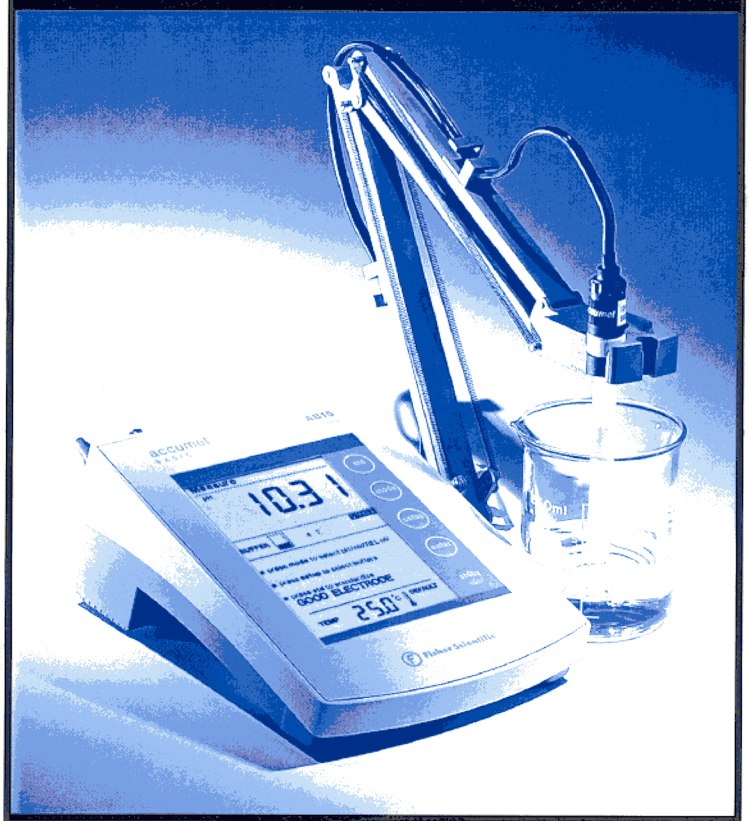
asure®

AB15



USER Manual

Fisher Scientific

std

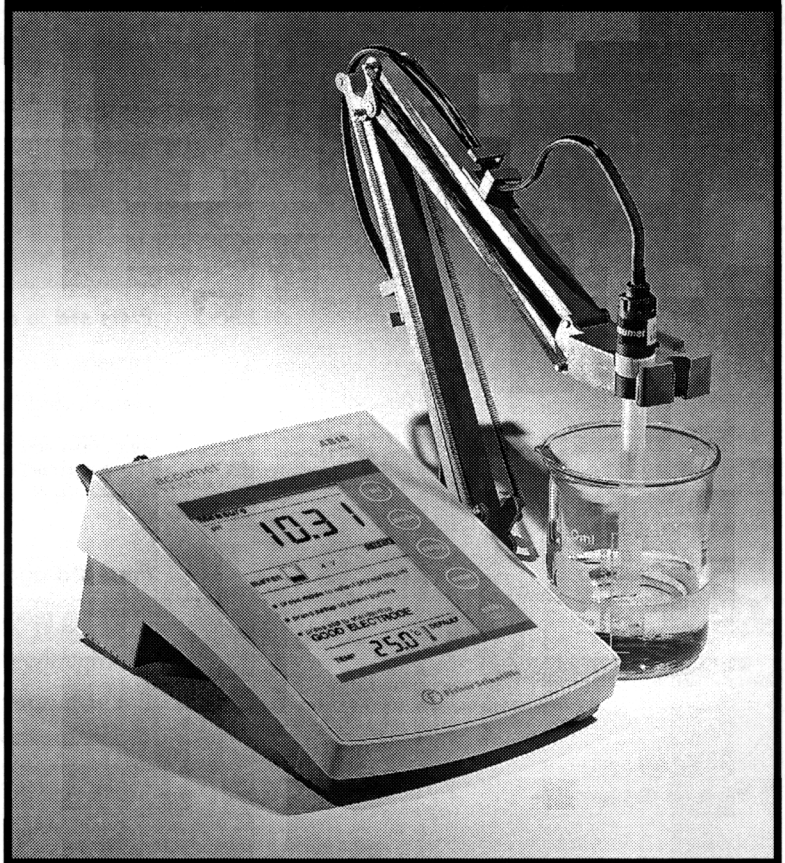
mode

setup

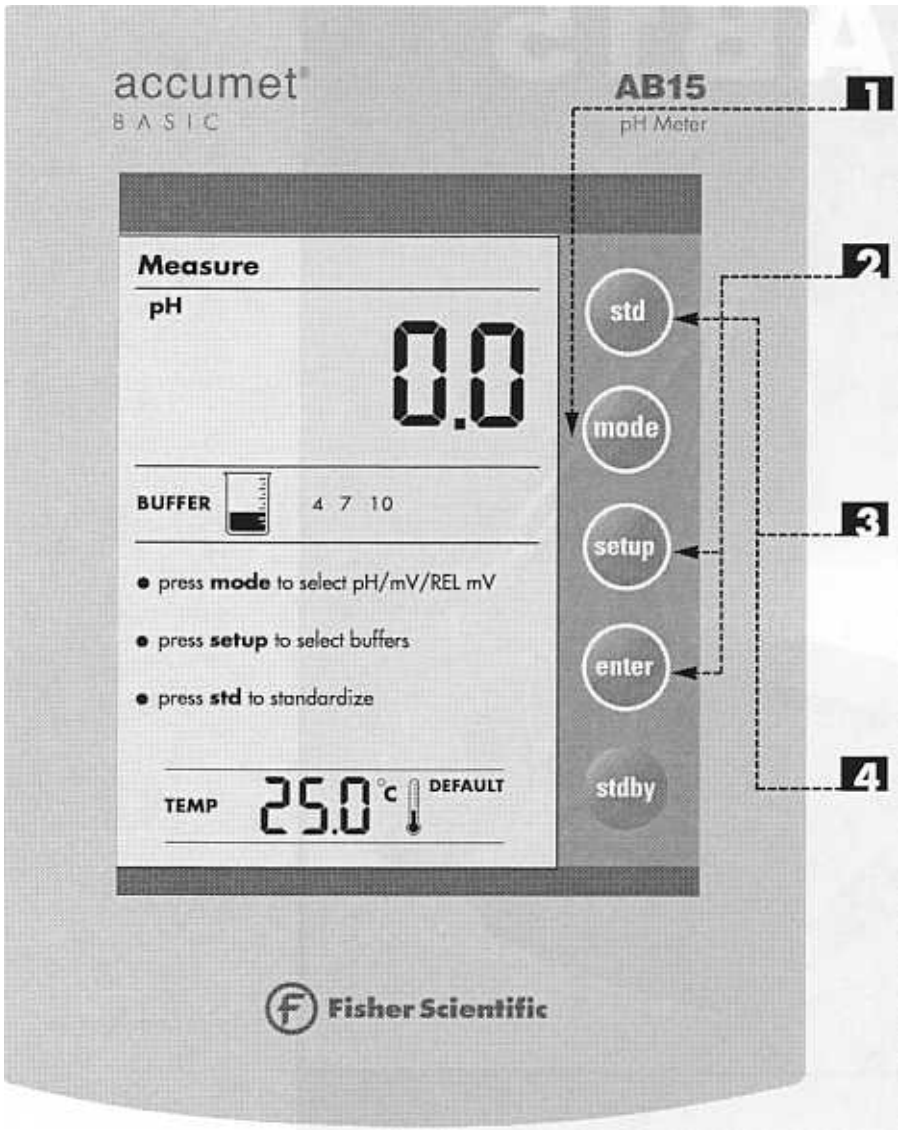
enter

stdby

AB15



USER Manual



Press **mode** to select pH.

Press **setup** twice and then **enter** to clear the existing standardization buffers.

