# FR-01

## *Nucleic Acid Quantifier Fluorometer*

**(Single Channel)**


INSTRUCTIONS FOR USE

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# CONTENT

## Product description

The Fluorometer FR-01 is a very compact DNA and RNA concentration quantitative detection device, which can obtain highly accurate detection results with only 1~20 μL samples. With high detection sensitivity, wide range and short time, it is an ideal detection tool for scientific research laboratories.

## Specifications

| | |
|---|---|
| Cat.No. | 1302641E |
| Sample Volume | 1~20 μL |
| Sample Throughput | 1 |
| Compatible Tube | 0.5 mL Transparent Thin Wall PCR Tube |
| Test Time | ≤5 s/sample |
| Linearity Range | 5 orders of magnitude |
| Light Source | LED |
| Excitation Wavelength | Blue 460-480 nm, Red 630-650 nm |
| Emission Wavelength | Green500-535 nm, Red670-710 nm |
| Detector | SiPMT |
| Sensitivity | dsDNA 0.01 ng/μL, ssDNA 0.05 ng/μL, RNA 0.25 ng/μL, microRNA 0.05 ng/μL |
| Calibration | 2 points or 3 points |
| Operation | 5 inches Touch screen |
| Power | DC5V，2A，10 W |
| Working Environment | 15-30°C，<75%，Indoor use |
| Dimension | 110*230*45.5 mm，0.5 Kg |

## Components

| Components No. | Name | |
|---|---|---|
| 1302641E | FR-01 Nucleic Acid Quantifier Fluorometer (Single Channel) | 1 Set |

## Features

**Fast**: Quickly and accurately measures sample concentration within 3 to 5 seconds;

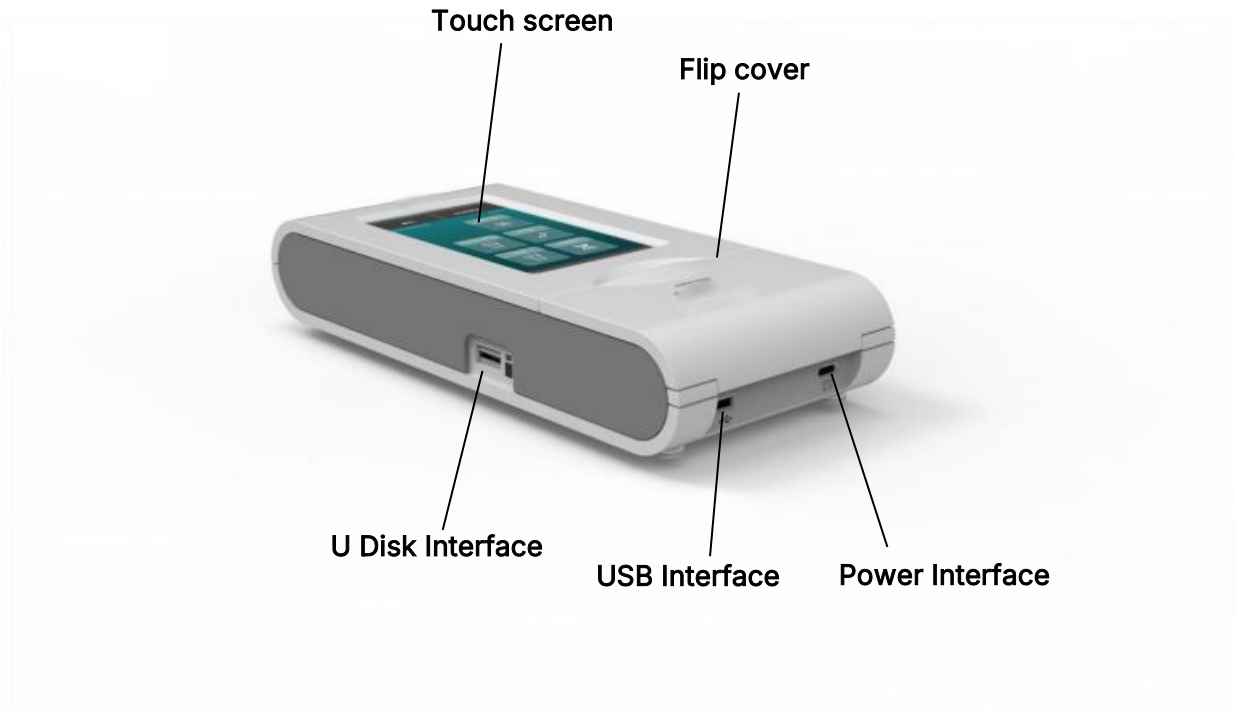
**Low Sample Volume**: Requires only 1–20 μL of sample to obtain accurate results;

