ComfyDrop™ μ-vol UV/Vis spectrophotometer

Operation Manual

Cat. No. : UVS-115/UVS-115C

Avans Biotechnology Corp.

www.avansbio.com

Note The manufacturer reserves the right to modify this manual without notice.

Thank you for your purchasing of this product
Before your first operation, please be sure that you have read this manual carefully.

Important State

1. Convention

Note	“Note” items include very important information. Please read them carefully. If not operate as instructed in “Note” the instrument may be damaged or fail to work.

Warning	“Warning” information requires you to operate this step very carefully. Or it may cause terrible personal injury.

2. Safety

In every moment when operate or maintain the instrument, following safety precautions must be observed. Or, basic protection of the instrument may become invalid. Safety standard in designing and manufacturing and expected measurement range of the instrument will be broken in the same time.

Note	This instrument is a I-class equipment with protection grade IP20 according to GB4793.1. This instrument is used indoor only.

1) Ground

To avoid electric shock, input power wire must be grounded reliably. Power cord of this instrument is the type with three wires including ground wire. It is a safety unit and can only be used together with proper grounded outlet. If the cord cannot be plugged in, please ask electrician to install a proper outlet, and do not deprive of its safety protection.

2) Keep away from energized circuit

Operator is not allowed to take the shell of instrument apart, replace components or do adjustment inside. If necessary it must be done by professional maintainer who holds certificate. It’s strictly prohibited to replace components when power is connected.

3) Note the power supply

Before connecting to AC power, ensure the voltage of power supply is the same with that the instrument requires (12V). Also ensure the rated load of power supply is no less than the maximum load of the instrument (30W).

4) Note the power cord

Normally accompanied power cord should be used to connect the power. If broken it must be replaced, repairing is not allowed. New power cord must be the same type and the same specification with the original one. When the instrument is in use, do not put any things on power cord and keep it away from crowd.

5) Plug of power cord

When you hold the plug, ensure that your hand is touching proper area on it. When plug in, ensure it is entirely, firmly inserted into outlet. When pull out, do not pull the wire rudely.

6) Note the placement of the instrument

This instrument should be placed in indoor space with no corrosive gas, smoke, hard light, blast air or strong magnetic field interference. The worktable to place the instrument should be horizontal and stable.

Please turn off the power when measurement is finished. If the instrument will not be used for a long time, please turn off the power, pull out the power cord, and cover it by soft cloth or plastic film to prevent dust or foreign matter from getting in.

7) Operation notice

Avoid dropping liquid to surface of the instrument during measurement.
In pedestal measurement, sample should be added to corresponding position.
In cuvette measurement, cuvette should put at corresponding position.

Note ·In following situations, please turn off the power immediately, pull out the power cord, and contact with supplier or qualified maintainer to deal with:

·Liquid is dropped into the instrument;

·The instrument is exposed to the rain poured by water;

·The instrument work abnormally, especially there is abnormal sound or smell;

·The instrument falls or shell get damaged badly;

·The function of the instrument changes obviously.

3. Instrument Maintenance

In pedestal measurement, please wipe the upper and lower pedestals using a dry lint free-laboratory wipe after each measuring is done to prevent remain of sample from disturbing next measuring.

Warning

·To clean the instrument, the power must be cut off.

·It is strictly prohibited to clear the surface of the instrument with corrosive cleaner.

4. After-sales service

For warranty details please check warranty bill.

Note

·Please check and accept the instrument and accessories according to packing list at once after opening the package. If anything is damaged or missing, please contact supplier immediately.

·Please store all package material properly for maintenance.

Contents

Chapter 1 Introduction

ComfyDrop™ is a full-wavelength ultra-micro ultraviolet-visible spectrophotometer. The micro detection mode can be used to detect nucleic acids, micro nucleic acid arrays, pure protein detection, labeled protein detection, protein quantitative detection, microbial cell culture detection and regular full-wavelength scanning. In the cuvette detection mode, nucleic acids, proteins, and microbial cells can be measured Cultivation and kinetic testing.

Features of this product as follows:

1 By forming a liquid column, the sample required for one test is as low as 0.5ul, and the trace amount is detected, saving precious samples.

2 The detection concentration range is wide, and commonly used samples can be detected without dilution.

3 The machine does not need to be warmed up, it can be detected after starting up, and the single detection time is about 5 seconds, and the detection is fast.

4 Built-in software, easy and fast to operate, software running fast and stable, no delay, provide a stable user experience.

5 Small size, easy to carry, very suitable for field testing.

6 Can record all the data that the user tests, and has screenshot function, convenient for users to export precious data or delete data at any time. More than 10,000 data can be stored.

7 It can be quickly upgraded by U disk, which is convenient for the instrument to update the software.

8 With user management system, multi-user independent detection, independent management of data.

9 High-definition 7-inch display screen, using capacitance touch screen, full touch operation, can sense the touch of laboratory gloves, longer life and better experience.

10 Has power-on self-test function, it can quickly and accurately judge whether there are impurities in the detection platform when the machine is started up.

11 The material of the sample detection platform is stainless steel and quartz optical fiber, high strength and anti-corrosion.

12 With cuvette measurement function, the cuvette measurement provides stirring and heating auxiliary functions at the same time, which makes the cuvette detection more powerful and uses more detection scenarios. (UVS-115C)

13 Support kinetic detection, kinetic detection provides users with an intuitive absorbance change curve, user-defined wavelength points to view the relationship between absorbance changes over time, and 100 kinetic programs can be built-in. (UVS-115C)

14 Support colonies (OD600) detection, and the detection of colonies can be carried out in both cuvette and micro mode, which meets the different detection needs of users. (UVS-115C)

15 The cuvette measuring hole has a dust-proof design, which can effectively prevent inaccurate measurement due to dust accumulation. (UVS-115C)