Press **std** to access the Standardize screen. Immerse the electrode(s) into a buffer from the selected buffer group shown (for buffer selection see page 16).

Press **std** again to initiate standardization. After the reading is stable the meter will return to the Measure screen. Repeat steps 3-4 with a second buffer.

Immerse electrode(s) into sample to be measured.

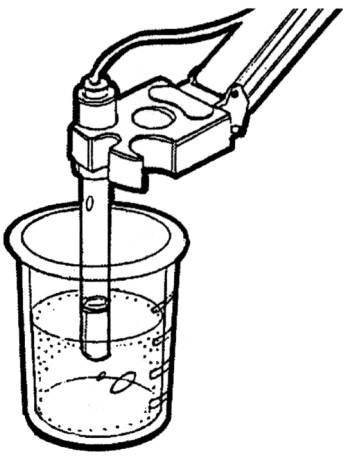


Table of Contents

Thank you for selecting a Fisher Scientific accumet pH Meter. This manual describes the operation of the accumet Basic AB15 meter. The meter that you have purchased is the most productive and easy-to-use meter available anywhere. This manual should answer any questions that might arise in operating your meter; however, don't hesitate to call our Fisher Lab Equipment Technical Support Hotline at 1/800-943-2006 or 412/490-6260 if you need any assistance.

This meter is designed to provide all the information necessary to guide the user through the process of measuring pH with a series of prompts on the screen. If more information or detail is required, refer either to the QUICK REFERENCE page on the inside front cover or to this manual for assistance.

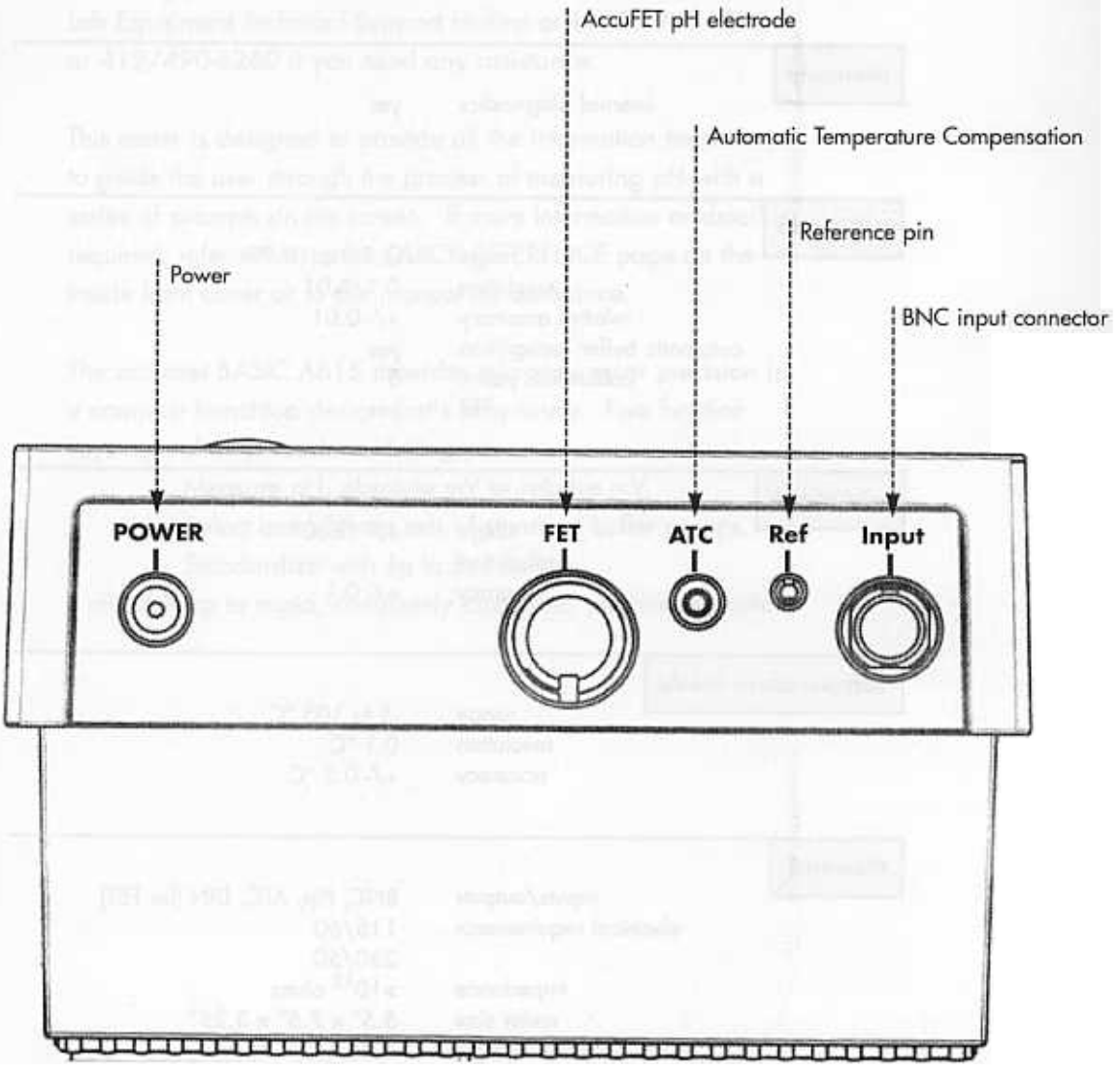
The accumet BASIC AB15 provides microprocessor precision in a compact benchtop design that's easy-to-use. Five function keys control all procedures, letting you:

- Measure pH, absolute mV or relative mV.
- Select one of three sets of standard buffer groups.
- Standardize with up to five buffers.

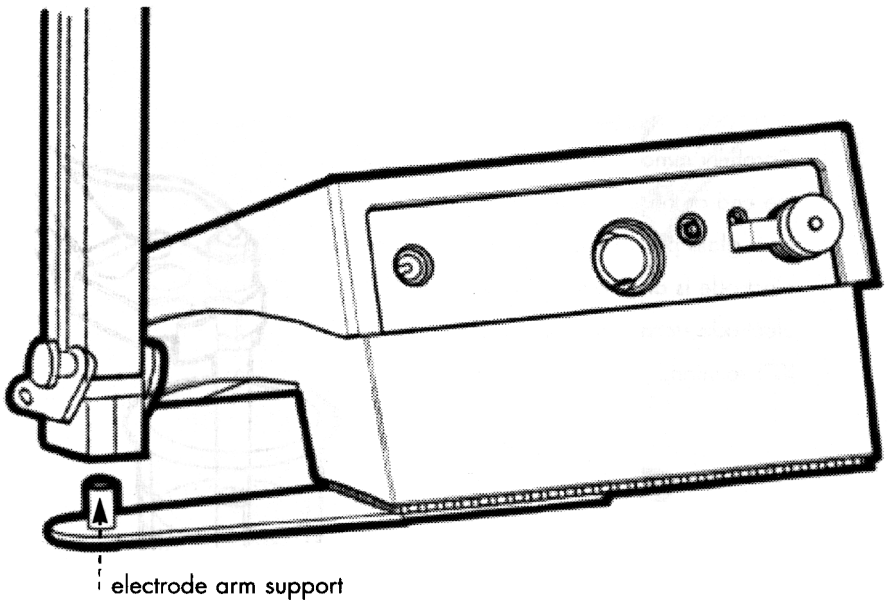
It all adds up to rapid, completely automatic, intuitive operation.

