iWanna66

Spectrophotometer Water Quality Analyzer

User Manual

The specifications and information mentioned in this manual are for reference only and are subject to change without notice. Unless otherwise agreed, this manual is for guidance only, and all statements and information herein do not constitute any form of warranty.

Guangdong Rainstin Instruments Co., Ltd. http://www.rainstin.com/

Contents

1.Product Introduction

1.1 Overview

The **iWanna66 Spectrophotometer Water Quality Analyzer** is a full-spectrum visible spectrophotometer designed for precise qualitative and quantitative water analysis. Equipped with a high-performance holographic-grating monochromator, 7-inch Android touchscreen, and advanced microprocessor control, the instrument supports photometric measurement, quantitative testing, spectral scanning, kinetics analysis, and multi-parameter water testing.

With excellent wavelength accuracy, ultra-low stray light, customizable calibration curves, dual cuvette compatibility, and storage for over 100,000 results, the iWanna66 delivers laboratory-grade accuracy and high operational flexibility. Its Wi-Fi/USB/RS232 connectivity and large parameter library make it ideal for environmental monitoring, wastewater analysis, industrial water management, education, and research laboratories.

This instrument operates based on the principle of relative measurement. A reference solution (such as distilled water) is selected, and its transmittance (T) is set to 100%. The transmittance of the test sample is then measured relative to this reference solution. The change in transmittance (T) has a functional relationship with the concentration of the measured substance. Within a certain range, it follows the **Lambert–Beer Law**:

$$T=I/ I_o$$

$$A=KCL=-\log I/I_o$$

Where:

- **T** – Transmittance
- **A** – Absorbance
- **C** – Concentration of the solution
- **K** – Absorption coefficient of the solution
- **L** – Optical path length of the solution
- **I** – Intensity of light reaching the photodetector after passing through test sample
- **I_0** – Intensity of light reaching the photodetector after passing through reference sample

1.2 Key Features

- **Wide Wavelength Range:** Continuous adjustment from 320–1000 nm to meet daily water quality testing requirements.
- **High-Performance Monochromator:** Low stray light (≤0.05%T), 2 nm bandwidth, and excellent wavelength accuracy ensure high precision, reproducibility, and stability.
- **Broad parameter library:** Covers more than 100 water quality parameters, including COD, TP, TN, ammonia nitrogen, nitrate, nitrite, color, turbidity, heavy metals, phenols, and more.
- **Fast and intuitive Android operating system:** Smartphone-like interface with a 7-inch color touchscreen enables easy navigation, data processing, and real-time display of spectral curves.
- **Custom calibration curves and flexible method programming:** Supports dilution method, manual input, USB import, and editable wavelength settings to accommodate non-standard or user-defined parameters.
- **High-efficiency optical system:** Stable LED light source and photodiode detection, ensuring long-term consistency and high signal-to-noise performance (noise ≤0.0005 A).
- **Large data storage & convenient file management:** Stores over 100,000 **measurement records**, supports Excel export, detailed data printing, and channel-based curve management.
- **Multiple connectivity options:** USB, RS232, and Wi-Fi for remote control, data transfer, LIMS integration, and PC software compatibility.
- **Laboratory-grade build:** Anti-interference design, excellent stability (≤0.001 A/h), and robust housing ideal for professional labs and long-term operation.

1.3 Technical Specifications

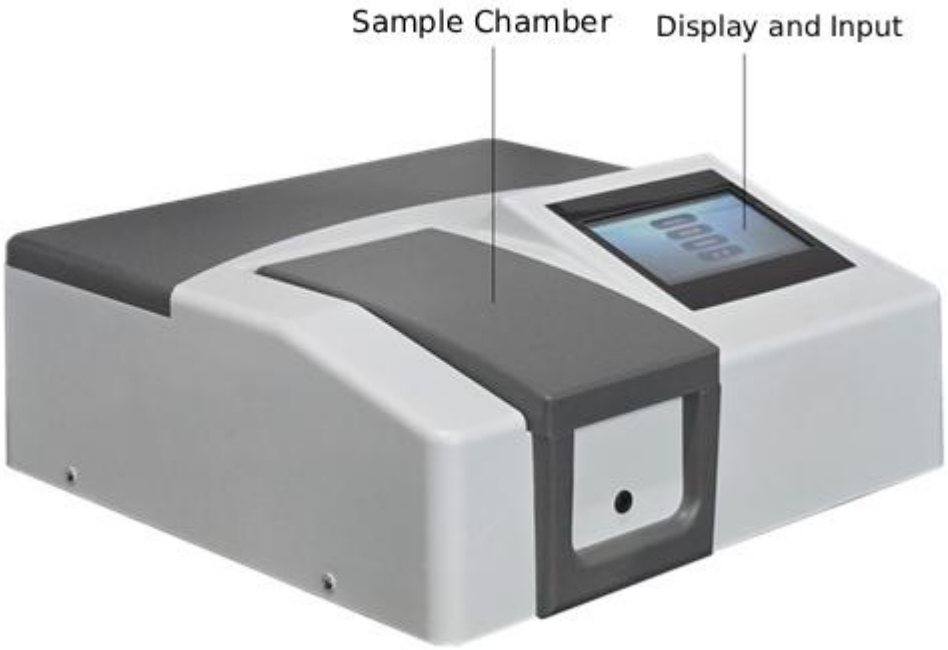
Item	Parameter
Display & Input	7-inch Android touchscreen
Wavelength Range	320–1000 nm
Wavelength Accuracy	±1 nm
Wavelength Repeatability	0.1 nm
Spectral Bandwidth	2 nm
Transmittance Accuracy	≤0.3% T
Transmittance Repeatability	0.1% T
Transmittance Range	0–200% T
Absorbance Range	±4.0 A
Concentration Range	0–99999
Stray Light	≤0.05% T
Stability	≤0.001 A/h
Noise	0.0005 A
Interfaces	RS232, USB
Wi-Fi Connectivity	Wireless data transmission and remote operation
Dimensions (L × W × H)	480 x 460 x 210 mm
Power Supply	220V/50Hz
Weight	15.35kg

1.4 Common Parameters and Measurement Ranges

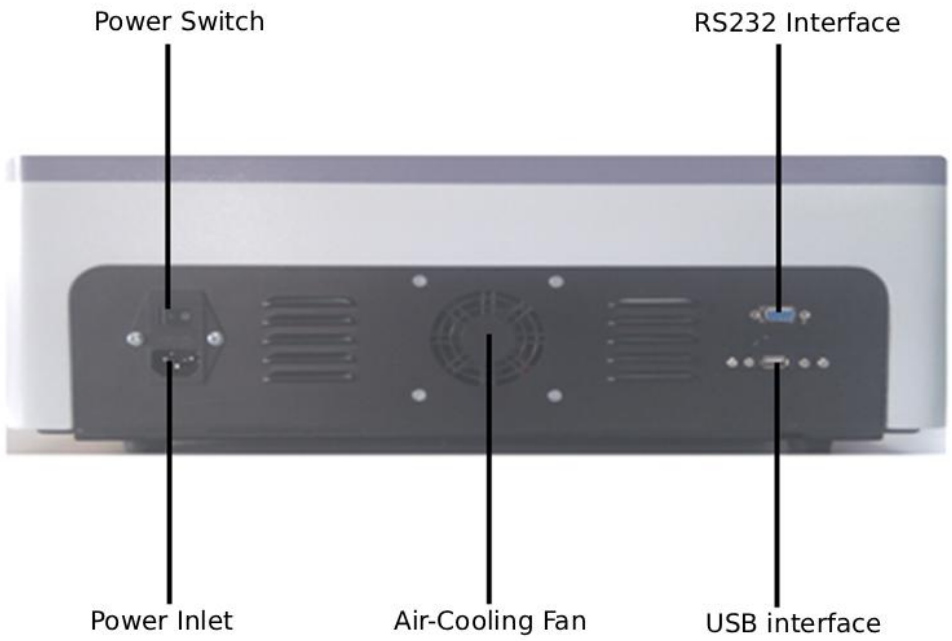
Parameter	Range	Parameter	Range
COD	0-20000 mg/L	Nitrate	0-100 mg/L
Ammonia Nitrogen	0-150 mg/L	Nitrite	0-10 mg/L
Total Phosphorus	0-30 mg/L	Permanganate Index	0-5 mg/L
Total Nitrogen	0-100 mg/L	Sulfate	0-250 mg/L
Copper	0-10 mg/L	Phosphate	0-90 mg/L
Nickel	0-5 mg/L	Cyanide	0-0.5 mg/L
Volatile Phenols	0-12 mg/L	Fluoride	0-2 mg/L
Silicon	0-80 mg/L	Sulfides	0-1 mg/L
Hexavalent Chromium	0-2 mg/L	Chloride	0-2000 mg/L
Manganese	0-20 mg/L	Hydrazine	0-1 mg/L
Total Iron/Ferrous Iron	0-10 mg/L	Formaldehyde	0-3.2 mg/L
Cobalt	0-2 mg/L	Color	0-500°
Zinc	0-2 mg/L	Turbidity	0-800 NTU
Lead	0-1.6 mg/L		

