

ESPECTROFOTÓMETRO UV/VIS 4510/5
4510/5 UV/VIS SPECTROPHOTOMETER
SPECTROPHOTOMÈTRE UV/VIS 4510/5



Este manual es parte inseparable del aparato por lo que debe estar disponible a todos los usuarios del equipo. Le recomendamos leer atentamente el presente manual y seguir rigurosamente los procedimientos de uso para obtener las máximas prestaciones y una mayor duración del mismo.

This manual should be available for all users of these equipments. To get the best results and a higher duration of this equipment it is advisable to read carefully this manual and follow the processes of use.

Ce manuel est une partie indissociable de l'appareil et doit être mis à la disposition de tous les utilisateurs de l'équipement. Nous vous recommandons de lire attentivement ce manuel et de suivre scrupuleusement les procédures d'utilisation afin d'obtenir des performances maximales et une plus longue durée de vie de l'appareil.

LANGUAGE INDEX

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English	44-85
French	86-127

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SAFETY INFORMATION

Please follow the guidelines below and read this manual in its entirety to ensure safe operation of the unit.



- Do not open the device.
- Disconnect the device from the mains supply before carrying out maintenance work or changing the fuse.
- The inside of the device is a high-voltage area Danger!
- Do not use the device if it is damaged, especially if the main power cable way is in any damaged or defective.



- Repairs may only be carried out by the service technicians from us.
- The device must be connected to a power outlet that has a protective ground connection.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Do not allow any liquid to enter into the device.
- Do not operate the device in a hazardous location or potentially explosive environment.

PACKAGE CONTENTS

Description	Quantity
Spectrophotometer	1 pc
Glass cuvette	4 pcs
Quartz cuvette	2 pcs
Power cord	1 pc
USB flash drive (Software & Instruction Manual inside)	1 pc
Tablet	1 pc
Tablet power adapter	1 pc
USB cable	1 pc
USB hub	1 pc
Double-sided tape	1 pc
Dust cover	1 pc

UNPACKING

Open the package and carefully check the packing list items; if you find missing or damaged items please contact your distributor.

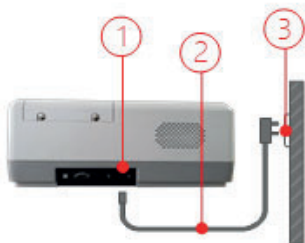
INSTALLATION

■ Placement

Place the instrument on the stable table carefully.

■ Connect the power cord

Check instrument power switch is turned off. Connect the power cord to the power inlet on the device (1); plug the other end of the power cord into a separate power outlet (3).



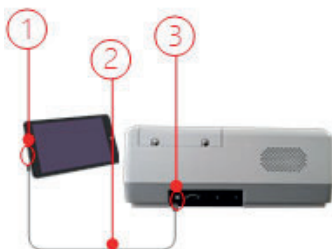
- 1 - Power inlet
- 2 - Power cord
- 3 - Power outlet

■ Connect to Tablet with Bluetooth

Make sure that “Bluetooth” is turned on on the tablet, and the user will need to start the spectrum analysis software to connect automatically.

■ Connect to Tablet with USB Cable

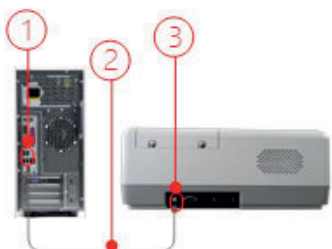
Plug one end of the USB cable into the instrument's USB port (Type B, square) and the other end into the tablet's USB port (Type A, flat).



- 1 - USB port of tablet (Type A, flat)
- 2 - USB Cable
- 3 - USB port of instrument (Type B, square)

■ Connect to computer with USB Cable

Plug one end of the USB cable into the instrument's USB port (Type B, square) and the other end into the computer's USB port (Type A, flat).



- 1 - USB port of computer (Type A, flat)
- 2 - USB Cable
- 3 - USB port of instrument (Type B, square)

SYMBOLS AND CONVENTIONS

The following chart is an illustrated glossary of the symbols that are used in this manual.



CAUTION This symbol indicates a potential risk and alerts you to proceed with caution.



CAUTION This symbol indicates the presence of high voltage and warns the user to proceed with caution.

OVERVIEW

4510/5 Spectrophotometer used in Chemistry, Pharmaceuticals, Biochemical, Metallurgy, Light Industry, Textile, Material, Environment, Medical, Education and some other fields for Quality Control laboratories.

SPECIFICATIONS

Model	4510/5
Reference	HJD015
Optical system	Split beam, 1200 l/mm grating
Light source	Flash Xenon lamp
Detector	Dual silicon photodiode
Spectral bandwidth	2 nm
Wavelength range	190-1100 nm
Wavelength accuracy	±0.3 nm
Wavelength repeatability	≤0.1 nm
Wavelength resolution	0.1 nm
Wavelength swing speed	10000 nm/min
Wavelength scanning speed	20-3200 nm/min
Photometric range	-0.3-3A, 0-200%T, 0-9999.9C
Photometric accuracy	±0.002 A @ 0.0 ~ 0.5 A, ±0.004 A @ 0.5 ~ 1 A, ±0.4 %T @ 0 ~ 100 %T
Photometric repeatability	≤0.001 A @ 0.0 ~ 0.5 A, ≤0.002 A @ 0.5 ~ 1 A, ≤0.2 %T @ 0 ~ 100 %T
Stray light	≤0.05%T @ 220nm & 340nm
Noise	≤0.001 A @ 0.0 A, 260 nm, ≤0.002 A @ 1 A, 260 nm, ≤0.004 A @ 2 A, 260 nm
Baseline flatness	±0.002A (200~1000 nm)
Sample compartment	For 4 cuvettes of 10 mm, manual changer
Display	10.1-inch IPS color capacitive touch screen
Storage	64GB (built-in)
Interface	1x RS232 serial port (printer), 1x USB-B (PC), 1x USB-A (USB memory stick), Bluetooth, 1x HUB 3+1 USB 3.0 + 1 Type C
Modes	Photometry, Multi Wavelength, Kinetics, Time Scanning, Quantitation, Spectrum Scanning, DNA/Protein
Power supply	100-240VAC, 50/60Hz
Dimension	450×370×187mm
Weight	10.2kg

GETTING STARTED


The following chart describes the basic operation of the instrument.

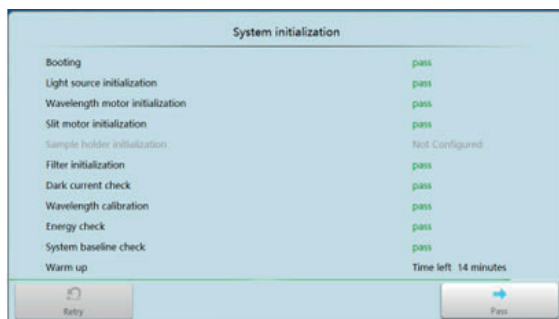
Turn the instrument power on/off

Switch on the power on the back of the instrument. Press the blue turn on/off button on the right of the instrument to start.

Note: Do not turn the instrument on and off continuously and quickly. Wait at least 30 seconds before turning the instrument back on, otherwise the electrical and mechanical systems may be damaged.

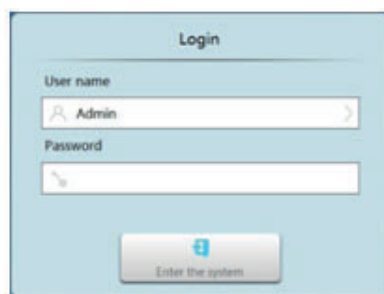
Self-check and calibration

Check the instrument sample chamber and remove anything from the light path. Launch the application **UV Studio** after double-clicking the icon  on the windows desktop. The instrument starts self-test. Self-check includes the following steps: Turn on lamp and positioning light source switching mechanism - Positioning filter disc - Positioning slit switching mechanism (if installed) - Positioning automatic sample holder (if installed) - Get dark current - Positioning wavelength - Checking energy - Checking system baseline.



User login

If the user has selected the “User Management and Audit Trail” module, after the self-test is completed, enter the “User Login” interface, select the user name and enter the password and press “Login” to enter the system.



GENERAL OPERATING INSTRUCTIONS

■ Touch screen using tips

The entire screen can be started with a touch. To make a choice, use your nails, fingertips, pencil, or stylus to press the screen. Don't press the screen with sharp objects (such as ball point).

■ Using the keyboard

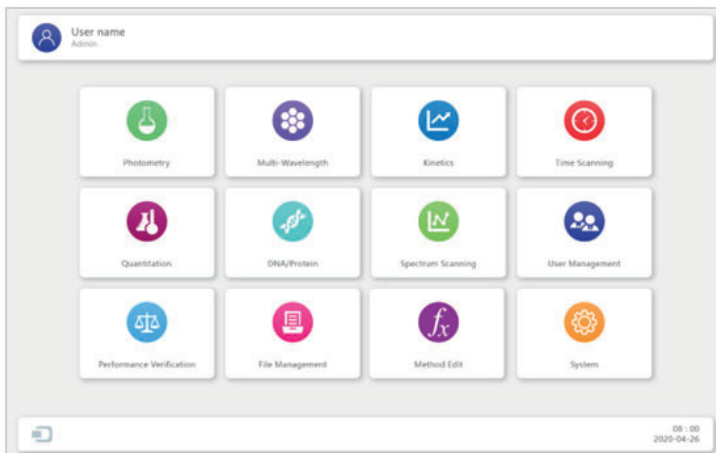
The instrument provides two kinds of keyboards for different situations. The numeric keypad is used to input parameters, and the full keyboard is used to input user information and file names.















