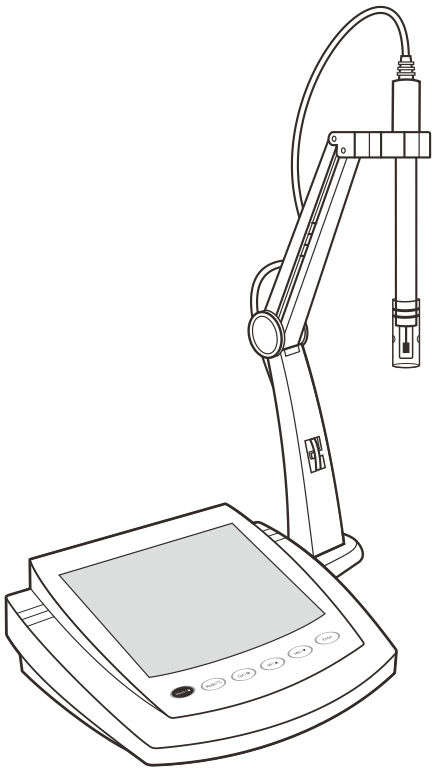
Bante 950E Benchtop Conductivity Meter

USER MANUAL



Bante Instruments Inc.

Introduction

Thank you for selecting the 950E benchtop conductivity meter. This user manual provides a step-by-step guide to help you operate the meter, please carefully read the following instructions before use. Any use outside of these instructions may invalidate your warranty and cause permanent damage to the meter.

Environmental Conditions

Before unpacking, ensure that current environmental conditions meet the following requirements.

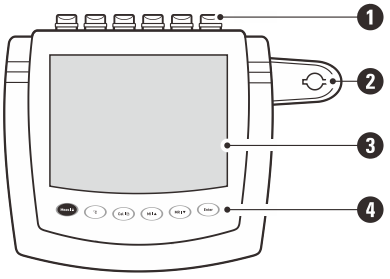
- Relative humidity is less than 80%
- Ambient temperature between 0°C (32°F) and 50°C (122°F)
- No potential electromagnetic interference
- No corrosive gas exists

Packing List

The following list describes all components of the meter. If any items are missing or damaged, contact the supplier immediately.

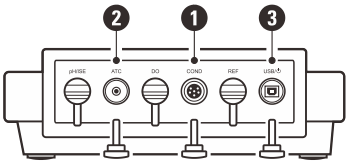
950E meter
Electrode arm
USB cable
DC 5V power adapter
CON-1 conductivity electrode
TP-10K temperature probe
Conductivity standard solutions 84 µS/cm, 1413 µS/cm, 12.88 mS/cm

Meter Overview



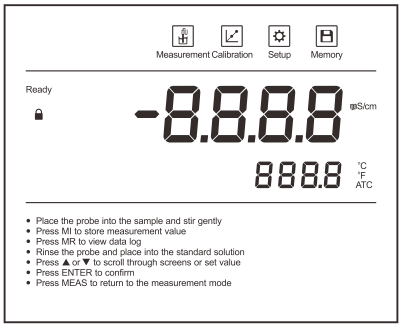
1	Sensor connections
2	Base plate of electrode arm
3	Display
4	Membrane keypad

Connectors



1	Socket for conductivity electrode (6-pin DIN)
2	Socket for temperature probe (3.5 mm jack)
3	USB-B interface to the power adapter or computer

Display



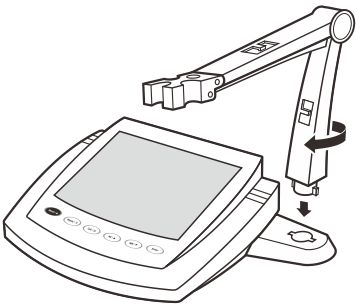
Icon	Description
	Indicates that the meter is in the measurement mode
	Indicates that the meter is in the calibration mode
	Indicates that the meter is in the setup mode
	Indicates that you are viewing the stored readings or a reading is stored into the memory
Ready	Shown when the measurement is stable
	Shown when the reading is locked
ATC	Indicates that the automatic temperature compensation is enabled

