Instruction manual

VWR® M6 UV/VIS Split Beam Spectrophotometer

EU cat. no 634-1236



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Safety Information

Avoiding Electrical Shock

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



To avoid electrical shock

- Do not open the device.
- Disconnect the device from the mains supply before carrying out maintenance work or changing the fuses.
- The inside of the device is a high-voltage danger zone.
- Do not use the device if it is damaged, especially if the main power cable is damaged or defective.
- Repairs may only be carried out by the service technicians from your local VWR office and authorized contractual partners.
- 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 function provided by the equipment may be compromised.



Avoiding Damage to the Instrument

- Do not allow any liquid to enter into the device.
- Do not operate the device in a hazardous location or potentially explosive environment.



Injury due to Gazing Directly at Flashing Xenon Lamp When Lit

- The Flashing Xenon Lamp radiates strong ultraviolet rays. Avoid gazing at directly when lit. For looking at the lamp, be sure to wear goggles equipped with a function for cutting off ultraviolet rays.

Package Contents

Description	Quantity
Spectrophotometer	1PC
Cuvette, Square.Glass, 10 mm (634-6013)	4PCS
Cuvette, Square.Quartz, 10 mm (634-6018)	2PCS
Power Cord (Euro/UK/CH Plug)	3PCS
VWR® UVStudio Standard Software USB Flash Drive	1PC
USB Cable	1PC
Quick Manual	1PC
Dust Cover	1PC
Fuse	1PC

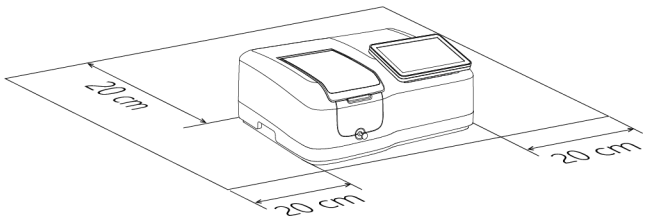
Unpacking

Open the package and carefully check the items against the packing list. If any items are missing or damaged, please contact your local VWR/Avantor service provider or relevant contact.

Installation

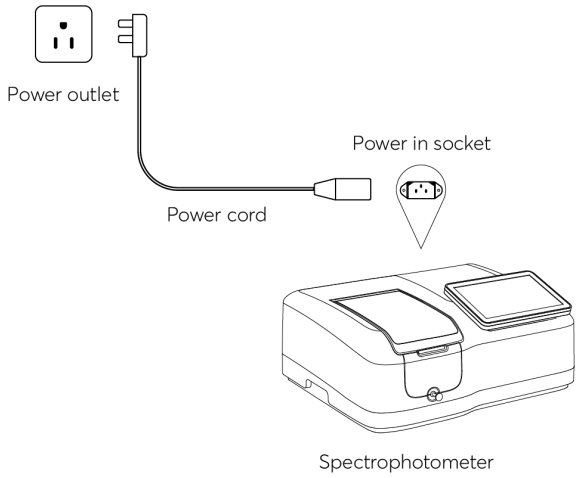
Placement

Place the instrument on the stable table carefully. Ensure at least 20 cm of clearance is maintained on the left, right, and rear sides of the instrument.



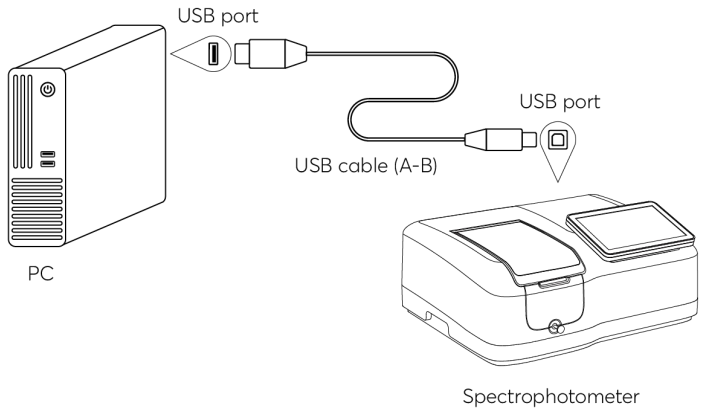
Connect the Power Cord

Ensure instrument power switch is turned off, plug-in the power cord to both wall power outlet and power supply input interface socket of instrument.



Connect to the Computer

Insert the square plug (Type B) into the USB port on the back of the instrument. And Insert the flat plug (Type A) into the USB port on the PC.



Intended use

For research use only. Not intended for any animal or human therapeutic or diagnostic use.

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.



CAUTION This symbol indicates risks associated with hot surfaces.

Product Specifications

Optical System	Split Beam
Wavelength Range	190-1100nm
Band Width	1.5nm
Stray Light	≤0.05%T @ 220nm & 360nm
Photometric Range	0 to 200%T, -0.3 to 3.0A, 0 to 9999C
Wavelength Accuracy	±0.5nm
Photometric Accuracy	±0.3%T or ±0.004A @ 1A
Stability	0.0008A/h @ 500nm (After warming up for 1 hour)
Baseline Flatness	±0.001A (200 ~ 1000 nm)
Language	English, French, German, Spanish, Portuguese, Chinese
Display	TFT Color LCD (8", Touch Screen)
Storage	128GB
Interface	USB-A×1, USB-B×1
Measuring Procedure	Photometry, Multi-wavelength, Kinetics, Time Scanning, Quantitation, Spectrum, Nucleic Acid/Protein
Power Supply	AC 100~240V, 50~60Hz, 100W
Dimension	456mm×360mm×213mm
Weight	11kg
Work Environment	15 to 35°C, 15 to 70% relative humidity
Store Environment	-10 to 50°C, 15 to 70% relative humidity

This instrument is compliant to the European Directives on Low Voltage Directive 2014/35/EU, Electromagnetic compatibility 2014/30/EU.

Restriction on use of Hazardous Substances RoHS 2011/65/EU and their amendments.

Overview

The M6 UV-Vis spectrophotometer covers a spectral range of 190~1100 nm (UV-Vis) with a 1.5 nm spectral bandwidth, which combines the resolution of qualitative analysis with the accuracy

of quantitative analysis. The instrument has seven built-in core modules: Photometry, Multi-wavelength, Kinetics, Time scanning, Quantitation, Nucleic Acid/Protein and Spectrum scanning. Equipped with a 8-inch colour touch screen, it is intuitive and convenient to operate, and is suitable for the needs of multiple scenarios. Widely used in education, chemical, biological, environmental protection, food and other industries, can meet the core needs of scientific research and quality control.

Description



1 Sample room lid	Provides access to sample room
2 Sample room front panel	For easy replacement of the special room front panel when installing certain accessories
3 Pull rod	Push/Pull to move the sample cell position
4 Lamp room lid	Allows access to lamp when replacement is necessary
5 Touchscreen color LCD display	User interface
6 10 mm 4-cells manual sample holder	Placement of sample cuvette during measurement (10 mm)



1 Power button	Power on/off the unit
2 USB port	Allows connection to USB peripheral devices



1 USB port	Allows connection to a PC
2 USB port	Allows connection to USB peripheral devices
3 Fuse seat	Installation of power input fuse
4 Power in socket	Connection socket for power supply unit

Technical Principles

The UV-Vis spectrophotometer is an instrument that analyzes the concentration, purity, or structure of substances by measuring absorbance based on the principle of selective absorption of ultraviolet and visible light by matter, adhering to the core principle of Lambert-Beer's Law.

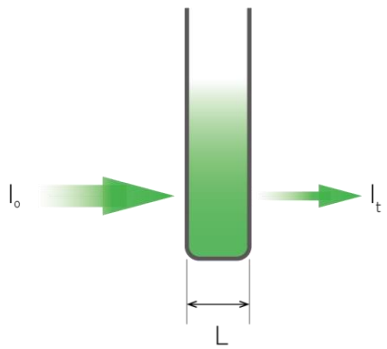
When a beam of parallel monochromatic light (light of a single wavelength) passes through a homogeneous solution under test, light absorption satisfies the following relationship:

$$A = \varepsilon bc$$

A	Absorbance (A = -lg(T), where T is transmittance)
ε	Molar absorption coefficient (unit: $L \cdot mol^{-1} \cdot cm^{-1}$)
b	Path length (Usually 1 cm, unit: cm)
c	Concentration (unit: $mol \cdot L^{-1}$)

In short: at a fixed wavelength and path length, the absorbance A is linearly related to the concentration of the substance c - this is the core basis for quantitative analysis in a spectrophotometer.

Transmittance is the proportion of the light which passes through the sample:



I_0 —— Incident light
I_t —— Transmitted light
L —— Path length

$$T = \frac{I_t}{I_0}$$

Absorbance is inversely related to transmittance:

$$A = -\log T = -\log\left(\frac{I_t}{I_0}\right)$$

Getting Started

Start the Instrument



The instrument is in the off state. Press the start button on the right of the instrument to start. After startup is complete, the Windows desktop appears on the screen.

Shut Down the Instrument



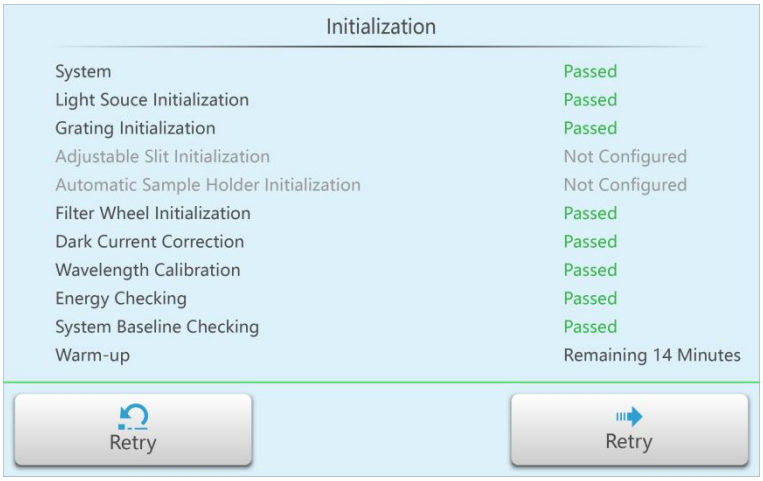
The instrument is in the on state. Press the start button on the right of the instrument to shut down.

> ***Warning***
>
> 1. *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.*
> 2. *Do not cut off the power supply while the instrument is in operation or not completely shut down. This may lead to system crash.*

Self-check and Calibration

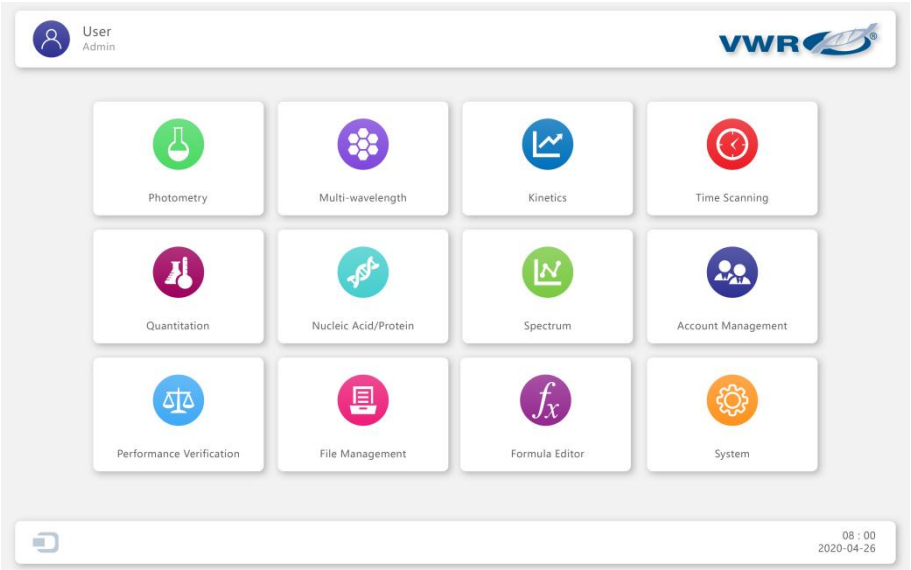


Check the instrument sample chamber and remove anything from the light path. Launch the application UVStudio after double-clicking the icon **VWR UVStudio** on the windows desktop. The instrument starts self-check. Self-check includes the following steps: Turn on lamp and positioning light source → positioning grating → positioning automatic sample holder (if installed) → positioning filter wheel→ correct dark current → calibrate wavelength → check the energy → check the system baseline.



Navigating

The Home screen is displayed below.



Functions

On the **Home** screen, click the icon as below to access the function screen.

Photometry
Measures the absorbance or transmittance of a sample at a single wavelength, and support real-time display.

Multi-wavelength
Measures the absorbance or transmittance of a sample at multiple wavelengths (up to 20 wavelength).

Kinetics
Measures the change in absorbance or absorbance change rate over time at a specified wavelength.

Time Scanning
Measures the change of absorbance or transmittance with time at a single

wavelength.



Quantitation
Establish a standard curve and measures the concentration of the sample using a standard curve.



Nucleic Acid/Protein
Measures DNA, RNA and protein concentrations using built-in methods or new methods.



Spectrum
Measures the photometric curve of a sample over a range of spectra.



Account Management (Only For Audit Trail Edition)
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.



Formula Editor
Users can add calculation formula for special applications or exploratory studies according to their needs.

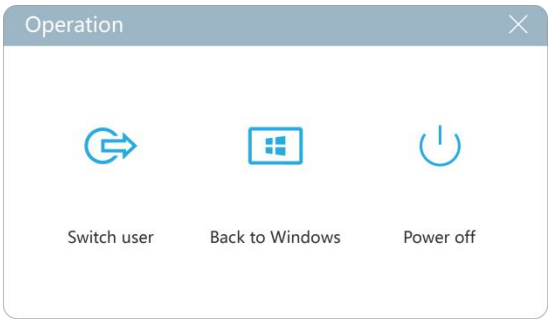


System
Set system parameters and system calibration.

Exit the VWR UVStudio



On the **Home** screen, click the **Device** icon on the status bar to pop up the "Operation" window, then click the **Back to Windows** icon to exit the application and return to the Windows desktop.



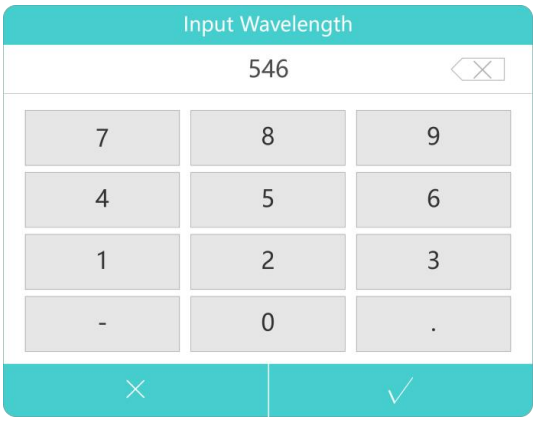
General Operating Instructions

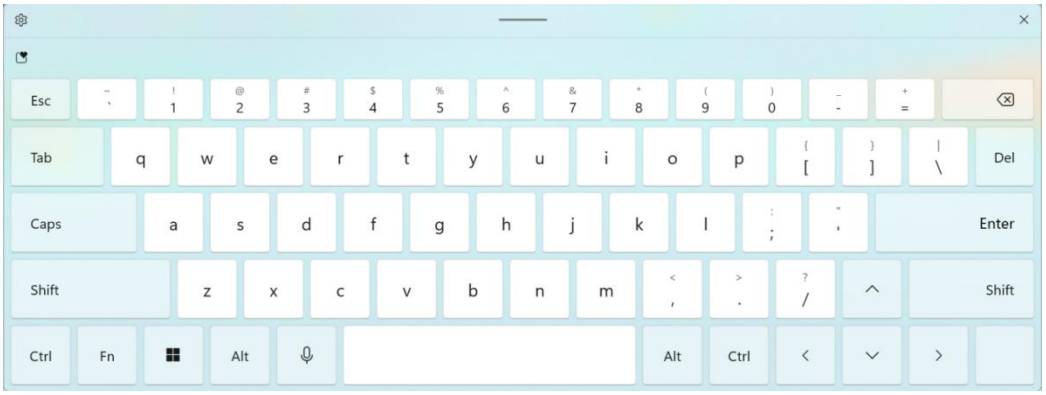
Touch Screen Using Tips

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).

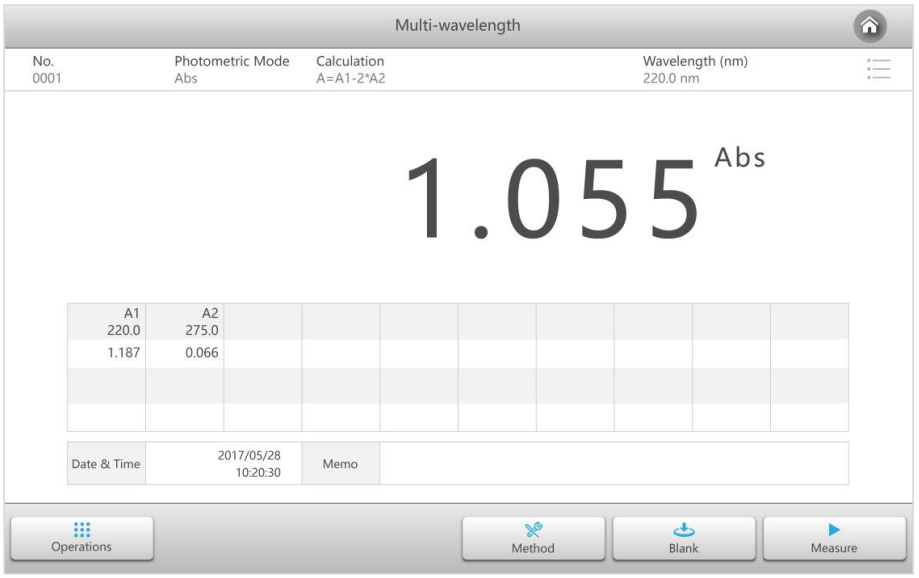
Using the Keyboard

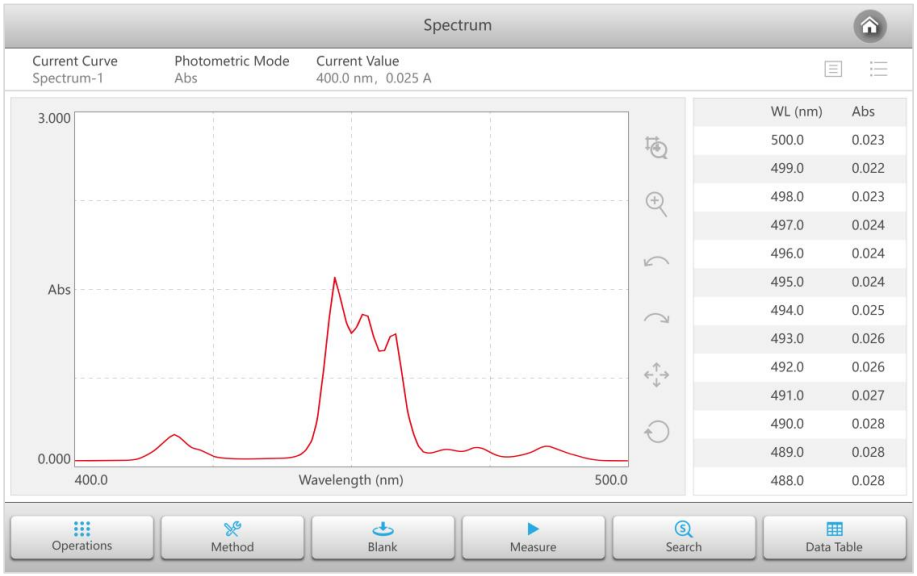
The instrument provides two kinds of keyboards for different situations. The **Numeric** keyboard is used to input parameters, and the full keyboard is used to input user information and file names.





Basic Operation





Click the **Home** icon to return to the **Home** screen.

Click the **Return** icon to return to the previous screen.

Click the **Method** button to access the **Method** screen and set measurement parameters.

Put the reference into the measurement channel, click the **Blank/Baseline** button to do blank/scan baseline.

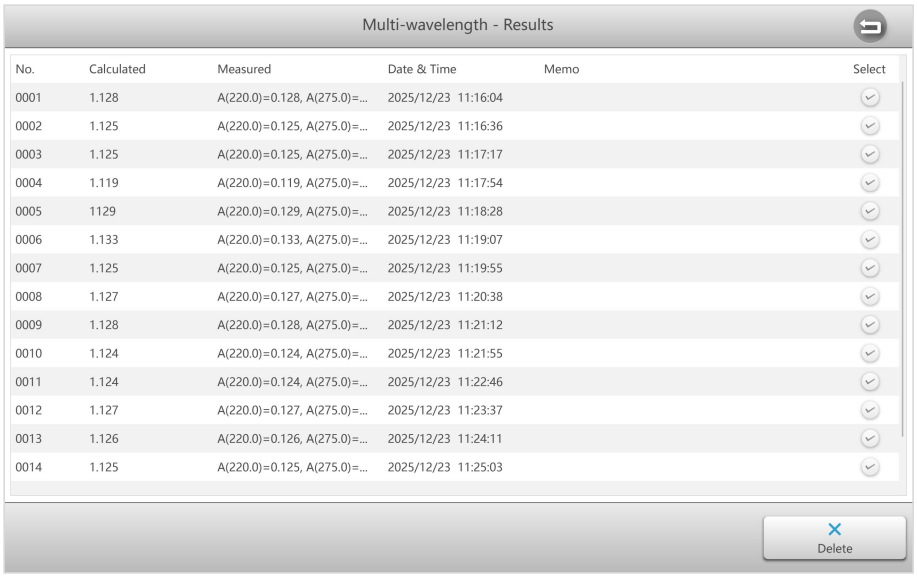
Put the sample into the measurement channel, click the **Measure** button to measure/scan the sample.

Click the **Stop** button to cancel baseline/sample scanning.

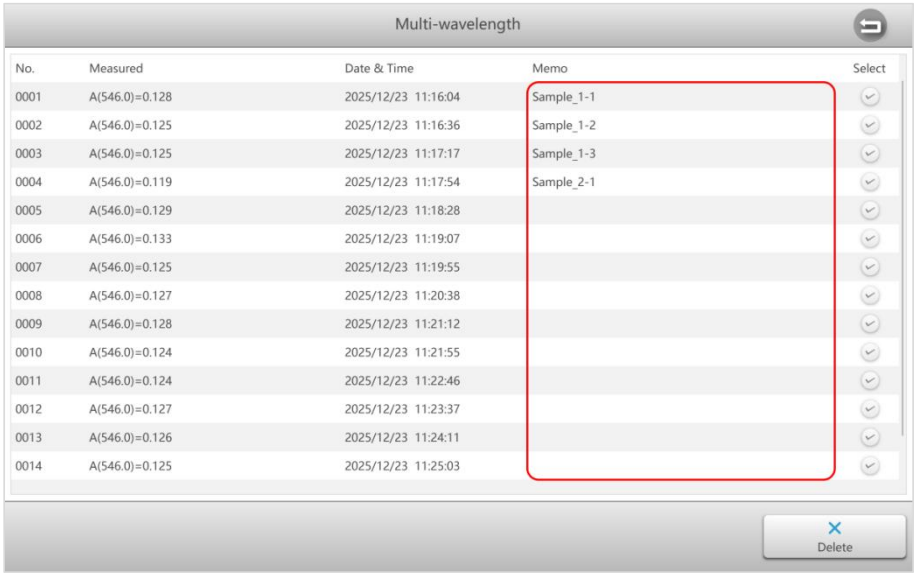
Click the **Pause** button to temporarily stop baseline/sample scanning. Click it again to resume.

Measurement Results Operation

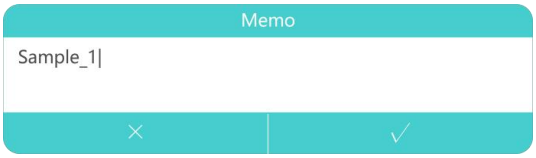
On the measurement screen of **Multi-wavelength**, **Quantitation** and **Nucleic Acid/Protein**, click the **List** icon to access the **Results List** screen.



Add Remark Information for the Sample



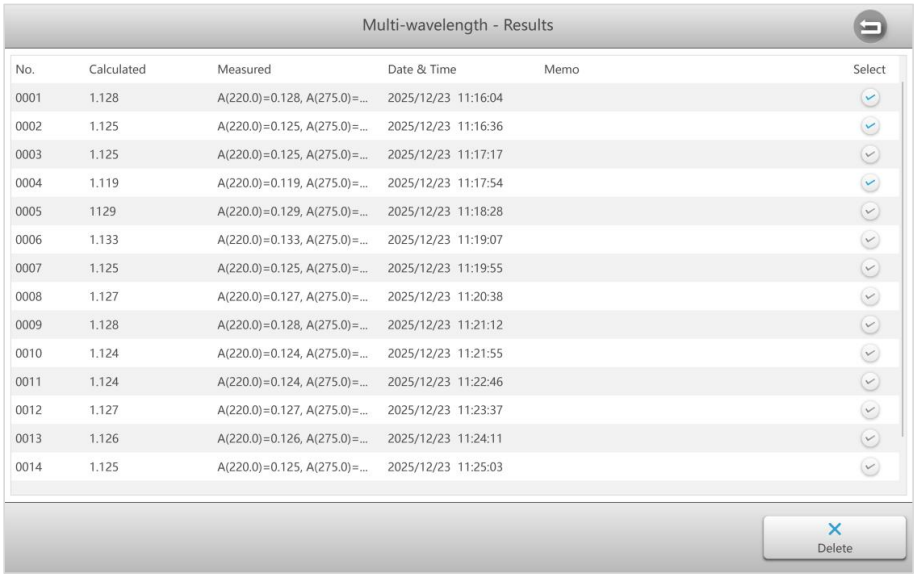
Click the cell in the **Memo** column to pop up the **Memo** input window and keyboard, key in the sample remark information. Click the **OK** button to accept the input content and return.



