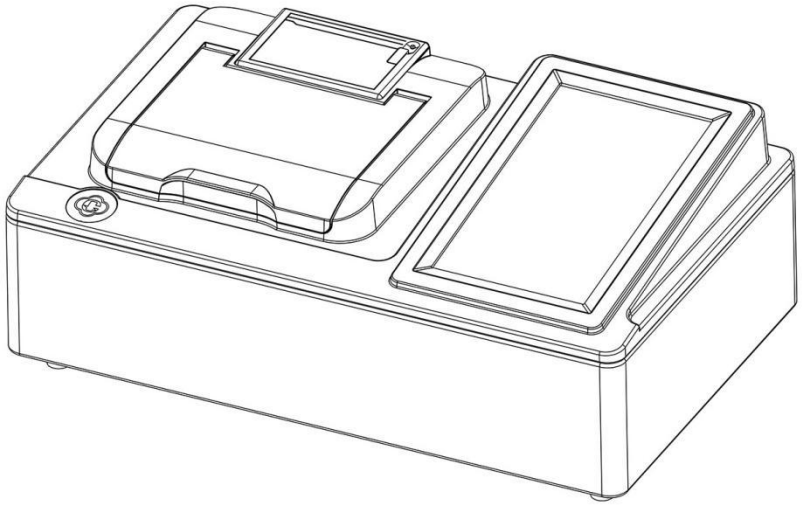
Benchtop Multi-Parameter Water Quality Analyzer TK-7000

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.

Contents

1.Product Introduction

1.1 Overview

The **Multi-Parameter Water Quality Analyzer** is a visible spectrum spectrophotometer for laboratory measuring over 70 water quality parameters and ranges, including COD, ammonia nitrogen, total phosphorus, total nitrogen, nitrate, nitrite, and more.

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 the test sample
- **I_0** – Intensity of light reaching the photodetector after passing through the reference sample

Each parameter can be tested through pre-programmed methods with compatible reagents from multiple brands. Users may also request customized method programming, allowing flexible budget control and more convenient operation.

1.2 Key Features

• **User-Defined Test Parameters:** Frequently used test parameters can be customized and added directly to the sample testing interface for quick and convenient operation.

• **Flexible Calibration Curve Creation:** Supports three methods: dilution factor method, manual curve value input, and USB import of calibration curves.

• **Configurable Wavelengths:** Optional 350 nm and 860 nm wavelengths can be configured according to user requirements for testing unconventional parameters.

• **Modular Circuit Design:** Independent control board and communication board provide excellent expandability and system stability.

• **Rich Communication Interfaces:** 2 USB-A ports, 1 USB-B port, 1 RS485 port, with optional Bluetooth, 4G, and Wi-Fi modules for enhanced connectivity.

• **High-Quality LED Light Source:** Delivers long-term stable performance without the need for frequent replacement.

• **Multi-Light Source Configuration:** Supports up to eight light sources to meet full-parameter testing requirements.

• **Reference Light Compensation:** Utilizes reference light subtraction to eliminate background interference and improve test repeatability.

• **Large Data Storage Capacity:** Stores more than 100,000 test records for easy data retrieval and traceability.

• **7-Inch Color Touchscreen:** Provides a clear, intuitive, and user-friendly interface.

• **Dual Cuvette System:** Compatible with both Φ16 mm colorimetric tube and Φ25 mm colorimetric cuvette, broadening the range of applicable sample types.

• **Built-in Thermal Printer:** Convenient for instant printing of test results.

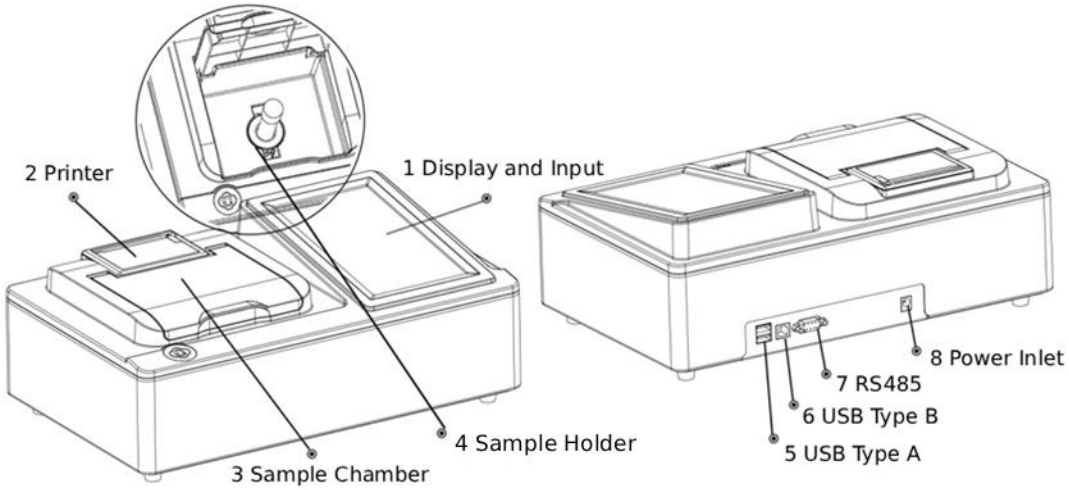
1.3 Technical Specifications

Item	Parameter
Display & Input	7-inch color touchscreen
Light Source	Light Emitting Diode (LED)
Detector	Photodiode
Testing Mode	Absorbance (Abs) and Concentration (Conc)
Number of Light Sources	Configurable according to specific requirements (within the range of 350–860 nm)
Display Accuracy	1 mg/L–0.001 mg/L
Measurement Error	≤5%
Measurement Reproducibility	≤3%
Sample Cell	Φ16mm colorimetric tube, Φ25mm colorimetric cuvette
Interfaces	2 USB-A, 1 USB-B, 1 RS485
Operating Environment	Temperature: 0–50°C; Humidity: ≤90%, no condensation
Dimensions (L × W × H)	341 × 207 × 134 mm
Power Supply	220V/50Hz
Net weight	3.2kg