16 USB can be connected to a printer, the output data is more intuitive and convenient.

Chapter 2 Specifications

1. The normal operating condition:

Ambient temperature: 4°C ~ 45°C

Recommended ambient temperature: 15°C ~ 35°C

The relative humidity: ≤70%

Power supply: DC12V 5A

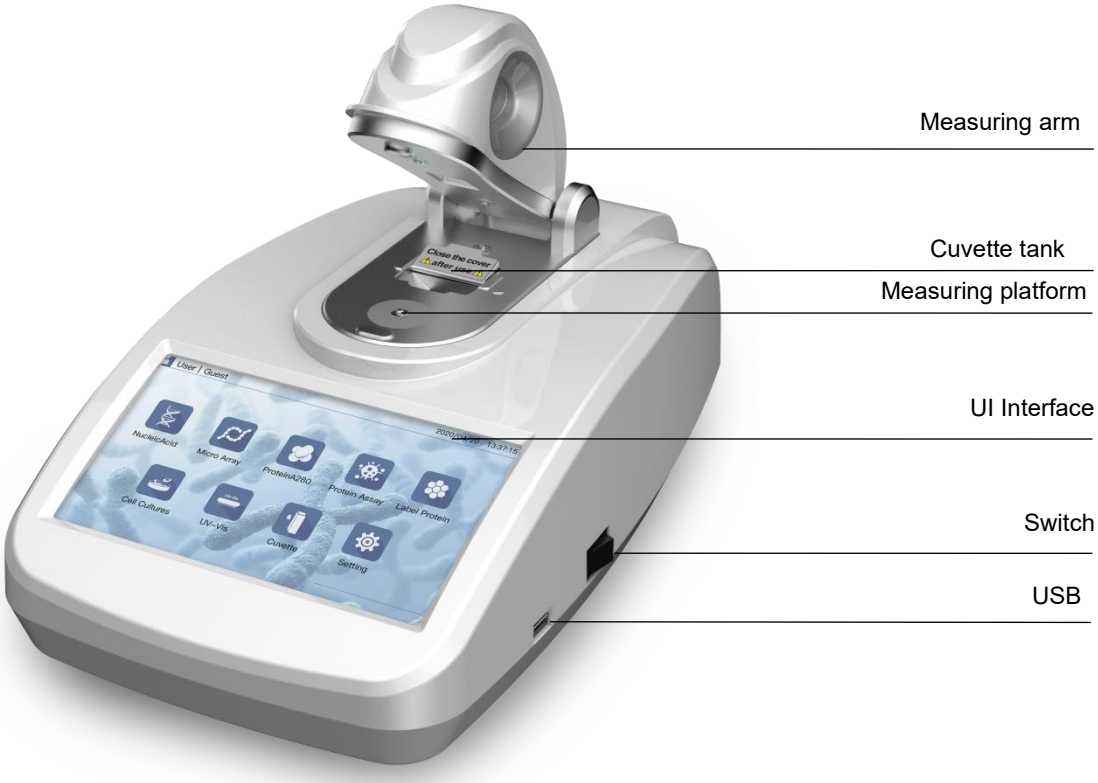
2. The parameters and function

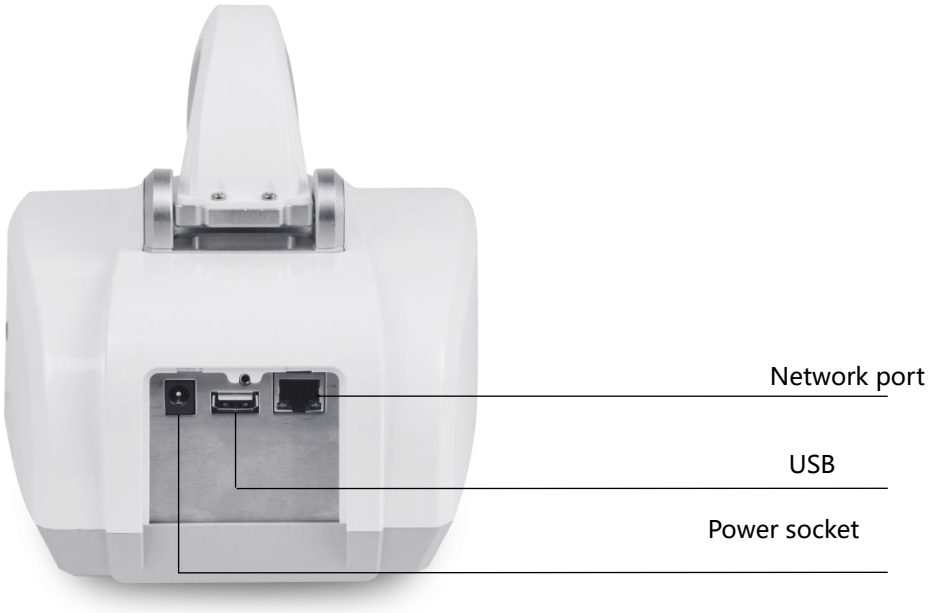
Parameters		**UVS-115**	**UVS-115C**
Detector		2048-element linear CCD array	
Sample Amount		0.5 -2μl	
Pathlength		0.05 – 0.7mm	
Wavelength Range		200 – 850nm	
Spectral Bandwidth		≦ 1.8mm (FWHM)	
Spectral Resolution		≦ 0.3nm	
Wavelength Accuracy		＜ 1nm	
Wavelength Resolution		≦ 2nm	
Absorbance Range		0.04 – 300Abs (10mm)	
Absorbance Precision		0.002Abs (1mm)	
Absorbance Accuracy		1% (0.76Abs at 256nm)	
Detection Range		2 – 15000ng/μl (dsDNA)	
Detection Time		5 sec.	
Cuvette Mode	Size	Null	12.5(L)x12.5(W)x45(H)mm
	Optical Length	Null	10, 5, 2, 1mm
	Center Height Z	Null	8mm
	Heating Temp.	Null	37 ± 0.5 ℃
	Mixing Speed	Null	130 – 900RPM
	Absorbance Range	Null	0.004 – 25Abs(10mm)
	Detection Concentration	Null	0.2 - 75ng/μl (dsDNA)(10mm)
Power		AC110V-220V 50HZ/60HZ (Power adapter)	
Size		197(W) x 327(D) x 181(H) mm	
Weight		3.1KG	

Chapter 3 Basic Operation

This chapter mainly introduces the structure of the instrument, the function of the operation panel, and the preparatory work before starting up. When using this instrument for the first time, you should be familiar with the contents of this chapter before starting it up.

1. Structure Description





2. Basic instructions for base inspection

1. Lift the sample arm and add the sample to the test base. (Theoretical value of sample volume is 0.5 ~ 2μl, 2μl is recommended)

2. Put down the sample arm and measure the sample according to the software interface.

3. After the test is completed, wipe the measuring platform clean with dust-free paper to avoid sample residue.

3. Instructions for cuvette detection

1. Raise the sample arm and put the cuvette into the cuvette slot.

2. Put down the sample arm and measure the sample according to the software interface.

3. After the test is completed, take out the cuvette, close the dust cover, and put down the measuring arm.

Chapter 4 Operation Guide

1. Blank control and light absorption calculations

The instrument adopts the automatic detection optical path mode, and the blank control will also take the blank light intensity of multiple optical paths. After the blank control, the instrument records the blank light intensity value under multiple optical paths. When performing sample detection, the instrument will refer to to the light intensity of the sample, the appropriate measurement light path is automatically selected, and the light intensity transmitted through the sample is also recorded. The light intensity through the sample and the blank light intensity are calculated according to the following formula:

Abs = -log10 (Intensity sample / Intensity blank)

In this way, the absorbance at a specific wavelength can be calculated from the transmitted light intensity of the sample and the blank control.

2. Software application

1. Pure nucleic acid concentration measurement (NucleicAcid)
2. Nucleic acid array measurement (Micro Array)
3. Pure protein measurement (ProteinA280)
4. Quantitative detection of protein(Protein Assay)
5. Label protein detection (Label Protein)
6. Microbial cell culture testing (Cell Cultures)
7. Ultraviolet and visible light measurement (UV-Vis)
8. Cuvette measurement
9. System Settings (Setting)

3 Introduction of the shared part in measurement software

1. "Blank" button, click this button to measure the light intensity value of the blank liquid and save it.

2. "Measure" button, click this button to measure the concentration of the sample.

3. Sample ID, measurement ID, name can be customized, the factory default Test.

4. Save Screen, save the screenshot of the current page, it can be saved to the U disk.

5. DATA (Grapic), data graphic display, display measurement data curve graph, can be exported to U disk.

6. DATA (Table), data chart display, table showing measurement data, can be exported to U disk.

7. Click "  " on the left to display the sidebar. The sidebar records the detailed data of the current measured sample, including Ext. Coeff, Baseline, SW nm, SW Abs, 260/280, 260/230 and other user-concerned data.

4. Starting up

After the instrument is powered on, press the power switch, the LCD screen lights, the instrument enters the welcome interface (see Figure 1), the LCD screen displays the

product name in the welcome interface, and then enters the main menu interface (see Figure 2).

Figure 1

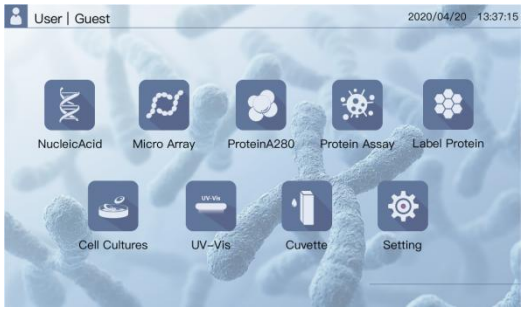
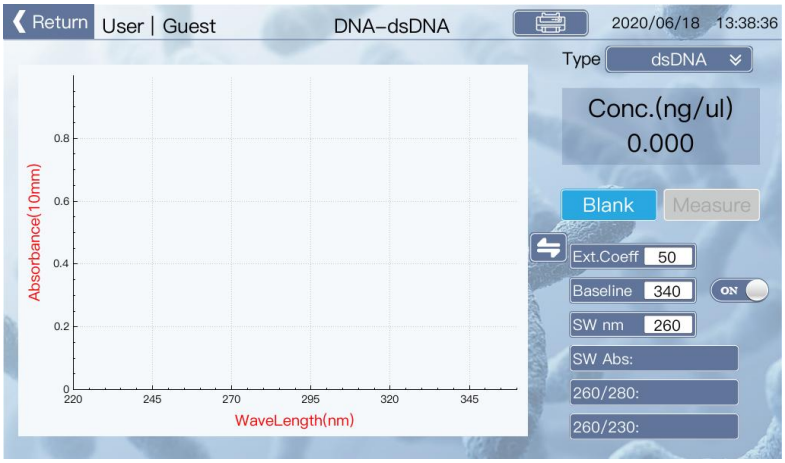


Figure 2

5. Blank cycle detection

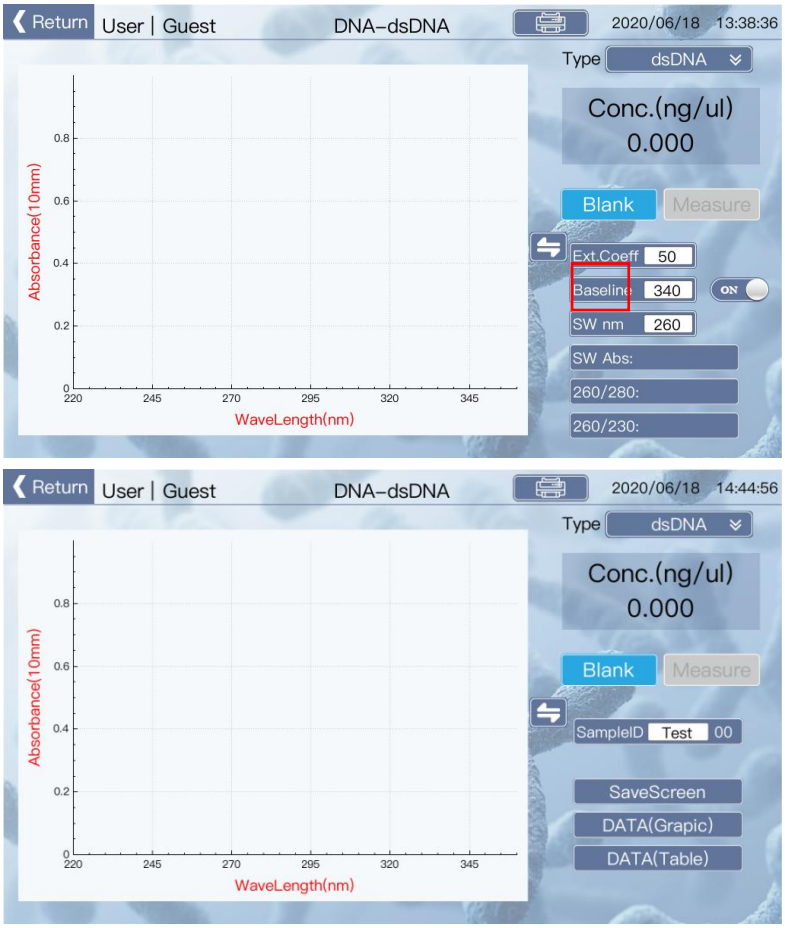
After the instrument is turned on, enter the sample measurement interface to be tested:



1. Add the blank solution to the sample base.
2. Click "Blank" button to measure the blank light intensity.
3. After wiping the sample base clean, add the blank solution to the sample base and click the "Measure" button to measure the absorbance value. The measurement result curve is basically at a horizontal line, and the change in absorbance value should not exceed 0.04A (10mm).