Keypad

Key	Function
Meas | 🔒	• Switch the meter on or off • Lock or unlock the measurement • Exit the calibration, settings, data logs and return to the measurement mode
°C	• Set the temperature
Cal | 🖹	• Start calibration • Press and hold the key to enter the setup menu
MI | ▲	• Store current reading to memory • Increase value or scroll up through a list of options
MR | ▼	• View the data log or calibration log • Decrease value or scroll down through a list of options
Enter	• Confirm the calibration or displayed option • Press and hold the key to switch the backlight on or off

Installing the Electrode Holder

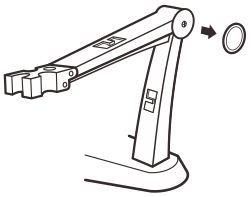
Take out the electrode arm from the accessory box. The base plate of electrode arm has a circular hole, the electrode arm has a connecting rod. Insert the connecting rod into the circular hole and swivel the electrode arm 90 degrees. The electrode holder is now ready to swing into desired position.



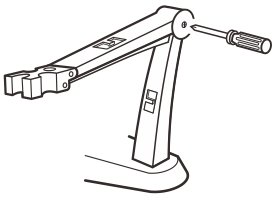
Adjusting the Electrode Arm

After installation, if the electrode arm automatically rises or falls, you are able to adjust the screw until arm locate at any position.

1. Remove the plastic cover from the right side of the electrode arm.



2. Use the screwdriver to tighten the screw moderately.

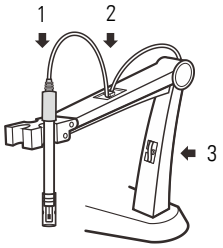


3. Insert the plastic cover to previous position.

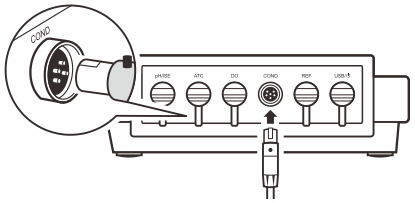
Connection

Connecting the Conductivity Electrode

1.1 Take out the electrode from packaging. Follow the steps below to place electrode into the left or right side of the electrode arm.



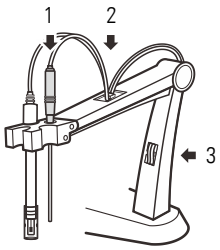
1.2 Insert 6-pin connector into the connector socket labeled COND. Ensure the connector is fully seated.



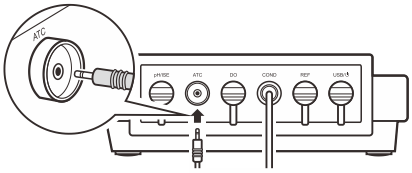
1.3 After the connection is completed, DO NOT pull on the cable. Always make sure that the connector is clean and dry.

Connecting the Temperature Probe

2.1 Place the temperature probe into the circular hole located at the center of the electrode arm.

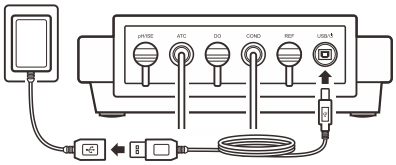


2.2 Insert the jack plug to the connector socket labeled ATC. Ensure the connector is fully seated.



Connecting the Power Adapter

3.1 Connect the USB cable to the meter and power adapter.
3.2 Plug the DC 5V power adapter into the wall outlet.

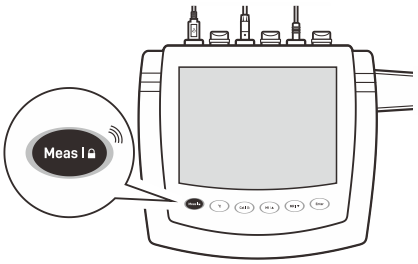


Prior to Use

Soak the conductivity electrode for about 10 minutes in tap water to remove dirt and oil stains on the electrode.

Switching the Meter On and Off

- Press the **Meas** key for about 3 seconds and release to switch on the meter.
- Press and hold the **Meas** key to switch off the meter.



Meter Setup

The 950E meter contains an integrated setup menu for customizing the displayed option to meet measurement requirements. The following table describes the functions of each menu item.