1.4 Common Parameters and Measurement Ranges

Parameter	Range	Parameter	Range
COD	0–40 mg/L	Ferrous Iron	0–10 mg/L
COD High Chlorine III	30–200 mg/L	Total Iron	0–10 mg/L
COD	10–150 mg/L	Manganese	0–20 mg/L
COD High Chlorine II	200–1500 mg/L	Permanganate Index	0.5–5 mg/L
TP	0.2–30 mg/L	Iodine	0.07–7 mg/L
TN	0–25 mg/L; 5–100 mg/L	pH	6.5–8.5
Ammonia Nitrogen (Nessler)	0–5 mg/L; 0–30 mg/L; 10–150 mg/L	Ammonia Nitrogen (Salicylate)	0–2.5 mg/L; 0–50 mg/L
Formaldehyde	0.2–3.2 mg/L	Active Oxygen	0.005–1 mg/L
Hydrazine	0–1 mg/L	Hydrogen Peroxide	0.01–1 mg/L
Sulfate	5–250 mg/L	Ozone	0.01–2.5 mg/L
Chloride	5–50 mg/L; 50–500 mg/L	Chlorine Dioxide	0.04–5 mg/L
Silica	1–80 mg/L	Volatile Fatty Acids	50–3000 mg/L
Nitrate	0–25 mg/L; 5–100 mg/L	Zinc	0–2 mg/L
Lead	0–1.6 mg/L	Cadmium	0.005–1 mg/L
Copper	0–10 mg/L	COD	20–1500 mg/L; 100–2000 mg/L
Nickel	0–5 mg/L	COD High Chlorine I	1500–20000 mg/L
Phosphate	0.6–90 mg/L	Bromine	0.05–5 mg/L
Volatile Phenols	0.017–2 mg/L	Cyanide	0.005–0.5 mg/L
Chlorine Dioxide	1–200 mg/L	Sulfides	0.02–1 mg/L
Hydrogen Peroxide	0.2–40 mg/L	Fluoride	0–2 mg/L
Cyanuric Acid	5–50 mg/L	Cobalt	0.02–2 mg/L
Urea	0.05–3.5 mg/L	Aluminum	0.002–0.2 mg/L
Silicic Acid	2–100 mg/L	Arsenic	0.1–5 mg/L
Residual Chlorine/Total Chlorine	0.02–3 mg/L; 0.1–10 mg/L	TP	0.02–2 mg/L
Total Hardness	0.5–10 mg/L; 50–500 mg/L	Phosphate	0.06–6 mg/L
Volatile Phenols	0.1–12 mg/L	Silica	0.02–2 mg/L
Nitrite	0–10 mg/L	Turbidity	0–200 NTU; 200–2000 NTU
Hexavalent Chromium	0–2 mg/L	Color	0–500°
Total Chromium	0–2 mg/L	Suspended Solids	

1.5 Instrument Appearance



1. **Display and Input**: Used for entering various operation commands and displaying execution results.
2. **Printer**: Used for printing analysis results by built-in thermal printer.
3. **Sample Chamber**: Compartment for sample detection.
4. **Sample Holder**: Designed to hold test samples using 16 mm colorimetric tube or 25 mm colorimetric cuvette.
5. **USB Type-A Port**: Used for upgrading the display and motherboard firmware.
6. **USB Type-B Port**: Connects to a host computer (PC).
7. **RS485 Communication Interface**: For external device connection and LIMS system integration.
8. **Power Inlet**: External power input port.

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 0℃–50℃ and a relative humidity of no more than 90%.
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.

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 Device Connection

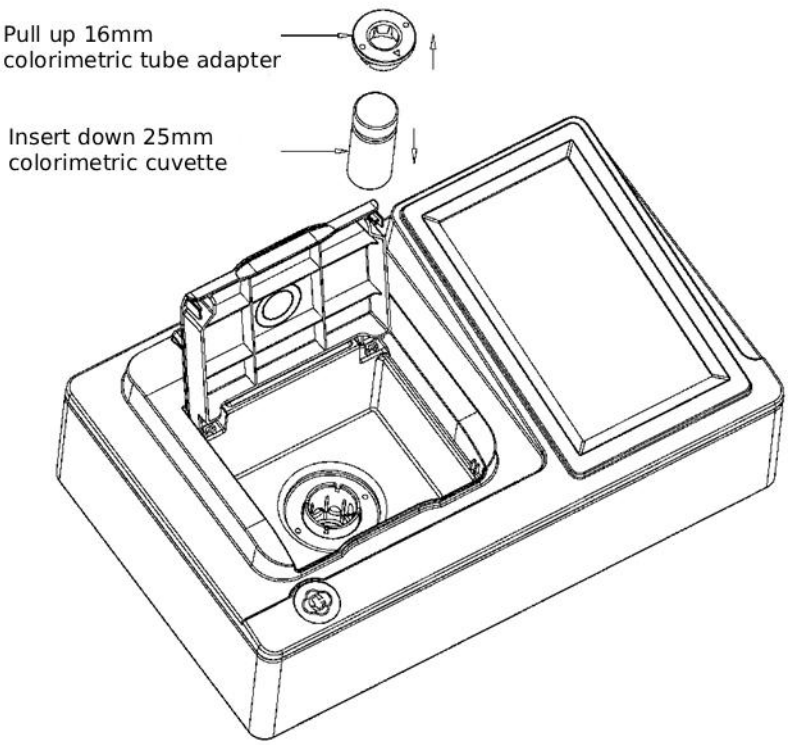
Open the package and check that all accessories are included. After confirming everything is correct, insert the power plug into the power inlet of the device.

Turn on the power switch and make sure the display screen lights up properly.

4.2 Preparation Before Testing

Prepare the reagents and ensure that they comply with the required cuvette standards (16 mm colorimetric tube or 25 mm colorimetric cuvette).

Prepare all supporting instruments and consumables such as a digestion device, pipette and tips, label paper, and water samples.

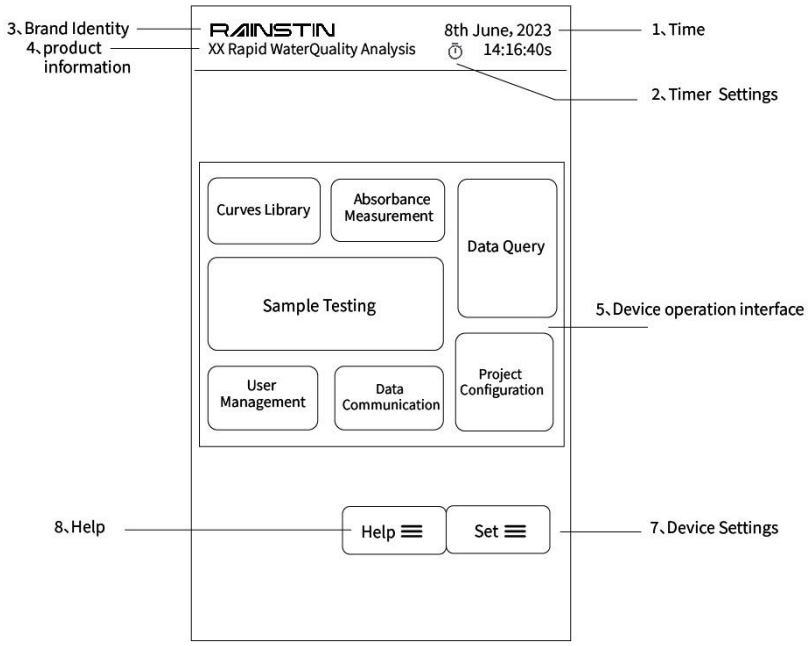


When using 16 mm colorimetric tube, align the 16 mm adapter with the arrow and insert it into the sample holder. The adapter is inserted by default.