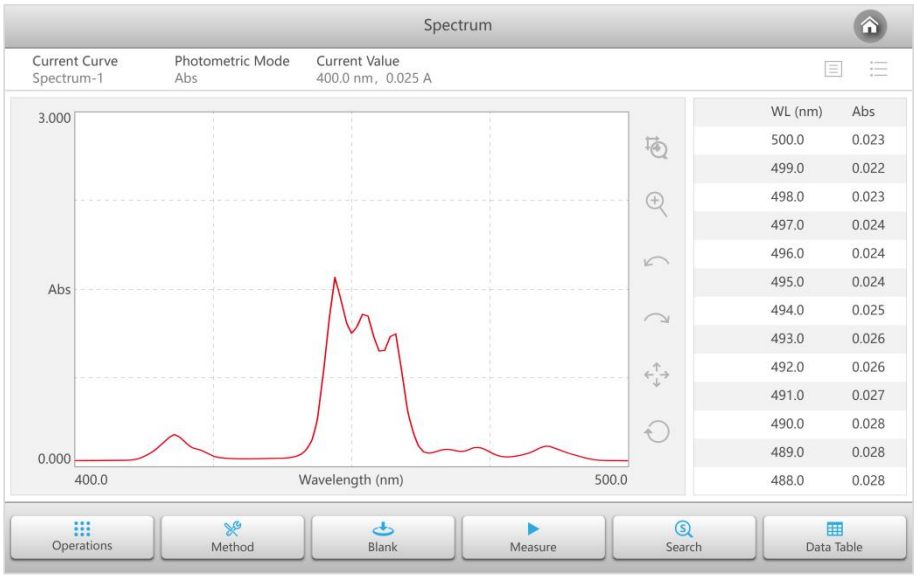
Remove the Results

> ***Caution***
>
> *Once results are removed, they cannot be recovered!*

Click the / icon to the right of the data to select/deselect the corresponding data row, click the **Delete** button to remove the selected data.



Spectrum Processing



Spectrum Display Mode Switching

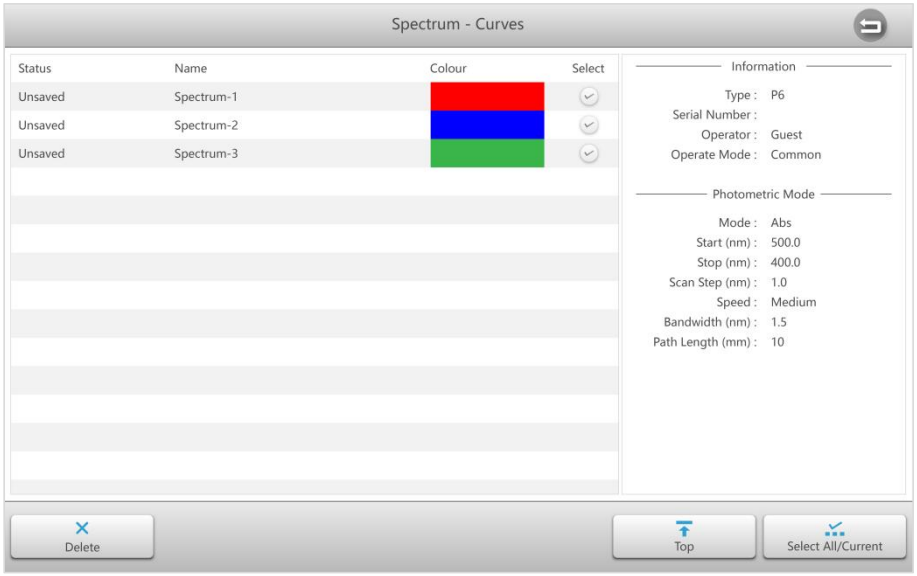
On the measurement screen of **Kinetics**, **Time Scanning** and **Spectrum**, click the **Display Mode** icon to switch the spectrum display mode.

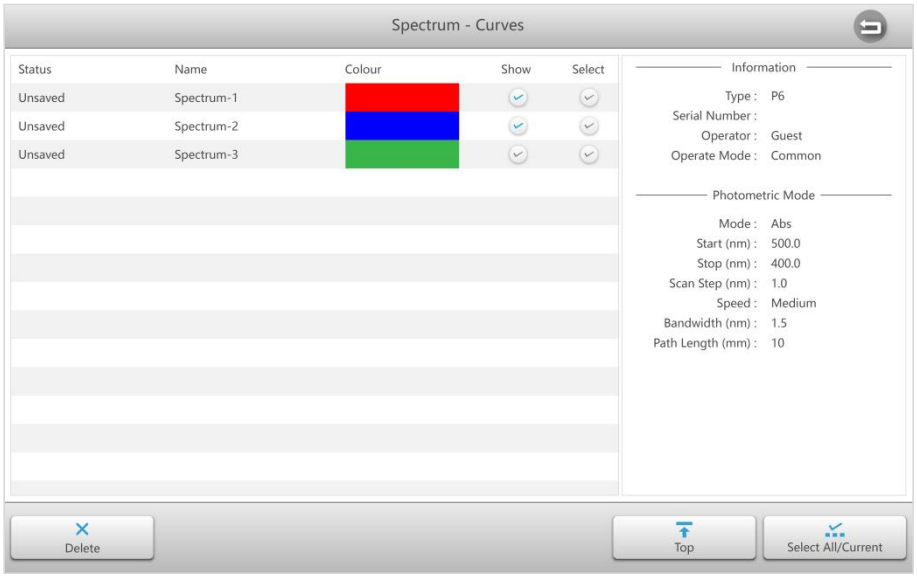
Single mode Only display currently active curve.

Overlapping mode Display all curves.

Spectrum Edit

On the measurement screen of **Kinetics**, **Time Scanning** and **Spectrum**, click the **List** icon to access the curves list screen.





- **Show/Hide the Curves**

  Click the / icon in the **Show** column to select/deselect the curves to be shown or hidden.

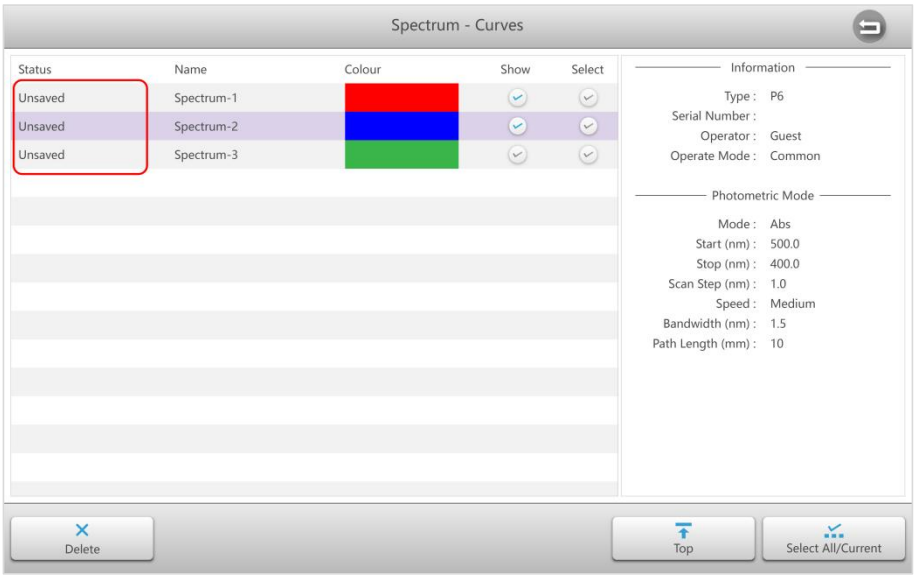
- **Remove the curves**

Caution

Once curves are removed, they cannot be recovered!

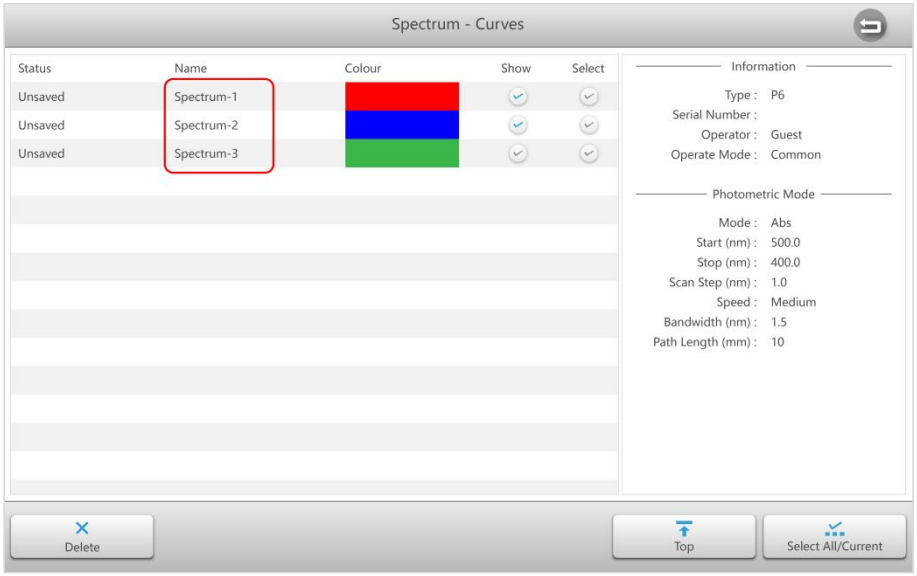
Click the / icon in the **Select** column to select/deselect the corresponding curves, click the **Delete** button to remove the selected curves.

- **Bring a Curve to Front**

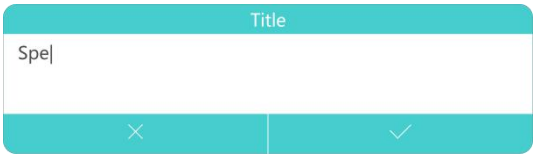


Click the cell in the **Status** column to select a curve, click the **Top** button to bring it to top.

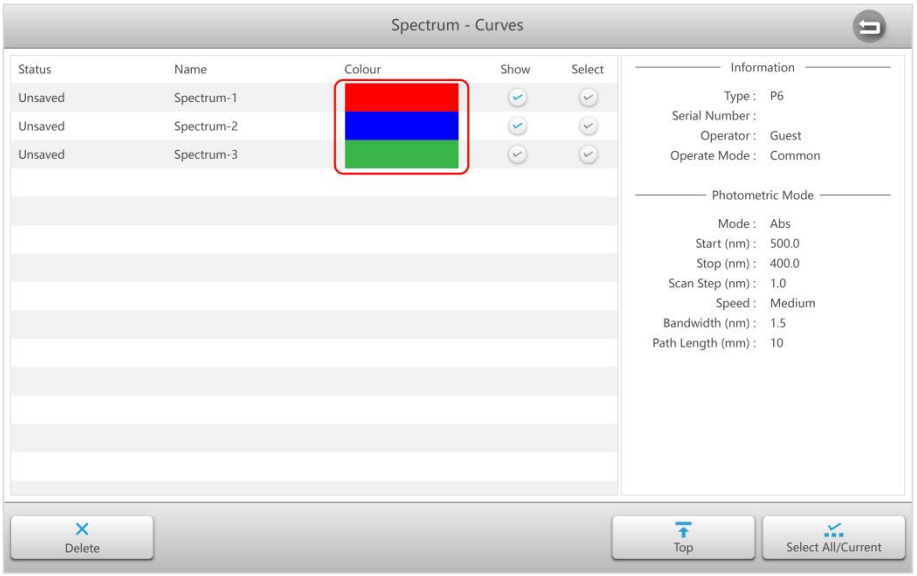
- **Rename a Curve**



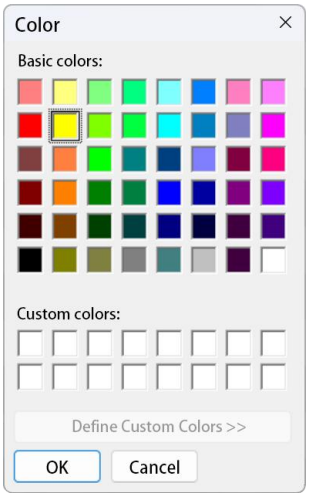
Click the cell in the **Name** column to pop up the **Name** input window and keyboard. Key in the new name, click the **OK** button to accept the input content and return.



- **Change the Colour of the Curve**

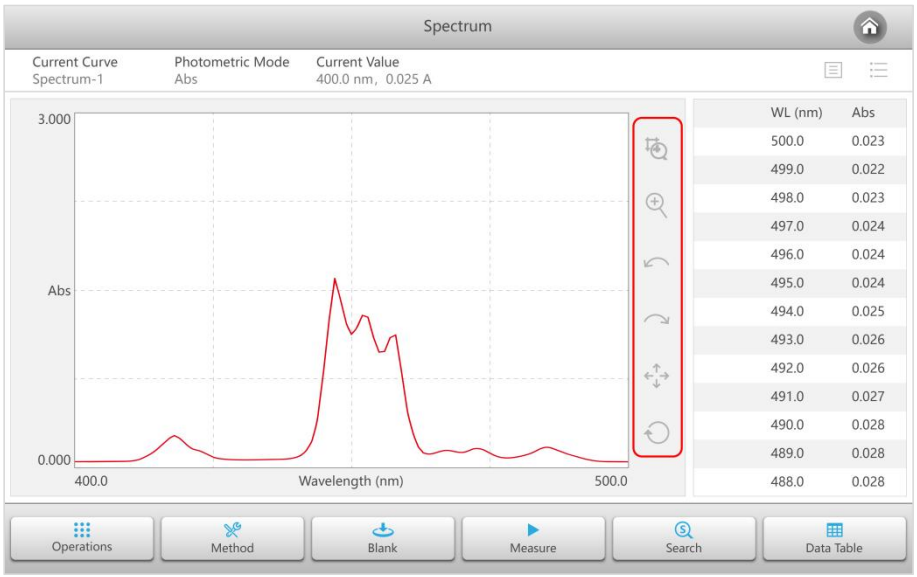


Click the cell in the **Colour** column to pop up the **Color** window. Select a new colour, click the **OK** button to accept the new colour and return.



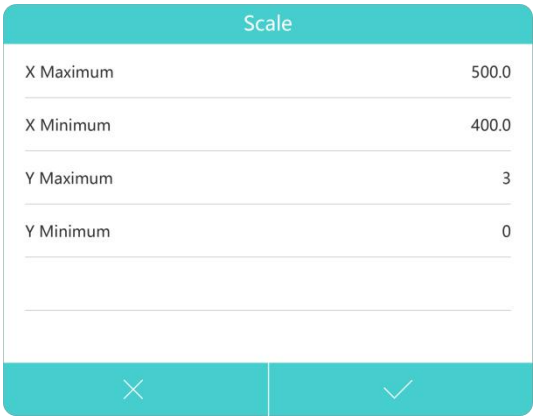
Spectrum Scaling

On the measurement screen of **Kinetics**, **Time Scanning** and **Spectrum**, click the **Scale** button to bring up the coordinate modification icons.

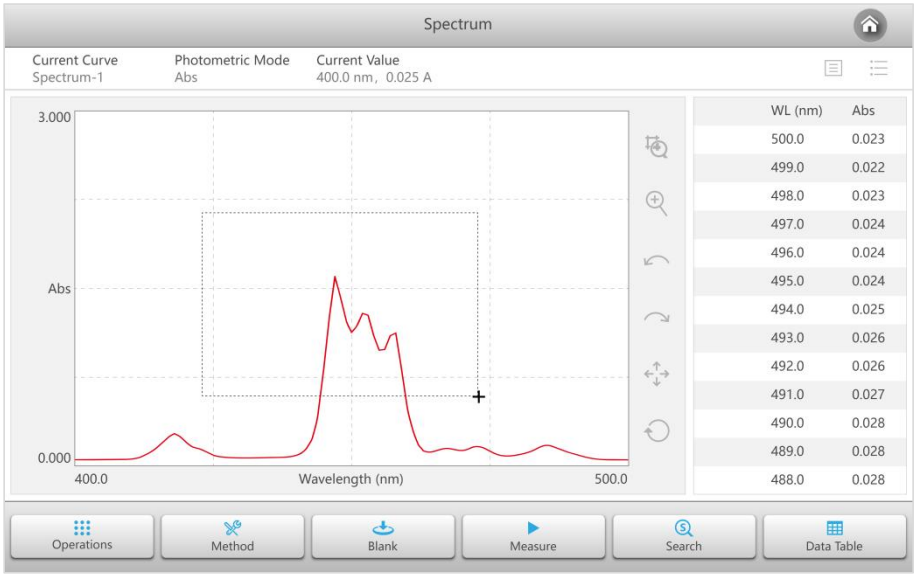




Click the relevant icon to pop up the **Scale** window, click the coordinate value field to activate the **Numeric** keypad for input. After entering all required coordinate values, click the **OK** button to generate the new coordinate system.



The cursor changes to a cross shape after clicking the icon. Click and hold at the upper left corner of the spectrum area that needs to be zoomed in, drag the selection frame to the lower right corner, and release upon reaching the target area. The spectrum within the selected frame will be magnified.



Return to the previous state of the spectrum.

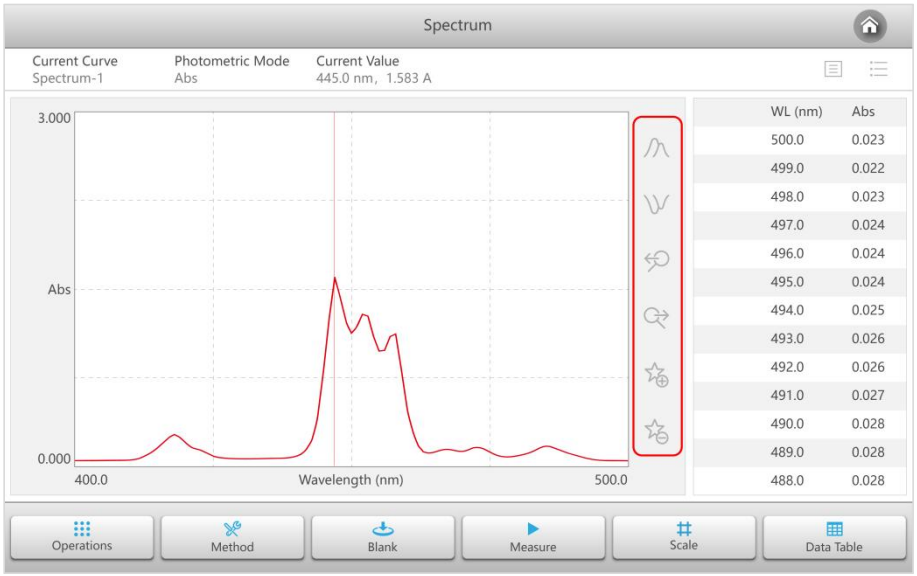
Proceed to the next state of the spectrum.

Auto-scale the spectrum to full display state.

Restore coordinates to the initial state.

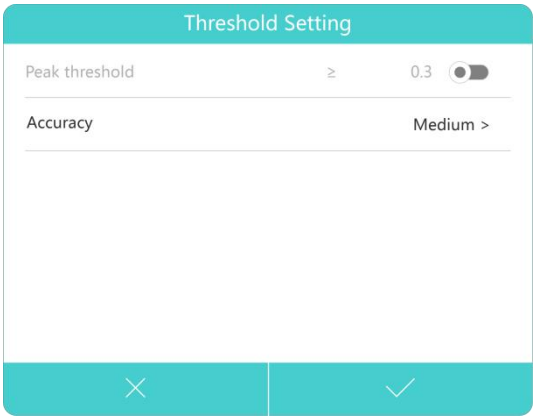
Spectrum Data Search

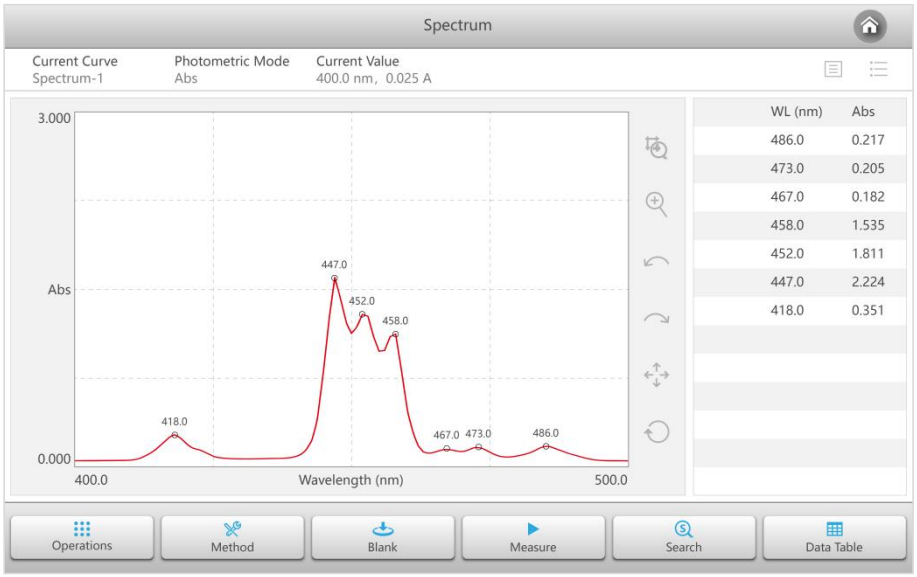
On the measurement screen of **Kinetics**, **Time Scanning** and **Spectrum**, click the **Search** button to bring up the data search icons.



Auto list the peak/valley values of the spectrum. Click the icon to pop up the Threshold Setting window, Set the parameters according to requirements and click the **OK** button to list the peak/valley values. Click the icon again to cancel.

- Peak threshold After the function is enabled, any peak or valley value that falls outside this threshold range will be ignored.
- Accuracy This function is used for filtering spurious peaks and valley values. In the sensitivity range from High to Low, lower sensitivity will result in more noise being filtered out. It is recommended to use the default value of Medium under normal conditions.







When the peak/valley icon is not selected, move the cursor forward/backward point by point to view the data.

When the peak/valley icon is selected, move the cursor forward/backward peak/valley by peak/valley to view the data.



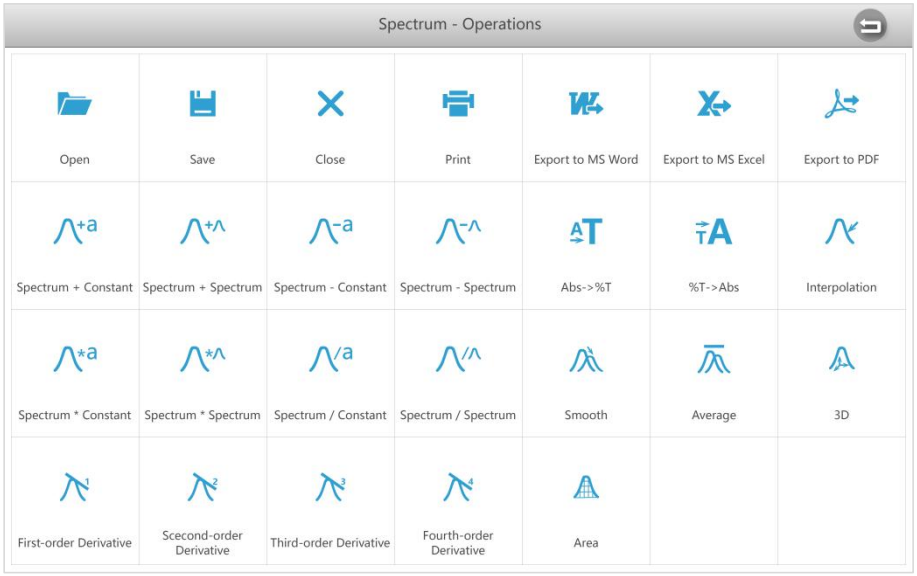
Move the cursor and add the corresponding value to the interest list.



Move the cursor, if the value corresponding to the cursor has been added to the interest list, click the icon to remove it.

Spectrum Data Calculation

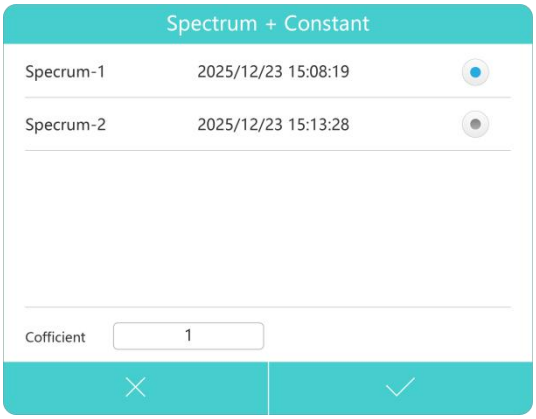
On the **Measurement** screen, click the **Operations** button to access the operations screen.



- **Arithmetic Operations of Spectrum and Constants**

	Add a spectrum to a constant to generate a new spectrum.
	Subtract a constant from a spectrum to generate a new spectrum.
	Multiply a spectrum by a constant to generate a new spectrum.
	Divide a spectrum by a constant to generate a new spectrum.

Click the corresponding calculation icon to pop up a dialog box. Select a spectrum, enter the coefficient in the constant input box, and click the **OK** button to generate a new spectrum.





- **Arithmetic Operations of Spectrum and Spectrum**



Add two spectrum to generate a new spectrum.



Subtract two spectrum to generate a new spectrum.