**Precise**: High detection sensitivity makes it an effective tool for quantifying low-concentration nucleic acids and proteins;

**Specific**: Enables specific detection of dsDNA, ssDNA, RNA, and protein, with measurement results unaffected by other substances present in the sample;

**Flexible**: The fluorometer is compatible with quantification reagents from various brands.

## Instrument Side View




## Instructions

### 1. Recommended consumables and reagents

| No. | Product Name | | Cat. No. |
|---|---|---|---|
| 1 | 0.5 mL PCR Assay Tubes | | 1000921E |
| 2 | dsDNA HS Assay Kit | | 0400421E |
| 3 | 1× dsDNA HS Assay Kit | | 0400431E |
| 4 | PicoGreen™ dsDNA Quantitation Reagent | | 0400441E |
| 5 | ssDNA Assay Kit | | 0400451E |

### 2. Installation Environment

- Indoor Placement: The device must be installed indoors.
- Temperature & Humidity: Operate within an ambient temperature range of 15°C ~ 30°C, with a relative humidity ≤75%.
- Atmospheric Pressure: Ensure atmospheric pressure is between 86 kPa~106 kPa.
- Environmental Stability: Keep away from significant heat sources or strong vibration-inducing equipment.
- Avoid Direct Exposure: Do not place under direct sunlight or near other direct heat sources.
- Pollution Level: Maintain a pollution level of grade 2, ensuring the absence of conductive dust, explosive gases, high concentrations of dust, or corrosive substances around the instrument.
- Stable Surroundings: Ensure there are no strong vibrations or air currents in the vicinity.

### 3. Power Connection

- Placement: Place the instrument on a flat, even, and dry surface after unpacking.

- Power Supply Connection: Connect one end of the provided power cord (DC5V, 2A, 10W) to the ES-PR01 fluorometer.
- Power Source: Plug the power cord into an electrical outlet.

Caution Notes:

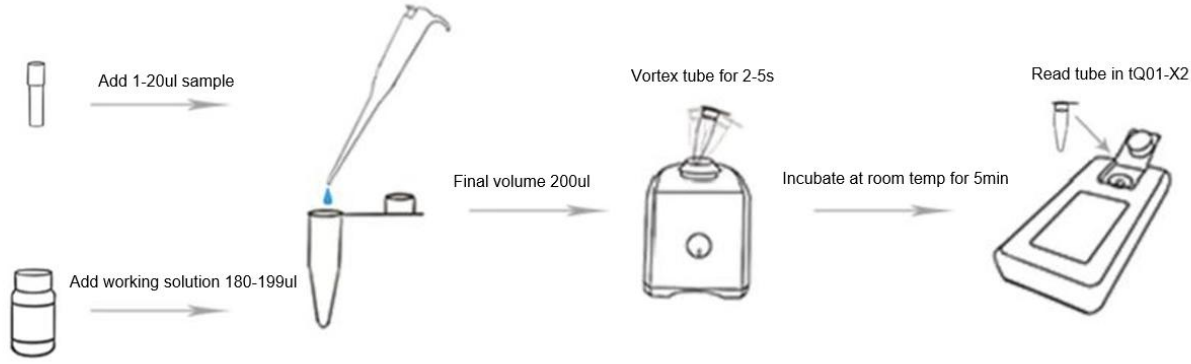
1)Use only the provided power cord and data cable or components approved by the manufacturer.

2)During operation, ensure that the power and data cables are securely connected.