As shown in the figure above, when using 25 mm colorimetric cuvette, simply pull up the 16 mm adapter, and insert the 25mm colorimetric cuvette.

4.3 Software Operation

When powered on for the first time, the “User Management” function is disabled by default. The main interface is displayed as shown below.



* Click “4. Product Information”, enter the password “666666”, and follow the prompts to modify the configuration name or customize a preferred name.

* The “2. Timer Setting icon” (alarm clock symbol) appears on every page. Click it to enter the timer setting interface and start a countdown as needed.

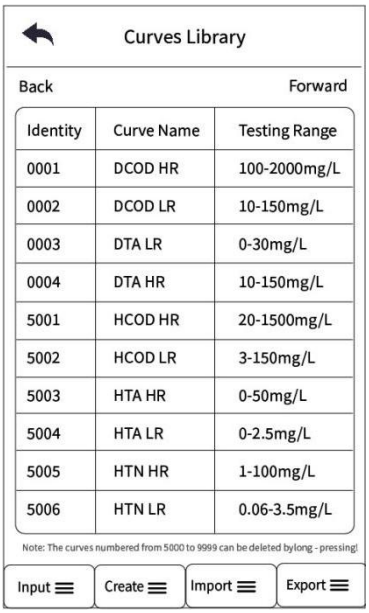
4.3.1 Curve Library

All measurement curves can be imported, entered manually, or created in this section.

Curves numbered below 5000 are built-in system curves and cannot be modified.

User-defined curves are numbered from 5000 to 9999, and can be freely edited.

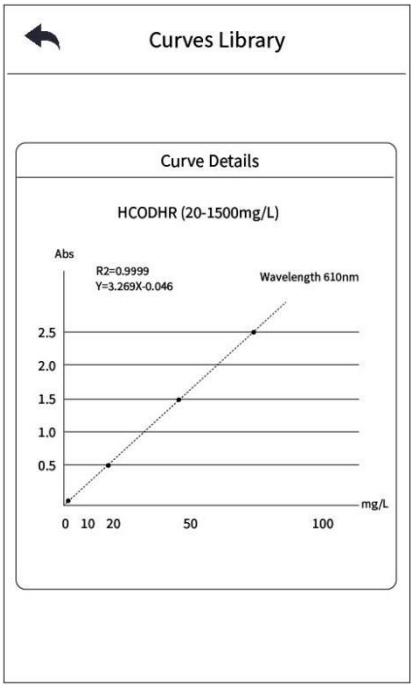
4.3.1.1 Curve Library Interface



The main page of the Curve Library displays all stored curves for selection. 4 features “Enter”, “Create”, “Import” and “Export” buttons are displayed below.

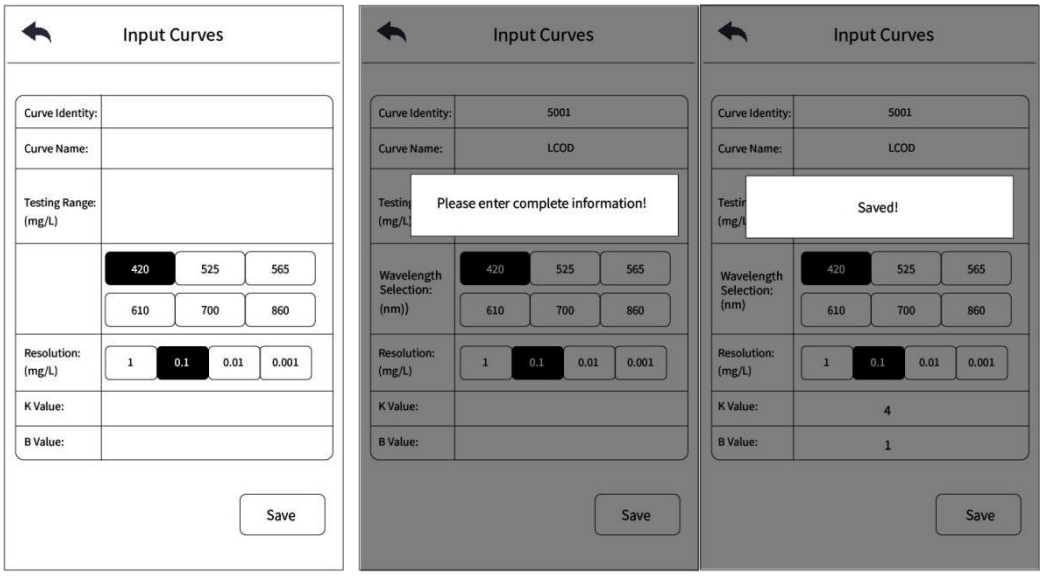
4.3.1.2 Curve Library Interface

Click any program within the Curve Library to view its detailed parameters, including K value, B value, and R value, or its corresponding graphical chart, as shown below



4.3.1.3 Enter Curve Manually

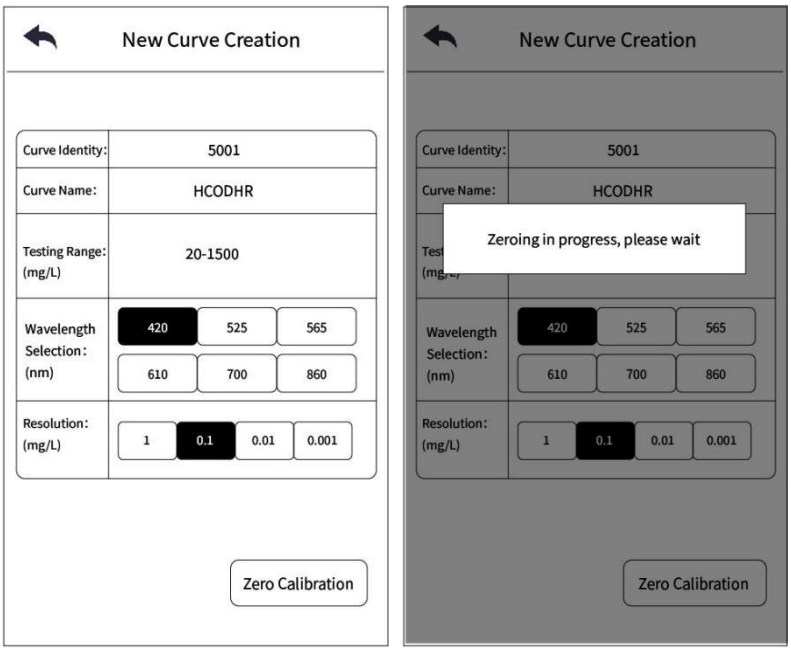
Click “Enter” button and enter all the corresponding information of measurement curve in the blank fields of the page, then click “Save” to store the curve. The values can be provided by company.