Menu Item	Option and Description	
CELL	**Cell Constant** Set the cell constant to match connected electrode.	
	0.1	K = 0.1
	1	K = 1 (default)
	10	K = 10
CAL	**Calibration Points** Set the number of calibration points.	
	...3	1 to 3 points (default 1 point)
COE	**Temperature Coefficient** Set the temperature correction method and coefficient.	
	LC	Linear (default 2.1%/°C)
	nLC	Non-linear
PUrE	**Pure Water Compensation** If enabled, the pure water compensation coefficient will be applied automatically for ultra-pure water measurements.	
	YES	Enable
	no	Disable (default)

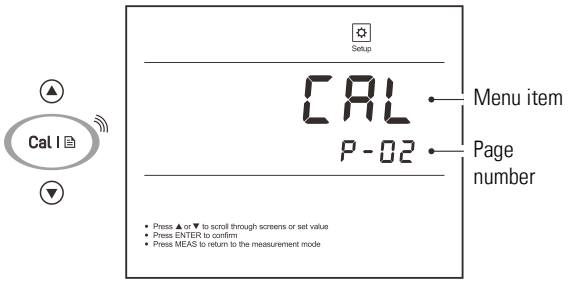
StD	**Reference Temperature** Set the normalization temperature for measurement, the readings will automatically compensate to the selected temperature during measurement.	
	25℃	25°C (default)
	20℃	20°C
UNIt	**Measurement Unit** Set the default temperature unit.	
	℃	Degrees Celsius (default)
	℉	Degrees Fahrenheit
HOLd	**Auto-Hold** If enabled, the meter will automatically sense and lock the measurement endpoint.	
	YES	Enable
	nO	Disable (default)
OFF	**Auto-Power Off** If enabled, the meter will automatically switch off if no key is pressed within 30 minutes.	
	YES	Enable
	nO	Disable (default)
CLr	**Clear Stored Data** Delete all data logs in the memory.	
	YES	Enable
	nO	Disable (default)
rSt	**Factory Reset** Reset the meter to factory default settings. Note, the meter must be recalibrated.	
	YES	Enable
	nO	Disable (default)

The meter contains two temperature correction methods. The linear temperature correction is appropriate for most samples. If the current samples belong to the natural water (e.g., natural ground, well, or surface waters), using the non-linear correction is necessary.

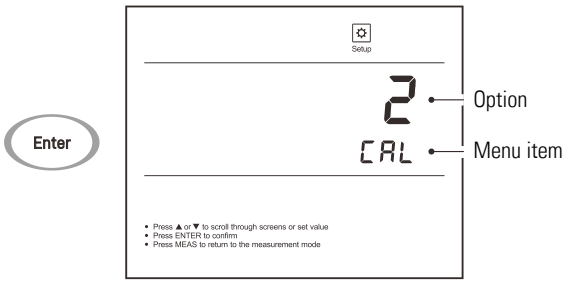
Note, the non-linear correction can only be performed at temperature range from 0°C to 36°C (32°F to 96°F). If the temperature value is out of above range, the display will always show ----.

Setting a Default Option

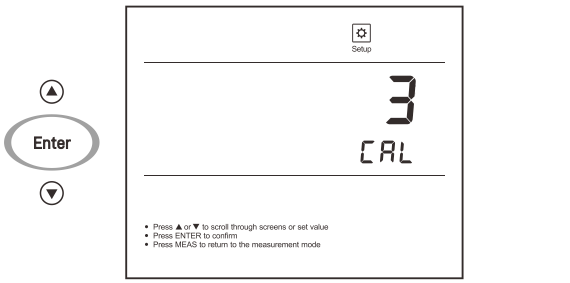
1. In the measurement mode, press and hold the 🗎 key to enter the setup menu.
2. Press the ▲ / ▼ key to select a menu item.



3. Press the **Enter** key, the meter shows the current option.



4. Press the ▲ / ▼ key to select a desired option.
5. Press the **Enter** key to save and return to the measurement mode.



To exit the setup menu without saving changes, press the **Meas** key.