## 4. Reagent Loading

### 4.1 The DNA/RNA Assay detection protocol

When conducting experiments, it is recommended to use the consumables recommended by our company. The DNA/RNA operation process is shown in the figure below:




1)Add 1-20 µL of sample into a 500 µL PCR transparent reaction tube.

2)Add 180-199 µL of working solution to the same reaction tube, ensuring a total volume of 200 µL.

**[NOTE]**: The total volume of sample and working solution needs to be 200 µL.

3)After capping the tube, vortex gently for 2-5 seconds and incubate at room temperature for 5 minutes in the dark;

4)After the instrument reads the standard, put the reaction tube into the instrument and select the sample volume;

5)Close the flip cover and start reading.

### 4.2 The Protein BR Assay detection protocol

1). Add 10 µL or 20 µL sample to 500 µL PCR tube;

2). Add 160 µL or 150 µL of protein BR Assay buffer to the 500 µL PCR tube, making the total volume of sample and buffer to 170 µL. Pipetting several times to mix well;

3). Add 30 µL protein BR detection reagent to make the total volume reach 200 µL. Cap the tube, vortex and mix for 5-7 seconds;

4). Incubate at room temperature for 10 minutes;

5). Test on the machine and read the result.

**5. Load Non-Standard Volume of Reagent**

The device is configured to detect a reagent volume of 200 µL according to the standard. If users opt for a 100 µL total volume for the purpose of saving reagents, the instrument is still capable of quantification. However, the results from the 100 µL detection may not be as accurate and stable as the standard volume (200 µL).

The sample volume range will be 0.5-10 µL for 100 µL system.

The setting volume on the machine should be the real volume X2.

5.1 Instructions for 100 µL Volume Detection

1)Calibration Reagent Preparation

Prepare the calibration reagent by combining 95 µL working solution with 5 µL standard1 and Standard 2. After thorough reaction, proceed with the normal calibration steps to calibrate the instrument. The volume set as 10 µL.

2)Sample testing

1.For the sample, mix 95 µL working solution with 5 µL of the test sample, set the volume as 10 µL on the machine; or if use 99 µL working solution with 1 µL of the test sample, set the volume as 2 µL on the machine.

2.After sufficient reaction of the reagents, transfer the mixture into the instrument and read the sample.

**6. Software Operation Instructions**

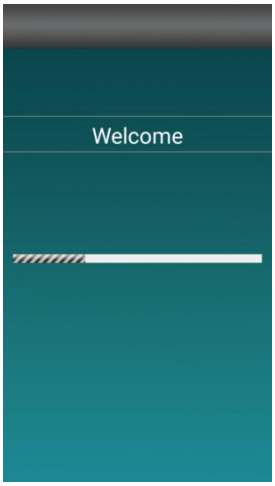
6.1 Operation Screen Startup

When the Fluorometer power cord is correctly connected, the system will be turned on automatically and instrument will start a self-test. After the self-test is completed, the main screen will enter into home page. The home page mainly includes experimental items, settings and data query.

[NOTE]:

If the instrument is powered off during the self-test process, it will take 5 minutes for the system to start when the instrument is restarted again, please wait patiently.

As shown in the figure below :

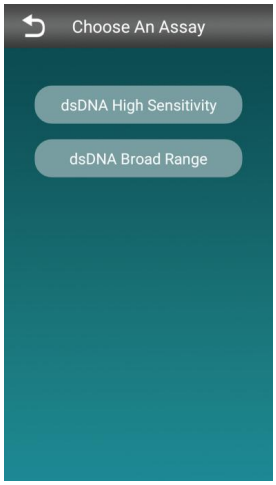



- Experimental items: including dsDNA, RNA, Oligo, Protein and Fluorometer five experimental items;
- Data query: you can query the historical experimental data ;
- Settings: Perform basic settings on the instrument, such as time settings, device information, software updates, etc.