6. Nucleic acid testing

1）Pure nucleic acid detection



Click "⇆" to pop up the sidebar

Type： Measurement type, dsDNA, dsDNA, RNA, Other can be selected, where" Other" is user-defined nucleic acid

Ext.Coeff： Extinction coefficient.

Nucleic acid samples	Extinction coefficient
dsDNA	50
ssDNA	33
RNA	40

Baseline： Baseline calibration wavelength, default is 340nm, default is on; users can customize the wavelength, can be customized on and off;

SW nm： Measure wavelength, the default nucleic acid is 260nm, users can customize the measurement wavelength.

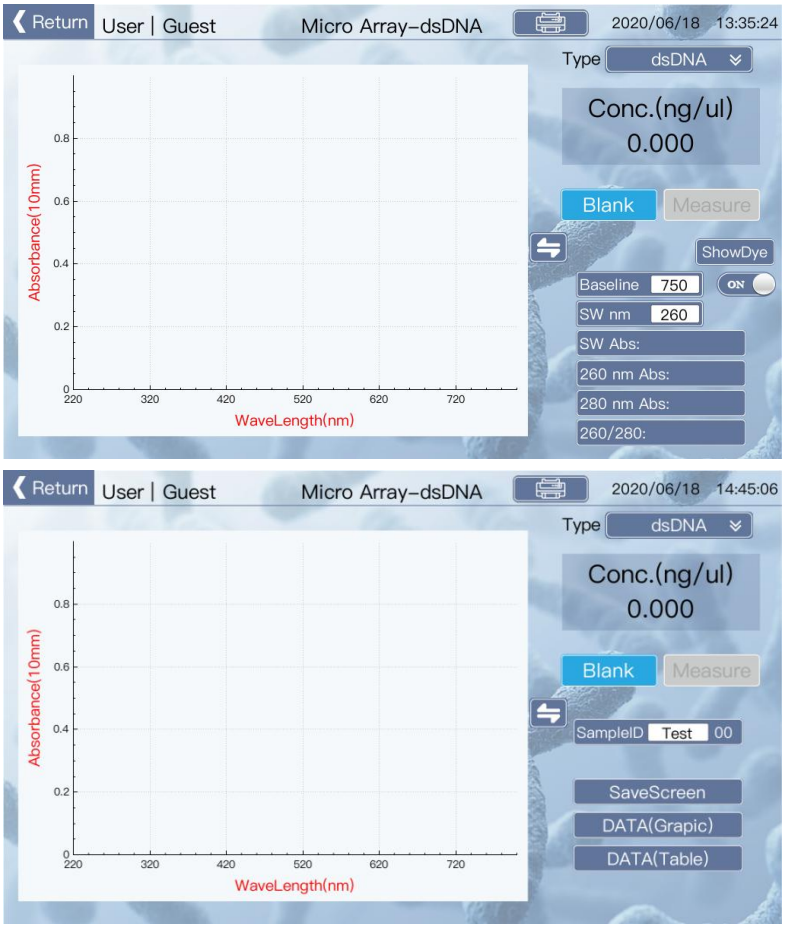
260/280： The ratio of 260nm absorbance to 280nm absorbance. This value is used to determine the purity of DNA and RNA. Generally, the ratio of pure DNA is about 1.8, and the ratio of pure RNA is about 2.0. If the ratio is too small, it indicates the presence of protein, phenol or other contaminants, these substances have obvious light absorption at 280nm.

260/230： Ratio of 260nm absorbance and 230nm absorbance, this is the secondary nucleic acid concentration indicator, generally between 1.8 and 2.2. If the

ratio is too low, it means that there are pollutants in the nucleic acid.

2) Micro nucleic acid array

The nucleic acid array module simultaneously measured the concentration of nucleic acid and dye at the set wavelength.



Type： Measurement type, dsDNA, dsDNA, RNA can be selected.

There is a ShowDye / HideDye button in the sidebar to open / hide the dye concentration interface. The user can set the dye type and check the dye concentration.

Baseline： Baseline calibration wavelength setting, default 750nm, user can modify according to actual needs, user can turn on and off line calibration.

SW nm： Nucleic acid measurement defaults to 260nm, and users can customize the measurement wavelength.

SW Abs： Select the wavelength absorption value.

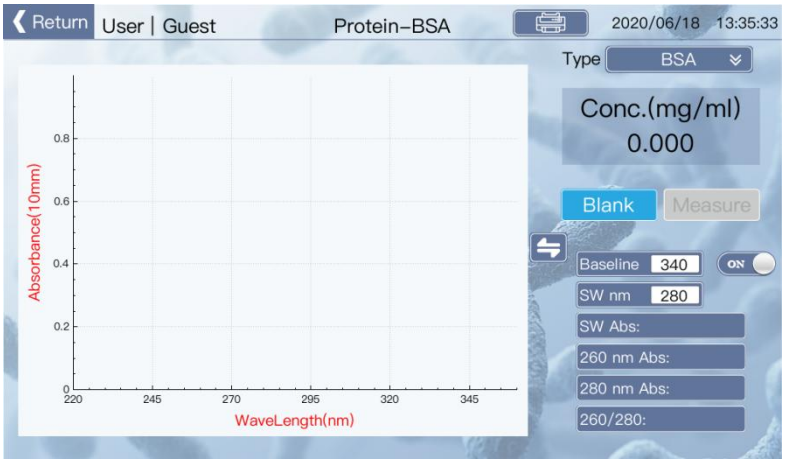
260nm Abs： 260nm light absorption value.

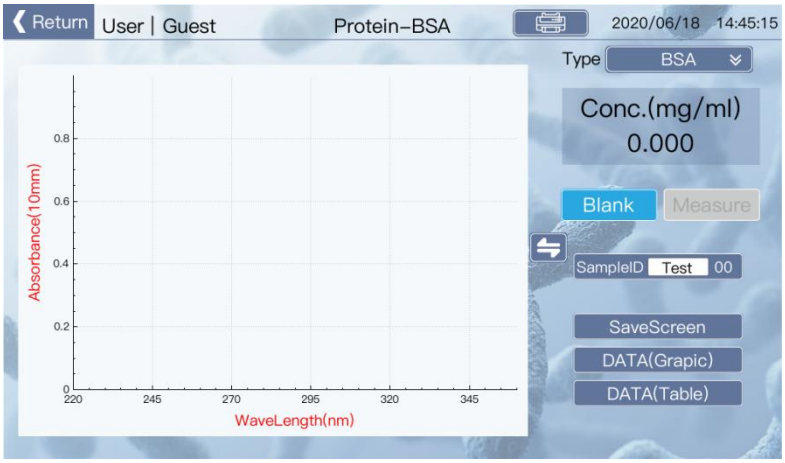
280nm Abs： 280nm light absorption value.

260/280： The ratio of 260nm absorbance to 280nm absorbance.

7. Protein detection section

1) Pure protein detection(ProteinA280)





Type： Detection protein type, BSA、1Abs=1mg/ml、IgG、Lysozyme。

Sample type	Extinction coefficient
BSA	For calf serum protein reference, the mass extinction coefficient calculated for protein concentration is: the mass extinction coefficient of 10mg / ml protein at 280nm is 6.7.
1Abs=1mg/ml	The absorbance of 1mg / ml protein at 280nm is 1A
IgG	IgG reference, the mass extinction coefficient calculated by protein concentration is: The mass extinction coefficient of 10mg / ml protein at 280nm is 13.7.
Lysozyme	For lysozyme reference, the extinction coefficient calculated by protein concentration was: the mass extinction coefficient of 10mg/ml protein at 280nm was 26.4

Baseline： Baseline calibration wavelength, default is 340nm, default is on; the user can customize the wavelength and can turn it on and off.

SW nm： Select the measurement wavelength, the default protein is 280nm, users can customize the measurement wavelength.