Temperature Compensation

The temperature compensation has a large effect on the conductivity measurement. If enabled, the meter will use the measured conductivity and temperature readings to calculate the results and automatically compensate to the selected reference temperature. If the temperature coefficient is set to 0, the temperature compensation will be disabled and the meter only shows the actual conductivity at the measured temperature.

Automatic Temperature Compensation

Connect the temperature probe to meter, the ATC icon appears on the display, the meter is now switched to the automatic temperature compensation mode.

Refer to the ***Connecting the Temperature Probe*** section on page 3.

Manual Temperature Compensation

If the meter does not detect a temperature probe, the degrees Celsius icon (°C) will show on the display indicating the meter is switched to the manual temperature compensation mode. To set the temperature value follow the steps below.

1. Press and hold the **°C** key to enter the temperature setting.
2. Press the ▲ / ▼ key to modify the temperature value.
3. Press the **Enter** key to save.

Press and hold the ▲ / ▼ key will make the value change faster.

Selecting a Conductivity Electrode

The 950E meter is capable of using the three types of conductivity electrodes. Before the calibration and measurement, ensure that you have selected a suitable electrode according to the anticipated sample conductivity. The following table lists the selectable electrode and its effective measurement ranges.

Electrode	Measurement Range	Cell Constant
CON-0.1	0.5 to 100 µS/cm	K = 0.1
CON-1	10 µS/cm to 20 mS/cm	K = 1
CON-10	100 µS/cm to 200 mS/cm	K = 10

Conductivity Calibration

The meter allows up to 3 points calibration in the conductivity mode. Before beginning the calibration, ensure that selected cell constant (K = 0.1, 1, 10) matches connected electrode.

For better accuracy, we recommend to perform 3 points calibration or select a standard solution closest to the sample conductivity you are measuring. The meter will automatically detect the standard solution and prompt the user to perform the calibration.

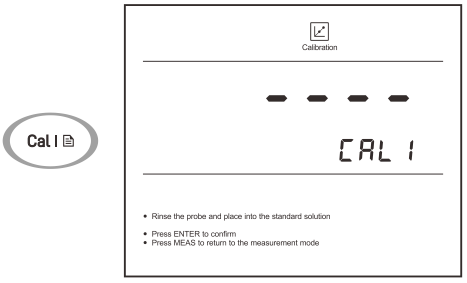
If you have changed the electrode, the meter must be recalibrated. The following table shows the default standard solution for each measurement range.

Measurement Range	Default Standard Solution
0 to 20 µS/cm	10 µS/cm
20 to 200 µS/cm	84 µS/cm
200 to 2000 µS/cm	1413 µS/cm
2 to 20 mS/cm	12.88 mS/cm
20 to 200 mS/cm	111.8 mS/cm

Single Point Calibration

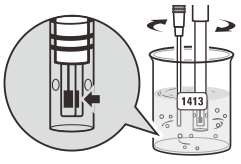
1.1 Ensure that you have selected 1 point calibration in the setup menu.

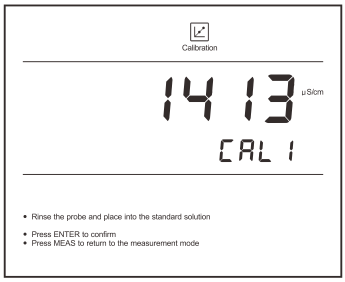
1.2 Press the **Cal** key, the display shows ----/CAL1, the meter waits for recognizing the standard solution.



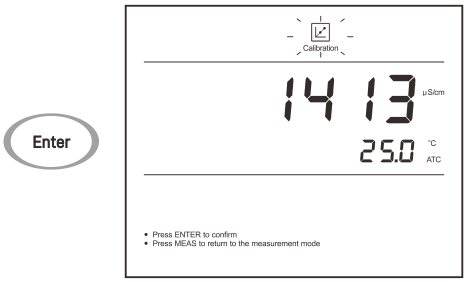
1.3 Rinse the conductivity electrode with distilled water, then rinse with a small amount of standard solution.

1.4 Place the electrode (and temperature probe) into the standard solution, stir gently to remove air bubbles trapped in the slot of the sensor.