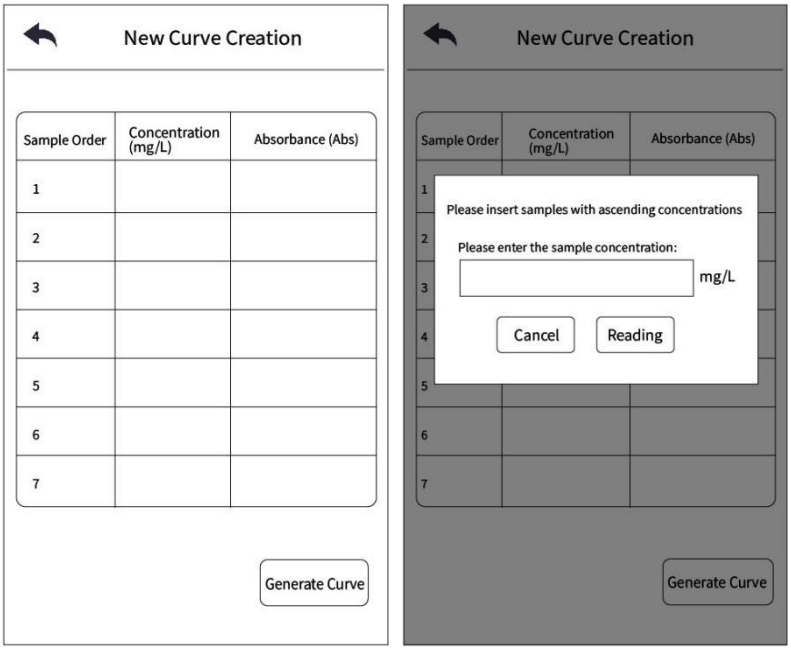
4.3.1.4 Create New Curve

Click “Create” button to create new curve as shown below. Select the wavelength, and input the curve code, name, and range. Select the resolution according to the

measurement range. Place a reference sample (zero) sample into the sample holder and click “Zero”.



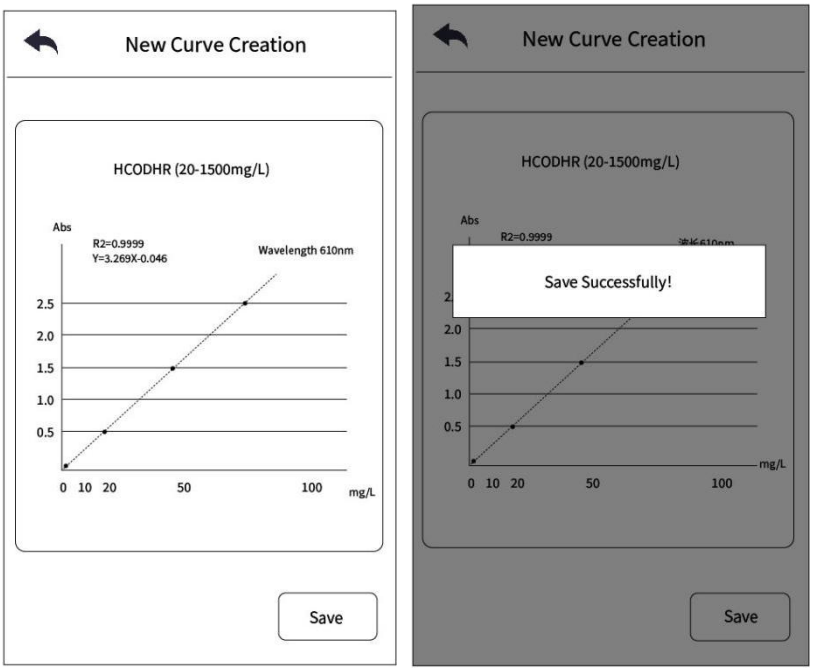
After zeroing, the interface will display as shown below:



Click the first concentration cell, input the concentration value of the first sample, then place the first sample to sample holder and click “Reading”. After the reading is complete, the absorbance value of the first sample will appear in the corresponding cell below.

Repeat the measurement process for different concentrations of samples.

When all data points are entered, click “Generate Curve” to create the curve chart at the bottom of the table. Click “Save” to store the new measurement curve, or back to cancel and return to the previous screen.



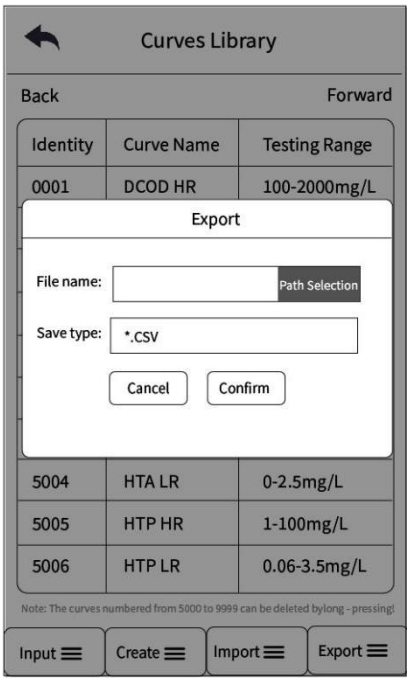
4.3.1.5 Import Curve

Click “Import” button to import curve. Select the file path (like USB drive) then click “Import” to complete the curve import.

***Important:** The file format of the curve is CSV. Make sure the USB drive contains only one CSV-format measurement curve file, otherwise the system may not recognize it.

