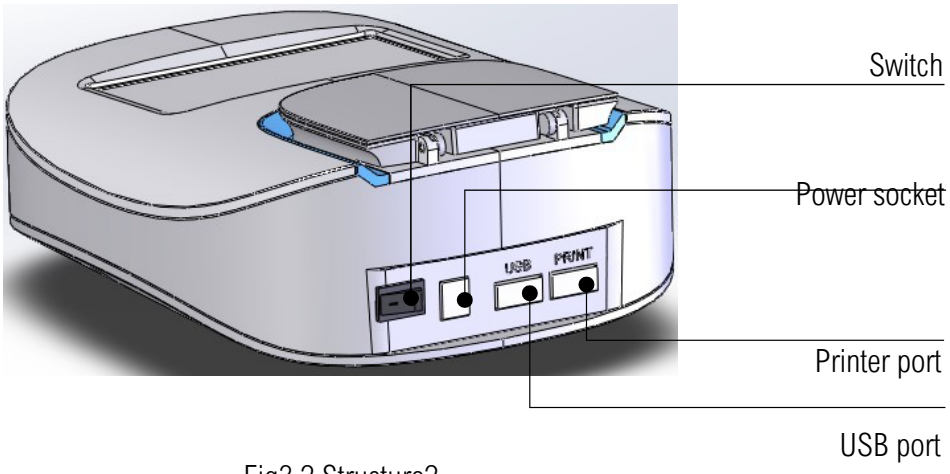

Fig3.2 Structure2

Chapter 4 Installation

4.1 Opening Check

Each YR412 has been inspected strictly before packing and transportation. Please checkagain 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 1Apower 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

0.2ml fluorescence PCR tube and 0.5ml fluorescence PCR tube can be used for sample teston YR412.

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.

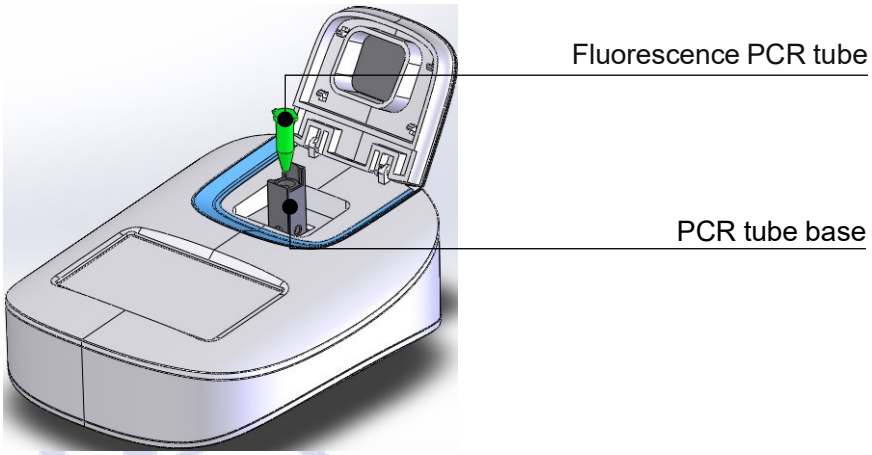

Fig4.1 Sample Test Steps

To insure the effect of test results,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 intocorresponding interfaces.

Home Interface, as default interface after self-testing.

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

System Settings Interface, do a series of normal settings.In the interface of home interface, there are six icons:

: Fluorescence detection;

: dsDNA detection;

: RNA detection.

: Protein detection;

: Oligo detection；

: 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 data of different kinds of sample.

