Bante932 Benchtop Water Hardness Meter

Instruction Manual

Introduction

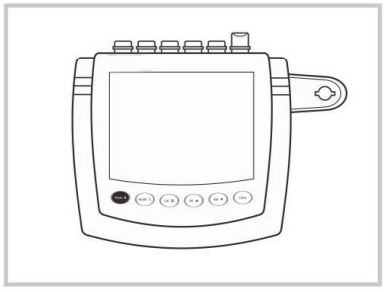
Thank you for selecting the Bante932 benchtop water hardness meter. This manual provides a step-by-step guide to help you operate the meter, please carefully read the following instructions before use.

Unpacking

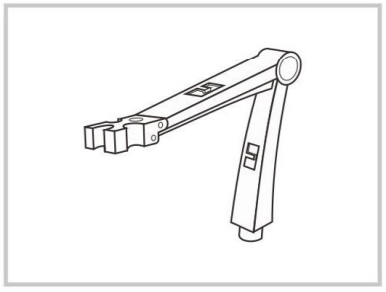
Before unpacking, ensure that the current work environment meets following conditions.

- Relative humidity is less than 80%.
- Ambient temperature is greater than 0°C and less than 60°C.
- No potential electromagnetic interference.

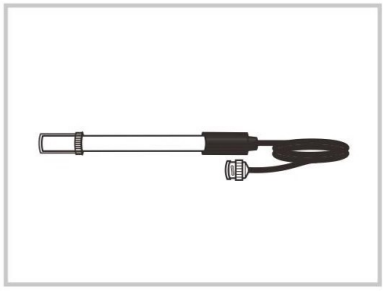
The following list describes the standard components of the meter. After the unpacking, please check all components are complete. If any are damaged or missing, please contact nearest distributor.



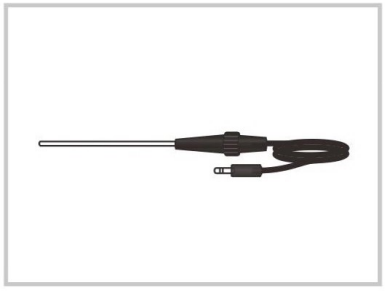
Bante932 Water Hardness Meter



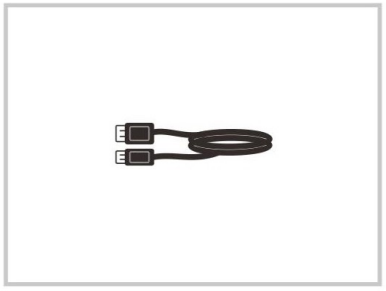
Electrode Arm



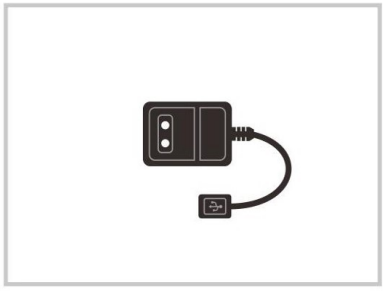
WH-UK Water Hardness Electrode



TP-10K Temperature Probe



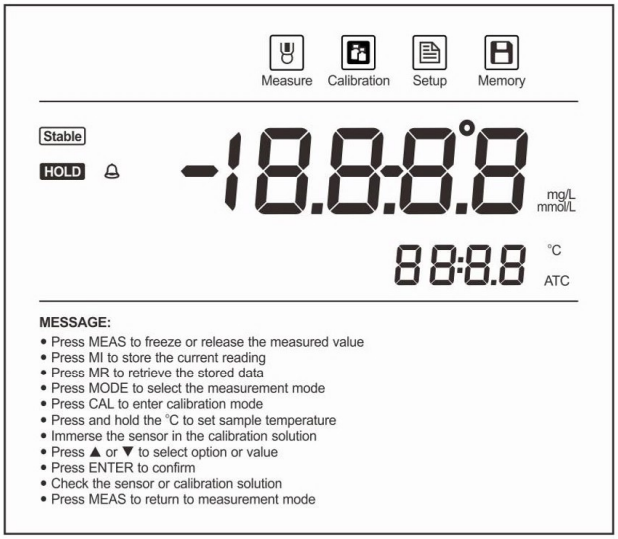
USB Cable



DC5V Power Adapter

Display

The Bante932 water hardness meter is equipped with an easy-read LCD display that used to show the measured values and mode icons. The following table describes the function of each icon.