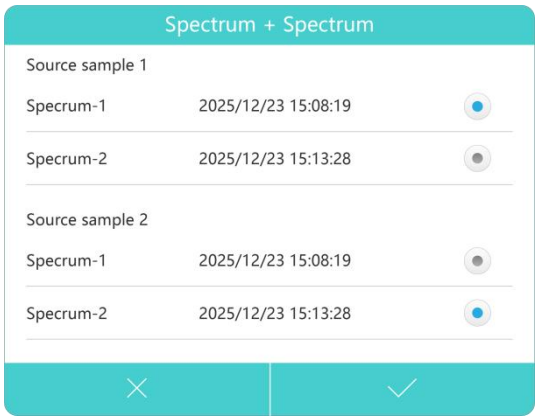


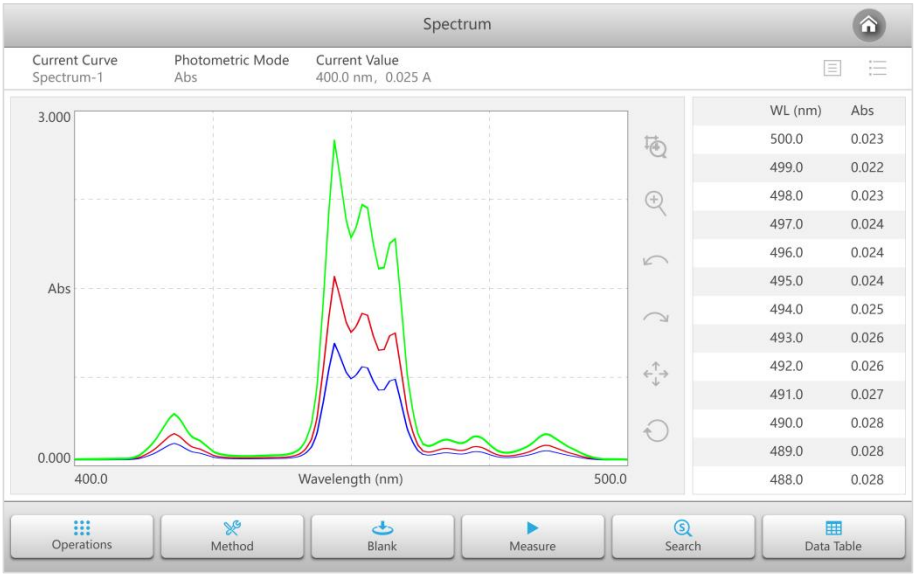
Multiply two spectrum to generate a new spectrum.



Divide two spectrum to generate a new spectrum.

Click the corresponding calculation icon to pop up a dialog box. Select a source 1 spectrum and a source 2 spectrum, click the **OK** button to generate a new spectrum.





- **Spectrum Differentiation**



Generate a new spectrum after calculating the first-order derivative of the spectrum.



Generate a new spectrum after calculating the second-order derivative of the spectrum.

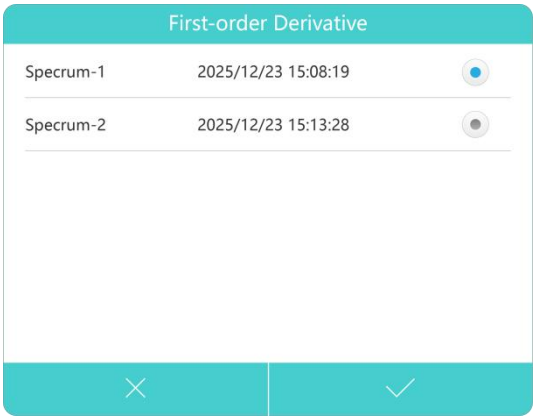


Generate a new spectrum after calculating the third-order derivative of the spectrum.



Generate a new spectrum after calculating the fourth-order derivative of the spectrum.

Click the corresponding calculation icon to pop up a dialog box. Select a spectrum and click the **OK** button to generate a new spectrum.



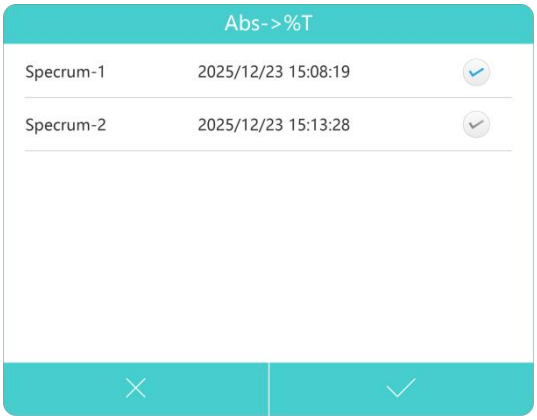


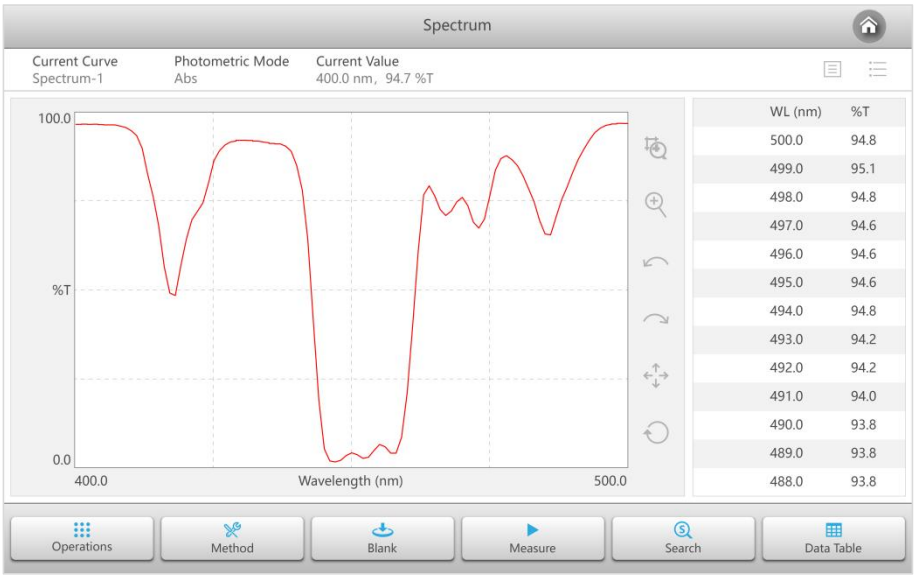
- **Photometric Mode Conversion**

Convert the photometric mode of the spectrum to %T mode and generate a new spectrum.

Convert the photometric mode of the spectrum to Abs mode and generate a new spectrum.

Click the corresponding calculation icon to pop up a dialog box. Select a spectrum and click the **OK** button to convert the photometric mode and generate a new spectrum.

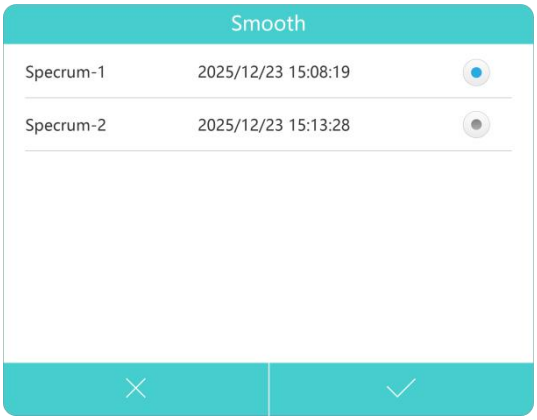


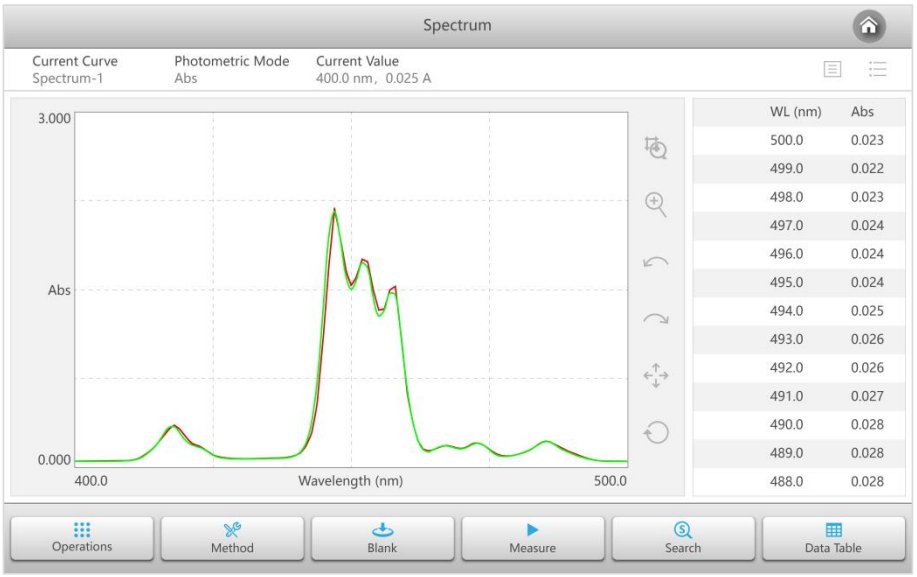


- **Spectrum Smoothing**

Smooth the spectrum and generate a new one.

Click the **Smooth** icon to pop up a dialog box. Select a spectrum and click the **OK** button to smooth and generate a new spectrum.

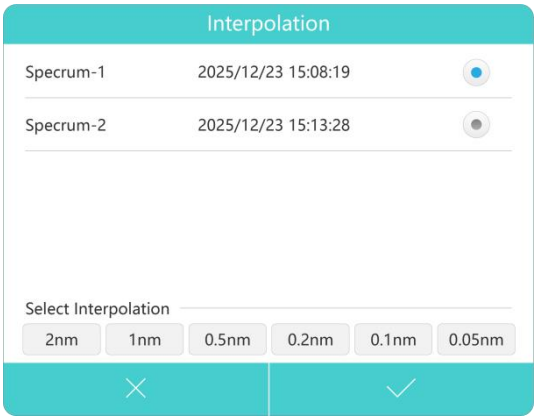


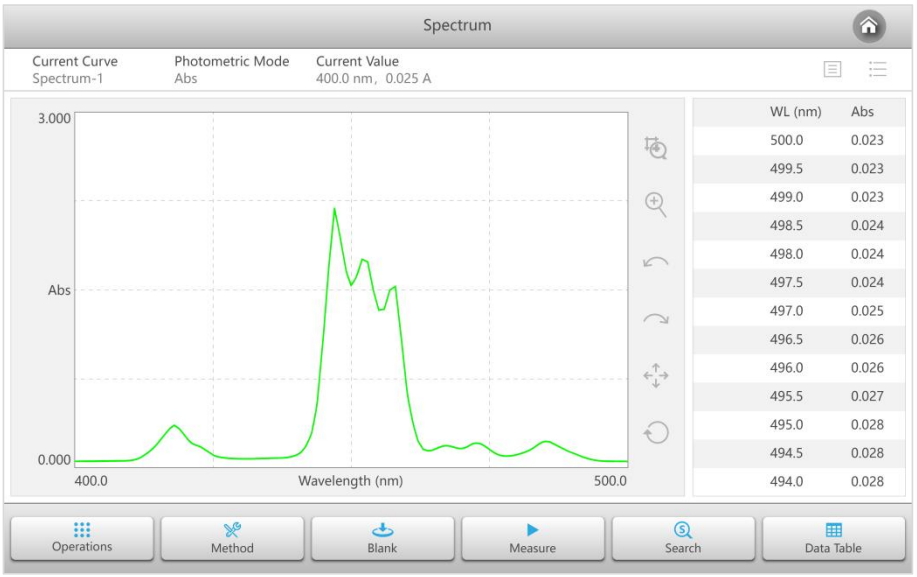


- **Spectrum Interpolation**

Calculate a smaller interval (2, 1, 0.5, 0.2, 0.1, 0.05 nm) for the spectrum using the interpolation method and generate a new spectrum.

Click the **Interpolation** icon to pop up a dialog box. Select a spectrum and interval, click the **OK** button to calculate and generate a new spectrum.

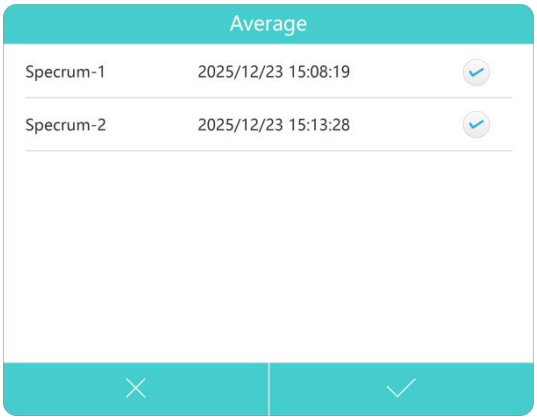


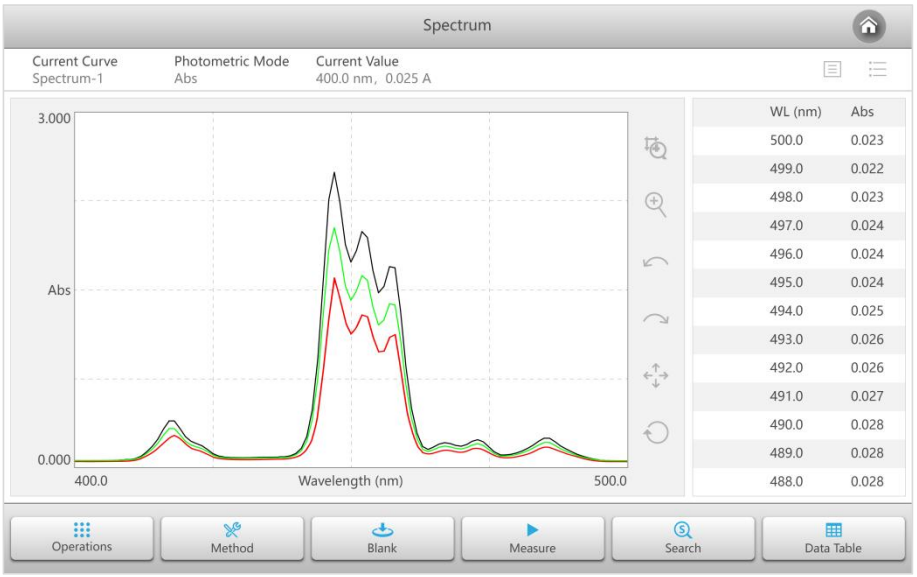


- **Spectrum Average**

Calculate the average of the photometric values at the corresponding wavelengths for two or more spectra and generate a new spectrum.

Click the **Average** icon to pop up a dialog box. Select two or more spectrum and click the **OK** button to calculate and generate a new spectrum.

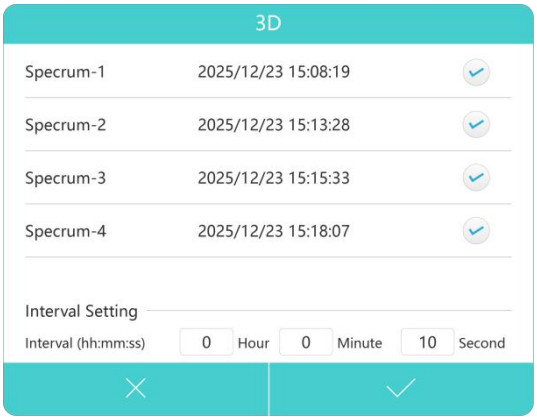


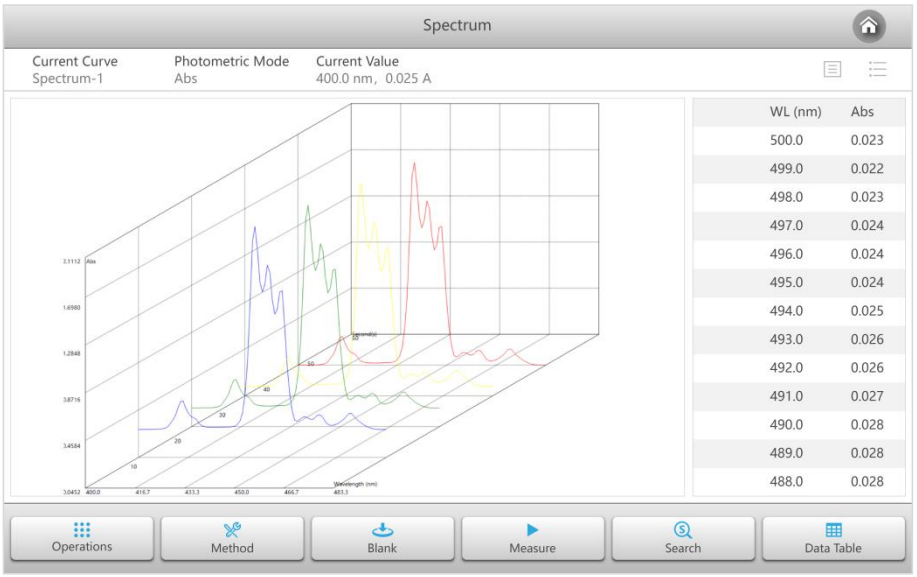


- **3D Spectrum**

Display multiple spectra scanned at equal time intervals in a three-dimensional format.

Click the **3D** icon to pop up a dialog box. Select two or more spectrum, and key in the time interval, click the **OK** button to show 3D spectrum.

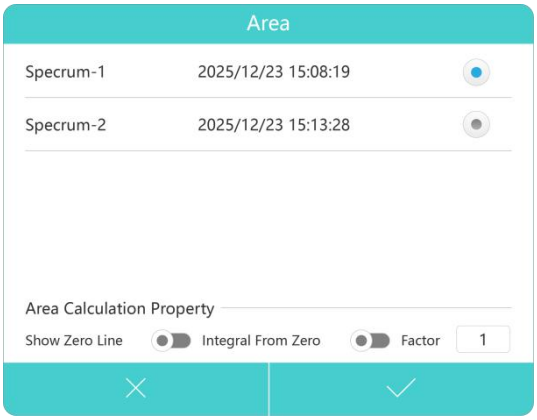




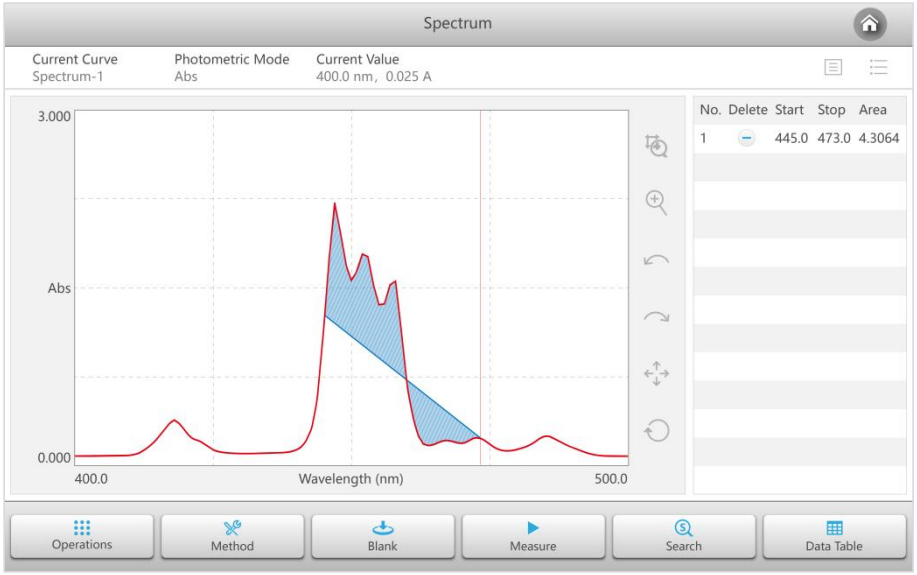
- **Spectrum Area Calculation**

Calculate the area of the region enclosed by the spectrum.

Click the **Area** icon to pop up a dialog box. Select a spectrum, set the calculate mode and key in the factor value, click the **OK** button to enter in Area mode.

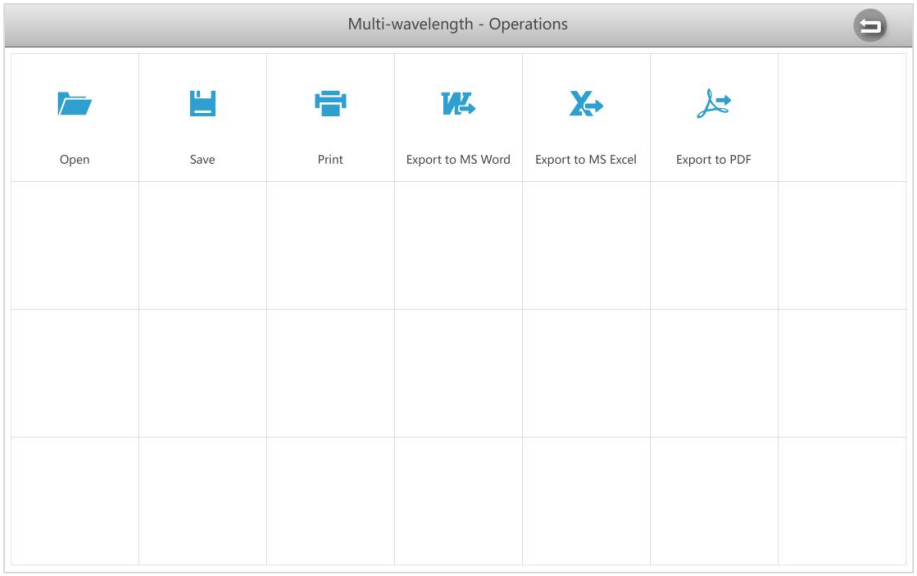


Click the cell in the column corresponding to Start/Stop, and enter the starting/ending point or select it by moving the cursor on the spectrum. Upon completion, the filled area for the calculated area will be displayed on the spectrum, and the area value will be calculated.



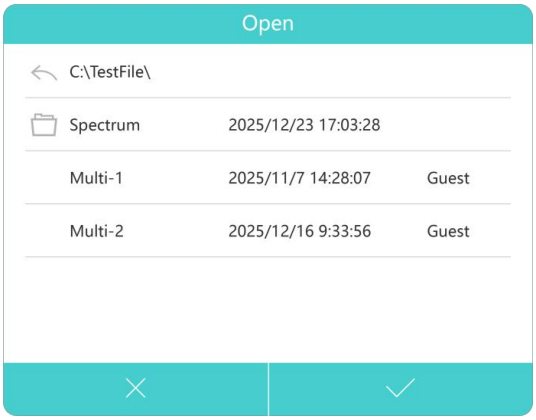
File Operation

On the measurement screen, click the **Operations** button to access the operations screen.



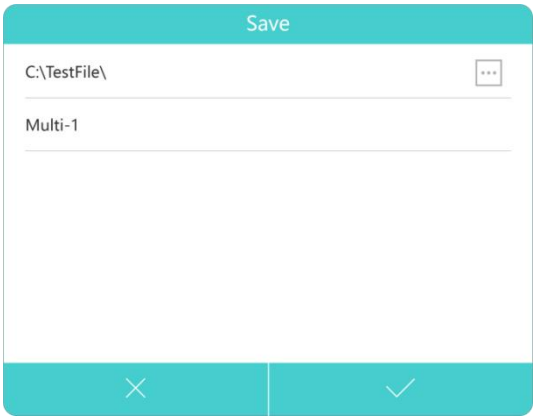
Load the Measurement Results

Click the **Open** button to pop up the Open window. Select the file you want to open, then click the **OK** button to open it.



Save the Measurement Results

1 Click the **Save** button to pop up the Save window.

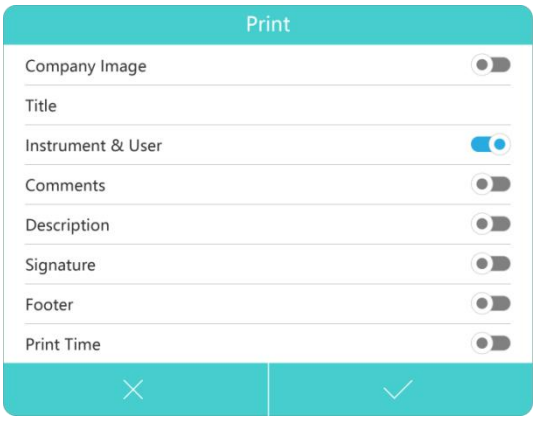


2 Click the file name, and an input box and keyboard will pop up. Enter the new file name, then click the **OK** button to complete the modification and return. Click the **OK** button to save the test results.



Print the Measurement Results

1 Click the **Print** button to pop up the print options window.



Company Image	Allow users to add an image, such as a company logo. Image formats such as JPG and PNG are supported, with a maximum resolution of 320*160. This image will be printed in the top-left corner of the first page of the test

	report.
Title	Title of the Test Report. Up to 56 characters.
Instrument & User	It includes the instrument model, serial number, spectral bandwidth, as well as user login information.
Comments	Some advisory information.
Description	General descriptive information about the test report.
Signature	Add a space for signature.
Footer	Content that can be displayed in the footer area.
Print Time	Print time of the Test Report.

2 Select the content to be printed together with the test report according to your requirements.

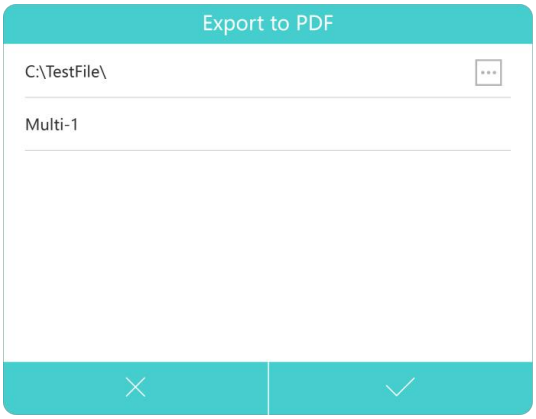
3 After selecting or entering the relevant content, click the **OK** button to print the report.

