



Benchtop Conductivity Meter FM-BCT-A100

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1. Introduction

Benchtop Conductivity Meter FM-BCT-A100 is a user-friendly conductivity meter ideal for aquaculture monitoring and water quality testing. Equipped with integrated automatic temperature compensation for conducting Conductivity & TDS tests across ranges up to 0.000 $\mu\text{S}/\text{cm}$ to 3000 mS/cm and 0.000 mg/L to 1000 g/L respectively. Featuring a 1–3 point calibration system for the automatic detection of known calibration standards.

2. Features

- Backlight, High-resolution LCD touchscreen, 7.0 inches
- Intelligent operational system offers calibration management, method reading, and data management
- Multi-reading feature enables auto-read, timed-read, and continuous-read
- Data analysis facilitates users to review, compare, and recalculate results
- GLP-compliant data storage: 1000 sets per parameter
- RS- 232 communication or USB port connection

3. Specifications

Model No.	FM-BCT-A100	
Conductivity	Range	0.000 $\mu\text{S}/\text{cm}$ to 3000 mS/cm
	Resolution	0.001 $\mu\text{S}/\text{cm}$ minimum, various with range selection
	Accuracy	$\pm 0.5\%$ FS
	Reference Temperature	5, 10, 15, 18, 20, 25 $^{\circ}\text{C}$
	Calibration Points	Up to 5
	Standard Recognition	146.5 $\mu\text{S}/\text{cm}$, 1408 $\mu\text{S}/\text{cm}$, 12.85 mS/cm , 111.3 mS/cm
Resistivity	Range	5.00 $\Omega\cdot\text{cm}$ to 100.00 M
	Resolution	0.01 $\Omega\cdot\text{cm}$
	Accuracy	$\pm 0.5\%$ FS
TDS	Range	0.000 mg/L to 1000 g/L
	Resolution	0.001 ppm minimum, changed with range
	Accuracy	$\pm 0.5\%$ FS
Salinity	Type	NaCl%
	Range	(0.00 to 8.00) %
	Resolution	0.0001
	Accuracy	$\pm 0.1\%$
Temperature	Range	-5 $^{\circ}\text{C}$ to 130 $^{\circ}\text{C}$
	Resolution	0.1 $^{\circ}\text{C}$
	Accuracy	± 0.1 $^{\circ}\text{C}$
Measurement	Reading Prompts	Reading, Stable, Locked
	Temperature Compensation	ATC, MTC
Inputs	Temperature Probe	6-pin Mini-DIN
	Conductivity Probe	8-pin Mini-DIN

Benchtop Conductivity Meter FM-BCT-A100

Display Options	Time-Zone	1 minute to 60 minutes
	IP Rating	IP54
General	Power	AC Adapter, 100- 240V AC input, DC24V output.
	Dimensions	280×280×130 mm
	Weight	2.5 kg

4. Applications

It is commonly used in water quality testing, wastewater treatment and printing and chemical industry along with general research and education.

5. Instrument Introduction

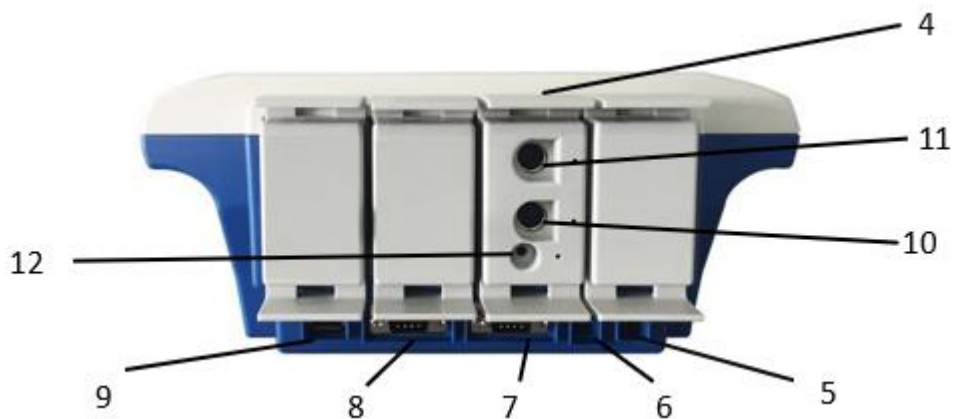
Structure

5.1 Front View of the Instrument



Front View (Figure 1)

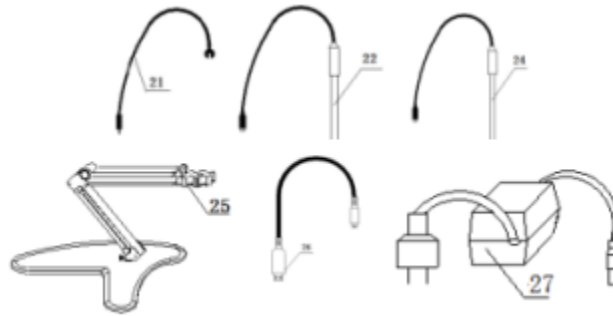
5.2 Rear view of the instrument



Rear View (Figure 2)

- | | |
|-------------------------------|----------------------------------|
| 1) Conductance Measuring Unit | 6) USB2 Socket |
| 2) Power Socket | 7) ATC Probe Socket |
| 3) USB1 Socket | 8) Conductivity Electrode Socket |
| 4) COM1 Socket | 9) Grounding Socket |
| 5) COM2 Socket | |

5.3 Instrument Accessories



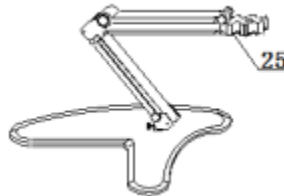
Instrument accessories (Figure 3)

- 1) Ground lead
- 2) Conductivity Electrode
- 3) ATC Probe
- 4) Electrode Stand
- 5) USB cable
- 6) Power adapter

6. Installation

Open the packing box; take out the Benchtop Conductivity Meter, electrode stand, and other accessories.

6.1 Installation of the multi-function electrode stand



Multi-function electrode stand (Figure 4)

6.2 Installation of the power adapter

The user should connect the power adapter with the instrument on one side and the power supply on the other side. The instrument lights up after turning on the power.

Caution:

- The power adapter only applies to this instrument, kindly don't use it for other instruments.
- There may be some tiny spark when users insert the power adapter into the instrument.
- This kind of phenomenon is quite normal; users do not have to worry about it.

1) Installation of the printer cable

- Instrument supports serial printers (users can choose and buy the printer by themselves, kindly refer to Appendix).
- If users need to print measuring results, stored results, and so on, connect a printer to the instrument, and then set up the serial number, communication baud rate, etc.

2) Daily use of the instrument

- In daily use, kindly don't insert and pull out the measuring unit at will, otherwise, it will affect the service life, channel parameters of the corresponding measurement method, etc.
- Relevant maintenance of measuring electrodes should refer to the operation instructions of the electrode.

7. Operations

7.1 Introduction

Make sure to read the installation and operation guides before use.

Note the following issues:

- Using a non-original power adapter may lead to unnecessary safety risks.
- Ensure proper grounding.
- Prevent exposure to corrosive gases.
- Keep the instrument interface clean and dry; avoid contact with acidic, alkaline, or salt solutions.
- This instrument is designed for long-term stability. After testing a sample, immerse the electrode in distilled water. If the testing interval exceeds 6 hours, or for long-term storage, clean the electrode and store it in an empty protective bottle.

1) Definition of Terms

- **Cell Constant:** Also called conductivity cell constant, it is the ratio of the distance between electrode plates to their area, usually expressed in cm^{-1} .
- **TDS Factor:** The conversion factor between conductivity and Total Dissolved Solids (TDS).
- **Temperature Coefficient:** The change in conductivity for each 1°C-temperature change, usually expressed as %/°C.

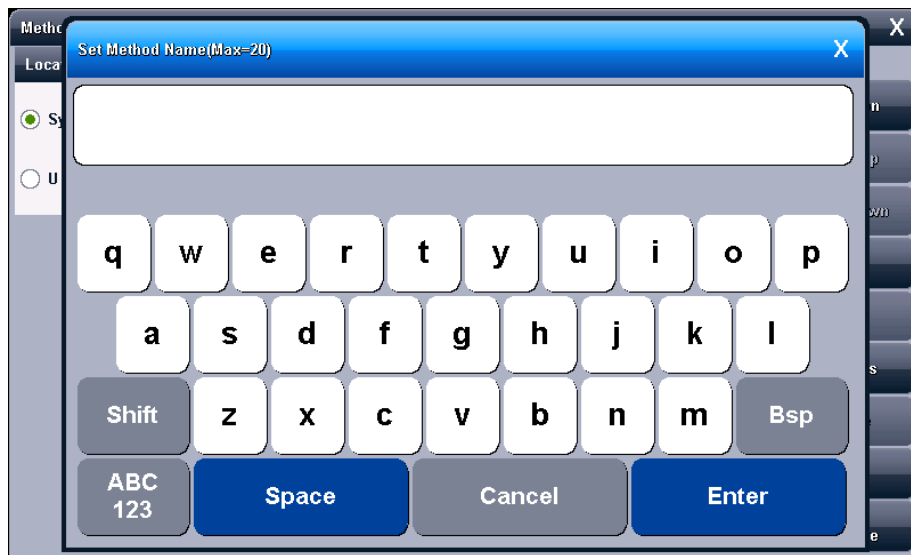
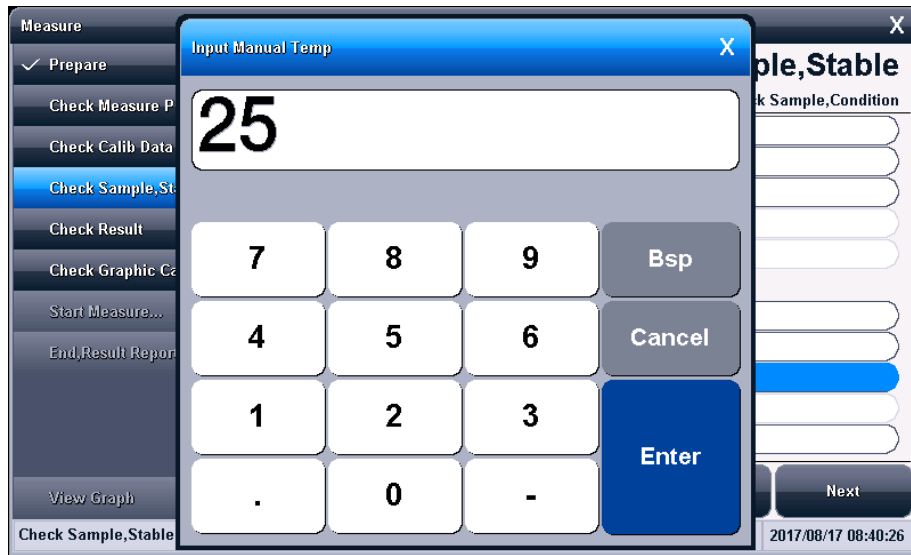
2) Operation Mode

- The default setting is that blue highlight bar for selected and time for invalid options.
- Click the highlight bar to carry on relevant operations. Concrete realization functions are related to actual function modules.
- There are two keyboard input ways, character and digit. The title of the input window is the input information tip; the upward side is the input window and below is the keypad.
- Press “**Cancel**” to exit input; press “**Enter**” to confirm input; press “**Bsp**” (Backspace) to clear input character.