6.2 dsDNA

This part is mainly to detect double-stranded DNA (dsDNA). Click dsDNA on the home page to go to the following page. The test range of each function is shown in the table below:

| Function | Sample concentration range(ng/μL) | Total Amount(ng) |
|---|---|---|
| dsDNA High Sensitivity | 0.005-120 | 0.1-120 |
| dsDNA Broad Range | 0.2-2000 | 4-2000 |




6.3 RNA

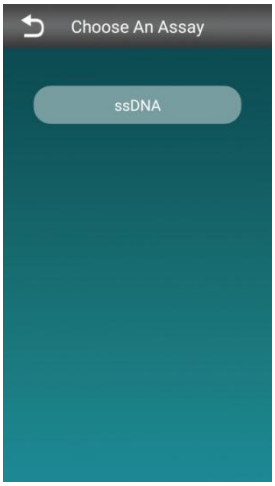
This part is mainly to detect RNA. Click RNA on the home page to go to the following page. The test range of each function is shown in the following table:

| Function | Sample concentration range | Total Amount(ng) |
|---|---|---|
| RNA High Sensitivity | 250 pg/μL and 100 ng/μL | 5-100 |
| RNA Broad Range | 1 ng/μL-1 μg/μL | 20-1000 |
| RNA Extended Range | 10 ng/μL and 10000 ng/μL | 200-10000 |
| microRNA | 50 ng/mL-100 μg/mL | 1-1000 |

6.4 Oligo

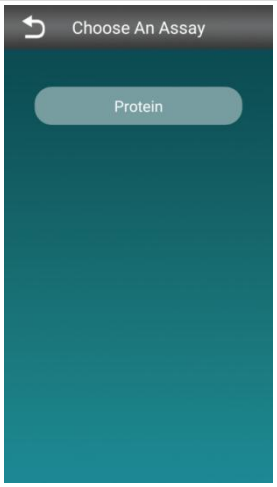
This part is mainly to detect single-stranded DNA (ssDNA). After clicking Oligo on the home page, it will go to the following page. The test range is shown in the table below:

| Function | Sample concentration range | Total Amount(ng) |
|---|---|---|
| ssDNA | 0.05-200 | 1-200 |



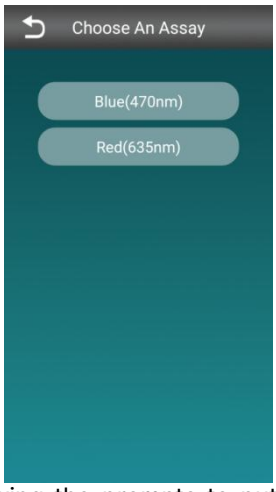

6.5 Protein

| Function | Sample concentration range | Total Amount(μg) |
|---|---|---|
| Protein BR Assay Kit | 100 μg/mL-20 mg/mL | 1-400 μg |



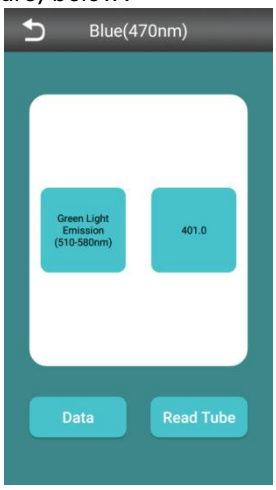
6.6 Fluorometer

After clicking Fluorometer on the homepage, go to the following page and select the corresponding experiment:

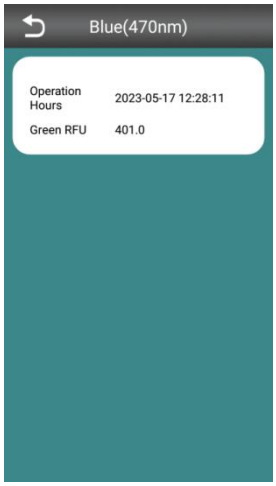



After selecting the experimental item, following the prompts to put in the sample and click "OK" to start the experiment(Left figure).