Display		Custom LCD
	screen size	3"x4.25"
	measurement display height	3/4" h
	temp/etc. display height	5/16"
	menu options	limited
	help screens	limited
	keypad controls	5 key membrane
Memory		
	internal diagnostics	yes
pH Mode		
	range	-1.99 to 19.99
	resolution	0.1/0.01
	relative accuracy	+/- 0.01
	automatic buffer recognition	yes
	calibration points	5
	FET	yes
mV Mode		
	range	+/- 1800
	resolution	
	accuracy	+/- 0.1
Temperature Mode		
	range	-5 to 105 °C
	resolution	0.1 °C
	accuracy	+/- 0.5 °C
General		
	inputs/outputs	BNC, Pin, ATC, DIN (for FET)
	electrical requirements	115/60
		230/50
	impedance	$>10^{12}$ ohms
	meter size	5.5" x 7.5" x 3.25"
	meter weight	1.86 lb.

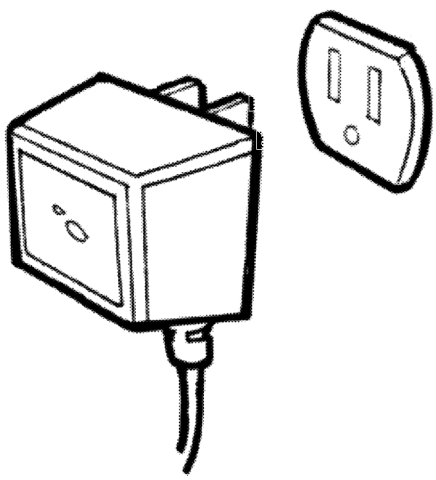
1 Review the layout and arrangement of the rear connector panel.



2 | Connect the electrode arm to the base.



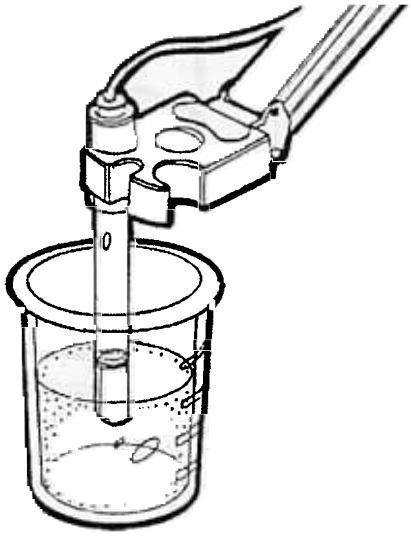
3 Connect the power cable to the rear connector panel power jack and to a power source.

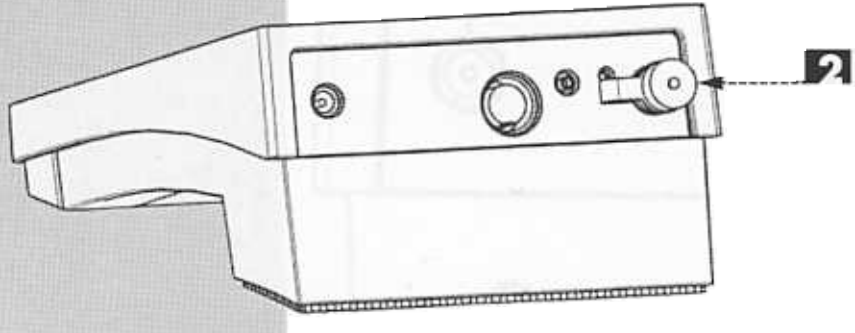


This meter allows you to use two types of pH electrodes: the conventional glass pH electrode and the AccuFET field effect transistor (FET) pH electrode. If both types of pH electrodes are connected, the meter will read the AccuFET electrode.

If both a conventional electrode and an AccuFET electrode are connected to the meter, do not put them in a solution together because you will get inaccurate measurements.

1 Carefully remove the protective cover from the end of the electrode. Before first using your glass pH electrode, or whenever the electrode is dry, soak it 2-4 hours in electrode storage solution, pH 4 buffer, or KCl solution.





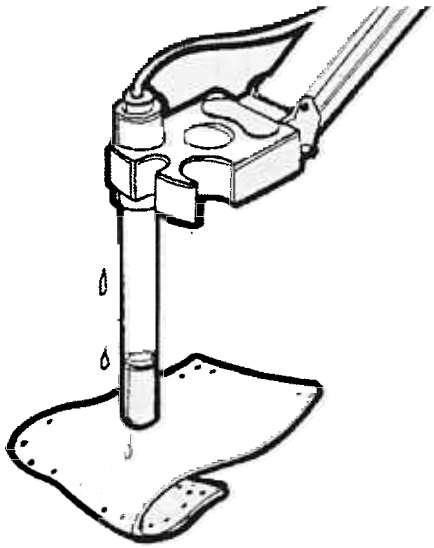
2 Remove the shorting cap on BNC connector. Install the **combination pH electrode** by plugging it into the BNC input connector (twisting to lock in place).

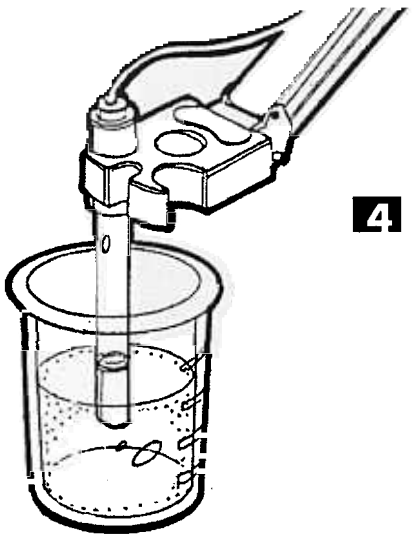
If a combination electrode isn't used, install the **indicating pH electrode** into the BNC input connector. Plug the **reference electrode** into the reference pin jack. Also, install the **ATC probe** into the ATC jack.

Option: Install the optional **AccuFET electrode** by plugging it into the FET jack on the back meter panel. Allow the AccuFET to warm up five minutes before use.

Do not discard the BNC shorting cap.

3 Rinse and blot-dry (don't wipe) electrodes between each measurement. Rinse electrodes with distilled or deionized water, or a portion of the next solution to be measured.