Caution:

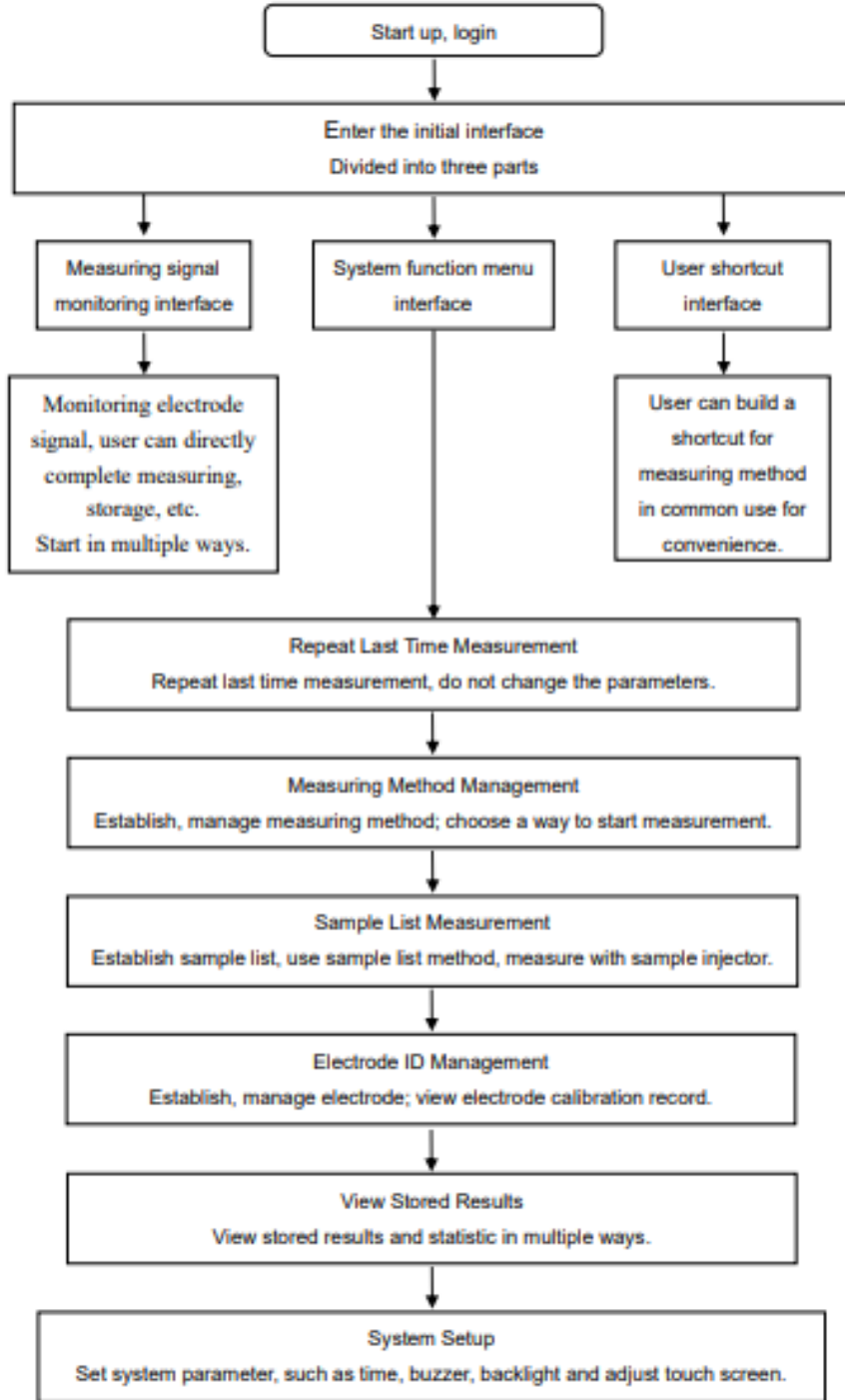
Since this instrument adopts a touch screen to operate and control, if the deviation in the touch screen is big, the user can click a little harder and extend the contact time appropriately to increase the click effect or recalibrate the touch screen.

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Keyboard input (Figure 5)

3) General operation chart



General operation chart (Figure 6)

7.2 Measuring Mode

1) Mode's description

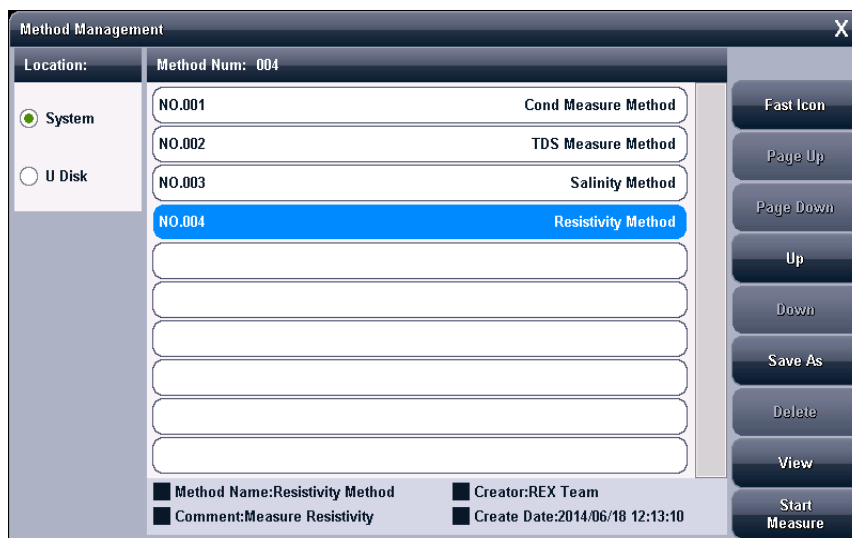
- The instrument defines all measurements with a measuring method; each measuring method contains a complete set of measuring processes.
- Every measuring method holds multiple parameters, including prompt parameters; electrode calibration parameters; measuring control parameters; sample parameters; measuring result parameters; etc., and mainly has basic measuring method information; measuring parameter; reading mode; electrode; calibration result; data stable condition; temperature control; sample; equipment(stirrer); result option; output options; graphics control parameters; etc.
- The instrument can store up to 100 sets of measuring methods. Once exceeds the limited number of storage, users can delete former measuring methods or store them into a U disk.
- The measuring methods stored in the U disk can also be viewed, deleted and copied to the instrument. The instrument will create a file name in the root directory in the first-used U disk with the following format:

C:\LEADSERI\METHOD\RESULT

Measuring methods are stored in C:\LEADSERI\METHOD.

Measuring results and measuring data curves are stored in C:\LEADSERI\RESULT.

- The file format temporarily adopts DOS system 8.3 coding, that is, eight upper cases for file name, and three characters for file extension. The extension is in a fixed format, that is, ".MOD" for measuring method file. For example, "M1.MOD" is the file of measuring method 1; "M2.MOD" is the file of measuring method 2.



Measuring mode management (Figure 7)

2) Parameters of Measuring Method

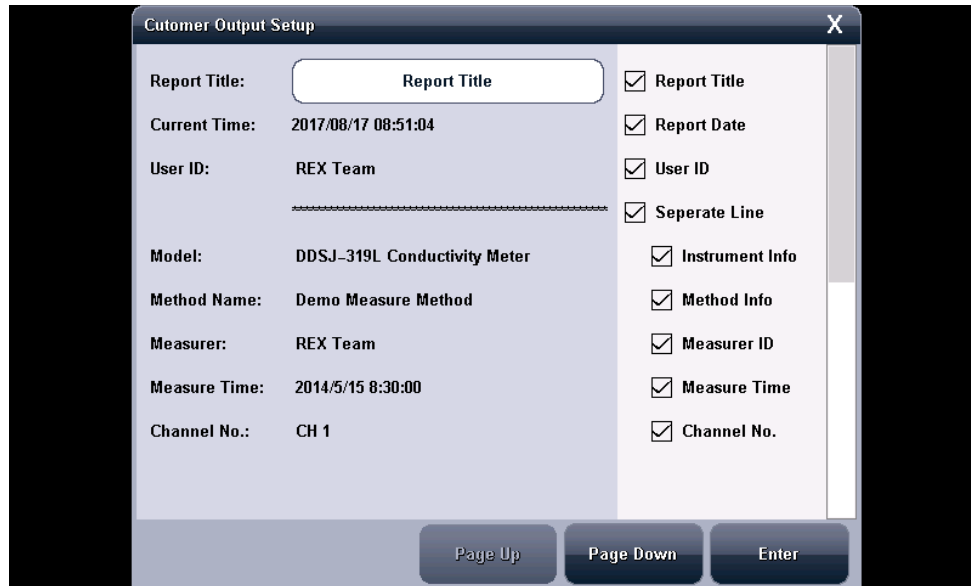
The following are explanations of specific parameters for the measuring method.