Export the Measurement Results

> ***Important Information***
>
> *To export a test report in Word format, Microsoft Office software must be installed!*



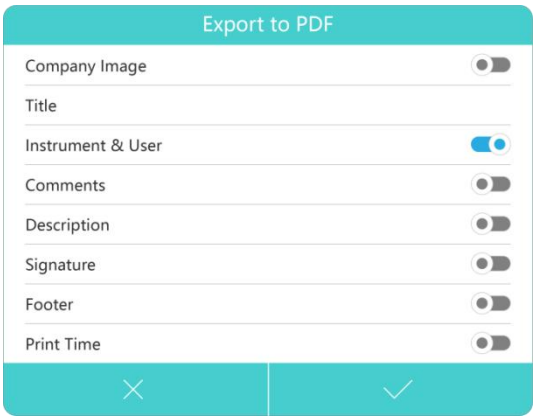
1 Click the **Export to MS Word**, **Export to MS Excel or Export to PDF** button to pop up the export file save window.



2 Click the file name, and an input box and keyboard will pop up. Enter the new file name, then click the **OK** button to complete the modification and return. Click the **OK** button to continue.



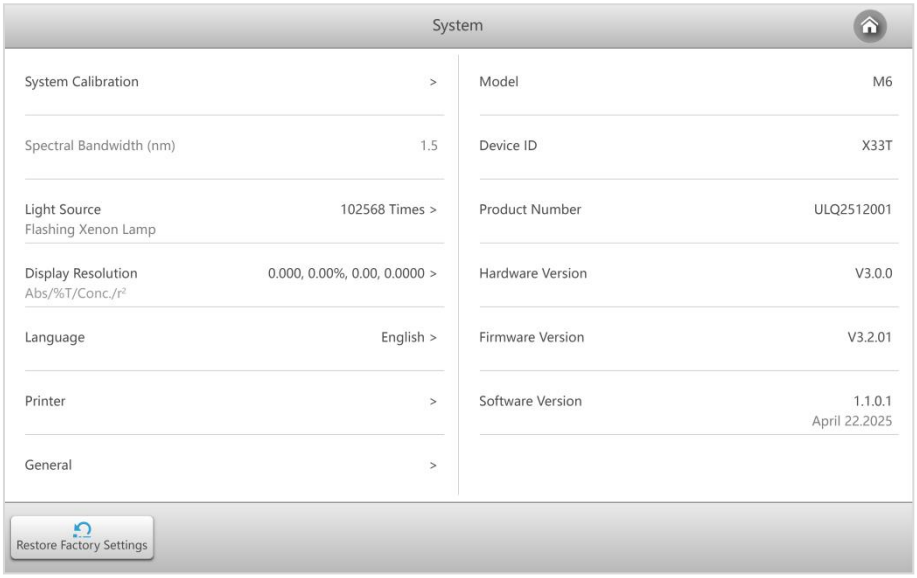
3 Select the content to be exported together with the test report according to your requirements. (Refer to the relevant operations in the printing section.)



Calibration and System Settings

This section covers settings related to instrument calibration and configure the basic instrument settings.

On the **Home** screen, click the **System** icon to access the **System** screen.



Calibration

The instrument provides three commonly used calibrations, Dark current, Wavelength, and System baseline, to ensure that the instrument is in optimal working condition in any operating environment.

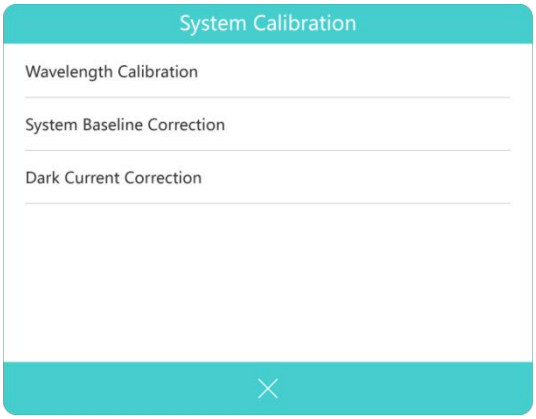
It is recommended that the system be calibrated when the following occurs.

- When there is a significant change in the environment in which the instrument is used, e.g. after transport, change of laboratory, etc.
- Every 3 months under normal use.
- After repair and maintenance. For example, replacement parts, light sources, etc.

> ***Caution***
>
> *Keep the sample room lid closed until calibration is complete. If it is accidentally opened during calibration, close it and re-calibrate!*

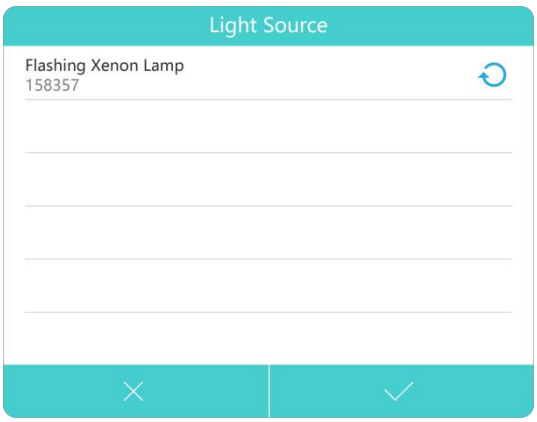
1 Remove anything from the measurement channel. Move the sample holder to the cell #1. Close the sample room lid.

2 Click the calibration item to start calibration.



Light Source Management

This section is used to check the flash count of the Flashing Xenon Lamp and reset counter.



Reset the Light Source Usage

After replacing the tungsten lamp or deuterium lamp, click the icon on the right of the corresponding item to reset its usage.

Display resolution setting

This section describes how to set the number of decimal places for different types of measured values.

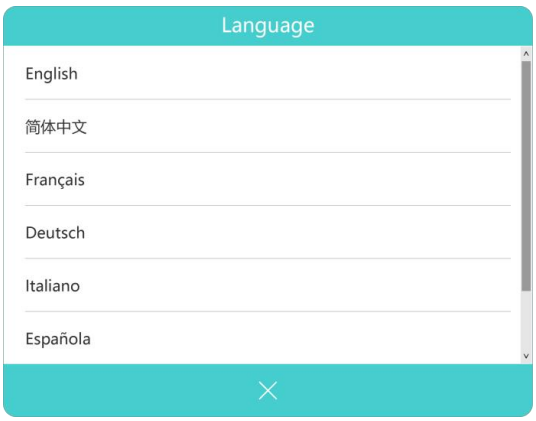


Click the value corresponding to the measured value type to pop up the selection window, then select the parameter and confirm to return. After completing all the modification, click the OK button to confirm.

Measured Value Type	Optional Range	Recommended
Abs	0.000, 0.0000, 0.00000, 0.000000	0.000
%T	0.0, 0.00, 0.000, 0.0000	0.0
Conc.	0, 0.0, 0.00, 0.000, 0.0000, 0.00000	0.000
r^2	0.0000, 0.00000, 0.000000, 0.0000000, 0.00000000	0.0000

Language setting

The unit features 8 built-in languages (English, Simplified Chinese, French, German, Italian, Spanish, Portuguese and Russian) for users in different countries and regions to select.

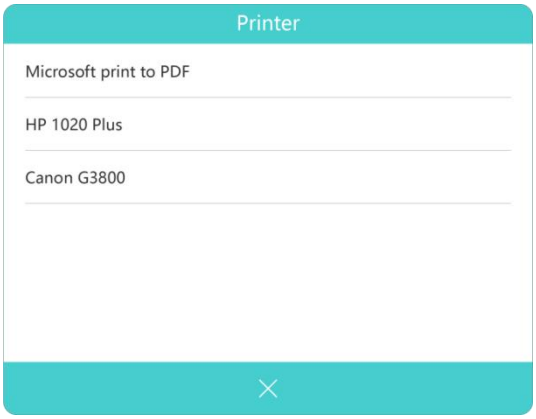


Click the language item to change the language.

Printer setting

This unit is compatible with general-purpose printers that support A4 printable format.

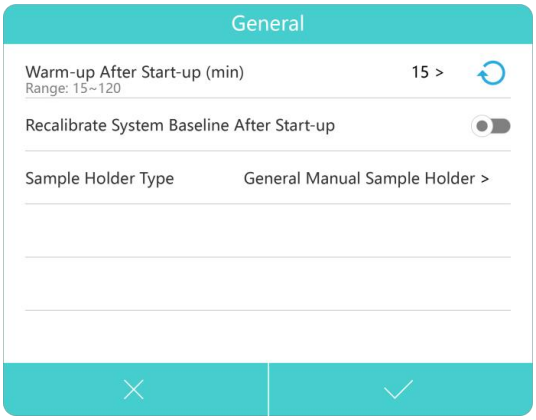
> ***Important information***
>
> *Only printers with drivers successfully installed are supported in the application. For a new printing device, please install a compatible print driver in Windows first.*



Click the printer item to select a printer as the current printing device.

General settings

This section describes the contents related to some additional operations of the instrument and the settings for optional accessories.



Warm Up

> ***Important information***
>
> *The electronic components of the instrument require a certain warm-up period to obtain stable measured values. It is generally recommended to warm up the instrument for at least 15 minutes after power-on before starting measurements.*

Click the value of warm up time to pop up the **Input Wavelength** window. Key in the new value (1~120 minutes), click the **OK** button to accept and return.

Calibrate System Baseline after Startup

Click the / icon to enable/disable the Calibrate System Baseline After Start-up" option.

Set Sample Holder Type

After replacing the automatic multi-cell holder or micro volume test base, you need to set the corresponding sample holder type for the unit to work properly.

Sample Holder Options	Adapted Sample Holder
Automatic 5-cells Sample Holder	Cell Holder, 5-Position Auto Cell Charger, 10 to 100mm (634-1233)
Automatic 8-cells Sample Holder	Cell Holder, 8-Position Auto Cell Charger, 10 mm (634-1232)
General Manual Sample Holder	Adapt to different types of fixed or manual constant sample holders
Micro Volume Test Base	MICRO VOLUME TEST BASE (634-1238)

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, 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 range of UV area (190 -400 nm).**

Photometry

Photometry (Photometric measurement) is for scenarios where sample properties are known and a specific reference wavelength is defined. Without complex calculations, it rapidly obtains absorbance (A) or transmittance (%T) at a specific wavelength to determine whether the sample meets "qualitative characteristics" or "rough compliance".

1 Start a Photometric Measurement



On the **Home** screen, click the **Photometry** icon to access the **Photometry** measurement screen.



2 Switch the Photometric Mode

Click the **Photometric Mode** button to switch the photometric mode .

- Abs Measure absorbance value of the sample(s)
- %T Measure transmittance value of the sample(s)

3 Switch the Measurement mode

Click the **Measurement Mode** button to switch the measurement mode.

Continuous mode: the measured value refreshes automatically every second.

Single mode: click the **Measure** button for one measurement.

4 Set the Factor

In Abs photometric mode, it supports automatic calculation with factor input, which can be entered by the user according to actual needs. Click the **Factor** button popup **Numeric** keyboard, key in the factor value.

5 Setup the Measurement Wavelength

Click the **Wavelength** button to pop up the **Numeric** keyboard, key in the wavelength (190-1100, step 0.1), click the **OK** button to go to the input wavelength and zero automatically.

6 Blank

Put the reference sample into the measurement channel, click the **Blank** button.

7 Measure the Absorbance or Transmittance of the Samples

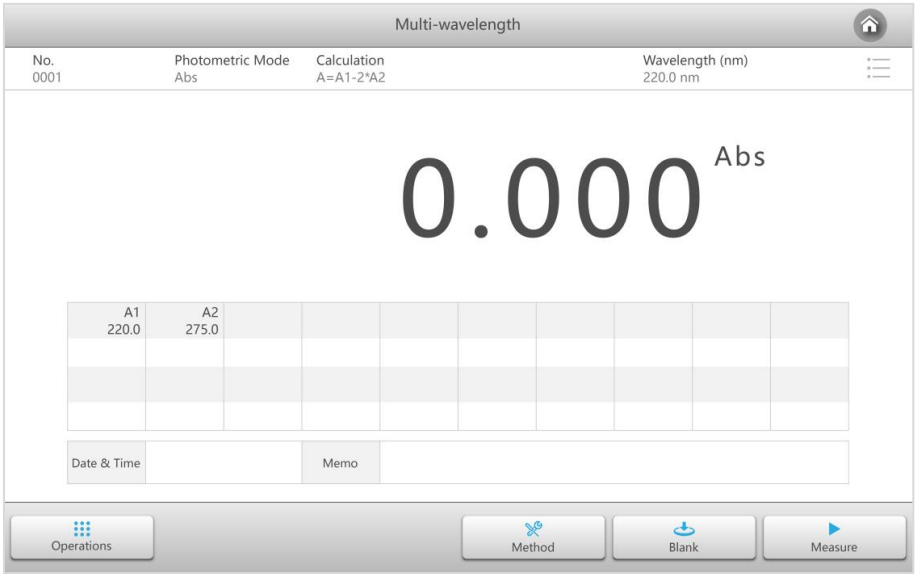
Put the sample into the measurement channel, and read directly or click the **Measure** button to read the result.

Multi-wavelength

The technical core of multi-wavelength measurement derives from the spectral fingerprint effect of substances and the multi-wavelength extension of the Lambert-Beer Law. By customizing multiple characteristic wavelength points via the optical system, it synchronously collects the absorbance or transmittance data of samples at each wavelength, enabling efficient analysis without scanning.

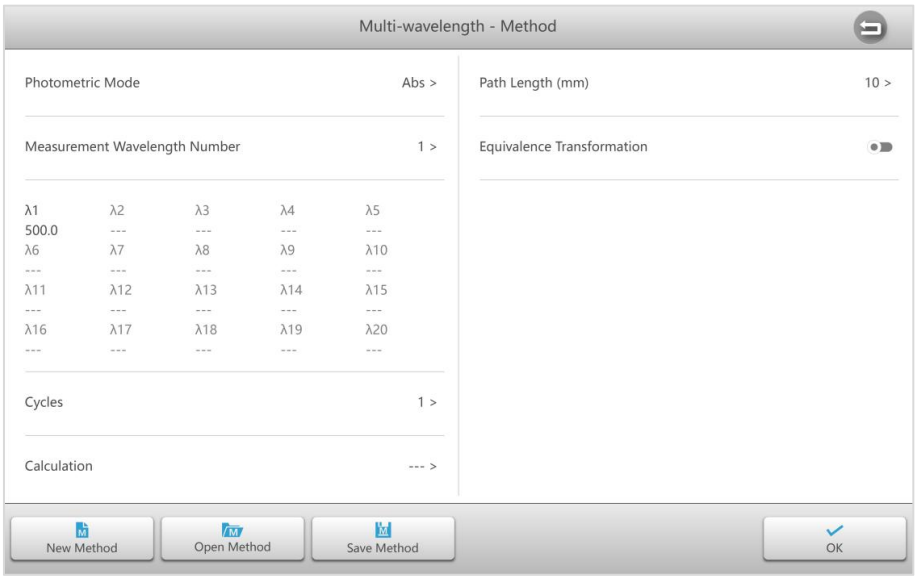
1 Start a Multi-wavelength Measurement

On the Home screen, click the **Multi-wavelength** icon to access the **Multi-wavelength** measurement screen.



2 Establish a Measurement Method

Click the **Method** button to access the **Multi-wavelength-Method** screen.



Photometric Mode	2 photometric modes: Abs, %T.
Measurement Wavelength Number	Set the number of measurement wavelengths and their corresponding values. 1~20 wavelengths are available, wavelength range: 190~1100nm.
Cycles	The number of measurements for the same sample. 1, 2, 3, 5, 10, 20, 30, 50 times can be selected. After setting, the instrument will measure the sample continuously for multiple times and output multiple sets of measurement values.
Calculation	The selection of calculation formulas is allowed to automatically calculate the measurement results before output. (Refer to the Formula Edit section for formula editing.)
Path Length	The width of the cuvette used for the measurement.
Equivalence Transformation	Activation automatically converts measurements from different path cuvettes to values in the 10 mm light path length.

Click the **New Method** button to create a new measurement method, set the parameters, and click the **OK** button to validate and return to the measurement screen upon completion.

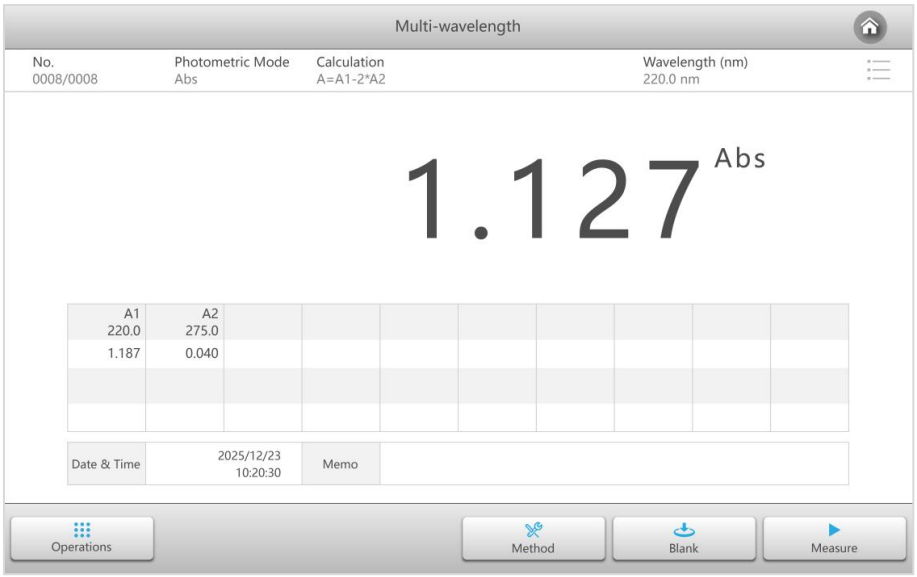
3 Blank

Put the reference sample into the measurement channel, click the **Blank** button.

4 Measure the Samples

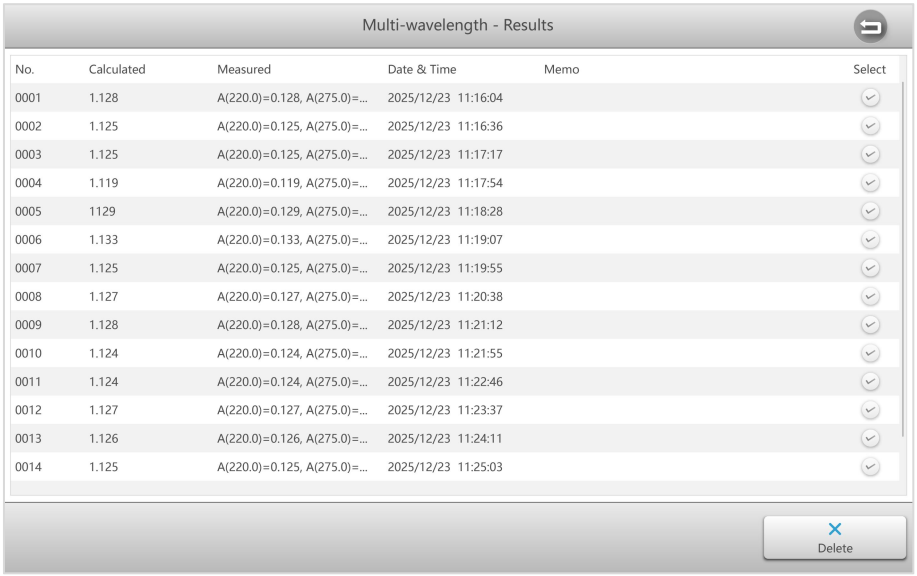
Put the sample into the measurement channel, and click the **Measure** button to measure the

sample.



5 Browse the Test Results

Click the **List** icon to access the **Results List** screen to browse the list of measurement results.



6 Save Measurement Results and Output Test Report

On the **Measurement** screen, click the **Operations** button to access the **Operations** screen.

Click the **Save** button to save the results.

Click the **Print** button to print the test report.

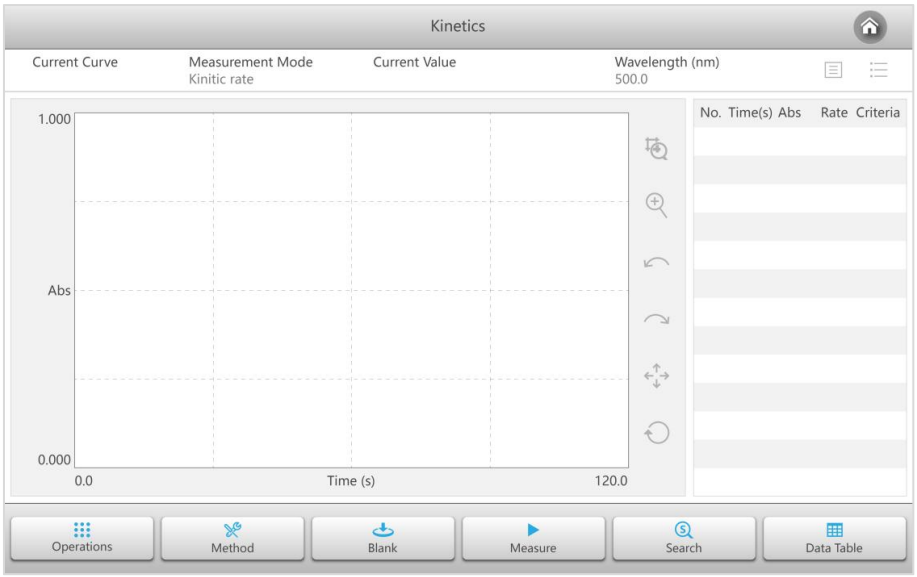
Click the **Export** button to export the test report.

Kinetics

Kinetic analysis is a method that continuously monitors the time-dependent changes in absorbance at a characteristic wavelength, combines the linear relationship between absorbance and concentration, fits curves to obtain reaction kinetic parameters, and achieves the quantification of target substances such as substrates and products. It enables real-time tracking of reaction processes without reaction termination, featuring high speed and sensitivity, and is widely applied in the research and detection of dynamic chemical reactions like enzymatic reactions.

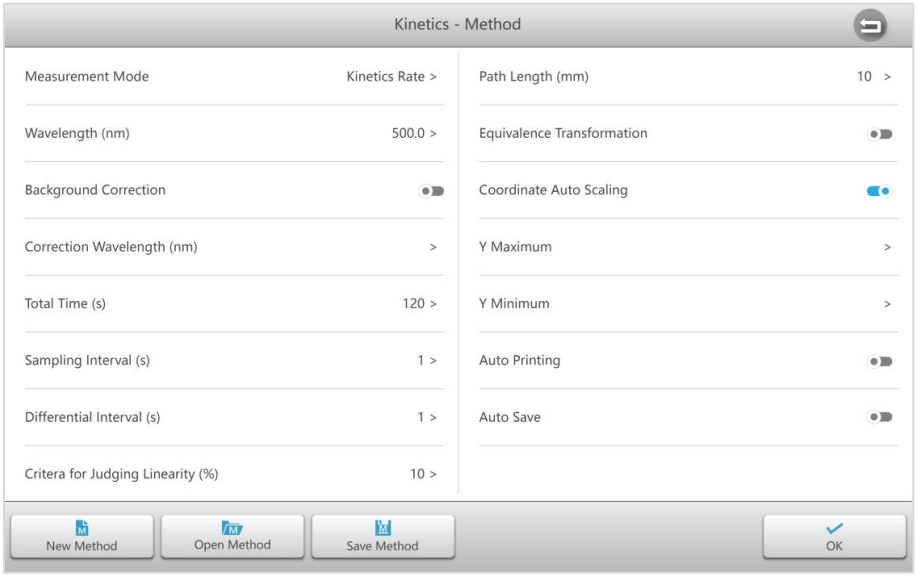
1 Start a Kinetics Measurement

On the **Home** screen, click the **Kinetics** icon to access the **Kinetics** measurement screen.



2 Establish a Measurement Method

Click the **Method** button to access the **Kinetics-Method** screen.



Measurement Mode	2 measurement modes: Kinetics, Kinetic Rate. ▪ **Kinetic Measurement** It is a quantitative detection method based on the continuous change of absorbance over time. Its core is to capture the dynamic correlation curve of absorbance (A) and time (t) of the sample system during the reaction process, and it is suitable for studying chemical/physical processes with concentration changes over time (such as enzymatic reactions, complexation reactions, redox reactions, etc.). ▪ **Kinetic Rate Measurement** It is an in-depth and quantitative analysis of kinetic measurement, whose core is to calculate the reaction rate parameters (e.g., reaction rate v, rate constant k) from the A-t kinetic curve for the direct characterization of the reaction rate.
Wavelength	Measured wavelength, range: 190~1100nm.
Background Correction	Background correction switch, can be set according to actual needs.
Correction Wavelength	Background corrected wavelength, range: 190~1100nm.
Total Time	Measure the total sampling time required.
Sampling Interval	Sampling interval.
Delay/Derivative	Waiting time before starting sampling/time of participating

	activity calculation.
Coefficient	Coefficient of activity calculation equation.
Path Length	The width of the cuvette used for the measurement.
Equivalence Transformation	Activation automatically converts measurements from different path cuvettes to values in the 10 mm light path length.
Coordinate Auto Scaling	Whether to automatically adjust the coordinates based on the data.
Y Maximum	The maximum value of the ordinate (valid only when the coordinates are fixed).
Y minimum	Minimum value of the ordinate (valid only when the coordinates are fixed).
Auto-printing	Automatically print curves and results after measurement is complete.
Auto Save	Automatically save curves and results after measurement is complete.