1.5 Instrument Appearance

• **Front Panel**



• **Rear Panel**



2. Installation and Environment

2.1 Installation Environment

1. The instrument is designed to operate at 220V ± 22V, 50Hz ± 1Hz. Ensure that the power supply is stable and reliable; otherwise, the instrument may not function properly.
2. The instrument should be installed in a dry indoor environment with an ambient temperature of 5℃–35℃ (optimal: 15℃–28℃) and a relative humidity of no more than 85% (typically controlled between 45%–60%).
3. Place the instrument on a solid and stable workbench, free from strong or continuous vibration.
4. The room should be free of corrosive gases such as hydrogen sulfide or nitrous fluoride.
5. Keep the instrument away from strong magnetic fields, electric fields, and devices generating high-frequency waves.
6. Avoid direct exposure to strong airflow.
7. Avoid direct exposure to intense light.
8. The power supply must have proper grounding with an independent ground wire.

2.2 Pre-Power-On Checklist

1. Verify that the power supply is 220V/50Hz and check that the rated working voltage shown on the instrument's nameplate matches the local supply voltage.
2. Connect the power cables of the main unit and the PC, and reconfirm that the instrument's set working voltage matches the local supply voltage.
3. Connect the USB control cable between the main unit and the PC, ensuring proper connection and stable status.

2.3 Performance Check

After powering on, allow the instrument to warm up for at least 30 minutes to reach a thermally stable operating condition.

Due to transport or storage conditions, the instrument may sometimes absorb moisture, leading to unstable readings such as fluctuations. In such cases, ensure good ventilation around the instrument and keep it powered on continuously for several hours until the readings stabilize.

3. Disclaimer and Warranty

3.1 Disclaimer

1. The specifications and information mentioned in this manual are for reference only and are subject to change without notice.
2. Please read the safety instructions carefully before using the instrument. The company is not responsible for accidents caused by improper operation.
3. This product is intended for use in professional fields. Operators must have relevant knowledge and skills. Accidents caused by misuse are not covered.

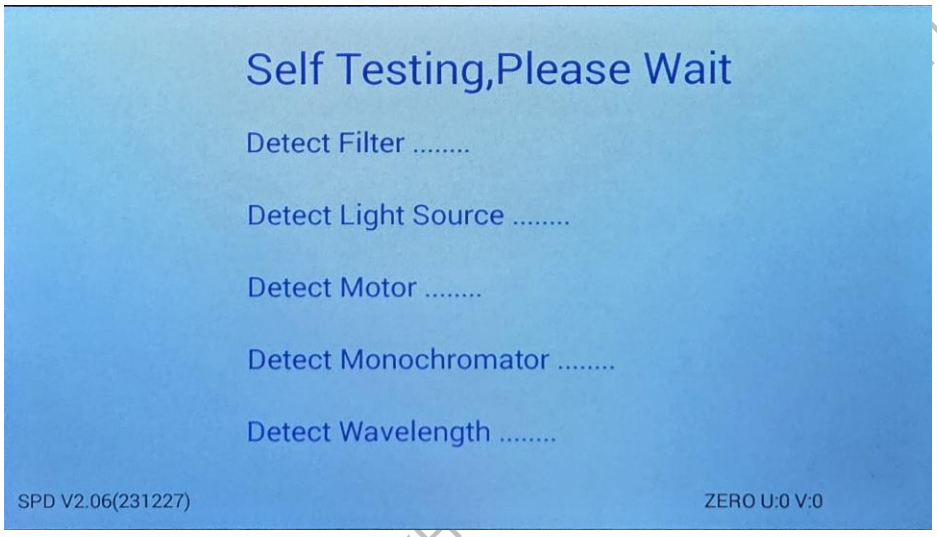
3.2 Warranty

1. All products undergo strict inspection before shipment and are covered by a one-year free warranty for quality issues.
2. During the warranty period, if problems arise due to improper operation, unsuitable environment, human error, accidents, or improper storage/transportation, the company may charge repair costs.
3. For out-of-warranty instruments, paid repair and service are available.
4. Warranty does not apply under the following conditions：
    a. Unauthorized disassembly, modification, or repair.
    b. Repairs by non-authorized personnel.
    c. Tampering or breaking of anti-disassembly seals.
    d. Use of non-original consumables causing malfunctions.
    e. Products purchased through unauthorized channels.
    f. Improper use or operation in unsuitable environments.

4. Instrument Operation

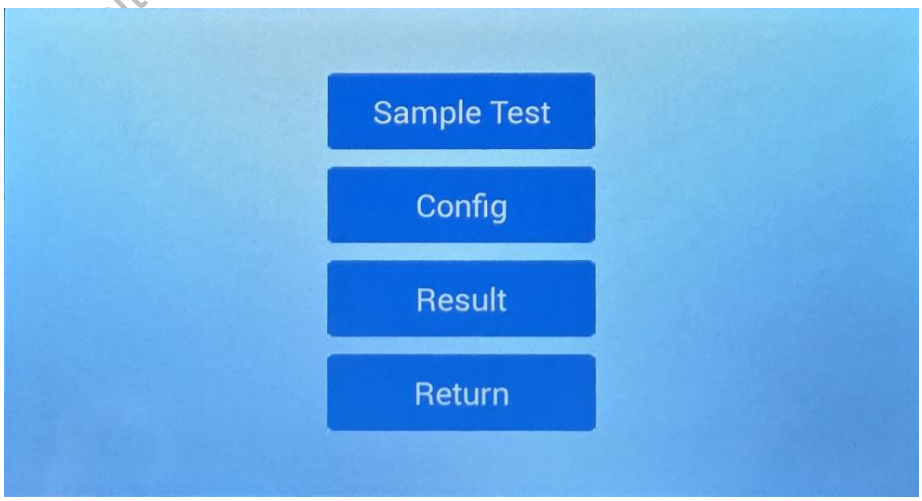
4.1 Installation

1. Open the instrument package, remove the instrument, and place it stably on the workbench.
2. Connect the power cable, switch on the power, and start the main unit to enter the self-check program, as shown in the figure below:



Note: Do not open the sample chamber during initialization.

3. Once the initialization is complete, the main interface of the Multi-parameter Water Quality Analyzer will be displayed, as shown in the figure below. To allow the instrument to reach a stable state and ensure measurement accuracy, preheat the instrument for at least 30 minutes.



4.2 Main Functions

• Photometric Testing

Within the allowable wavelength range, set any wavelength to measure the absorbance and transmittance of the sample. Test data can be saved and printed in tabular form.

• Dynamics Testing

Fixed-wavelength scanning can be performed at any selected wavelength within the spectral range, with Absorbance, Transmittance, and Energy modes available for versatile applications.

• Quantitative Test

Supports quantitative testing via Standard Comparison and Standard Curve methods. Users can build absorbance–concentration regression curves (single or dual wavelength) for accurate determination of unknown sample concentrations.

• Spectral Scanning

Configure scanning parameters to perform various spectrum scans of the sample. The system automatically detects peaks and valleys in the resulting spectrum.

• Multi-parameter Measurement

Measure over 100 water quality parameters and ranges by preset analysis programs.