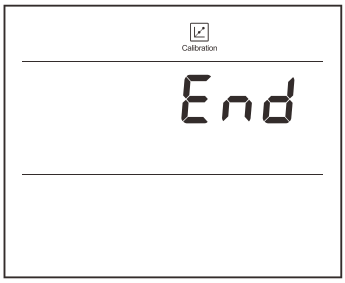




1.5 Press the **Enter** key, the Calibration icon begins flashing.



1.6 When the reading has stabilized, the meter will show End and return to the measurement mode.



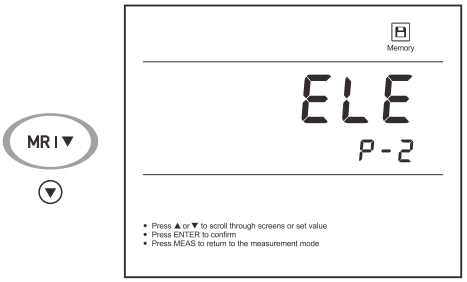
Multipoint Calibration

2.1 Ensure that you have selected 2 or 3 points calibration in the setup menu.
2.2 When the first calibration point is completed, the display will show ----/CAL2. The meter prompts you to continue with second point calibration.
2.3 Repeat steps 1.3 through 1.5 above until the meter shows End. Calibration is completed.

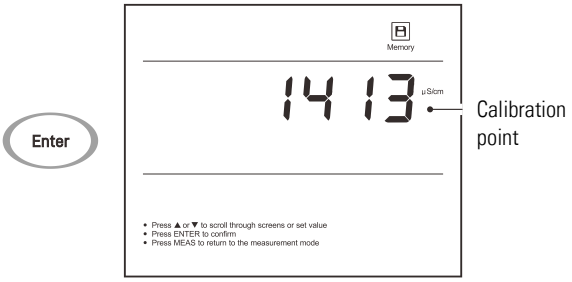
To exit the calibration without saving changes, press the **Meas** key.

Viewing the Calibration Log

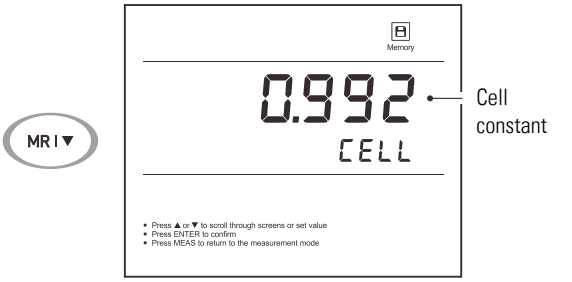
3.1 Press the **MR** key in the measurement mode and press the ▼ key until the meter shows ELE/P-2 (Electrode/Page 2).



3.2 Press the **Enter** key, the meter shows the calibration point 1.



3.3 Press the ▼ key to view the calibration factor of the calibration point 1 (e.g., 0.992).



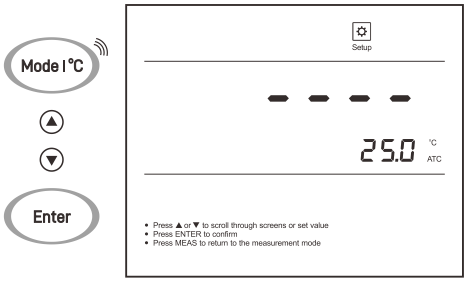
3.4 Press the ▼ key to view the next data set.
3.5 To exit the calibration log, press the **Meas** key.

If the meter is not calibrated with standard solution, the display will show ---- only.

Temperature Calibration

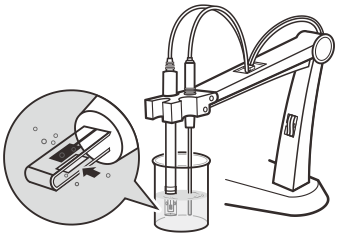
The 950E meter is supplied with a temperature probe for measurement and temperature compensation. If the measured temperature reading differs from that of an accurate thermometer, the probe needs to be calibrated.

1. Connect the temperature probe to the meter and place into a solution with a known accurate temperature.
2. Press and hold the **°C** key to enter the temperature setting.
3. Press the ▲ / ▼ key to modify the temperature value.
4. Press the **Enter** key to save.