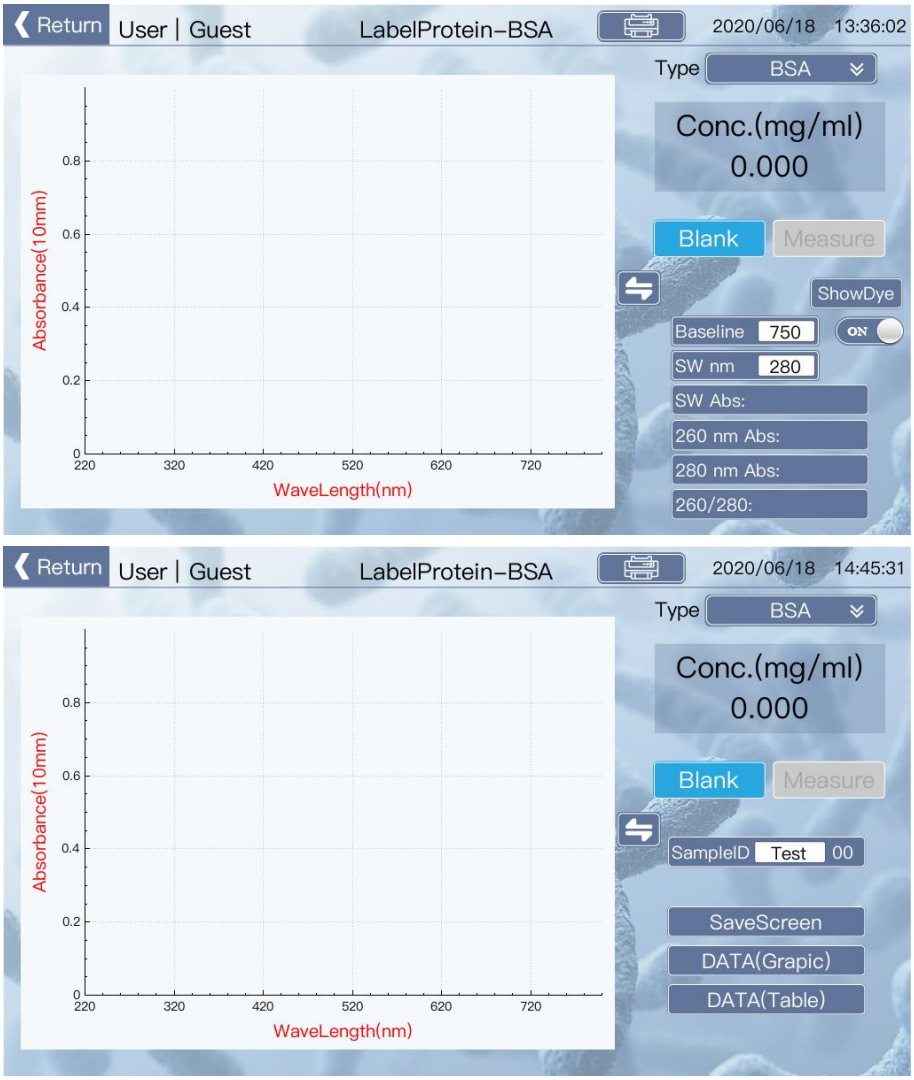
SW Abs： Select measurement wavelength absorption value.

260 nm Abs： 260nm light absorption value.

280 nm Abs： 280nm light absorption value.

260/280： The ratio of 260nm absorbance to 280nm absorbance.

2） Labeled protein detection(Label Protein)



Type： Detection protein type, BSA、1Abs=1mg/ml、IgG、Lysozyme.

Baseline： The baseline calibration wavelength, default is 750nm, the baseline calibration is turned on by default. The user can customize the baseline wavelength, and can turn it off and on.

SW nm： Select the measurement wavelength, the default protein detection is 280nm, users can modify the measurement wavelength according to the actual situation;

SW Abs： Select the wavelength absorption value.

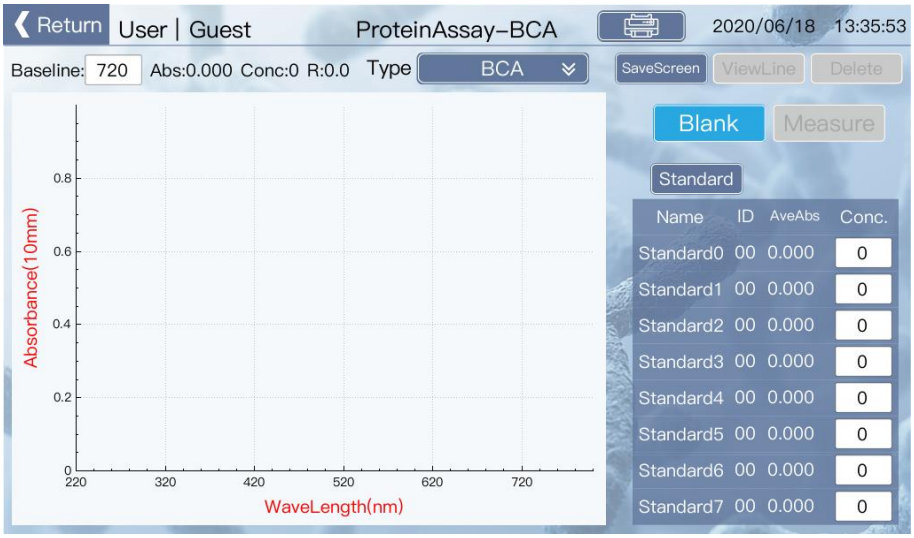
260 nm Abs： 260nm light absorption value.

280 nm Abs： 280nm light absorption value.

260/280： The ratio of 260nm absorbance to 280nm absorbance.

In the sidebar, there is a ShowDye/HideDye button to open/hide the dye concentration interface. Users can set the dye type and check the dye concentration.

3）Quantitative protein detection(ProteinAssay)



Type： BCA quantitative method, Lowry quantitative method, Bradford quantitative method.

a) The BCA quantitative method and the diquinolinecarboxylic acid (BCA) method are based on the principle that Cu2 + will be converted to Cu + under alkaline conditions. The formed Cu2 + will react with BCA. This reaction will produce a strong violet absorption value at 562nm.

b) The Lowry quantitative method is based on the principle that Cu2 + will be converted to Cu + under alkaline conditions. This reaction will produce a strong blue absorption value at 750nm.

c) The Bradford quantitative method is a common method of colorimetric determination of protein concentration in a sample solution. The protein determination Bradford method is based on the binding of a dye (Coomassie Brilliant Blue G) to the protein. The combination of the two makes the maximum absorption peak of the dye shift from red light to blue light. At a wavelength of 595nm, by comparing the standard curve, the absorbance of the measurement solution can be converted into protein concentration.

ViewLine： Because the drawing of the standard curve requires data of at least two standard products, this button is not clickable by default; click this button to view the standard curve of the currently measured protein standard sample.

Delete： After opening the page, the button is gray and cannot be clicked by default, because when opening the page, the standard sample is not selected by

default. When a standard sample is selected in the standard sample table, the button becomes available, and clicking the button clears the selected standard. After the measurement data of the sample is cleared, the standard sample does not participate in the calculation of the standard curve.

Standard： Click this button to view the standard measurement interface.

Sample： Click this button to enter the sample measurement interface. After measuring the sample concentration in the unknown sample concentration measurement interface, you cannot return to the Standard measurement interface. This is to prevent the user from modifying the standard measurement value by mistake.

① Standard measurement table

Support measurement of up to 8 standard samples, and at least two standard samples are needed to obtain the standard curve of the sample.

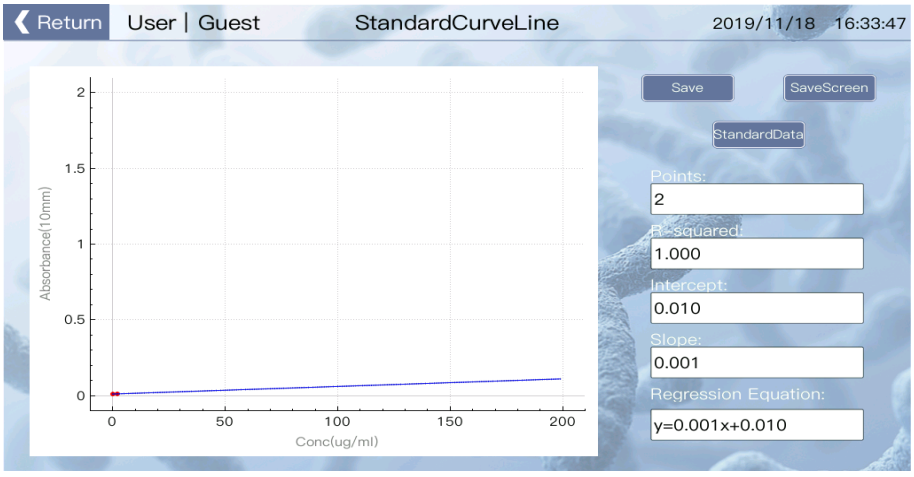
1) Name： The standard sample name defaults to Standard 0 ~ 7, and the name cannot be modified.

2） ID： Standard sample measurement serial number.

3） AveAbs： The average absorbance value of the standard sample can be measured multiple times for the same standard sample. Here, the average value of all measured absorbance values is displayed. The average value used for subsequent drawing of the standard curve also uses the average value to improve the calculation accuracy.

