Operational Manual

Labotronics

Fluorometer LB-10FFM

Index

1. Safety Measures

1.1 Operation Information

Users should know the working principle of the instrument before operation. Read this manual carefully.

1.2 Safety Instructions

The operation, maintenance, and repair of the instrument should comply with the basic guidelines and the remarked warning below.
If the users don't comply with them, it will affect the instrument.

 Indoor used instrument.

 Read the Manual carefully before operation. Only trained personnel can operate the instrument.

 Turn off the power in case of stop working, unplug the power connector from the socket in case of long-term non-use, and cover the instrument with a cloth to avoid dust.

 Unplug the power connector, contact your maintenance personnel who were trained in case of the following:

- There is some liquid flowing into the Instrument.
- The instrument gets wet through rain or water.
- Can't work normally, especially with odd sounds or smells.
- The instrument falls or comes out of the shell, damaged.

2. Introduction

Fluorometer LB-10FFM offers a wide concentration range down to 0.5pg/µL, ensuring high-sensitivity fluorescence detection. It features a dual-channel detection system for simultaneous measurement of two fluorescence signals. It is equipped with a monochrome LED light source and a high-sensitivity photodiode detector. Our fluorometer includes a 7-inch touchscreen display, enabling precise and reliable molecular analysis.

3. Features

- High-sensitivity detection
- Fast signal processing
- User-friendly interface
- Multiple calibration options
- Multiple excitation wavelengths
- Multi-format data export

4. Specifications

Model No.	**LB-10FFM**
Sample Capacity	1
Sample Volume	1 to 20μl
Tube Type	0.5ml PCR tube
Channel Number	2
Detection Time	3s
Repeatability	< 1.5%
Concentration Range	0.01ng/μl to 120ng/μl dsDNA HS 0.05ng/μl to 240ng/μl Oligo 0.2ng/μl to 2000ng/μl dsDNA BR 0.1mg/ml to 20mg/ml protein BR
Excitation Wavelength	470/625 (standard) 365/525 (optional)
Emission Wavelength	525/690 (standard) 460/620 (optional)
Calibration Method	2 or 3-point calibration
Response Range	Five orders of magnitude
Linearity	$R^2 > 0.995$
Light Source	Monochrome LED
Detector	Photodiode
Display	7-inch touchscreen display
Programs Stored	10000
Data Export	U Disk
Data Format	CSV, PDF
Data Interface	USB Type-A (×2), USB Type-B (×1)
Voltage	DC12V 2A
Power Consumption	4.5W
Powe Supply	100-240V 50/60Hz
Dimensions (W × D × H)	296 × 161 × 55 mm
Packaging Dimension	390 × 290 × 190 mm
Net weight	1 kg
Gross Weight	2 kg

5. Applications

Fluorometer LB-10FFM is used for the qualitative and quantitative analysis of nucleic acids, proteins, and biomolecules in molecular biology and genetic studies. It is widely used in research institutes, pharmaceutical companies, clinical laboratories, and forensic science facilities.

6. Instrument Introduction

Instrument Structure:

Figure-1

Note: USB B for Program burn port, USB A for Printer, and USB disk (data export)

7. Operations

7.1 Working Conditions

1) **Ambient temperature:** 5°C – 35°C
2) **Relative humidity:** ≤70%
3) **Voltage:** DC12V 2A

7.2 Basic Operation

Figure-2 Insert the sample tube into the detection chamber

Insert the sample tube into the sample chamber and close the lid when setting up a standard curve or detecting.

Note:

1) Don't pinch tubes with standard or samples with fingers for a long time before detection, as body temperature will affect the solution in the tubes.
2) Do close the chamber lid to avoid interference with fluorescence from light during detection.
3) In case of tubes with scale lines, place tubes with the same direction for each measurement for the standard curve and detections to gain accurate and stable results.
4) The chamber temperature will heat up if it is closed for a long time, which will affect fluorescence sensitivity. When multiple detections are required from one PCR tube, keep the tube in a box free from light for 30 seconds before the next measurement.

