GENERAL INFORMATION

This combination pH electrode comes in many styles and is designed for maximum reliability, accuracy, and ease of use. The outer body can be glass, epoxy, or other plastic materials. The reference half-cell can be refillable or permanently sealed at the factory and non-refillable. The refillable electrode will have one or two fill holes located underneath the cap at the top of the electrode. Some models are constructed with a built-in temperature sensor (ATC). The electrode is shipped with a protective boot or soaker bottle filled with a membrane/junction wetting agent (1:1 pH4 buffer/KCl). Crystals which may form around the protective boot will in no way affect electrode performance.

ELECTRODE SPECIFICATIONS

pH Range:	pH 0 to 14
Slope (Span):	95 – 102% (between pH 7 & 4 at 25°C)
7 pH Offset (Zero):	0 mV +/- 30 mV

REQUIRED METER & BUFFERS

Meter: This electrode will work with any pH meter commercially available or mV meter that accepts a high resistance pH input. Consult the meter instruction manual for specific details on connecting/wiring the pH electrode to the meter or operating the meter. Some electrodes may require adaptor cables or detachable lead cables for connection to the pH and/or mV meter.

Buffers: For precise electrode standardization, two buffers are required, of which one should be close to the desired sample pH. pH 7.00 (at 25°C) buffer is normally recommended for initial standardization, followed by pH 4.01 (at 25°C) or pH 10.01 (at 25°C) buffer to span (slope) the electrode.

ELECTRODE PREPARATION

1. Remove the pH bulb protector boot or soaker bottle covering the pH bulb and rinse the bulb area with deionized water or pH buffer. Save the boot if the electrode will be stored. It is possible that air bubbles may have migrated into the pH sensitive bulb during shipment. Since the electrode is not able to function with air behind the pH bulb, gently shake the electrode downward in the same manner as a clinical thermometer to remove any trapped air bubbles.
2. Reference electrodes that are refillable: For electrodes shipped with fill-hole plugs, remove the shipping tape covering the rubber fill-hole plug and withdraw the plug to expose the fill-hole. For electrodes shipped with a sleeve over the fill-hole(s), slide the rubber sleeve down and remove the shipping tape to expose the fill-hole. Fill the refillable electrodes with any fill solution(s) shipped with the electrode to a level just below the fill-hole(s). The fill hole should be open whenever the electrode is in solution. Cover the fill hole when not in use.
3. Prior to first usage, or after long-term storage, immerse the pH bulb in pH 4 buffer for thirty minutes. This hydrates the pH bulb and wets the reference junction for optimum performance. The electrode is now ready for use.

ELECTRODE WIRING (COMBO COAX)

Clear (BNC Center Wire or Pin)	=	pH Signal
Black (BNC Outer Shield or Pin)	=	Reference
White or Black, and Red	=	ATC (optional)
Green or Blue	=	Solution Ground (optional)

Color Code Variation – Direct replacement electrodes may differ from above color coding in order to match other manufacturer's color schemes.

Wiring Tips – There are instances where a solution ground may be required for wiring but is not included with the electrode. In some cases, jumpering of the terminal marked "solution ground" with the terminal marked "reference" is required. Consult the meter instruction manual for specific details on connecting/wiring the pH electrode.

ELECTRODE CALIBRATION & SAMPLE pH MEASUREMENT

1. Place the electrode in fresh pH 7.00 buffer and stir. Allow meter reading to stabilize for one minute. Adjust the meter to read the buffer value according to the meter instruction manual. If the meter will not accept calibration, see ELECTRODE CLEANING section.
2. Rinse the electrode in distilled water and place the electrode in either fresh pH 4.01 buffer or fresh pH 10.01 buffer depending on whether the sample is acidic or basic. Stir and allow meter reading to stabilize for 30 seconds to one minute. Adjust the meter reading to the buffer value according to the meter instruction manual. If the meter will not accept calibration, see ELECTRODE CLEANING section.
3. Rinse the electrode with distilled water. Place in sample and stir. Allow meter reading to stabilize for one minute. Record reading. For best accuracy, the temperature of the buffers and samples should be identical and at room temperature.

ELECTRODE STORAGE

For short terms, always keep the pH bulb wet, preferably in a membrane/junction wetting agent (1:1 pH4 buffer/KCl). Other pH buffers or tap water are acceptable storage media, but avoid storage in distilled water. The protective boot/soaker bottle filled with wetting agent above will provide an ideal storage chamber for longer periods. **NOTE: Electrodes should not be stored for a period longer than 6 months for optimal performance. Electrode stock should be rotated accordingly.**

ELECTRODE CLEANING

General Cleaning: Soak the electrode in 1:10 dilution of household laundry bleach in a 0.1-0.5% liquid detergent solution in hot water with vigorous stirring for 15 minutes. Place junction under warm, running tap water for 15 seconds. Soak the electrode in pH 4 buffer for at least 10 minutes.

Salt Deposits: Dissolve the deposit by immersing the electrode in 1% HCl for five minutes, followed by immersion in 1% NaOH for five minutes, and thorough rinsing with distilled water.

Oil/Grease Films: Wash electrode pH bulb in a little detergent and water. Rinse electrode tip with distilled water. If the film is known to be soluble in a particular organic solvent, rub the bulb gently with this solvent using a tissue or soft cloth. Acetone or isopropyl alcohol are often used to remove films.
Clogged Reference Junction: Heat a diluted KCl solution to 60-80°C. Place the reference portion of the pH electrode into the heated KCl solution for approximately 10 minutes. Allow the electrode to cool while immersed in some unheated KCl solution.

After any of these special cleaning procedures, remember to drain/refill the reference chamber, if refillable. Soak the electrode in pH 4 buffer for at least 10 minutes. If these steps fail to restore normal electrode response, replace the electrode.

TROUBLESHOOTING HINTS

Symptom	**Possible Causes**	**Next Step**
Out of Range Reading	meter	check meter with shorting plug
	electrode	check CALIBRATION
	electrode wired incorrectly	check wiring connections
	air bubble on pH bulb	remove electrode & reattach
Noisy/Unstable Display	meter	check meter with shorting plug
	solution not grounded	ground meter & electrode
	air bubble on pH bulb	remove electrode & reattach
Drift (reading slowly changing in one direction)	pH bulb contaminated	see CLEANING hints
	reference clogged	see CLEANING hints
Low Slope	buffers contaminated	use fresh buffers
	pH bulb contaminated	see CLEANING hints
	reference clogged	see CLEANING hints
	electrode	check CALIBRATION

VAN LONDON CO.
10540 Rockley Road • Houston, TX • 77099 • 832-456-6641• 800-522-7920

*Warranty information and Warranty Disclaimer are available upon request.
P:\Manuals\4IM00140 - Rev. 5/31/18

VAN LONDON CO.

pH ELECTRODE

INSTRUCTION AND MAINTENANCE