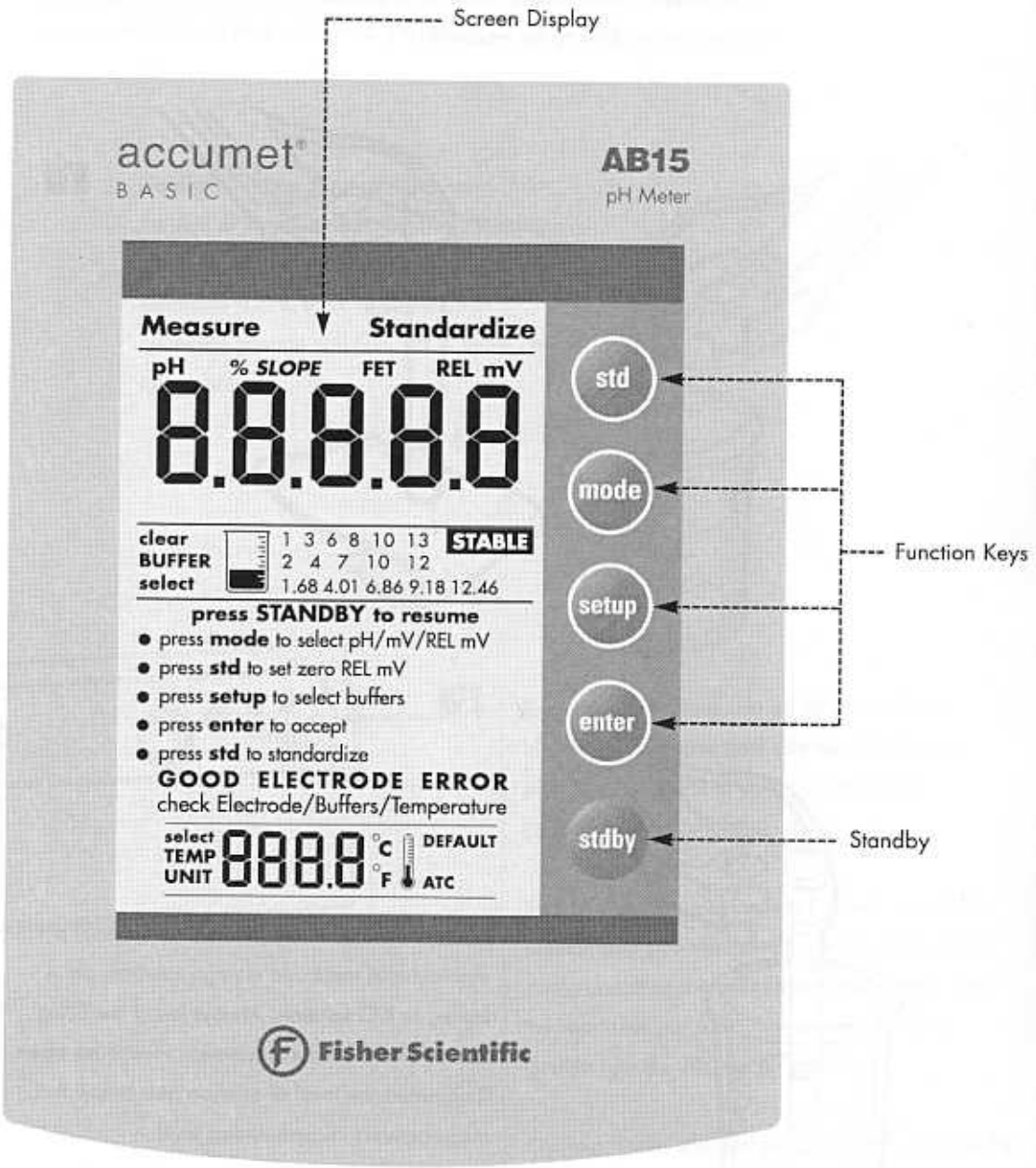




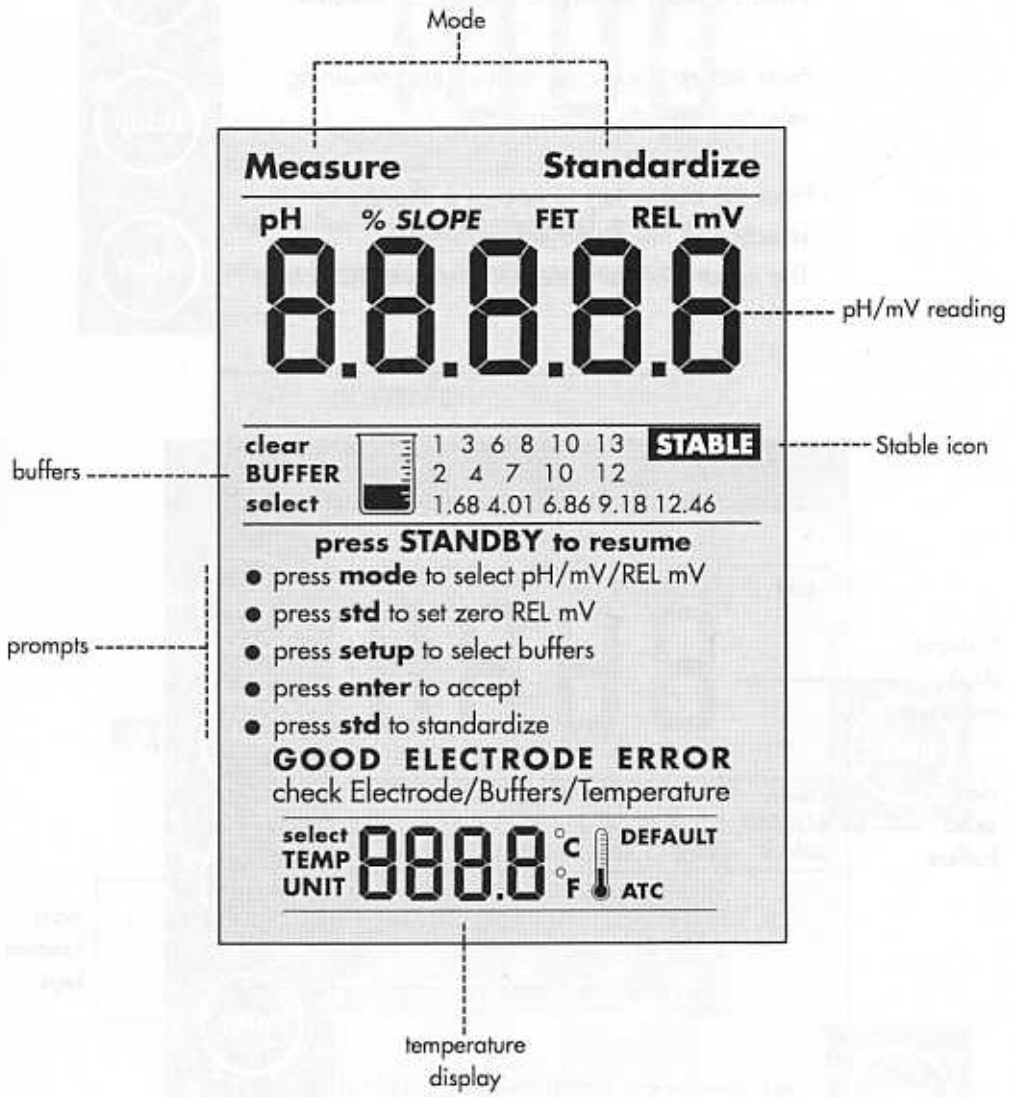
4 Between measurements, store conventional pH electrodes in electrode storage solution, pH 4 buffer, or KCl solution. Always leave the filling hole of liquid filled combination electrodes open. Refill when the level of solution gets below the manufacturers recommended level.

Proper electrode care is fundamental to obtaining reliable pH measurments. Improper care of the electrode may cause the meter reading to drift, respond slowly, or produce erroneous readings. For this reason, the electrode should always be conditioned and used in accordance with manufacturer's instructions.