The experimental results are shown in the figure(Right figure) below:

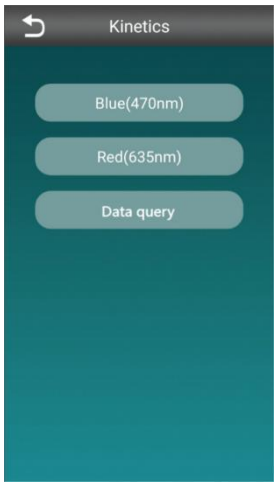

Click "Data" to view the current experimental data, as shown in the figure below:

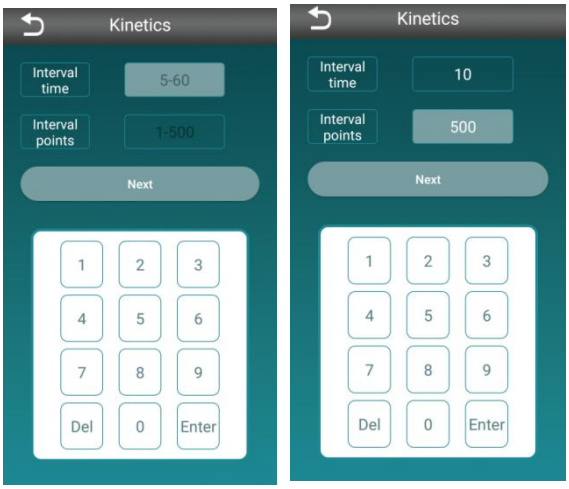

If you need to continue the experiment, you can replace the sample tube, close the cover, and click "Read Test Tube" to continue the experiment.

6.7 Kinetics

The Kinetics project is used to observe the kinetic curves of reagents or drugs in research and development experiments. Upon clicking on "Kinetics" on the homepage, you will be redirected to the following page, where you can choose the corresponding experiment.

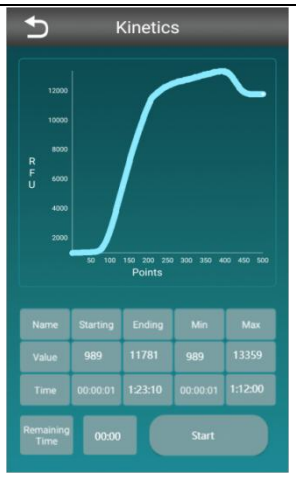



After selecting the desired experiment, you will be redirected to the following page to set experimental parameters according to user requirements.



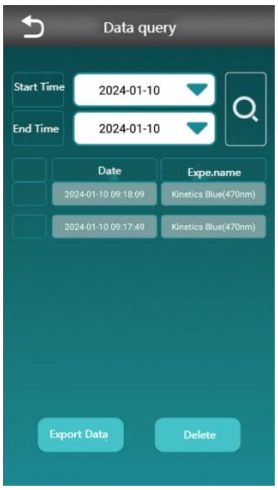

Example: Add reagent (volume: 100-200 μL), set the interval time to 10 seconds, and the interval points to 500. The experimental run page is as follows.

After setting the experimental parameters, click ‘Next’ to enter the detection page. The page displays information such as kinetics curves, start/end-point fluorescence, max/min fluorescence, and time to reach each fluorescence point. Click ‘Stop’ to end the experiment. The result graph is as follows.

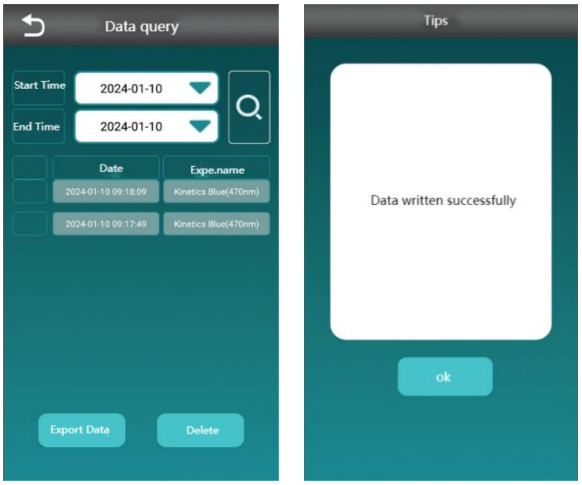



6.7.1 Kinetics-Data query

The data retrieval for the Kinetics project is separate from the data retrieval for other experiments. Click on the data retrieval option within the Kinetics project to obtain the data results for Kinetics experiments. The redirected page looks like the following:

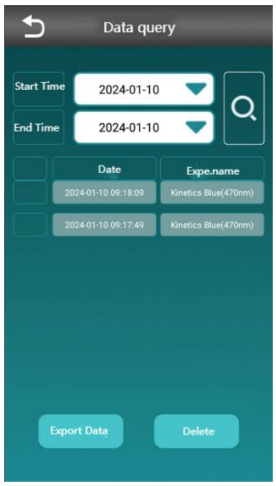



You can retrieve relevant experimental data based on time. Click on the respective experiment to view the experimental data. Check the experiments you want to export or delete. To export experiments, insert a USB flash drive, then insert the USB drive, check the experiments, and click "Export Data," as shown in the following page.



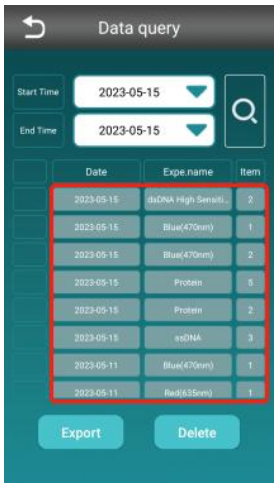
Data Inquiry

Click "Data Query" on the home page to go to the following page;

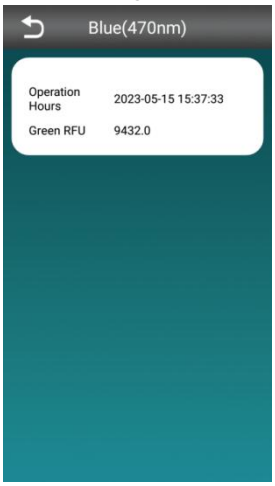



Relevant experimental data can be queried according to time, and relevant experimental information can be viewed, exported or deleted by selecting the corresponding experiment;

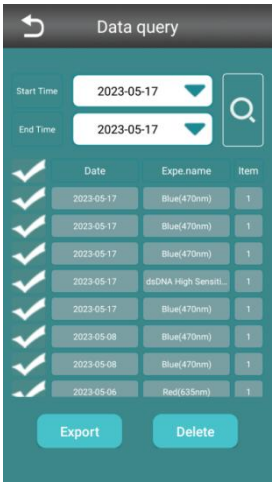
Click anywhere in the box below to view the experimental information of the corresponding project.








Select the corresponding experiment to perform export and delete operations, as shown in the figure below, if you need to export the experimental data, you need to insert a U disk.



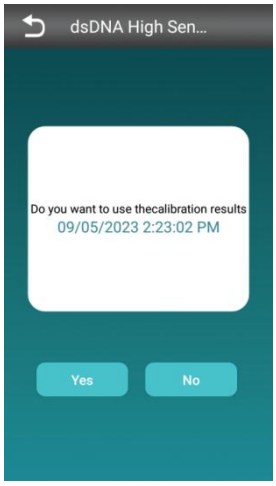


**[NOTE]**：To export data, you need to insert a U disk. If no U disk is inserted, a prompt will appear that the device U disk is not detected.

## 7. Experimental operation steps

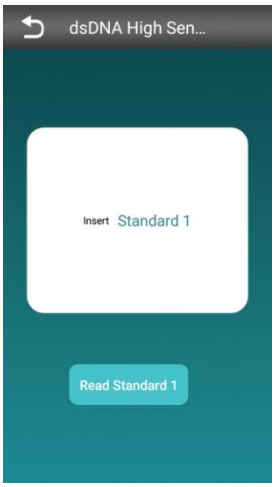
Taking the dsDNA High Sensitivity assay as an example, the operation steps are as follows:

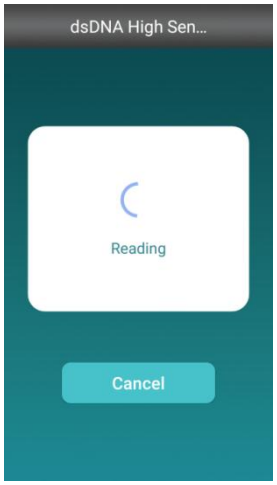
Click ‘dsDNA High Sensitivity’ on the screen, you will be asked whether you want to use the previous calibration result or not,as shown in the below image. If you use the last calibration result to perform the experiment, click "Yes", and the instrument will go to the sample volume setting page. If you need to re-calibrate, click "No";