- **Method Name:** The name of the method; can be modified; no more than 20 characters.
Caution: Users cannot modify measuring methods provided by random.
- **Comment:** Explains the specific applications of the method; can be modified; no more than 20 characters.
- Measuring parameters shows the current type of measuring parameter, such as conductivity measurement, TDS, etc. Each measuring parameter supports the corresponding measuring channel, reading mode, balance condition, electrode, electrode type, calibration results, ion name, and measuring samples.
Caution: Basic measuring methods that have been set measuring parameters by random cannot be modified.
- **Channel No:** shows the relevant channel number of the current measuring parameter, CH1 to CH4.
- **Reading Mode:** Shows the relevant reading mode of the current measure parameter. The instrument supports three reading modes: continuous reading mode, balanced reading mode, and timed reading mode.
Caution: Users cannot modify the reading mode of basic measuring, methods provided by random cause they are default locked.
- **Continuous Reading Mode:** This reading method is suitable for continuously monitoring sample data and observing the changing trend of the sample. Requires the user to terminate the measurement manually.
- **Smart Reading Mode:** Users should first set balance conditions, when measurement begins, the meter will automatically measure, calculate and display the measuring result. Once it meets the set balance condition, the measurement will be over. Balance condition includes balance time and balance value. The condition is satisfied when all measured data meet the requirements of balance value in set balance time. The instrument provides four balance conditions, expressed as "Fast, Medium, Strict, Custom". The instrument allows users to customize the balance condition; the balance condition varies with the measuring parameter.
- **Timed Reading Mode:** The instrument supports two timing reading modes, one is fixed time reading mode and the other is fixed interval reading mode.
- **Fixed time reading mode:** When measurement begins, the instrument will work till time out. For example, set time is 300 seconds; the instrument will continue measuring 300 seconds.
Note: A fixed time mode will not automatically save measuring results.
- **Fixed interval reading mode:** Need to set the measuring interval and the times of measurement, the instrument will automatically collect and record data according to the set interval. The minimum timing interval is 1 second.
- **EC Name:** the name of the electrode corresponding to the current measuring parameter.

Caution: To manage better to the electrode better, the concept of using specifications for the electrode is necessary. When using a new electrode, users are recommended to create an electrode name by "**EC ID Management**". Thus, every time after electrode calibration, the calibration data will be automatically saved to this electrode, making it easy to view the electrode performance.

- **Calib Result:** The last time calibration result of using an electrode, also the electrode parameter that will be used to a current measuring parameter.
- **Calib Operator:** The operator of the last calibration.
- **Calib Time:** The last time of calibration.
- **Temp Coefficient:** Corresponding to the measurement of conductivity, TDS, and salinity. When accuracy measurement is required, the influence of temperature will affect the measurement accuracy of conductivity; at this point, we need to set the temperature compensation coefficient, the default value is 0.020, which is 2.00%/°C.
- **Set Cell Constant:** This parameter corresponds to conductivity and salinity measuring parameters. Usually, there are two ways to get an electrode constant: calibrate the conductivity electrode with a standard conductivity solution or set the electrode constant directly.
- **Set TDS Factor:** This parameter corresponds to the TDS measuring parameter. Usually, there are two ways to get the TDS factor: calibrate the conductivity electrode with a standard conductivity solution or set the TDS factor directly.
- **COND Compensation Mode:** This parameter corresponds to the conductivity measuring parameter. The instrument supports three kinds of compensation modes, including non-compensation mode; linear compensation mode, and pure water compensation mode:
 1. **Non-compensation:** At this point, the instrument measures the absolute conductivity value.
 2. **Linear Mode:** The instrument will automatically compensate for the corresponding conductivity of the reference temperature.
 3. **Pure Water Compensation Mode:** This compensation mode corresponds to the measuring requirements of pure water.
- **COND Reference Temperature:** This parameter corresponds to the measurement of conductivity. The instrument supports six kinds of reference temperatures: 5.0 °C, 10.0 °C, 15.0 °C, 18.0 °C, 20.0 °C and 25.0 °C. The default is 25.0 °C.
- **Salinity Compensation Mode:** This parameter corresponds to the measurement of salinity. Support the default mode and seawater mode.
- **Standard Seawater Salinity:** This parameter corresponds to seawater salinity measuring mode. It means the nominal salinity of seawater salinity calibration; currently always use salinity 35.000 ‰, which is 3.500% standard seawater.
- **Corrected Conductivity:** This parameter corresponds to seawater salinity measuring mode, seawater salinity can also be calibrated, the default conductivity of standard seawater under 15.0 °C is 42.9 mS/cm. If users need accurate measurement, calibrate again.

- **Balance Condition:** The instrument provides four balance conditions, expressed as "**Fast, Medium, Strict, Custom**". It will have different measuring parameters and measuring environments for different balance conditions.
- **Balance Time:** Corresponding to the balance condition. It is a parameter of the balance condition, which means the minimum waiting time that meets the data stability condition. Within this time, all the measuring data should meet the set balance value; the instrument will always wait till that condition. The longer the time is, the stricter the requests are, and vice versa.
- **Balance Value:** This parameter corresponds to the balance condition, it is a parameter of balance condition, which means the more acceptable degree of data, the greater the number is, the easier it can reach balance, and vice versa. It will have different indicative values for different measuring parameters.
Caution: Users can only modify custom balance time and balance value.
- **Temperature Display Mode:** The instrument supports Celsius (°C) or Fahrenheit (°F) temperature display.
- **Temperature Compensation Mode:** Each measuring parameter supports independent temperature compensation; when users select manual temperature compensation, the instrument will calculate with the set temperature value; when users select automatic compensation, the instrument will collect temperature with a temperature sensor. At this time, if the temperature sensor is not connected, the instrument will still use the manually set temperature.
- **Manual Temperature:** Adopt manual temperature when automatic temperature compensation is invalid.
- **Sample Quantity:** The quantity of measuring samples with this method.
- **Sample ID:** Sample Name, no more than 10 characters. The instrument allows the measurement of multiple parameters, multi-channel, and multi-samples at the same time. To meet this need, it is necessary to set the name of the sample. Whether store results after measurement or not, the parameter corresponds to the measuring results. If set to store results, the instrument will automatically store after the measurement is finished; otherwise, users must manually store the results. The instrument allows users to store results at any time.
- **Output Option**
The output option includes an output device, output port number, baud rate of communication, the number of characters per line of printer, whether the output title or not, the name of the output title, and output content. The instrument supports the GLP function and allows users to establish output requirements. Usually, there are three kinds of output methods: in GLP format, in a standard format, and in a user-defined format. Once users select a custom format, the instrument allows users to customize output settings. As shown in Figure 8, users can customize the report title, report time, user information, instrument information, measuring method information, measuring information, electrode information, calibration information, sample information, etc.



User-defined output display (Figure 8)

Output in GLP format is to print all relevant information, standard format is brief output.

- **Graphics parameter:** Controls the graphic display parameter during measurement. Mainly record interval parameter with curve; means the record frequency of measuring curve, the minimum is 1 second.

3) Create Your Measuring Method

The instrument supports users to generate their special measuring method in some special applications, usually, we can save the system-provided measuring method or direct measuring method as a new method, and then you can get by modifying and adjusting measuring parameters.

7.3 Power On, Shutdown, and Keypad

- 1) Connect one end of the power adapter to the instrument, plug the other end to an alternating current power supply outlet; and turn on the power; the instrument will directly start up. The instrument will first display information instrument model, name, etc. Just a moment after self-inspection, the instrument will require users to log in.
- 2) This instrument adopts a touch screen for operation and control and is matched with a touch pen. Users can extend contact time appropriately to increase the accuracy of clicks. If the deviation position is big, re-calibrate the touch screen so as not to affect the use effect.
- 3) The default setting is a blue highlight bar for selected and time for invalid options. Click the highlight bar to carry on relevant operations.
- 4) The instrument adopts a navigational keypad. After measurement, the user can press the navigation key for more than 4 seconds to shut down the instrument. Next time, press one time to start up directly.

- 5) The instrument also supports navigation key operation. Rotate the navigation key left and right, the user will find a blinking prompt box pointed at the relevant function module displayed above the monitor. Press once to enter the relevant function. If the user does not rotate the navigation key for 5 seconds, the prompt box will automatically disappear.

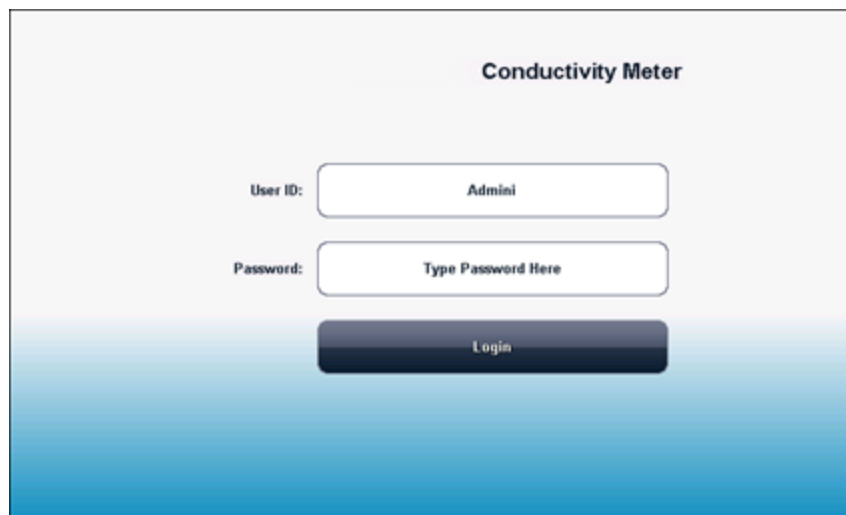
Caution

1. If not in use for a long time, to avoid unnecessary loss, users should disconnect the power source of the power adapter or close the alternating current power supply, to avoid heat damage caused by long-time power supply.
2. Use the power adapter matched with the instrument. Users should not use power adapters that do not meet the requirements of the instrument, to avoid damage to the instrument and bring you unnecessary loss.

7.4 User Login and Initial Interface

This instrument supports up to 8 users and has password management. By default, the first user is Admin and cannot be modified. Only Admin has the right to create and delete users.

- 1) After login success, the instrument begins to check external equipment and enter the initial state. All operations will start from here and the instrument will back to the initial state after finishing the corresponding operations, as the figure below shows.



Instrument login display (Figure 9)

Warning:

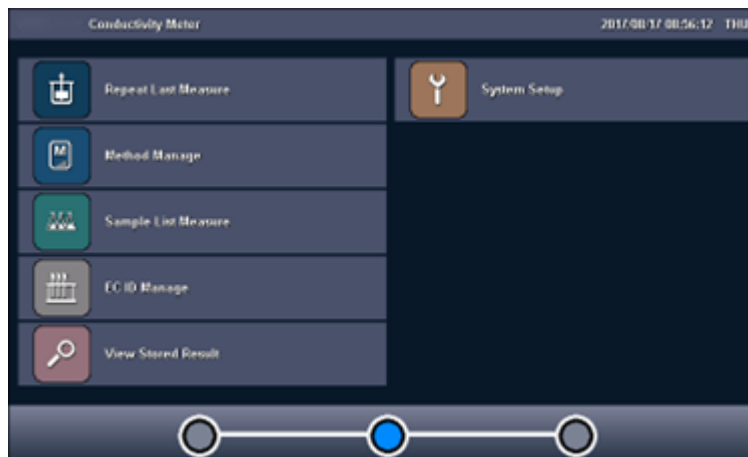
1. Before leaving the factory, there is no password, which means, the default password of Admin is blank, users can log in by directly pressing the "Enter" button.
2. If users have set a password, kindly safely keep the password to avoid unnecessary troubles.