Review the meter screen display and function key layout

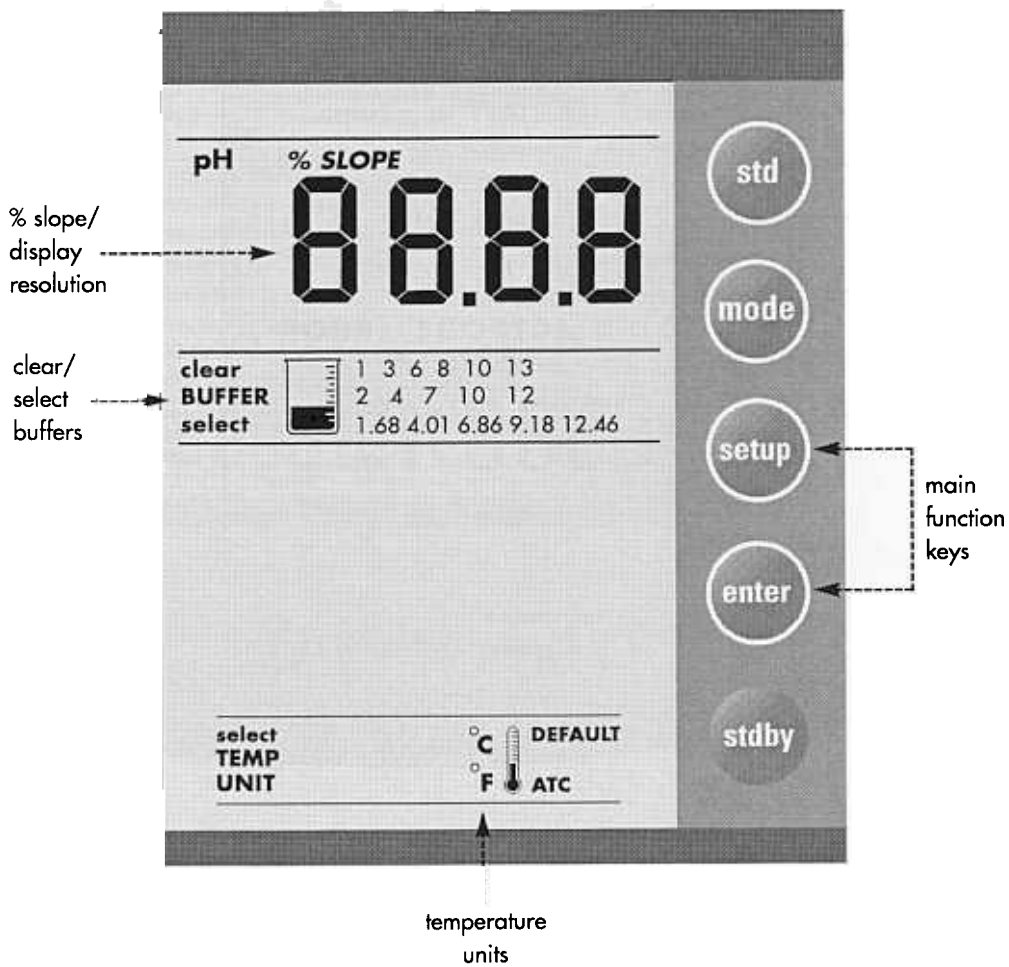


Familiarize yourself with the layout of the digital screen display.



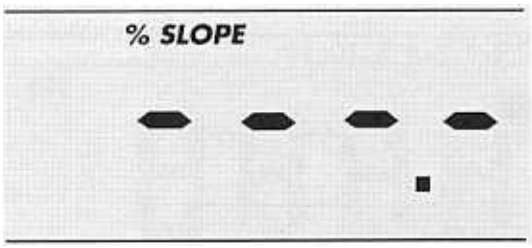
The setup button is in essence a scroll key which allows you to change several operating parameters. While in the Setup mode you may:

- Press the **mode** key to return to the Measure screen without making a change or selection.
- Press **setup** and scroll through the remaining selection options available.
- Press the **enter** key to accept a change or selection in the displayed parameter. The meter will then return to the measure screen.

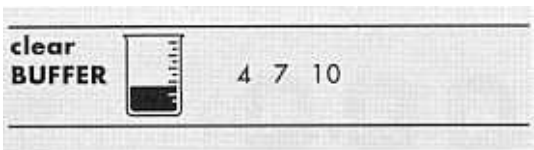


1 Press **setup** to view the slope

If the unit has not been standardized, a series of dashes will appear on the display rather than a number.



2 Press **setup** again and the clear BUFFER icon is displayed along with the previously entered buffers.



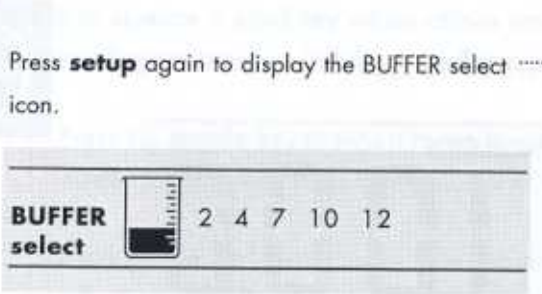
Press **enter** to clear all existing buffers. The meter clears all buffers and returns to the Measure screen, **or**

NOTE: If no buffers have been entered, the meter will skip this screen and continue to Step **3**

You can escape the setup mode at any time by pressing **mode**.

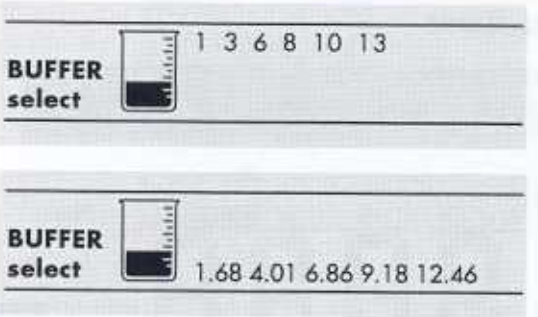
Pressing **enter** will always return the display to the Measure screen.

3 Press **setup** again to display the BUFFER select icon.



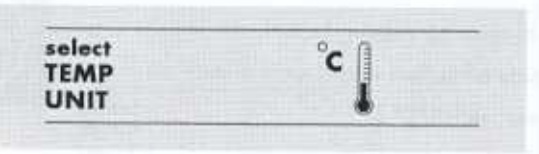
Press **enter** to accept the group and return to the Measure screen, **or**

Continue to press **setup** until the desired buffer group is displayed.



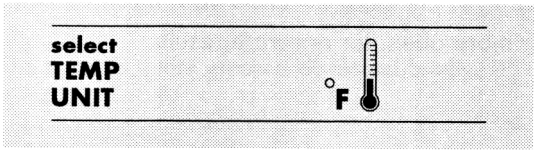
Press **enter** to accept the desired buffer group and return to the Measure screen, **or**

4 Press **setup** again to display the select TEMP UNIT icon.



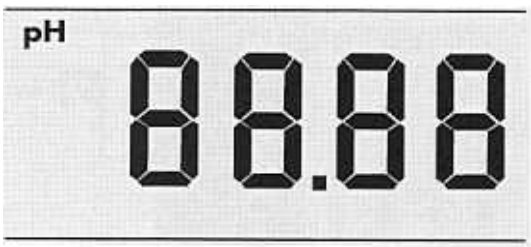
Press **enter** to accept the °C temperature unit and return to the Measure screen, **or**

Press **setup** again to display the °F unit.



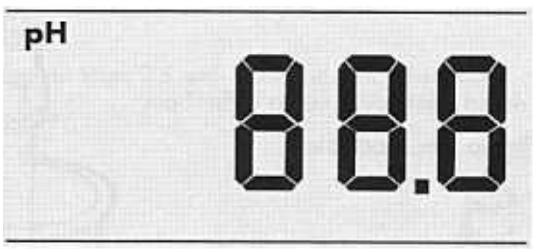
Press **enter** to accept the °F unit and return to the Measure screen, **or**

5 Press **setup** again to view the two decimal point resolution selection.



Press **enter** to accept this resolution and return to the Measure screen, **or**

Press **setup** again to display the one decimal point resolution selection.

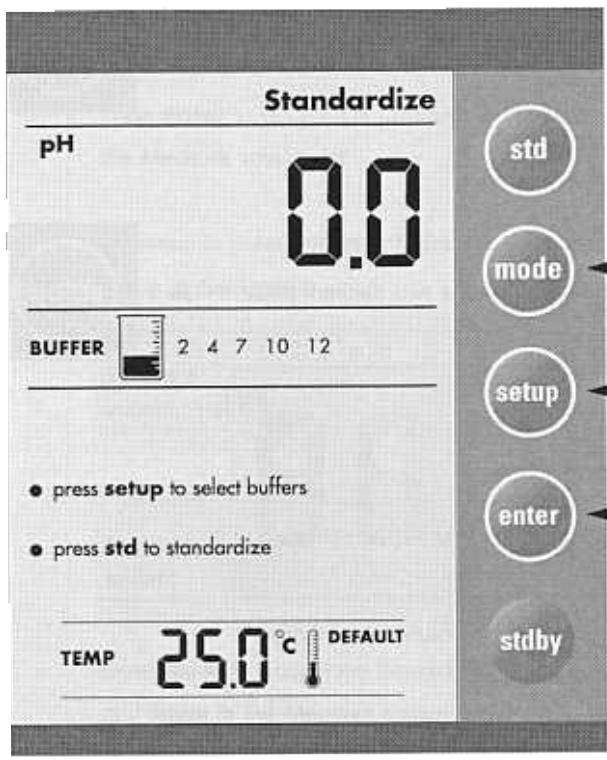


Press **enter** to accept this resolution and return to the Measure screen.