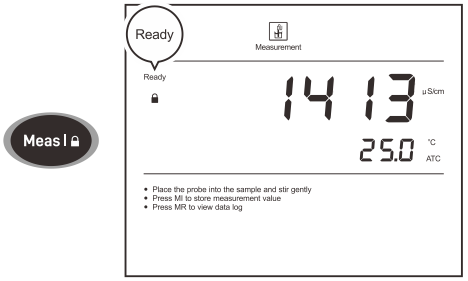
Conductivity Measurement

1. Rinse the conductivity electrode with distilled water. Place the electrode (and temperature probe) into the sample solution and stir gently. Ensure that no air bubbles on the sensor surface.



2. If the Auto-Hold option in the setup menu is enabled, the meter will automatically sense a stable reading and lock measurement, the Ready / 🔒 icon appears on the display. Press the **Meas** key to resume measuring. If the option is disabled, the meter will continuously measure and update the readings.
3. Wait for the measurement to stabilize and record the reading.
4. When all of the samples have been measured, rinse the electrode with distilled water.

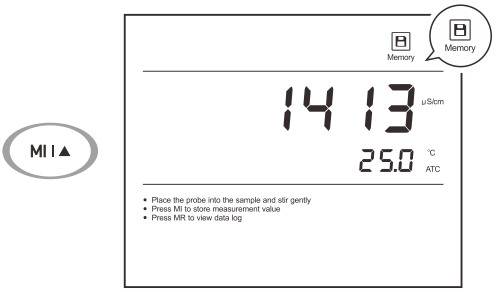
If the meter shows ---- indicating the measurement exceeds the range, replace a conductivity electrode that is appropriate for the conductivity range of the sample solution you are measuring.



Data Management

Storing a Measurement Result

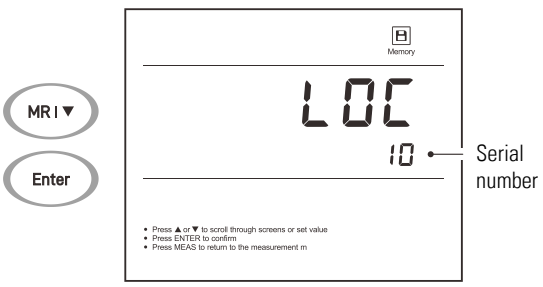
In the measurement process, press the **MI** key to store the reading into the memory, the Memory icon appears on the display.



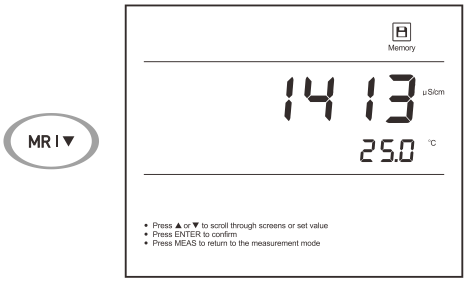
Viewing the Data Logs

1.1 Press the **MR** key in the measurement mode, the meter shows LOG/P-1 (Log/Page 1).

1.2 Press the **Enter** key, the meter shows the serial number of the stored data.



1.3 Press the ▼ key to view the stored data.



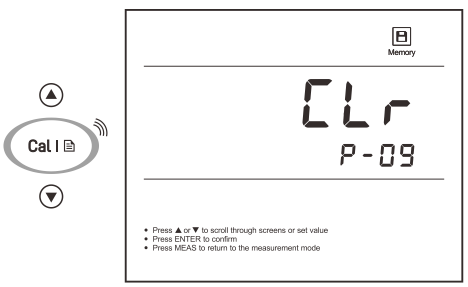
1.4 Press the ▼ key to view the next data set.
1.5 To exit the data log, press the **Meas** key.

If the meter does not store any reading, the display will show ---- only.