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- 2) There are three parts to the initial state, one is measurement signal monitoring, the second is the system function menu, and the third is a user-defined shortcut. Below every page, the upper left side is the instrument model, the upper right side is the current clock, and the current page direction is at the bottom of the page. Users can click on the icon or slide left and right to switch.
- 3) First, the measurement signal monitoring page. The measuring result is in the middle, the upper side displays reading mode; temperature compensation type; measured parameters; etc., and below is the last time calibration result.



Instrument initial state display1 (Figure 10)



Instrument initial state display2 (Figure 11)

- 4) **Second, the system menu page.** This page contains entire system function menus, including repeat last time measurement; measuring method management; sample list measurement; electrode ID management; looking up for the stored data; system settings; etc. Users can click the option to enter the corresponding module.

- 5) The third is a user-defined shortcut page. Users can create a shortcut of frequently used measuring methods here for convenience.



Instrument initial state display3 (Figure 12)

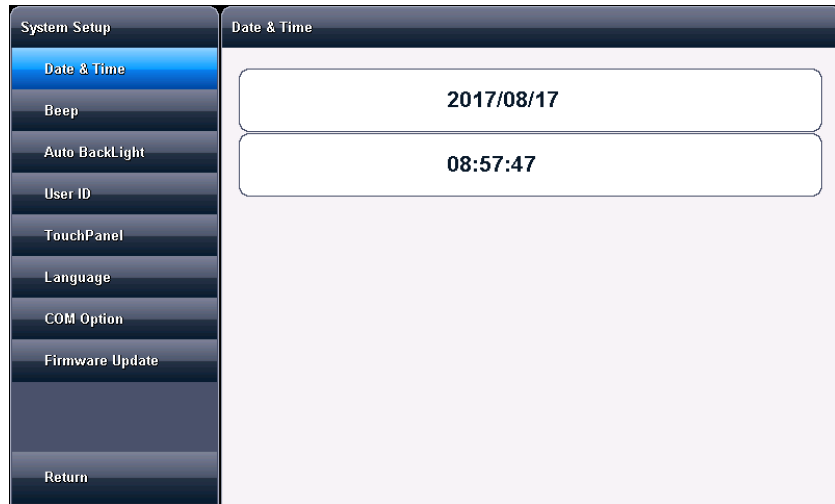
7.5 Instrument Operation

1) Shortcut

- This instrument supports simple shortcut operations and allows users to create a shortcut icon for commonly used measuring methods. The shortcuts are displayed on the instrument's initial state; users can enter the corresponding function directly by pressing them for convenience.
- Click the add icon at the end of the user-defined shortcut page, it will skip to measuring method management. If users want to create a certain measuring method as a shortcut, press the "Shortcut" button to establish it. The instrument supports up to 10 shortcut icons.
- If users want to modify the display content of the icon, press a certain shortcut icon, then press Rename Shortcut. The input name can only be an English character (length≤20 characters) to ensure artistic display.
- Also, users can delete a certain shortcut. Press the shortcut that needs to be deleted, then choose Delete Shortcut.

2) System Setup

System setup includes function modules like system time, buzzer, automatic backlight, display settings, User ID management, touch screen correction, language selection, baud rate setting, firmware upgrade, etc. In the initial state, select "**System Setup**" to enter, as shown in the figure below.



System setup display (Figure 13)

- **System Time:** It is used to record the time of operation, method development, electrode calibration, etc. If the deviation is big, adjust the system time according to the local time. Time format as Year/Month/Day Hour: minute: second.
- **Buzzer:** Set the prompting mode of the buzzer, including whether beeping when the button is valid and when moving to a special situation.
- **Automatic backlight control:** The instrument can adjust the backlight automatically, which can reduce power consumption. It will automatically reduce the brightness of the backlight once reaches the preset time. There are five options, that is, to set backlight automatically or not; “off” means backlight always shows; “1 min, 5 min, 10 min, 20 min” respectively means if there isn’t any key operation within 1 minute, 5 minutes, 10 minutes or 20 minutes, the backlight will shut down automatically (to enter power saving mode, there is still a pale display. In power saving mode, press any place of the screen to back to preset backlight value); the instruments also allows users to set the brightness of the backlight;
- **User ID Management:** This function includes changing the user ID, setting a password, creating a user, deleting the user, and logging off. It supports up to 8 users. By default, the first user is Admin and cannot be modified. Only Admin has the right to create and delete users. Log off will restart the instrument. Another user has no right to create and delete users.

Warning:

1. Before leaving the factory, there is no password, which means, the default password of Admin is blank, users can log in by directly pressing the “**Enter**” button.
2. If a password has been set, please keep it safe to avoid any unnecessary issues.

- **Touch Screen:** Including two functions: touch screen calibration and test of touch screen. Recalibrate the touch screen if users find the deviation of the touch screen button is big due to long-term use or other reasons. The instrument adopts five-point calibration, users need to continuously press five times in five locations to complete calibration. Once enter the calibration state, please operate carefully according to the operation steps, the calibration results will directly affect your use. To verify the result of calibration, the instrument also provides a test module. After entering the test module, users can press any position of the screen according to their user habits to view the accuracy of the click, including click strength, location size, and effect of clicking by touch pen or finger. Coordinating with use habits, users can use the touch screen in a better way. After calibration, save calibration data.
- **Language Select:** The instrument supports both Chinese and English versions to meet different users' requirements.
- **Baud Rate Set:** This function is used to set equipment and external devices, such as RS232 printers, and the baud rate of PC communication.
- **Firmware Update:** The instrument supports the firmware upgrade function and provides many ways to upgrade to meet the product function extension and users' individuation needs. There are two ways to upgrade the instrument: upgrade with U disk and upgrade with specific software through PC. Press "**About**" to view version information.

7.6 Electrode ID Management

The instrument supports electrode ID management. By default, there is one electrode for the convenience of customers. It supports up to five of every kind of electrode. Every electrode includes the following properties: electrode name, description, registrant, registration time, shelf life, the prompting mode to shelf life, electrode type, and previous calibration record.

- **Electrode Name:** Electrode ID. It is a unique identification to recognize one electrode. Once created and defined, please don't change it casually, otherwise users are likely to lose calibration data. It supports modification, up to 20 characters.
- **Description:** Allows users to briefly explain the electrode, supports modification, up to 20 characters.
- **Registrar:** The operator establishes the electrode. Once it is established, the instrument will mark the current user as the electrode registrar. This parameter cannot be modified.
- **Registration time:** The time that establishes the electrode. This parameter cannot be modified.
- **Shelf Life:** It usually expresses the operational use time of the electrode, for different electrodes, the shelf life is different.
- Prompting mode to shelf life, the instrument allows users to prompt the shelf life of the electrode when measuring, for easy checking and detection.

- **Calibration Record:** each electrode supports up to 20 sets of calibration records. The conductivity electrode supports 20 sets of calibration records of electrode constant calibration records and 20 sets of TDS factor calibration records. Users can delete certain calibration records. When the storage exceeds the maximum, the instrument will automatically delete the earliest record.

In the initial state, select the menu item "**Electrode ID Management**" to enter. After selecting a relevant electrode, press "View" to check the specific content of a certain electrode, including relevant calibration records and related parameters, etc. For each electrode, the instrument supports up to 20 sets of electrode calibration records. Users can view, delete, or calibrate data of measuring method (enter by measuring method). Here, the instrument also supports the re-calibration of the electrode.

The screenshot displays the 'EC ID Manage' interface. On the left is a vertical menu with options: pH EC, pX EC, ORP EC, COND EC (highlighted in blue), DO EC, and Return. The main area shows 'EC Number: 01' and a list of electrodes. The first entry is 'NO.01' with 'COND Electrode' to its right. Below this are seven empty input fields. On the right side, there are five buttons: Select, Create, Save As, Delete, and View. At the bottom, a status bar contains the following information: EC Name: COND Electrode, Shelf Life: Six Months, Comment: Meas COND,TDS,SALI, Message Type: Message Close, Loginer: REX Team, Calib Number:01, Login Date: 2014/06/18 12:13:10, and Last Calib Time: 2014/06/18 12:13:10.

Electrode ID Management display (Figure 14)

Benchtop Conductivity Meter FM-BCT-A100

View EC ID Parameter, EC ID:COND Electrode

Basic Information | Cell Const Calib Log | TDS Factor Calib Log

Basic Information

EC Type: COND EC

Loginer: REX Team

Login Date: 2014/06/18 12:13:10

EC Name: COND Electrode

Comment: Meas COND,TDS,SALI

Shelf Life: Six Months

Message Type: Message Close

Calib Type: Yes

Page Up

Page Down

Select

ReCalib

Delete

Return

View electrode parameter display1 (Figure 15)

View EC ID Parameter, EC ID:COND Electrode

Basic Information | **Cell Const Calib Log** | TDS Factor Calib Log

Cell Const Calib Log

Calib No. 1

Calib No. 2

Calib No. 3

Calib No. 4

Calib No. 5

Calib No. 6

Calib No. 7

Calib No. 8

Calib No. 9

Calib No.10

User ID: REX Team

Calibrate Time: 2014/06/18 12:13:10

Calib Num: 3

No.	STD Value	Measured	Cell Cont
STD1	1408µS/cm	1408µS/cm	1.000
STD2	12.85mS/cm	12.85mS/cm	1.000
STD3	111.3mS/cm	111.3mS/cm	1.000

Cond 1408

Cond 12852

Cond 111310

1408µS/cm
1408µS/cm
25.0°C

12.85mS/cm
12.85mS/cm
25.0°C

111.3mS/cm
111.3mS/cm
25.0°C

Page Up

Page Down

Select

ReCalib

Delete

Return

View electrode parameter display2 (Figure 16)

7.7 Electrode Calibration

For different measuring electrodes, the calibration method is different. Usually, there are many ways to calibrate electrodes:

- When electrode ID is managed, view electrode calibration data.
- When measuring method management, view electrode calibration data.
- When measurement begins, examine the electrode and calibrate the result.