7.3 Reagent preparation

Different preparation procedures for different kinds of reagents. Refer to the instructions that come with the reagent.

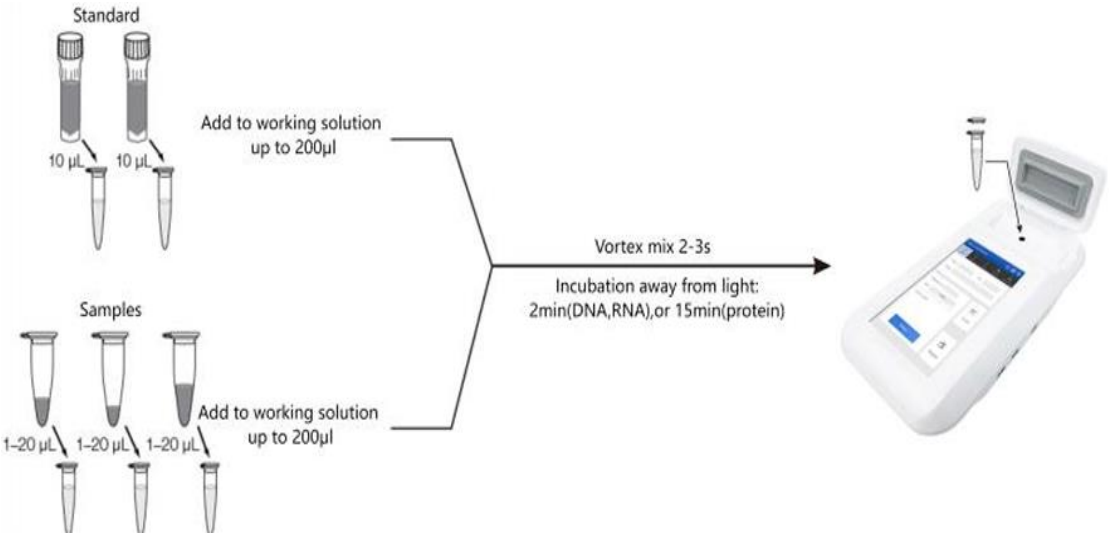


Figure-3 DNA/RNA/Protein detection reagent preparation

Reagent preparation steps:

1) **Standard preparation:** Get two 0.5ml PCR tubes, add each tube with 10μl of standard 1 and standard 2, and add 190μl of working solution respectively. Vortex mix both tubes for 2-3s, incubate at room temperature away from light for 2min or 15min. Then, start to set up the standard curve.
2) **Sample preparation:** Add the sample into a new tube with a volume 1-20μl, then add some working solution into the tube till the total volume to 200μl, vortex mix the tube for 2- 3s, incubate the tube at room temperature away from light for 2minor 15min, then start to detect. The steps above are only for DNA/RNA/Protein measurement; DNA/RNA requires 2 standard samples, while Protein requires 3.