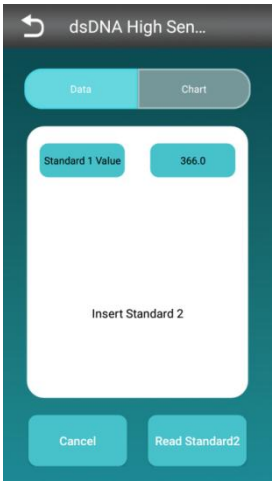



If re-calibration, the following page will be displayed:

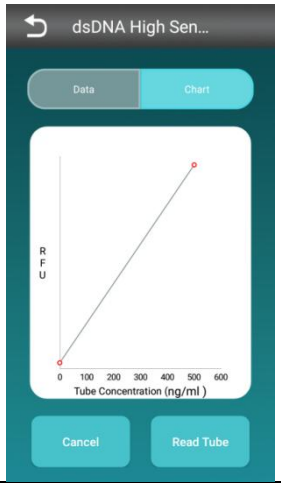
After putting in the standard value 1, click to read the standard value, follow the prompts to insert the standard value 2, as shown in the figure below, click to read the standard value 2.




After the calibration, go to the following page, you can choose two display modes of data and charts, click "Read Tube" to carry out the experiment;

Please set the sample volume (1-20 μL), there are two ways to set the sample volume:

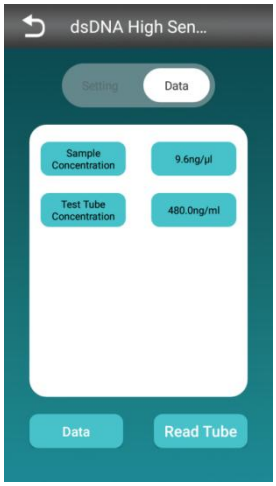
- Slide the fan-shaped block left and right to set the sample volume;
- Click "-" or "+" to decrease or increase sample volume;

Select the Sample Unit.

Insert the sample tube.

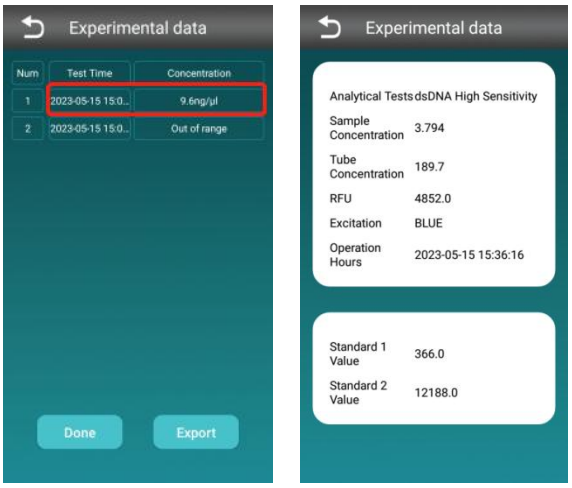
Close the flip cover of the instrument and click to start the experiment:


The experimental results are shown in the figure below:

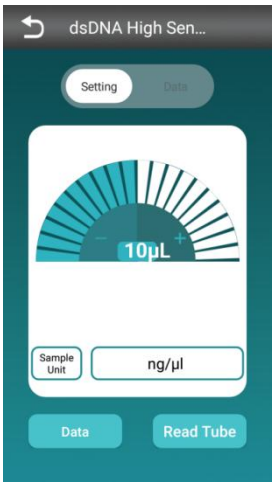



Click "Data" in the lower left corner to view the experimental data of the current experiment, as shown in the figure below:

Click anywhere in the box below to view the experimental information of the corresponding project.