■ Basic Operation

- Enter an application module

Main interface, press an application icon.



	Photometry Measure the photometric value of a sample at a single wavelength.
	Multi wavelength Measure the photometric value of a sample at multiple wavelengths.
	Kinetics Measure the change in absorbance or absorbance change rate over time at a specified wavelength.
	Time scanning Measure the change of photometric value with time at a single wavelength.
	Quantitation Establish a standard curve and measure the concentration of the sample using a standard curve.
	Biological measurement Measure DNA, RNA and protein concentrations using built-in methods or new methods.
	Spectrum scanning Measure the photometric curve of a sample over a range of spectrum.
	User management Assign user rights, operate log management.
	Performance verification Verify the technical performance of the instrument.
	File management Efficient management of user files, browsing, copying, renaming, and deleting operations.
	Custom method Users can add calculation methods for special applications or exploratory studies according to their needs.
	System Set system parameters and system calibration.

- Back to main interface

Measurement interface, press  back to main interface.

- Return to previous interface

Method/Settings/Data list/Curve list interface, press  back to previous interface.

- Do blank/Scan baseline

Measurement interface, put "Reference" in measurement channel, press  to do blank/scan baseline.








- Measure the sample

Measurement interface, put "Sample" in measurement channel, press  to perform the measurement.


- Enter data/curve list

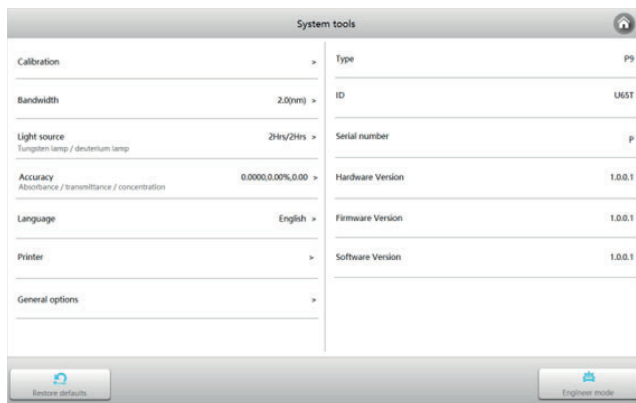
Measurement interface, press  to enter data/curve list.

■ Measurement Results Operation

	Open Open a stored file, load data or parameters.
	Save Save data, parameters to storage.
	Print Print test report.
	Export to MS Word Export file to MS Word format.
	Export to MS Word file format Export file to MS Excel format.
	Export to PDF Export file to PDF format.
	Delete Delete the selected results.

CALIBRATION AND SYSTEM SETTINGS

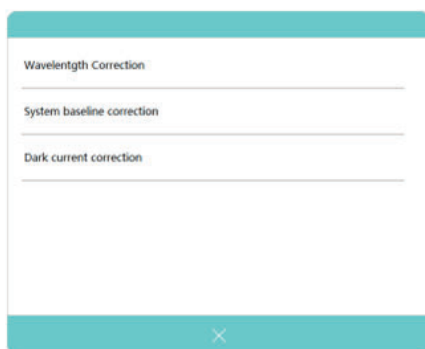
Select the icon  in the main interface. Display options to calibrate the system and configure the basic instrument settings.



■ Calibration:

Select the tab **Calibration** in the System interface. Remove something from the measurement channel, close the sample chamber cover, and select the item **Wavelength calibration, System baseline calibration or Dark current calibration** to do calibration.

Important! Before performing the calibration, you must remove something from the measurement channel, close the sample chamber cover, and maintain this state throughout the calibration process.



■ Result resolution setting:

Press the tab **Result resolution**. Select the resolution of the required display digits according to different measurement modes.



Set accuracy	
Abs	0.0000
%T	0.00
Conce.	0.00

■ Language setting:

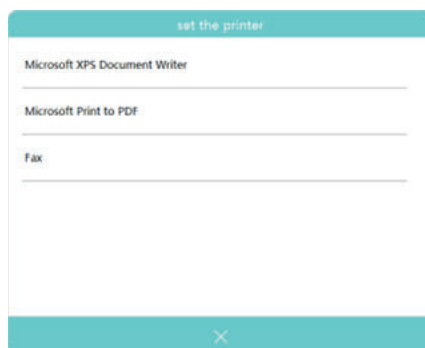
Press the tab **Language** and select the desired language.



Modify system language	
English	
简体中文	
Français	
Deutsch	
Italiano	
Español	

■ Printer setting:

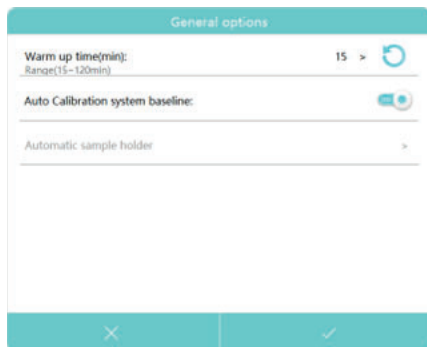
Press the tab **Printer** and select the installed printer.




set the printer	
Microsoft XPS Document Writer	
Microsoft Print to PDF	
Fax	

■ General settings:


Press the tab **General options** to enter.



- Warm up:

Press “Warm up time”, pop up numeric keyboard, input value 1~120 minutes, and press the button  to complete the setting.

- Calibration of system baseline when boot:

Press the icon  to turn on/off the “Calibration of system baseline when boot” option.

MEASUREMENT

■ Important Guidelines

- Reagents and dilution buffers can cause cauterization and other damage to health.
- Samples (nucleic acids, proteins, bacteria cultures) can be infectious and cause serious damage to health.
- During sample preparation, measuring procedures and maintenance and cleaning work, observe all local laboratory safety precautions (e.g. wear protective clothing and gloves, use of disinfectant) regarding the handling of sample material.
- Dispose of measuring solutions and cleaning and disinfectant materials in accordance with the relevant local laboratory regulations.

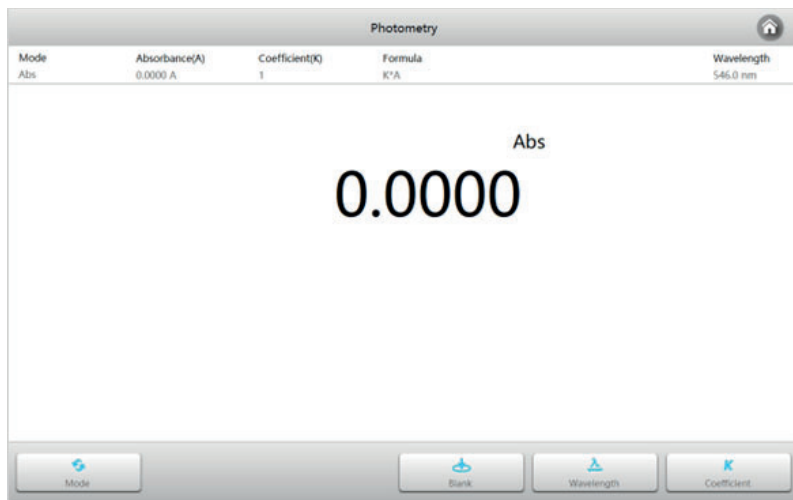
■ Check the cuvettes


The cuvettes must be clear and there's no remains of the samples on the surface of it. **Only Quartz cuvettes are permitted to be used in the UV region.**

■ Photometry




Photometry mode is used to measure the photometric value of the sample at a single wavelength.

- Main interface, press the icon  to start a **Photometry** application.



1. Press the icon  to switch to the measurement mode.

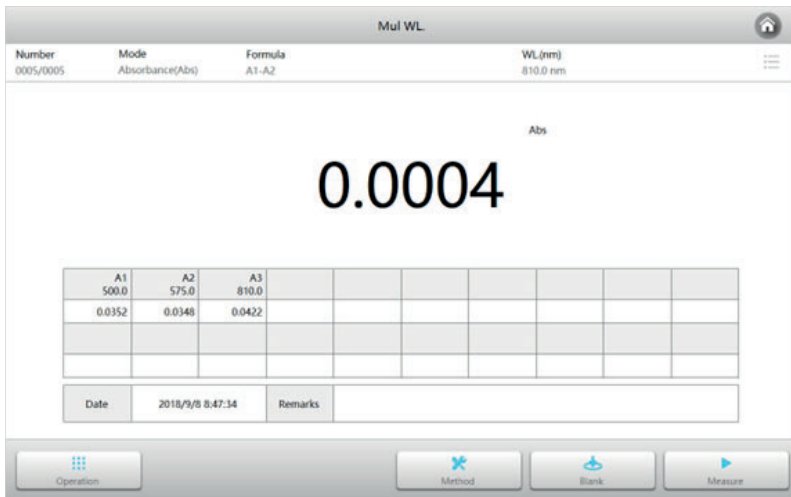
Abs	Measure absorbance value of the sample(s).
%T	Measure transmittance value of the sample(s).
%R	Measure reflectance value of the sample(s).

