OPERATING MANUAL

CONDUCTIVITY METER

BMET-302

CE ISO9001 CERTIFIED

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INDEX

1. Introduction

1.1 Introduction

BMET-302 Conductivity Meter can measure conductivity and TDS in water solution, and can be widely used in universities, environmental protection, medicine, food, sanitation, geological prospecting, metallurgy, ocean exploration.

• General Features
• High resolution LCD display screen, 6.0 inches.
• It can measure conductivity, TDS and Temperature.
• Multi-reading feature allows auto-read and continuous-read.
• Reading prompts shows the status of reading.
• Cell constant is settable.
• 1 point calibration automatically recognizes the standard solutions, including 12.88mS/cm, 1413μS/cm and 84μS/cm.
• Automatic/Manual temperature compensation ensures accurate results.
• Data storage 50 sets for each parameter.
• IP54 protection.

1.2 Technical Specification

Instrument Specifications

Model		BMET-302
Conductivity	Range	0.00μ S/cm～200mS/cm
	Resolution	0.01 μS/cm, automatic switching according to the range
	Accuracy	±1.0%(FS)
	Repeatability	0.33%(FS)
	Measurement Accuracy	±1.50%(FS)
	Measurement Repeatability	0.70%(FS)
TDS	Range	0.00mg/L～100g/L
	Resolution	0.01mg/L, automatic switching according to the range
	Accuracy	±1.0%(FS)
Temperature	Range	(-5.0～110.0)°C
	Resolution	0.1 °C
	Accuracy	±0.2 °C
	Instrument indication error	±0.4°C(0.0°C～60.0°C), ±1.0°C(Else)

Work environment	Ambient temperature: (0～40) °C Relative humidity: not more than 85%
Dimensions (L×B×H), weight (kg).	242mm×195mm×68mm, 0.9kg
Power supply	AC Adapter,100-240V AC input, DC 9V output

Table 1

1.3 Function Introduction

Function		Explanation
Basic Function	Backlight adjustment	●
	Reset settings	●
	Power failure protection	●
	Anti-interference automatic recovery	●
	Automatic shutdown	●
	Protection	IP54
Reading Function	Default balance settings	●
	Auto-lock reading	●
	Reading Mode	auto-read and continuous-read
Data Management	Storage	50 sets
	View	●
	Delete	●
Measurement	Conductivity	●
	TDS	●
	calibration point	1 point
	Automatic standard solutions recognition	12.88mS/cm, 1413μS/cm and 84μS/cm
	Cell constant set	●
	Auto temperature compensation	●
	Manual temperature compensation	(0.0°C～60.0°C)
Temperature Function	Temperature Unit	°C

Table 2

2. Safety Notices

Please read the entire contents of this manual carefully before use, and please keep this manual properly. The user MUST use the instrument following this manual to avoid damage to the user and equipment.
Before using the meter, READ the following notes:
• DO NOT disassemble the device for inspection or repair.
• To prevent electric shock or damage to the device, do not place cables and connectors in any liquid, wet or corrosive environment.
• Please use the defaulted power adapter, Do not use it if the power cord is damaged (the wire is exposed or broken).
• Do not use in flammable and explosive environments.
• Do not use if the user finds any abnormalities such as damage or deformation of the device.
The following identifier will be used in this manual.

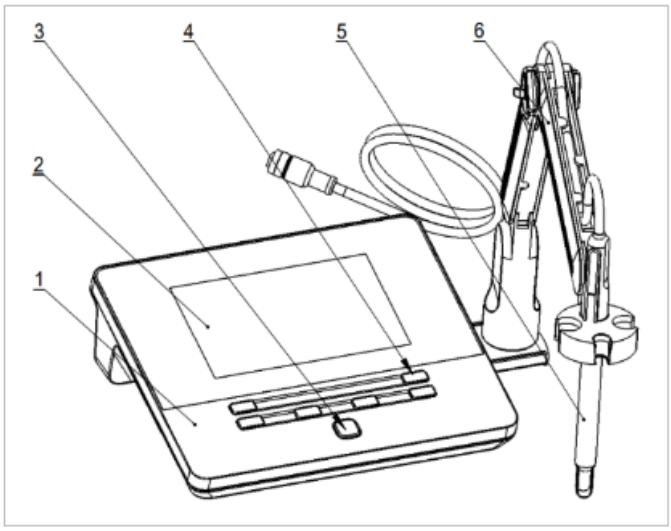
 TIPS:
Tips help users to use the meter.