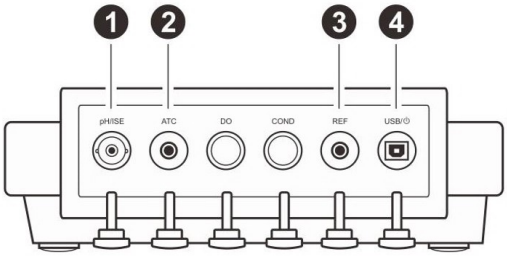
INDEX:

Measure	Measurement mode icon: Indicates the meter is in the measurement mode.	Stable	Stable icon: Indicates the measuring value has stabilized.
Calibration	Calibration mode icon: Indicates the meter is in the calibration mode.	Hold	Hold icon: Indicates the measuring value has been locked.
Setup	Setup mode icon: Indicates the meter is in the setting mode.		Calibration Due Alarm: Prompts the user to calibrate the meter.
Memory	Memory icon: Indicates the data is stored into memory.	ATC	Automatic Temperature Compensation: Indicates the temperature compensation is enabled.

Keypad

KEY	FUNCTION
Meas | 🔒	• Switches the meter ON/OFF. • Locks the measured value, press the key again to resume measuring. • Exits the calibration or setting and returns to measurement.
Mode | °C	• Toggles between available measurement modes (Refer to page 6 "Switching the Measurement Mode"). • Sets the temperature (Press and hold the key for 3 seconds).
Cal | 🖹	• Starts calibration. • Enters the setup menu (Press and hold the key for 3 seconds).
MI | ▲	• Stores current reading to memory. • Increase value or scroll up through the menu item.
MR | ▼	• Views the calibration report or data logs. • Decrease value or scroll down through the menu item.
Enter	• Confirms the calibration, settings or displayed options. • Turn on/off the backlight (Press and hold the key for 3 seconds).

Connectors

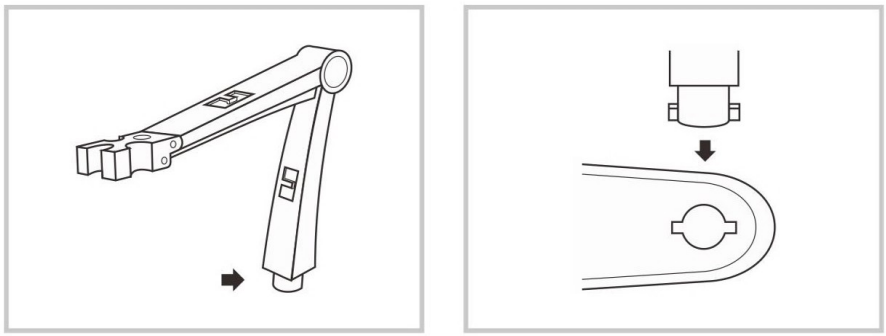


INDEX:

NO.	CONNECTOR	DESCRIPTION
1	pH/ISE	Used for connecting the water hardness electrode
2	ATC	Used for connecting the temperature probe
3	REF	Used for connecting the reference electrode
4	USB ⏻	Used for connecting the USB cable and DC5V power adapter

Installing the Electrode Holder

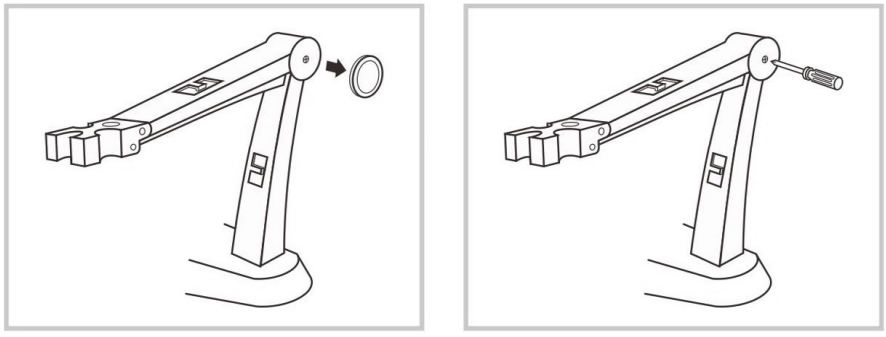
Take out the electrode arm from the packaging. The base plate of the electrode holder has a circular hole, the electrode arm has a connecting rod. Insert the connecting rod into the circular hole and swivel the electrode arm 90°. Electrode holder is now ready to swing into desired position.