5.2.1 Fluorescence Detection

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

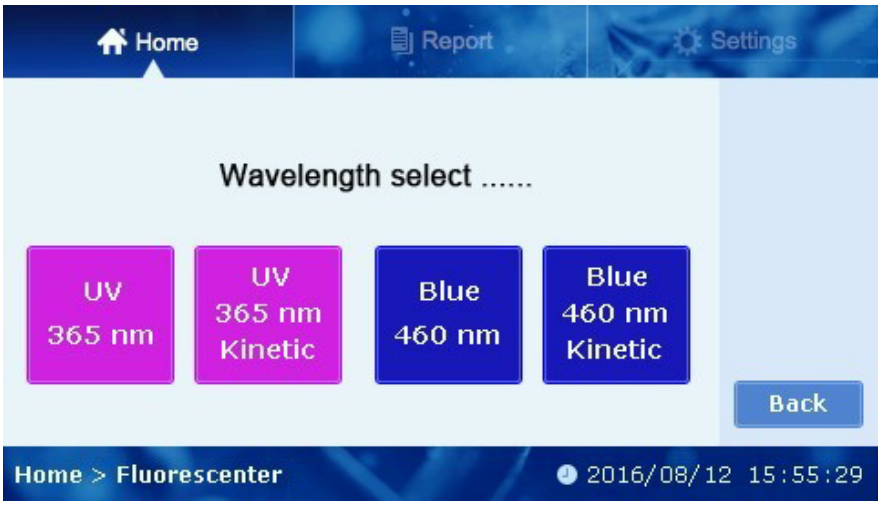

Fig5.3 Home>Fluorescent

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

NOTE: There are two channels in the device, thus detection channel should be selectedbefore detecting. Choose the detection channel according to excitation and emission wavelength, otherwise, you can't get the right result.

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

Fig5.4 Home>Fluorescent>Blue 460nm

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

Fig5.5 Home>Fluorescent>Blue 460nm Kinetic

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

Fig5.6 Home>Fluorescent>Blue 460nm Kinetic>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 detailsin Chapter 2.

5.2.2 dsDNA Detection

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

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

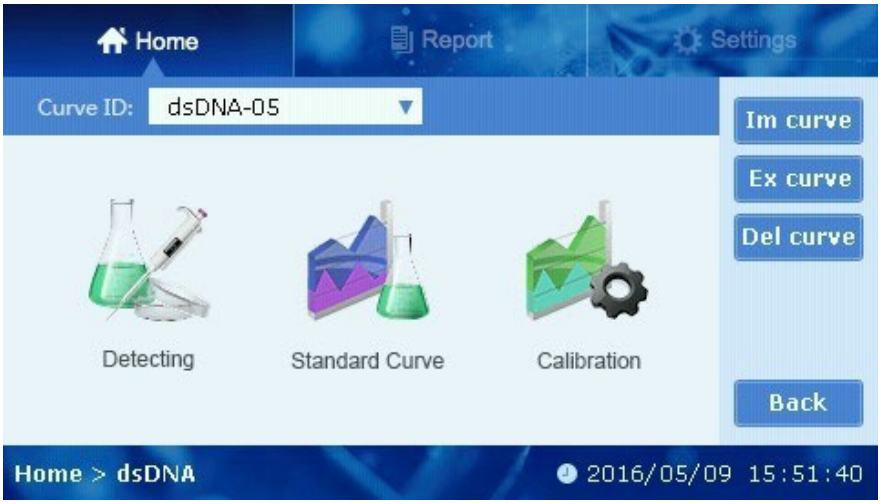

Fig5.8 Home>dsDNA

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

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

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

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 existingcurve (Fig5.9).