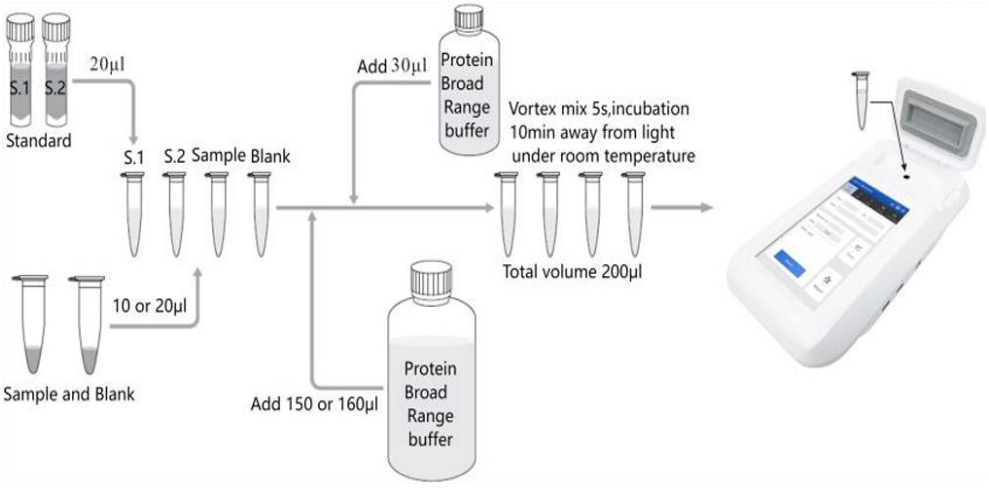


Figure-4 Protein BR detection reagent preparation

Preparation steps are different between "Protein BR" and "DNA/RNA/protein":
Standard preparation: Get two 0.5ml PCR tubes for S.1 and S.2 with 20μl standard 1 and standard 2, add 30μl reagent and 150μl buffer to each tube, respectively, to make a total volume of 200μl. Vortex mix each tube for 5s, incubate at room temperature for 10 min, then start to detect.
Note:

1) Room temperature of 22-25℃ is recommended, according to measured data and relative data.
2) The DNA/RNA reagent fluorescence stability time is 3 hours, oligo reagent fluorescence stability time is 30 minutes at room temperature after incubation.

8. Software Operations

8.1 Home page

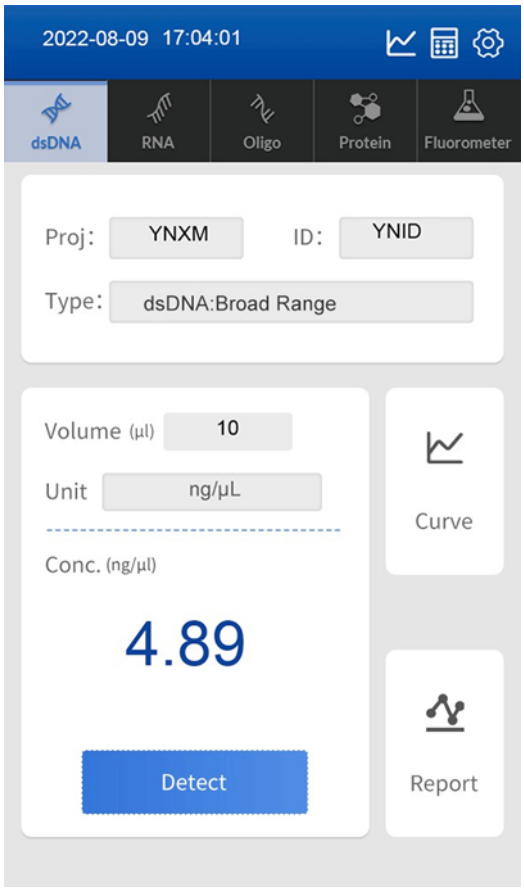
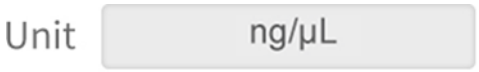


Figure-5

Icon	Description
	Calculator for reagent and concentration range
	Setting, for time settings and calibration
	DNA detection button
	RNA detection button
	Oligo detection button

	Protein detection button
	This function is to detect sample fluorescence intensity. Fluorescence intensity is proportional to concentration, it's only used to detect relative concentration comparison for unknown samples.
	Project name, tap to set for the project
	ID name, tap to set
	Tap to choose the sample type
	Tap to set sample volume in a 0.5ml PCR, can adjust the value using by buttons of + or -, can also input a value directly
	Unit of concentration for different samples
	Detection result
	Tap this button to start detection. Insert the sample tube into the chamber, close the lid, and tap this button to detect
	Tap this button to set up the standard curve
	Tap this button to check the data