3. Terms Explanation

• Cell Constant: Also known as the conductivity cell constant. The ratio of the distance to the area of the electrode sheet, expressed in cm-1. Usually, there are conductance electrodes with several cell constants such as 0.01, 0.1, 1.0, 10, etc. The conductance electrode with a cell constant of 1.0 is the most used one and has a wide measurement range.
• Temperature Coefficient: The change in conductivity caused by a 1°C change in temperature is usually expressed in %/°C, and the default is 0.02, which is 2.00%/°C.
• TDS Conversion Factor: The conversion factor between conductivity and TDS, which defaults to 0.5.

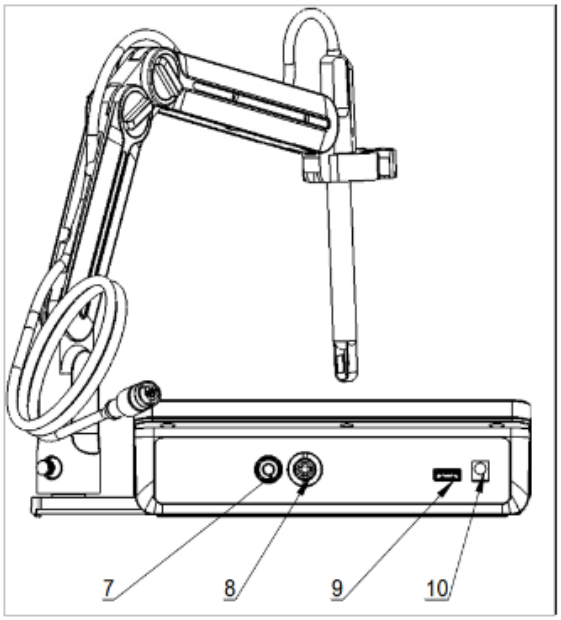
4. Overview and Installation

4.1 Overview



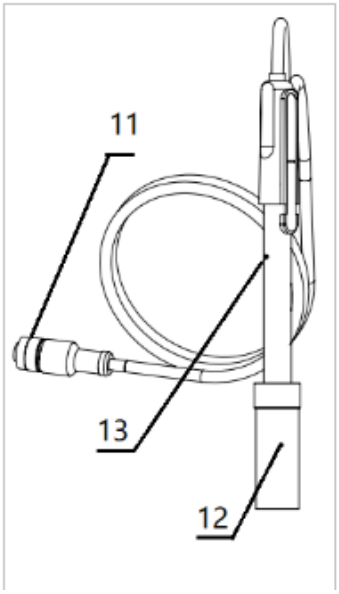
1 Meter Body
2 Screen
3 Power Key
4 Function Key
5 Electrode Stand
6 Electrode

Figure 1
Overview-Front View



7 Ground Terminal
8 EC
9 USB
10 DC/9V

Figure 2
Overview- Back View



11 5-pin aviation connectors

12 Electrode protection cap

13 Conductivity electrode

Figure 3
Electrodes and connectors
Connector Specifications

Electrode type	Connector specifications
Conductivity electrode	5-pin aviation

Table 3

4.2 Instrument Installation

4.2.1 Electrode Stand Installation
1) Pull out the plate on the right side of the meter.
2) Insert the electrode holder into the fixed vertical shaft of the plate.
3) Screw the fixed screws at the bottom of the electrode holder.