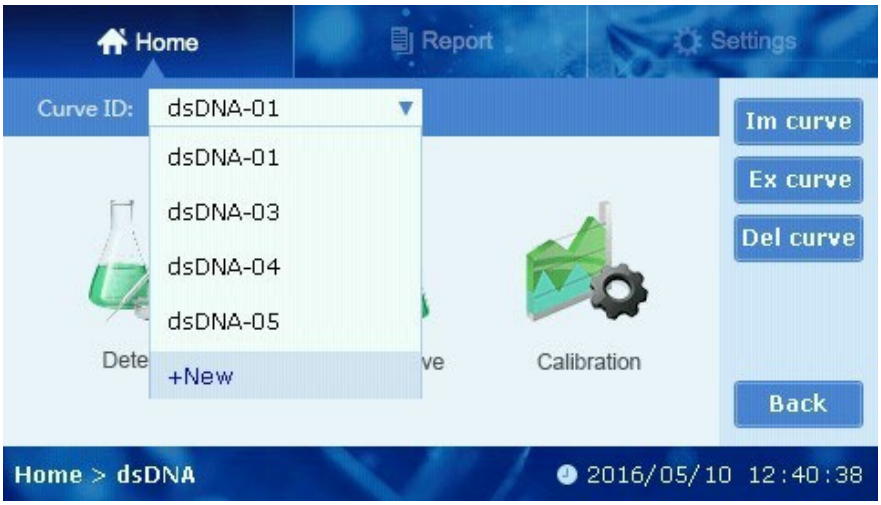

Fig5.9 Curve ID

Im curve Import Curve. Import curve to YR412 via U flash disk which was exported from YR412 to the U flash disk before. Click “Im curve” to choose the curve data youwant 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.

