Bante210 Benchtop pH Meter

Instruction Manual

BANTE INSTRUMENTS LIMITED

Introduction

Thank you for selecting the Bante210 benchtop pH meter. This manual provides a step-by-step guide to help you operate the meter, please carefully read the following instructions before use. The following list describes the standard accessories of the meter. After the unpacking, please check all accessories are complete. If any are damaged or missing, please contact nearest distributor.

ACCESSORIES:
- pH Electrode
- Temperature Probe
- pH Buffer Pouches (pH4.01/7.00/10.01)
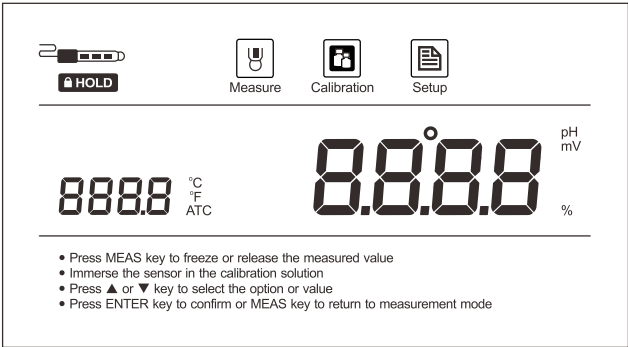- DC9V Power Adapter

| pH Electrode | Temperature Probe | pH Buffer Pouches | DC9V Power Adapter |

Display

Bante210 benchtop pH meter is equipped with a clear and bright LCD display that used to show measured values, mode indicators and help message. The following table describes the meaning of each indicator.

- Press MEAS key to freeze or release the measured value
- Immerse the sensor in the calibration solution
- Press ▲ or ▼ key to select the option or value
- Press ENTER key to confirm or MEAS key to return to measurement mode

INDEX:

|			
Measure	Measurement mode indicator: Indicates meter is in the measurement mode		Electrode slope indicator: Indicates the average slope of the pH electrode
Calibration	Calibration mode indicator: Indicates meter is in the calibration mode	Hold	Hold indicator: Indicates the displayed value has been frozen
Setup	Setup mode indicator: Indicates meter is in SETUP mode	ATC	Automatic Temperature Compensation: Indicates meter is in the temperature compensation mode

Keypad

The meter has a succinct membrane keypad, names and symbols describe the each function key controls.

| KEY	FUNCTIONS
MEAS|🔒	• Power the meter ON/OFF. • Freezes the measured value on the display, press the key again to resume measuring. • In the calibration or temperature setting mode, exits current mode and returns to measurement.
MODE	• Toggles between pH and mV measurement modes.
CAL|📄	• Press the key to enter the calibration mode. • Press and hold the key to enter the setup menu.
ºC	• Press the key to set the temperature or enter the temperature calibration mode.
▲	• Press the key to increase setting value.
▼	• Press the key to decrease setting value.
ENTER	• Confirms the calibration, setting value or displayed option.

Connecting the Electrode Holder

Bante210 benchtop pH meter comes with an easy-to-use holder for mounting the pH electrode and temperature probe. If necessary, follow the steps below to install the electrode holder.
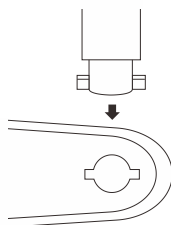
1.   The base of the electrode holder with an irregular round hole.
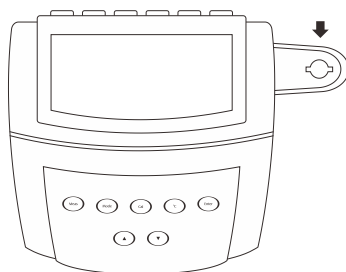

2.   The electrode arm has a plastic rod.
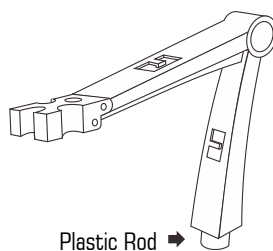
Plastic Rod ➜

3.   Insert the plastic rod into the irregular round hole and swivel the electrode arm 90º. 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.
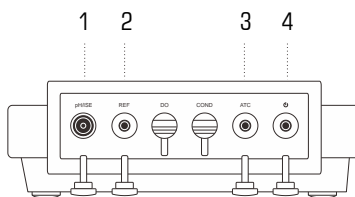1.   Remove the plastic cover from the electrode arm.
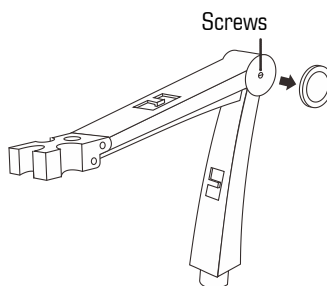
2.   Use the screwdriver to tighten the screw moderately.
3.   Insert the plastic cover to previous position. Installation is completed.