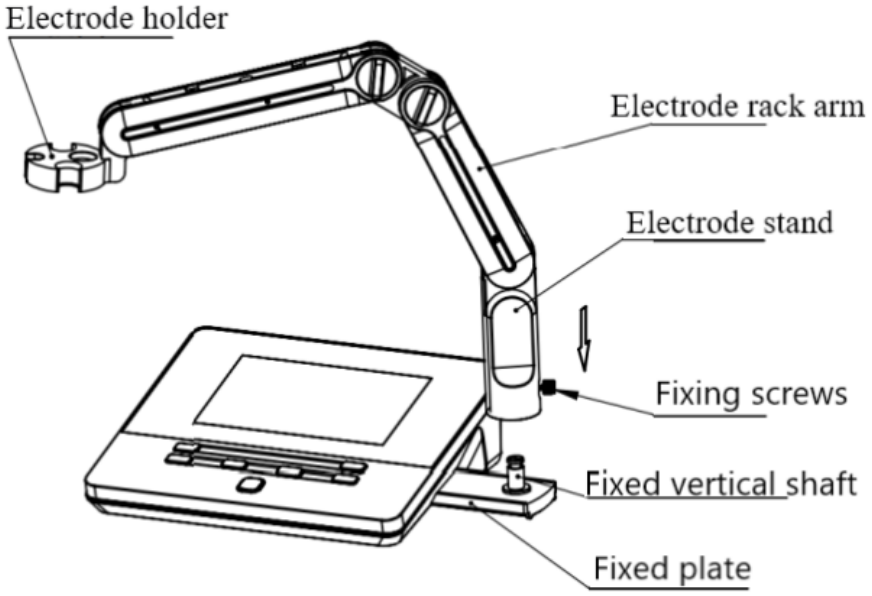


Figure 4

Electrode Stand Installation

4.2.2 Electrodes Connection
Push the conductivity electrode into the electrode holder. Remove the protector cap of the conductivity electrode. Connect the conductivity electrode into the right socket. Combination conductivity probes integrated with ATC probe.

5. Instrument Operation

5.1 Screen Icons

The meter has 6.0 inches high resolution LCD display screen. The User interface has the menu, status, result and parameter. The menu has measurement, calibration, setting and view. The status shows the reading mode, reading prompts and auto shutdown etc. The result shows the conductivity and unit. The parameter shows manual temperature, data No., cell constant and type.

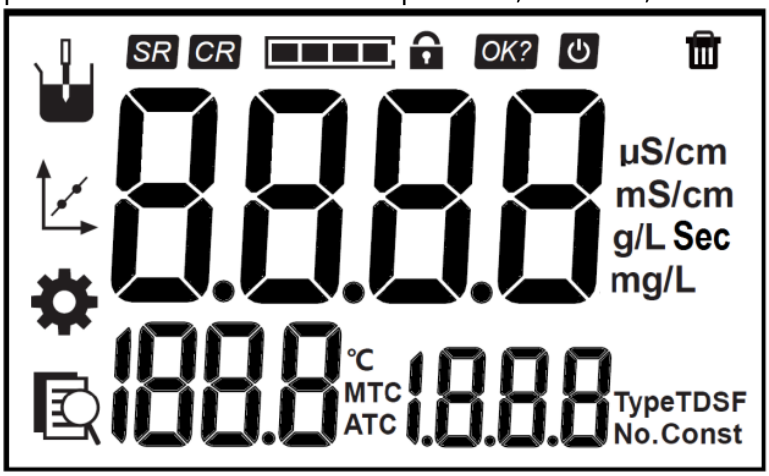


Figure 5
Screen icons explanation

Symbol Explanation

No.	Symbol	Explanation	Note
1		Reading state	When all four sections are lit up, it shows a stable status.
2		Reading is locked	In the auto-read mode, when the reading is stable, end the measurement, the result has locked.
3	OK?	Confirm the option	Flashing Display when Need to Confirm
No.	Symbol	Explanation	Note
4		Automatic shutdown	