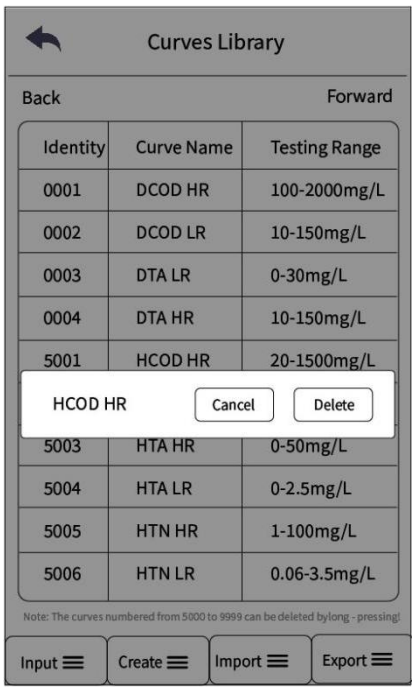
4.3.1.6 Export Curve

Click “Export” button to export all curves in the curve library. Enter the file name and select export file path. Click “Confirm” button to complete the curves exporting.



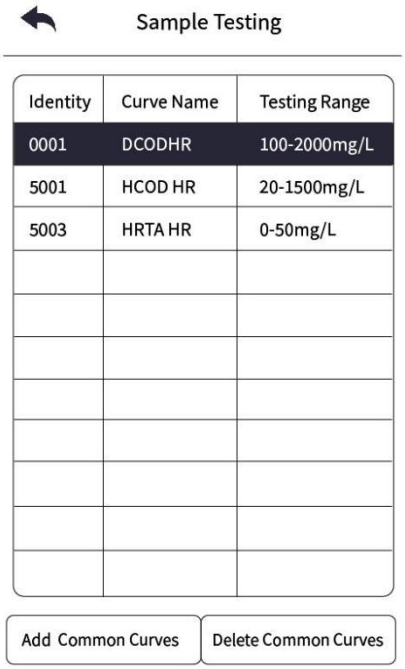
4.3.1.7 Delete Curve

Select the curve you wish to remove in the curve library, press and hold 3 seconds to active curve delete function which is shown below. Then press “Delete” button to delete it.



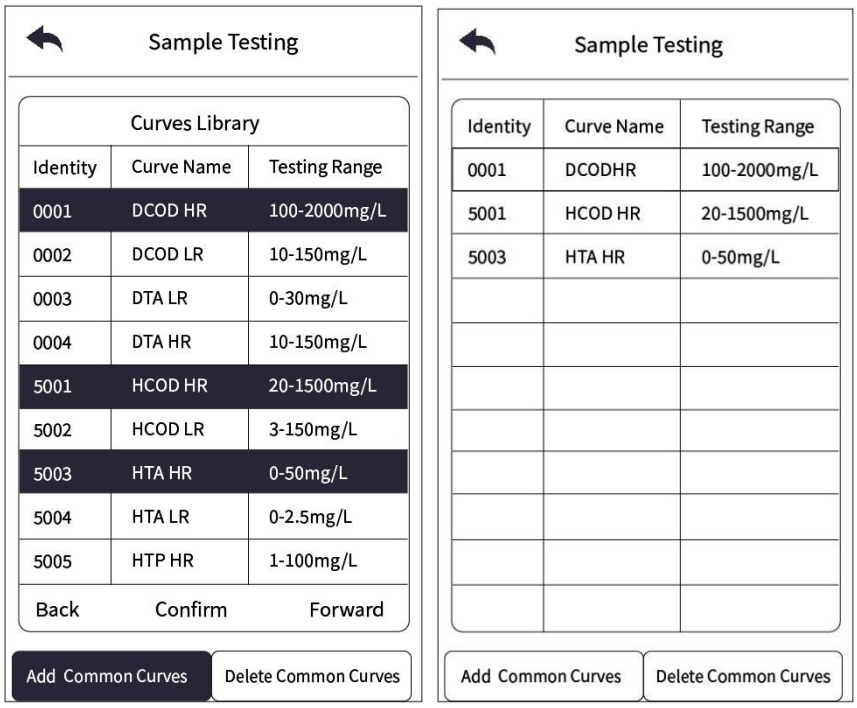
4.3.2 Sample Measurement

The “Sample Measurement” page contains “Add Programs” and “Delete Programs” and “Sample Measurement” functions.



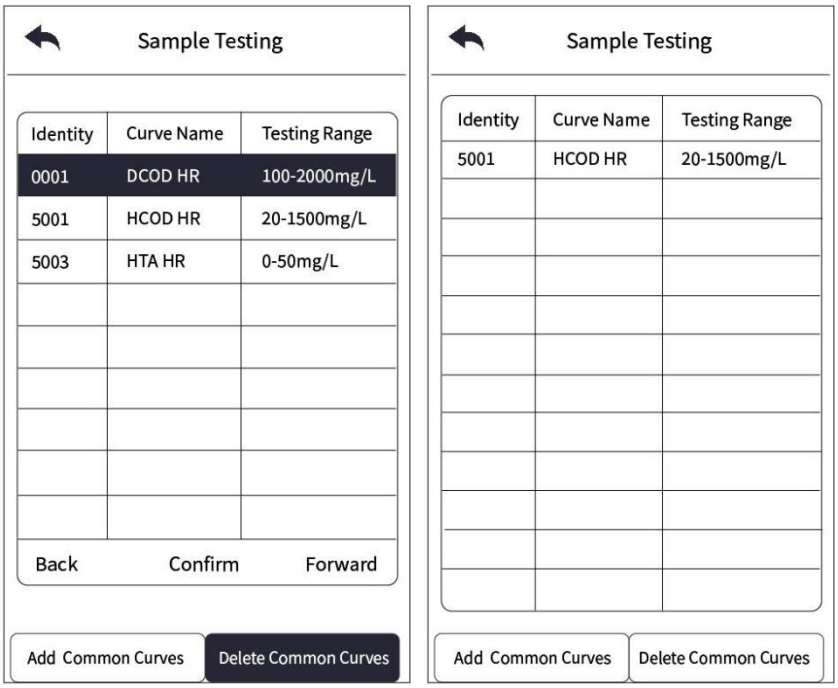
4.3.2.1 Add Frequently Used Programs

Click “Add Program”, select desired curves from the Curve Library, and press Confirm to add. Once added, these curves can be directly accessed from the “Sample Measurement” page next time.