Connectors
The meter provides 4 connectors for connecting the various types of sensors and power adapter. Listed in the below table are the details of these connectors.

INDEX:

| NO.	CONNECTOR	FUNCTION
1	pH	For connecting the pH or ORP electrode
2	REF	For connecting the reference electrode
3	ATC	For connecting the temperature probe
4	⏻	For connecting the DC9V power adapter

Connecting the pH Electrode

1.   Take out the pH electrode from the packaging. Follow the steps below to place the electrode into left or right sides of the electrode arm.

A. Insert the electrode   B. Hook up the cord

◄ C. Hook up the cord
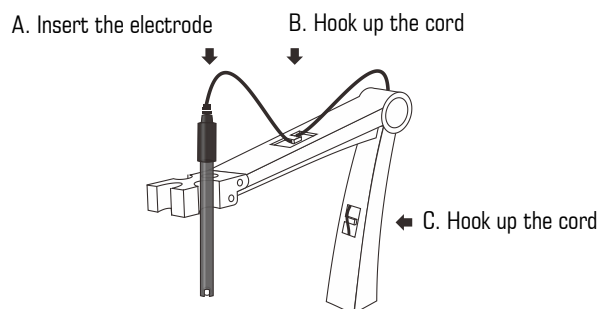
2.   Insert the BNC connector into corresponding connector socket. Rotate and push the connector clockwise until it locks. After connection is completed, DO NOT pull on the sensor cord. Always make sure that the connector is clean and dry.
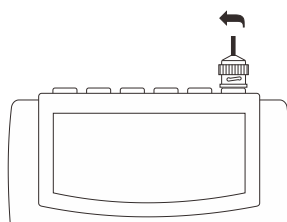
Connecting the Temperature Probe

Bante210 benchtop pH meter comes with a temperature probe for measuring temperature of the sample. When probe is connected to meter, Automatic Temperature Compensation function will immediately start.

1.   Place the temperature probe into the circular hole of electrode arm.
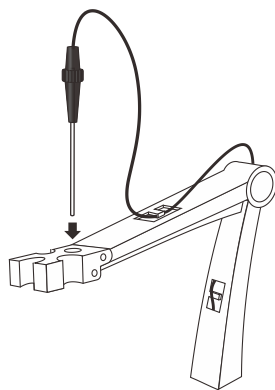
2.   Insert the connector of probe into the corresponding connector socket (Marked "ATC"). Ensure the connector is fully seated.
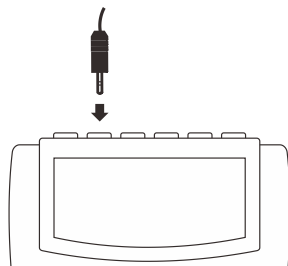
Connecting the Power Adapter

1.   Before plugging in the power adapter, ensure the its voltage matches your local main voltage.
2.   Insert the connector of power adapter into the power socket on the meter. The meter is now ready for use.
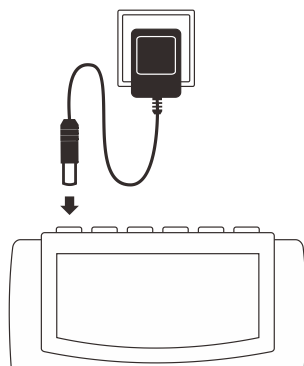
Preparing the pH Buffer Solutions

Bante210 benchtop pH meter is packaged with three pH buffer packets required for calibration.


•   Open the pH7.00 buffer packet, place the powder into a 250ml volumetric flask. Pour distilled water 250ml to scale line, mix the solution until reagent is completely dissolved.

•   Preparation of pH4.01 and 10.01 standard buffer solutions are the same as above.
•   Prepared standard buffer solutions should be stored in hermetically sealed glass containers.