5		Delete the result	
6	Sec	Time Unit	Unit: Sec
7	mg/L	TDS Unit	Unit: mg/L
8	g/L	TDS Unit	Unit: g/L
9	µS/cm	Conductivity Unit	Unit: µS/cm
10	mS/cm	Conductivity Unit	Unit: mS/cm
11	MTC	Manual temperature compensation	
12	ATC	Auto Temperature compensation	
13	°C	Temperature Unit	Unit: °C
14	Const	Cell Constant	
15	TDSF	TDS Conversion Factor	
16	Type	Electrode Type	
17	No.	No.	
18		Auto-read	Auto reading
19		continuous-read	Continuous Reading
20		Measurement	
21		Calibration	
22		setting	
23		View	

Table 4

5.2 Key Function

Figure 6
The Screen and the Key

Key Function Explanation

No.	Key	Explanation	Note
1		Power Key	Switch on the meter by press and release the key. Switch off the meter by press and hold the key for more than 3 seconds and release. Backlight adjustment key when Switch on the meter.
2		Mode/Up	Exchange the display of Conductivity and TDS. Increase the number in setting. Browse the data in view.
3		Save/Down	Save the result. Decrease the number in setting. Browse the data in view.
4		setting	Enter into setting when in the measurement status. Adjust the temperature and calibration type.
5		Meas/Del	In the auto-reading mode, measure the next sample. Delete the data when browse. Change to the manual recognitioncalibration in the calibration status.
6		Cal/Enter	Enter into the Calibration status. Identify the operation.

7	Cancel	Cancel	Give up.

Table 5

5.3 Instrument Settings

5.3.1 Switch On/Off

Connect the power adapter, and press and release  to switch on the meter. The startup screen shows the device model, name, software version and other related information. After the self-test program, the screen turns to the homepage and the meter are ready to measure. Press and hold  the key for more than 3 seconds and release to shut down.
Switch On/Off Interface Explanation

No.	Display	Explanation
1	U7A	Switch On, Software Version
2	OFF	Switch Off

Table 6

5.3.2 Instrument Settings
Instrument Settings

No.	Explanation	Note
1	Reading Mode Settings	Flashing display SR CR
2	Cell constant settings	Flashing display Const
3	TDS Coefficient Setting	Flashing display TDSF
4	Temperature Settings	Flashing show °C
5	View the data	Flashing display
6	Automatic shutdown settings	Flashing display “APD”(Auto Power Down)
7	Reset settings	Flashing display “rSt” (Reset)and “dFt” (Default)

Table 6
he meter has the parameter setting, such as Reading Mode Settings, Cell constant settings, Temperature Settings, View the data, Automatic shutdown settings, and Reset settings. Press the “Setting”, the meter shows the setting symbol, SEL and number. Press the up and down to adjust the parameter and press “Enter” to select.

