

# Polymer Body, Sealed Combination ISE Electrodes

## Product Instructions

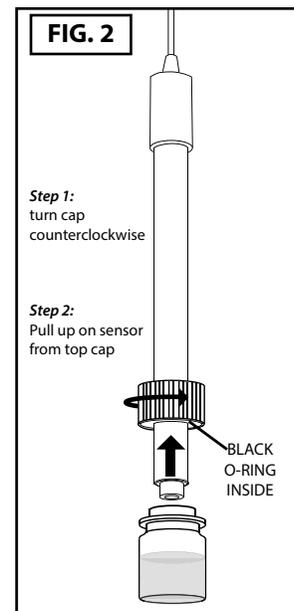
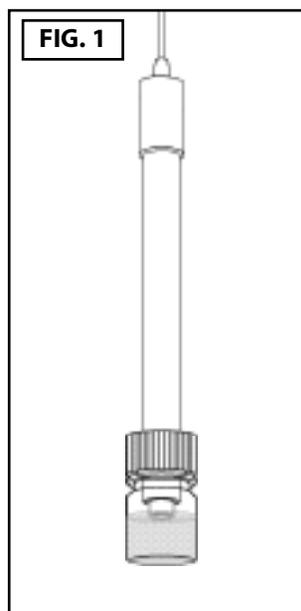
Epoxy body combination ISE electrodes afford a unique ease of use. They measure free ions in aqueous solution quickly, simply, accurately and economically. The sealed reference design eliminates the need to add filling solutions and minimizes reference dryout.

### REQUIRED EQUIPMENT

1. ISE meter or pH meter with mV setting
2. ISE electrode
3. DI water
4. Calibration standards

### HELPFUL OPERATING TIPS

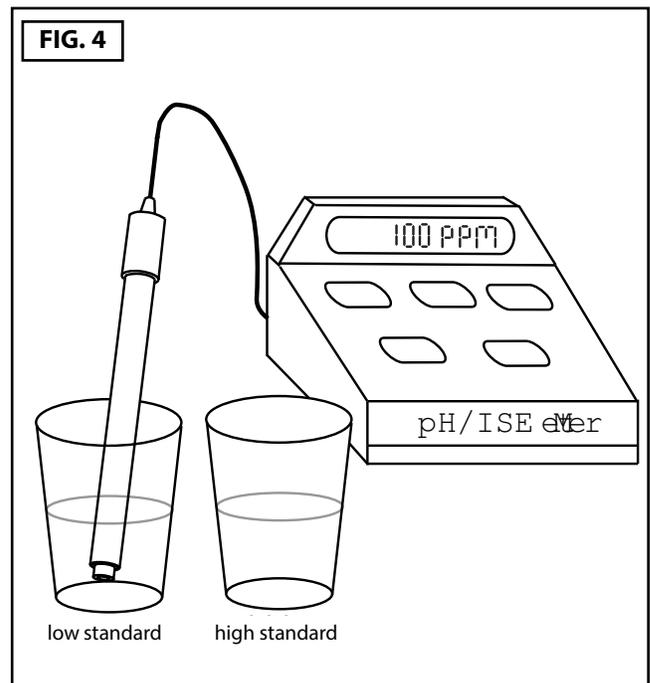
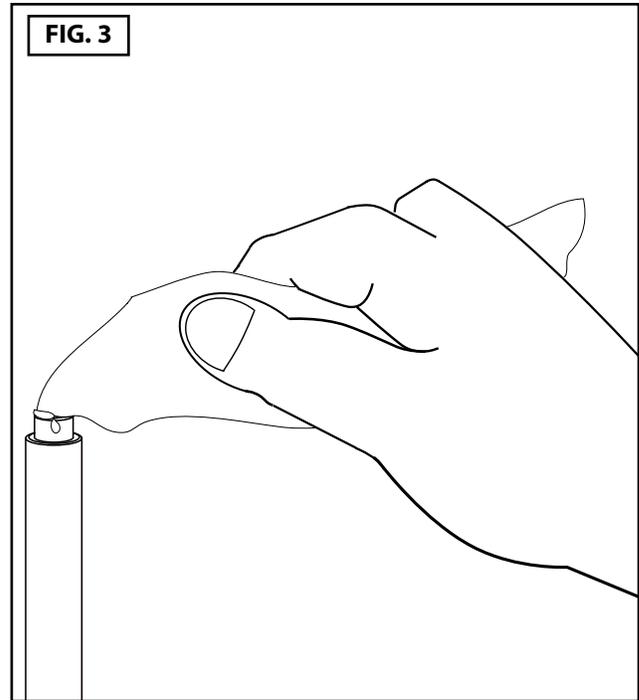
1. The electrode is shipped in a protective plastic bottle. Chloride( $\text{Cl}^-$ ) is shipped with pH4 buffer solution in the bottle, Nitrate( $\text{NO}_3^-$ ), Fluoride ( $\text{F}^-$ ), Potassium( $\text{K}^+$ ) and Ammonium ( $\text{NH}_4^+$ ) ISE are shipped dry. The electrode should remain in the bottle until it is ready for use. If the electrode is used infrequently, the bottle and its solution should be saved and the electrode stored in it (See Electrode Storage Section). Take out electrode by loosening plastic top on bottle counterclockwise and pulling electrode out. Slide cap and o-ring off electrode and save (SEE FIGS 1 & 2).
2. Stir the electrode in the sample, standard, or rinse solution. This action will bring solution to the electrode's surface quicker and improve the speed of response.
3. Use these electrodes for **aqueous samples only**. Samples with organic solvents can dissolve ISE membranes.
4. Keep standards and samples at the same temperature. This action will eliminate the need to correct values for temperature effects.
5. Keep in mind that all ISE electrodes can change with use. This is characterized by shortened span (slope) and slower speed of response. Check the measuring surface to see if it is dirty. Follow cleaning instructions in page 3 to remove build up on the electrode's sensing surface.