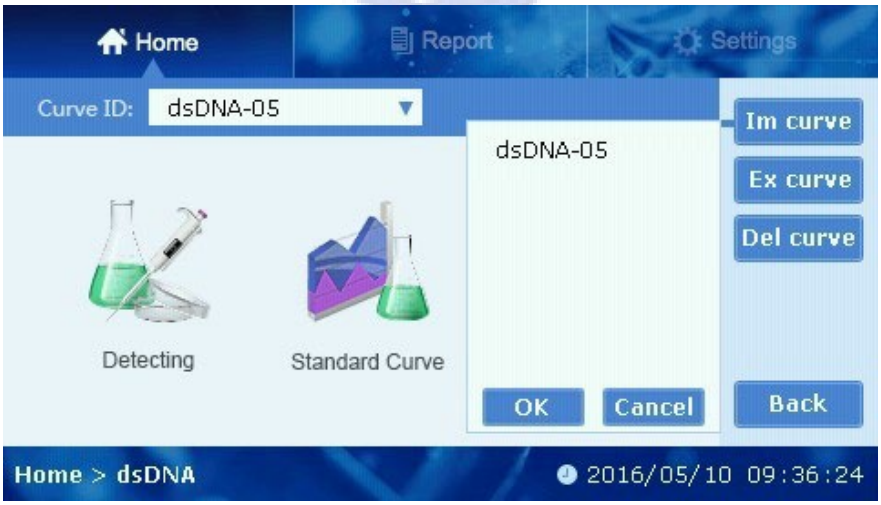

Fig5.10 Import Curve

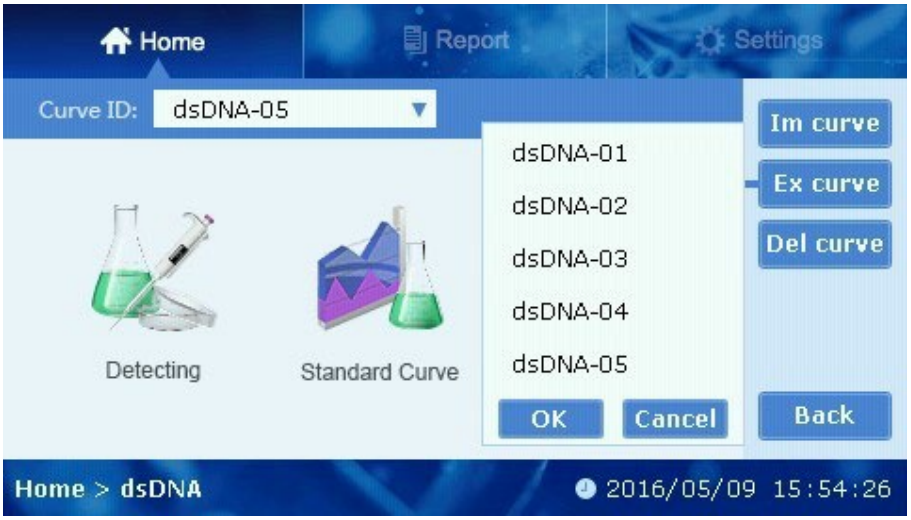

Fig5.11 Export Curve

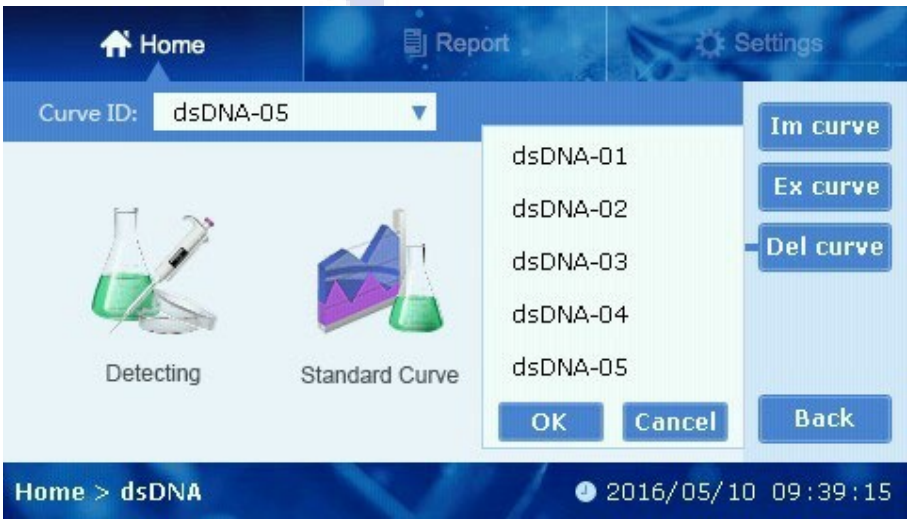

Fig5.12 Delete Curve

5.2.2.1 Standard Curve

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

Fig5.13 Home>dsDNA>Standard Curve

1. Parameter

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

Fig5.14 Home>dsDNA>Standard Curve>Parameter

2. Curve Fitting

Click “Curve Fitting” and standard samples are detected to fit standard curve. Youcan 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 valuesthat can be used for fitting standard curve and one average value at least.

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

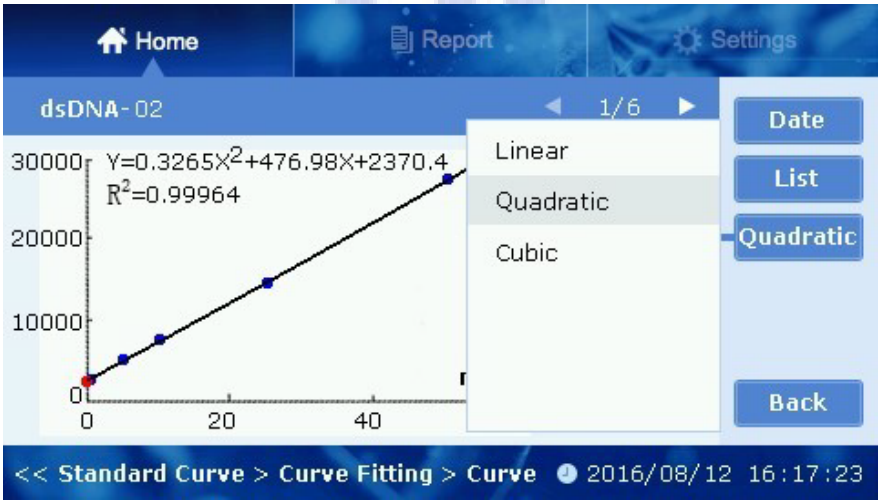

Fig5.16 Curve Checking

Click Date to check current curve, sample number, concentration and correspondingfluorescence 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).