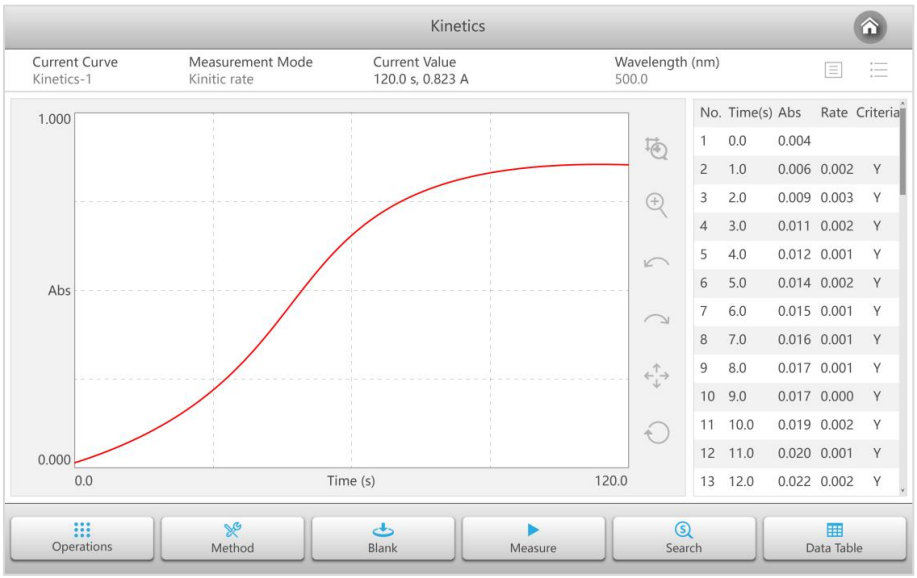
Click the **New Method** button to create a new measurement method, set the parameters, and click the **OK** button to validate and return to the measurement screen upon completion.

3 **Blank**

Put the reference sample into the measurement channel, click the **Blank** button.

4 **Measure the Samples**

Put the sample into the measurement channel, and click the **Measure** button to scan the sample.



5 Browse the Curves

Click the **List** icon to access the **Curves List** screen to browse the curves.

6 Process the Curves

For the curves processing operation, please refer to the relevant content in the Spectrum Processing chapter.

7 Save Measurement Results and Output Test Report

On the **Measurement** screen, click the **Operations** button to access the **Operations** screen.

Click the **Save** button to save the results.

Click the **Print** button to print the test report.

Click the **Export** button to export the test report.

Time Scanning

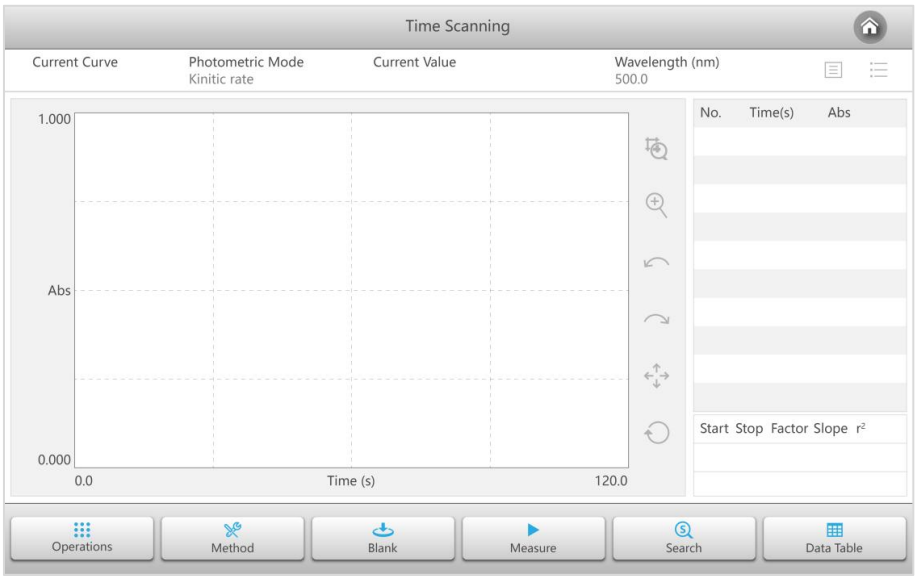
Time Scanning is a basic time-dimensional acquisition function of the instrument. It continuously scans and records absorbance data at preset time intervals under the set wavelength conditions (single wavelength). It can be applied to all scenarios where the change in absorbance over time

needs to be observed (including kinetic reaction research, as well as non-reaction testing such as sample stability detection, baseline drift observation over time, and instrument repeatability verification), with only data acquisition and recording performed.

1 Start a Time Scanning

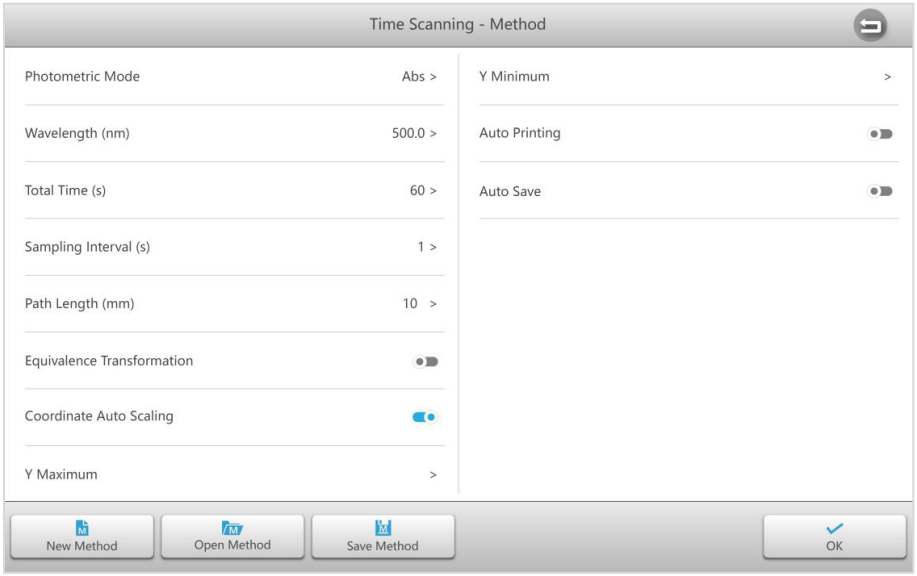


On the **Home** screen, click the **Time Scanning** icon to access the **Time Scanning** screen.



2 Establish a Measurement Method

Click the **Method** button to access the **Time Scanning-Method** screen.



Photometric mode	2 photometric modes: Abs and %T.
Wavelength	Measurement wavelength, range: 190~1100nm.
Total	Measure the total sampling time required.
Interval	Sampling interval.
Path Length	The width of the cuvette used for the measurement.
Equivalence Transformation	Activation automatically converts measurements from different path cuvettes to values in the 10 mm light path length.
Coordinate Auto Scaling	Whether to automatically adjust the coordinates based on the data.
Y Maximum	The maximum value of the ordinate (valid only when the coordinates are fixed).
Y minimum	Minimum value of the ordinate (valid only when the coordinates are fixed).
Auto-printing	Automatically print curves and results after measurement is complete.
Autosave	Automatically save curves and results after measurement is complete.

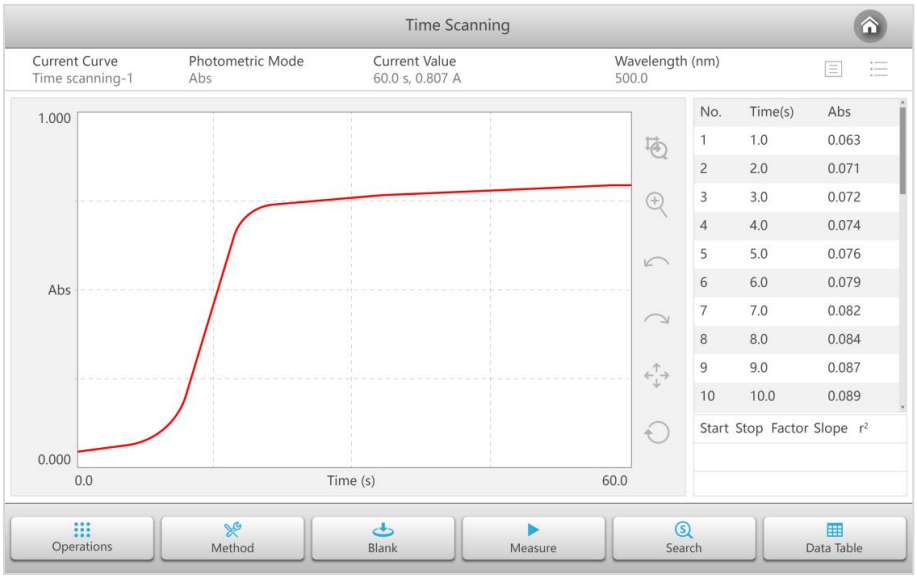
Click the **New Method** button to create a new measurement method, set the parameters,

and click the **OK** button to validate and return to the measurement screen upon completion.

3 Blank

Put the reference sample into the measurement channel, click the **Blank** button.

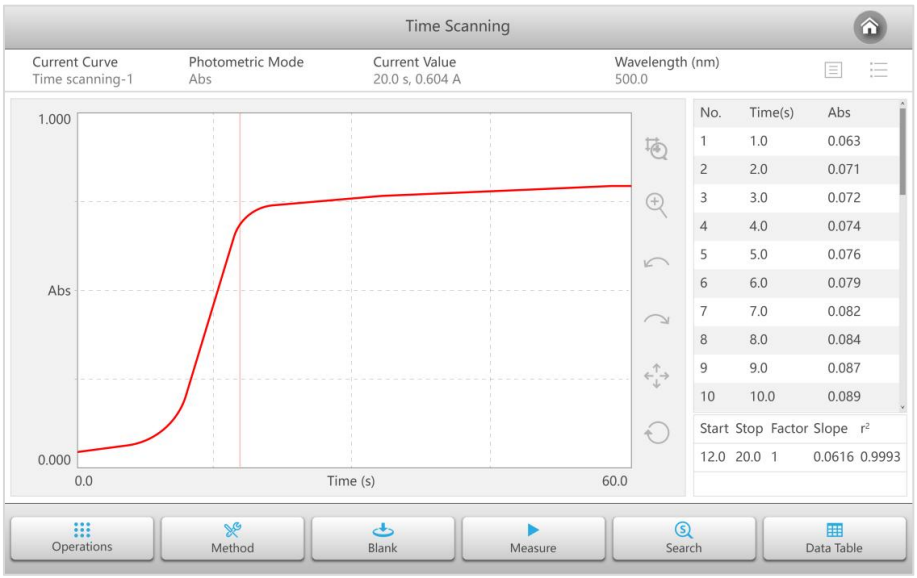
4 Measure the Samples



Put the sample into the measurement channel, and click the **Measure** button to scan the sample.

5 Calculate the Reaction Rate

Click the corresponding cell input for Start/Stop, or directly move the cursor to select the start/stop points for reaction rate calculation on the spectrum. Enter the Factor value afterwards, and the instrument will automatically calculate the reaction rate and the correlation coefficient.



6 Browse the Curves

Click the **List** icon to access the **Curves List** screen to browse the curves.

7 Process the Curves

For the curves processing operation, please refer to the relevant content in the Spectrum Processing chapter.

8 Save Measurement Results and Output Test Report

On the **Measurement** screen, click the **Operations** button to access the **Operations** screen.

Click the **Save** button to save the results.

Click the **Print** button to print the test report.

Click the **Export** button to export the test report.

Quantitation

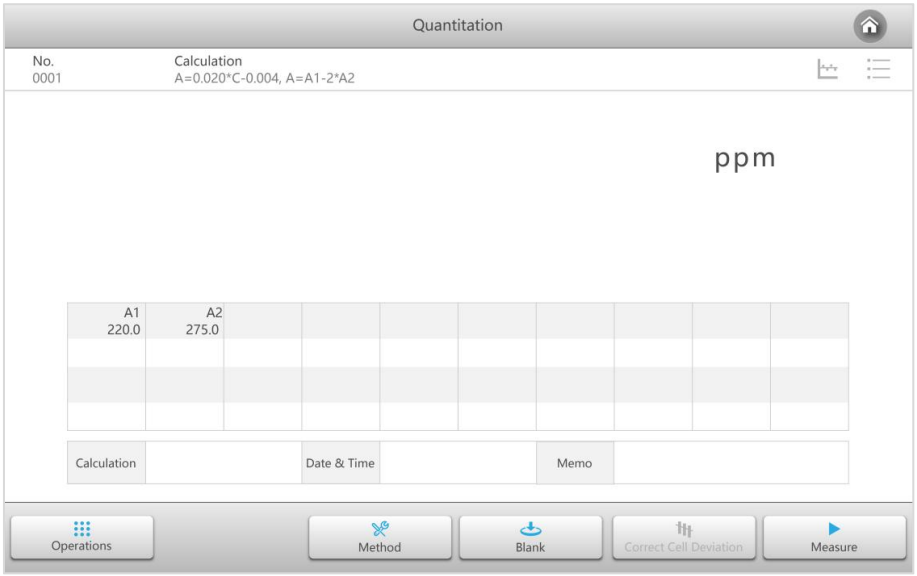
Quantitation (Quantitative measurement) is for analytical requirements where "specific content must be known". By optimizing measurement modes (single wavelength/dual wavelength), interference is eliminated and accuracy enhanced, ultimately calculating the precise

concentration of target substances in the sample.

1 Start a Quantitation Measurement

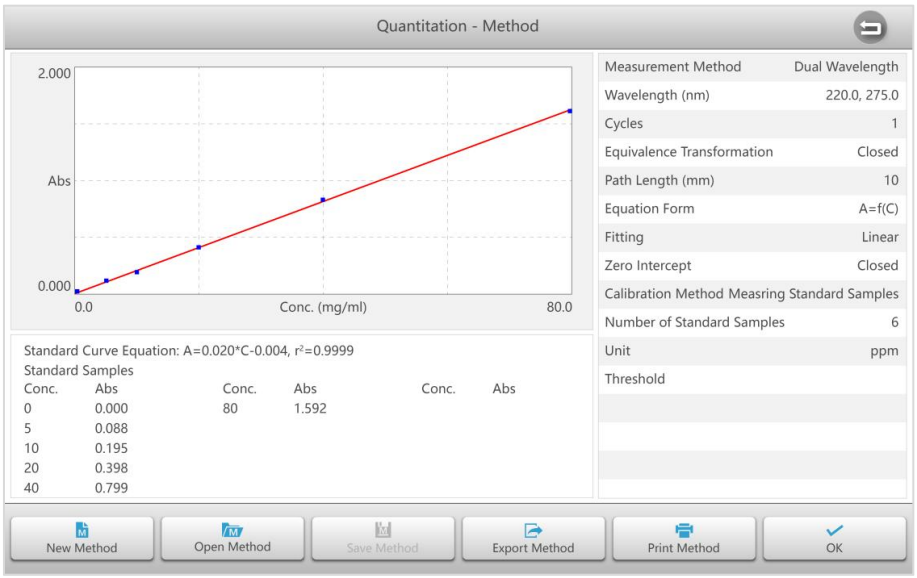


On the **Home** screen, click the **Quantitation** icon to access the **Quantitation** measurement screen.

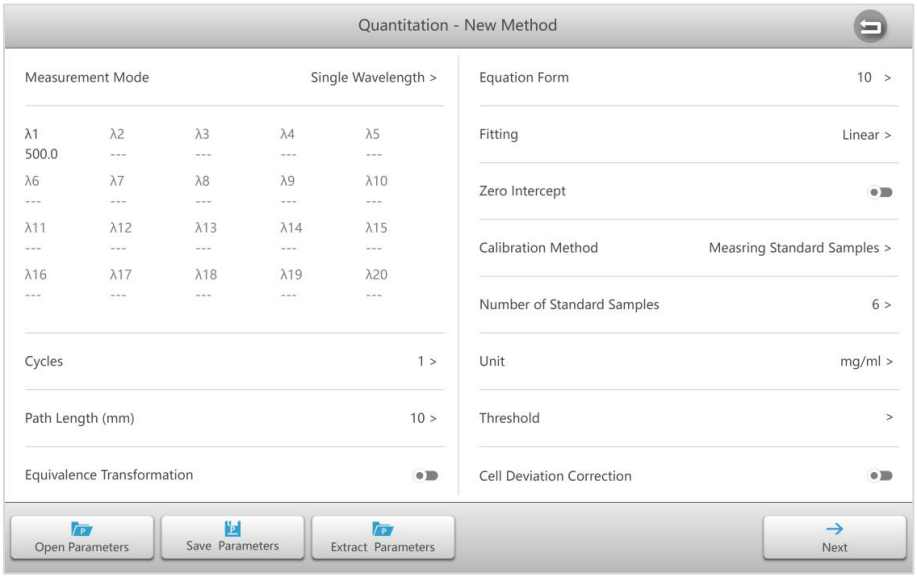


2 Establish a Measurement Method

Click the **Method** button to access the **Quantitation-Method** screen.



Click the **New Method** button to create a new measurement method, set the parameters.



2.1 Setup the Measurement Parameters

Click the item to set the measurement parameters.

Measurement Method	Built-in 4 mesurement method. Single Wavelength, Dual Wavelengths Difference, Dual Wavelengths Ratio, three Wavelengths. And support custom formula. ▪ **Single Wavelength**

A=A1 Select a characteristic absorption wavelength (usually the maximum absorption wavelength λmax of the analyte, avoiding the absorption of interfering substances), zero the instrument with a blank solution, determine the absorbance of the test sample at this wavelength, and calculate the concentration of the analyte in combination with the Lambert-Beer Law (A=εbc). This is the most fundamental quantitative spectrophotometric method. It is applicable to sample systems where no other interfering substances produce absorption at this wavelength, or the interference can be completely eliminated by the blank solution.

- **Dual Wavelengths Difference**

  A=A1-A2 Select two wavelengths λ1 (the characteristic absorption peak of the analyte) and λ2 (the reference wavelength) that meet the criteria: the absorbance of interfering substances at λ1 and λ2 is equal (A1=A2), while the analyte exhibits a significant difference in absorbance at these two wavelengths. Measure the absorbance of the sample at the two wavelengths, and calculate the analyte concentration using ΔA=Aλ1 - Aλ2. The value of ΔA is correlated only with the analyte concentration, and the interference from interfering substances is completely eliminated. This method is applicable when the reference wavelength λ2 is determined from the isosbestic point on the absorption spectrum of the interfering substances, and it can also be used to eliminate the background absorption caused by sample turbidity (e.g., suspended particles).

- **Dual Wavelengths Ratio**

  A=A1/A2 Select two characteristic wavelengths λ1 and λ2 associated with the analyte, determine the absorbance of the sample at these two wavelengths, use the ratio K=Aλ1/Aλ1 as the quantitative basis, and calculate the concentration of the analyte by combining with the K-c calibration curve of the standard series. This method is applicable because the absorbance ratio can offset systematic errors such as fluctuations in the instrument light source, cuvette differences and sample dilution errors, and is suitable for samples that are difficult to make up to a precise volume and whose systems are prone to slight turbidity.

- **Three Wavelengths**

  Abs = A1-(λ1-λ2)*(A2-A3)/(λ2-λ3)-A3 Select three wavelengths λ1, λ2 (the middle wavelength, the absorption peak of the analyte) and λ3 at equidistant (or reasonably

	spaced) intervals on the absorption spectrum of the analyte, such that the absorbance of interfering substances at these three wavelengths follows a linear relationship. Calculate the corrected absorbance using the formula: A_corrected = Aλ2 - (Aλ1 + Aλ3)/2. The A_corrected is correlated only with the concentration of the analyte, which completely eliminates the interference of interfering substances (including linear and slightly nonlinear backgrounds) and turbidity. Compared with the dual-wavelength difference method, this method has stronger adaptability to interfering substances and can handle complex systems where the absorption spectrum of interfering substances has no obvious isosbestic points and the background absorption shows linear/slightly nonlinear characteristics.
Wavelength	Measured 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.
Path Length	The width of the cuvette used for the measurement.
Equivalence Transformation	Activation automatically converts measurements from different path cuvettes to values in the 10 mm light path length.
Equation Form	Equation form: C=F(Abs) and Abs=F(C).
Fitting	Three ways of fitting are provided: Linear, Quadratic, Cubic.
Zero Intercept	Turning on the representative fitting curve will directly cross the zero point, and closing will represent the fitting curve but the zero point.
Calibration Method	3 ways to generate a standard curve: Inputting Equation Coefficients, Measuring Standard Samples and Inputting Standard Samples.
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.
Number of standard samples	The number of standard samples can be selected (only valid for standard sample calibration and standard sample input), quantity: 2~20.
Threshold	Upper and lower limits of measurement results.

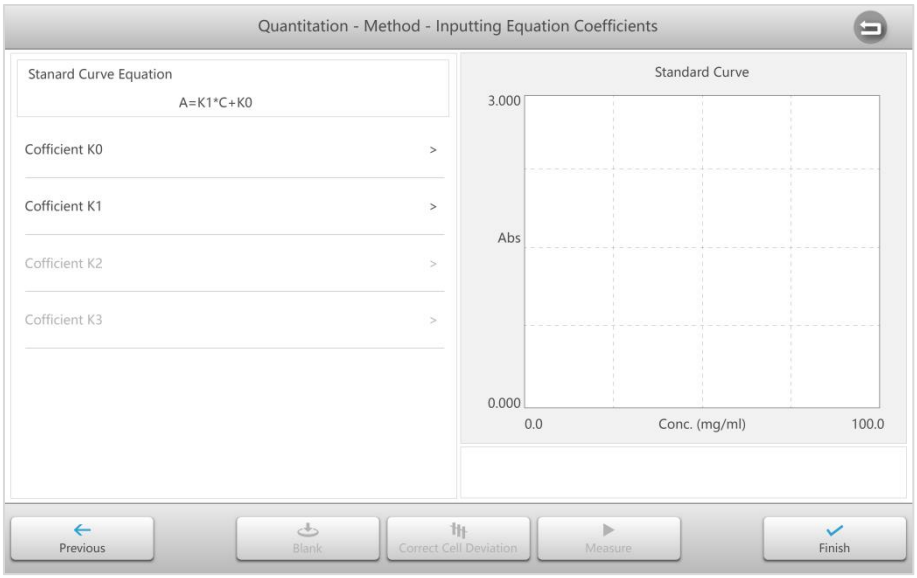
2.2 Establish Standard Curve

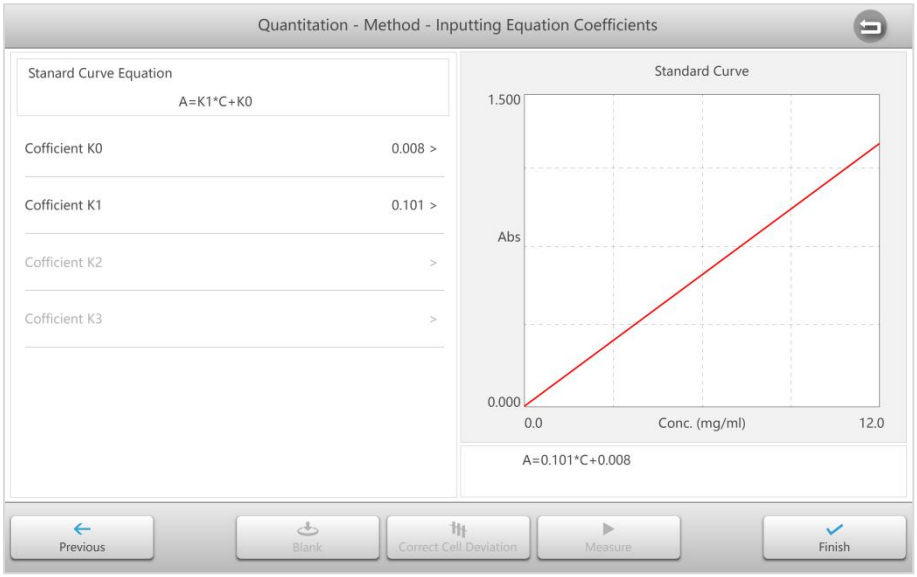
After completing all parameter settings, click the **Next** button to start the standard curve establishment process. Based on the parameters set in the Calibration Method item, establish the standard curve according to the selected method.

- **Inputting Equation Coefficients**
  Refer to section 2.2.1
- **Measuring Standard Samples**
  Refer to section 2.2.2
- **Inputting Standard Samples**
  Refer to section 2.2.3

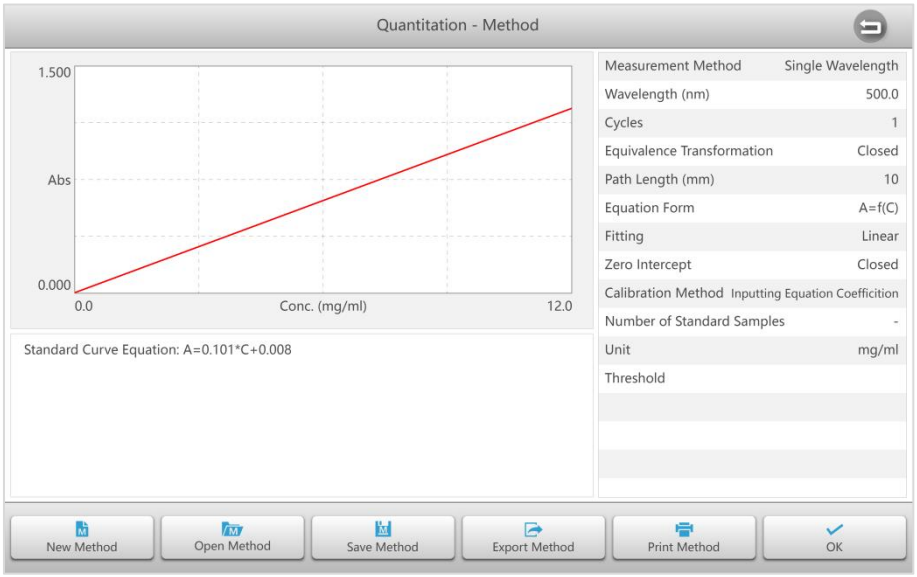
2.2.1 Establish Standard Curve by Inputting Equation Coefficients

(1) On the **Inputting Equation Coefficients** screen. Click the coefficient item to pop up a **Numeric** keyboard, key in the equation coefficient.