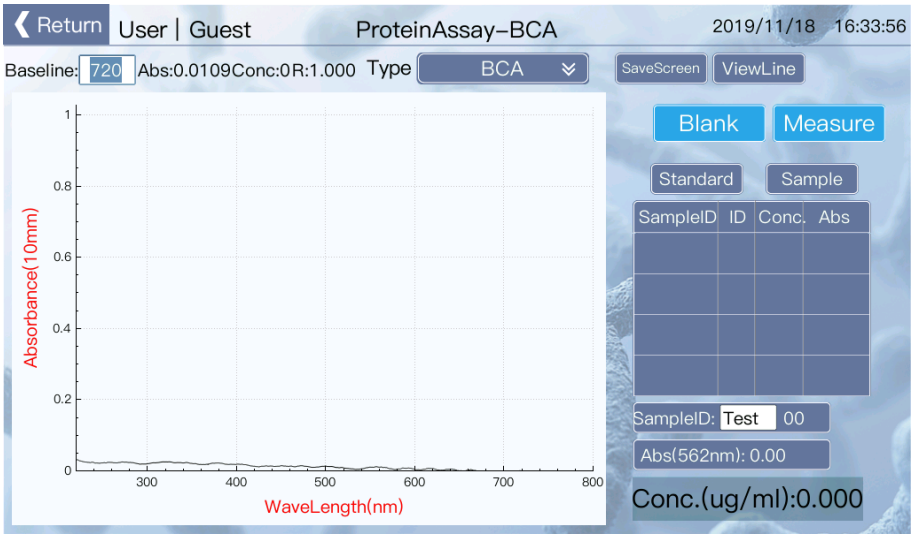
4） Conc： The concentration of the standard sample measured by the user needs to be set by the user; when setting the concentration, the user should note that only the concentration of StandArd0 can be set to 0, and the others can not be zero. If it's zero, it cannot be measured.

② Standard curve viewing



The instrument is based on the measured standard (at least two standards are measured), generate the standard curve corresponding to the standard product;

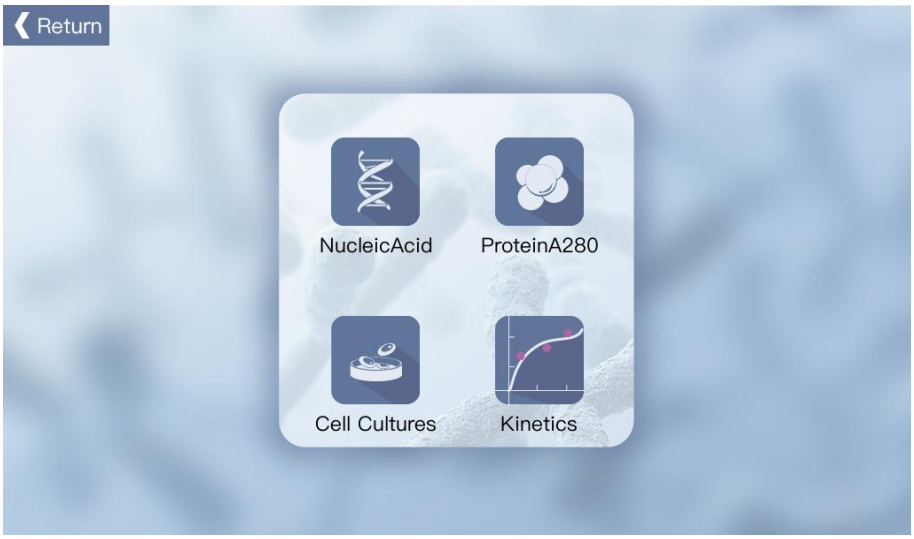
③ Unknown concentration sample measurement.



Abs（562nm）： The absorbance value at 562nm is displayed. The BCA method measures the absorbance value at 562nm; other quantitative methods are the same.

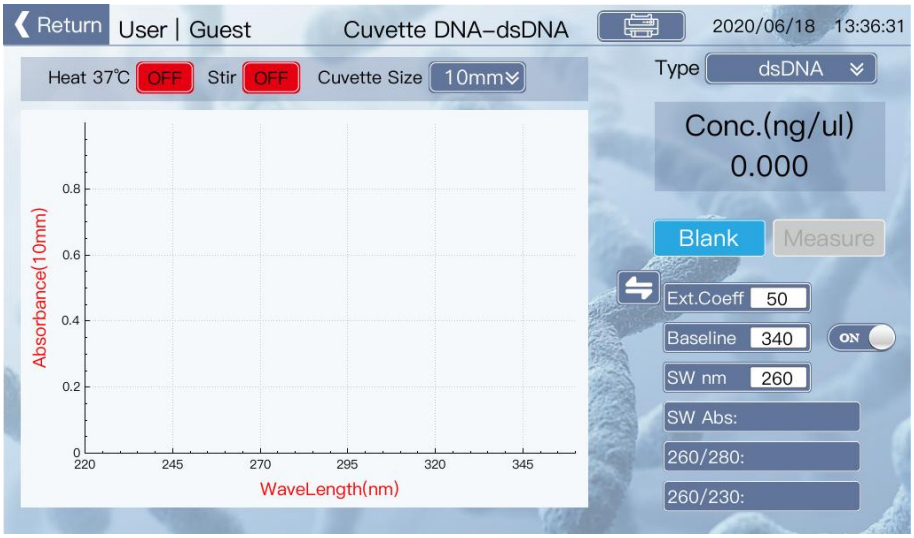
Conc.(ug/ml)： The measured concentration of the sample is displayed. The measured concentration is calculated based on the absorbance value at 562 nm substituted by the standard curve.

8. Cuvette mode detection



Click "Cuvette" on the main interface to enter the cuvette measurement item selection interface. There are 4 test items "NucleicAcid, ProteinA280, Cell Cultures, Kinetics".

1）NucleicAcid, ProteinA280, Cell Cultures detection interface description



Heat 37℃：Standard cuvette heating on and off, constant temperature 37℃.。

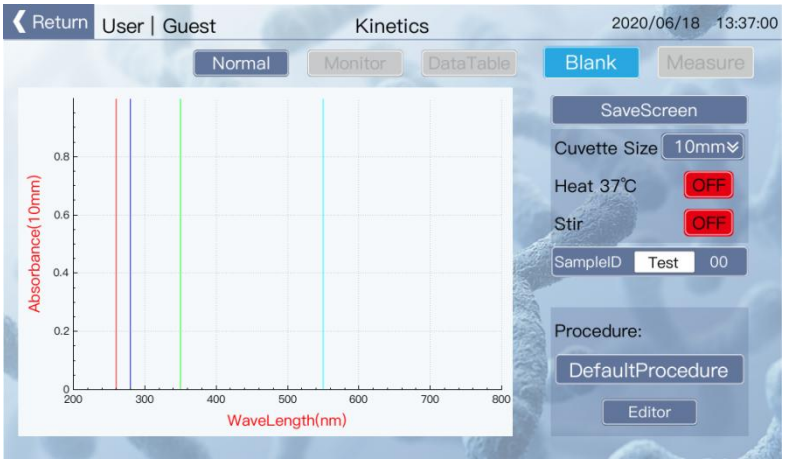
Stir：Cuvette stirring function, need to put a stir bar in the cuvette, the speed has 2 types, low speed and high speed.

Cuvette Size：Cuvette optical path selection, supported optical paths are 10mm, 5mm, 2mm, 1mm respectively.

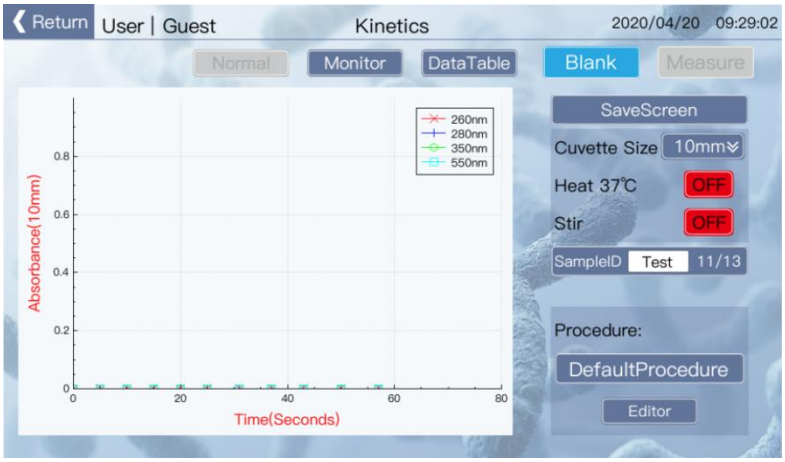
2). Kinetics detection interface description

Normal: Display the relationship curve between wavelength and absorbance. The curve cursor is the wavelength point of the program monitoring, and the user can customize the monitoring Wavelength points, up to 6 monitoring points.