2. Press the button  to set wavelength, key in the measurement wavelength.
3. If the mode is Abs, you can calculate $K \cdot A$ by pressing the button  to set the coefficient K.
4. Put the reference in the measurement channel, press the button  to do blank.
5. Put the sample in the measurement channel, read the result.

■ Multi wavelength

Multi wavelength mode is used to measure the photometric value of the sample at multiple wavelengths.

- **Main** interface, press the icon  to start a **Multi wavelength** application.



Number	Mode	Formula	WL (nm)
0005/0005	Absorbance(Abs)	A1-A2	810.0 nm



Abs

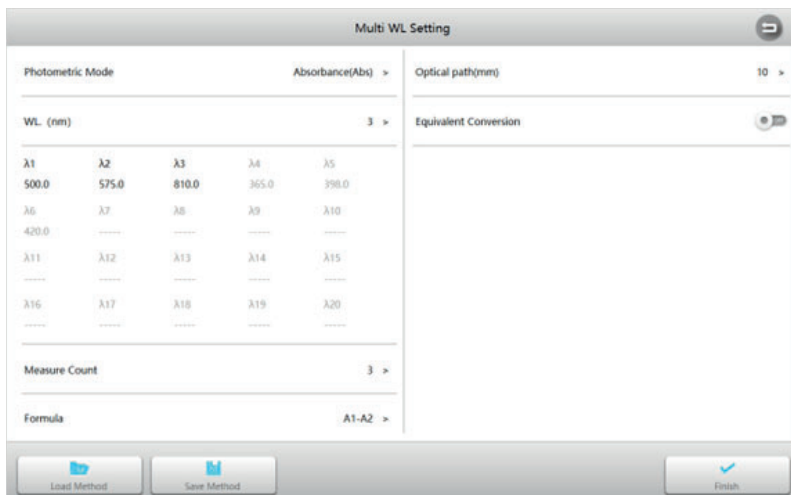
0.0004

A1	A2	A3					
500.0	575.0	810.0					
0.0352	0.0348	0.0422					

Date	2018/9/8 8:47:34	Remarks	
------	------------------	---------	--

Buttons: Operation, Method, Blank, Measure

1. **Multi wavelength** interface, press the button  to set the measurement parameters. The method can be saved or directly called from the memory. Press  to accept the new parameters and return to the measurement interface.



Multi WL Setting

Photometric Mode: Absorbance(Abs) >

Optical path(mm): 10 >

Equivalent Conversion:

WL (nm): 3 >

λ1	λ2	λ3	λ4	λ5
500.0	575.0	810.0	365.0	398.0
λ6	λ7	λ8	λ9	λ10
420.0	-----	-----	-----	-----
λ11	λ12	λ13	λ14	λ15
-----	-----	-----	-----	-----
λ16	λ17	λ18	λ19	λ20
-----	-----	-----	-----	-----

Measure Count: 3 >

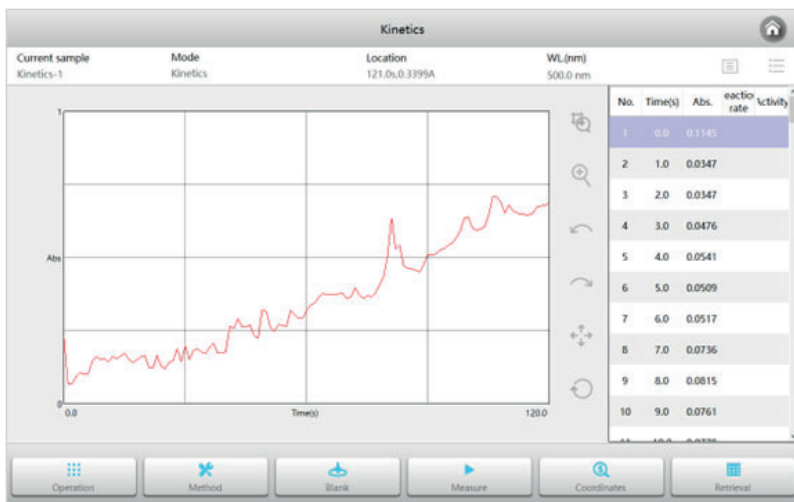
Formula: A1-A2 >



Buttons: Load Method, Save Method, Finish

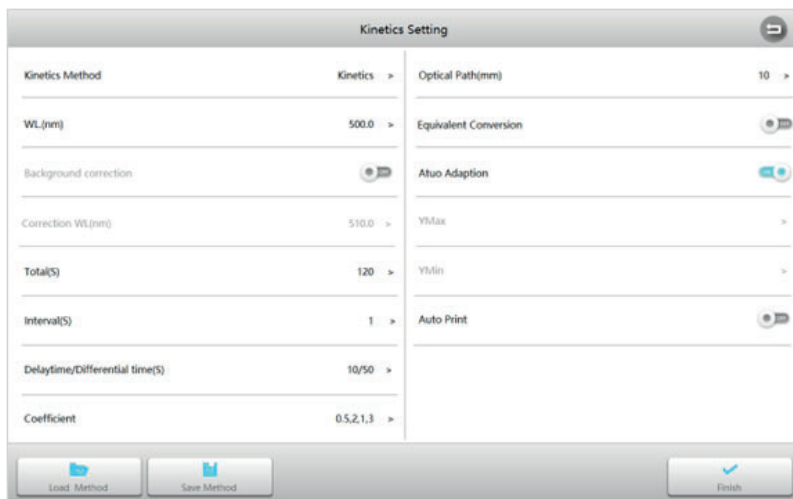
■ Kinetics

Kinetics mode is used to measure the rate of change of the sample.

- **Main** interface, press the icon  to start a **Kinetics** application.





1. **Kinetics** interface, press the button  to set the measurement parameters. The method can be saved or directly called from the memory. Press the button  to accept the new parameters and return to the measurement interface.



The screenshot shows the Kinetics Setting interface with the following parameters and values:

Parameter	Value
Kinetics Method	Kinetics
WL(nm)	500.0
Background correction	Off
Correction WL(nm)	510.0
Total(S)	120
Interval(S)	1
Delaytime/Differential time(S)	10/50
Coefficient	0.5,2,1,3
Optical Path(mm)	10
Equivalent Conversion	Off
Atuo Adaption	On
YMax	
YMin	
Auto Print	Off

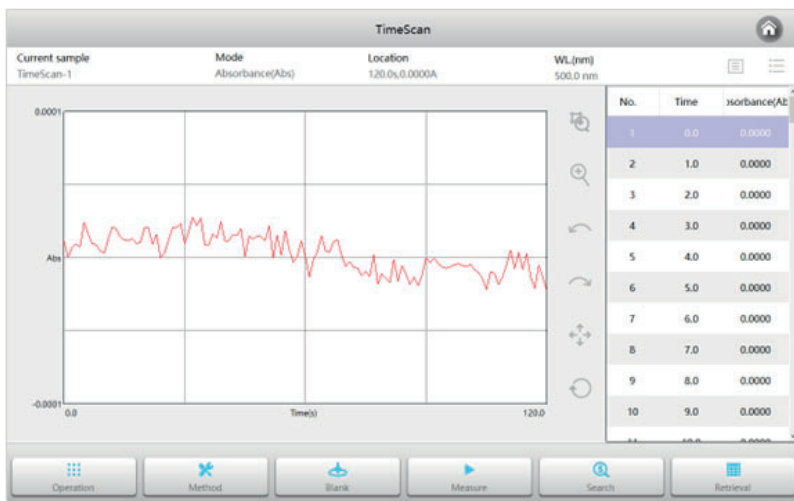
Measurement mode	2 measurement modes: kinetics, kinetic rate.
Wavelength	Measurement wavelength, range: 190~1100nm.
Background correction	Background correction switch, can be set according to actual needs.
Corrected wavelength	Background corrected wavelength, range: 190~1100nm.
Total	Total sampling time required.
Interval	Sampling interval.
Delay/Derivative	Waiting time before starting sampling/time of participating activity calculation.
Coefficient	Coefficient of activity calculation equation.
Light path length	The width of the cuvette used for the measurement.
Equivalent conversion	When activated, the instrument automatically converts measurements from different path cuvettes to values in the 10mm light path length.
Auto scale	Whether to automatically adjust the coordinates based on the data.
Y max	The maximum value of the ordinate (valid only when the coordinates are fixed).
Y min	Minimum value of the ordinate (valid only when the coordinates are fixed).
Automatic printing	Automatically print curves and results after measurement is complete.
Automatic save	Automatically save curves and results after measurement is complete.



- Put the reference in the measurement channel, close the sample chamber cover, and press the button  to do blank.
- Put the sample in the measurement channel, close the sample chamber cover, and press the button  to measure and get sampled data and draw the curve.
- Repeat step 3 to measure more samples.