Adjustment of electrode arm

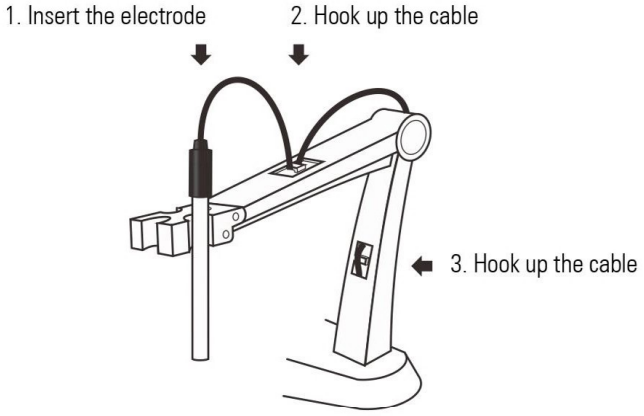
After installation, if the electrode arm automatically rises or falls, you need to adjust the screws until arm locate at any position.

1. Remove the plastic cover from the electrode arm.
2. Use the screwdriver to tighten the screw moderately.
3. Insert the plastic cover to previous position. Installation is completed.

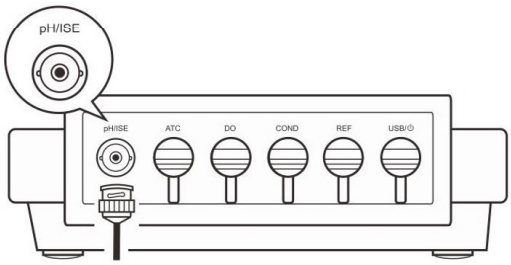


Connecting the Electrode

1. Take out the water hardness electrode from the packaging. Place the electrode into left or right side of the electrode arm.

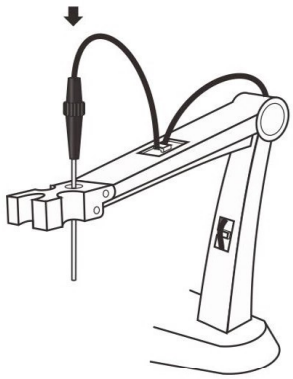


2. Insert the BNC connector into the connector socket labeled pH/ISE. Rotate and push the connector clockwise until it locks. After the connection is completed, DO NOT pull on the cable. Always make sure that the connector is clean and dry.

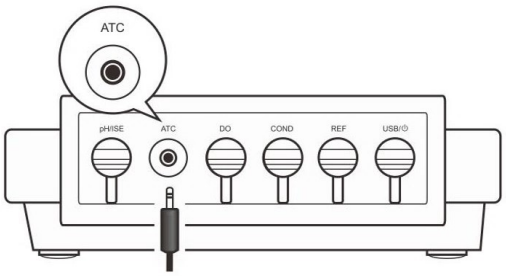


Connecting the Temperature Probe

1. Place the temperature probe into the circular hole of the electrode arm.

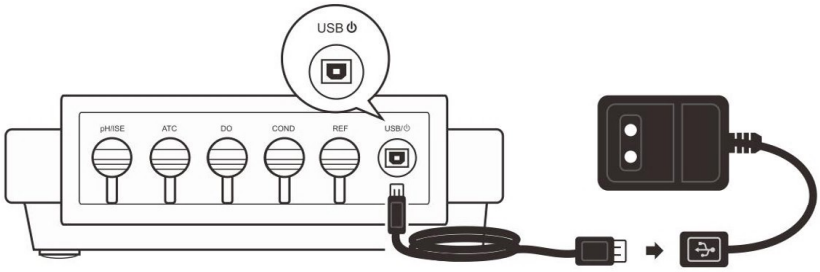


2. Insert the phone plug to the connector socket labeled ATC.



Connecting the Power Adapter

1. Connect the USB cable to power adapter.
2. Insert the other side of cable into the power socket. The meter is now ready for use.

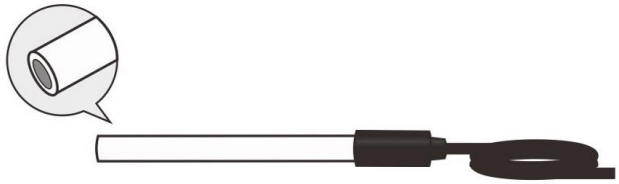


Preparing the Standard Solution (0.1mol/L)

- To prepare this solution, half fill a 1 liter volumetric flask with distilled water and add 14.7 grams of reagent-grade calcium chloride ($CaCl_2 \bullet 2H_2O$). Swirl the flask gently to dissolve the solid and fill to the mark with distilled water. Cap the flask and upend several times to mix the solution.
- Diluting the above stock solution to desired standard concentrations (at least 2).