NOTE: Pressing **setup** again will return you to the beginning of the setup process.

Because electrodes vary in their response, you must standardize your pH meter and electrode to compensate for electrode variation. The more frequently you standardize, the more accurate your measurements. Standardize daily, or more often, for accurate results.

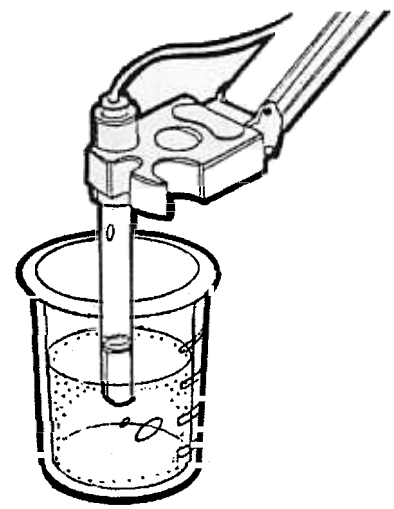
This meter allows for automatic calibration using up to 5 buffers.



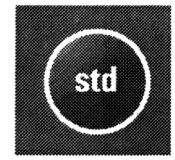
1 Press and release the **mode** key until your digital display indicates pH mode. This key toggles between pH, mV, and Rel mV modes.

2 Press the **setup** key twice and then the **enter** key to clear an existing standardization. *(see USING SETUP on pg. 10).*

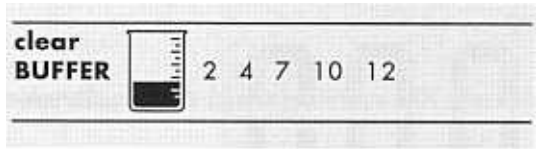
3 Immerse the rinsed electrode(s) into a buffer from the selected group. Stir, moderately.



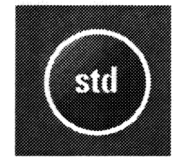
4 Press **std** to access the Standardize mode.

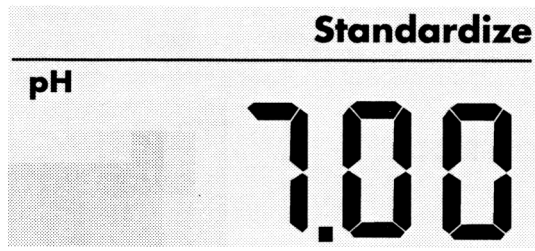


The selected buffer group is displayed briefly.



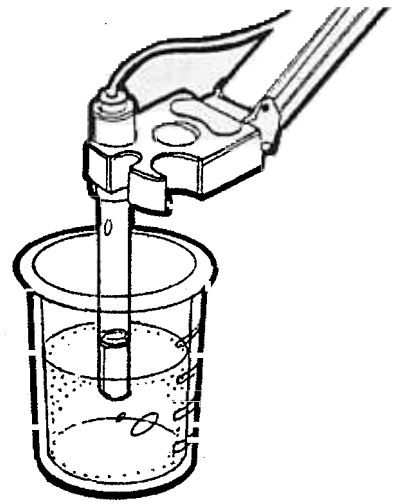
5 Press **std** again to initiate standardization. The meter will automatically recognize the buffer and flash the value on the screen.





When the stable icon appears the buffer value is entered and the meter returns to the Measure screen.

6 Repeat steps 3-5 with a second and subsequent buffers.

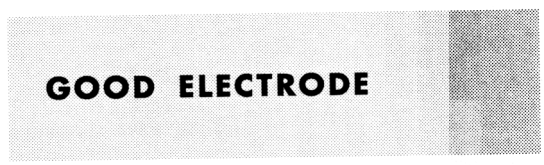


When the ATC probe is connected, the meter will continually adjust for temperature. Therefore the buffer values may vary slightly from the nominal values because of temperature variations.

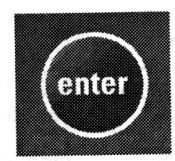
Standardize your meter using at least 2 buffers.

When the meter accepts the second buffer, it will briefly display the percent slope associated with the electrode's performance prior to returning to the Measure mode.

If the electrode is within the range of 90-102%, the GOOD ELECTRODE message will appear.



If the electrode is outside this range, the meter will display the ELECTRODE ERROR message, and will not return to the Measure screen until the user presses **enter**.



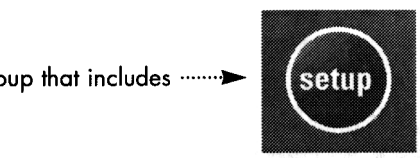
The meter will permit the user to use an electrode outside the recommended range, but the ERROR message will persist.

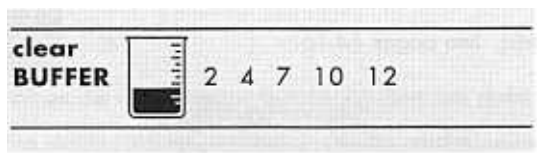
Standardizing with buffers from different buffer sets

You can standardize the meter at buffer values from different selected buffer groups.

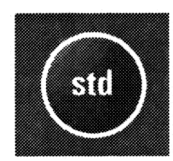
To standardize with buffers from different buffer sets

1. Press **setup** to select a buffer group that includes the desired buffer. *See page 10.*



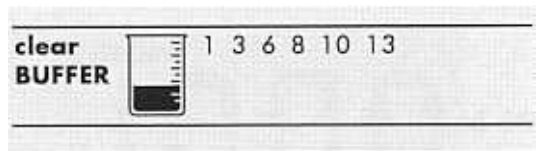


2. Press **std** to standardize the meter with the selected buffer(s). *See pages 14-16.*

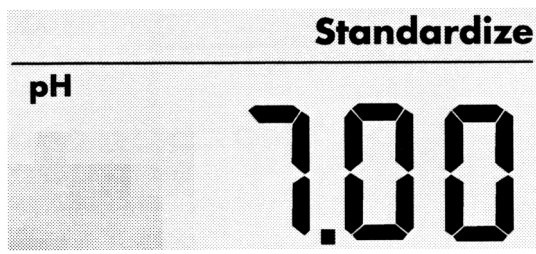


(over)

3 Press **setup** to return to setup and select the next buffer group that contains the desired buffer(s). *See page 12.*



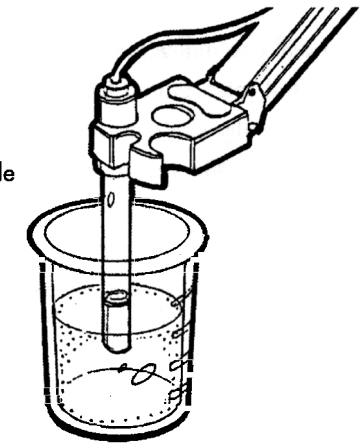
4 Press **std** to standardize the meter with the selected buffer(s). *See pages 14-16.*



Selected buffers should be at least 2 pH units apart.