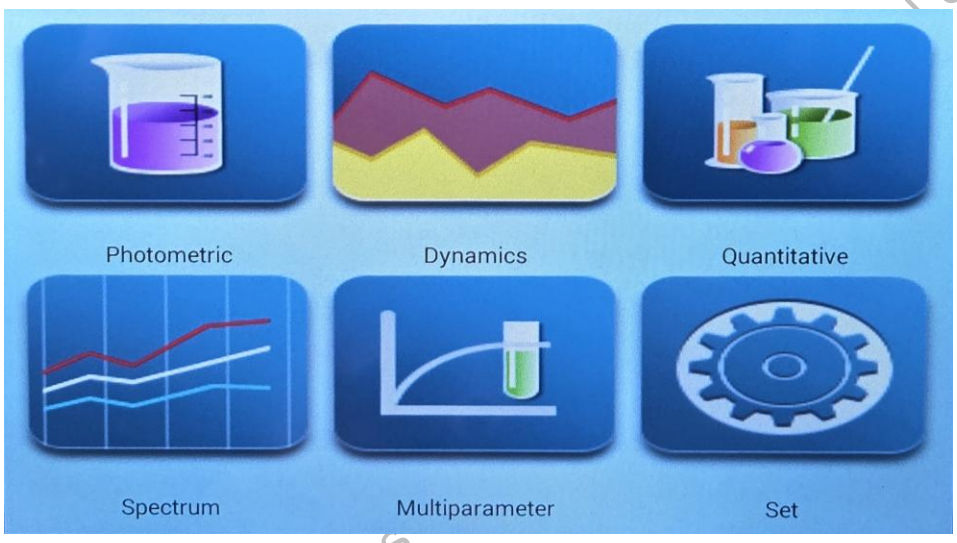
• Instrument Settings

Configure basic parameters such as light source switching wavelength, bandwidth selection, detailed data printing, etc.

4.3 Operating System Overview

This instrument adopts advanced microprocessor technology and runs on the Android operating system, offering a user-friendly interface similar to Android smartphones and tablets. It is equipped with a 7-inch full-color LED touch screen, supporting both touch and USB mouse operation.

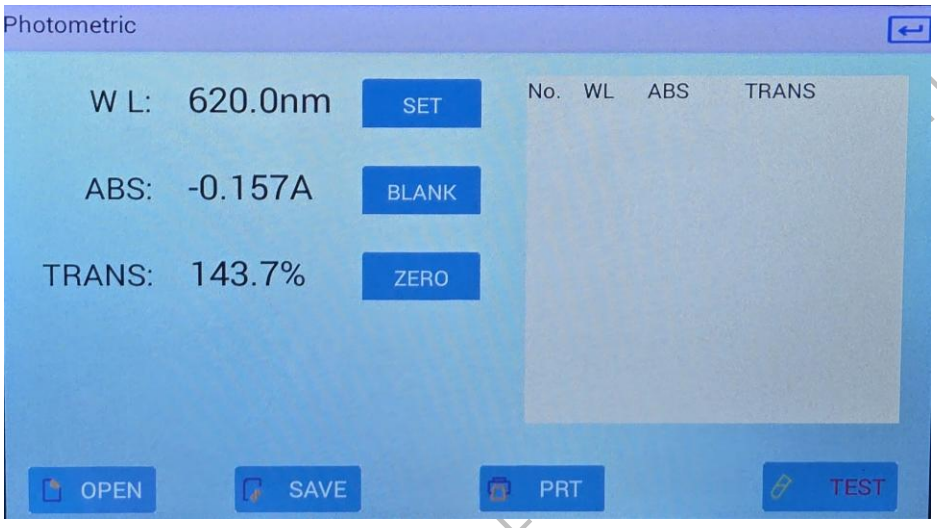
After startup and self-check, press the “Return” button to access the main interface, as shown below.



4.4 Function Introduction

4.4.1 Photometric

Photometric testing determines the absorbance and transmittance of substances at a specific wavelength. Select “Photometric” from the main menu to enter the interface as shown below.



SET: Input the required test wavelength.

ZERO: Adjust the instrument to zero transmittance.

BLANK: Full-scale adjustment. Set absorbance to 0.000 A.

TEST: Measure absorbance and transmittance; data is recorded in the box on the right.

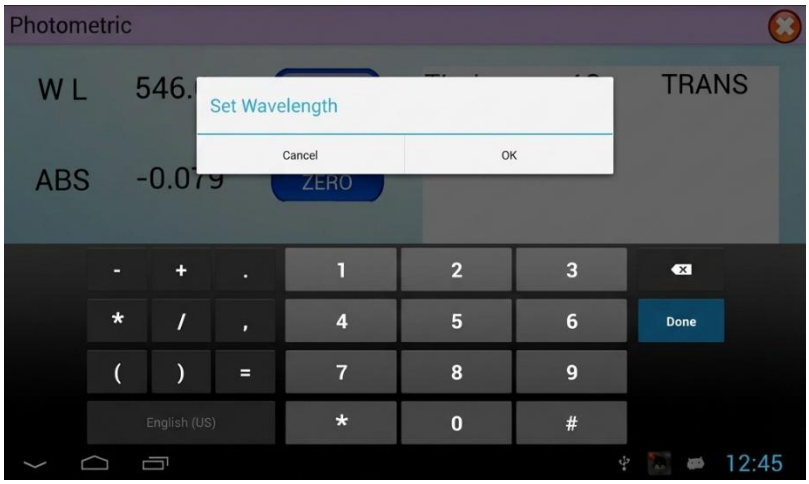
SAVE: Save the test data.

PRT: Print test data.

OPEN: View saved data.

Test steps:

1. Set the test wavelength via the “SET” button.



2. Place a reference sample into the sample cell. Press the “BLANK” button to perform full-scale adjustment. After completion, click the “ZERO” button on the main menu to correct the dark current (please allow a few seconds during this process).

   After the adjustment, the absorbance should read 0.000 A. If not, repeat Full-Scale Adjustment and Zero Adjustment until the absorbance is stabilized at 0.000 A.

3. After completing the previous step, place the sample to be tested into the sample cell. Click the “TEST” button. The test window will display a set of measurement data, including wavelength, transmittance, absorbance, and test time.

4. Remove the tested sample, insert another sample, and click the “TEST” button again. A new set of data will be obtained and displayed sequentially in the results window, as shown in below figure.

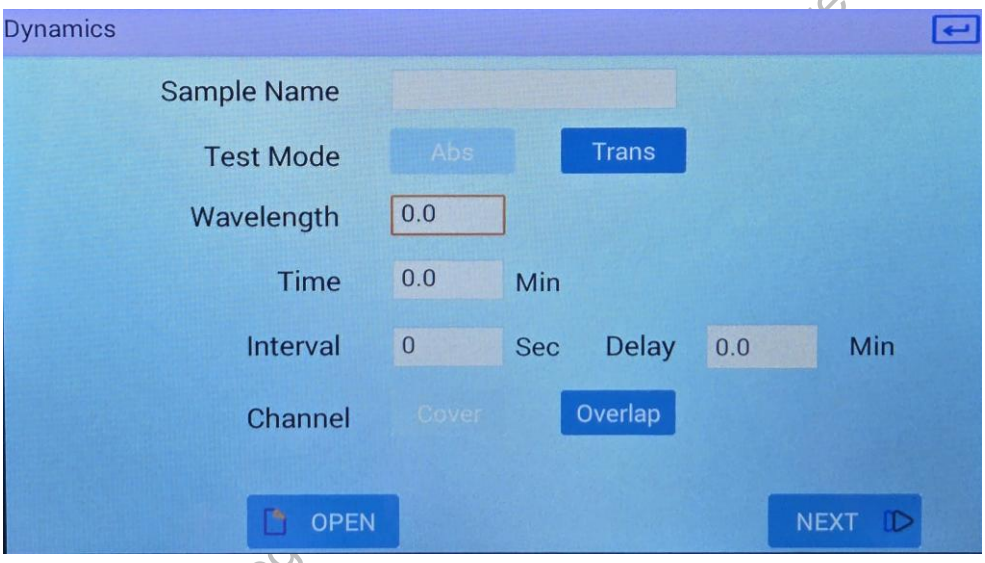
4.4.2 Dynamics

The dynamics test function allows time scanning of absorbance (A) or transmittance (T) at a specified wavelength, establishing a curve showing how A or T changes with time.

Click the main menu item “Dynamics” to enter the kinetic test interface.

Test steps:

1. Set the scanning parameters. The parameter setting interface is shown as below, which mainly includes the test mode, test time, waiting time, wavelength setting, sampling interval, and coordinate limits.