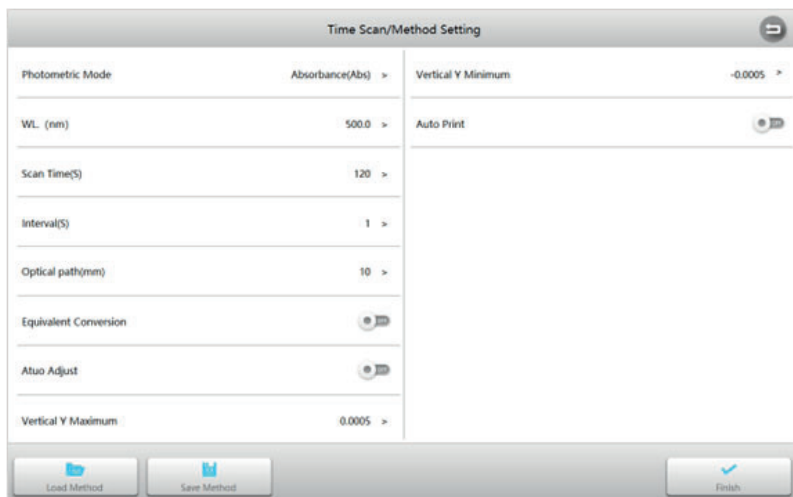
■ Time scanning

Time scanning mode is used to measure photometric value changes of the sample.

- **Main** interface, press the icon  to start a **Time scanning** application.





1. **Time scanning** interface, press the button  to set the measurement parameters. The method can be saved or directly called from the memory. Press  to accept the new parameters and return to the measurement interface.



Time Scan/Method Setting	
Photometric Mode	Absorbance(Abs) >
WL (nm)	500.0 >
Scan Time(S)	120 >
Interval(S)	1 >
Optical path(mm)	10 >
Equivalent Conversion	<input type="checkbox"/>
Auto Adjust	<input type="checkbox"/>
Vertical Y Maximum	0.0005 >
Vertical Y Minimum	-0.0005 >
Auto Print	<input type="checkbox"/>

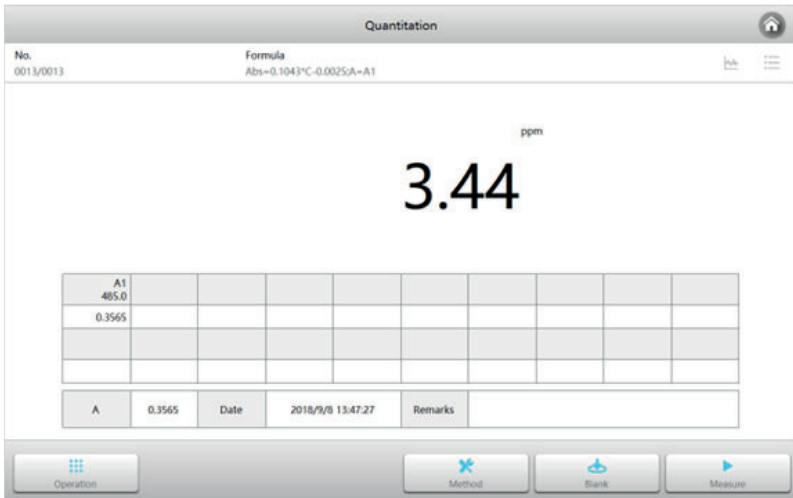
Photometric mode	3 photometric modes: Abs, %T and %R.
Wavelength	Measurement wavelength, range: 190~1100nm.
Scan time	Total sampling time required.
Interval	Sampling interval.
Light path length	The width of the cuvette used for the measurement.
Equivalent conversion	When activated, the instrument automatically converts measurements from different path cuvettes to values in the 10mm light path length.
Auto scale	Whether to automatically adjust the coordinates based on the data.
Y max	The maximum value of the ordinate (valid only when the coordinates are fixed).
Y min	Minimum value of the ordinate (valid only when the coordinates are fixed).
Automatic printing	Automatically print curves and results after measurement is complete.
Automatic save	Automatically save curves and results after measurement is complete.

2. Put the reference in the measurement channel, close the sample chamber cover, and press the button  to do blank.
3. Put the sample in the measurement channel, close the sample chamber cover, and press the button  to measure and get sampled data and draw the curve.
4. Repeat step 3 to measure more samples.

■ Quantitation

Quantitation mode is used to measure sample concentration by establishing and using a standard curve.

- **Main** interface, press the icon  to start a **Quantitation** application.



Quantitation

No. 0013/0013 Formula Abs=0.1043*C-0.0025A=A1


3.44 ppm

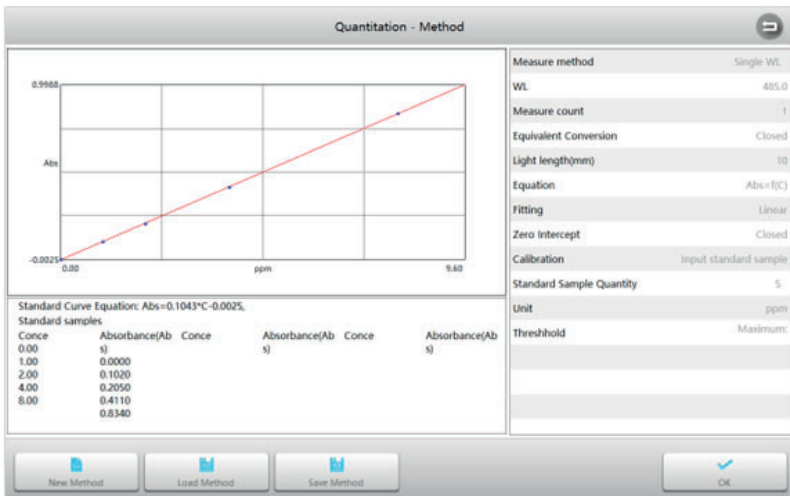
A1							
485.0							
0.3565							

A	0.3565	Date	2018/9/8 13:47:27	Remarks

Operation Method Blank Measure

Establish quantitative methods

1. **Quantitation** interface, press the button  to enter into **Method** interface.



Quantitation - Method

0.9988

Abs

0.0025 0.00 9.60 ppm

Standard Curve Equation: Abs=0.1043*C-0.0025,

Standard samples

Conce	Absorbance(Ab s)	Conce	Absorbance(Ab s)	Conce	Absorbance(Ab s)
0.00	0.0000				
1.00	0.1020				
2.00	0.2050				
4.00	0.4110				
8.00	0.8340				

Measure method Single WL

WL 485.0

Measure count 1

Equivalent Conversion Closed

Light length(mm) 10

Equation Abs=f(C)

Fitting Linear

Zero intercept Closed


Calibration Input standard sample

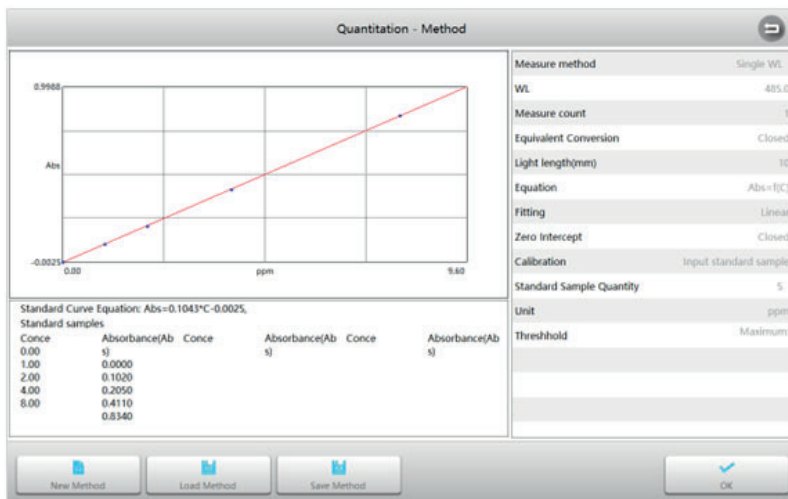
Standard Sample Quantity 5

Unit ppm

Threshold Maximum

New Method Load Method Save Method OK


2. **Method** interface, press the button  to start a new measurement method and enter the parameter setting interface.

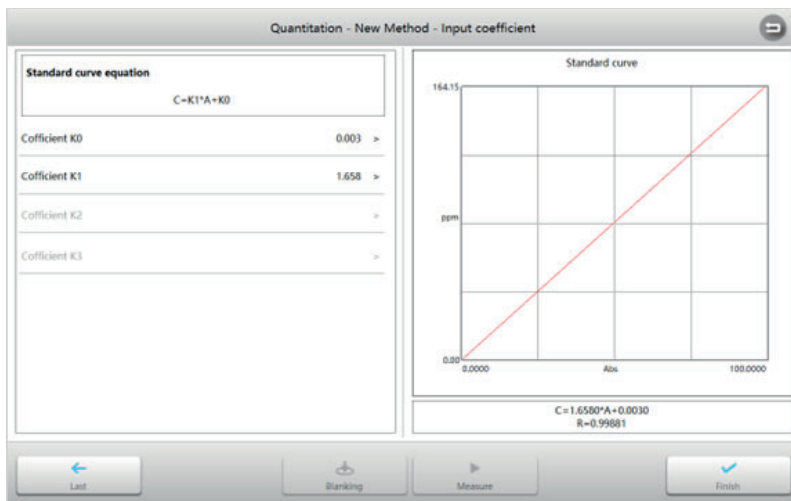



Measurement	Built-in single wavelength, dual wavelength difference, dual wavelength ratio, three wavelengths, area 5 ways, and support custom formula.
Wavelength	Measuring wavelength, range: 190~1100nm.
Cycles	1, 2, 3, 5, 10, 20, 30, 50 times can be selected, the instrument will calculate the average as the final output.
Light path length	The width of the cuvette used for the measurement.
Equivalent conversion	When activated, the instrument automatically converts measurements from different path cuvettes to values in the 10mm light path length.
Equation	Equation form: $C=F(Abs)$ and $Abs=F(C)$.
Fitting	Three ways of fitting are provided: first order, second order, third order.
Zero intercept	When turned on the representative fitting curve will directly cross the zero point, and when closed will represent the fitting curve without zero point.
Calibration	Three ways to generate a standard curve: inputting equation coefficient, measuring standard samples and inputting standard sample values.
Unit	Built-in 19 commonly used concentration units: -, %, ppm, ppb, g/l, mg/l, μ g/l, ng/l, g/dl, mg/dl, μ g/dl, mg/ml, μ g/ml, ng/ml, μ g/ μ l, ng/ μ l, mol/l, mmol/l, IU, and support input custom units.
Number of standard samples	The number of standard samples can be selected (only valid for standard sample measurement and standard sample input), quantity: 2~20.
Threshold	Upper and lower limits of measurement results.