Prior to Use

Remove the protective cap from the bottom of the pH electrode. If the glass sensitive membrane on the electrode dries out, soak the sensor in 3M KCL solution or tap water for at least 15 minutes. DO NOT use distilled or deionized water, it will shorten the life of sensor.

……… Glass Sensitive Membrane
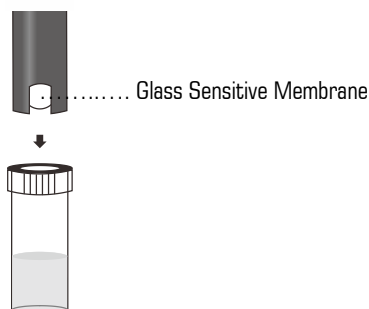
Power On/Off

• Press MEAS key to turn on the meter, the display shows measured value.

• Press and hold the MEAS key for 5 seconds, the meter will turn off.

• If you do not press any key for 3 hours, the meter will turn off automatically.

ⓘ To disable the auto-off function, please read the SETUP MENU section.

Setup Menu

Bante210 benchtop pH meter contains an integrated setup menu that allows you to customize each displayed option to meet measurement requirements.

PARAMETER	DESCRIPTION	OPTIONS	DESCRIPTION	DEFAULT
bUF	pH Buffers	USA	USA Standard (pH4.01, 7.00, 10.01)	●
		NIST	NIST Standard (pH4.01, 6.86, 9.18)	
CAL	Calibration Point	1	1 point	
		2	2 points	●
		3	3 points	
UNIt	Temperature Unit	℃	Degrees Celsius	●
		℉	Degrees Fahrenheit	
HOLd	Auto-Hold	YES	Automatically freezes a stable reading	
		NO	Disable	●
OFF	Auto-Off	YES	Automatically turn off the meter	
		NO	Disable	●
rSt	Reset	YES	Restore factory settings	
		NO	Disable	●

Setting the Default Parameters

1. Press and hold the ▤ key for 3 seconds to enter setup menu, the meter shows default pH buffer option.

Cal | ▤

Setup

bUF   USA

• Press ▲ or ▼ key to select the option or value
• Press ENTER key to confirm or MEAS key to return to measurement mode
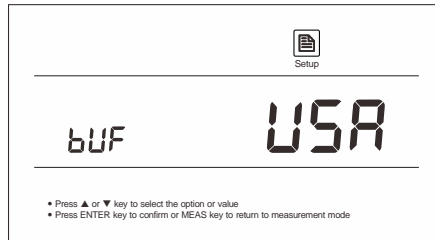
2. Press ▲ or ▼ key select the USA or NIST standard, press ENTER key to confirm. The meter goes to calibration point selection mode, the display shows 2 points calibration.

Enter

Setup

CAL   2

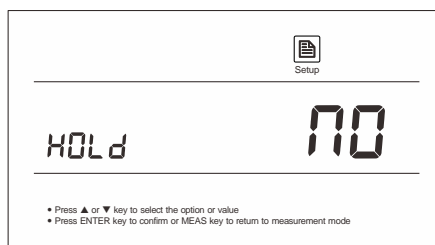• Press ▲ or ▼ key to select the option or value
• Press ENTER key to confirm or MEAS key to return to measurement mode
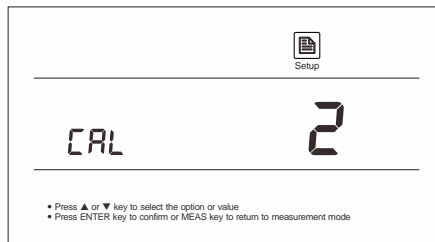
3. Press ▲ or ▼ key to select the number of calibration points, press ENTER key to confirm. The meter goes to temperature unit selection mode, the display shows "UNIT/ºC".

Enter

Setup

UnIt   °C

• Press ▲ or ▼ key to select the option or value
• Press ENTER key to confirm or MEAS key to return to measurement mode
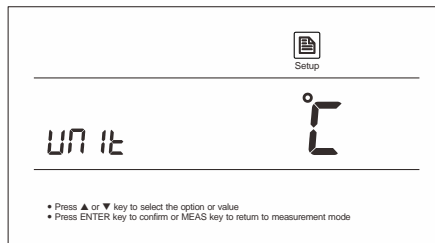
4. Press ▲ or ▼ key to select the desired temperature unit (ºC or ºF), press ENTER key to confirm. The meter shows "HOLD/NO" indicating that the auto-hold function is disabled.