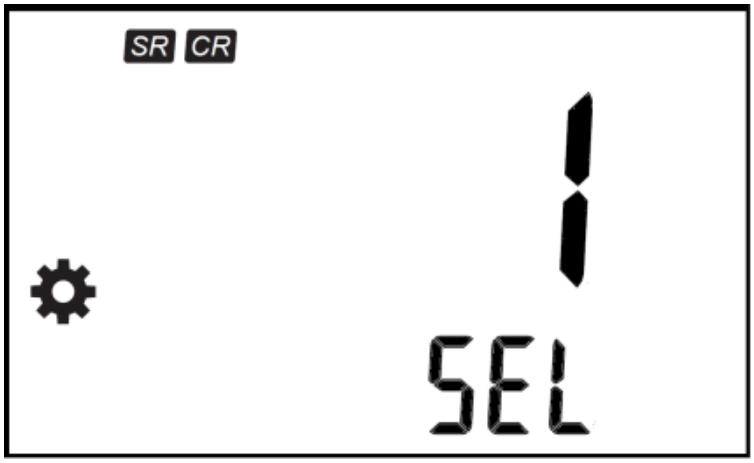


Figure 7
Instrument Settings

5.3.2.1 Reading Mode Settings
The meter provides two reading modes, including continuous readings, and auto reading.
• Continuous reading: The instrument displays real-time measurement results. User can end the measurement at any time and save the last result.
• Auto-reading: The measurement reached the balance, and the meter locked the reading result. Balance condition is that the results fluctuates within 0.4% for 6 sec. In the auto-reading mode, press the “Meas” to test the next one sample.

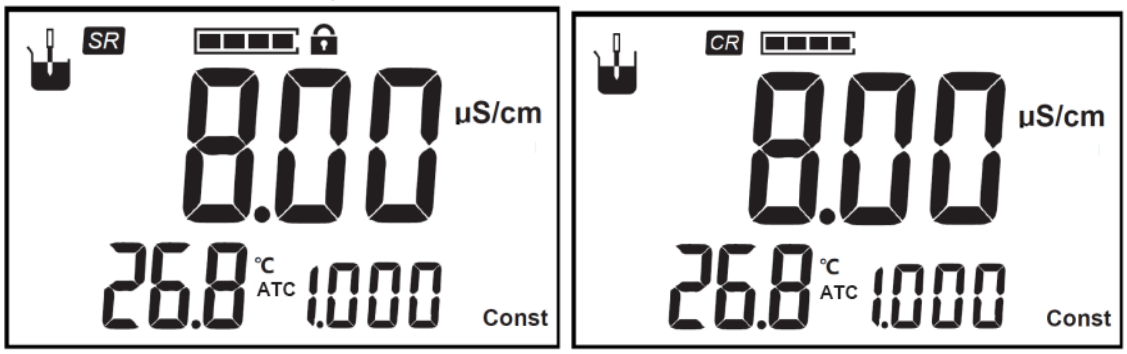


Figure 8
Continuous reading and Auto-reading Display

TIPS:
In the measurement status, press and hold “Meas” for more than 3 seconds and release to exchange the reading mode.

5.3.2.2 Cell Constant Settings
Please refer to 5.4.2.

5.3.2.3 TDS Coefficient Settings
The TDS coefficient can be adjustable, and the default is 0.500.
In the measurement status, press the “Setting” to select the TDS Coefficient Setting, and press the “Cal/Enter” to adjust the coefficient, then press “Cal/Enter” to save the TDS Coefficient.press “Cal/Enter” to save the TDS Coefficient.

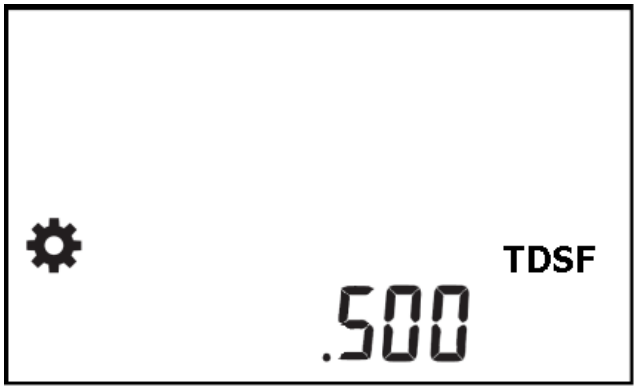


Figure 9
TDS Coefficient Setting

5.3.2.4 Temperature Settings

The meter supports auto temperature compensation and manual temperature compensation.
When select manual temperature compensation function, it needs to use the EC electrode without temperature measurement. Measure the test solution temperature with the temperature meter. Press “Setting” to select the “Temperature setting”, then press “Cal/Enter” to adjust the temperature as the real temperature, press the “Cal/Enter” to save the temperature.