3. Establish the standard curve


3.1 Establish the standard curve by inputting the equation coefficient

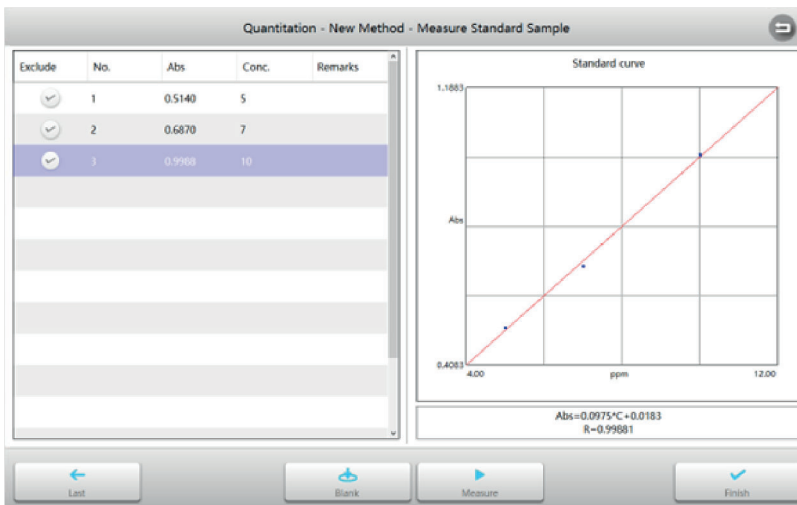
- 1) Set **Calibration** to **Input Equation Coefficient**, set other measurement parameters according to measurement requirements, and press the button  to start.
- 2) **Input Equation Coefficient** interface, press the coefficient K0~Kn to pop up the keyboard and enter the coefficient.



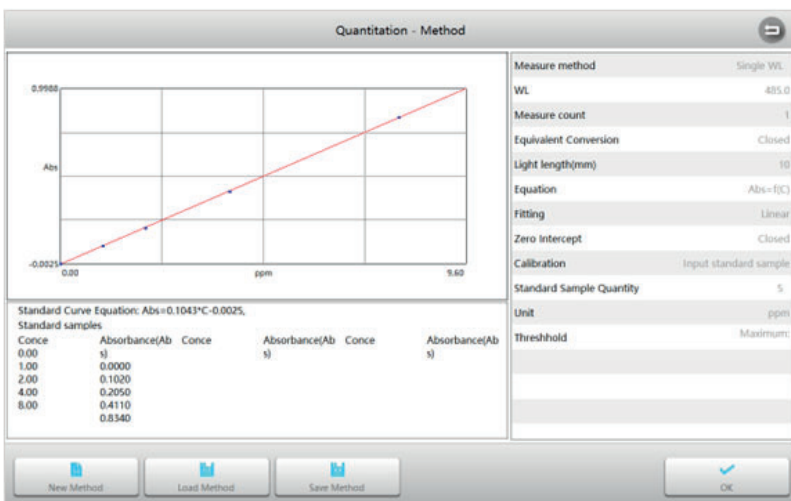
- 3) After the method is completed, the standard curve and related information are displayed. Press the button  to complete and return to **Method** interface.

3.2 Establish the standard curve by measuring standard samples


- 1) Set **Calibration** to **Measure standard samples**, set other measurement parameters according to measurement requirements, and press the button  to start.



- 2) **Measure standard sample** interface, put the reference in the measurement channel, close the sample chamber cover, and press the button to do blank.
- 3) Put the standard sample in the measurement channel, close the sample chamber cover, and press the button to measure.
- 4) Repeat step 3 to measure all standard samples.
- 5) Press the concentration cell to enter the corresponding concentration value.
- 6) After the method is completed, the standard curve and related information are displayed. Press the button to complete and return to **Method** interface.

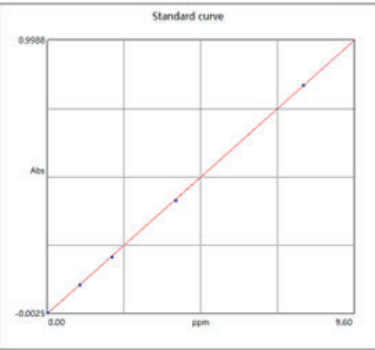


3.3 Establish the standard curve by inputting standard samples





- 1) Set **Calibration** to **Input standard samples**, set other measurement parameters according to measurement requirements, and press the button  to start.

Quantitation - New Method - Input Standard Sample


Exclude	No.	Abs	Conc.	Remarks
<input checked="" type="checkbox"/>	1	0	0	
<input checked="" type="checkbox"/>	2	0.102	1	
<input checked="" type="checkbox"/>	3	0.205	2	
<input checked="" type="checkbox"/>	4	0.411	4	
<input checked="" type="checkbox"/>	5	0.834	8	



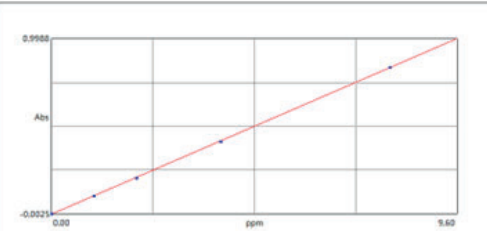
Abs=0.1043*C-0.0025
R=0.99997

Buttons:  Last,  Blanking,  Measure,  Finish

- 2) Press the **Abs** cell to input absorbance value and press **Conc** cell to input the corresponding concentration value.

- 3) After the method is completed, the standard curve and related information are displayed. Press the button  to complete and return to **Method** interface.





Quantitation - Method








Standard Curve Equation: Abs=0.1043*C-0.0025

Standard samples			Absorbance(Ab vs)		
Conce	Absorbance(Ab vs)	Conce	Absorbance(Ab vs)	Conce	Absorbance(Ab vs)
0.00	0.0000				
1.00	0.1020				
2.00	0.2050				
4.00	0.4110				
8.00	0.8340				

Measure method	Single WL
WL	495.0
Measure count	1
Equivalent Conversion	Closed
Light length(mm)	10
Equation	Abs=f(C)
Fitting	Linear
Zero intercept	Closed
Calibration	Input standard sample
Standard Sample Quantity	5
Unit	ppm
Threshold	Maximum:


Buttons:  New Method,  Load Method,  Save Method,  OK


Measure sample

1. **Quantitation** interface, press the button  to enter into **Method** interface.
2. **Method** interface, load a method or establish a new method, press the button  to accept and return to measurement interface.
3. Put the reference in the measurement channel, close the sample chamber cover, and press the button  to do blank.
4. Put the sample in the measurement channel, close the sample chamber cover, and press the button  to measure and calculation results.
5. Repeat step 4 to measure more samples.
6. Press  to switch to list mode to browse the list of measurement results.

■ Biological measurement

Biological measurement mode is used to measure DNA, RNA and protein concentrations using built-in methods or new methods.

- **Main** interface, press the icon  to start a **Biological measurement** application.


DNA/Protein Analysis 


No.	Formula	Unit	...
0006/0006	C(DNA)=62.9*(A1-Aref)-36.0*(A2-Aref); C(Protein)=1552*(A2-Aref)-757.3*(A2-Aref);		


1.01 ^{mg/L}


48.53 ^{mg/L}


A1	A2	Aref	Ratio						
260.0	280.0	320.0	0.87						
0.0940	0.1011	0.0000							
Date	2018/9/8 10:56:27		Remarks						


 Operation


 Method


 Blank


 Measure


1 **Biological measurement** interface, press the button  to enter into **Method** interface.

Protein Analysis - Measure

C(DNA)=(A1-Aref)*62.9-(A2-Aref)*36.0
 C(protein)=(A2-Aref)*1552.0-(A1-Aref)*757.3
 Ration=(A1-Aref)/(A2-Aref)

Biometric method	DNA Method 1
WL	260.0,280.0
Measure count	1
Equivalent Conversion	Closed
Light length(mm)	10
Equation	
Fitting	
Zero Intercept	
Calibration	
Standard Sample Quantity	
Unit	mg/L
Threshold	

New Method Load Method Save Method OK

2 **Method** interface, press the button  to start a new measurement method and enter the parameter setting interface.