Except for the DO electrode, the instrument supports the edit and select function of calibration results; allows users to store the last calibration result to this calibration and select reedit in calibration results. Therefore, before calibration, the instrument will remind the users whether to store the last calibration result or not. If users want to re-calibrate, select not reserve, or else select reserve. For example, users completed the last calibration with KCl solution 0.01mol/L、 0.1mol/L、 1mol/L three-point calibration, this time want to repeat calibrate the calibration point 0.1mol/L, then can select reserve this data.

The instrument adopts navigational calibration; users can follow instructions step by step to complete the calibration.

1) Calibrate cell constant

Usually, every conductivity electrode is marked with a cell constant value, users can just set the cell constant value of the conductivity electrode in the mainframe.

Under different operating environments or not in use for a long time, there will be certain drift for conductivity electrode, causing the change of response range and linearity. Users need to use the standard solution to re-calibrate. The instrument supports up to five-point calibration.

The instrument supports an automatic recognition function for electrode standard solution. There are usually two ways to get the standard solution, prepare by themselves or purchase.

First, prepare the conductivity standard solution: users can prepare the standard solution by themselves according to the below data.

Table of KCl Standard Solution used to measure cell constant

Cell Constant(cm ⁻¹)	0.01	0.1	1	10
KCl solution approximate concentration (mol/L)	0.001	0.01	0.01 or 0.1	0.1 or 1

The Composition of Standard Solution

Approximate concentration (mol/L)	Volume concentration KCl(g/L) solution (in 20°C air)
1	74.2650
0.1	7.4365
0.01	0.7440
0.001	Dilute 100mL 0.01mol/L solution to 1L

The relationship between KCl solution approximate concentration(Unit: $\mu\text{S}/\text{cm}$) and its' conductivity value

Approximate Solution (mol/L)	Temperature				
	15.0°C	18.0°C	20.0°C	25.0°C	30.0°C
1	92120	97800	101700	111310	131100
0.1	10455	11163	11644	12852	15353
0.01	1141.4	1220.0	1273.7	1408.3	1687.6
0.001	118.5	126.7	132.2	146.6	176.5

Second, the purchase of a conductivity standard solution. If it is inconvenient for users to prepare a standard solution because of the limited conditions, users can also directly purchase certified standard buffer solutions from professionals.

Caution:

For users' convenience, to reduce the work of preparing standard solutions, 4 standard buffer solutions are mentioned above. Users can buy directly. It is convenient to use the standard solution to calibrate the electrode before the measurement.

Preparation before Calibration

Prepare 1 to 5 kinds of conductivity standard solution, DI water, etc. as required. After preparation, press "Next".

Check Calibration Parameter

Check measuring parameter display (Figure 17)

The instrument supports conductivity solution automatic recognition function, default 4 kinds of standard solution. The standard data adopts a KCl solution of 1mol/L; 0.1mol/L; 0.01mol/L; 0.001mol/L.

If using the unconventional standard solution, users can set the identification type to "Manual identification" and input the nominal value manually.

Check Graphic Attribute

It shows the display attributes in the process of calibration.

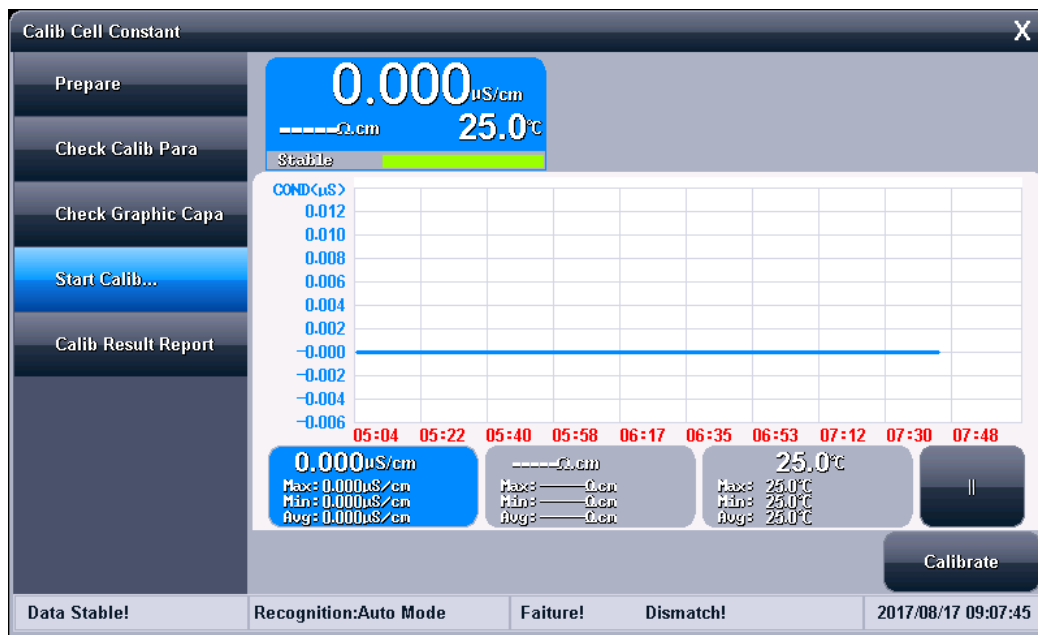
Start Calibration

The specific calibration process is as follows:

- Prepare 1~5 kinds of standard solutions as required (can be purchased).
- Insert the conductivity electrode and ATC Probe into the relevant instrument socket; rinse the electrode with DI water and immerse it in standard solution.
- If it is automatic identification, the instrument will automatically identify the standard solution and display the nominal value; if the recognition is a failure, maybe the ATC Probe is connected wrongly, an electrode is damaged, or the standard solution passes its shelf life.
- If it is manual identification, users need to manually input the nominal value.
- If the standard solution cannot be identified or there is no input nominal value, this calibration will not be able to continue.
- After the reading is stable, press the "Calibrate" key, the instrument will store the calibration result and switch to the report page of calibration result, displaying the calibration result.

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- If users need to continue calibrating other standard solutions, press the "Continue Calibration" key to return to calibration status; rinse the electrode and put into another standard buffer solution. After successfully identifying and stable reading, press the "Calibrate" key to complete the calibration.
- The instrument supports repeatedly calibration of the same standard solution, that is, supports the function of matching the same standard solution. When the current calibration solution differs by 50 μ S/cm from previous calibration solution, the instrument considers the standard solution the same and will automatically cover former standard solution's calibration data. This function can prevent repeat calibration, or allow users to calibrate casually.
- Complete calibration, press "X" key to exit.



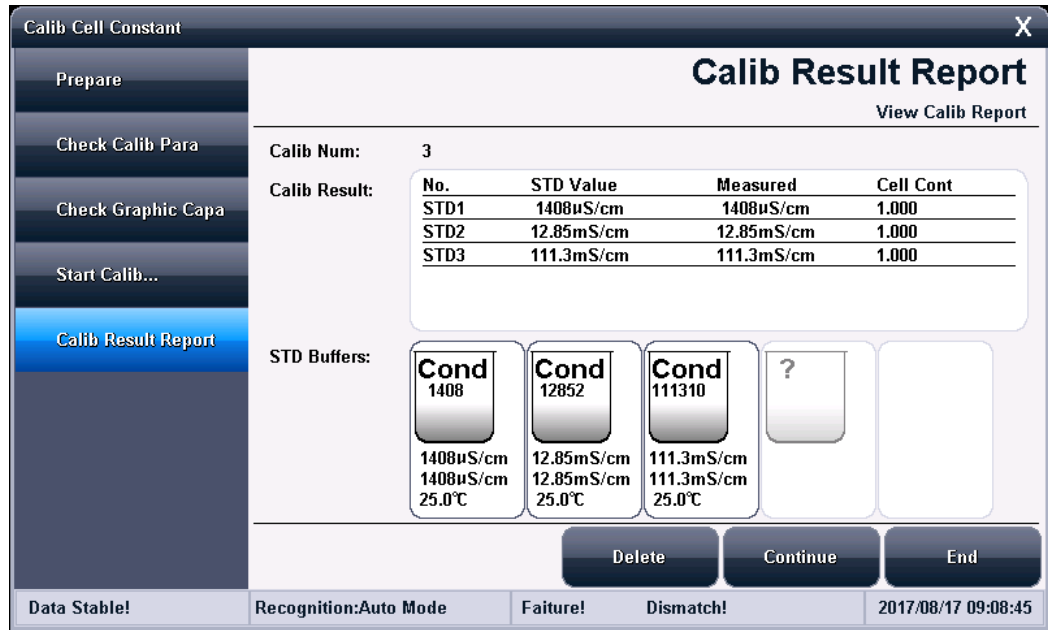
Calibration display (Figure 18)

Calibration Result Report

Every time after the end of calibration, the instrument will switch from the calibration page to the calibration result report page. The report page prompts the detailed data of the current calibration point, calibration result and calibration solution.

The instrument allows users to switch to the calibration result report page at any time to view calibration results. If there is previous calibration data, the instrument allows deleting a certain calibration result.

Press the "End" key to finish calibration.



Calibration result report display (Figure 19)

Calibrate TDS Factor

For the measurement of corresponding TDS, users may need to calibrate the TDS factor. The operation method is like calibrating cell constant, basic operations are as follows:

- Rinse the electrode with DI water.
- Immerse the conductivity electrode in standard solution; control the temperature of solution at $(25.0 \pm 0.1) ^\circ\text{C}$.
- Set nominal value, input corresponding data in table, which is the TDS value of current standard solution.
- After the reading is stable, press “Calibrate” key, the instrument will automatically calculate new TDS conversion coefficient value; if there is other standard solution, repeat above calibration process.
- Please refer to Cell Constant Calibration for detailed operations.

Relation table of conductivity and TDS standard solution

Conductivity $\mu\text{S}/\text{cm}$	TDS Standard Value		
	KCl(mg/L)	NaCl(mg/L)	442(mg/L)
23	11.6	10.7	14.74
84	40.38	38.04	50.5
447	225.6	215.5	300
1413	744.7	702.1	1000
1500	757.1	737.1	1050
2070	1045	1041	1500
2764	1382	1414.8	2062.7
8974	5101	4487	7608
12880	7447	7230	11367
15000	8759	8532	13455
80000	52168	48384	79688

1. 442 means 40% Na₂SO₄, 40%NaHCO₃ and 20%NaCl.
2. The value listed in the table is under 25°C.