Prior to Use

- Remove the protective cap from the bottom of the water hardness electrode.
- Soak the electrode in the 0.01mol/L standard solution for at least 30 minutes.



Switching the Meter On and Off

- Press the **Meas** key to switch on the meter, the display shows the measured value.
- Press and hold the **Meas** key for 5 seconds, the meter will switch off.

Switching the Measurement Mode

The Bante932 water hardness meter contains the 8 measurment modes. Press the **Mode** key, the display will show corresponding mode icon.

LCD DISPLAY	DESCRIPTION	MEASUREMENT UNIT
ION	Ion concentration	mmol/L
CACO	$CaCO_3$	mg/L
CAO	CaO	mg/L
bOL	Boiler	mmol/L
CA	Ca^{2+}	mg/L
FH	French degree	^{0}fH
dH	German degree	^{0}dH
EH	English degress	^{0}e

Setup Menu

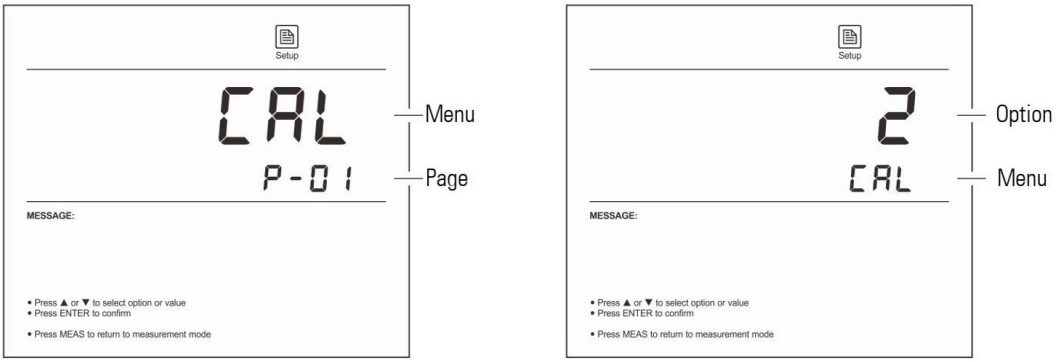
The meter contains an integrated setup menu that is used to customize the displayed option to meet measurement requirements. The following table describes the functions of the menu items.

MENU	DESCRIPTION	OPTIONS	DESCRIPTION	DEFAULT
CAL	Calibration Points: Set the number of calibration points.	2	2 points	2 points
		3	3 points	
		4	4 points	
		5	5 points	
StA	Stability Criteria: When the LO option is enabled, the Stable icon will quickly appear on the display. When the HI option is enabled, the icon will take longer to appear, but guarantees high accuracy of the measurement.	LO	Low	Low
		HI	High	
HOLd	Auto-Hold: When the option is enabled, the meter will automatically sense a stable reading and lock the measurements.	YES	Enable	Disable
		NO	Disable	
OFF	Auto-Power Off: When the option is enabled, the meter will automatically turn off if no key is pressed within a specified time period.	10	10 minutes	Disable
		20	20 minutes	
		30	30 minutes	
		NO	Disable	
CALL	Calibration Due: When the option is enabled, if the meter does not calibrated within a specified time period, the meter will automatically show the 🔔 icon.	1...31	1 to 31 days	Disable
		OFF	Disable	
dAtE	Date and Time: Set the current date and time.	---	Year-month-day, hour-minutes	
CLr	Clear Stored Data: Delete all stored readings in the memory.	YES	Enable	Disable
		NO	Disable	
rSt	Factory Reset: If enabled, all of the calibration data and selected parameters will back to factory default settings, the meter must be recalibrated.	YES	Enable	Disable
		NO	Disable	

Setting the default option

1.1 Press the **Mode** key until the display shows ION (Ion concentration measurement mode).
1.2 Press and hold the ▤ key for 3 seconds to enter the setup menu and the ▲ or ▼ key to select the menu item (e.g., CAL/P-01).
1.3 Press the **Enter** key, the display shows an option.
1.4 Press the ▲ or ▼ key to select the desired option.
1.5 Press the **Enter** key to confirm, the meter returns to the measurement mode. Setting is completed.

ⓘ If you want to exit the setting, press the **Meas** key.