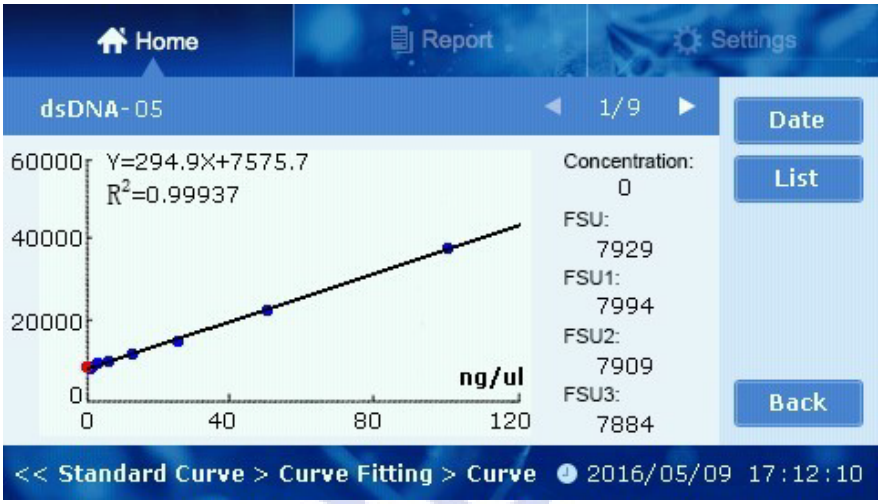

Fig5.17 Home>dsDNA>Standard Curve>View Curve

Click Date to view excitation or emission wavelength and setting time of the curve.Click List to view the data list of standard curves (Fig5.19).