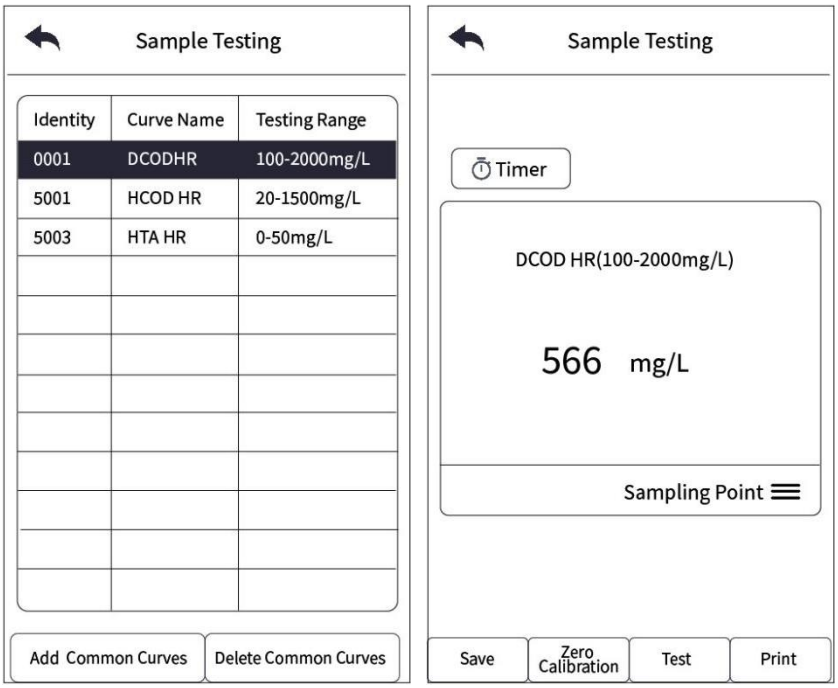
4.3.2.2 Delete Frequently Used Programs

Click “Delete Program”, select the curve you wish to remove, and press “Confirm” to delete it.



4.3.2.3 Sample Measurement Procedure

Click the corresponding curve number to enter the specific testing interface.



a) Click the symbol "≡" beside "Sampling Point " to select the sample point.

b) Place the reference (zero) sample into the sample holder, and click "Zero".

c) Remove reference sample and insert the sample to be measured into the sample holder, and click "Measure" to read data.

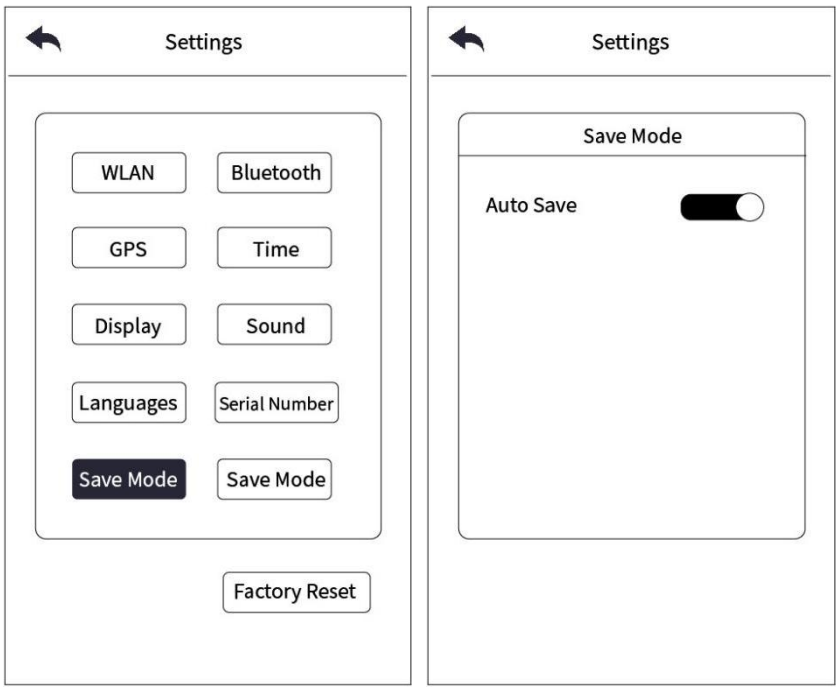
d) After the measurement result appears, click "Print" to print the data by thermal printer

e) Click "Timer" to set countdown reminders for color development reactions (e.g., ammonia nitrogen, total phosphorus).

f) Click "Data Saving" to choose result save mode:

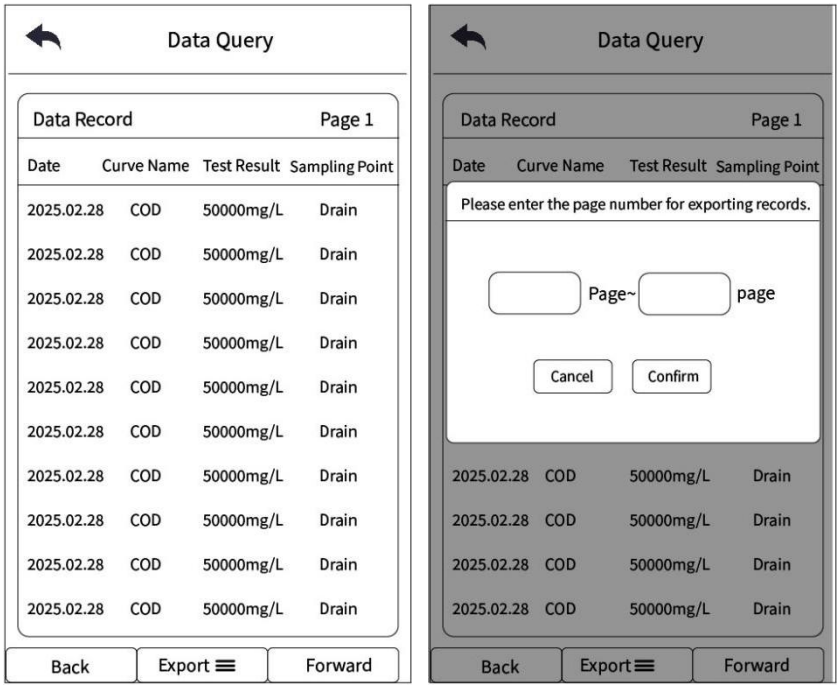
---- Default mode: Auto Save (data automatically saved after measurement).

---- Manual mode: click "Save" manually after each test. A popup message will confirm successful data saving.