8.2 Set up a standard curve

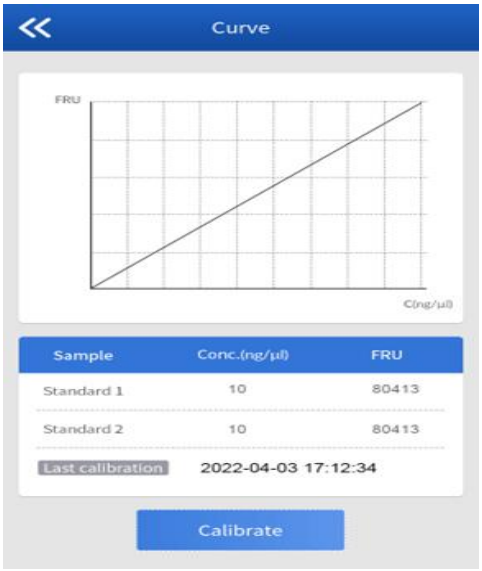
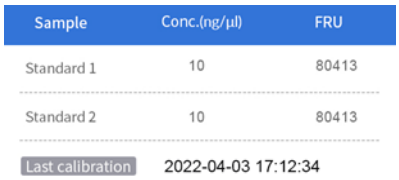
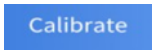
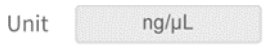
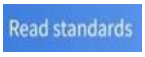


Figure-6 Standard Curve

Figure-7 Set parameters for samples

Tap button **"Curve"** to set up the standard curve, utilize 2 or 3 standard samples with certain concentration to set up a standard curve before detection unknow samples.

Icon	Description
	Showing the standard concentration, fluorescence intensity, and calibration time after setting the standard curve.
	Tap to set the standard curve
	Input the standard sample concentration value
	Tap to choose the Unit for a standard sample
	After inputting the concentration value and Unit for standards, insert the standard sample into the chamber, close the lid, and tap this button to read the fluorescence value

Different quantity of standard required for different type samples, after all standard samples detection, a standard curve shall be set up. Return to the home page to start detection.

8.3 Report

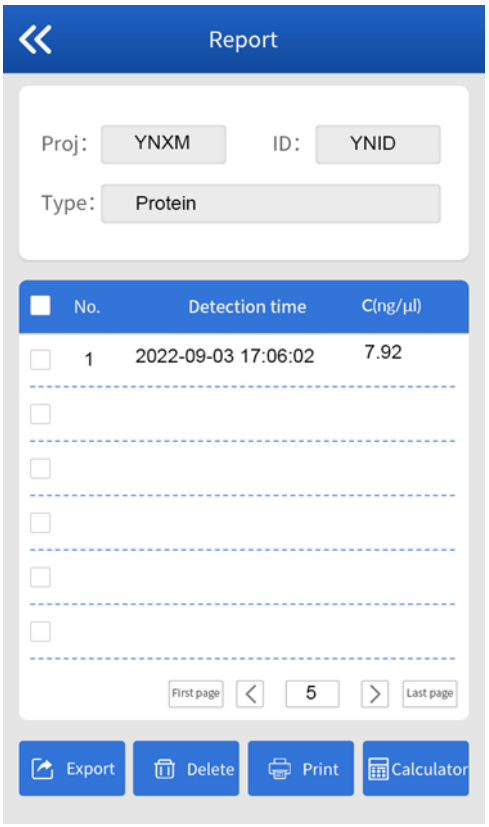


Figure-8 This page is for detection data

Tap "**Report**" on the home page.