Enter

Setup

HOLd   NO

• Press ▲ or ▼ key to select the option or value
• Press ENTER key to confirm or MEAS key to return to measurement mode

If the auto-hold function is enabled, the meter will automatically sense a stable endpoint reading and freeze it. If you disable this function, the meter allows user to freeze the reading by pressing the HOLD key.

5. Press ▲ or ▼ key to enable or disable the auto-hold function, press ENTER key to confirm. The meter shows "OFF/NO" indicating that the auto-off function is disabled.

Enter

Setup

OFF   NO

• Press ▲ or ▼ key to select the option or value
• Press ENTER key to confirm or MEAS key to return to measurement mode
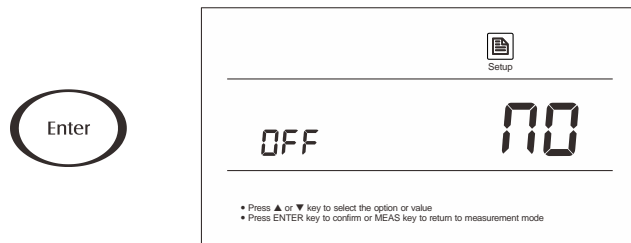
When the auto-off function is enabled, if you do not press any keys within 3 hours, the meter will automatically turn off.

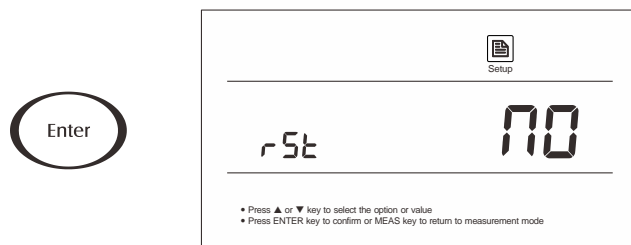6. Press ▲ or ▼ key to enable or disable the auto-off function, press ENTER key to confirm. The meter shows "RST/NO" indicating that the meter should not be reset.

Enter

Setup

rSt   NO

• Press ▲ or ▼ key to select the option or value
• Press ENTER key to confirm or MEAS key to return to measurement mode

WARNING:
Reset function will restore the meter back to factory default parameters, all calibration values and selected parameters will be reset.

7. Press ▲ or ▼ key to enable or disable the reset function, press ENTER key to confirm. The meter returns to measurement mode. Setting is completed.

EXIT THE SETUP MENU:
During the setup mode, press MEAS key, the meter returns to measurement mode immediately.

Temperature Compensation

In order to get accurate measuring results, you need to enable the manual or automatic temperature compensation before measurement or calibration.

AUTOMATIC TEMPERATURE COMPENSATION:

Insert the connector of temperature probe into corresponding "ATC" socket, the display immediately shows "ATC" indicator. The meter is now switched to automatic temperature compensation mode.
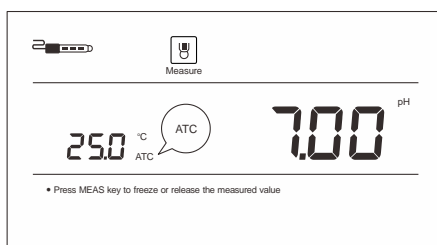
MANUAL TEMPERATURE COMPENSATION:

1.   DO NOT connect the temperature probe to meter. Press ℃ key to enter the temperature setting mode.
2.   Press ▲ or ▼ key to set temperature value.
3.   Press ENTER key to confirm. Setting is completed.

ⓘ   In the temperature setting mode, press ▲ 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.

pH Calibration

Bante210 benchtop pH meter allows 1 to 3 points calibration. We recommend that you perform at least 2 points calibration for high accuracy measurement. The meter will automatically recognize and calibrate to following standard buffer values.

- USA Standard Buffer Options: pH4.01, 7.00, 10.01
- NIST Standard Buffer Options: pH4.01, 6.86, 9.18

Single point calibration should only be carried out with pH7.00 or 6.86, otherwise calibration will not be accepted.

The meter must be calibrated prior to first use or new electrode replaced. To ensure accuracy, regular calibration is recommended. DO NOT reuse calibration solution after calibration, contaminants in solution will affect the calibration and eventually the accuracy of the measurement.