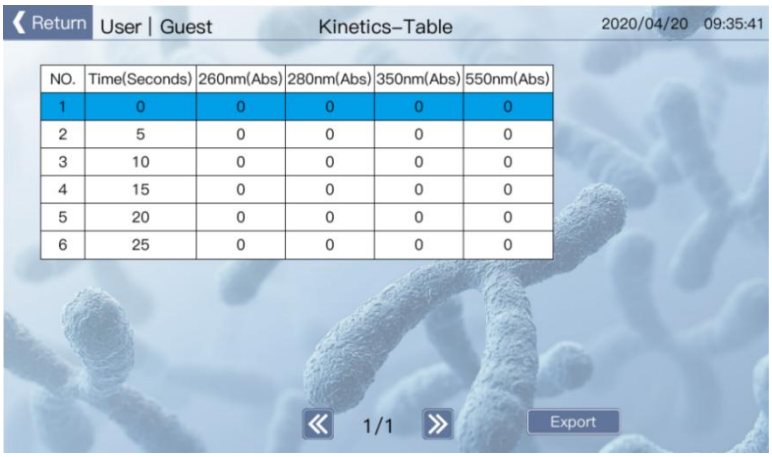
SaveScreen: Screenshot.



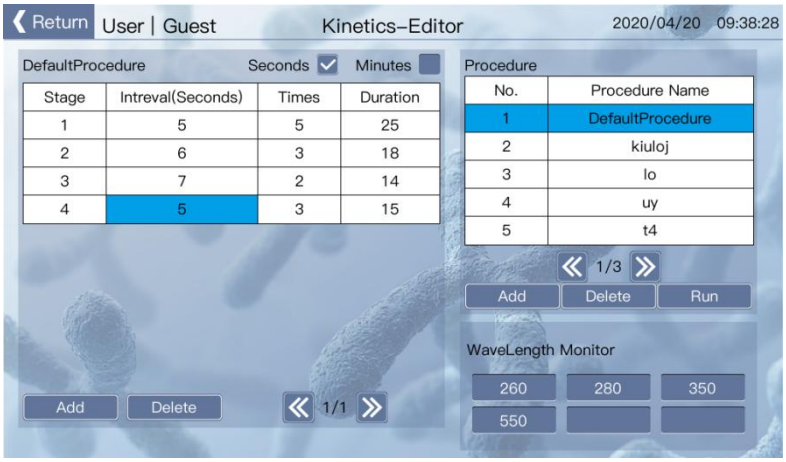
Monitor: Display the relationship curve between the time of the specified wavelength and the absorbance. The example of the curve is the wavelength monitored by the program.



DataTabel: View the operating data of the Kinetics program and export the operating data.

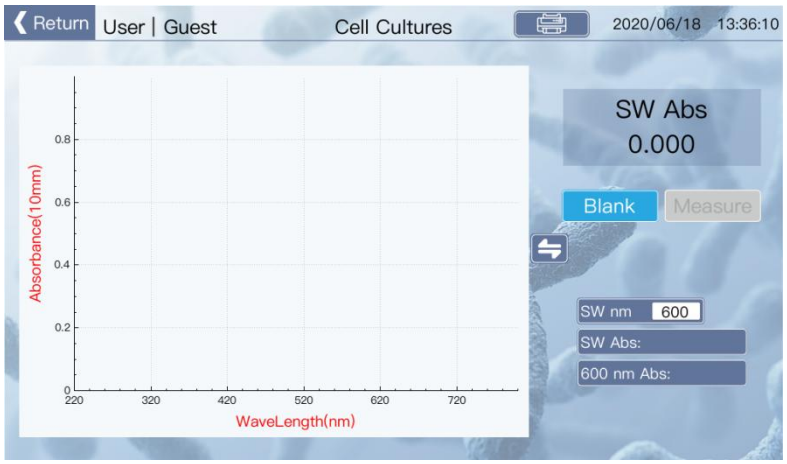


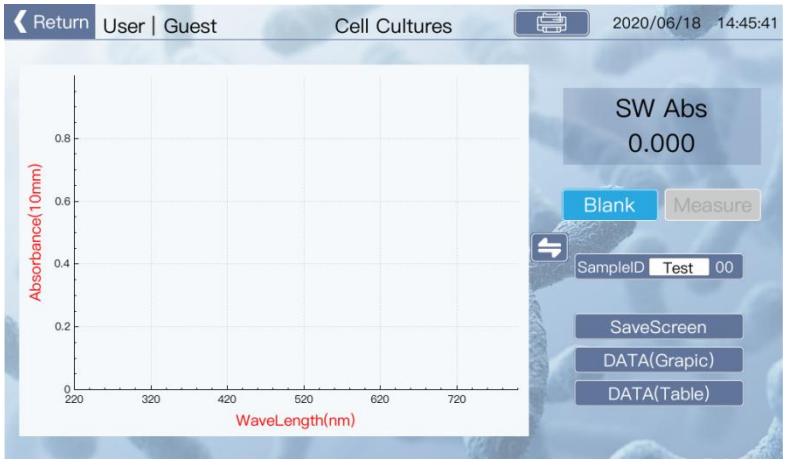
Editor: Open the running program editing interface, you can add new programs, edit programs, and run programs in the editing interface.



9. Other testing

1）Microbial cell culture testing





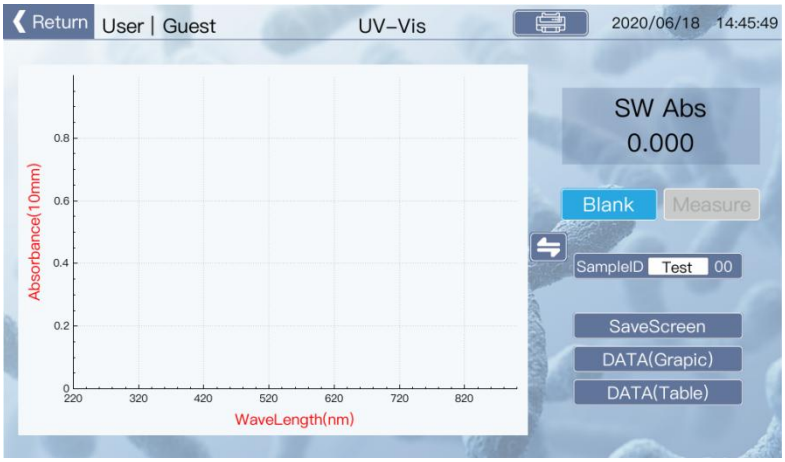
The instrument can measure the suspension density of cells or microorganisms by detecting the absorbance at 600nm wavelength.

SW nm: incident wavelength, the absorbance value is displayed in SW Abs.

SW Abs: Absorbance value at incident wavelength.

600 nm Abs: 600nm absorbance is equivalent to 10mm absorbance.

2）UV-visible measurement

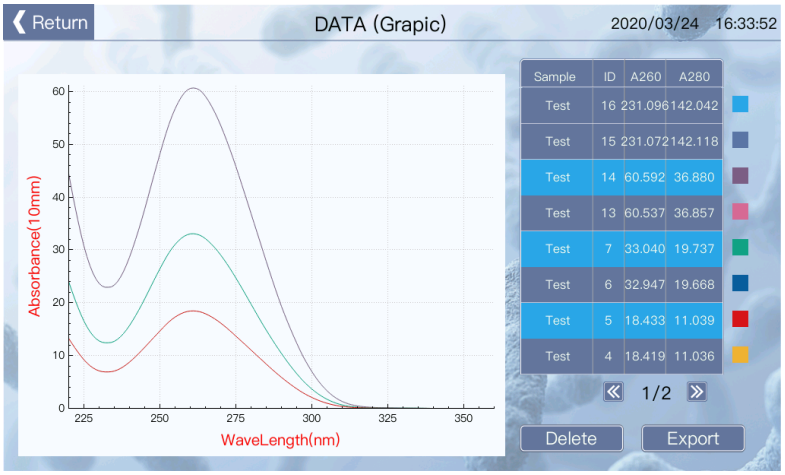


The UV-visible light module of the instrument provides the measurement of absorbance from 200nm to 900nm, Users can set the wavelength point they want to measure and the corresponding baseline calibration wavelength.

10. Data export

1) Graphic data file export

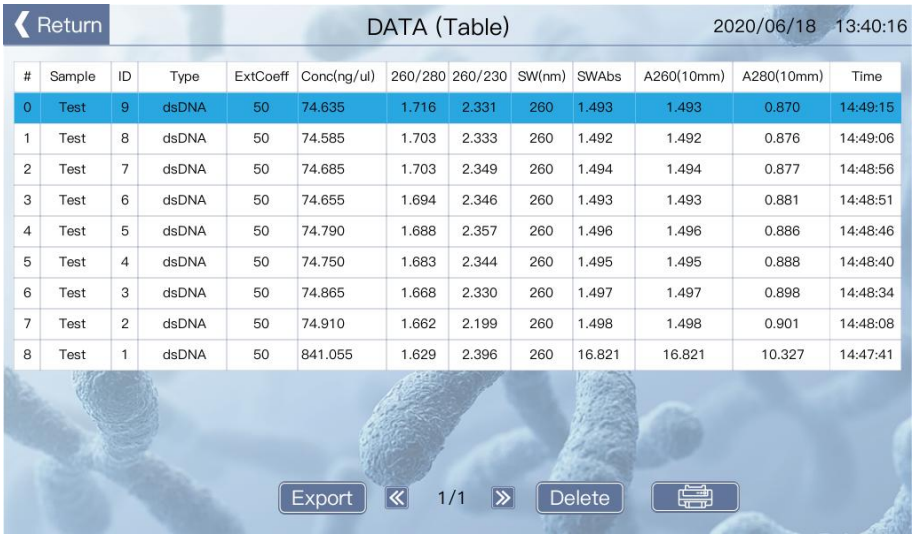
On the measurement page, click the DATA (Grapic) button to enter the graph data viewing page.