Calibrate the Salinity of Seawater

When measuring the salinity of seawater with seawater salinity mode, users need to re-calibrate. At present, we use standard seawater of S=35.000 to calibrate. The operation method is like calibrating cell constant, basic operations are as follows:

- Rinse the conductivity electrode with DI water.
- Immerse the conductivity electrode in standard solution and control the temperature of the solution at (15.0±0.1) °C.
- After the reading is stable, press the “Calibrate” key and the instrument will automatically measure the calibration factor.
- Kindly refer to Cell Constant Calibration for detailed operations.

Electrode Calibration

Preparation before Measurement

Users should know better about the properties of measuring material (samples); conventional test methods; basic operation and application of the instrument and the usage and maintenance of general electrodes.

If using the automatic sample injector developed, users need to test if the sampler can work normally, if the connection pipe of the sample injector has fallen off, and drainage hole is clear. Debug with the sample injector built-in button, or online debug after connecting to the instrument.

Several ways to start measurement

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The instrument supports a variety of ways to start and complete a measurement, including:

- Start with "Repeat Last Measurement".
- Start with "Direct Measurement".
- Start with "Method Measurement".
- Start with "Sample List Measurement".
- Start with "Shortcut".

Start with "Repeat Last Measurement"

If users have performed a measurement, the instrument will record the last measuring parameter. Press the menu item "Repeat Last Measurement" to directly start the last measurement process with all measuring parameters unchanged. After measurement, users can view, store, print, stat, etc.

Start with "Direct Measurement"

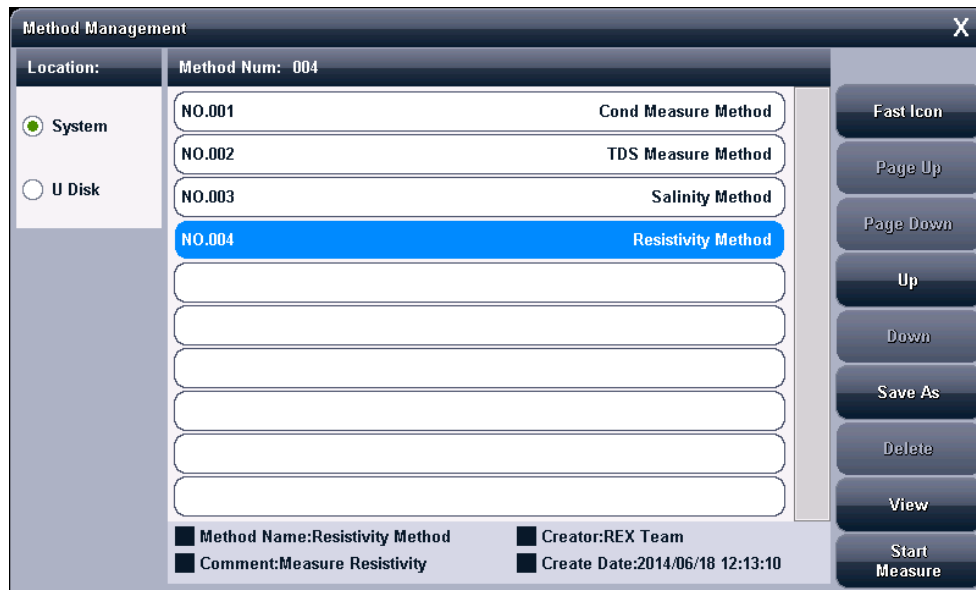
The instrument displays measuring results in the initial state, users can click to start measurement. Direct measurement is also a measurement method; all measuring parameters should be set and modified before the measurement starts.

In the initial state of the instrument, click the measurement window or "Direct Measurement" to start the measurement. The instrument controls measuring parameters based on the measuring unit configured.

The instrument adopts a navigation structure; it guides users to complete operations and parameter configuration step by step and finally begins and complete measurement. Please refer to Method Measurement for detailed operations.

Start with "Method Measurement"

For all users, this is the most used to start measurement. Users can click "Measuring Method Management" to enter method management, as shown in Figure 20.



Measuring method management display (Figure 20)

Usually, the general steps are as follows:

- Select the proper measurement method.
- Press the “View” key to view or set relevant parameters and return after finishing. Detail settings and parameter definitions refer to the “Parameter of Measure Method” section.
- Press the “Start Measuring” key to start measurement. Every measure method is controlled by reading mode. For details, kindly refer to the relevant measure section.
- After measurement, users can view, store, print out, etc.
- All the measuring process of the measuring method is similar.

Start with “Sample List Measurement”

Sample list measurement, that is multi-sample measurement, can meet users’ requirements for large amounts of sample measurement. Sample list measurement is suitable for batch measurements of mature samples; complete the measurements of multiple samples at once which can meet efficient work demands. The function requires the support of an automatic sample injector.

Set Sample List

The sample list allows users to set measurement parameters, sample ID, sample injector position, selective measurement options, electrode selection, current channel number, reading mode, balance conditions, and more. Users can click on the relevant item to modify settings.

- Measuring parameter: it shows the type of parameter under test. Here only displays the first measuring parameter, if there are multiple parameters, press “View” to view other parameters.
- Sample ID: set the information of the sample according to actual.
- Sample injector position number: it shows the position number of the sampler corresponding to this sample. Note: The position of the sample must be one-to-one corresponding to the position of the sampler.
- Selective measuring: the instrument allows users to choose if set samples take part in the measurement. Users can decide on a few samples to be measured together at any moment; unselected samples will automatically be displayed in a light color.
- Using electrode: the electrode corresponding to the measuring parameter.
- Current channel number: the channel number corresponding to the measuring parameter.
- Reading mode: the reading mode corresponding to the measuring parameter. The reading mode must be the balanced reading mode or timing reading mode, otherwise, the measurement cannot end.
- Balance condition: the balance condition corresponding to the measuring parameter.

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Each sample corresponds to a specific measurement method. Click "View" to check and modify the relevant parameters. Use "Add" or "Delete" to add or remove a measurement method.

In the instrument's initial state, select the "Sample List Measurement" option to access sample list management, as shown in Figure 21. In the figure, five samples have been created, with three samples ready for measurement. "Conductivity" is set as the measurement parameter, and the corresponding positions of the sample injector are Cups No. 1, 2, and 3.



The screenshot shows a software interface titled "Sample List Table Management" with a close button (X) in the top right corner. On the left is a vertical menu with options: "Sample Table" (highlighted), "AS Option", "EC Calibrate", "Result Option", "Output Option", and "Return". The main area is titled "Sample Table" and contains the following information:

- Total Sample: 05
- Create Sample Table for Series Measurement.
- A table with 5 rows and 5 columns: No., Measure Para., Sample ID, Cup No., and Selected.
- Buttons on the right: Left arrow, Right arrow, Up, Down, Add, Delete, View, and Start Measure.
- Selected Sample: 03 at the bottom.

No.	Measure Para.	Sample ID	Cup No.	Selected
01	Conductivity	Sample 1	1	Yes
02	Conductivity	Sample 1	2	Yes
03	Conductivity	Sample 1	3	Yes
04	Conductivity	Sample 1	4	No
05	Conductivity	Sample 1	5	No

Sample List display (Figure 21)

Sample Injector Settings

Allows users to set sample injector parameters, including the connected port number, communication baud rate, selective cleaning options, cleaning position, cleaning mode, cleaning speed, cleaning volume, stirrer settings, and more.

- **Port Number:** This refers to the communication signal of the sample injector. The instrument supports two RS232 ports, labeled COM1 and COM2, and must be set accordingly.
- **Baud Rate:** The baud rate for communication with the sample injector, which defaults to 9600 bps.
- **Selective Cleaning:** Determines whether the electrode should be cleaned before measurement. If cleaning is selected, users must set the relevant cleaning control parameters.

- **Cleaning Position:** Supports cleaning either at the cleaning position or in situ with the sample. The sample injector has a dedicated cleaning position (position 0), with a special drainage pipe designed to handle large cleaning volumes. If cleaning in situ, users must ensure the cleaning volume does not exceed the sample cup's capacity, as this could lead to overflow, potential damage to the instrument, and unnecessary losses.
- **Cleaning Mode:** Includes automatic cleaning mode and fixed cleaning mode.
- **Cleaning Speed:** The spray speed of the sample injector, which can be set to fast or slow.
- **Cleaning Volume:** The volume of cleaning fluid, with four available options: 5 ml, 10 ml, 20 ml, and 30 ml.
- **Stirrer Type:** Some measurements require a stirrer. The instrument allows users to employ a stirrer on the sample injector for convenience.
- **Stirrer Speed:** The speed at which the stirrer operates, which can be set by the user.

Sample List Table Management		AS Option
		Set Auto Sampler for Measurement.
Sample Table	COM Port No.:	COM1
AS Option	BaudRate:	9600bps
EC Calibrate	Cleaning Select:	Before Measure
Result Option	Clean Position:	Clean Position
Output Option	Clean Mode:	Auto Mode
	Clean Speed:	Fast
	Clean Volume:	30mL
Return	AS Stirrer Type:	No Stirrer

Sample list measurement - Sample injector settings display (Figure 22)

Electrode Calibration

To maximize the convenience of users, the instrument allows users to automatically complete the calibration of the cell constant before measurement, to complete all the measurements at once.

Caution:

1. To use the sample injector for automatic calibration, the instrument must have an automatic identification function, and the standard solution provided is essential. If users use their standard solution, the identification may fail, and the measurements may be incorrect!
2. There are four default standard solutions. The standard data uses KCl solutions with concentrations of 1 mol/L, 0.1 mol/L, 0.01 mol/L, and 0.001 mol/L.

Electrode calibration includes selective calibration, calibration parameters, standard solution, the number of standard solutions, and the position on the sampler, among others. Click on the corresponding item to modify.

- **Selective Calibration:** There are several options: no calibration, calibrate once, or calibrate every time. "No calibration" means the electrode is not calibrated; "calibrate once" means the electrode is calibrated once before starting the entire measurement process; "calibrate every time" means the electrode is calibrated before each sample measurement.
- **Calibration Parameter:** This refers to the type of parameter being calibrated, such as calibration for conductivity.
- **Standard Solution:** Four types of standard solutions are locked and predefined.
- **Position on Sample Injector:** This refers to the position on the sample injector, which should correspond one-to-one with the actual standard solution.