SINGLE POINT CALIBRATION:

1.1 Make sure that you have selected 1 point calibration in the setup menu.
1.2 Rinse the pH electrode with distilled water.
1.3 Press CAL key, the meter shows "CAL1/pH7.00"(or "CAL1/pH6.86").
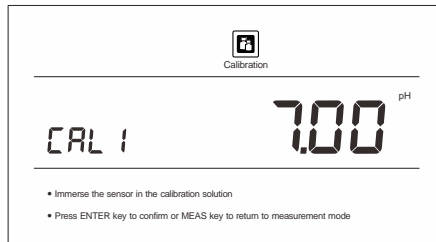
1.4 Dip the pH electrode into the pH7.00 (or pH6.86) standard buffer solution. Stir the sensor gently.
1.5 Press ENTER key to confirm. Wait for the measured value to stabilize, the display shows "END". Single point calibration is completed.
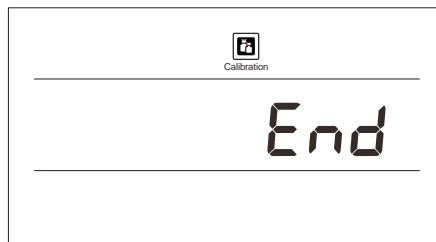
2 POINTS CALIBRATION:

2.1 Make sure that you have selected 2 points calibration in the setup menu.
2.2 Repeat steps 1.2 to 1.5 above. When the first calibration point is done, the display will show "CAL2 ". The meter prompts you to continue with second point calibration.

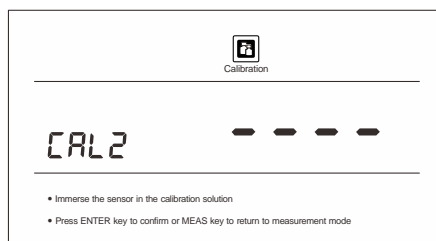2.3   Rinse the pH electrode with distilled water. Dip the electrode into the pH4.01 or 10.01 (pH4.01 or 9.18) standard buffer solution. Stir the sensor gently.

2.4   Press ENTER key to confirm. Wait for the measured value to stabilize, the display shows electrode slope and "END". Second point calibration is completed.

Enter

Calibration

25.0 °C ATC   4.01 pH

Calibration

SLOP   99 %

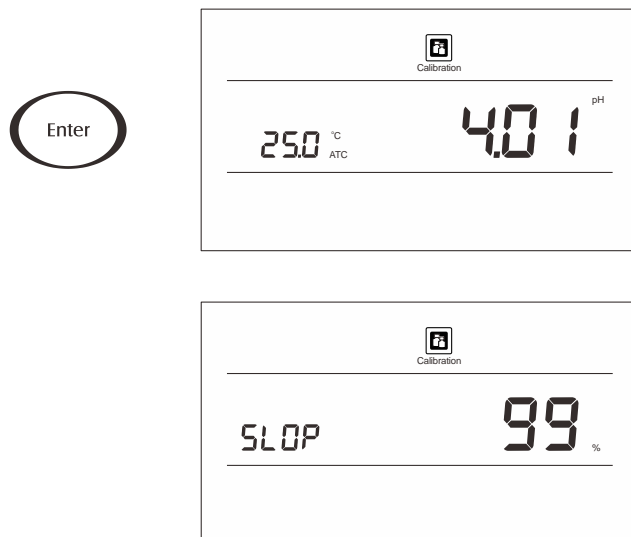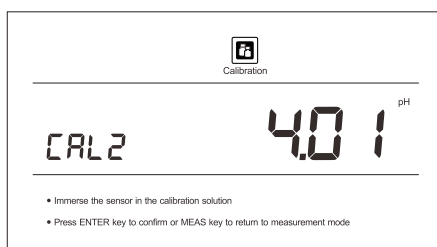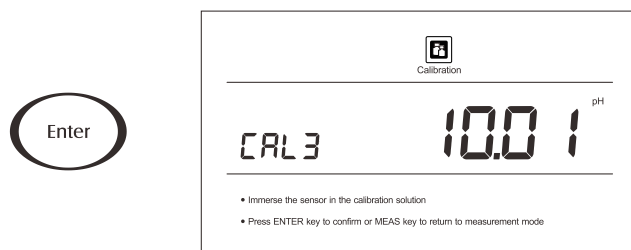3 POINTS CALIBRATION:

3.1   Make sure that you have selected 3 points calibration in the setup menu.

3.2   Repeat steps 1.2 to 1.5 above. When the first calibration point is done, the display will show "CAL2/pH4.01". The meter prompts you to continue with second point calibration.