Export: After inserting the U disk, click the button to enter the file export page.
Delete: Delete the selected graphic data.

2) Table data file export

Click the DATA (Table) button on the measurement page to enter the graph data viewing page.



Export: After inserting the U disk, click the button to enter the file export page.
Delete: Delete the selected graphic data.

3）Screenshot file export

On the measurement page, click the SaveScreen button to enter the screenshot export page. You need to insert a USB flash drive to export screenshots.

11. Dye

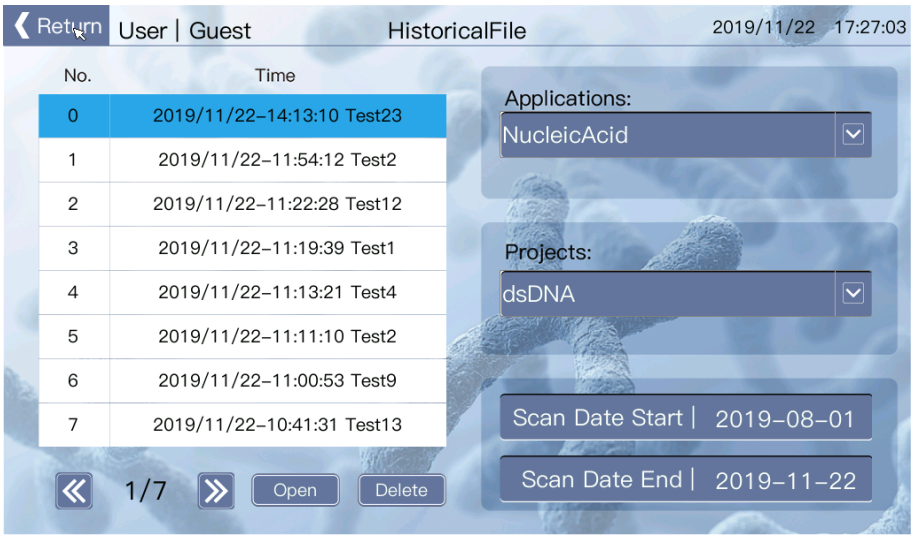
When performing Micro Array and Label Protein detection, Lambert Beer law is used for dye calculation. The following table shows the dye parameters saved in the software:

Dye	Unit	Coeff (1/mole-cm)	Analysis Wavelength(nm)	260nm Correction	280nm Correction
Cy3	uM	1.5E+5	550	0.04	0.05
Cy5	uM	2.5E+5	650	0.00	0.05
Alexa Fluor 488	uM	7.1E+4	495	0.30	0.11
Alexa Fluor 546	uM	1.04E+5	556	0.21	0.12
Alexa Fluor 555	uM	1.5E+5	555	0.04	0.08
Alexa Fluor 594	uM	7.3E+4	590	0.43	0.56
Alexa Fluor 647	uM	2.39E+5	650	0.00	0.03
Alexa Fluor 660	uM	1.32E+5	663	0.00	0.10
Cy3.5	uM	1.5E+5	581	0.08	0.24
Cy5.5	uM	2.5E+5	675	0.05	0.18

12. View and export historical data

Click the Setting button on the main menu page to enter the Setting page:

Click the Historical File button to enter the historical data viewing page:



Applications： Measurement applications, there are NucleicAcid, Micro Array, ProteinA280, Label Protein, ProteinAssay, Cell Cultures, UV-Vis; The unmeasured ones will not be displayed.

Projects： Corresponding to the measurement subdivision of Applications above, for example, if the measurement application is NucleicAcid, Projects has dsDNA, ssDNA, RNA, Other, and it will not be displayed if it has not been measured.

The file list on the left corresponds to each measurement made by the user. The file name is "time + SampleID + number of measurements". Click the Open button to open the selected measurement file. After opening, you can export historical data according to the process described in "Data Export" . Click Delete button deletes the selected file.

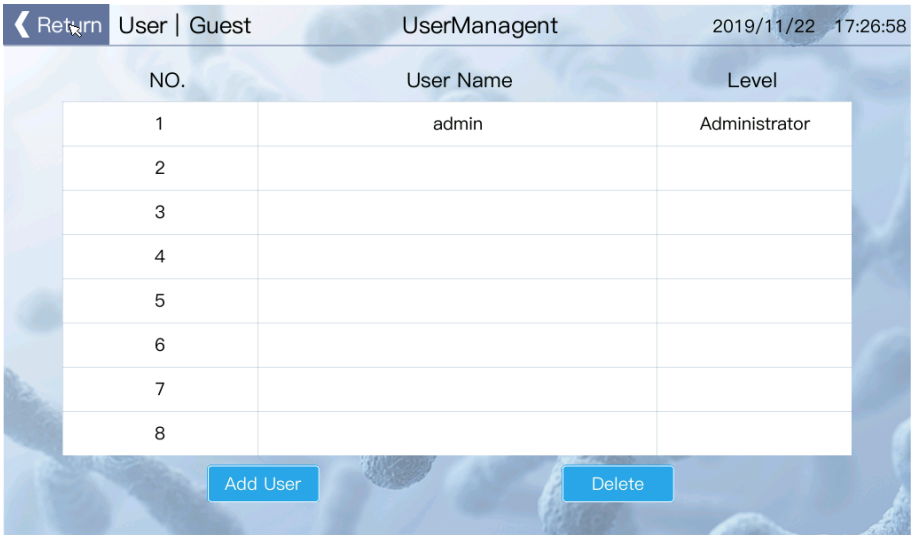
In the lower right corner, you can set the time period of the file to be browsed. By default, the measurement file within the first 3 months of the current time is

displayed. If you want to browse earlier files, you can customize the time period.

13. User Management

Click the Setting button on the main menu page to enter the Setting page:

The user management provided on the settings page includes switching the current user (SwitchUser) and entering the user management interface (Managenment); users entering the user management interface need to enter the administrator (admin) password, the administrator password is 123456 by default.



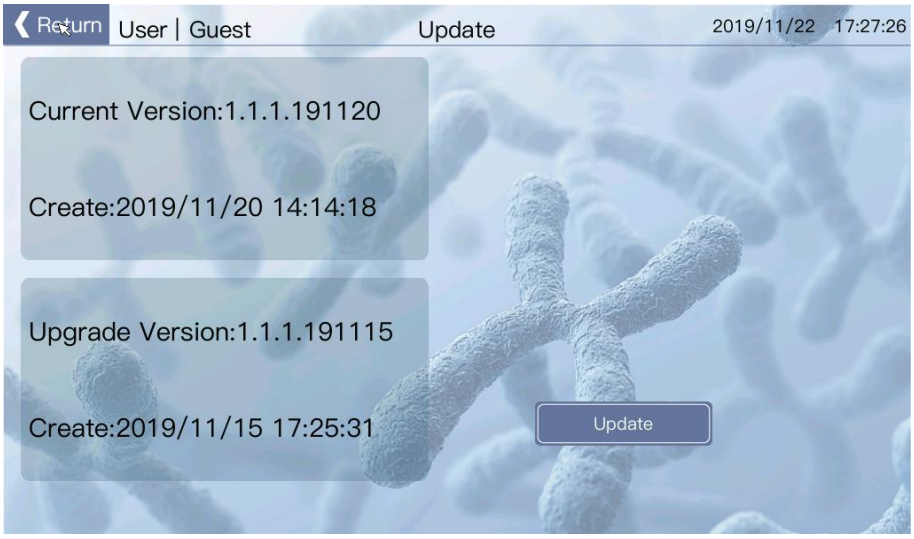
On the user management page, users can add new users and delete users, but they cannot delete admin users. Users can add up to 7 users, total 8 users including the administrator user.

14. Software update

Click the Setting button on the main menu page to enter the Update page

Click the "Update" button to enter the upgrade interface. If no USB disk is inserted, it will prompt "**No USB device found!**" The user is prompted to insert the usb flash drive. If there are no upgradable files in the usb flash drive, the prompt will be "**U disk no upgrade file available!**" If normal, insert the usb flash disk and enter the upgrade interface. The interface is as follows:

The current software information is displayed at the top of the interface, and the software information to be updated is displayed at the bottom. Click the "Update" button to update the software. After the update is completed, the system will automatically restart and enter the new software program.