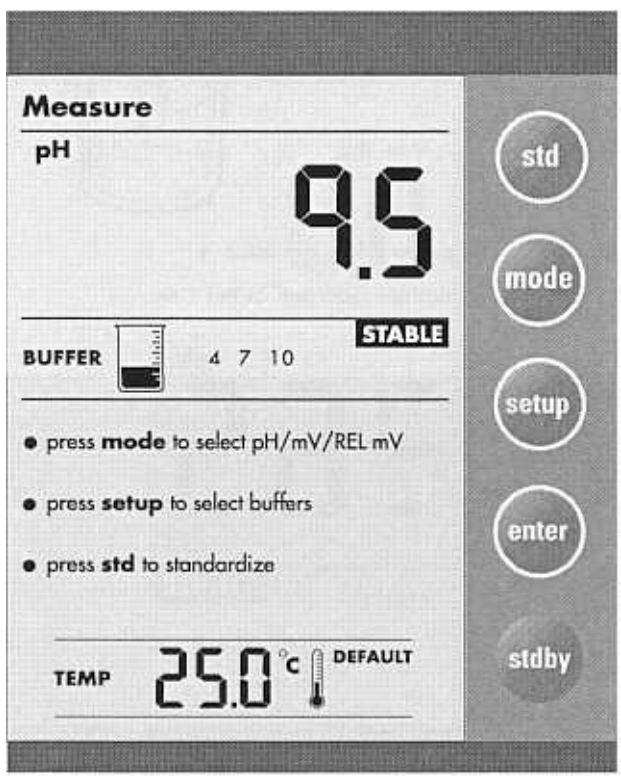
5 Repeat steps 1-2 until standardization with all desired buffers is completed. *See page 17.*

1 Immerse the electrode(s) into the sample solution. Stir moderately.



Make sure that the meter is in the pH mode. ·····► 

2 When the meter senses that the reading has stablized, the stable icon will appear under the reading. The reading may be recorded at this time.

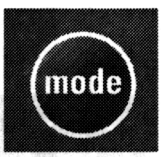


Standardize your meter following the instructions beginning on pg. 14.

Stirring with a magnetic stir bar and stirrer provides faster electrode response.

You will use millivolt measurement primarily for measuring redox potential (also called ORP, oxidation reduction potential). You will normally use a platinum indicator electrode, combined with a reference electrode, to measure redox potential (ORP). Redox measurements indicate the oxidizing or reducing capability of a solution. You can use Redox values to monitor or control solutions requiring a set amount of oxidants or reductants.

1 Press **mode** until your meter displays the mV mode.

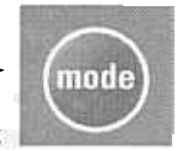


2 Immerse the electrode in a sample solution.

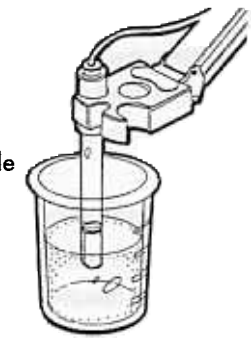
3 The stable icon will appear when the value is stable. The reading may be recorded at this time.

The Relative mV mode may help you to standardize certain analytical and monitoring activities such as titrations.

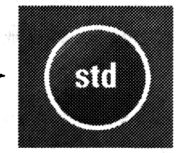
1 Press **mode** until your meter displays the Relative mV mode.

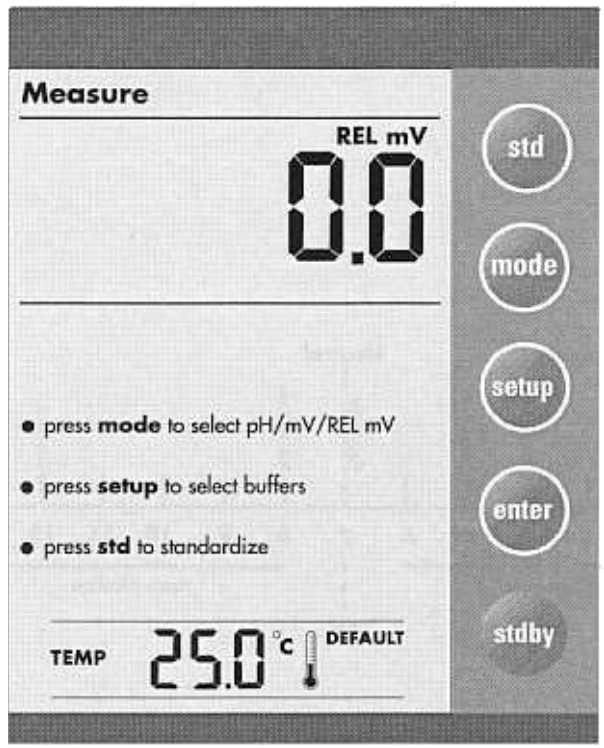


2 Immerse the electrode in a sample solution.



3 Press **std** and the millivolt value on the screen will change to a 0.0 mV reading. Subsequent mV readings will be displayed relative to this 0.0 mV reading.





The measurement of pH plays an important role in quantifying and controlling acidity and alkalinity levels for industry and research. pH is a measure of the acidity or alkalinity of a solution and can be represented by this equation:

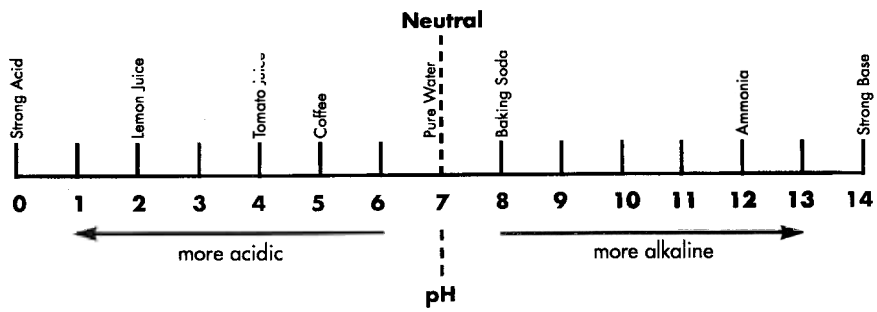
$$pH = -\log [H^+]$$

with $[H^+]$ representing the concentration of hydrogen ions in the solution pH is sometimes referred to as the power of the hydrogen ion in a solution.

By using a pH meter, you can most precisely determine exact pH levels of solutions. For example, rather than saying that lemon juice is quite acidic, you can say that lemon juice has a pH of 2.4. An exact pH value is often required to control or optimize acidity levels for manufacturing processes or for basic research.

pH values generally range from 0 to 14, with a pH value of 7 being the neutral point, or the value of pure water. The pH values above the neutral point represent increasing alkalinity, whereas pH values below the neutral point represent increasing acidity.