Fig5.18 View Curve Data

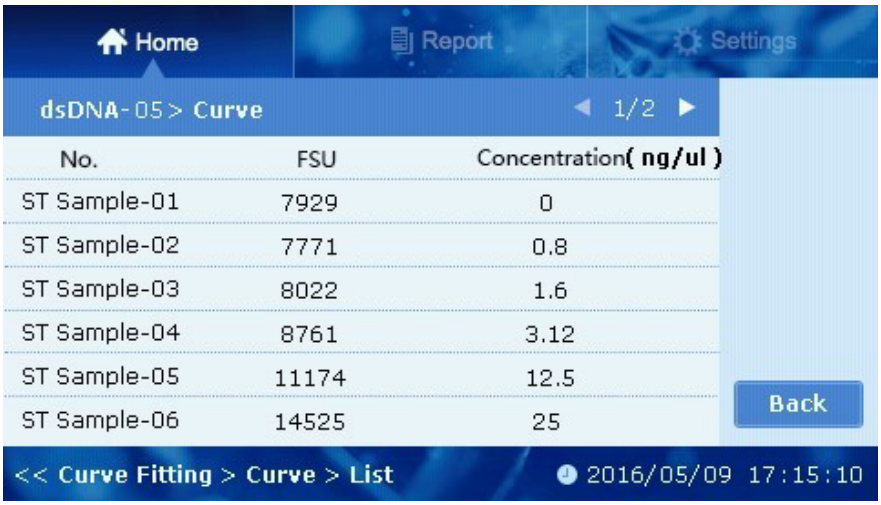

Fig5.19 View Curve List

5.2.2.2 Detecting

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

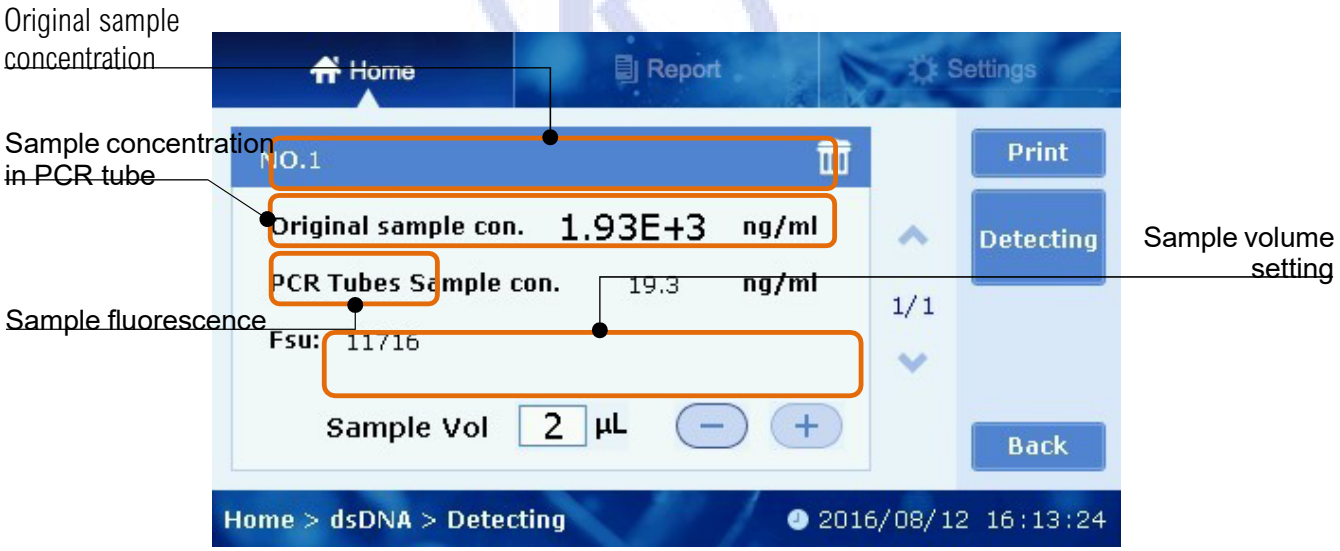

Fig5.20 Detecting Interface

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 standardcurve.

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 number 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.

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

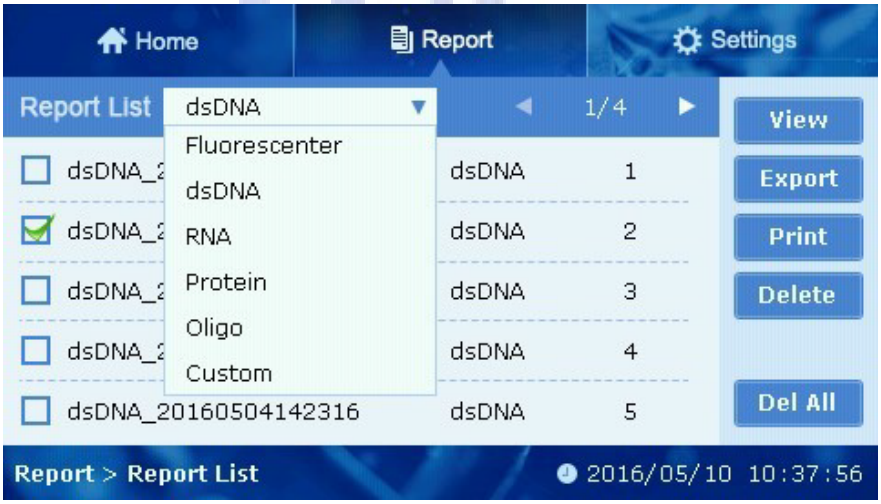

Fig5.23 Report List

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 all the detecting data to the U disk.

Print the detecting data you choose.

Delete the detecting data you choose.

Del All Delete all the detecting data.

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

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).