Calibration

CAL2   4.01 pH

• Immerse the sensor in the calibration solution

• Press ENTER key to confirm or MEAS key to return to measurement mode

3.3   Rinse the pH electrode with distilled water. Dip the electrode into the pH4.01 standard buffer solution. Stir the sensor gently.

3.4   Press ENTER key to confirm. Wait for the measured value to stabilize, the display shows electrode slope and "CAL3/pH10.01" (or "CAL3/pH9.18").

Enter

Calibration

CAL3   10.01 pH

• Immerse the sensor in the calibration solution

• Press ENTER key to confirm or MEAS key to return to measurement mode

3.5   Rinse the pH electrode with distilled water. Dip the electrode into the pH10.01 (or pH9.18) standard buffer solution. Stir the electrode gently.

3.6   Press ENTER key to confirm. Wait for the measured value to stabilize, the display shows electrode slope and "END". The meter automatically returns to measurement mode. Calibration is completed.

ⓘ

- During the calibration, if the meter shows "Err", please check the pH electrode and calibration solutions are fresh and uncontaminated.


- If you want to exit from calibration mode, press MEAS key, the meter will immediately return to measurement mode.
- The electrode indicator shows average slope of the pH electrode after calibration. If the electrode slope or calibration result does not meet measurement requirements, the indicator will disappear on the display.
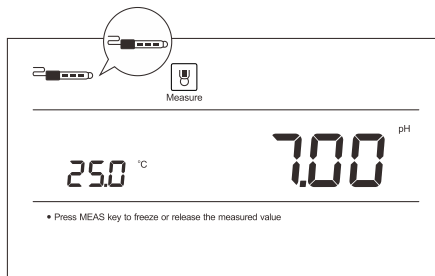
Temperature Calibration

During the measurement, when automatic temperature compensation is enabled, if the temperature reading displayed differs from that of an accurate thermometer, you need to calibrate the meter.

1.   Make sure the connecter of temperature probe had connected to the meter.
2.   Press ℃ key to enter the temperature calibration mode, the display shows current temperature reading.
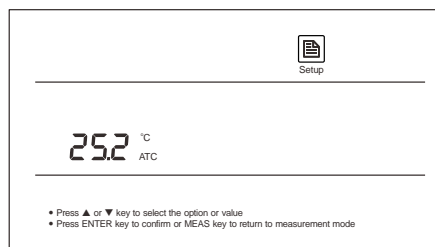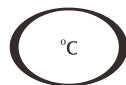
3.   Press ▲ or ▼ key to set the temperature value.
4.   Press ENTER key to confirm. Calibration is completed.

pH Measurement

1. Press MODE key until the display shows measurement unit "pH".
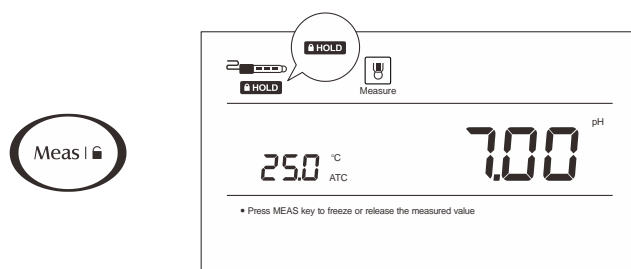2. Rinse the pH electrode with distilled water to remove any impurities adhering to the probe body.
3. Dip the electrode into the sample solution, stir the sensor gently to create a homogeneous sample.
4. Wait for the measured value to stabilize, record the reading on the display.

mV Measurement

1. Press MODE key until the display shows measurement unit "mV".
2. Rinse the electrode thoroughly with distilled water.
3. Dip the electrode into the sample solution, stir the sensor gently.
4. Wait for the measured value to stabilize, record the reading on the display.

Hold Function

Bante210 benchtop pH meter contains two data hold modes. When the Auto-Hold function is enabled, the meter will automatically sense a stable endpoint reading and freeze it, "HOLD" indicator appears on the display. If the Auto-Hold function is disabled, press 🔒 key, the meter will immediately freeze currently displayed value. Press the key again to resume measuring.