Icon	Description
Proj: YNXM ID: YNID Type: Protein	Choose names for Proj, ID, Type to select data
No. Detection time C(ng/μl) 1 2022-09-03 17:06:02 7.92	Display the detection time and result
First page < 5 > Last page	Choose a different page
Export	Insert U disk to export data
Delete	Tap to Delete data
Print	Tap to print data after connecting a printer
Calculator	Tap to enter calculator page

8.4 Fluorometer

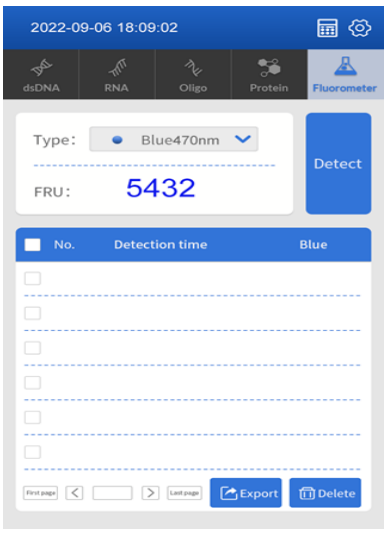


Figure-9 Fluorometer page

Icon	Description
Type: Blue470nm	Tap to choose excitation light source, red, blue, or blue&red
FRU: 5432	Fluorescence value
Detect	Tap to detect the fluorescence value

8.5 Calculator

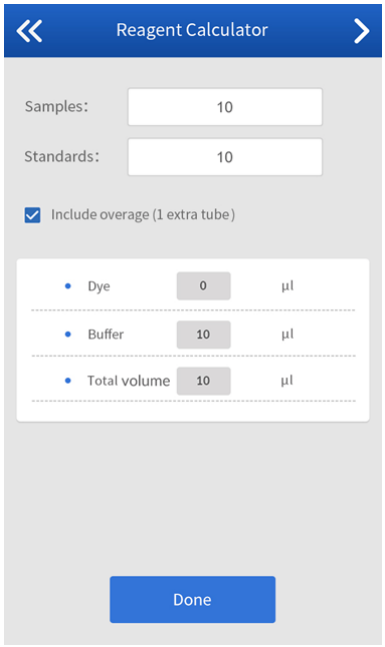


Figure-10 Calculator

This function is to calculate the volume of samples and standards.

Icon	Description
Samples: 10	Quantity of samples
Standards: 10	Quantity of samples
Include overage (1 extra tube)	Option of the extra tube. Tick to add one extra one, untick to cancel
Dye 0 µl Buffer 10 µl Total volume 10 µl	Display volumes of dye, buffer, and total volume

Done	Tap this button to start the calculation

Note: The Reagent calculator is not suitable for protein BR.