DNA/Protein Analysis/New Method

Method Name DNA Method 1 >

λ_1	λ_2	λ_3	Background WL (nm)	
260.0	280.0	320.0		<input checked="" type="checkbox"/>

Coefficient 62.9,36.0,1552.0,757.3 >

Measure Count 1 >

Optical Path (mm) 10 >





Equivalent Conversion 30

Unit mg/L >

Threshold >

Default Load Parameters Save Parameters Finish

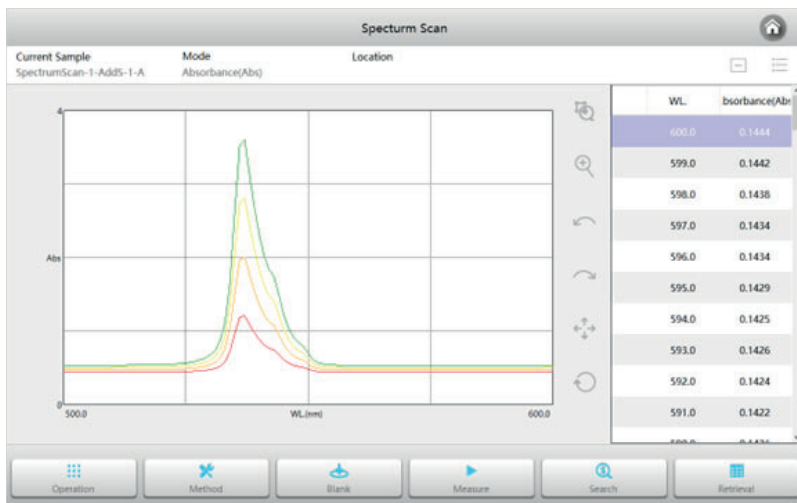
Measurement method	Built-in 7 methods: DNA-1(260/280)□DNA-2(260/230), UV method, Lowry method, BCA method, CBB method, Biuret method.
Wavelength	Measure wavelength, range: 190~1100nm.
Coefficient	Calculate the coefficient required for concentration (related to the specific measurement method)
Light path length	The width of the cuvette used for the measurement.
Equivalent conversion	When activated, the instrument automatically converts measurements from different path cuvettes to values in the 10mm light path length.
Unit	Built-in 19 commonly used concentration units: -, %, ppm, ppb, g/l, mg/l, μg/l, ng/l, g/dl, mg/dl, μg/dl, mg/ml, μg/ml, ng/ml, μg/μl, ng/μl, mol/l, mmol/l, IU, and support input custom units.
Threshold	Upper and lower limits of measurement results.


- 3 **Method** interface, load a method or establish a new method, press the button  to accept and return to measurement interface.
- 4 Put the reference in the measurement channel, close the sample chamber cover, and press the button  to do blank.
- 5 Put the sample in the measurement channel, close the sample chamber cover, and press the button  to measure and calculation results.
- 6 Repeat step 5 to measure more samples.
- 7 Press  to switch to list mode to browse the list of measurement results.

■ Spectrum scanning

Spectrum scanning mode is used to get the photometric curve of a sample in a wavelength range.





- **Main** interface, press the icon  to start a **Spectrum scanning** application.



1. **Spectrum scanning** interface, press the button  to enter into **Method** interface.

Spectrum Scan/Method	
Photometry Mode	Absorbance(Abs) >
Start WL. (≤1100.0nm)	600.0 >
End WL. (≥190.0nm)	500.0 >
Step(nm)	1.0 >
Speed	Medium(MS) >
Loop (1 - 99)	1 >
Loop Interval	10 >
Optical Path (mm)	10 >
Auto Adjust	<input checked="" type="checkbox"/>
Y Maximum	1. >
Y Minimum	0. >
Auto Print	<input checked="" type="checkbox"/>
Auto Save	<input checked="" type="checkbox"/>

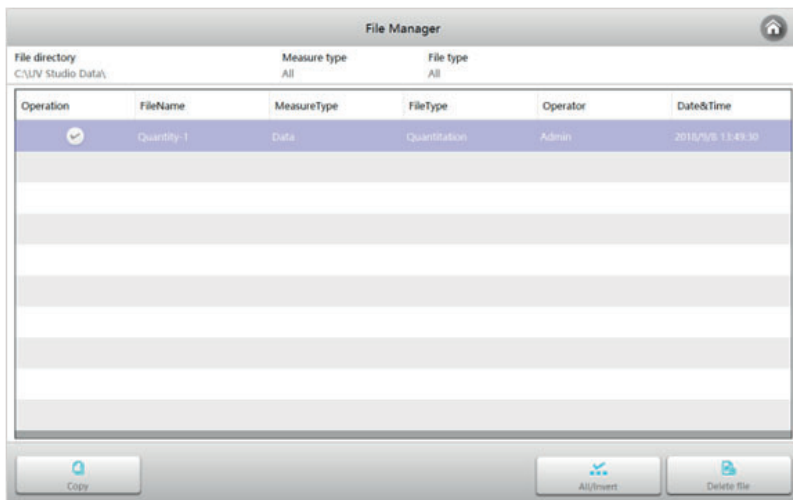
Photometry mode	3 modes: Abs, %T and %R
Start wavelength	Scan start wavelength, range: 190~1100nm
End wavelength	Scan end wavelength, range: 190~1100nm
Step	6 wavelength intervals selectable: 0.1, 0.2, 0.5, 1.0, 2.0, 5.0 nm
Speed	3 scan speeds selectable: Quick, Medium, Slow
Loop	Scan times
Loop interval	Interval between 2 scans
Light path length	The width of the cuvette used for the measurement
Auto scale	Whether to automatically adjust the coordinates based on the data
Y max	The maximum value of the ordinate (valid only when the coordinates are fixed)
Y min	Minimum value of the ordinate (valid only when the coordinates are fixed)
Automatic printing	Automatically print curves and results after measurement is complete
Automatic save	Automatically save curves and results after measurement is complete

2. Put the reference in the measurement channel, close the sample chamber cover, and press the button  to scan baseline.
3. Put the sample in the measurement channel, close the sample chamber cover, and press the button  to scan sample and draw the curve.
4. After the scan is complete, press the button  to zoom the graph as needed.
5. Press the button  to retrieve the value of each point (peak) of the curve and mark it for a specific point.

■ File management

File management is used to manage saved parameters, methods, and measurement files.


- Main interface, press the icon  to start **File management**.




Browse file list:

File management interface displays the data files stored in the storage, including data, methods and parameters. Press **Measurement type** and **File type** to set the filter conditions and display the corresponding file types.


Delete files:

Select the file you want to delete and then press the button  to delete it.

Copy files:

Select the files you want to copy, then press the button Copy, pop up the **Path selection** form, select target path and press the button .

Rename file name:

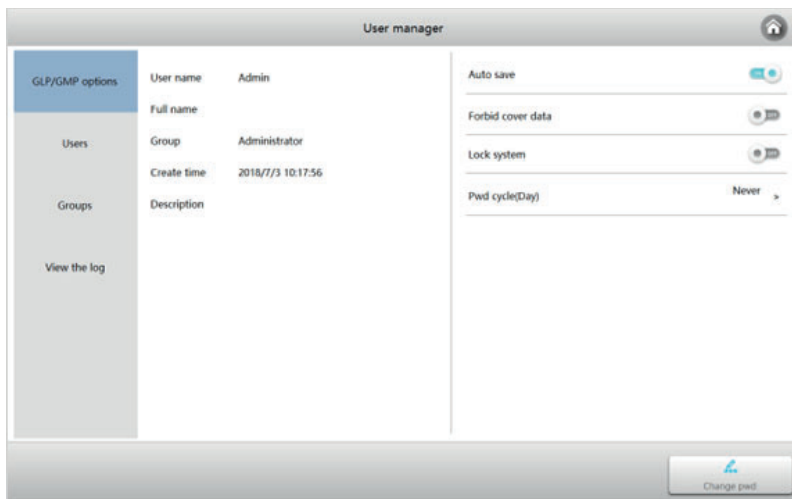
Press the file name you want to rename, pop up the keyboard, enter a new file name, and press the button  to complete the modification.

■ User management and audit trail

User management is used to manage user permissions, operation logs, etc.

- Main interface, press the icon  to start **User management**.

Note: Only authorized users can enter the module to perform the corresponding operations. Usually, an administrator or some advanced users.

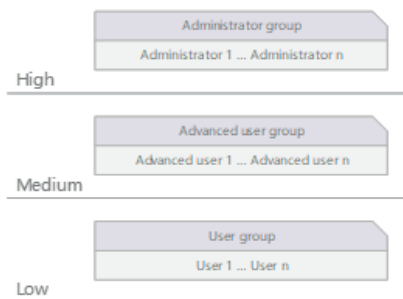


GLP/GMP options:

GLP/GMP options contains four options: “Automatic Data Saving”, “Disable Overwriting Data”, “Allow Locking System” and “Password Replacement Period”, which can be enabled/disabled by the administrator as needed.