Figure 10
Temperature Settings

5.3.2.5 View the data

The meter provides 50 sets of measurement results storage space.
In the measurement status, press “Setting”, select the view, press “Cal/Enter” to browser the data. Press the “Mode/▲” and “Save/▼” to view the data and number. In the view status, press “Setting” to exchange the display of Conductivity and TDS.

Figure 11
The data information
It offers single deletion and all deletion. dELonE 1 means single deletion and dEL All 2 means all deletion.

Press the up and down to select the delete type and press the “Cal/Enter” to delete data.

TIPS:

➤ In the measurement status, press the “Save/▼” for 3 sec to enter view to browser data.
➤ The “nuLL” means Null Stored Result in the View Interface.

5.3.2.6 Automatic shutdown settings
The meter provides auto shutdown function. When the meter is not using and set the auto shutdown, the meter switches off automatically. There are six options: off, 300Sec, 600Sec, 1200Sec, 1800Sec, and 3600Sec.
5.3.2.7 Reset settings
When the meter is not working. Users can reset the meter from the default’s backup. The default setting includes constant type as 1.0, Cell constant as 1.000, refer temperature as 25.0°C, continuous reading mode, automatic shutdown as close etc. All data will be deleted after resetting.

5.4 Electrode Calibration

5.4.1 Conductance Electrode Preparation
In common, there are two type calibrations. one is entering the cell constant value directly; the other is calibrating the conductance electrode with standard conductivity standard solution.
There are many conductance electrodes in order to suit for different measurement range. According to the material, conductive electrode is divided into platinum black electrode and bright electrode. Usually, there are conductance electrodes with several cell constants such as 0.01, 0.1, 1.0, 10, etc. The conductance electrode with a cell constant of 1.0 is the most used one and has a wide measurement range.
It is needed to select the suitable conductance electrode according to the sample properties, such as the conductivity range as recommend table.
Conductivity Range and Cell Constant recommend

Cell constant cm -1	Conductivity range µS/cm
0.01	0～2.000µS/cm
0.1	0.2～20.00 µS/cm
1	2 µS/cm～100.0 mS/cm

Table 7

5.4.2 Cell Constant Settings
Users need to enter the cell constant value on the label of conductance electrode for accurate measurement. The defaulted conductivity cell constant is 1. Cell constant settings process is as follows:
1) In the measurement status, press “Setting” to select the Cell constant settings, press “Cal/Enter” to adjust cell constant and type.
2) Adjust the constant type by press the “Setting”.
3) Adjust the cell constant by press the “Mode/▲” and “Save/▼”.
4) Press “Cal/Enter” to save the constant.