Figure 1

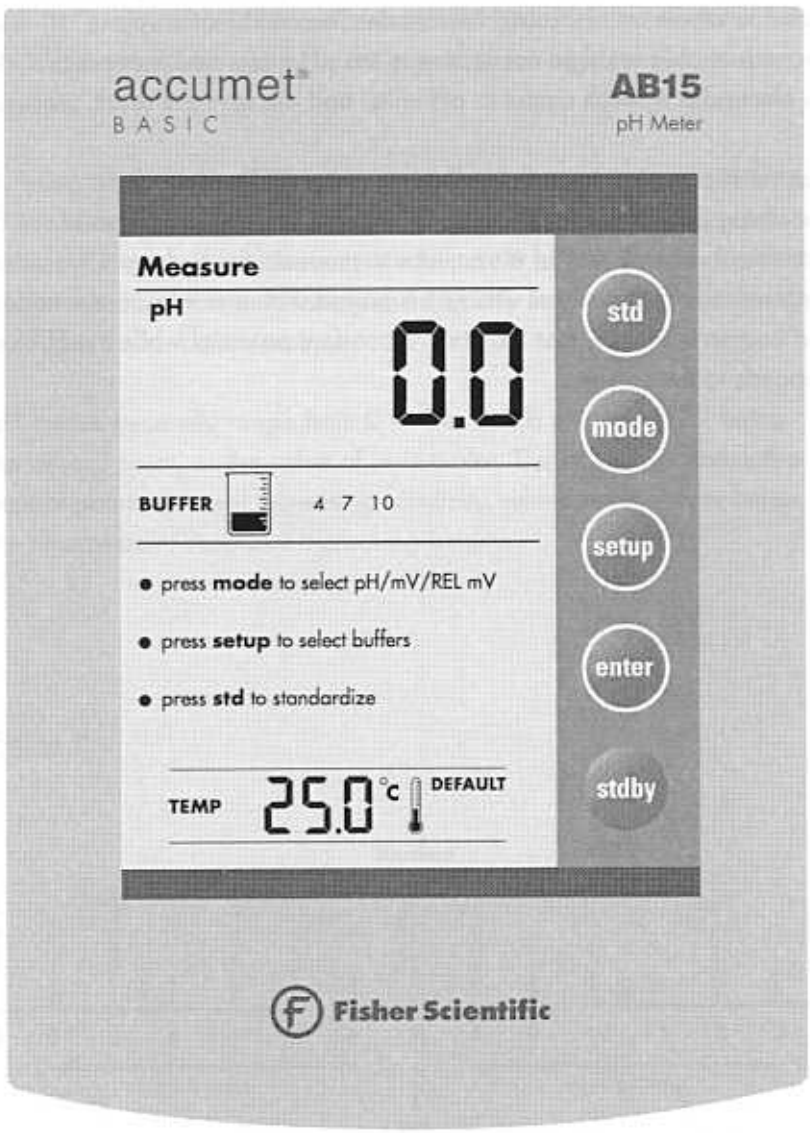


To measure pH, the meter receives a millivolt signal from a glass bulb electrode that is sensitive to hydrogen ions. Therefore the potential developed at the glass bulb is directly related to the pH of the solution.

The glass bulb electrode is always paired with a reference electrode which completes the electrical measuring circuit and provides a stable reference point. These two electrodes can be separate or they can be joined to create a combination electrode. The combination glass electrode makes a single connection to the pH meter which converts the electrodes millivolt output to pH units, and displays the result.

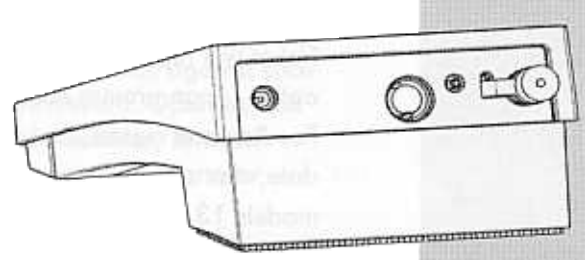
This meter can also use a field effect transistor (FET) electrode for measuring pH. This type of electrode employs an ion-sensitive solid state membrane as part of a transistor to measure the hydrogen ion concentration of a solution. The FET is paired with a reference electrode and counter electrode that maintain a constant potential while the FET responds to the sample.

This meter requires no regular maintenance, but it is recommended to occasionally wipe down the front with a damp cloth. If there are any further questions regarding maintenance, call the Fisher Lab Equipment Technical Support Hotline at 1-800/943-2006 or 412/490-6260.



Most troubles arise out of a problem with the electrode, not the meter. However, a meter check can be performed, and is simple to do.

To test the meter for correct operation, install the BNC (input) shorting cap. Press the mode key to access the mV mode, and note the mV reading. If the meter reads 0 +/- 1 mV, it is measuring correctly.



The meter will display Electrode Error when it detects an error in electrode response. During standardization, the message indicates that the electrode has a slope of less than 90% or more than 102%. The Electrode Error message can indicate either a bad electrode(s), bad buffer(s) or a bad standard sequence technique.

ELECTRODE ERROR

If the meter detects that the temperature is outside the range of the meter, the display shows ERROR Temperature. If you do not use a temperature probe, the meter uses the default temperature of 25°C.

ERROR
Temperature

pH Meter and Electrode Warranty Statement

The Fisher Scientific Company ("Fisher") warrants to the direct purchaser that the Accumet meters and Accumet, AccuTupH, AccuFet, AccupHast, and Microprobe electrodes will be free from defects in material or workmanship for a specified warranty period. During that period, Fisher will repair or replace the product or provide credit, at its sole option, upon prompt notification and compliance with its instructions. For Accumet meters, that specified period is 24 months from delivery date. For electrodes, that specified period is 12 months - except for models 13-620-532, 13-620-533, 13-620-534, 13-620-535, 13-620-536, 13-620-537, 13-620-538 and 13-620-539 - which are warranted for six months.

Unless otherwise agreed, the warranty is limited to the country in which the product is sold.

No Fisher employee, agent or representative has the authority to bind Fisher to any oral representation or warranty concerning any product sold. Any oral representation or warranty made prior to purchase of any product and not set forth in writing and signed by a duly authorized officer of Fisher shall not be enforceable by the purchaser.

FISHER EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Fisher's sole responsibility and the purchaser's exclusive remedy for any claim arising out of the purchase of any product listed above is repair, replacement or credit as described above, where applicable. In no event: 1) shall the cost of the exclusive remedy exceed the purchase price: 2) shall Fisher be liable for any special, indirect, incidental, consequential, or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

Each article that Fisher furnishes will conform to the written specifications given in this manual, or those of a further improved model. Changes are made often to the information in the manual and will be incorporated into future editions.

Notice of Compliance

WARNING: This meter generates, uses, and can radiate radio frequency energy. If not installed and used properly, that is in strict accordance with the manufacturer's instructions, it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

This product is to be used only as described in the manual. This product is for indoor use only, and must be used in a well ventilated area.

WARNING: To meet or exceed FCC regulations and comply with CE requirements, the Fisher-supplied power supply must be used. Use of a power supply that is not approved be Fisher Scientific may cause safety hazards and/or cause unit to exceed EMC limits and/or damage unit. When using this meter with a computer or printer, a shielded RS232 cable must be used to meet or exceed FCC regulations, and comply with CE Mark requirements.

Replacement Parts

Description	Fisher Catalog Number
Accumet 3-in-1 pH/ATC combination electrode, single junction, Ag/AgCl reference, polymer body, BNC connector	13-620-530
AccuFlex electrode support arm	13-637-671
Electrode support bracket	13-637-671A
Power Supplies: 115V, US plug	13-636-100
230V, UK plug	13-636-101
230V, Europe plug	13-636-102
Operator's Manual	13-636-AB15M
BNC Shorting cap	13-636-99

Accessories

pH Electrodes	Fisher Catalog Number
Accumet 3-in-1 pH/ATC combination electrode, single junction, calomel reference, polymer body, BNC connector	13-620-531
Accumet pH combination electrode, single junction, calomel reference, glass body, BNC connector	13-620-286
AccupHast pH combination electrode, double junction, glass body, BNC connector	13-620-296
AccupHast pH combination electrode, double junction, epoxy body, BNC connector	13-620-298
AccuFet solid state pH/ATC combination electrode, Ag/AgCl gel reference	13-620-755
ATC probe	13-620-19

For a complete selection of electrodes and accessories, please refer to the Fisher 1998/99 Catalog, or contact your Fisher Scientific sales representative.

pH Buffers and Solutions

pH	Color	Ingredients	Size	Fisher Catalog Number
4.00	Red	Potassium Biphthalate	500 mL	SB101-500
7.00	Yellow	Potassium Phosphate Monobasic & Sodium Hyroxide	500 mL	SB107-500
10.00	Blue	Potassium Carbonate, Potassium Borate & Potassium Hydroxide	500 mL	SB115-500
Fisher Buffer-Pac		(500mL ea. of color coded pH 4, 7, and 10 buffers)	3x500 mL	SB105
4.00	Red	Individual Tear open pH Packets	20/box	SB4
7.00	Yellow	Individual Tear open pH Packets	20/box	SB7
10.00	Blue	Individual Tear open pH Packets	20/box	SB10
	Gray	Electrode Rinse Individual Tear open pH Packets	20/box	SB15
		Electrode Storage Solution	1L	SE40-1

To place an order, call 1-800/766-7000
For Technical Support, call 1-800/943-2006

Electrochemical Questions?

call our Technical Specialists at:

1-800/943-2006

MODEL NUMBER _____

SERIAL NUMBER _____

PURCHASE DATE _____