Setting the date and time

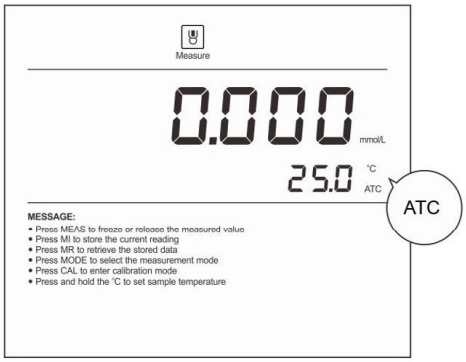
2.1 Press and hold the ▤ key for 3 seconds to enter the setup menu and the ▲ or ▼ key until the display shows DATE/P-06.
2.2 Press the **Enter** key, the meter shows current year (e.g., 2018).
2.3 Press the ▲ or ▼ key to set year and the **Enter** key to confirm, the display shows current date and time (Format: month-day, hour-minutes).
2.4 Press the ▲ or ▼ key to set the date and time, press the **Enter** key to confirm until the meter returns to the measurement mode. Setting is completed.

Temperature Compensation

In order to get accurate measuring results, we recommend that the standards and samples should be measured at the same temperature. If you need to enable the temperature compensation, follow the steps below.

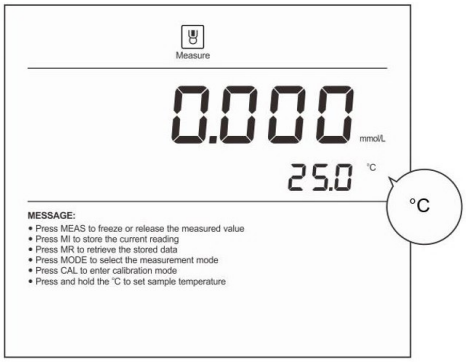
Automatic Temperature Compensation

Connect the temperature probe to the meter (Refer to page 5 "Connecting the Temperature Probe"). The ATC icon immediately appears on the display, the meter is now switched to the automatic temperature compensation mode.



Manual Temperature Compensation

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



1. Press and hold the **ºC** key for 3 seconds to enter the temperature setting mode.
2. Press the ▲ or ▼ key to modify the temperature value.
3. Press the **Enter** key to confirm.

ⓘ Press the ▲ or ▼ key once, the setting value will increase or decrease by 0.1. Press and hold the ▲ or ▼ key, the setting value will increase or decrease by 1.

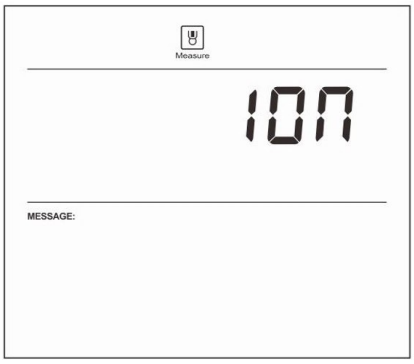
Ion Concentration Calibration

The Bante932 water hardness meter is capable of 2 to 5 points calibration with standard solutions, available calibration points include the following options.

MEASUREMENT UNITS	CALIBRATION POINTS
mol/L	0.001, 0.01, 0.1
mmol/L	0.001, 0.01, 0.1

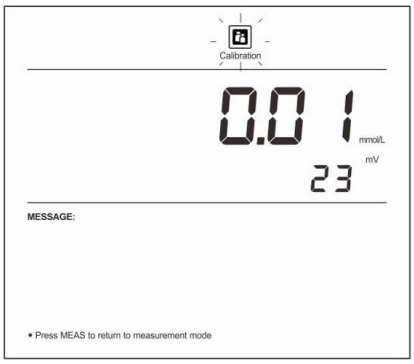
In order to get accurate measuring results, we recommend that adding the ionic strength adjuster to all standards and samples. A typical addition would be 2ml ISA to 100ml of standards and samples. If the meter does not calibrated or calibration is not successfully, the display will always show 0.000.
During the calibration, ensure that the selected calibration points cover the anticipated range of the samples.

Calibrating the meter



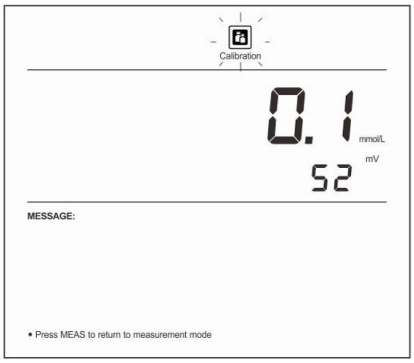
1.1 Press the **Mode** key until the display shows ION, the meter enters the ion concentration measurement mode.