- Sample Name – Set the name of the sample to distinguish between different data sets.
- Test Mode – Select between two modes: Absorbance (ABS) or Transmittance (T%).
- Wavelength – The measurement wavelength for the kinetic test, in nanometers (nm).
- Time – Input the total test duration.
- Interval – Time interval for data recording.
- Delay – The waiting period before the formal scan begins.
- Channel – Determines how the curves are displayed after scanning:

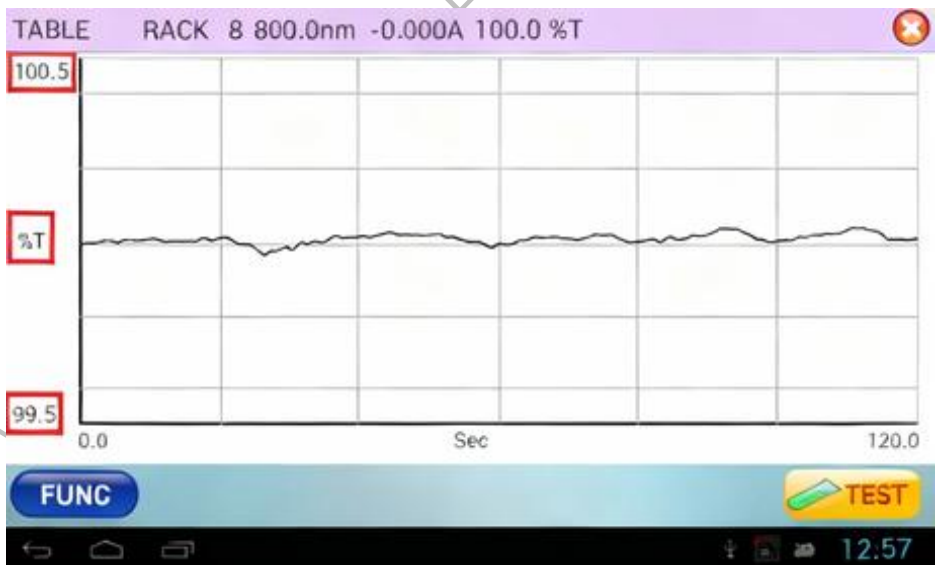
  Cover: Only one spectrum is shown on the screen.

  Overlap: The number of spectra displayed equals the number of scans.
- Open – View saved data.
- Next – Proceed to the sample setting interface for the dynamics test.

2. Dynamics Sample Test

Place the reference sample in the reference cell. In the interface shown as above, click “FUNC”, then click “Blank” and “ZERO” to calibrate the reference sample to 100%T / 0.000A.

After calibration, remove the reference sample. Insert the test sample into the sample cell, then click the “TEST” button to start scanning.



3. Dynamics Test Graph

Click directly on the coordinate axis numbers to re-enter the limit values, then click “OK” to confirm. Click “Abs” or “%T” to switch between the two display modes.

Click “FUNC” → “Detailed Data” to view the specific scan data of the sample.

4.4.3 Quantitative

The quantitative analysis function is mainly used to perform quantitative testing and analysis of samples.

The Standard Curve Method measures the absorbance values of multiple standard samples (up to 8 can be set, each with a known concentration).

Using the instrument's built-in linear regression function, a working curve of absorbance and concentration is automatically generated according to the equation:

Conc = Abs × K + B

where:

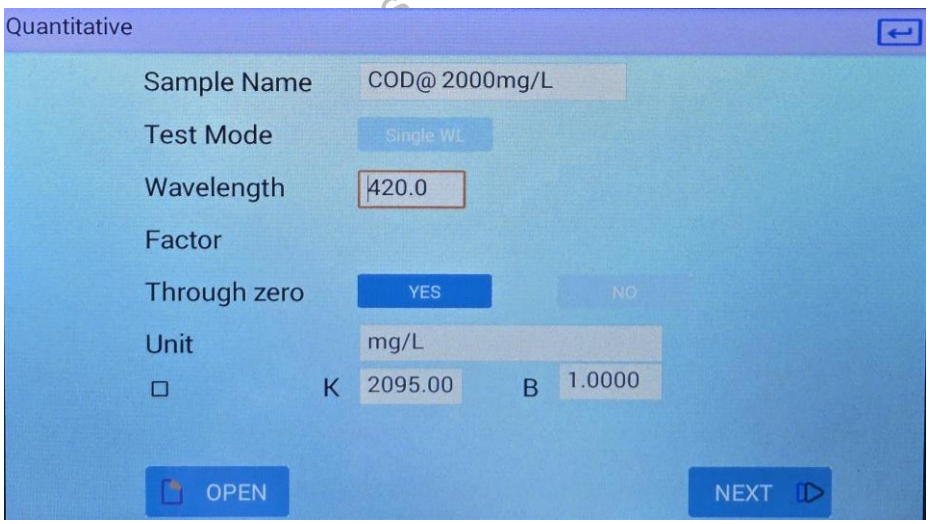
- **K** — slope
- **Conc** — concentration
- **B** — intercept

By measuring the absorbance value (**Ax**) of an unknown sample, the instrument automatically calculates its concentration (**Cx**).

Test Step

1. Basic Settings

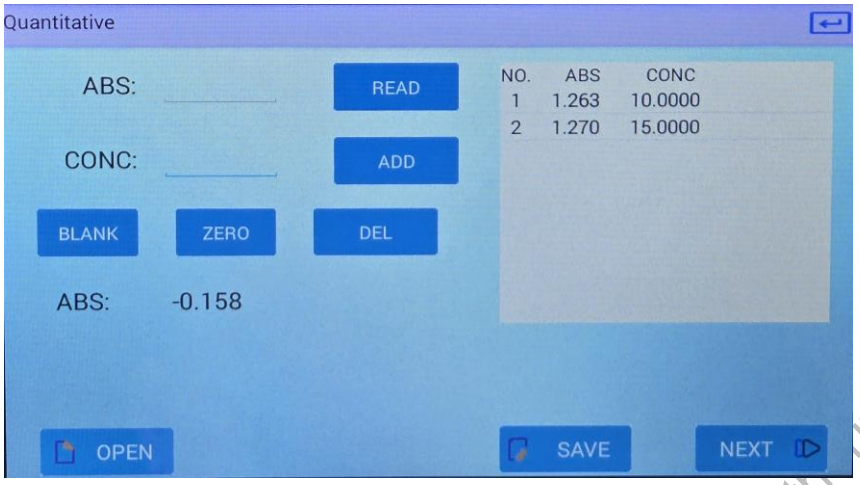
Click the "Quantitative" button on the main interface to enter the quantitative test basic settings interface as shown below.



Set a name to distinguish different samples and the required wavelength and concentration unit. Choose single-wavelength or dual-wavelength mode and select whether the standard curve passes through zero. Click "NEXT" to enter the Standard Sample Setup interface.

2. Standard Sample Setup

After click “NEXT” button of previous interface, the standard sample setup interface as shown below.

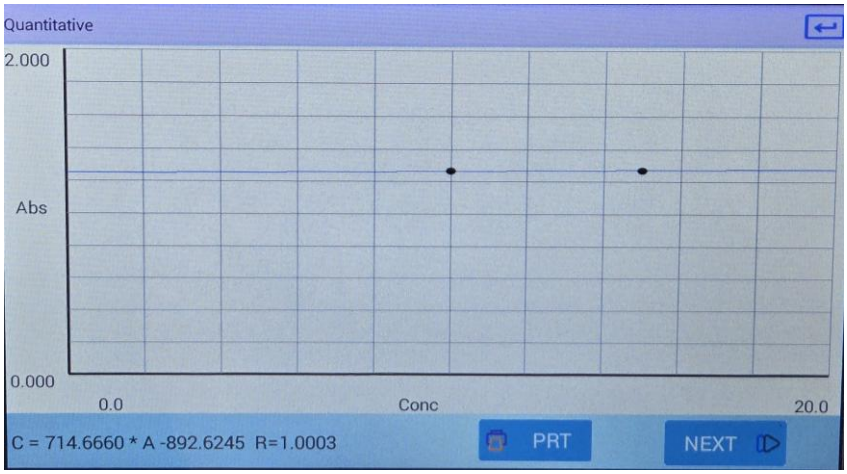


Place the reference sample into the reference cell. Click “BLANK” to adjust the full-scale value, then click “ZERO” to adjust dark current (wait a few seconds). The absorbance should read 0.000A. If not, repeat the Full Scale and Zero adjustments until the reading is 0.000A. Input concentration “0” in the Concentration field, click “READ” to record the absorbance of the reference solution, and click “ADD” to store this data which is shown in the window on the right.