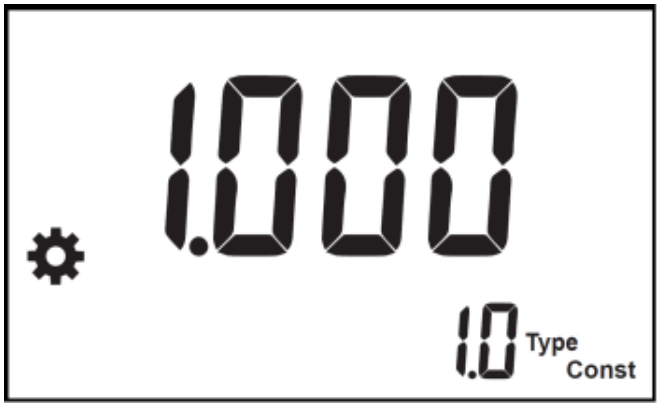


Figure 12
Constant Type is 1.0, Cell constant is 1.000

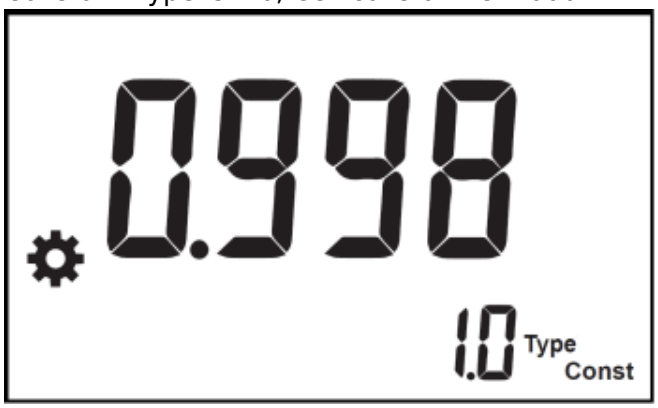


Figure 13
Constant Type is 1.0, Cell constant is 0.998

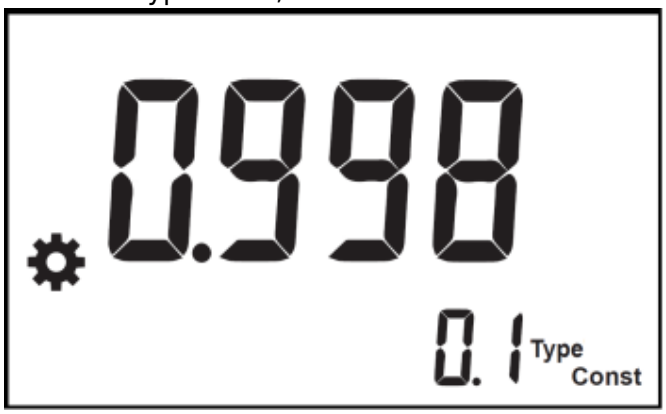


Figure 14
Constant Type is 0.1, Cell constant is 0.998

5.4.3 Calibration with Standards

In general, conductivity electrodes need few calibrations. When the user gets an unexpected result, an electrode calibration is considerable.

Usually, single standard solution is required for calibration. The meter supports one point calibration. The standard solution needs close to the sample.

Calibration Interface Explanation

No.	Display	Explanation
1	Auto	Auto Standard Recognition

2	Non	Manual Standard Recognition
3	Err	Calibration Failure
4	OH	Calibration success
5	End	Calibration End

Table 8

The meter supports auto standard recognition includes 12.88mS/cm, 1413μS/cm and 84μS/cm.
For conductivity electrodes with different cell constants, it is recommended to use the following conductivity standard solutions for calibration.
KCl standards to electrode cell constants

Cell constant (cm -1).	0.1	1	10
KCl solution Concentration (mol/L).	0.001	0.01 or 0.1	0.1 or 1

Table 9

Approximate concentrations of KCl solutions and their conductivity values relationship

T（°C）	84μS/cm	1413μS/cm	12.88mS/cm
5	53.02	896	8.22
10	60.34	1020	9.33
15	67.61	1147	10.48
20	75.80	1278	11.67
25	84.00	1413	12.88
30	92,19	1552	14.12
35	100.92	1696	15.39

Table 10

The auto standard recognition calibration process is as follows:
• Place a standard conductivity (e.g., 1413μS/cm conductivity solution) solution in a thermostatic bath, and set the temperature to (25.0±0.1) °C.
• Rinse the conductance electrode with DI water, dry out and place it into a standard solution.
• Press the “Cal/Enter”, enter the Calibration status.
• Press “Setting”, adjust the temperature(25.0°C), then press “Cal/Enter” to save the temperature.
• When the conductivity and temperature reading (e.g.1420μS/cm, 25.0°C)are stable, press “Cal/Enter” to end the calibration.
• The meter automatically saves calibration data and shows the calibration results (e.g.1413μS/cm, 25.0°C).
• After calibration complete, the meter turn to the measurement status.
If use other standard solutions to calibration, it needs to know the relational table of conductivity and temperature.
The manual standard recognition calibration process is as follows:
• Place a standard conductivity (e.g., 1413μS/cm conductivity solution) solution in a thermostatic bath, and set the temperature.