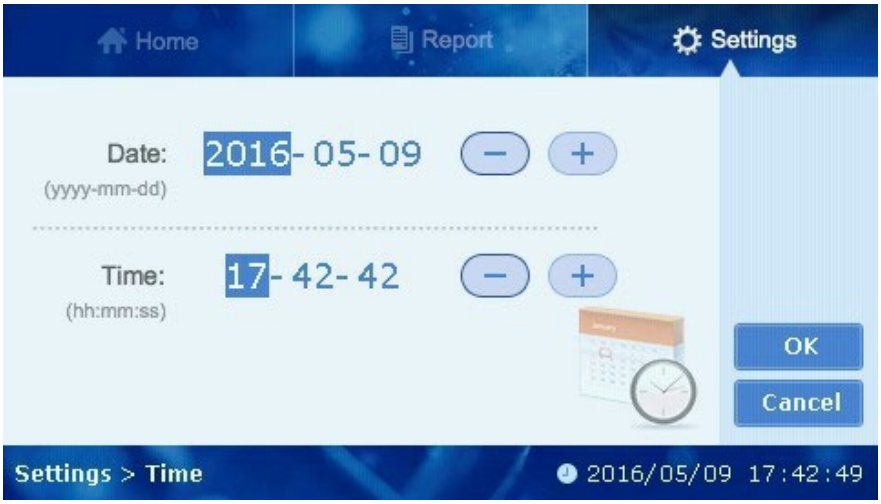

Fig5.26 Settings>Time

OK Save the date and time you have settled and back to the “Settings” interface. Cancel Give up setting and back to the “Settings” interface.

5.4.2 LCD

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

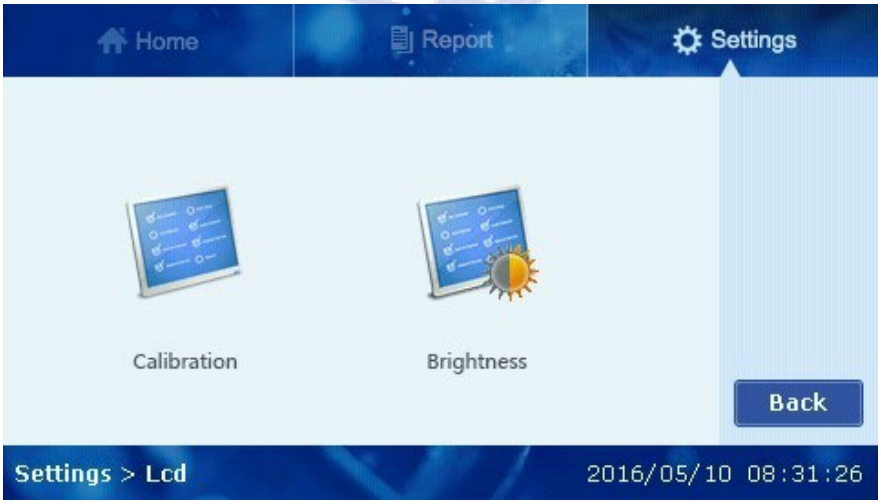

Fig5.27 Settings>LCD

“Calibration”: According prompt message to calibrate accuracy touch spot of the screen (Fig5.28).