Replace the reference sample with the first standard sample. Enter its concentration value, click “READ” to measure its absorbance, and click “ADD” to store the data. Repeat for multiple standard samples until all are added.

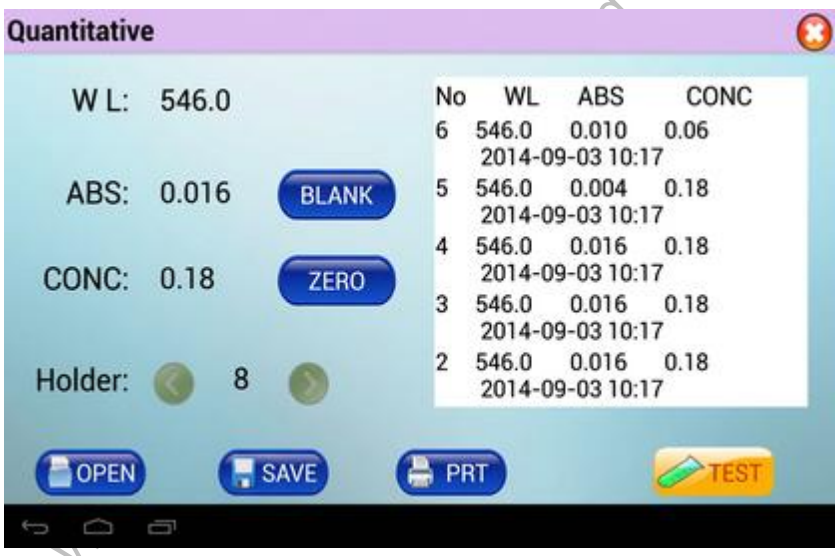
Click “NEXT” to proceed to the Fitted Curve Display interface

3. Fitted Curve Display



The fitted curve display interface displays the fitted curve and regression equation of the standard samples. Click “NEXT” to enter the sample concentration test interface.

4. Sample Concentration Test



Place the reference sample into the reference cell. Click “BLANK” to adjust the full-scale value, then click “ZERO” (wait a few seconds). Replace the reference sample and place the test sample into the sample cell and click “TEST”. The result will be displayed in the right window, automatically showing the calculated concentration of the sample. Click “SAVE” to save the result as the test item for measurement parameter and range.

4.4.4 Spectrum

The Spectrum function continuously varies the wavelength within a specified range for an unknown sample, recording the absorbance, transmittance, or energy value at each wavelength. It then plots curves showing the relationship between Absorbance (A), Transmittance (T), or Energy (E) and Wavelength (λ).

In this mode, the system also provides multiple data analysis and processing features such as peak/valley detection, spectrum derivation, and curve integration. Additionally, spectral images can be saved or printed for record keeping.

Test steps:

1. Basic Settings

Click the “Spectrum” button on the main interface to enter the spectrum scanning test window, as shown as below:

- Sample Name – Set the name of the sample to distinguish between different data sets.
- Test Mode – Select between two modes: Absorbance (ABS) or Transmittance (T%).
- Wavelength – Set the start and end wavelengths for the scan (the start wavelength must be lower than the end wavelength).
- Interval – Defines the wavelength step interval between recorded data points during scanning.
- Speed – Select scanning speed: Slow, Normal, or Fast.
- Channel – Determines how the curves are displayed after scanning:

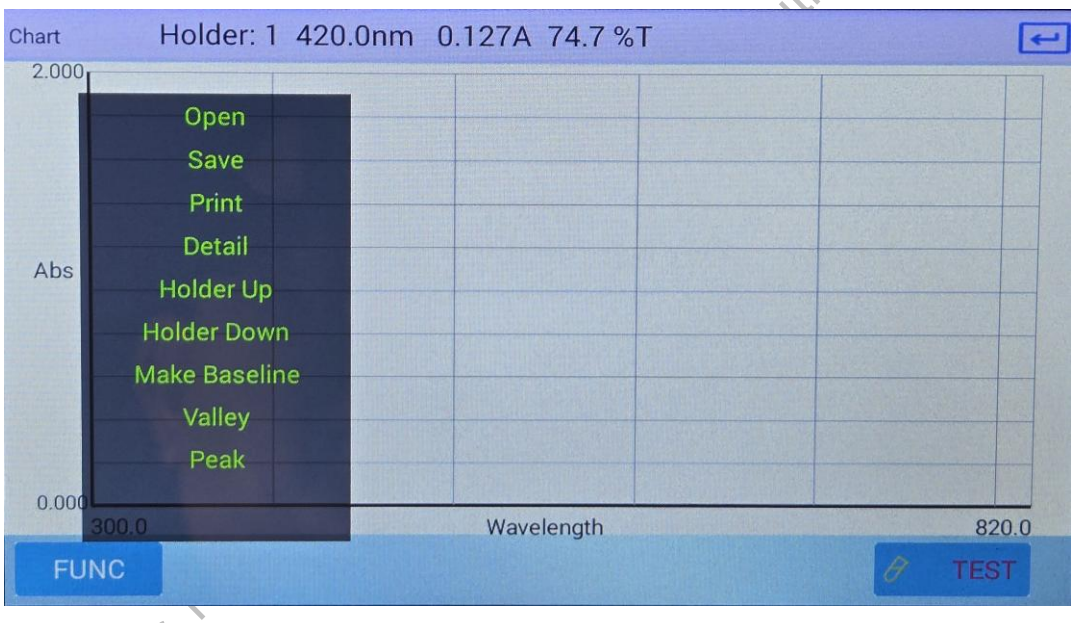
Cover: Only one spectrum is shown on the screen.

Overlap: The number of spectra displayed equals the number of scans.

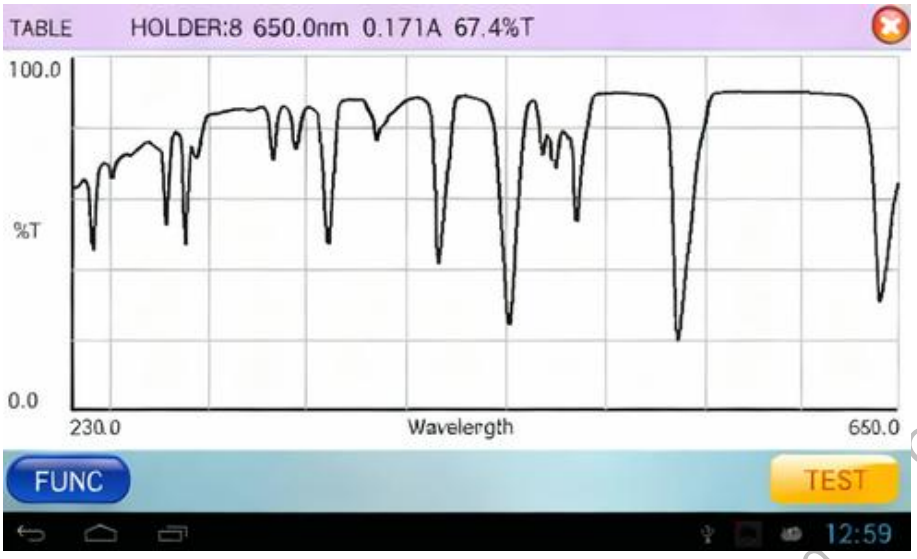
- Slit – Adjust the slit through which light passes, selectable at 0.1, 0.2, 0.5, 1, 2, or 4 nm bandwidths.
- Open – Open previously saved scan data.
- Next – Proceed to the spectrum scanning test interface.

2. Sample Scanning

Before scanning the test sample, a baseline must be established. Place the reference sample in the reference cell, then in the interface shown as below, click “FUNC” → “Establish Baseline.” The instrument will automatically establish the baseline.