1.2 Press the **Cal** key, the meter shows 0.001mmol/L.
1.3 If necessary, press the ▲ or ▼ key to select the desired calibration point (e.g., 0.01mmol/L).

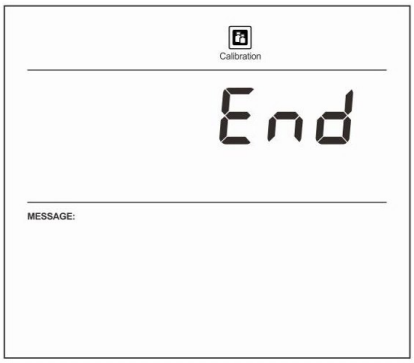


1.4 Rinse the water hardness electrode with distilled water, then rinse with a small amount of standard solution. Place the electrode into corresponding standard solution. Stir the electrode gently to create a homogeneous solution. Press the **Enter** key, the Calibration icon begins flashing.

1.5 Wait for the reading to stabilize, the display shows 0.1mmol/L/CAL2. The meter prompts you to continue with second point calibration.



1.6 Rinse the water hardness electrode with distilled water, then rinse with a small amount of standard solution. Place the electrode into the next standard solution. Stir the electrode gently. Press the **Enter** key, the Calibration icon begins flashing.



1.7 Wait for the reading to stabilize, the meter automatically show END and return to the measurement mode. Calibration is completed.

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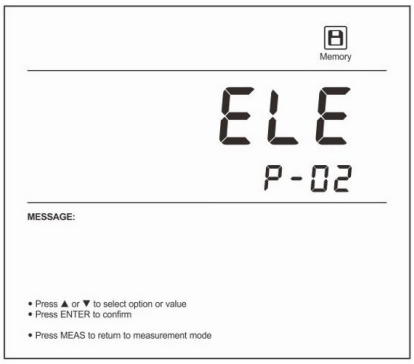
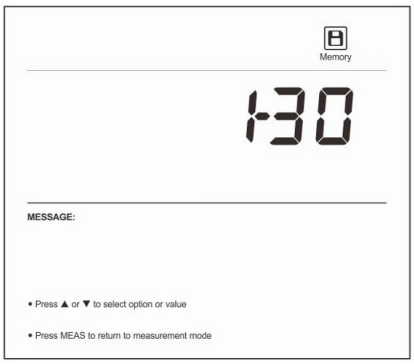
- If you have selected the multi-point calibration in the setup menu, the display will show CAL3. The meter prompts you to continue with third point calibration. Repeat the step 1.6 above until the display shows END. The meter will automatically return to the measurement mode.
- If you want to exit the calibration, press the **Meas** key.

Viewing the calibration report

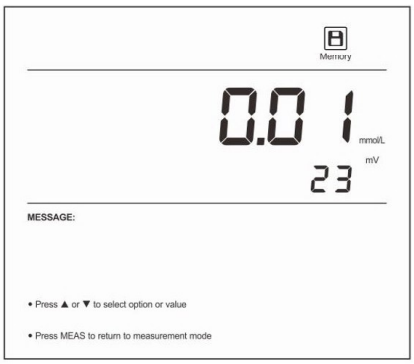


2.1 Press the **MR** key in the ion measurement mode, the meter shows LOC/P-01.

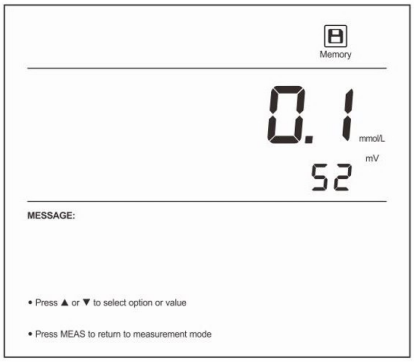
2.2 Press the ▲ or ▼ key until the meter shows ELE/P-02.



2.3 Press the **Enter** key, the meter shows the last calibration date (Format: month-day).



2.4 Press the ▼ key, the meter shows the first calibartion point and mV value (e.g., 0.01mmol/L, 23mV).



2.5 Press the ▼ key, the meter shows the second calibartion point and mV value (e.g.,0.1mmol/L, 52mV).

2.6 To exit the calibration report, press the **Meas** key.

Temperature Calibration

During the measurement process, if the temperature reading displayed differs from that of an accurate thermometer, the meter 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 for 3 seconds to enter the temperature setting mode.
3. Press the ▲ or ▼ key to set the temperature value.
4. Press the **Enter** key to confirm. Calibrating is completed.