The screenshot shows the 'EC Calibrate' settings window. On the left is a navigation menu with options: Sample Table, AS Option, EC Calibrate (highlighted), Result Option, Output Option, and Return. The main area is titled 'EC Calibrate' and includes the instruction 'You can set Calibrate Type here.' The settings are as follows:

- Calibrate Select: No Calibrate
- Calibrate Para: Calib COND
- STD Buffer: Four buttons labeled 'Cond' with values 147, 1408, 12852, and 111310.
- Calib STD Num: 3
- Cup Position: Three buttons labeled 1, 2, and 3.

Sample list measurement - Electrode calibration settings display (Figure 23)

Measuring Result Selection

This setting applies to all measured samples, including options for storing results, outputting results, and more. Users can adjust the settings as needed.

Output Options

After the measurement, if users need to print the measurement results directly, they must set the serial printer and output parameters.

Sample List Table Management	
Sample Table	Output Option You can set Output Option in detail.
AS Option	Output to: Printer
EC Calibrate	COM Port No.: COM1
Result Option	BaudRate: 9600bps
Output Option	Max Char Len a Line: 40
	Report Title Yes/No: Yes
	Title Name: Report Title
	Output Type: GLP Format
Return	

Sample list output options display (Figure 24)

Start Measurement

- After completing all settings, click on the "Sample List" item and press the "Start Measurement" button to begin the measurement. The instrument will control the sample injector to sequentially measure all samples according to the settings, or it will perform automatic calibration first, followed by the measurements.
- Once the measurement is complete, the instrument will automatically store and print the results as configured.

COND Measuring Method

- The COND measuring method is a common method used to measure conductivity and resistivity values.
- Select "Cond Measure Method" in the measuring method management to begin the measurement process. This includes preparation before measurement, checking measurement parameters, reviewing electrode calibration results, verifying sample measurement conditions, checking result processing, confirming graphic attributes, starting the measurement, and generating the result report after measurement. Click "Next" in sequence to complete the measurement.

Preparation before measurement

Users should prepare the conductivity electrode before measurement. If calibration is needed, users can either purchase or prepare a calibration solution themselves. The following are the preparatory steps and important considerations for the conductivity electrode.

- Completely rinse the conductivity electrode with DI water, and then rinse it as described in the "Maintenance of Conductivity Electrode" section. If it continues to malfunction or becomes unstable, please refer to the "Maintenance of Conductivity Electrode" section.
- Check samples: If the conductivity electrode works well in a standard solution but does not function properly with samples, check for the presence of interfering substances or possible damage to the conductance cell.
- The surface of the platinum slice in the platinum black series conductivity electrode is coated with a delicate platinum black layer. Avoid any contact with objects, and only rinse it with DI water. Any other contact may damage the platinum black layer and lead to inaccurate measurements.
- If the performance of the platinum black conductivity electrode is reduced, immerse the platinum slice in anhydrous ethanol followed by DI water for cleaning.
- Since the platinum black layer on the surface of the platinum slice can adsorb sample components during measurement, the electrode must be rinsed thoroughly after each use.
- After being stored for some time or after extended use, the cell constant may change and recalibration will be necessary.

Check Measuring Parameter

The measuring parameters include the settings for reading mode, conductivity compensation mode, conductivity reference temperature, and more.



Check measuring parameter display (Figure 25)

Check electrode, Calibration result

- This page allows users to set the measured conductivity electrode and calibration data. It enables users to view, set, or re-calibrate the cell constant and adjust the temperature compensation coefficients.
- Each conductivity electrode has a corresponding cell constant, which should be set before measurement. The cell constant may change after prolonged use, so it is recommended that users recalibrate using a conductivity standard solution. There are two methods for obtaining the cell constant value: one is by recalibrating with a conductivity standard solution, after which the instrument will automatically calculate the cell constant; the other is by directly setting the cell constant.

Caution: Only one method should be chosen. If the last cell constant was obtained through calibration, users will need to directly input the cell constant this time. The instrument will delete the previous calibration data, so please take note.

No.	STD Value	Measured	Cell Cont
STD1	1408μS/cm	1408μS/cm	1.000
STD2	12.85mS/cm	12.85mS/cm	1.000
STD3	111.3mS/cm	111.3mS/cm	1.000

Check electrode calibration result parameter display (Figure 26)

Check the sample and measuring condition

This page sets the balance condition, temperature display, and sample ID.

Check result processing

This page sets the process mode of measuring results and relevant output content.

Check graphic attribute

This page sets the control attributes of the display curve when measuring.

Start Measurement

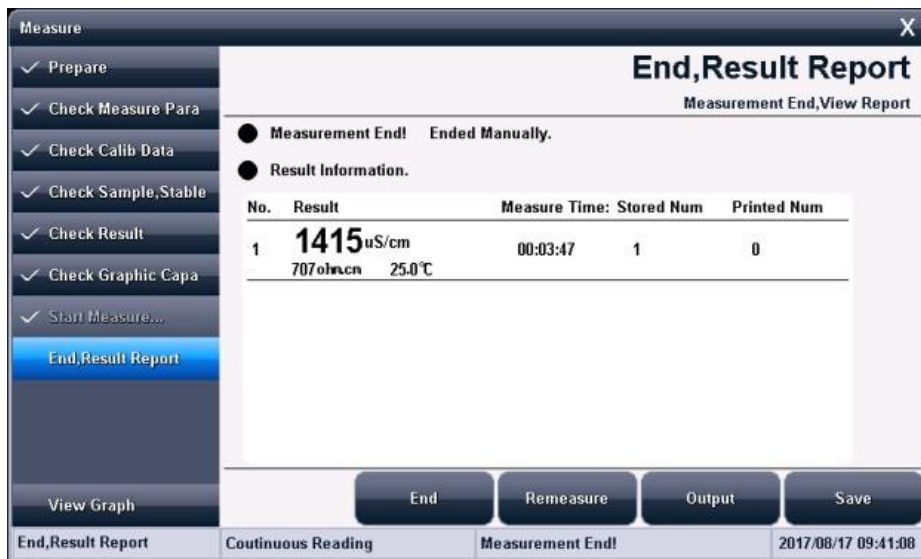
After completing all settings, the instrument can begin the measurement. It will automatically sample, display results, judge, and complete the entire measurement process according to the set reading mode.



Measurement display (Figure 27)

Result Report after Measurement

After the measurement, this page displays statistical information of measurement.



Result Report after Measurement display (Figure 28)

TDS Measuring Method Measurement

- The TDS measuring method is commonly used to measure TDS and resistivity values.
- Select "TDS Measuring Method" in the measuring method management to start the measurement.
- All operations, displays, and measurements are similar to the COND measuring method. Please refer to the "COND Measuring Method" section for details.

Salinity Measuring Method Measurement

- The salinity measuring method is commonly used to measure salinity and resistivity values.
- Select "Salinity Measuring Method" in the measuring method management to start the measurement.
- All operations, displays, and measurements are similar to the COND measuring method. Please refer to the "COND Measuring Method" section for details.

Resistivity Measuring Method Measurement

- The resistivity measuring method is commonly used to measure resistivity.
- Select "Resistivity Measuring Method" in the measuring method management to start the measurement.
- All operations, displays, and measurements are similar to the COND measuring method. Please refer to the "COND Measuring Method" section for details.

Data Center

The instrument supports viewing current measurement unit data, electrode calibration information, saved measurement results, and result statistics.

View Current Measuring Unit

In the initial state, the instrument displays the current measurement result in real time. The measuring parameter is set to the direct measurement method. Click on the measurement window or "Start Direct Measurement" to view, modify, and calibrate the method parameters.

View Electrode Calibration Data

Kindly refer to the electrode ID management function.

View Stored Measuring Result

After the measurement, the instrument automatically saves the measurement results. In the initial state, click the menu item "View Stored Results" to access them.

View settings

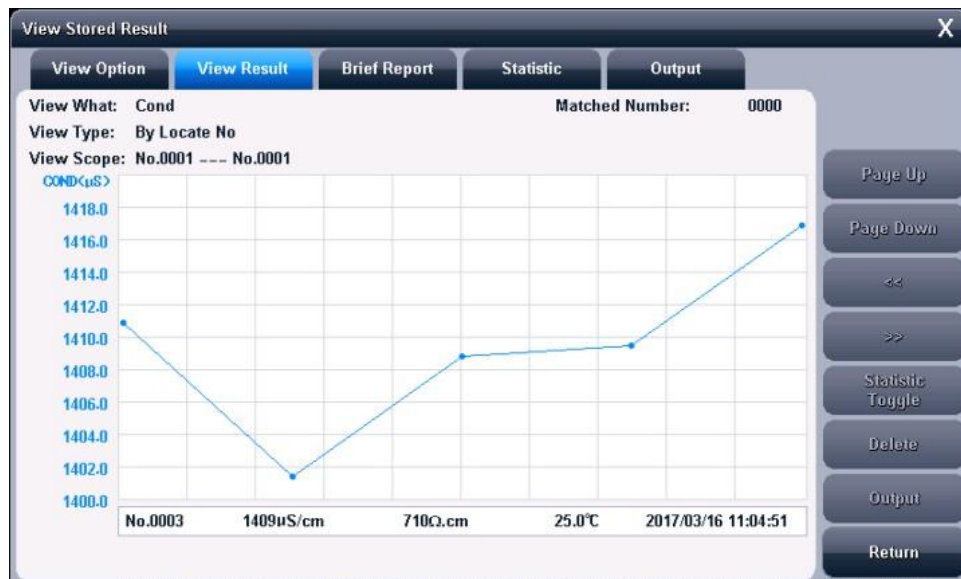
The instrument supports multiple search methods; users can retrieve stored data based on storage number, storage time, operator, method name, measured sample ID, electrode ID, etc. Users can set the search criteria as needed, and then click "Start View." The instrument will display the results in curve mode according to the selected criteria.



View settings display (Figure 29)

View Result

The instrument will display the results in curve mode based on the selected search criteria, as shown in Figure.



View result display (Figure 30)

The diagram displays the content, current consultation method, consultation range, number of matched results, the starting number of the current curve being displayed, and the ending number of the curve being displayed, among other details. On the right side of the curve, there are control keys. For a tidy display, the instrument shows up to 100 sets of data at a time. Users can click "Previous Page" and "Next Page" to view the remaining data, or click "<<", ">>" to move the indicator and view the corresponding results.


Result Report

The instrument can display the result data report in detail corresponding to the indicated item. Reports include measuring results, calibration information, calibration results, and basic information. List the information of usage, operator, storage time, electrode, samples, reading mode, etc.