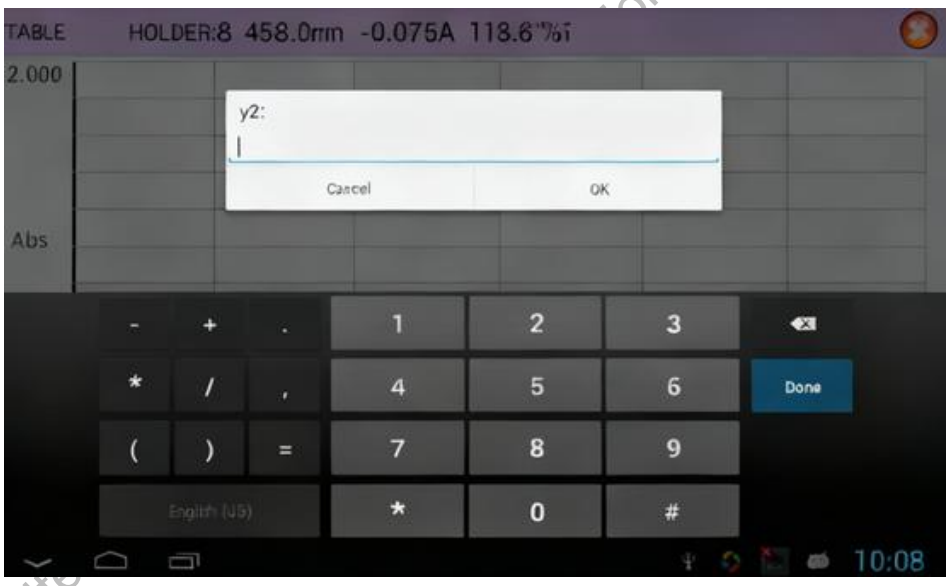


After the baseline is established, insert the test sample into the sample cell. Click the “TEST” button to begin scanning. The instrument will record the spectrum and automatically plot the complete scanning curve, as shown as below.



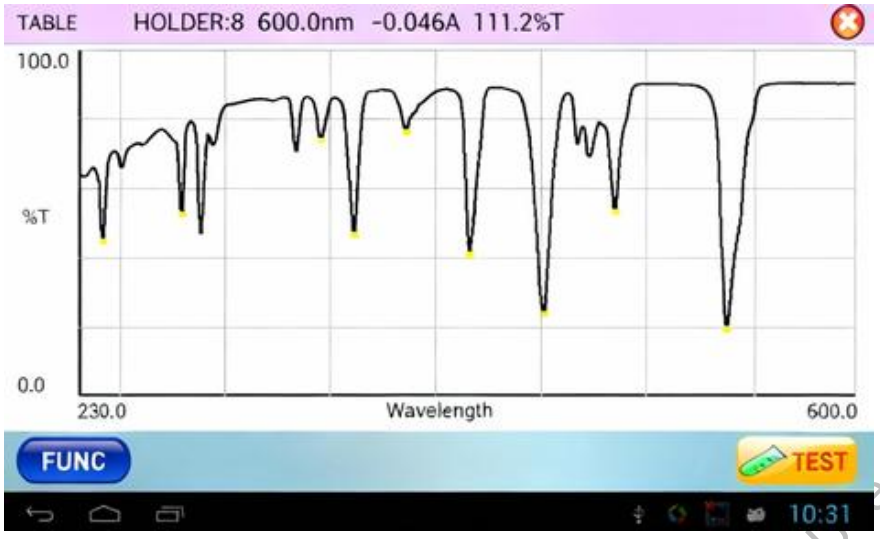
3. Coordinate Settings

Click directly on the coordinate axis values to re-enter the upper and lower limits, then click “OK” to confirm. Click “Abs”, “%T”, or “E” to switch between display modes.



4. Peak and Valley Detection

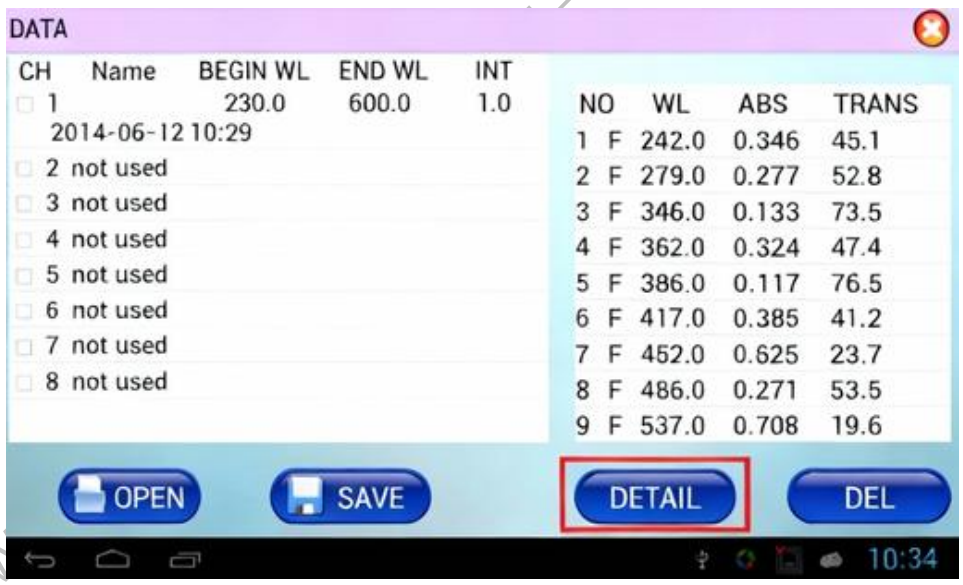
Click “Function” → “Peak Detection” or “Valley Detection.” The instrument will automatically analyze the test data to identify peak and valley points and mark them on the spectrum, as shown as below:



5. Detailed Data

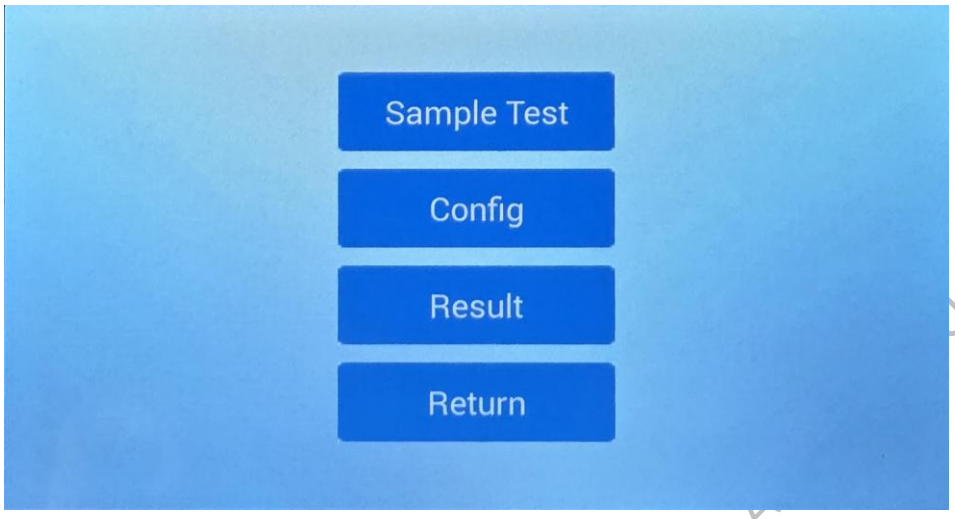
Click “Function” → “Detailed Data” to view the specific scanning data for the sample, as shown as below. You can review both detailed spectral data and peak/valley data.

Click “Detailed Data” or “Peak/Valley Data” to switch views. Click “Delete” to remove a channel or data entry if necessary.