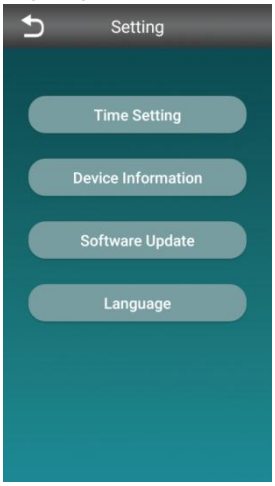



If you need to reset the sample volume, click "Settings" in the upper left corner to go to the sample volume setting page, as shown in the figure below. If you need to continue the experiment, put in a new sample tube, and after the cover is closed, click " Read tube" to continue the experiment..



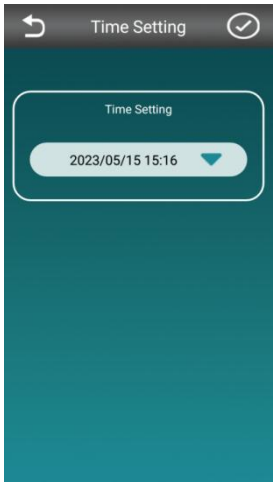

## 8. Setting

Click "Settings" ,system will enter into following page:



8.1 Time Setting

This part can set the time of the instrument, click "Time Setting" to go to the following page, click the drop-down button to set the time of the instrument. Click to save the changes.

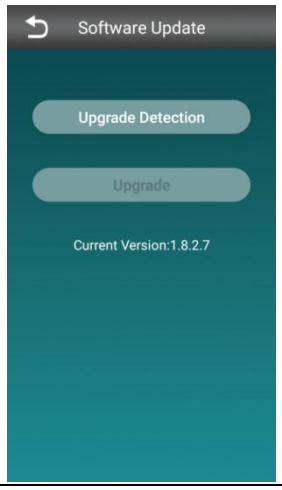



8.2 Device Information

You can view the hardware information of the instrument. Click "Device Information" to display the following page.


8.3 Software Update

If you want to update the software, you need to insert the U disk with the new version of the software into the instrument, you can check the current software version and update the latest version, click "Software Update" to go to the following page.

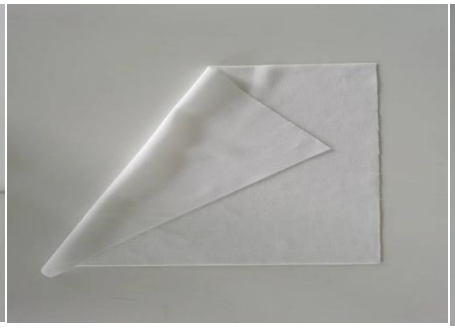


9. Instrument Maintenance and Cleaning

1)To ensure the performance of the instrument and reduce contamination, the instrument requires regular weekly cleaning.

2).If contamination occurs, wipe all accessible parts (heating block, heat cover, sealing ring, etc.) with a clean rag of 70% ethanol. Let dry naturally.

Alcohol/Water



Cleaning cloth

Cotton swab

## Notes

1. This product is for research use only.
2. Do not use solvents or strong detergents to clean the instrument, as this may damage the plastic case of the instrument and reduce its function.
3. Before cleaning and replacing, turn off the power of the instrument.
4. Do not drop any liquid or nuts into the instrument.
5. Do not spill water or ethanol on the parts, please use a rag to wipe.
6. Do not turn on the power until the instrument has dried naturally.
7. WARNING: Do not wipe with a damp cloth, or rinse the instrument with water.

## TROUBLE SHOOTING

| Number | Failure | Possible causes | Processing method |
|---|---|---|---|
| 1 | Turn on the instrument power, the instrument does not respond | Power cord connection is loose | Plug in the power cord again and tighten it |
| | | The wiring port is damaged | Contact the Supplier |
| 2 | Display appears lighter or darker | Instrument is too hot or cold | Suspend the use of the instrument, adjust the room temperature, and continue to use it after the instrument returns to normal temperature |
| | | Using the Instrument in Unsuitable Lighting | / |
| 3 | Incomplete display or wrong display on the display | Display window is dirty | Clean the display window |
| | | Display window is scratched or dented | Contact the Supplier |
| | | Display or instrument damage or error | Contact the Supplier |
| 4 | No response to keyboard presses | Some buttons are only valid after a certain program is selected | / |
| | | Damaged or faulty keyboard or instrument | Contact the Supplier |