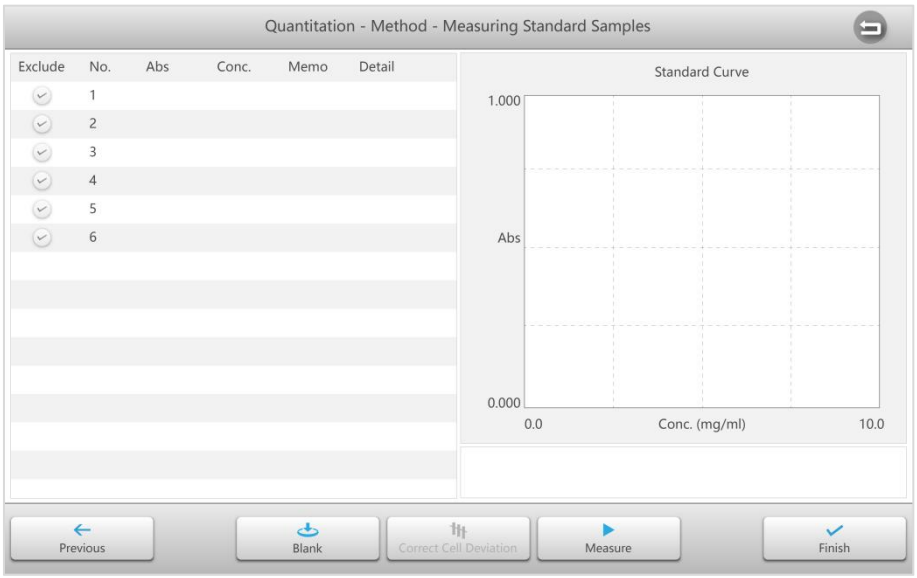
After entering all coefficients, click the **Finish** button to complete method establish.



2.2.2Establish Standard Curve by Measuring Standard Samples

(1) Blank

On the **Measuring Standard Samples** screen. Put the reference sample in the measurement channel, click the **Blank** button.



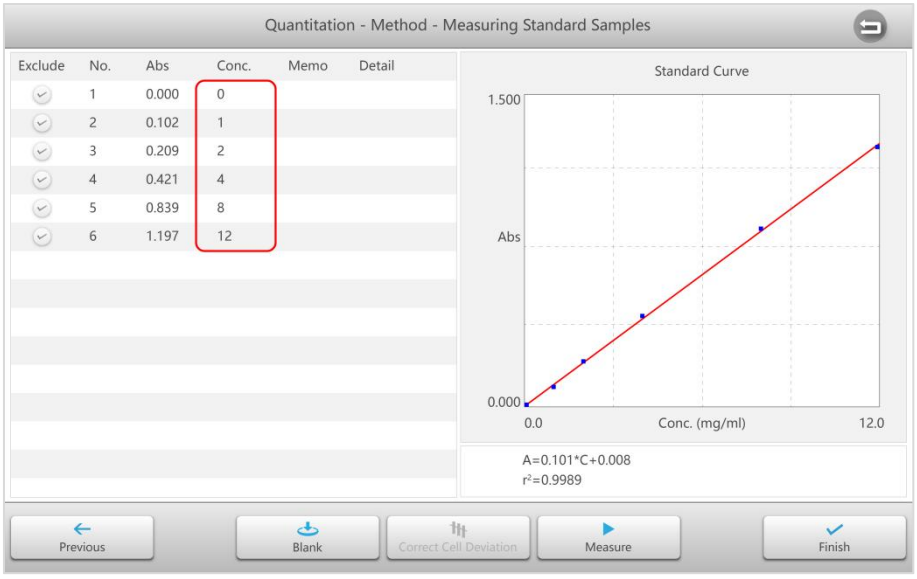
(2) Measure Standard Sample

Put the 1# standard sample in the measurement channel, click the **Measure** button to measure the sample.

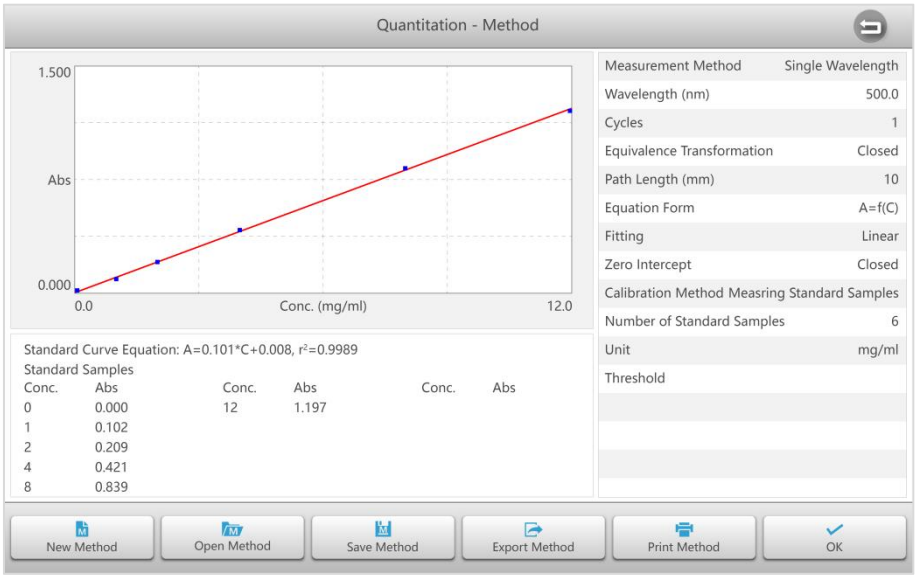
Repeat to measure all the standard samples in sequence.

(3) Enter the Concentrations of the Standard Samples

Click the cell in the **Conc.** column to pop up the **Numeric** keyboard, key in the concentration values of the standard samples.



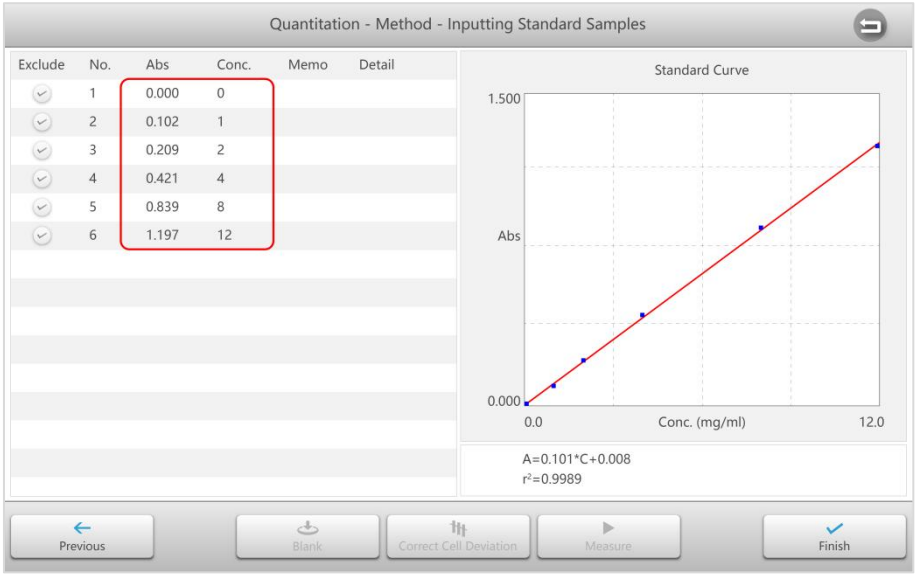
After entering all concentration values, click the **Finish** button to complete method establish.



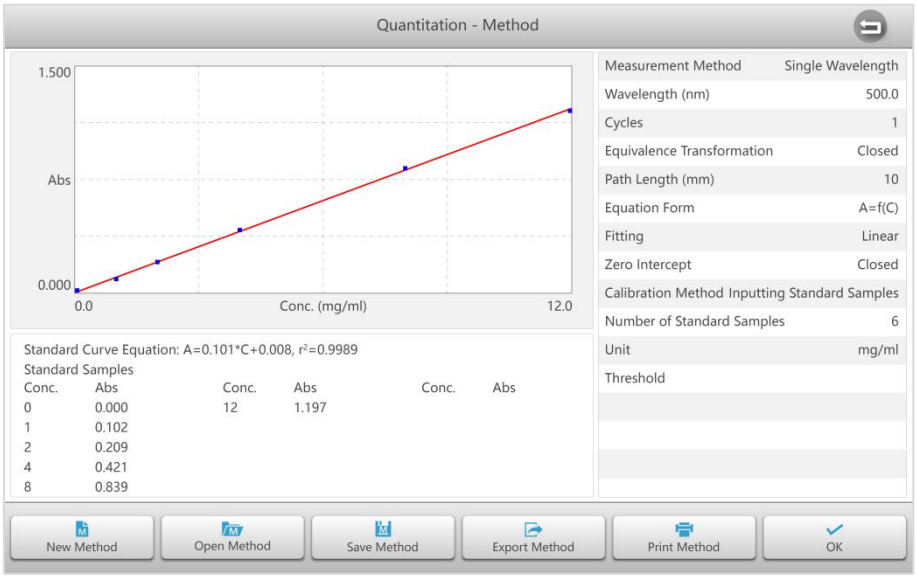
2.2.3Establish Standard Curve by Inputting Standard Samples

(1) Enter the Concentrations of the Standard Samples

On the **Inputting Standard Samples** screen. Click the cell in the Abs/Conc. column to pop up the **Numeric** keyboard, key in the Abs/concentration values of the standard samples.



After entering all Abs and concentration values, click the **Finish** button to complete method establish.

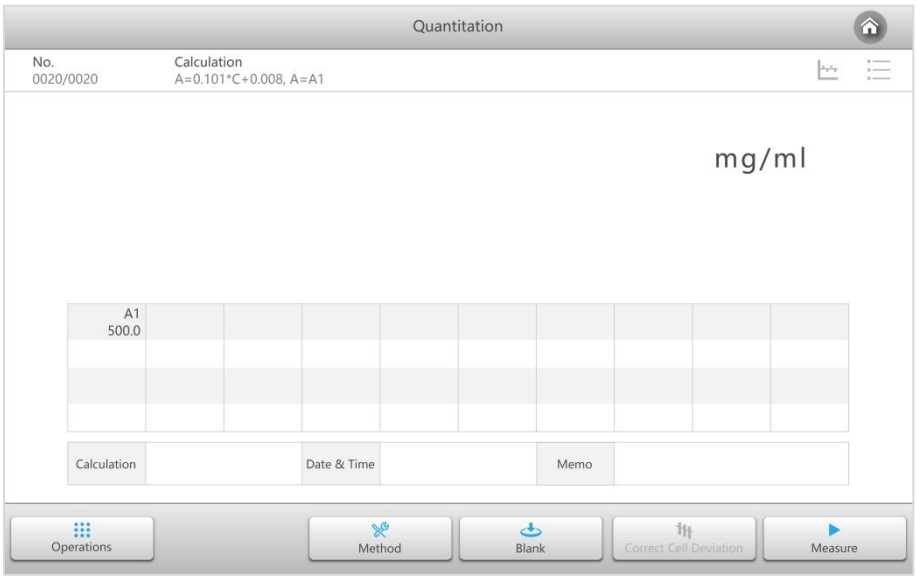


2.3 Save, Export and Print Method

Finished establish method. Click the **Save Method**, **Export Method** or **Print Method** button to save, export or print the method.

3 Measure the Samples

On the Method screen, click the **OK** button to accept the new method and enter the measurement screen.



3.1 Blank

On the **Measurement** screen, put the reference sample into the measurement channel, click the **Blank** button.

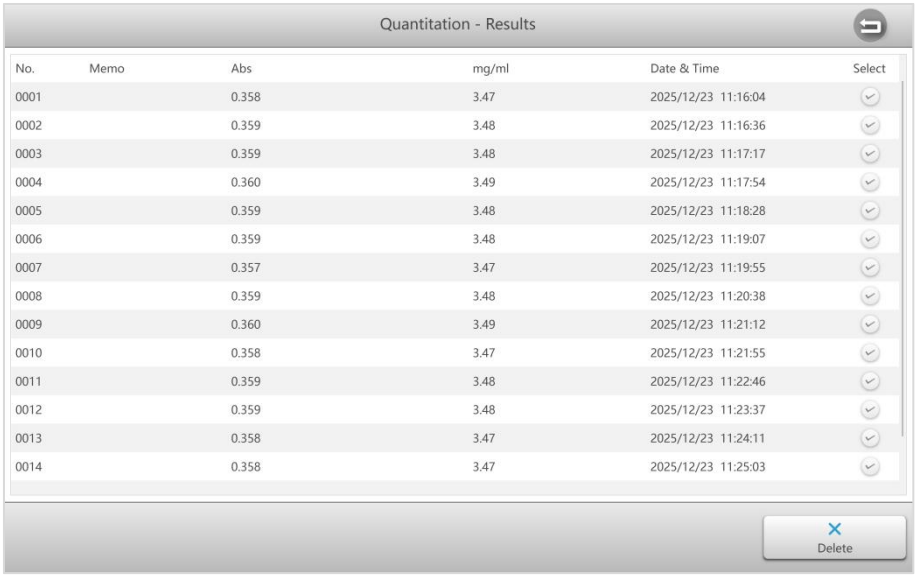
3.2 Measure the Samples

Put the sample into the measurement channel, and click the **Measure** button to measure the sample.



3.3 Browse the Test Results

Click the **List** icon to access the **Results List** screen to browse the list of measurement results.



3.4 Save Measurement Results and Output Test Report

On the **Measurement** screen, click the **Operations** button to access the **Operations** screen.

Click the **Save** button to save the results.

Click the **Print** button to print the test report.

Click the **Export** button to export the test report.

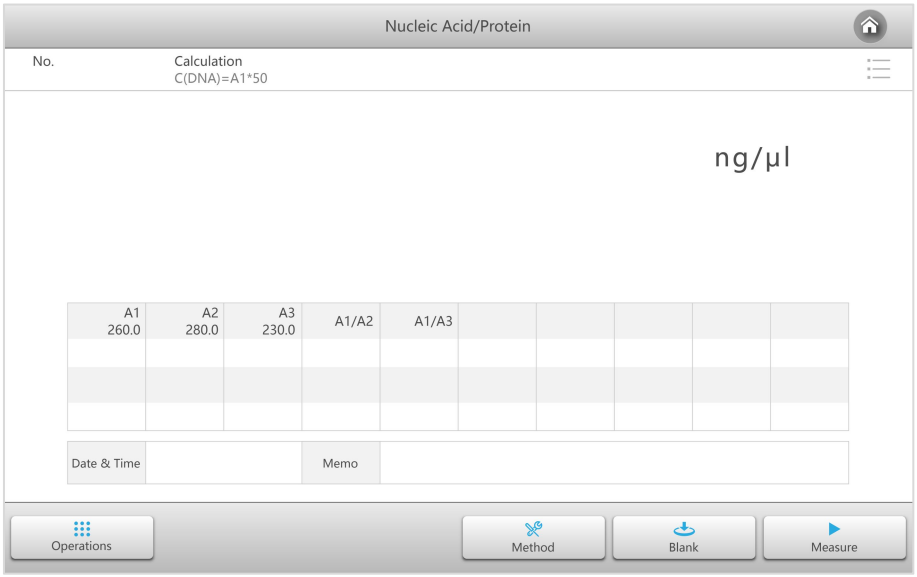
Nucleic Acid/Protein

The nucleic acid and protein measurement module of a spectrophotometer is a dedicated functional module for the quantitative analysis of nucleic acids and proteins. It rapidly detects the absorbance of nucleic acids (DNA/RNA) and proteins at characteristic wavelengths, directly calculates their concentrations via preset calibration formulas, and simultaneously determines nucleic acid purity. Featuring rapid detection and no need for chromogenic reagents, it is widely used in sample pretreatment and quantitative detection in molecular biology, biochemistry and

other fields.

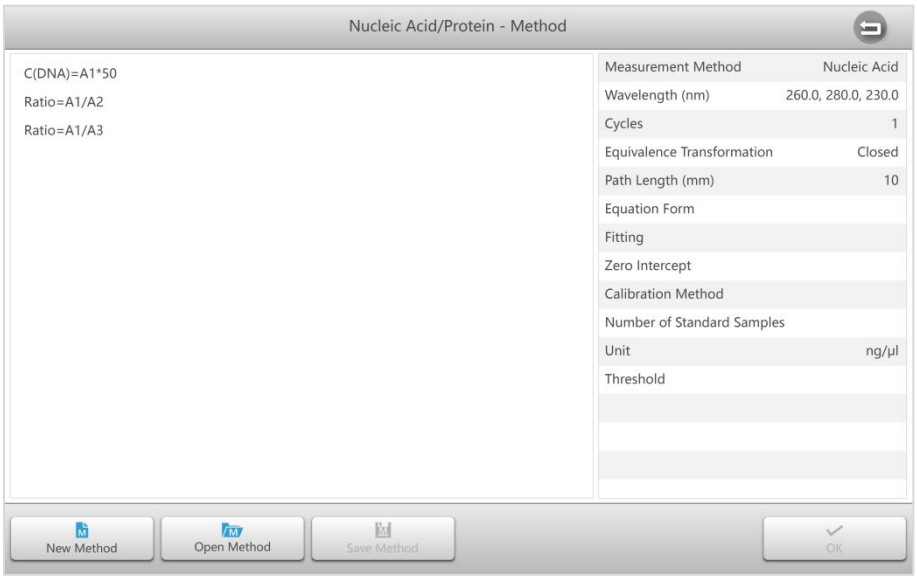
1 Start a Nucleic Acid/Protein Measurement

On the **Home** screen, click the **Nucleic Acid/Protein** icon to access the **Nucleic Acid/Protein** measurement screen.

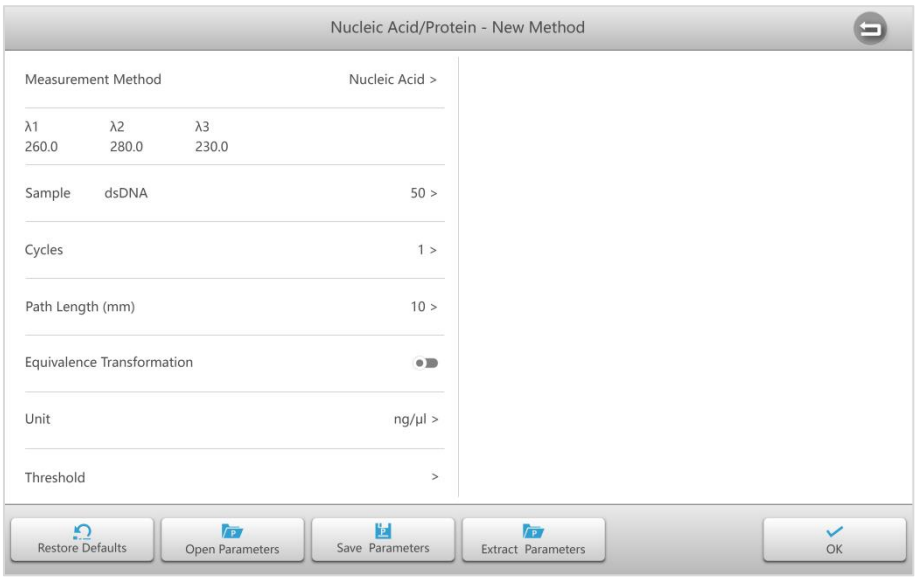


2 Establish a Measurement Method

Click the **Method** button to access the **Nucleic Acid/Protein-Method** screen.



Click the **New Method** button to create a new measurement method, set the parameters.



Measurement Method	Built-in Nucleic Acid (dsDNA, ssDNA, RNA), Protein A-280 (1Abs=1mg/mL, BSA, IgG, Lysozyme), DNA Quantitation 1 (260/280), DNA Quantitation 2 (260/230), Protein-Lowry, Protein-BCA, Protein-CBB, Protein-Biuret measurement method. ▪ **Nucleic Acid (dsDNA, ssDNA, RNA)** Nucleic Acid UV Quantitation (Basic Method). Nucleic acids

have characteristic UV absorption at 260nm, with different absorption coefficients for double-stranded DNA (dsDNA), single-stranded DNA (ssDNA) and RNA. Detection wavelength: 260nm. Calculate concentration using calibration coefficients corresponding to dsDNA/ssDNA/RNA respectively. Label-free and non-destructive to samples. Enables rapid rough quantitation of all types of nucleic acids, serving as the basis for ratio methods.

- **DNA Quantitation 1 (260/280)**

  Nucleic Acid 260/280 Purity & Concentration Detection. Nucleic acids absorb at 260nm and proteins at 280nm. Protein contamination is judged by the absorbance ratio. Detection wavelength: 260nm/280nm. Judgment criteria: ~1.8 for pure dsDNA, ~2.0 for pure RNA. A lower ratio indicates severe protein contamination. Simultaneously achieves nucleic acid concentration quantitation and protein contamination identification; Suitable for routine primary screening of nucleic acid purity.

- **DNA Quantitation 2 (260/230)**

  Nucleic Acid 260/230 Impurity & Concentration Detection. 230nm is the characteristic absorption peak of impurities such as salts, organic solvents, phenols and sugars. Impurity residues are judged by the absorbance ratio | Detection wavelength: 260nm/230nm. Judgment criterion: ~2.0 for pure nucleic acids. A lower ratio indicates impurity residues | Assists the 260/280 method to complete comprehensive purity identification.; Specifically detects inorganic/organic impurities during nucleic acid extraction.

- **Protein A-280**

  Aromatic amino acids in proteins have characteristic UV absorption at 280nm. Absorbance is positively correlated with protein concentration. Detection wavelength: 280nm. Conversion benchmark: 1Abs=1mg/mL, Standard substances: BSA/IgG/Lysozyme. Label-free and non-destructive to samples. Enables rapid primary quantitation, suitable for rapid detection of crude or purified proteins.

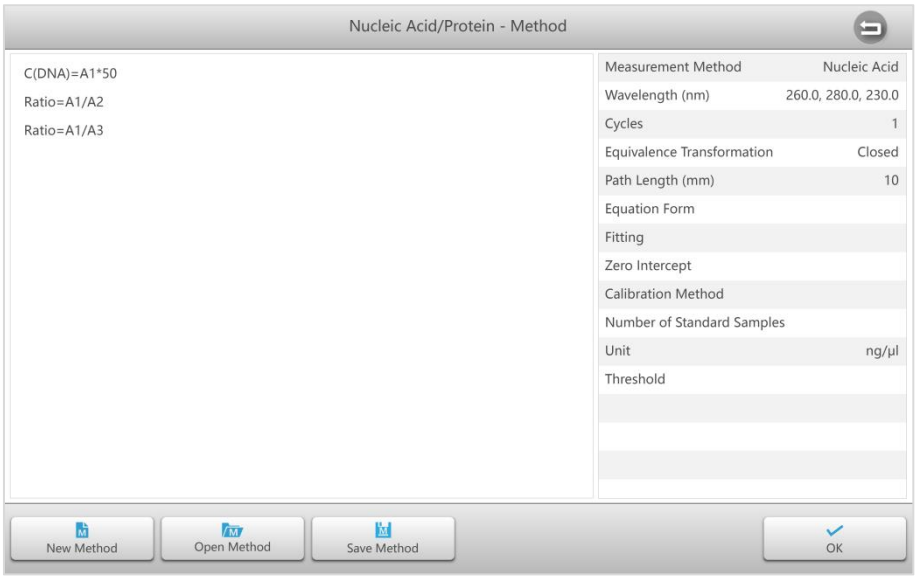
- **Protein-Lowry**

  Combines Biuret reaction and Folin-phenol reduction reaction. A blue complex is formed in the reaction system. Detection wavelength: ≈500nm. High sensitivity. A classic detection method with much higher sensitivity than the Biuret method. Susceptible to interference from reducing

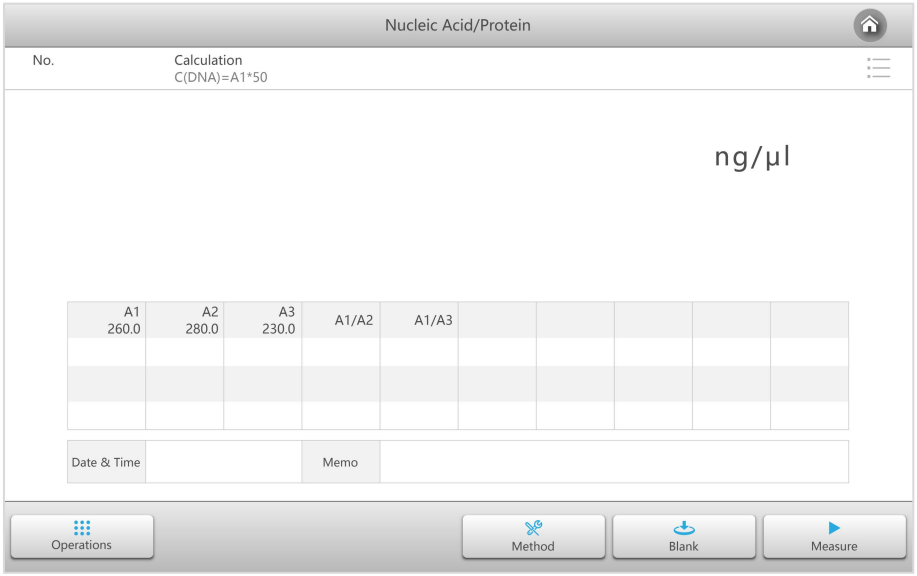
	agents and phenols, requiring sample pretreatment in advance. ▪ **Protein-BCA** Under alkaline conditions, proteins combine with Cu^{2}+ to form Cu^{2}+-protein complexes. BCA reagent binds to these complexes to form stable purple complexes. Detection wavelength: 562nm. Sensitivity equivalent to the Lowry method | Strong anti-interference (tolerates reducing agents and ionic detergents), simple operation without strict time control. Preferred method for routine protein quantitation in laboratories. ▪ **Protein-CBB** Coomassie Brilliant Blue G-250 binds to proteins and changes color from reddish-brown to blue. Detection wavelength: 595nm. High sensitivity and wide linear range. Fast detection speed and low reagent cost. No obvious interference from a small amount of non-ionic detergents, suitable for rapid detection of high-throughput samples. ▪ **Protein-Biuret** Under alkaline conditions, peptide bonds of proteins combine with Cu^{2}+ to form purple complexes. Detection wavelength: ≈540nm. Low sensitivity. Simple principle and convenient operation. Only suitable for quantitation of high-concentration proteins (mg/mL level), applicable to pure protein quantitation without complex pretreatment.
Wavelength	Measured wavelength, range: 190~1100nm.
Sample	Sample type, dsDNA, ssDNA, RNA, Protein, etc.
Cycles	1, 2, 3, 5, 10, 20, 30, 50 times can be selected, the instrument will calculate the average as the final output.
Path Length	The width of the cuvette used for the measurement.
Equivalence Transformation	Activation automatically converts measurements from different path cuvettes to values in the 10 mm light path length.
Equation Form	Equation form: C=F(Abs) and Abs=F(C).
Fitting	Three ways of fitting are provided: first order, second order, third order.
Zero Intercept	Turning on the representative fitting curve will directly cross the zero point, and closing will represent the fitting curve but the zero

	point.
Calibration Method	3 ways to generate a standard curve: input equation coefficient method, standard sample method and input standard sample.
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.