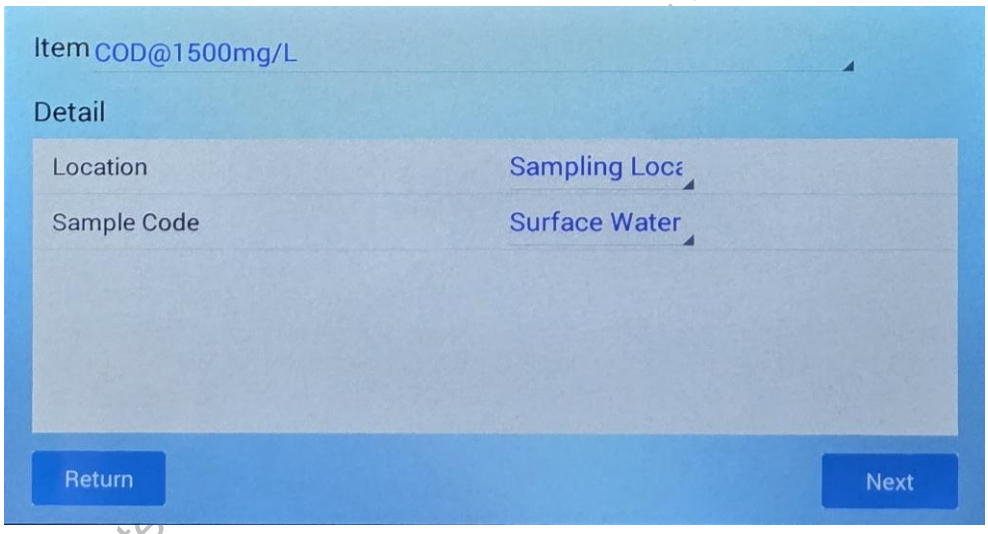


4.4.5 Multi-Parameter

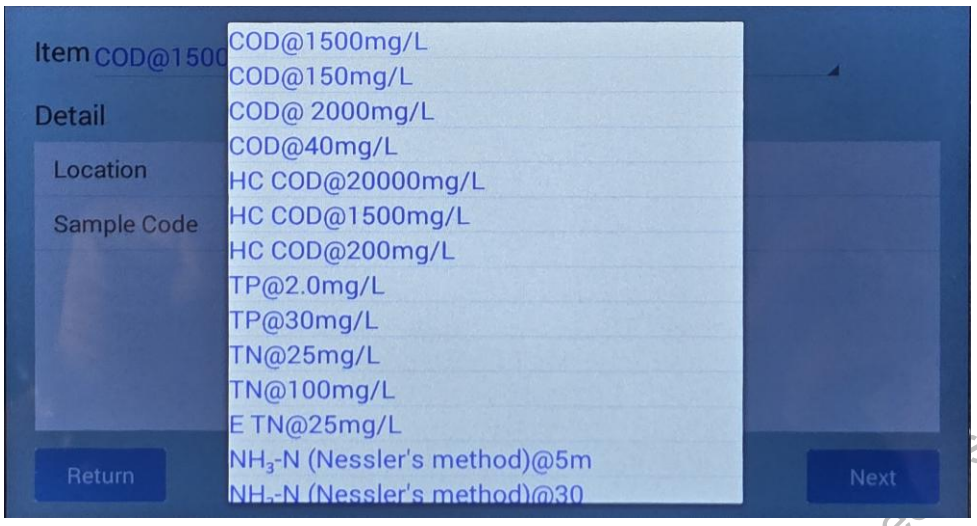
After clicking “Multiparameter” on the main interface, or after the instrument completes its self-check upon startup, the following interface will appear。



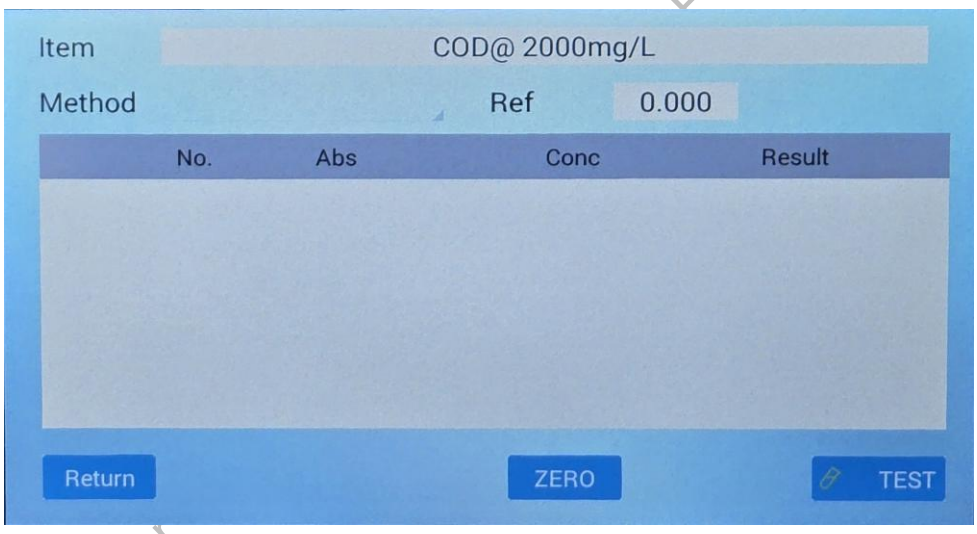
Click “Sample Test” to open the interface shown below:

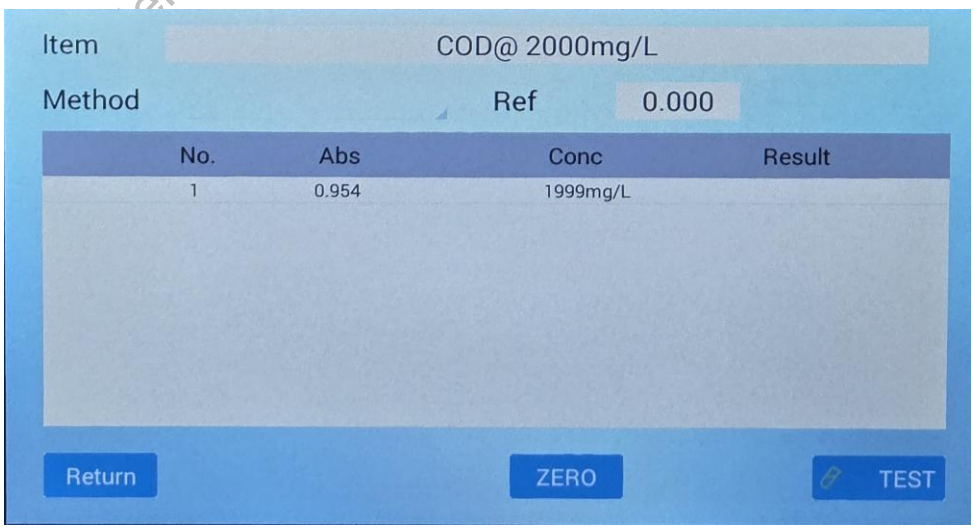


Click “Test Item” to select the corresponding parameter and measurement range.

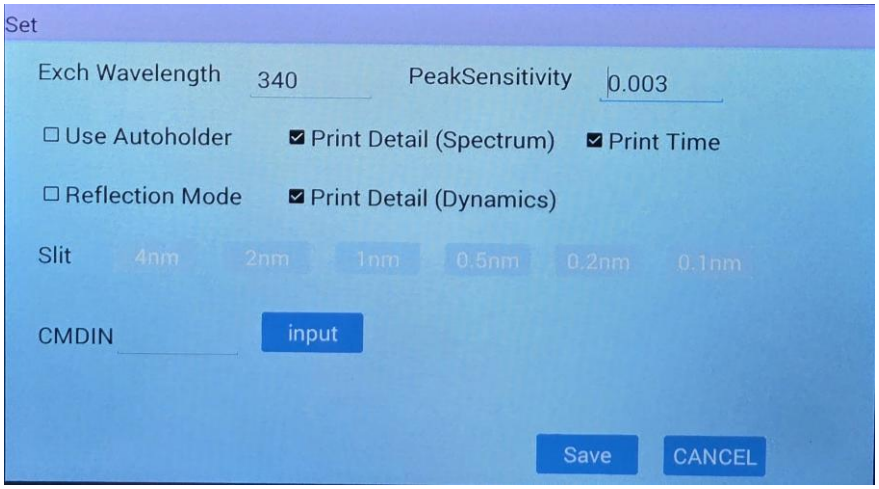


Click “Test” When the following interface appears, use the blank sample to perform zero calibration, then test the water sample. (The preparation methods for the blank and water sample should follow the reagent instructions). The result will be shown when completed.





4.4.6 Instrument Settings



Functions include:

Wavelength Exchange Point: Used to set the switching point between the ultraviolet and visible light sources. Normally, this setting does not need to be adjusted.

Peak Detection Sensitivity: Sets the sensitivity for peak and valley detection in the spectrum scanning function. The recommended value is between 0.003–0.006.