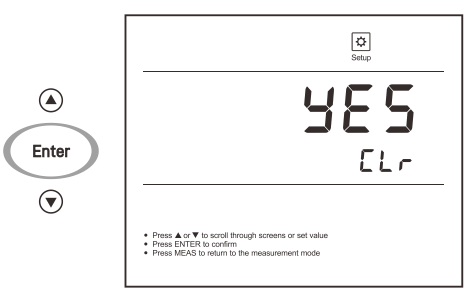
Clearing the Data Logs

If the memory is full, the meter will automatically show FULL when the **MI** key is pressed. To delete the data logs, please follow the steps below.

2.1 Press and hold the 🖹 key to enter the setup menu.
2.2 Press the ▲ key until the meter shows CLr/P-09.



2.3 Press the **Enter** key, the meter shows nO/CLr.
2.4 Press the ▲ key to select the YES/CLr.
2.5 Press the **Enter** key to confirm.

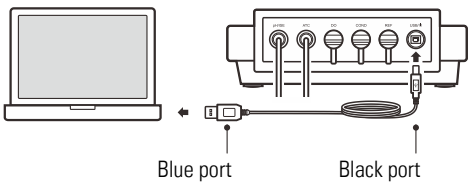


Communication

The 950E meter can transfer data to a computer or export data to Excel using DAS software. You can download the software from our official website.
Before installation, make sure that Windows 10 is installed on your computer and that you have a USB-2303B data cable.

Receiving the Data

1. Connect the black port of the data cable to the meter and the blue port to the computer.



2. Double-click "**220_520_820_APP**". The system will automatically scan for an available port and display "Device port successfully recognized."
3. Click **OK** to start the application.
4. Click **Connect**. The screen displays "Connection established."
5. Click **OK** to continue.
6. Click **Receive**. The measurement values stored in the meter are automatically transferred to the computer.

Interval Recording

This function helps the user record measurement values at regular intervals over a specified time period. The recording interval can be set to 10/30/60 seconds, 10/30 minutes, or turned off.

1. Click the Interval Recording dropdown and select a parameter.
2. Click **Receive** to begin automatically transferring the measured values to the data sheet.

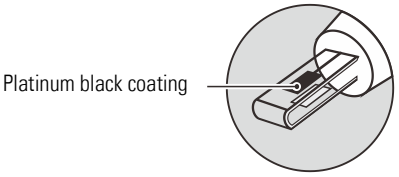
Creating an Excel File

1. Click **Save as Excel** to open the Save As dialog.
2. Enter a file name, then click **Save**.

Once the software is closed, all received measurement values will be lost and cannot be recovered.

Electrode Maintenance

- Rinse the conductivity electrode thoroughly with distilled water after use.
- Do not touch the platinum black coating on the sensor surface and always keep it clean.



- If there is a build-up of solids inside the sensor, remove carefully, then recalibrate the electrode.
- If you do not use the electrode for long periods, wipe clean with a lint-free tissue and store the electrode in a dry and cool area.
- If your electrode is model CON-10, store the electrode with tap water. This sensor needs to be kept wet always.

Appendix

Preparation of Conductivity Standard Solutions

1. Place the analytical grade potassium chloride (KCl) in a beaker and dry in an oven for about 3 hours at 105°C (221°F), then cool to room temperature.
2. Add the reagent to a 1 liter volumetric flask according to the instructions in table below.

Conductivity Standard	Reagent	Weight
84 µS/cm	KCl	42.35 mg
1413 µS/cm	KCl	745.5 mg
12.88 mS/cm	KCl	7.45 g
111.8 mS/cm	KCl	74.5 g

3. Fill the distilled water to the mark, mix the solution until the reagent is completely dissolved.

Calculating the Cell Constant

1. Refer to the ***Meter Setup*** section to reset the meter.
2. Place the electrode into a standard solution and record the reading.
3. Calculate the cell constant using the following formula.

$$K = \frac{C_{std}}{C_{meas}} \times G$$

Where:
K = Cell constant
C_{std} = Value of conductivity standard solution
C_{meas} = Measured value
G = Raw cell constant (0.1, 1 or 10)

Calculating the Temperature Coefficient

1. Do not connect the temperature probe to meter.
2. Press and hold the **°C** key to enter the temperature setting.
3. Press the ▲ / ▼ key to set the temperature to 25°C and press the **Enter** key to confirm.
4. Place the conductivity electrode into the sample solution, record the temperature value T_A and conductivity value C_{TA}.
5. Condition the sample solution and electrode to a temperature T_B that is about 5°C to 10°C different from T_A. Record the conductivity value C_{TB}.
6. Calculate the temperature coefficient using the formula below.