• Rinse the conductance electrode with DI water, dry out and place it into a standard solution.
• Press the “Cal/Enter”, enter the calibration status.
• Press “Meas/Del” for 3 second. The meter shows the “Non” in the display. It changes to manual standard recognition status. Adjust the conductivity standard value manually.
• Press “Setting”, adjust the temperature, then press “Cal/Enter” to save the temperature.
• When the conductivity and temperature reading are stable, press “Cal/Enter” to end the calibration.
• The meter automatically saves calibration data and shows the calibration results.
• After calibration complete, the meter turn to the measurement status.

5.5 Measurement

5.5.1 Measurement Preparation
Before measurement, the user should understand the properties and attributes of the substance (sample) to be measured; the method of routine testing; know the basic operation and application of the instrument; know the use and maintenance of conventional electrodes.
The user needs to prepare the sample first, or the standard solution that needs to re-calibrate the electrode, etc.

5.5.2 Measurement
The meter provides conductivity and TDS measurement, it could exchange by pressing “Mode/▲” in the measurement status. Before TDS measurement, please identify the Electrode Type, the cell constant and TDS conversion factor are set correctly.
The meter provides two reading modes, including continuous readings, and auto readings. It could select the reading mode according to the actual situation. When it needs to monitor the conductivity value constantly, please select the continuous reading mode.
The measurement process is as follows:
• Rinse the electrode with DI water. Put the measurement end of the electrode into the sample solution.
• When the reading (Conductivity/TDS, Temperature) is stable, end the measurement.
• Press “Save/▼”to record the results if necessary.
• If in the auto reading mode, the measurement reached the balance, and the meter locked the reading result. It shows the locked mark and the data will not change until pressing the measure to test the next one.
• After measurement, switch off the meter, and store the probe referring to the electrode instruction manual.

6. Maintenance/Troubleshooting

6.1 Maintenance

The correct use and maintenance of the instrument can ensure the accurate and reliable performance of the instrument. Additionally, exposure to chemicals or harsh Work environments can affect performance.
• If the meter is not used for a long time, please disconnect the power supply.
• The electrode socket of the instrument must be kept clean and dry, and should not be in contact with acid, alkali, and salt solutions.
• Keep the meter and accessories clean and away from acids, alkalis, and any corrosive solutions/gases.
• Users can clean the meter surface with clean waters and detergent.
• When the meter is transported, please follow the instructions:
• please remove all connected cables.
• Please remove the electrode holder.
• Please use original packaging in the long-distance transport to avoid damage.

6.2 Electrodes Maintenance

Before using the electrode, you should read the electrode manual carefully to know the type, structure and application scope of the electrode.
For more detailed information, please refer to the electrode instruction manual.

6.3 Troubleshooting

Phenomenon	Probable reasons	Solutions
1. No Display	No power supply. Damage to the meter. Damage to the Adapter.	Reconnect to the adapter and switch on. Replace or repair as required. Change the adapter.
2. Incorrect EC measurement	The electrode is out of service life. The electrodes are not calibrated or are calibrated incorrectly.	Replace the electrodes. Recalibrate the electrode or replace the standard solution.

Table 11
If the meter still does not work, please contact your local dealer for further assistance.

7. Technical Supports

Accessories
Please refer to the accessories table for purchasing recommendations.
Meter accessories

Name	Description
DJS-1VTC conductivity electrode	Conductivity, TDS Measurement Probe
DJS-1VC conductivity electrode	Conductivity, TDS Measurement Probe
DJS-1VTG conductivity electrode	Conductivity, TDS Measurement Probe
DJS-1VG conductivity electrode	Conductivity, TDS Measurement Probe
DJS-0.1VTG conductivity electrode	Conductivity, TDS Measurement Probe
Conductivity solution 1413μs/cm 250mL	Standard solution

Table 12

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