After completing all parameter settings, click the **OK** button to accept the new parameters and return to Method screen.



Click the **OK** button to accept the new method and return the measurement screen.

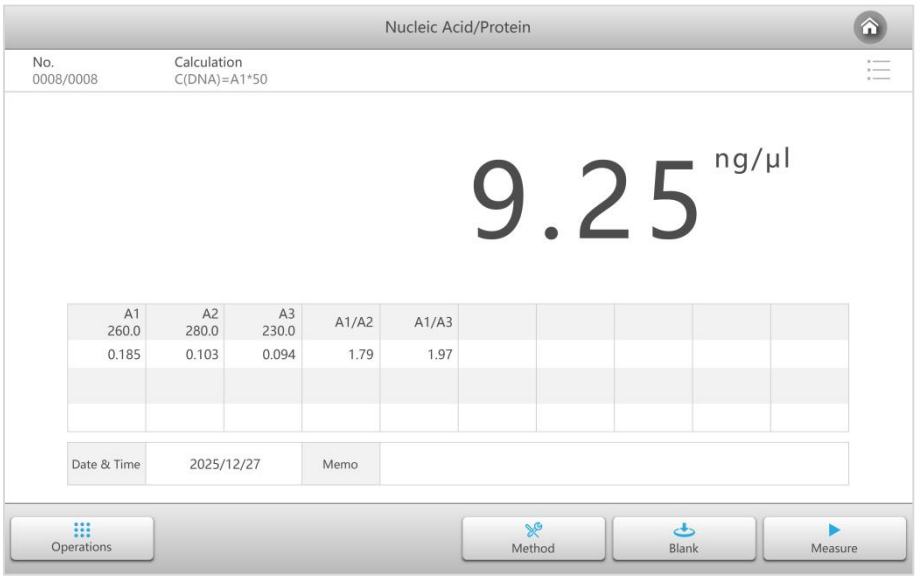


3 Blank

On the **Measurement** screen, put the reference sample into the measurement channel, click the **Blank** button.

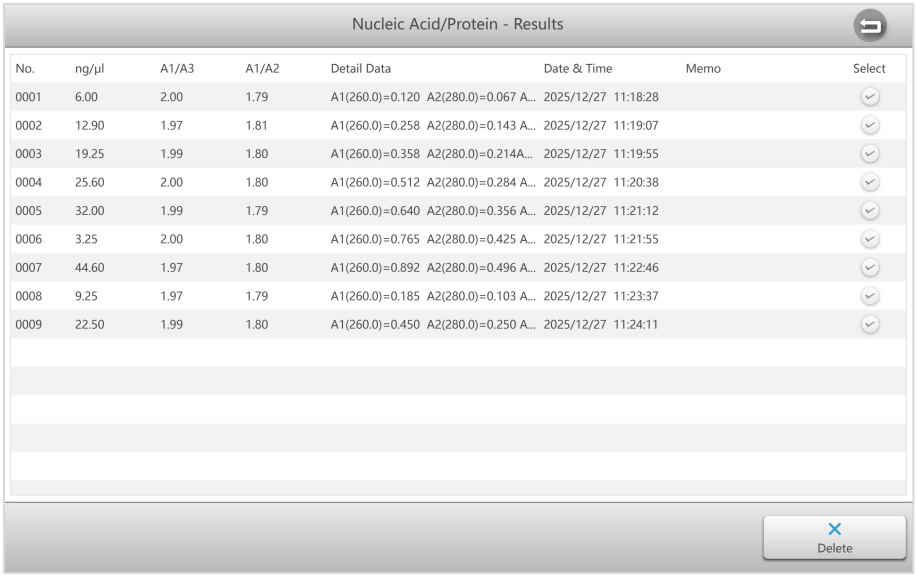
4 Measure the Samples

Put the sample into the measurement channel, and click the **Measure** button to measure the sample.



5 Browse the Test Results

Click the **List** icon to access the **Results List** screen to browse the list of measurement results.



6 Save Measurement Results and Output Test Report

On the **Measurement** screen, click the **Operations** button to access the **Operations** screen.

Click the **Save** button to save the results.

Click the **Print** button to print the test report.

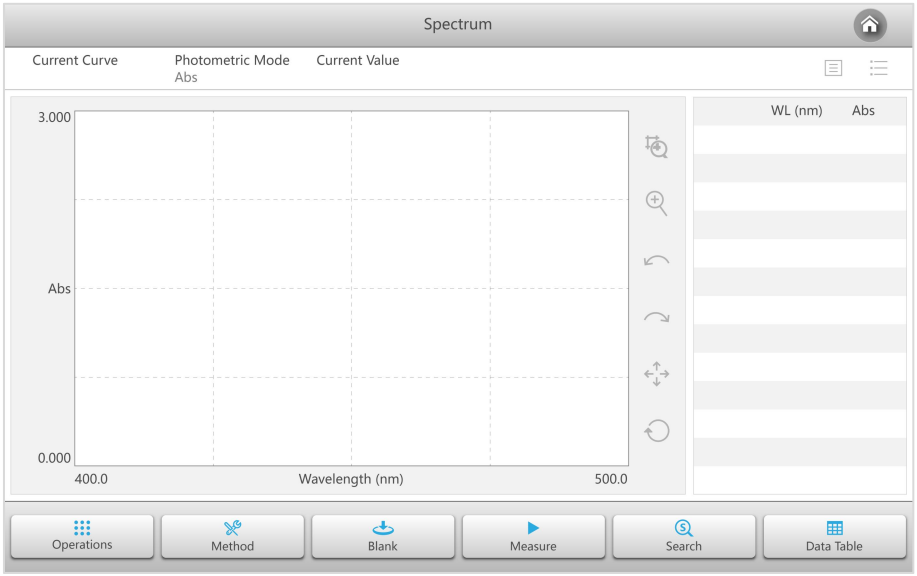
Click the **Export** button to export the test report.

Spectrum

Spectrum scanning of a spectrophotometer is a detection mode that continuously varies the detection wavelength within a set range, collects absorbance data synchronously, and generates an absorbance-wavelength spectral curve. It enables accurate localization of the characteristic absorption peaks of analytes and determination of the optimal detection wavelength, and can also be used for qualitative sample analysis and impurity screening, serving as a fundamental and core operation in spectral analysis.

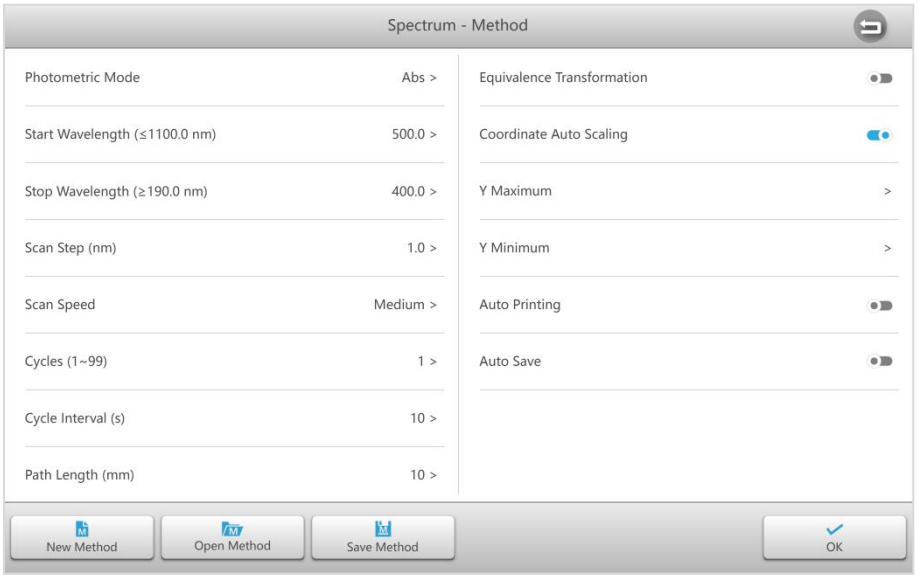
1 Start a Spectrum Scanning

On the **Home** screen, click the **Spectrum** icon to access the **Spectrum** screen.



2 Establish a Measurement Method

Click the **Method** button to access the **Spectrum-Method** screen.

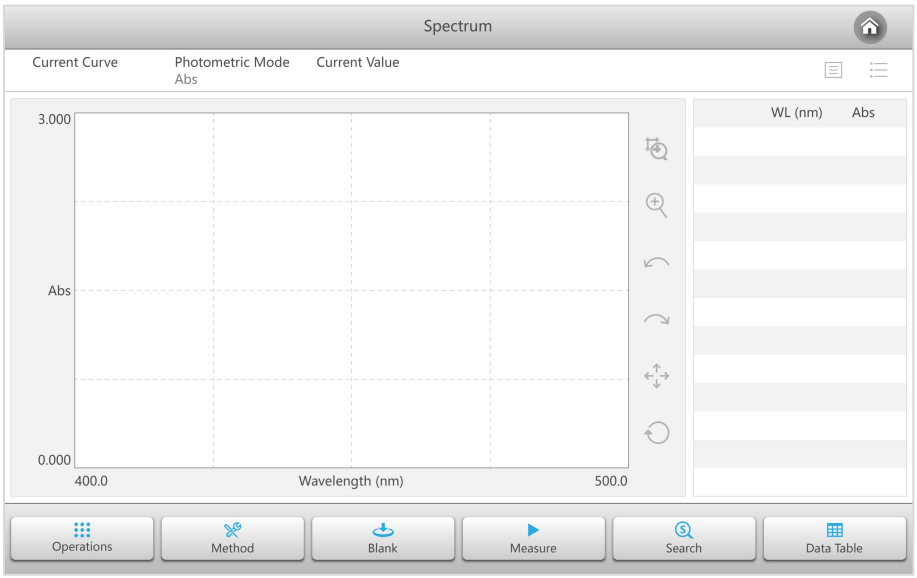


Click the **New Method** button to create a new measurement method, set the parameters.

Photometric mode	2 photometric mode: Abs, %T.
Start wavelength	Scan start wavelength, range: 190~1100nm.
Stop wavelength	Scan stop wavelength, range: 190~1100nm.
Scan Step	7 wavelength interval selectable 0.1, 0.2, 0.5, 1.0, 2.0, 5.0, 10.0nm.
Scan Speed	4 scan speed selectable: Quick, Medium, Slow and Very Slow.
Cycles	Scan times.
Cycle Interval	Interval between 2 scans.
Path Length	The width of the cuvette used for the measurement.
Equivalence Transformation	Activation automatically converts measurements from different path cuvettes to values in the 10 mm light path length.
Coordinate Auto Scaling	Whether to automatically adjust the coordinates based on the data.
Y Maximum	The maximum value of the ordinate (valid only when the coordinates are fixed).
Y minimum	Minimum value of the ordinate (valid only when the coordinates are fixed).
Auto-printing	Automatically print curves and results after measurement is complete.
Autosave	Automatically save curves and results after measurement is complete.

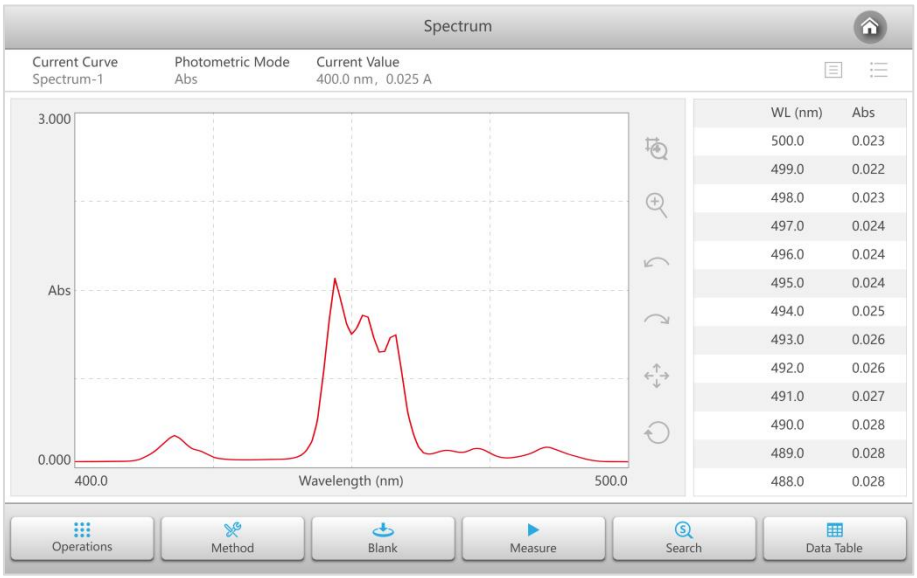
3 Scan Baseline

On the **Measurement** screen, put the reference sample into the measurement channel, click the **Blank** button.



4 Scan the Samples

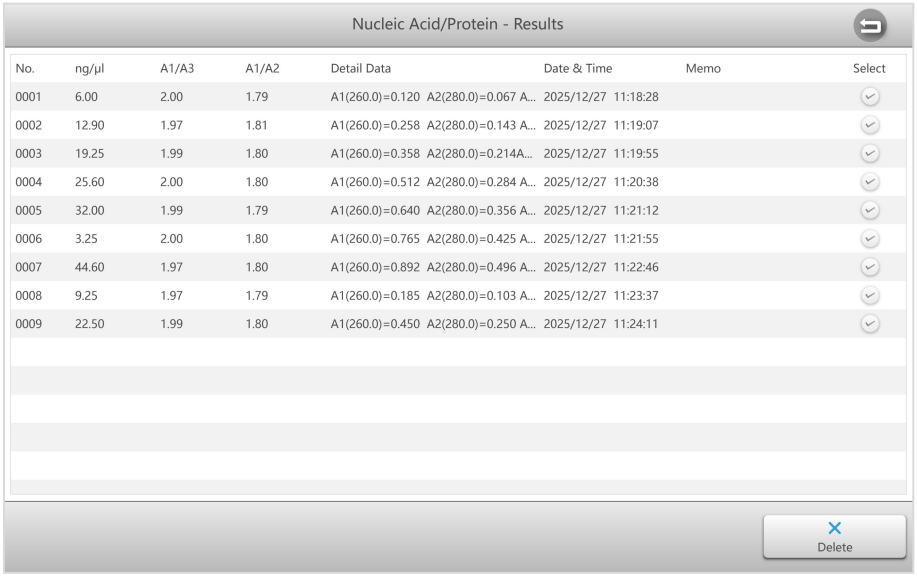
Put the sample into the measurement channel, and click the **Measure** button to scan the sample.



5 Browse the Curves



Click the **List** icon to access the **Curves List** screen to browse the list of curves.



6 Process the Curves

For the curves processing operation, please refer to the relevant content in the Spectrum Processing chapter.

7 Save the Curves and Output Test Report

On the **Measurement** screen, click the **Operations** button to access the **Operations** screen.

Click the **Save** button to save the results.

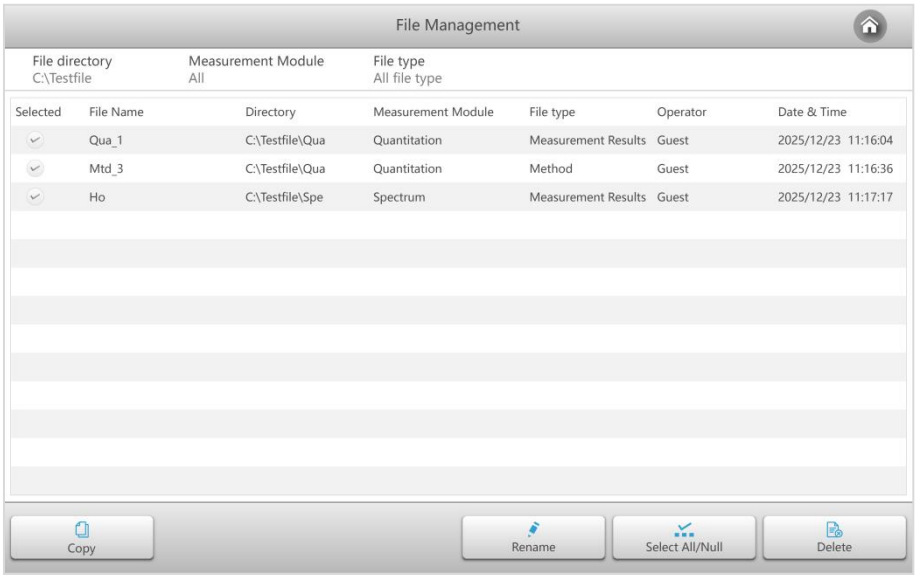
Click the **Print** button to print the test report.

Click the **Export** button to export the test report.

File Management

The File Management Module is mainly used for querying, copying, deleting, renaming and other operations on measurement results, methods and parameter files related to this application.

On the **Home** screen, click the **File Management** icon to access the **File Management** screen.



Browse Through the File List

On the **File Management** screen, all files associated with this application are shown in the file list. Including results, methods and parameters. Click the **File Directory**, **Measurement module** and **File Type** to set the filter conditions and display the corresponding file types.

Delete the Files

Make your selection in the Select column, then click the **Delete** button to remove the selected files.

> ***Caution***
>
> *Once files are removed, they cannot be recovered!*

Copy the Files

Make your selection in the **Select** column, then click the **Copy** button to pop up the path selection window, select target path and click the **OK** button to complete the copy.

Rename a File

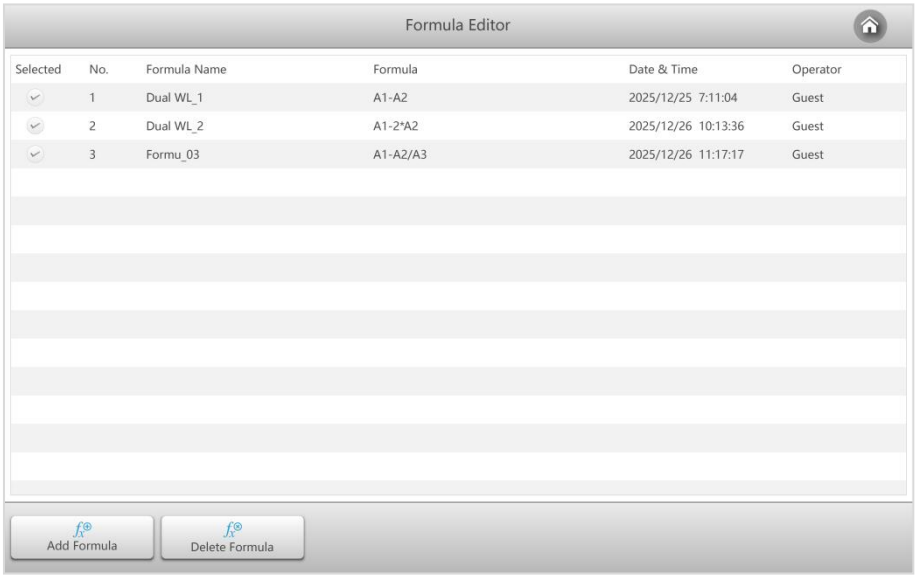
Make your selection in the **Select** column, then click the **Rename** button to pop up the name

input window and keyboard. Key in the new name, click the **OK** button to complete the rename.

Formula Editor

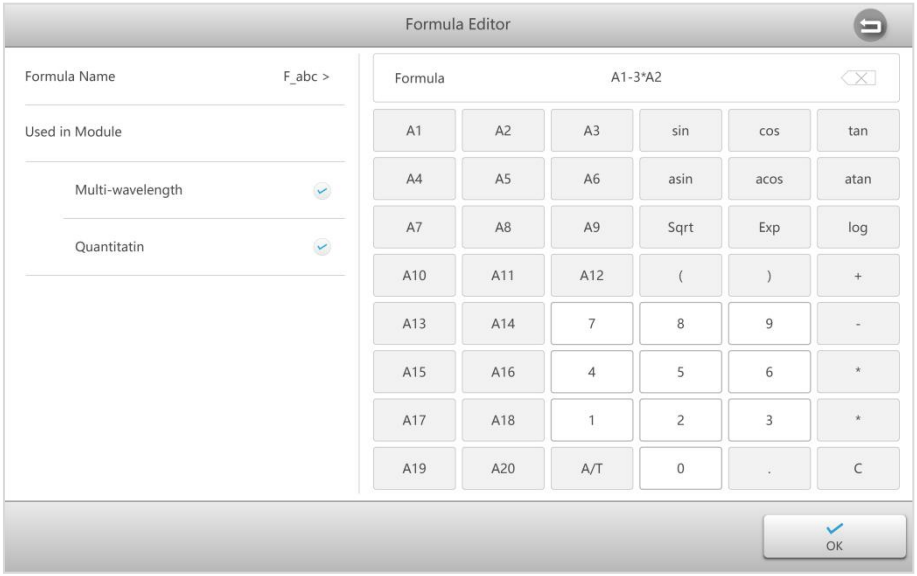
The Formula Editor supports photometric values corresponding to up to 20 wavelengths and enables common calculation methods such as four fundamental arithmetic operations, trigonometric functions and logarithms. The methods can be called in the **Multi-wavelength** and **Quantitation** modules for flexible data processing.

On the **Home** screen, click the **Formula Editor** icon to access the **Formula Editor** screen.



Add a Calculation Formula

On the **Formula List** screen, click the Add Formula button to access the to **Formula Editor** screen. Click the name entry corresponding to Formula Name, enter the formula name, and select the application module for the formula. Then enter the formula in the formula editing area on the right side of the screen, and click the **OK** button to complete the formula addition.



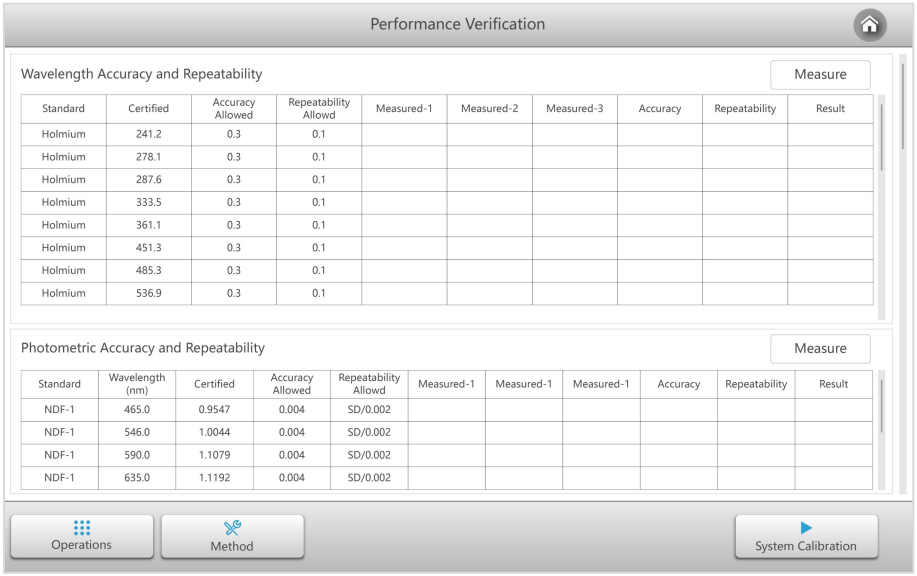
Delete the Calculation Formulas

On the **Formula List** screen. Make your selection in the Select column, then click the **Delete Formula** button to remove the selected formulas.

Performance Verification

The Performance Verification Module includes verification items such as wavelength accuracy, photometric accuracy, photometric linearity, stray light and ultraviolet resolution. It helps you verify that the instrument is always operating in a reliable and credible state.

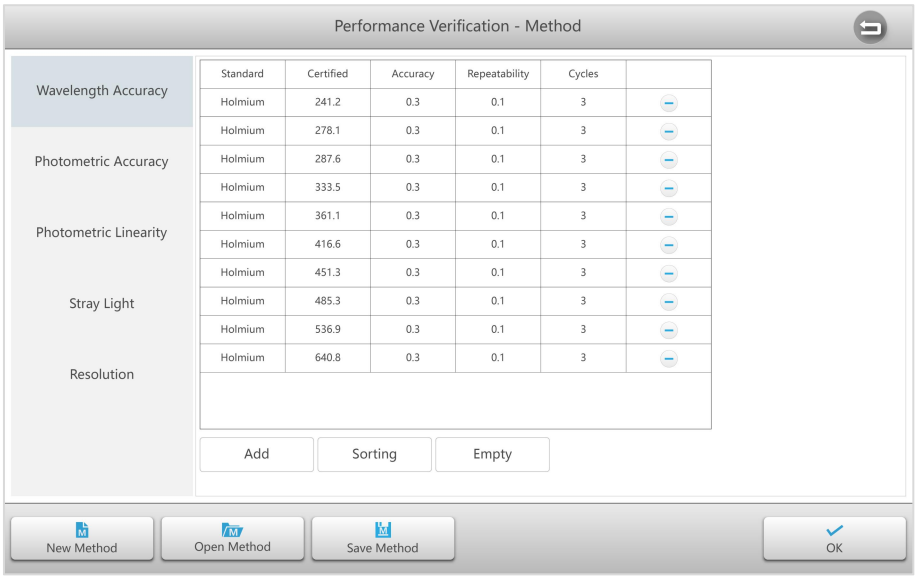
On the **Home** screen, click the **Performance Verification** icon to access the **Performance Verification** screen.