Use Automatic Sample Holder: Check this option if the instrument is equipped with an automatic sample holder.

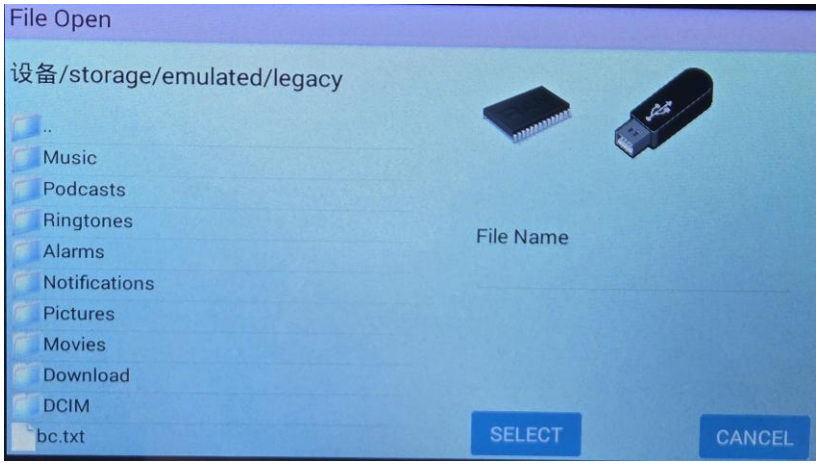
Print Detailed Data: When enabled, detailed measurement data will be included in the printed test report. If only the spectrum chart is required, this option can be left unchecked.

Slit Width: Click to set the spectral bandwidth.

CMDIN: Enter command codes to enable or disable specific instrument functions.

5.4.5 File Management

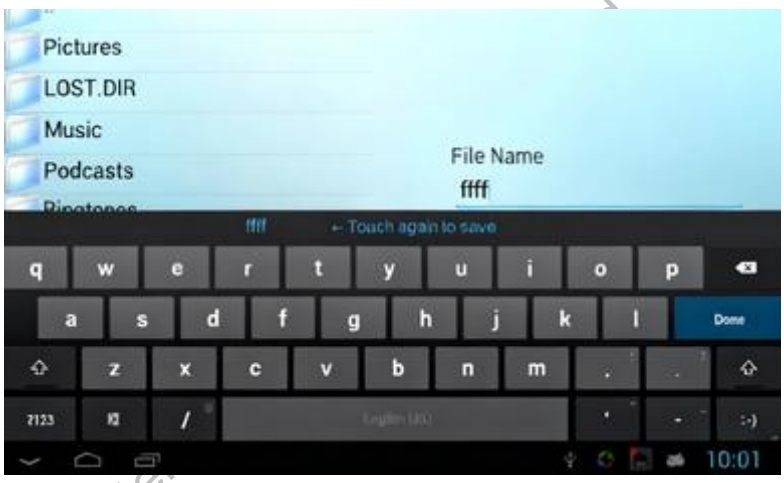
1.Open File



1) Select “Open” in the test interface.

2) choose the filename, and press “Select.”

2.Save File



1. On the test interface, click the “Save” button to enter the file saving screen. You must select the storage path (“sdcard” or “sdcard0”) before the data can be saved.
2. Select the desired file directory and enter a file name. (If you check the “Export as EXCEL format” option, the data will be exported as an Excel file.)
3. Click the “Select” button to complete the data saving process.

5 Routine Maintenance

The multi-parameter water quality analyzer is a precision optical instrument that has been carefully assembled and calibrated before delivery. Proper maintenance and care can not only ensure its reliability and stability but also significantly extend its service life.

1. Provide a good operating environment for the instrument as described in Section 2.1.
2. After each use, check the sample chamber for any spilled solution. Wipe it clean regularly to prevent corrosive damage to the components or optical path caused by waste liquid. Do not leave cuvettes containing test solutions inside the chamber for an extended period.
3. Take care to protect the optical windows (light-transmitting surfaces) of the cuvettes. Avoid scratches and contamination. After use, clean them promptly to prevent any residue or cleaning solution from adhering to the optical windows, ensuring proper optical matching.
4. After use, cover the instrument with a dust cover. A desiccant (silica gel) bag may be placed inside the sample chamber for moisture prevention, but it must be removed before powering on the instrument.
5. When storing the instrument, protect it from scratches, water, dust, and corrosion.
6. Perform regular performance inspections. If any issues are found, contact your local distributor or the manufacturer’s sales department. Do not open the instrument housing or attempt repairs unless you are a qualified service technician.
7. If the instrument will not be used for a long period, pay special attention to temperature and humidity control. It is recommended to place a desiccant bag inside the sample chamber and replace it regularly.

6 Common Troubleshooting and Maintenance Guide

1. Preliminary Check Steps

When the instrument fails to operate properly, first switch off the main power, then check step by step as follows:

1. Ensure the sample compartment cover is properly closed.
2. Check whether any foreign object is blocking the light path inside the sample compartment.
3. Confirm that the correct type of cuvette is being used.
4. Turn on the instrument and check whether the tungsten lamp is lit.
5. Within the specified wavelength range, verify whether “100%T” or “0A” can be adjusted normally.

2. Common Faults and Corrective Actions

Fault Description	Possible Cause	Corrective Action
1. No response when power is switched on (fan not running)	1) Power not connected;	1) Check the power supply voltage and connection;
	2) Fuse blown.	2) Replace with the same type and rating of fuse.
2. 0%T cannot be adjusted	1) Sample compartment cover not closed;	1) Ensure the cover is fully closed when adjusting 0%T;
	2) Internal malfunction.	2) Contact professional service personnel for inspection or return for repair.
3. 100%T / 0A cannot be adjusted	1) Reference sample absorbance too high;	1) Dilute the reference sample;
	2) Lamp position misaligned;	2) Adjust the lamp position;
	3) Light source lamp damaged;	3) Replace with a new lamp of the same specification;
	4) Foreign object blocking light path;	4) Remove any obstruction in the light path;
	5) Internal malfunction.	5) Contact qualified technicians for repair.
4. Display readings unstable	1) Insufficient warm-up time;	1) Extend instrument warm-up time;
	2) Excessive vibration, airflow, or strong external light;	2) Improve the working environment;
	3) Unstable power supply voltage;	3) Use an AC voltage stabilizer (220V ±10%);
	4) Poor grounding;	4) Ensure proper grounding;
	5) Lamp misalignment;	5) Re-adjust lamp position;
	6) Sample instability or volatility;	6) Wait for sample to stabilize or use an airtight cuvette;
	7) Internal malfunction.	7) Contact service for maintenance.
5. Poor measurement accuracy or repeatability	1) Improper sample preparation;	1) Prepare the sample correctly as instructed;
	2) Unsuitable testing conditions (temperature, humidity, vibration, interference, grounding);	2) Optimize testing environment;
	3) Sample concentration or cuvette thickness causes absorbance beyond linear range;	3) Keep absorbance within 0.2A–0.8A (or 0.1A–1.0A);
	4) Sample reaction not balanced or volatile;	4) Wait for reaction equilibrium or use an airtight cuvette;
	5) Sample turbidity causing background interference.	5) Use dual-wavelength, triple-wavelength, or derivative spectrophotometry.

3. Notes and Precautions

1) The instrument should be stored in its original packaging under 5°C–35°C, with relative humidity ≤85%, and in an environment free from corrosive gases.
2) Ensure the operating environment meets the conditions specified in section 2.1.
3) The instrument has been precisely calibrated before delivery. Users must not disassemble or readjust internal components (except lamp replacement). Do not touch or wipe optical elements directly.
4) Within one year from the date of purchase, if malfunction occurs under normal transportation, storage, and use conditions due to manufacturing defects, the manufacturer will provide free repair service (excluding consumables such as tungsten and deuterium lamps). Unauthorized disassembly voids the warranty.
5) In case of emergency self-repair, obtain approval and guidance from the manufacturer's technical personnel. Repairs must be carried out by qualified technicians. Return to the manufacturer for service whenever possible.

7 Packing List

Item	Number
Benchtop multi-parameter water quality analyzer Instrument	1
Power Cable	1
Dust Cover	1
Fuse (same type and rating)	1
User Manual	1
Certificate of Conformity	1
Warranty Card	1