ⓘ During the setting process, press the ▲ or ▼ key once, the setting value will increase or decrease by 0.1. Press and hold the ▲ or ▼ key, the setting value will increase or decrease by 1.

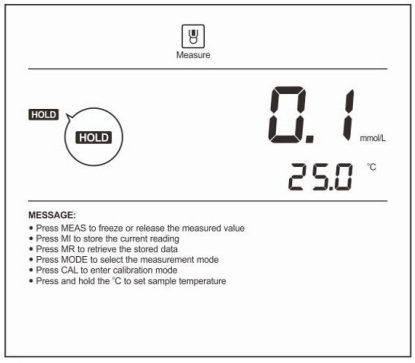
Water Hardness Measurement

Before measuring, ensure that the temperature of samples are the same as the standard solutions, the maximum error should be controlled within the 1°C. For low level measurements or samples contain the interference ions, ensure that adding the ionic strength adjuster to samples.

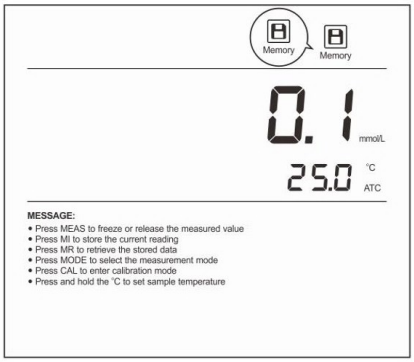
1. Press the **Mode** key to select desired measurement mode (Refer to page 6 "Switching the Measurement Mode").
2. Rinse the water hardness electrode thoroughly with distilled water. Place the electrode into the sample solution, stir the electrode gently. Record the measured value when the reading is stable.

Auto-Hold

The meter contains an Auto-Hold function. If enabled, the meter will automatically sense a stable reading and lock the measurements, the HOLD icon appears on the display. If disabled, press the 🔓 key, the meter will immediately lock the displayed value. Press the **Meas** key to resume measuring.



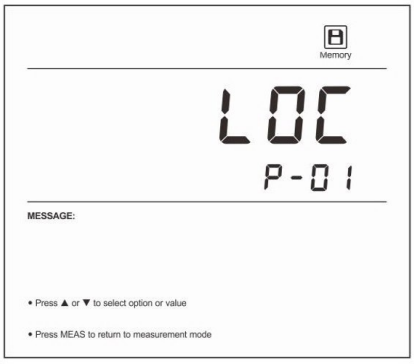
Storing and Recalling Data



The Bante932 water hardness meter is capable of storing and recalling up to 500 data sets.

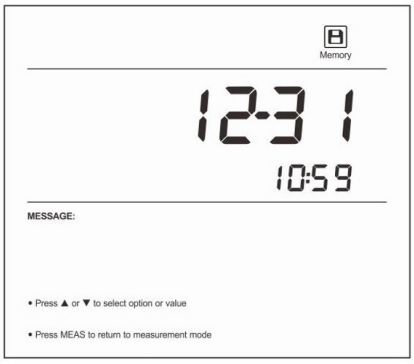
Storing readings into memory

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

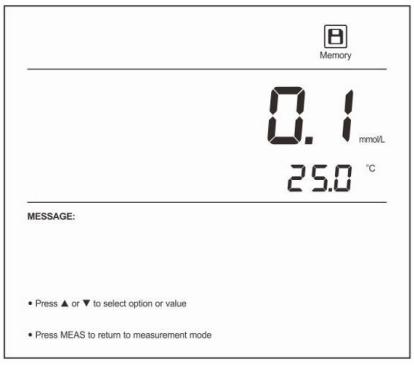


Viewing stored readings

1. Press the **MR** key in the measurement mode, the meter shows LOC/P-01 (Data Log).
2. Press the **Enter** key, the meter shows the serial number of the stored data.



3. Press the ▼ key, the meter shows the date and time of the stored data (Format: month-day, hour-minutes).



4. Press the ▼ key, the meter shows the stored data.
5. Press the ▼ key again, the meter shows next data set.
6. Press the **Meas** key, the meter returns to the measurement mode.