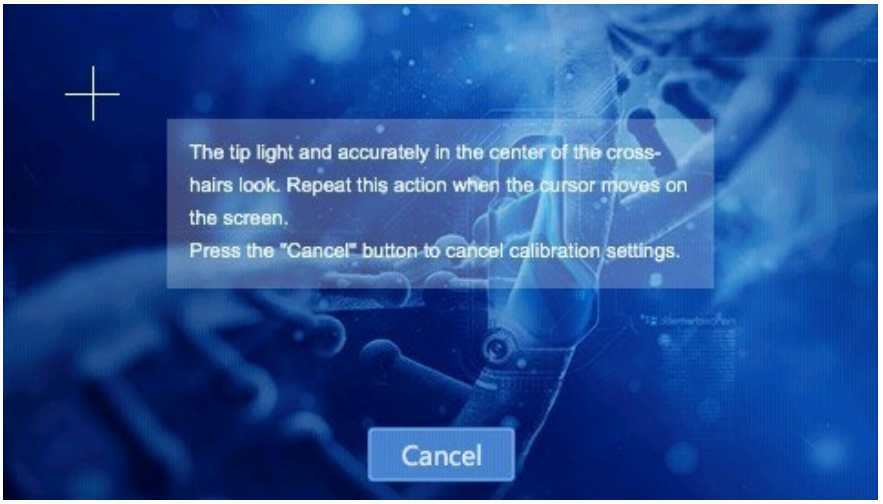

Fig5.28 Settings>LCD>Calibration

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

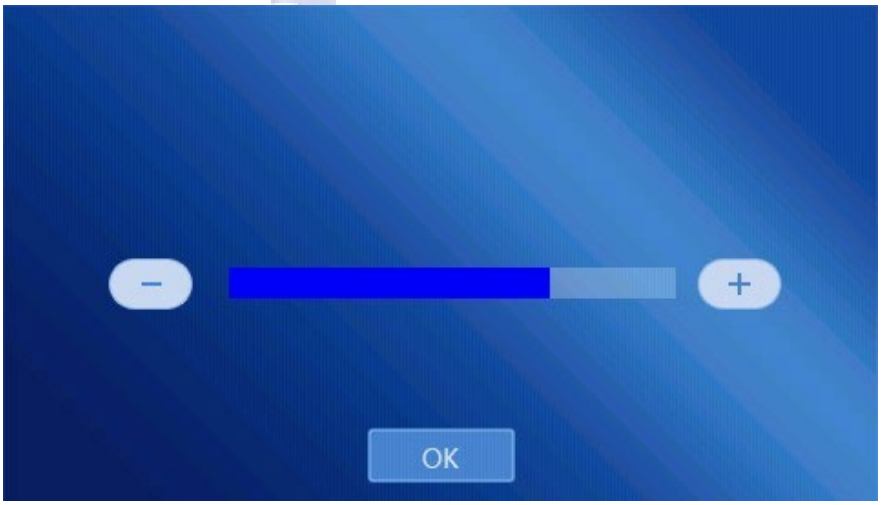

Fig5.29 Settings>LCD>Brightness

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.

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

Cancel Back to the “Settings” interface.

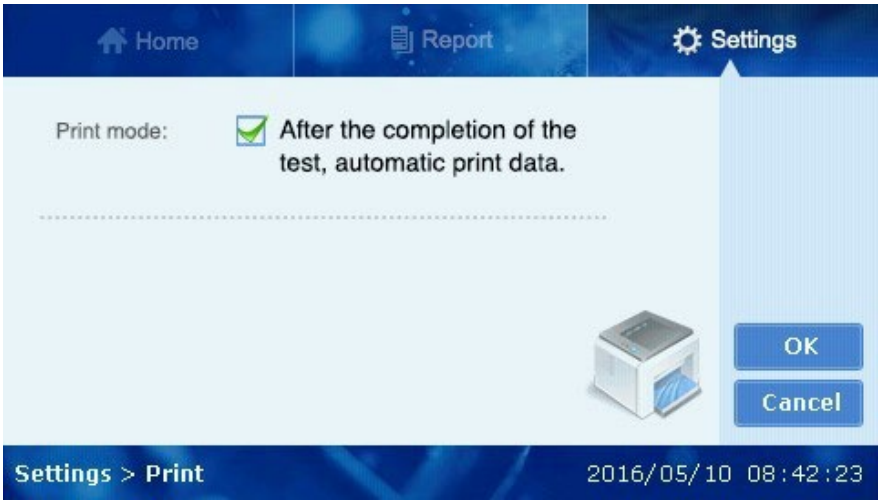

Fig5.30 Settings>Print

5.4.4 Updata

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

Fig5.31 Settings>Update

Chapter 6 Maintenance, Storage andTransportation

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 theinstrument. 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℃～40℃, 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 cannot start	Power defective	Check the power supply. Check whether the plug is loose
2	Light source cannot 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 pressit in place
4	Measurement not accuracy	Linear of standard curveis 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	0.5ml PCR tube holder	EA	1	
3	User manual	EA	1	
4	Usb stick	EA	1	