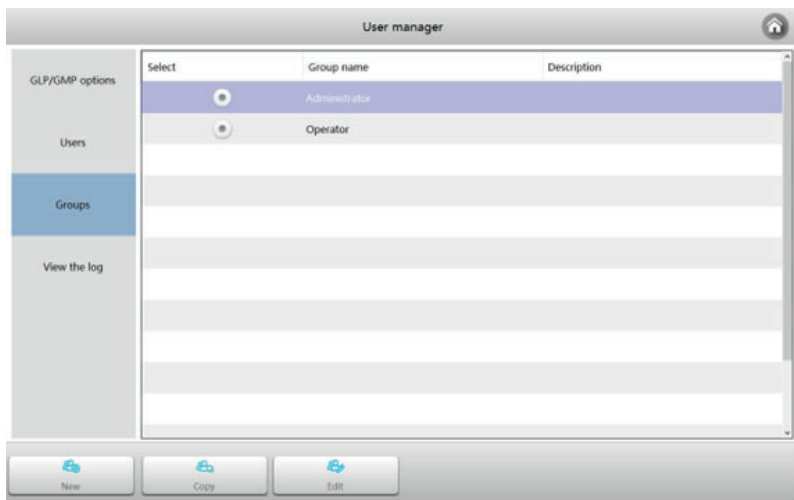
Users and user groups:

The module is divided into three layers of management structure. Each layer exists in the form of a group. All members belong to different groups. Group members in different levels can separately assign the permissions available for allocation within the level.





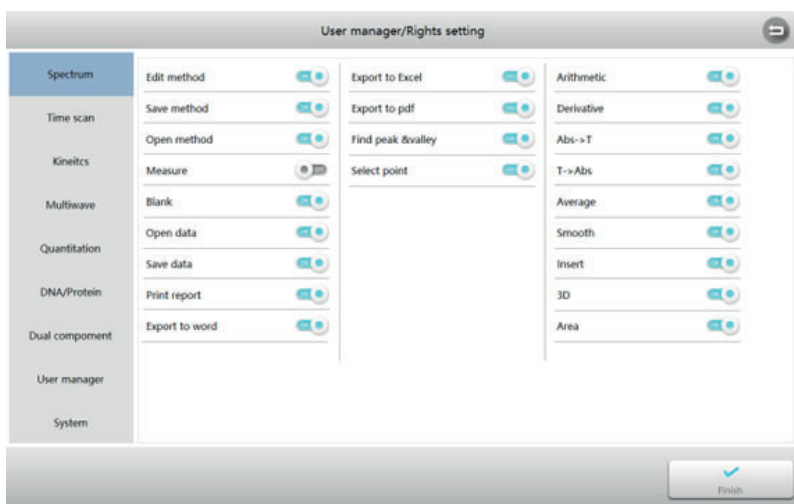
1) Operation of user groups:

User management interface, press the tab **Groups** to enter user group management.





- Create a new user group



Press the button  to create a new user group, assign the permissions that the group has, and press the button  when done.



- Copy a user group

Select the user group you want to copy, then press the button  to copy a user group with the same permissions and press the button  to complete.



- Edit a user group

Select the user group you want to edit, then press the button  to edit a user group and press the button  to complete.



2) Operation of user:

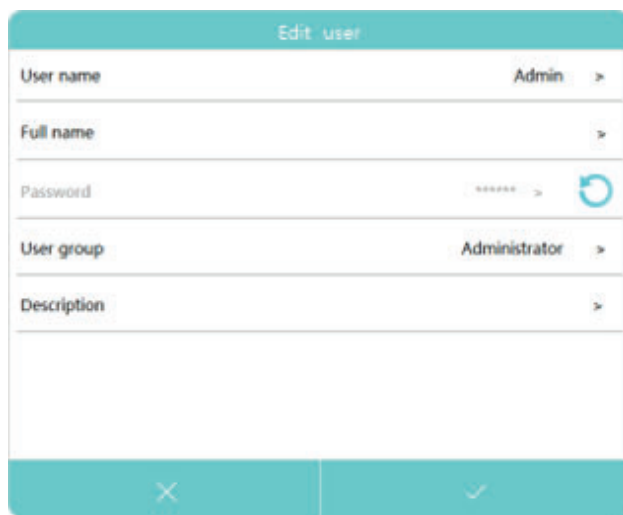
User management interface, press the tab **Users** to enter user management.

- Copy a user



Select the user you want to copy, then press the button  to copy a user with the same permissions and press the button  to complete.

- Edit a user

Select the user you want to edit, then press the button  to edit user name, description information, password, etc., and press the button  to complete.

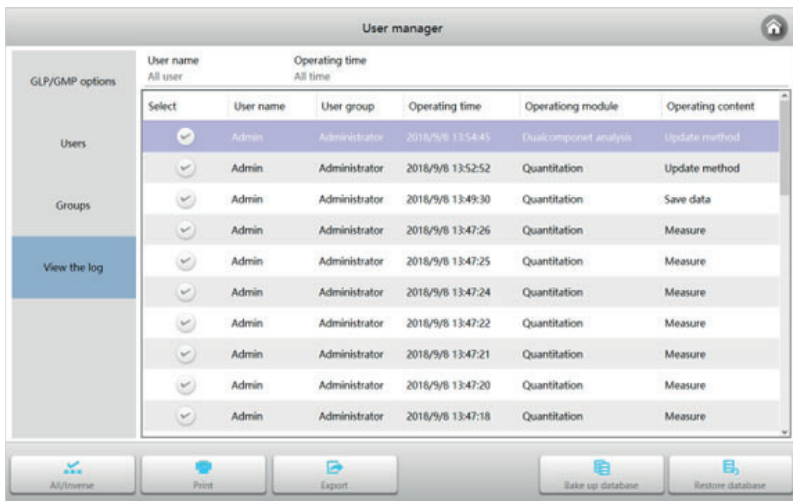


- Lock/unlock user:

Select the user who needs to lock/unlock, and then press the button  to lock the original active user. It is temporarily unavailable. If you need to re-enable it, select the user to press the button  again.


Audit trail:

User management interface, press the tab **Log** to enter log management.


**3) Browse operation log**

Press **User Name** to select the user who needs to browse the log. Press **Operation Time** to select the time range to view the operation log of one or all users.


4) Print log

Select the log content you want to print and press the button  to print the log contents.


5) Export log

Select the log content to be exported, press the button , and select the export path to export the log content.

6) Database backup

Press the button  to back up the database to other storage after selecting the backup path.

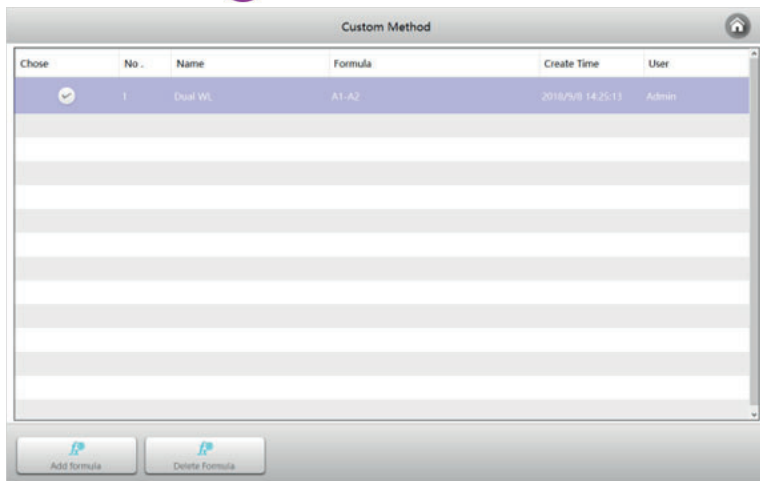
7) Database recovery

Press the button  to select the backed-up database file to restore the database to the instrument default storage location.


■ Formula editor

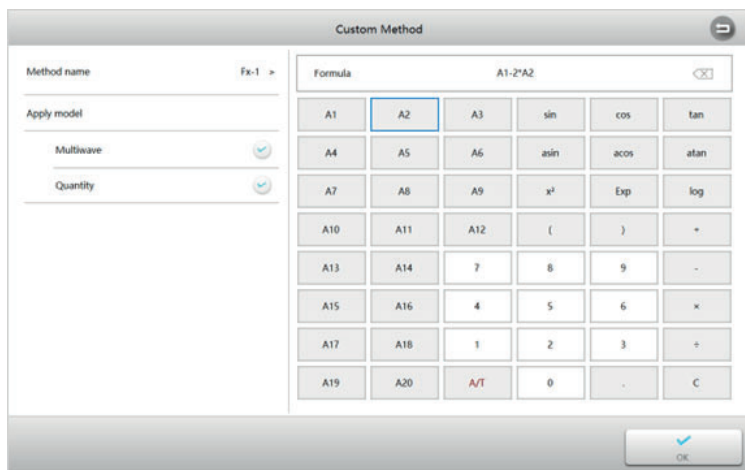
Method editor is used to write formulas for photometric calculations.

- **Main interface**, press the icon  to start **Formula editor**.



Add calculation formula:

Formula list interface, press the button **Add formula** to enter to **Formula editor** interface. Enter the formula name as required by pressing the label **Formula Name**, select the applied model, enter the calculation formula and press the button  to complete.