The performance validation module has two built-in validation templates to meet the United States Pharmacopoeia (USP) and European Pharmacopoeia (EP) for direct use by the user. Users can modify based on the templates or create new test methods, and save them for use during testing.

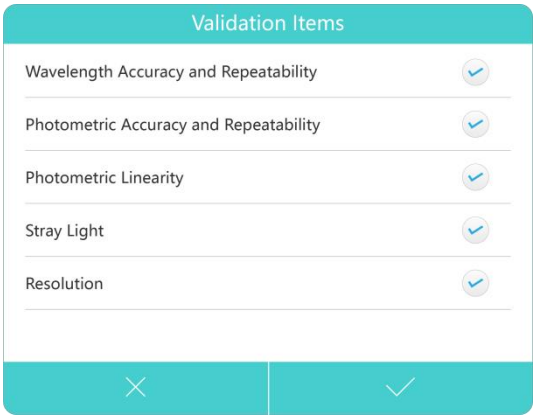
Establish a User's Performance Validation Method

On the Performance Verification screen, click the **Method** button to access the **Method** screen.



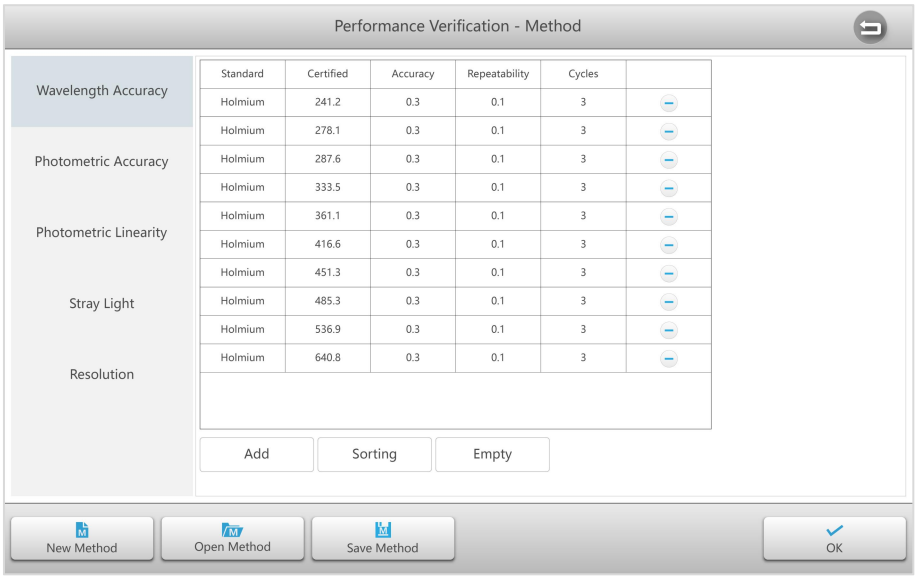
1 Select Validation Items

Click the **New Method** button to create an empty method template. In the **Validation Items** pop-up window, select the items that need to be validated and click the **OK** button.



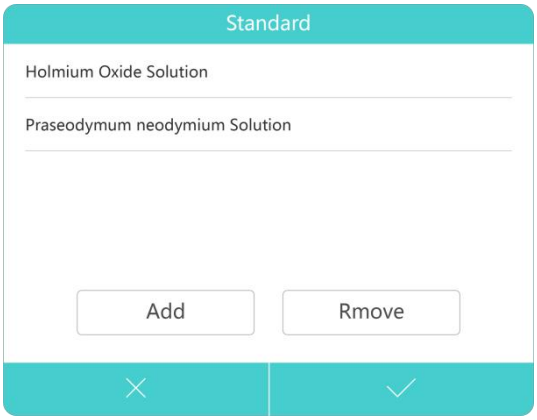
2 Edit Wavelength Accuracy Verification

Click the **Wavelength Accuracy** tab in the verification items column on the left to access the parameter editing screen for wavelength accuracy.



(1) Click the **Add** button to add a test point.

(2) Click the cell in the **Standard** column to select a standard.



Important information

If you are using a Standard that is not in the list, you can click the Add button to add it to the list, or you can remove the selected Standard from the list.

(3) Click the cell in the **Certified** column to enter a certified wavelength test point.

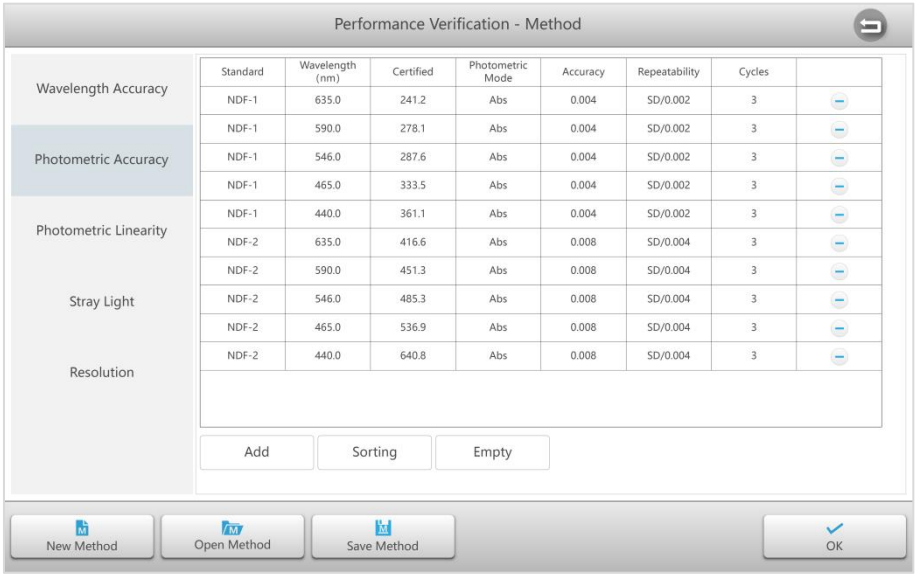
(4) Click the cell in the **Accuracy** column to enter the allowable deviation for wavelength accuracy.

(5) Click the cell in the **Repeatability** column to enter the allowable deviation for wavelength repeatability.

(6) Click the cell in the **Cycles** column to enter the number of tests.

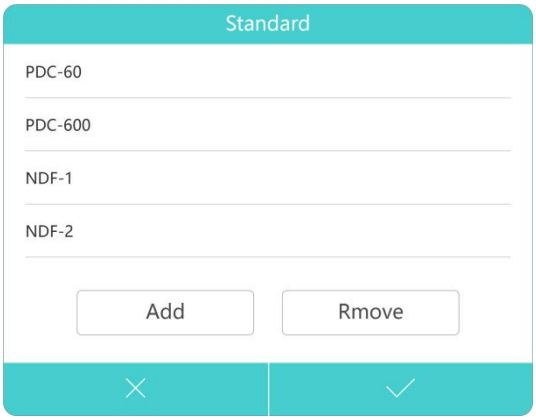
3 Edit Photometric Accuracy Verification

Click the **Photometric Accuracy** tab in the Verification Items column on the left to access the parameter editing screen for photometric accuracy.



(1) Click the **Add** button to add a test point.

(2) Click the cell in the **Standard** column to select a standard.

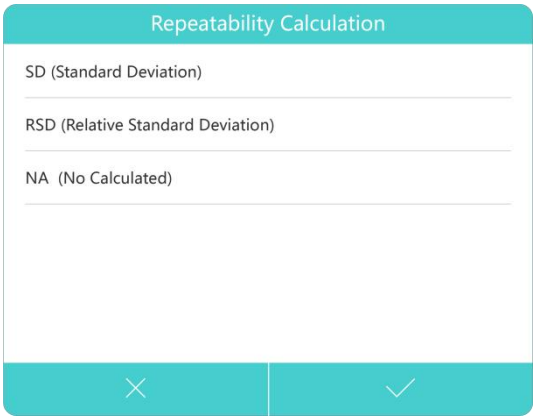


(3) Click the cell in the **Wavelength** column to enter a wavelength test point.

(4) Click the cell in the **Certified** column to enter a certified photometric test point.

(5) Click the cell in the **Accuracy** column to enter the allowable deviation for photometric accuracy.

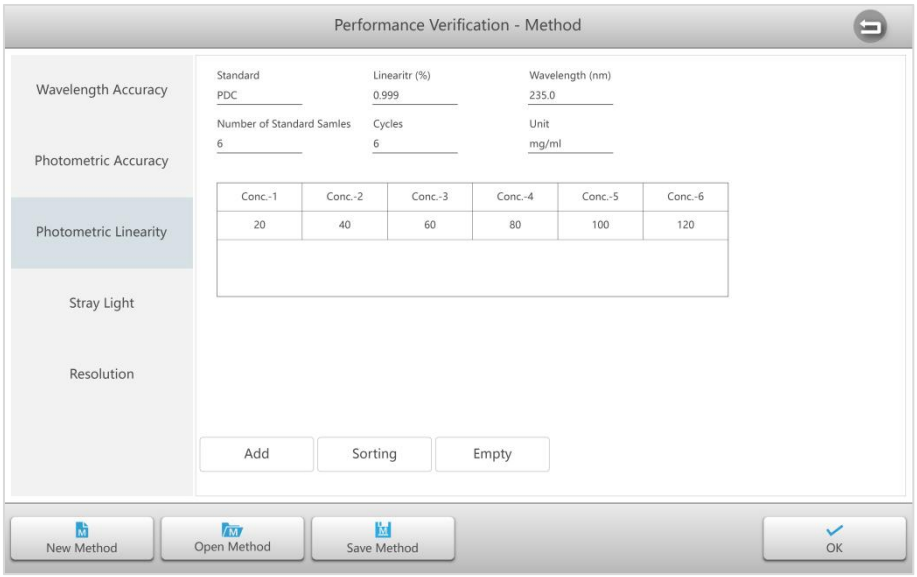
(6) Click the cell in the **Repeatability** column to select the repeatability calculation method and enter the allowable deviation for photometric repeatability.



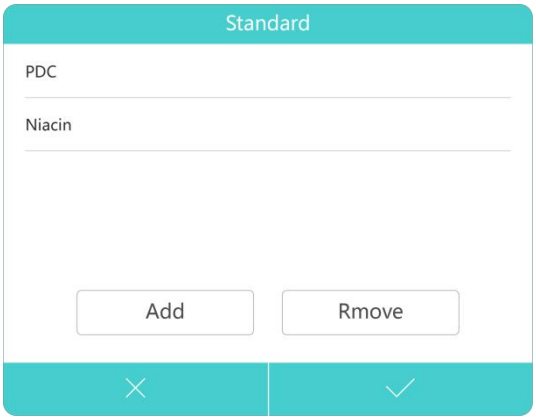
(7) Click the cell in the **Cycles** column to enter the number of tests.

4 Edit Photometric Linearity Verification

Click the **Photometric linearity** tab in the Verification Items column on the left to access the parameter editing screen for photometric linearity.



(1) Click the cell in the **Standard** to select a standard.

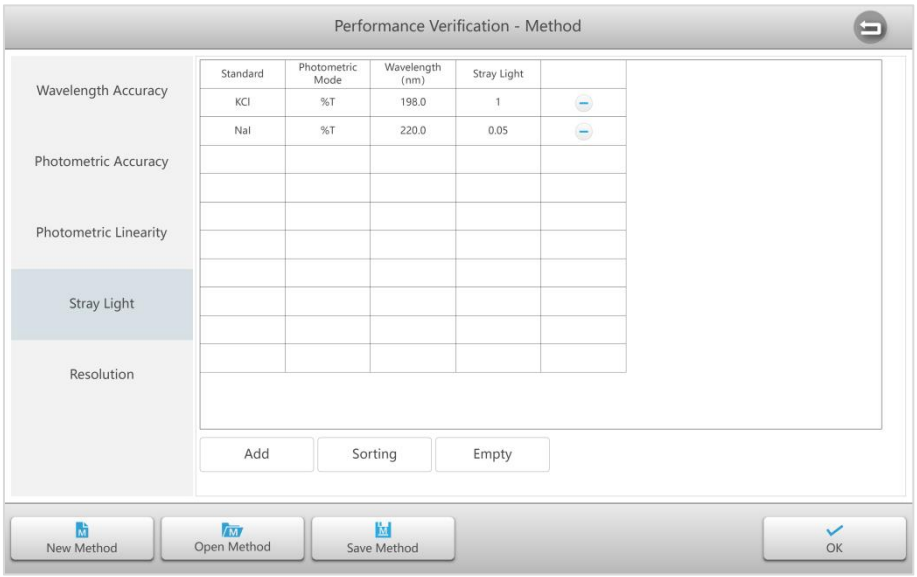


(2) Click the parameter item to set the parameter.

(3) Enter the concentration of the standard sample in the table.

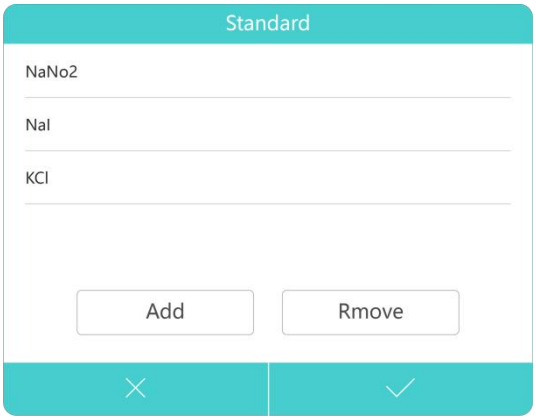
5 Edit stray light verification

Click the **Stray light** tab in the Verification Items column on the left to access the parameter editing screen for stray light.



(1) Click the **Add** button to add a test point.

(2) Click the cell in the **Standard** column to select a standard.



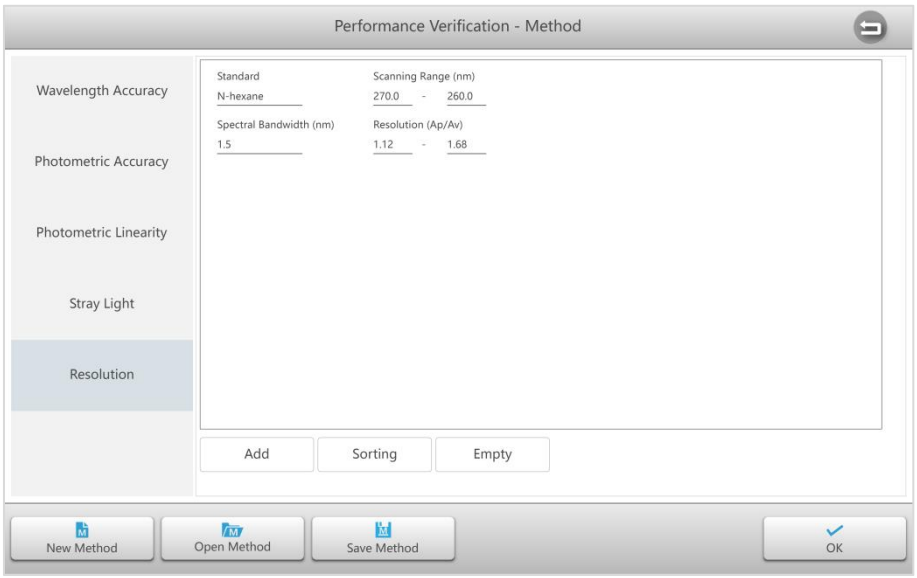
(3) Click the cell in the **Photometric Mode** column to select Abs or %T.

(4) Click the cell in the **Wavelength** column to enter the test wavelength.

(5) Click the cell in the **Stray Light** column to enter the allowable deviation for stray light.

6 Edit resolution verification

Click the **Resolution** tab in the Verification Items column on the left to access the parameter editing screen for resolution.



(1) Click the cell in the **Standard** to enter standard name.

(2) Click **Scanning Range** to set the scanning wavelength range.

(3) Click **Resolution** to enter the allowable deviation for resolution.

7 Finished

Click the **Save method** button to save the verification method. Establishment of the validation method is complete.

Verify performance

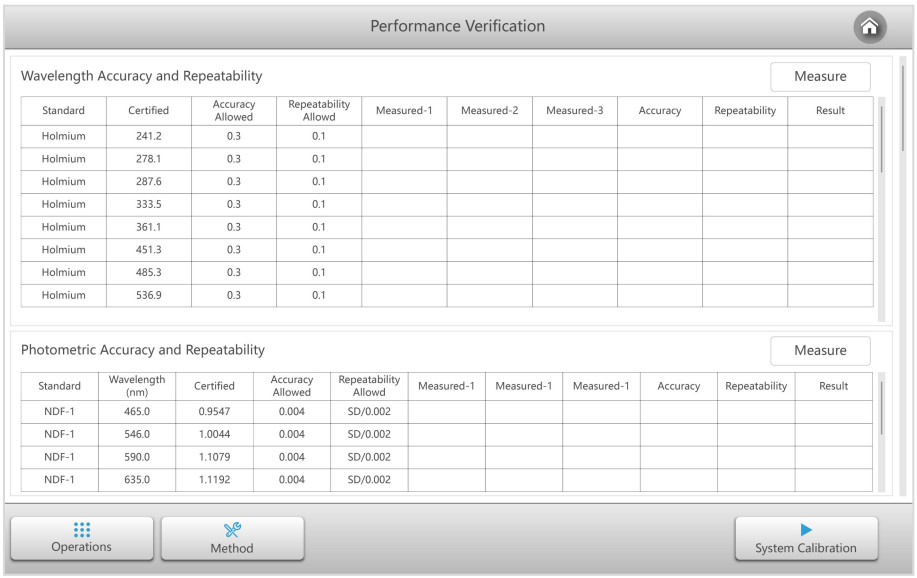
1 Preparing

- 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 standard material for verification must be within its valid period.

> ***Important information***
>
> *Standard filters used to verify the performance of the instrument can be purchased separately from third parties or our company and are not configured with the instrument.*

2 Open the Performance Verification Method

On the **Performance Verification** screen, click the **Open Method** button to open a performance verification method, click the **OK** button.



3 System calibration

Remove anything from the measurement and reference channels and close the sample chamber lid. On the **Performance Verification** screen, click the **System Calibration** button to calibrate the system baseline.

4 Verify

Press the **Measure** button and follow the on-screen prompts to place the reference or standard samples in sequence until all items are completed.

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 connectivity.
	Fuse burning.	Replace fuse.
Measurement uncertainty	Glass cuvettes used in UV Range.	Use quartz cuvettes.
	Sample is not Stable.	Replace the unstable sample.

	The concentration of sample is too high.	Diluted the sample.
	Power Supply Voltage Low or not Stable.	Stabilize 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 Calibrate Failed	Something block the Light path.	Remove it, calibrate again.
Measurements inaccurate	Cuvettes were contaminated.	Clean cuvettes.
	Samples were contaminated.	Replace the unstable sample.
	Worse matching of the cuvettes.	Improve the matching of the cuvettes.
	Dark current error.	Resample dark current.

Repair and maintenance

Daily Maintain

Check the Compartment

After measurement, the cuvettes with sample solutions should be taken out of the compartment in time. Otherwise, the volatilization of the solution will cause mold growth on the mirror. 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.

Surface Clean

The cover of the instrument is with paint. Please use wet towel to wipe off the drips on the surface immediately. Organic solution is forbidden to be used to clean the cover. Please wipe off the dirt on the cover timely.

Clean 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.

Check the Lamp

The light sources used in this instrument are consumables. It is recommended that you obtain a sufficient number of these parts, taking into account the frequency of use of the instrument.

Assuming that the instrument runs for 8 hours per day, the light source will be used for approximately 160 hours/month (20 working days) and approximately 1920 hours/year (240 working days). You need to replace the light source every 10 to 12 months.

Spare Parts Replacement

Replace the Fuse

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

1 **Tools preparation**
Prepare a 3×75 Flat Blade screwdriver.

2 **Switch Off the power supply**
Switch off the power supply, and unplug the socket.

3 **Take out the Fuse Seat**
Push the fuse case by using the screwdriver, and turn it counter clockwise, the fuse seat will pop out when released.



4 **Replace a new fuse**
Pick out the spare fuse (3.15 A/250 V) and replace it.



5 **Reset the fuse seat**
Replace the fuse seat in the power socket. Push the fuse case by using the screwdriver, and turn it clockwise, the fuse seat will be locked when released.



6 Switch on the power

Plug the socket and switch on the power.

User replaceable accessories and spare parts

Description	Quantity	Cat. No.
CELL HOLDER, 4-CELL, 10MM	1PC	634-6003
CELL HOLDER, 4-CELL,10 TO 50MM	1PC	634-6004
CELL HOLDER, 4-CELL, 10 TO 100MM	1PC	634-6005
CELL HOLDER, FOR CYLINDRICAL CELL	1PC	634-6006
CELL HOLDER FOR TEST TUBES	1PC	634-6009
CELL HOLDER, WATER-JACKETED, 1 CELL, 10MM	1PC	634-1135
CELL HOLDER FOR MICRO CELLS,BEAM HEIGHT:15MM	1PC	634-0687
CELL HOLDER FOR TEST TUBES, D=16mm	1PC	634-1133
CELL HOLDER,8-POSITION AUTO CELL CHANGER, 10MM	1PC	634-1232
CELL HOLDER,5-POSITION AUTO CELL CHANGER, 10 TO 100MM	1PC	634-1233
CELL HOLDER, SOLID SAMPLE	1PC	634-6011
CELL HOLDER, WATER-JACKED, 4 CELL, 10MM	1PC	634-1134
CUVETTE, SQUARE.GLASS,10MM	4PCS	634-6013
CUVETTE, SQUARE.GLASS,20MM	2PCS	634-6014
CUVETTE, SQUARE.GLASS,30MM	2PCS	634-6015
CUVETTE, SQUARE.GLASS,50MM	2PCS	634-6016
CUVETTE, SQUARE.GLASS,100MM	1PC	634-6017
CUVETTE, SQUARE.QUARTZ,10MM	2PCS	634-6018
CUVETTE, SQUARE.QUARTZ,20MM	2PCS	634-6019
CUVETTE, SQUARE.QUARTZ,30MM	2PCS	634-6020
CUVETTE, SQUARE.QUARTZ,50MM	2PCS	634-6021

CUVETTE, SQUARE.QUARTZ,100MM	1PC	634-6022
CELL,QUARTZ, 100UL, 10MM, BEAM HEIGHT:15MM	1PC	634-0688
CELL,QUARTZ, 200UL, 10MM, BEAM HEIGHT:15MM	1PC	634-0689
CELL,QUARTZ, 500UL, 10MM	1PC	634-6025
FLOW CELL, 5 MM, GLASS, BEAM HEIGHT:15MM	1PC	634-0690
FLOW CELL, 10 MM, GLASS, BEAM HEIGHT:15MM	1PC	634-0691
FLOW CELL, 20 MM, GLASS, BEAM HEIGHT:15MM	1PC	634-0692
FLOW CELL, 30 MM, GLASS, BEAM HEIGHT:15MM	1PC	634-0693
FLOW CELL, 5 MM, QUARTZ, BEAM HEIGHT:15MM	1PC	634-0694
FLOW CELL, 10 MM, QUARTZ, BEAM HEIGHT:15MM	1PC	634-0695
FLOW CELL, 20 MM, QUARTZ, BEAM HEIGHT:15MM	1PC	634-0696
FLOW CELL, 30 MM, QUARTZ, BEAM HEIGHT:15MM	1PC	634-0697
SIPPER UNIT WITHOUT PELTIER TEMP. CONTROL, A-1101	1PC	634-1138
SIPPER UNIT WITH TEMP. CONTROL, A-1001	1PC	634-1139
PELTIER UNIT, A-1201	1PC	634-1140
SAMPLE ROOM PANEL WITH PORT	1PC	634-1143
FUSE, 3.15A/250V	1PC	634-0651
VWR® UVSTUDIO STANDARD SOFTWARE	1PC	634-1182
VWR® UVSTUDIO AUDIT TRAIL SOFTWARE	1PC	634-1183
MICRO VOLUME TEST BASE	1PC	634-1238
FIBER DETECTION ACCESSORY M6	1PC	634-1239

Technical service

Web Resources

Visit the VWR website at **www.vwr.com** for:

- Complete technical service contact information
- Access to the VWR Online Catalogue, and information about accessories and related products
- Additional product information and special offers

Contact us For information or technical assistance contact your local VWR representative or visit www.vwr.com.

Warranty

VWR warrants that this product will be free from defects in material and workmanship for a period of two (2) years from date of delivery. Flashing Xenon Lamp have a warranty of five (5) years. If a defect is present, VWR will, at its option and cost, repair, replace, or refund the purchase price of this product to the customer, provided it is returned during the warranty period. 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.

Items being returned must be insured by the customer against possible damage or loss. This warranty shall be limited to the aforementioned remedies. IT IS EXPRESSLY AGREED THAT THIS WARRANTY WILL BE IN LIEU OF ALL WARRANTIES OF FITNESS AND IN LIEU OF THE WARRANTY OF MERCHANTABILITY.

Compliance with local laws and regulations

The customer is responsible for applying for and obtaining the necessary regulatory approvals or other authorisations necessary to run or use the Product in its local environment. VWR will not be held liable for any related omission or for not obtaining the required approval or authorisation, 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.

Instead 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!

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