Electrode Care and Maintenance

Since pH electrode is susceptible to dirt and contamination, clean as necessary depending on the extent and condition of use.

AFTER MEASURING:
Rinse the pH electrode in distilled water, store the sensor into the electrode storage solution.

CLEANING THE ELECTRODE:
- Salt deposits: Soak the pH electrode in warm tap water to dissolve deposits, then thoroughly rinse with distilled water.
- Oil or Grease film: Wash the electrode bulb gently in some detergents and water. If necessary, using the alcohol to clean the electrode bulb, then rinse with distilled water. Place the sensor in the electrode storage solution for 30 minutes.
- Clogged reference junction: Heat a diluted KCl solution to 70°C. Place the sensing part of the sensor into the heated solution for about 10 minutes. Allow the sensor to cool in some unheated KCl solution.
- Protein deposits: Prepare a 1% pepsin solution in 0.1M of HCL. Place the electrode in the solution for 10 minutes. Rinse the sensor with distilled water.

REACTIVATING THE ELECTRODE:
If stored and cleaned properly, the electrode should be ready for immediate use. However, a dehydrated bulb may cause sluggish response. To rehydrate the bulb, immerse the electrode in a pH4.01 buffer solution for 10 to 30 minutes. If this fails, the electrode requires activation.
- Soak the pH electrode in 0.1M HCl for 5 minutes.
- Remove and rinse with distilled water, then place in 0.1M NaOH for 5 minutes.
- Remove and rinse again, and soak in electrode storage solution for 30 minutes.

Optional pH Electrodes

Bante210 benchtop pH meter is equipped with a general purpose pH electrode, if it can not fully meet your measurement requirements, please refer to the table below to select an applicable sensor.

SAMPLE TYPE	P11	P12	P13	P14	P16	P17	P18	P19	P20	P21
Agar						●				
Beer	●	●	●	●		●			●	●
Blood Products	●	●	●			●				●
Bread, Dough							●	●		
Cement	●									
Cosmetics	●	●	●	●		●				●
Dairy Products	●	●	●			●		●		
Education	●			●		●			●	
Fats/Cream								●		
Field Use				●		●	●		●	
Fish Products						●		●		
Lab Flasks		●								
Low Ionic	●									●
Meat, Cheese						●		●		
Micro Samples			●							
Paint		●	●			●				
Photographic										
Soil							●	●		
Surface						●				
Test Tubes		●			●					
Tris Buffer					●					
Viscose Samples						●				

Troubleshooting

LCD DISPLAY	CAUSE	CORRECTIVE ACTION
- - -	Electrode dried out	Soak the pH electrode in 3M KCL solution for 10 minutes
	Measured value is out of range	Check the electrode whether clogged, dirty or broken
Err	Incorrect pH buffer solutions	Using the fresh pH buffer solutions for calibration
	Electrode is out of service life	Replace the pH electrode

Specifications

pH	Model	Bante210
	Range	-1.00~15.00pH
	Accuracy	±0.01pH
	Calibration Points	1 to 3 points
	Calibration Solutions	USA (pH4.01/7.00/10.01) or NIST (pH4.01/6.86/9.18)
mV	Range	-1000~1000mV
	Accuracy	±1mV
	Resolution	1mV
Temperature	Range	0~105℃, 32~221°F
	Accuracy	±1℃
	Resolution	0.1℃
	Calibration Points	1 point
	Calibration Ranges	Measured value ±10℃
Others	Temperature Compensation	0~100℃, 32~212°F, Manual or Automatic
	Hold Function	Manual or Automatic
	Power Off	Manual or Automatic (180 minutes after last key pressed)
	Connector	BNC
	Display	LCD (135×75mm)
	Power Requirements	DC9V, using AC adapters, 220VAC/50Hz
	Dimensions	210(L)×205(W)×75(H)mm
	Weight	1.5kg

Addendum: How to prepare the electrode storage solution

Dissolve 22.365 grams of potassium chloride reagent (KCL) in the 100mL distilled water. Stir the solution until the solution has thoroughly mixed.

Hazardous Substance Statement

Bante Instruments Limited 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 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.

BANTE INSTRUMENTS LIMITED
E-mail: banteinstruments@yahoo.com
Phone: +8621-6404-1598
Website: www.bante-china.com