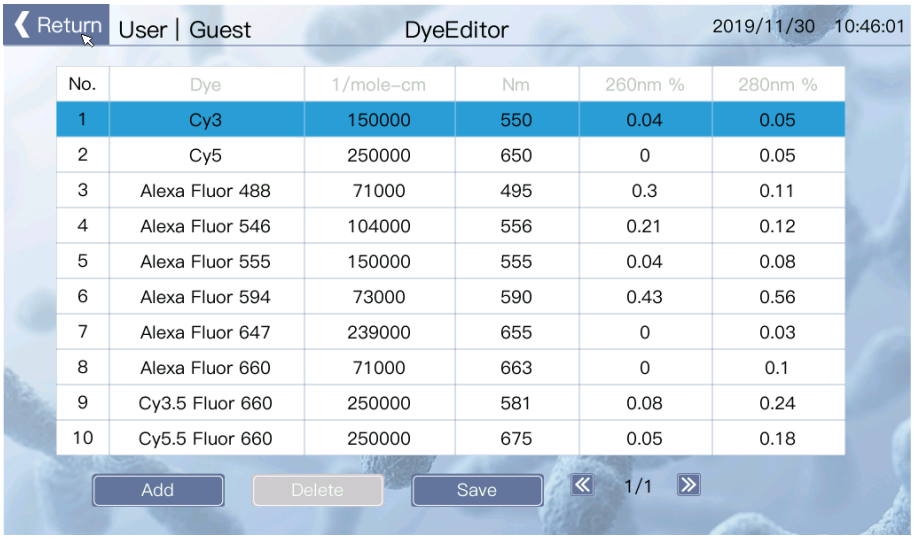


The upper part of the interface displays the current software information, and the lower part displays the information of the software to be updated. Click the "Update" button to update the software. After the update is completed, the system will

automatically restart and enter the new software program.

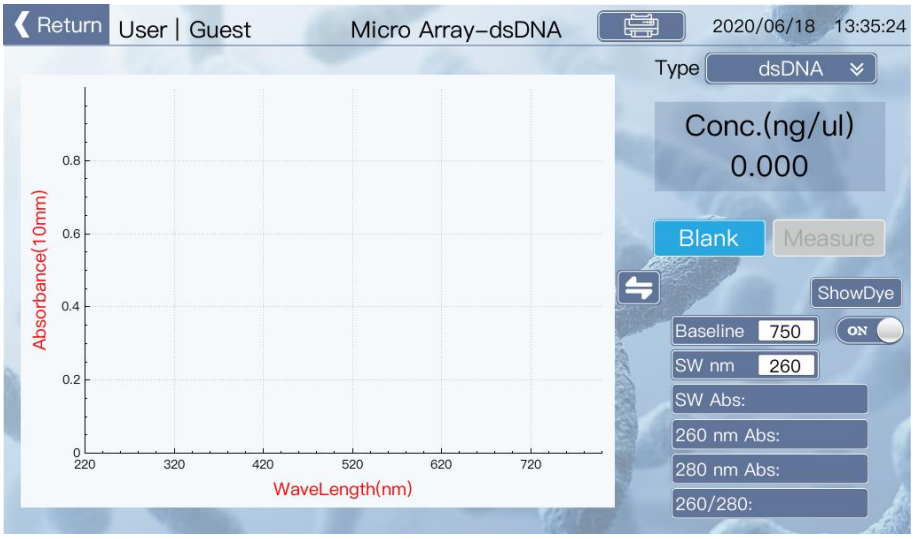
15. Dye editing

Click the Setting button on the main menu page to enter the Dye Editor page:

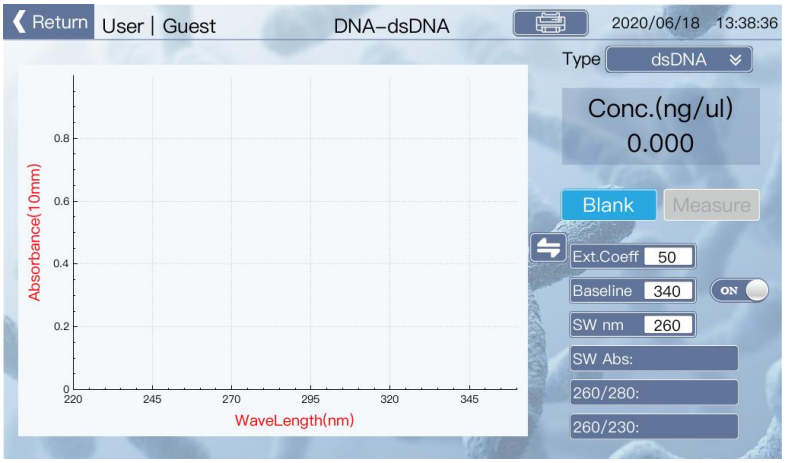


No.	Dye	1/mole-cm	Nm	260nm %	280nm %
1	Cy3	150000	550	0.04	0.05
2	Cy5	250000	650	0	0.05
3	Alexa Fluor 488	71000	495	0.3	0.11
4	Alexa Fluor 546	104000	556	0.21	0.12
5	Alexa Fluor 555	150000	555	0.04	0.08
6	Alexa Fluor 594	73000	590	0.43	0.56
7	Alexa Fluor 647	239000	655	0	0.03
8	Alexa Fluor 660	71000	663	0	0.1
9	Cy3.5 Fluor 660	250000	581	0.08	0.24
10	Cy5.5 Fluor 660	250000	675	0.05	0.18

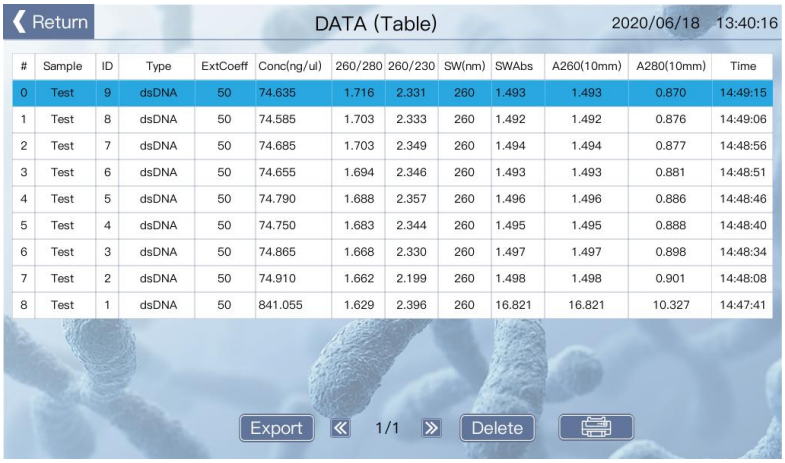
Users can view related dye parameters, or they can add custom dyes and save them for use. The system's default dyes cannot be deleted, and users can delete custom dyes. Click "ShowDye" on the measurement interface to select a custom dye or select the default dye. Click the dye setting box to pop up the dye selection interface, as shown below:



16. Printer description




Printer button: Click the button to print the current measurement data.



#	Sample	ID	Type	ExtCoeff	Conc(ng/ul)	260/280	260/230	SW(nm)	SWAbs	A260(10mm)	A280(10mm)	Time
0	Test	9	dsDNA	50	74.635	1.716	2.331	260	1.493	1.493	0.870	14:49:15
1	Test	8	dsDNA	50	74.585	1.703	2.333	260	1.492	1.492	0.876	14:49:06
2	Test	7	dsDNA	50	74.685	1.703	2.349	260	1.494	1.494	0.877	14:48:56
3	Test	6	dsDNA	50	74.655	1.694	2.346	260	1.493	1.493	0.881	14:48:51
4	Test	5	dsDNA	50	74.790	1.688	2.357	260	1.496	1.496	0.886	14:48:46
5	Test	4	dsDNA	50	74.750	1.683	2.344	260	1.495	1.495	0.888	14:48:40
6	Test	3	dsDNA	50	74.865	1.668	2.330	260	1.497	1.497	0.898	14:48:34
7	Test	2	dsDNA	50	74.910	1.662	2.199	260	1.498	1.498	0.901	14:48:08
8	Test	1	dsDNA	50	841.055	1.629	2.396	260	16.821	16.821	10.327	14:47:41


Printer button: Click the button to print the selected measurement data.

(**Note**: The printer is an accessory, and it is not equipped by default. If necessary, please contact the sales directly to purchase it separately.)

Printer parameters	
Printer model	GP-5890XIII
Printer manufacturer	Beijing, China
Printing method	Direct line thermal printing
Print width	48mm
Dot density	384 Point/Row
Printing speed	90 mm/sec
Interface Type	USB interface
Printer paper	Paper width：57.5±0.5mm，Paper outer diameter：φ83 mm
Power Adapter	Input：AC 110V/220V,50~60Hz　Output：DC 12/3A
Power supply	DC12V/3A
Lifespan	Reliability 50 km

Chapter 5 Failure Analysis and Handling

Failure analysis and processing procedures

No.	Error message	Possible causes and corresponding countermeasures
1	Low light intensity alarm at startup	The measuring arm is not lowered or there are pollutants on the measuring platform; lower the measuring arm and wipe the measuring platform clean.
2	The motor is noisy	The motor wiring is partially broken or the photoelectric switch is damaged. The motor reaches the limit.
3	The power-on screen is not bright	The internal circuit is damaged and needs to be returned to the factory for repair.
4	Touch is not available	The internal circuit is damaged and needs to be returned to the factory for repair.
5	Unrecognized U disk	The internal circuit is damaged and needs to be returned to the factory for repair.
6	Xenon lamp does not flicker during measurement	The internal USB cable is loose or the internal circuit is damaged, you need to return to the factory for repair.

Annex A Wiring Diagram for Photometer