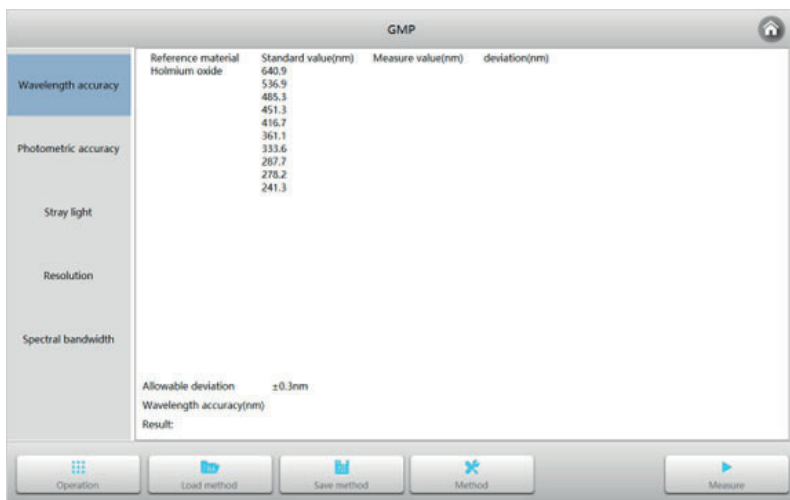
Delete calculation formula

Formula list interface, select the method you want to delete and press the button **Delete formula** to delete the method.

■ Performance verification

Performance verification is used to verify that the instrument's performance indicators are good.

- **Main** interface, press the icon  to start **Performance verification**.





1) Preparing

- The instrument must be warmed up for more than 30 minutes before performing performance verification.
- The instrument must first calibrate the dark current and the system baseline before verification.
- The reference material used for verification must be within the validity period of the test.

Note: Standard filters used to verify the performance of the instrument can be purchased separately, they are not supplied with the instrument.

2) Wavelength accuracy and wavelength repeatability verification:

- Standard material: Holmium oxide solution or equivalent filter
- Verification:
 - 1: **Performance Verification** interface, press the tab **Wavelength accuracy**, press the button **Method** to enter into the **Setting** interface, set parameters and press the button  to accept and back.

2: Remove anything in the measurement channel, close the sample chamber cover, press the button  and select the tab **Photometric accuracy** to start the measurement.


3: According to the instructions of the instrument, put the reference into the measurement channel to do blank, then put the standard material into the measurement channel and display the test result after completion.

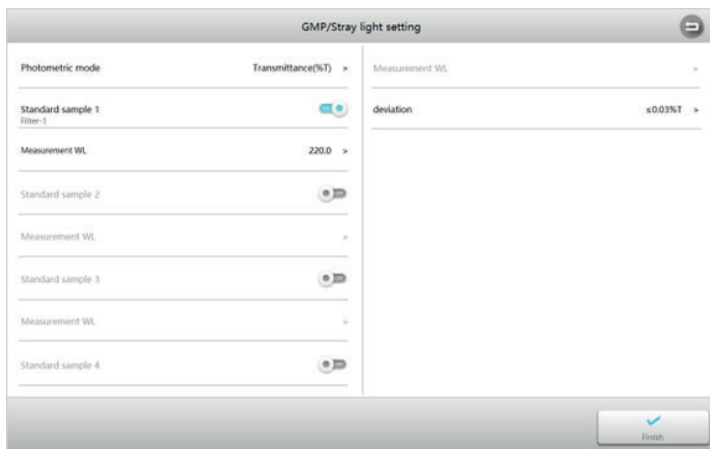
4) Stray light verification


- Standard material:

10g/L NaI solution or equivalent filter (220nm), 50g/L NaNO₂ solution or equivalent filter (340 or 360nm).

- Verification:

1: **Performance Verification** interface, press the tab **Stray light**, press the button **Method** to enter into the **Setting** interface, set parameters and press the button  to accept and back.




2: Remove anything in the measurement channel, close the sample chamber cover, press the button  and select the tab **Stray light** to start the measurement.

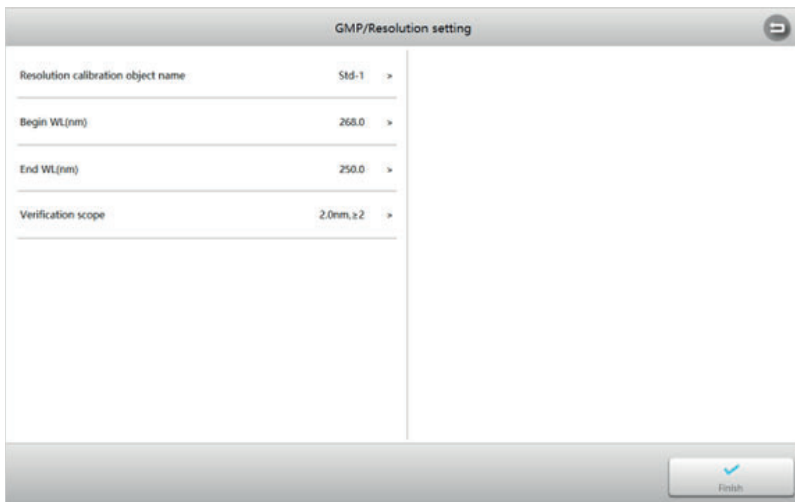
3: According to the instructions of the instrument, put the reference into the measurement channel to do blank, then put the standard material into the measurement channel and display the test result after completion.

5) Resolution verification

- Standard material: Toluene-hexane


- Verification:

1: **Performance Verification** interface, press the tab **Resolution**, press the button **Method** to enter into the **Setting** interface, set parameters and press the button  to accept and back.



GMP/Resolution setting	
Resolution calibration object name	Std-1
Begin WL(nm)	268.0
End WL(nm)	250.0
Verification scope	2.0nm, s2

Finish

2: Remove anything in the measurement channel, close the sample chamber cover, press the button  and select the tab **Resolution** to start the measurement.

3: According to the instructions of the instrument, put the reference into the measurement channel to do blank, then put the standard material into the measurement channel and display the test result after completion.

REPAIR AND MAINTENANCE

In order to keep the instrument in optimal working condition, the daily maintenance of the instrument must be done. This chapter introduces some things you need to pay special attention to so that you can easily solve some minor problems.

■ Daily Maintain

1- Check the compartment:

After measurement, the cuvettes with sample solutions should be taken out of the compartment in time. Or the volatilization of the solution would make the mirror go moldy. Users must pay more attention to the corrosive sample and liquid easy to volatilize. Any solution remains in the compartment should be wipe off immediately.

2- Cleaning of the instrument surface:

If paint drops fall on the surface of the instrument, wipe them off immediately with a damp towel. Organic solution is forbidden to be used to clean the surface. Please wipe off the dirt on the surface timely.

3- Cleaning of the cuvettes:

After every test or after a solution change, the cuvettes should be cleaned carefully, or the remains on the surface would cause measuring error.

■ Troubleshooting

Review the information in the table below to troubleshoot operating problems.

Problem	Cause	Solution
Power on, no response	Power cord connection is not reliable	Improve connection
	Fuse burning	Replace fuse
Measurement uncertainty	Sample is not stable	Improve the sample
	Glass cuvettes used in UV region	Use quartz cuvettes
	The sample concentration is too high	Dilute the sample
	Power supply voltage low or not stable	Improve the power supply
	Lamp damage or lamp life maturity	Replace lamp
Dark current error when self-check	The lid of the compartment is open during self-check	Close the lid, restart
System calibration failed	Something blocks the light path	Remove it, calibrate again
Inaccurate measurements	Cuvettes were contaminated	Clean the cuvettes
	Samples were contaminated	Improve the samples
	Bad matching of the cuvettes	Improve the matching of the cuvettes
	Dark current error	Resample dark current

SPARE PARTS REPLACEMENT

■ Fuse replacement



Danger! Be sure to switch off the power and unplug the socket before replacement!

Tools preparation: Prepare a 3×75 flat blade screwdriver.

Switch off the power supply: Switch off the power supply and unplug the socket.

Take out the fuse seat: Insert a screwdriver into the slot of the fuse holder, rotate it 90 degrees counterclockwise, then release. Remove the fuse holder.



Replace the fuse: Place the new fuse.



Mount the fuse holder: Install the fuse holder back into the instrument fuse hole and use a screwdriver to press it 90 degrees clockwise; the fuse holder will be locked when released.

Switch on the power: Plug the socket and switch on the power.

WARRANTY

AUXILAB S.L. warrant that this product will be free from defects in material and workmanship for a period of 2 years from date of delivery except the lamps. Lamps have a warranty of 1000 hours usage time or 6 months max. This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication, or from ordinary wear and tear. If the required maintenance and inspection services are not performed according to the manuals and any local regulations, such warranty turns invalid, except to the extent, the defect of the product is not due to such non-performance.

Compliance with local laws and regulations

The customer is responsible for applying for and obtaining the necessary regulatory approvals or other authorizations necessary to use the product in its local environment. We will not be held liable for any related omission or for not obtaining the required approval or authorization, unless any refusal is due to a defect of the product.

EQUIPMENT DISPOSAL

This equipment is marked with the crossed out wheeled bin symbol to indicate that this equipment must not be disposed of with unsorted waste.

It's your responsibility to correctly dispose of your equipment at lifecycle -end by handling it over to an authorized facility for separate collection and recycling. It's also your responsibility to decontaminate the equipment in case of biological, chemical and/or radiological contamination, so as to protect from health hazards the persons involved in the disposal and recycling of the equipment.

For more information about where you can drop off your waste of equipment, please contact your local dealer from whom you originally purchased this equipment.

By doing so, you will help to conserve natural and environmental resources and you will ensure that your equipment is recycled in a manner that protects human health.

Thank you!