Statistics Result

The instrument supports a statistics function that can give statistics of current consulting data (by curve). Click the "Statistical Result" page, the instrument will display the basic statistical results, including maximum, minimum, average, standard deviation and relative standard deviation, and relevant statistical information.

The instrument supports the statistics switch function if users find the deviation of a certain measuring data is big, they can click on the "Statistics Switch" to close the statistics.



The screenshot shows a software window titled "View Stored Result" with a close button (X) in the top right corner. The window has five tabs: "View Option", "View Result", "Brief Report", "Statistic" (which is selected and highlighted in blue), and "Output". Below the tabs is a table with six columns: "Max", "Min", "Average", "SD", and "RSD". The table contains three rows of data. Below the table is a "Statistic Info" section with the following fields: "View What:" (Cond), "Statistic Scope:", "Statistic Num:" (0000), and "Left Statistic Num:" (0000). Below that is a "Message" section with the text "Statistics Data According to Graphic Data Only!". A "Return" button is located in the bottom right corner of the window.

	Max	Min	Average	SD	RSD
	1417 μ S/cm	1401 μ S/cm	1409 μ S/cm	5.8972	0.4184%
	714 Ω .cm	706 Ω .cm	710 Ω .cm	2.9711	0.4187%
	25.0 $^{\circ}$ C	25.0 $^{\circ}$ C	25.0 $^{\circ}$ C	0.0000	0.0000%

Statistic Info

View What: Cond

Statistic Scope:

Statistic Num: 0000

Left Statistic Num: 0000

Message

Statistics Data According to Graphic Data Only!

Return

Statistics results displayed (Figure 31)

Output Setup

- Output option includes an output device, output port number, baud rate of communication, the number of characters per line of printer, whether output title or not, the name of the output title, and output content.
- The instrument supports output to the printer, PC and U disk.
- The instrument supports the GLP function and allows users to establish output requirements.
- Usually, there are three kinds of output methods: in GLP format, in a standard format and a user-defined format. Once users select a user-defined format, the instrument allows users to customize output settings.
- Users can customize report title, report time, user information, instrument information, measuring method information, measuring information, electrode information, calibration information, sample information, etc.

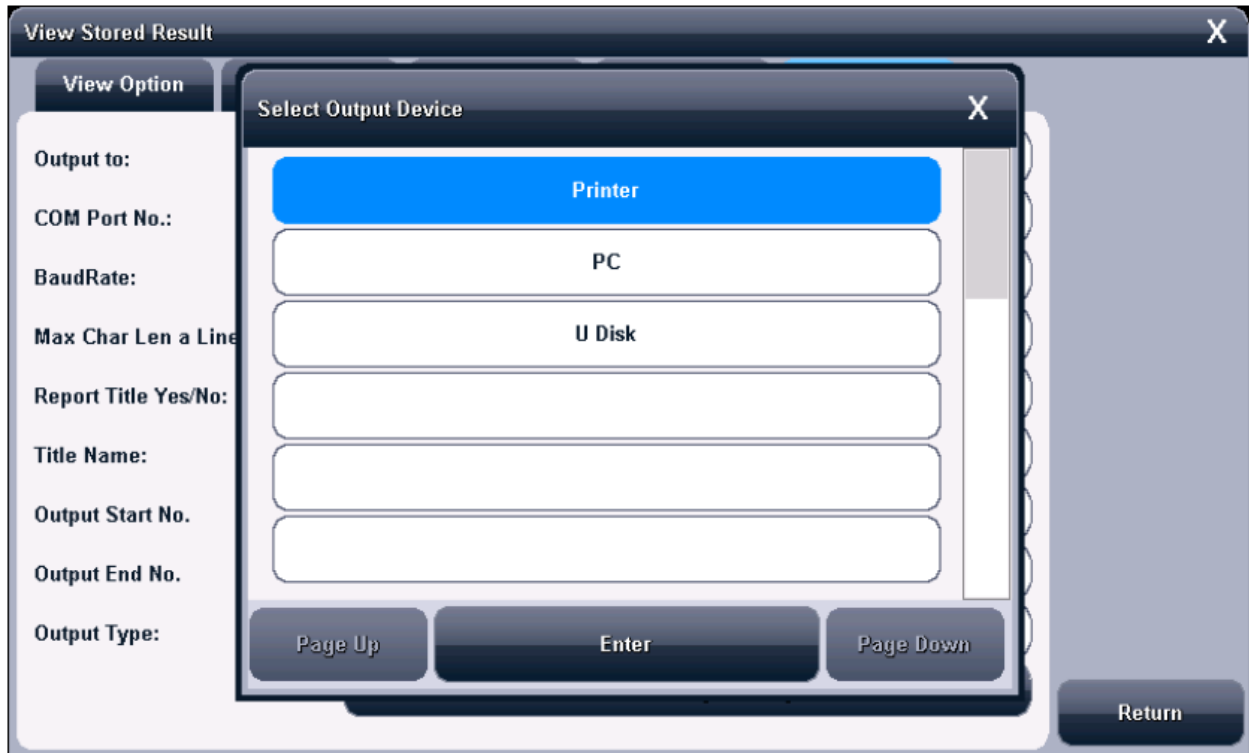
1) Output

Users can output saved measuring results and statistics results according to output settings after finishing data view and statistics.

The instrument supports output to the printer, PC and U disk; allows users to print data, record and store. See appendix for detail.

The screenshot shows a software interface window titled "View Stored Result" with a close button (X) in the top right corner. Below the title bar are five tabs: "View Option", "View Result", "Brief Report", "Statistic", and "Output". The "Output" tab is currently selected and highlighted in blue. The main area of the window contains a list of settings, each with a label on the left and a text input field on the right. The settings are: "Output to:" with "Printer", "COM Port No.:" with "COM1", "BaudRate:" with "9600bps", "Max Char Len a Line:" with "40", "Report Title Yes/No:" with "Yes", "Title Name:" with "Report Title", "Output Start No." with "1", "Output End No." with "0", and "Output Type:" with "Custom". At the bottom of the settings area is a large button labeled "Customer Output Setup". In the bottom right corner of the window is a smaller button labeled "Return".

Output setup display (Figure 32)



Output instrument selection display (Figure 33)

8. Maintenance

The proper usage and maintenance of the instrument can ensure that the instrument operates correctly.

- Keep the sockets of the meter clean and dry. Keep them away from acid, alkali, and salt solutions, and also keep them damp-proof to ensure insulation and high input impedance performance of the meter.
- When the meter is used in a place with higher humidity, dry the electrode plug with clean gauze.
- Store the electrode according to the electrode specification.

9. Troubleshooting

Phenomenon	Cause	Troubleshooting
No display after start-up	The power adapter is damaged.	Replace the power adapter of the same type.
	The instrument unit is damaged.	Replace or repair by rule.
The measuring unit cannot be connected	The measurement unit is in poor contact.	Re-pulg.
	The measuring channel is damaged.	Replace the measuring channel.
Conductivity measurement is not correct	Electrode performance is bad.	Replace the electrode.
	Wrong compensation way.	Set the correct compensation way.
	Calibrate the electrode wrongly.	Recalibrate the electrode.
	Problem in conductivity standard solution.	Purchase or prepare a new standard solution.
The printer does not work or works incorrectly.	The printer is out of power supply.	Connect the power supply of the printer.
	The printing line is not connected.	Connect the printer cable.
	The printer is set wrongly.	Set the baud rate and communication port of the printer.
	The printer is wrongly purchased.	Use the serial port printer.
	The printer's length is not enough.	Choose the printer with a longer length per line.

10. Accessories

No.	Description	Quantity
1.	FM-BCT-A100 Conductivity meter	1
2.	GM65-240270 AC/DC Power Adapter	1
3.	Electrode Stand	1
4.	USB Communication Line	1
5.	Manual	1

11. Appendix

11.1 Instrument output device and operating instructions

The instrument supports three kinds of output devices: printer, PC, and U disk, corresponding to different output content.

1. Printer is a standard RS232 serial port printer. Usually, this kind of printer, or POS machine, is used in the supermarket, canteen, and pharmacy. Generally, it is a temperature-sensitive printer with a cheap price. If users need to save the records for a long time, it is suggested to purchase a stylus printer with colored tape. The printer can be connected and used as long as it supports a standard RS232 serial port. For a stylus printer, a printer with more than 40 characters per line is recommended. The operating steps are as follows:
 - Connect the instrument and printer with the printer line. For insurance, users should connect the instrument when the power supply is disconnected!
 - Set the output device as a printer, and set the communication port and baud rate.
 - Set the baud rate of communication of the printer, usually, it is 9600 bps; other
 - format is 8 data bits, without check, one stop bit.
 - Operate in relevant function module to output data.
 - If cannot print, please check the connection line and baud rate
2. If select PC as an output device, it must fit two conditions: First, the PC must have a free serial port (or use the USB serial port equipment); Second, the PC is installed with universal serial debugging software or the same type of communication software used to receive and send data, the operation steps are as follows:
 - If the PC uses a USB serial device, users must first install the USB driver. Users can check whether the driver is installed successfully through the below method (take the Windows system for example). Connect the PC with a USB patch cord, and check "My computer\ Property\Device Manage\Port (COM and LPT)", users can see the virtual standard RS232 COM port (including device information), if there is no yellow exclamation mark indicates success, otherwise, the driver installation is a failure, the instrument will not be able to communicate.
 - Install general serial port testing software on the PC.
 - Connect the PC and the instrument.
 - Set the output device as PC, and set the communication port and baud rate.
 - Set the communication port of testing software on PC, communication baud rate, other format is 8 data bits, without check, one stop bit.
 - Operate in relevant function module to output data.
 - If cannot print, please check the connection line and baud rate.

3. If select U disk as an output device, the operating steps are as follows:
 - Insert the U disk into the instrument, the instrument will automatically identify the U
 - disk and display a connection prompt.
 - Some U disks in strange shapes may affect connection, at this time, users can
 - change to another U disk or use an extension cord. If still cannot be identified, the data will
 - not be able to be written into the device.
 - Operate in relevant function module to output data.
 - Usually, data is stored in the C: \ LEADSERI \ RESULT.

11.2 Term Definitions

- **Cell Constant:** Also called conductivity pond constant, the ratio of the distance of electrode slice and area. Usually expressed as cm-1.
- **TDS factor:** Conversion factor of conductivity and TDS.
- **Temperature Coefficient:** The conductivity variation for each 1°C temperature change, usually expressed as %/°C.



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