4.3.3 Data Inquiry

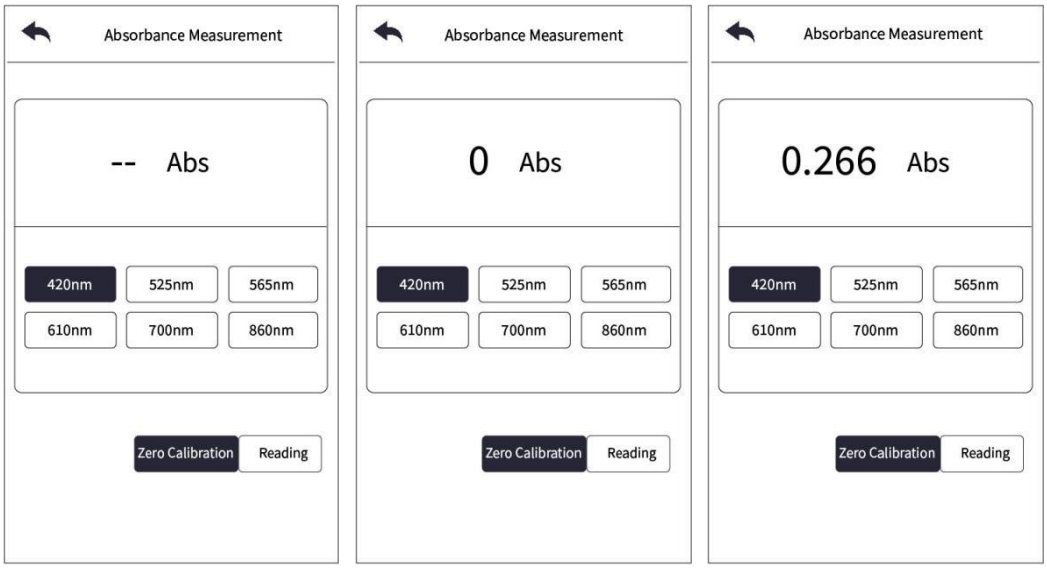
View all stored measurement records. Click any record to view detailed data. Click “Export” to transfer selected data to a USB drive.



4.3.4 Photometric Measurement

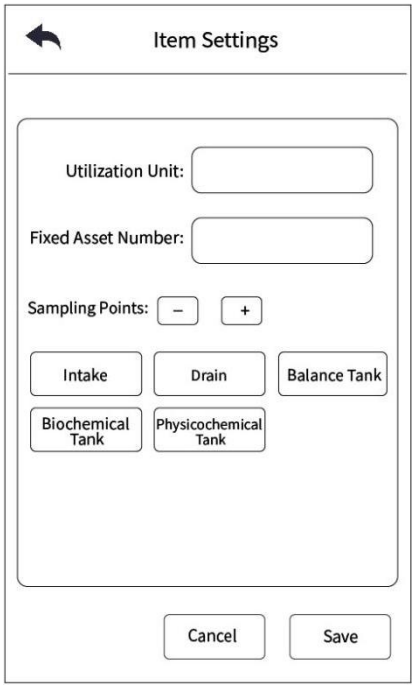
This function is used to measure the absorbance value at different wavelengths.

Select the desired wavelength, place the sample in the sample holder, and the system will automatically display the absorbance reading.



4.3.5 Project Settings

In this function, users can set the location of sampling points, user unit (organization name), and asset identification code according to specific project requirements.



4.3.6 User Management

By default, the “User Management” function is disabled.

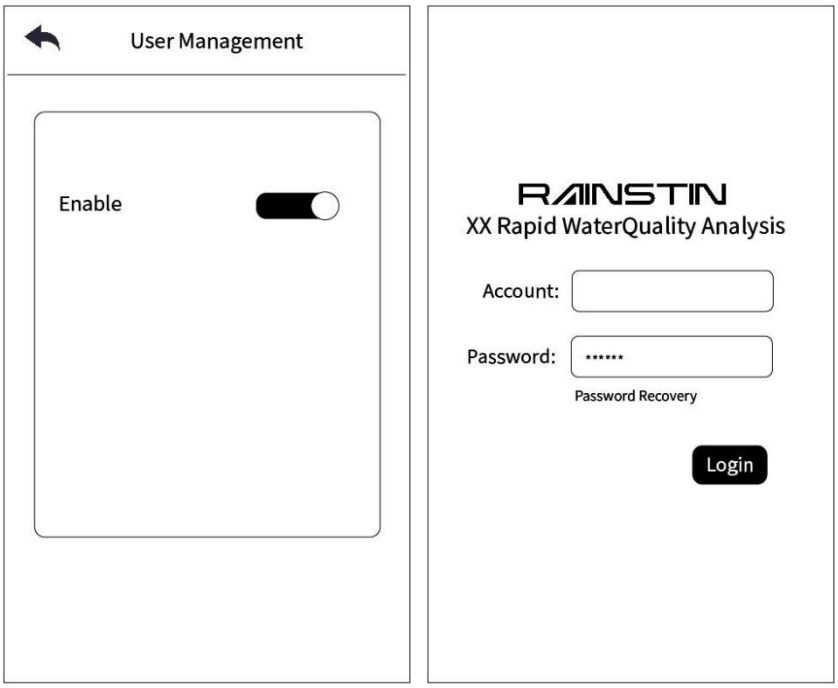
When enabled, the system will restart and enter the administrator login Interface.

- Administrator Username: admin
- Default Password: 123456

Upon first login, the administrator is required to change the password.

Administrator privileges include:

- Creating and managing sub-accounts
- Creating new curves
- Importing and exporting curves
- Deleting curves
- Viewing all user data records



4.3.7 Data Communication

This function becomes available only when the Wi-Fi or 4G communication module is installed.

Through this module, the instrument can connect to external systems such as LIMS (Laboratory Information Management System) for data synchronization and remote data transfer

4.3.8 Settings

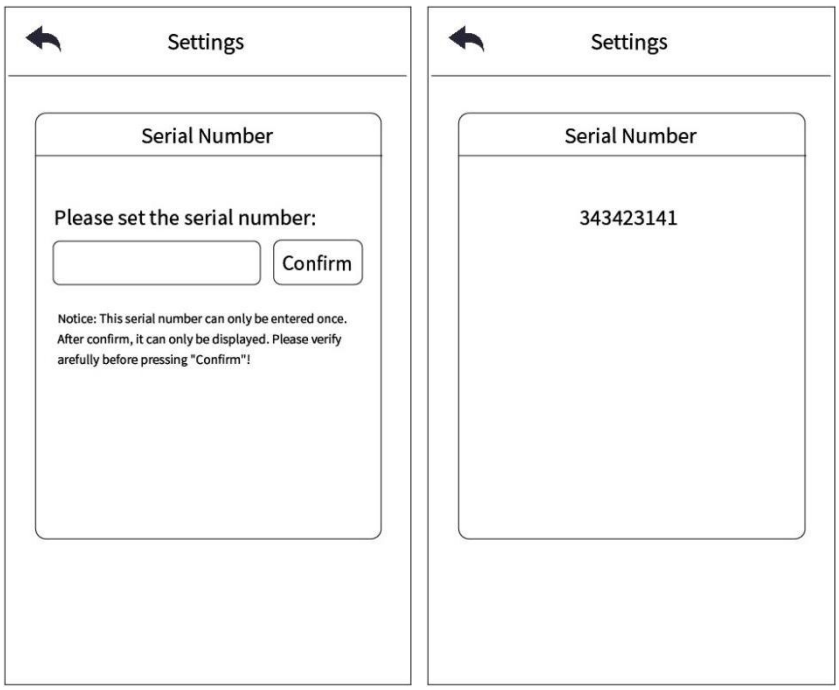
Click on the desired item to enter the corresponding sub-menu for configuration.