8.6 Data calculator

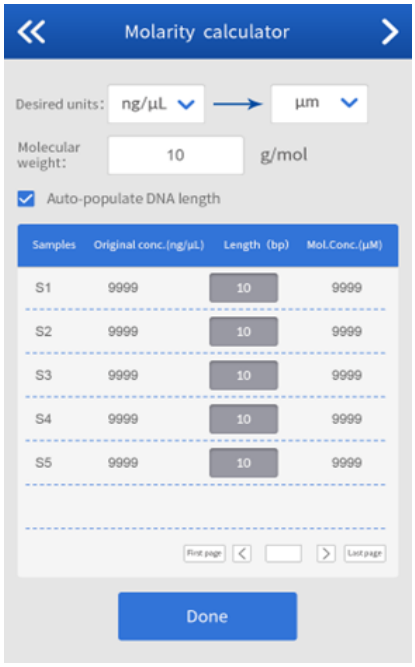


Figure-11 Molarity calculator

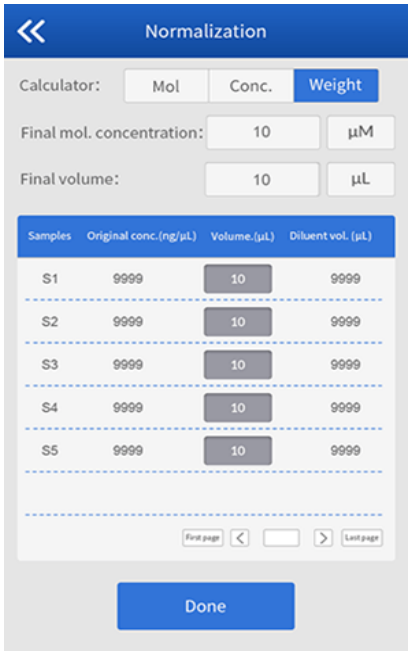
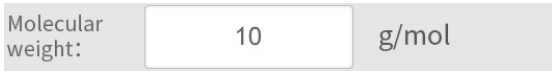
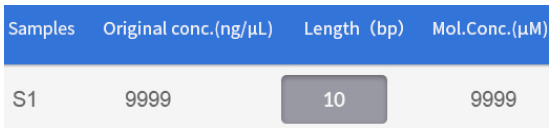
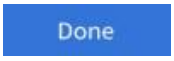
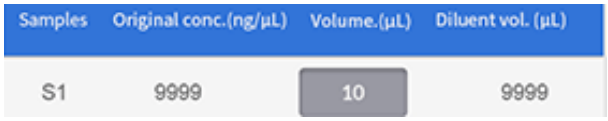
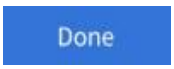


Figure-12 Normalization

On the data page, tap the "**Data**" button, which will bring you to the data calculator page, including the Molarity calculator and Normalization. The molarity calculator converts molecular weight to Molarity concentration. Normalization is used to convert several different concentration samples to the same molarity, concentration, or weight.

Icon	Description
	Set the unit before converting
	Set molecular weight
	Length (bp) is for the number of base pairs
	Tap to calculate the molarity concentration
	Choose the type of normalization
	Set concentration and volume for normalization
	Original concentration, volume required by normalization, and diluent volume.
	Tap to start normalization

8.7 Data and Time

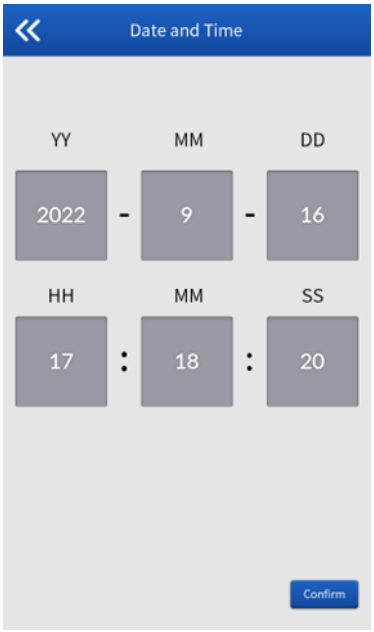


Figure-13 Setting page

Tap the button in the upper right corner of the Home page to set Date and Time.

Icon	Description
	Input values directly to set Year, Month, Day
	Input values directly to set Hour, Minute, Second
	Tap this button to confirm settings

9. Maintenance

1) Use a soft, lint-free cloth dampened with clean water to clean the sample pedestal.
2) Do not use alcohol or solvent-based cleaners on the sample pedestal, as they may cause damage.
3) Dry the pedestal gently with a clean, dry cloth or allow it to air dry.
4) Wipe the instrument's exterior using a soft cloth and a mild cleansing cream or gentle detergent solution.
5) Avoid abrasive cleaners, scouring pads, or rough materials that can scratch the surface.
6) Prevent any liquid from entering the openings or ports of the instrument.
7) Keep cleaning materials clean and store them separately to avoid contamination.
8) Always turn off and unplug the instrument before cleaning.

10. Troubleshooting

Trouble	Cause	Solution
Unable to turn on	No electricity	Check the input port connection
Light source defect	Poor module connection	Check the instrument by shaking it gently to see if the module is fixed well or not
Unstable detection results	The PCR tube is not placed properly	Press the tube down again gently to a better position.
Inaccurate detection results	A standard curve is not good	Prepare standard samples and set up the standard curve again according to the steps strictly

11. Accessories

Standard Accessories

S. No	Accessory Name
1	U Disk