Clearing the memory

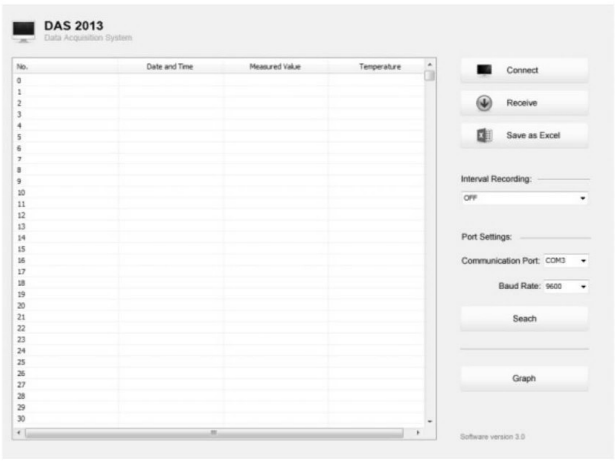
Please refer to page 7 SETUP MENU.

Communication

Bante Instruments provides a Data Acquisition System that can be used to transfer data, receive the measuring values or import the data to Excel. You are able to download this software from our official website at Before installation, ensure that Windows 7/8/10 operating system has been installed on your computer.

Receiving data

- Connect the USB cable to meter and computer. Click the DAS icon, the system will automatically scan an available communication port and show the message box "Found a port on your computer".
- Click the **OK** button, the application starts.



- Click the **Connect** button, the screen shows "Port is connected" indicate that the communication between the meter and the computer has been established.
- Click the **OK** button to confirm.
- Click the **Receive** button, the stored data automatically transfer to computer.

Interval recording

This function is used for recording the measuring value within the specify time period.

- Click the **Interval Recording** button and select a time option.
- Click the **Receive** button, the measured value will automatically send to data sheet.

ⓘ

- The first data need 1 minute to be shown on screen.
- Do not press any key on meter during the Interval Recording mode, it will cause communication interruption.

Graph mode

This function is used for viewing the variations of the measured parameter continuously.
Click the **Graph** button, the screen immediately shows the curve graph. To quit current mode, click the **Back** button.

Create the excel file

When the transfer is completed, click the **Save as Excel** button, the measured values in the data sheet will automatically convert to Excel file.

ⓘ Once the software is closed, all received data will be lost and can not be recovered.

Electrode Care and Maintenance

- Ensure that the water hardness electrode is thoroughly washed with distilled water after each use.
- Avoid touching the membrane surface.
- If performance becomes sluggish, rinse with dilute detergent, rinse with distilled water and immerse the tip in a 1000ppm calcium solution for 1 hour.

Troubleshooting

LCD DISPLAY	CAUSE	CORRECTIVE ACTION
- - -	Electrode has dried out	Soak the water hardness electrode in the 1000ppm calcium solution for at least 1 hours.
	Measured value is out of range	Check the electrode whether clogged, dirty or broken.
Err	Incorrect calibration solutions	Using the fresh calibration solutions for calibration.
	Electrode has expired	Replace the electrode.
	Keypad is not working properly	Replace the batteries.

Specifications

Water Hardness	Model	Bante932
	Range	0.05~200mmol/L
	Range ($CaCO_3$)	0~19999mg/L
	Range (CaO)	0~11220mg/L
	Range (Boiler)	0~400mmol/L
	Range (Ca^{2+})	0~8020mg/L
	Range (German Degree)	0~1122°dH
	Range (French Degree)	0~2000°f
	Range (English Degree)	0~1404°e
	Accuracy	±1% F.S
	Resolution	0.001/0.01/0.1/1
	Calibration Points	2 to 5 points
	Calibration Solutions	0.01/0.1mmol/L, 0.001/0.01/0.1mol/L
Temperature	Range	0~105°C
	Accuracy	±0.5°C
	Resolution	0.1°C
	Calibration Points	1 point

General	Temperature Compensation	0~50°C, Manual or Automatic
	Memory	Stores up to 500 data sets
	Output	USB communication interface
	Connector	BNC
	Display	LCD
	Operating Temperature	0~60°C
	Relative Humidity	< 80%
	Power Requirements	DC5V, using AC adapters, 220VAC/50Hz
	Dimensions	210 (L) × 188 (W) × 60 (H)mm
	Weight	1.5kg

Hazardous Substance Statement

Instruments is committed to the reduction and eventual elimination of all hazardous substances in both the manufacturing process and finished products we supply. We have an active manufacturing and procurement program to minimize and eliminate the use of harmful heavy metals such as cadmium, lead, mercury and the like. New technologies and design parameters are also promoting these efforts and we expect to have little or no such materials in our product in the coming years. We welcome our customer suggestions on how to speed up these efforts.

Warranty

The warranty period for meter is one year from the date of shipment. Above warranty does not cover the sensor and calibration 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 nearest authorized distributor.