$$T_C = \frac{C_{TB} - C_{TA}}{C_{TA}(T_B - 25) - C_{TB}(T_A - 25)}$$

Where:
T_C = Temperature coefficient
C_{TA} = Conductivity at temperature A
C_{TB} = Conductivity at temperature B
T_A = Temperature A
T_B = Temperature B

Optional Accessories

Conductivity Electrodes

Order Code	Description
CON-0.1	For measuring low conductivity liquids / pure water
CON-1	For general purpose applications
CON-10	For measuring high conductivity liquids / wastewater

Conductivity Flow Cell

Order Code	Description
CON-FC	Compatible with the CON-0.1 conductivity electrode for measuring pure and ultrapure water below 10 µS/cm

Temperature Probe

Order Code	Description
TP-10K	Range: 0 to 100°C (32 to 221°F), 1 m (3.3 ft.) cable

Solutions

Order Code	Description
ECCS-84	Conductivity standard solution 84 µS/cm, 480 ml
ECCS-1413	Conductivity standard solution 1413 µS/cm, 480 ml
ECCS-1288	Conductivity standard solution 12.88 mS/cm, 480 ml
ECCS-1118	Conductivity standard solution 111.8 mS/cm, 480 ml

Communication and Power Supply

Order Code	Description
USB-2303B	USB Type-A to Type-B data cable, 1 m (3.3 ft)
DCPA-5V	DC 5V power adapter, european standard plug

Meter Specifications

Model	Bante 950E
Conductivity	
Range	0.01 µS/cm to 200.0 mS/cm
Resolution	0.001, 0.01, 0.1, 1
Accuracy	±0.5% F.S.
Calibration Points	1 to 3 points
Calibration Solutions	10 µS/cm, 84 µS/cm, 1413 µS/cm,
	12.88 mS/cm, 111.8 mS/cm
Temperature Compensation	0 to 100°C (32 to 212°F), manual or automatic
Temperature Coefficient	Linear (0.0 to 10.0%/°C)
	Non-linear
	Pure water
Reference Temperature	20°C or 25°C
Cell Constant	K = 0.1, 1, 10
Temperature	
Range	0 to 105°C (32 to 221°F)
Resolution	0.1°C (0.1°F)
Accuracy	±0.5°C (±0.9°F)
Calibration Point	1 point
Other Specifications	
Memory	100 data sets
Communication Interface	USB-B
Operating Temperature	0 to 50°C (32 to 122°F)
Storage Temperature	0 to 60°C (32 to 140°F)
Relative Humidity	< 80% (non-condensing)
Display	LCD, 125 × 100 mm (4.9 × 3.9 in.)
Power Requirements	DC 5V/400mA power adapter
Auto-Off	30 minutes after last key pressed
Dimensions	210 (L) × 188 (W) × 60 (H) mm, (8.2 × 7.4 × 2.3 in.)
Weight	1.5 kg (3.3 lb)

Troubleshooting

Fault	Cause and Corrective Action
Screen shows - - - -	Electrode dried out. Soak the conductivity electrode in tap water for about 10 minutes.
	Measurement exceeded the maximum range. Check the electrode and sample. If non-linear correction is enabled, make sure that the sample temperature between 0 and 36°C.
Drifting erratic readings	Check whether electrode is contaminated, clogged or broken.
Screen shows Err	Electrode is broken. Replace the conductivity electrode.

Disposal

This product is required to comply with the European Union's Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC and may not be disposed of in domestic waste. Please dispose of product in accordance with local regulations at the collecting point specified for electrical and electronic equipment.

Warranty

The warranty period for meter is one year from the date of shipment.
Above warranty does not cover the electrode and standard solutions.
Out of warranty products will be repaired on a charged basis.
The warranty on your meter shall not apply to defects resulting from:

- Improper or inadequate maintenance by customer
- Unauthorized modification or misuse
- Operation outside of the environment specifications of the products

For more information, please contact the supplier.

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