4.3.8.1 Optional Settings

Some settings become active only when the corresponding hardware module is installed — such as WLAN, Bluetooth, and GPS.

4.3.8.2 Serial Number

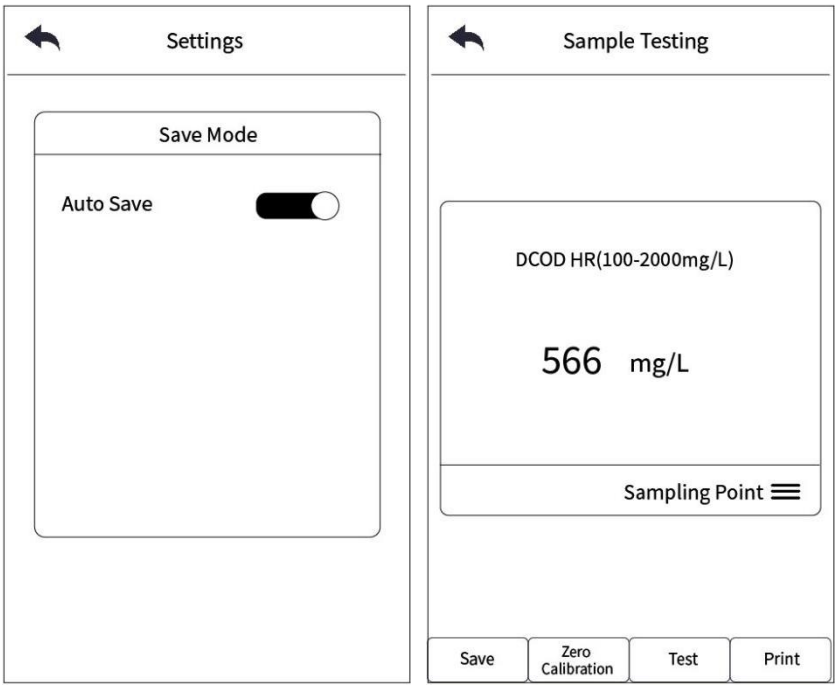
The serial number can only be set once. After being set, it becomes read-only and is used for after-sales tracking and device traceability.



4.3.8.3 Data Save Mode

The default mode is auto save mode. In auto save mode, measurement results are automatically saved and can be reviewed under “Data Inquiry”.

If manual save mode is selected, users must manually click the “Save” button on the “Sample Measurement” page to store results. After saving, a popup message will confirm “Data Saved Successfully.”



4.3.8.4 Other Settings

Follow the on-screen instructions to adjust system parameters such as date, time, and display options.

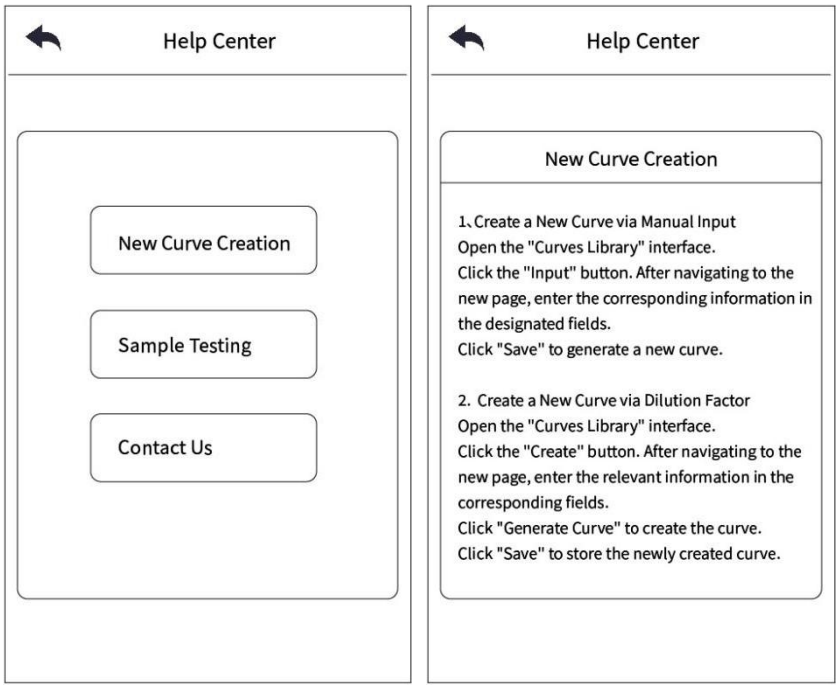
4.3.8.5 Restore Factory Settings

The “Restore Factory Settings” option will erase all user data and restore the device to its original state.

*Use this function with caution.

4.3.9 Help Center

The Help Center provides brief operating instructions and contact information for technical support.



5. Packing List

Item	Number
Benchtop multi-parameter water quality analyzer Instrument	1
Power Cable	1
User Manual	1
Certificate of Conformity	1
Warranty Card	1

About Zhongke Tk

Zhongke Tk (Shandong) Intelligent Technology Co., Ltd. was founded in 2015, with its headquarters located in Jinan, Shandong Province. It is a high-tech enterprise specializing in the R&D, production, sales and service of water quality analysis equipment.

The company has a professional R&D team. With profound professional knowledge and rich practical experience, the team members continuously promote the innovation and progress of water quality analysis technology to ensure that the products are always at the advanced level of the industry.

Our products cover a variety of water quality analysis equipment, including hydrogen conductivity meter, dissolved oxygen meter, pH meter, conductivity meter, multi-parameter water quality analyzer, etc. At the same time, the company also provides customized solutions for customers, tailoring suitable water quality analysis equipment and monitoring schemes according to their specific needs.

Adhering to the business philosophy of Technological Innovation, Quality First, Service Supreme, we continuously improve product quality and service level, provides customers with suitable water quality analysis equipment and solutions, and makes greater contributions to the development of the water quality analysis industry.

Address: Room 101-02, Building 22, Jinan Artificial Intelligence Technology Valley (Central District) Project, No.730 Qicai Road, Caishi Street, Licheng District, Jinan City, Shandong Province
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