## CALIBRATION PROCEDURE

The frequency of calibration is a function of the electrode, the meter, and the solutions the electrode is exposed to. The electrode and meter should always be calibrated together with the calibration frequency determined by experience. Use at least two standard solutions bracketed around the measuring range (example: range = 10-800ppm, standards = 1ppm and 1000ppm)---The value you must differ by a factor of 10x or more . Make sure all standard solutions are at the same temperature.

1. Remove the electrode from its soaker bottle and the save the bottle.
2. Rinse the electrode in deionized water and blot dry
3. Stir the electrode in the lowest concentration standard and record the reading once it stabilizes (mV if manual cal or press cal button for meter with ISE mode).
4. Repeat Step 2.
5. Stir the electrode in the next higher (or highest if only performing a 2-point calibration) concentration standard and record the reading once it stabilizes (mV if manual cal or press cal button for meter with ISE mode).

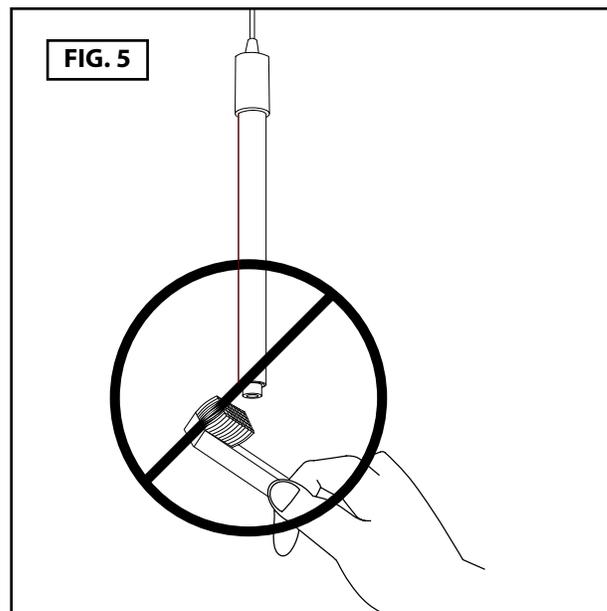


## ELECTRODE STORAGE

When ISE readings are taken infrequently, for example, several days or weeks apart, the electrode can be stored simply by replacing it in its soaker bottle. First, slide the cap onto the electrode, then the O-ring, and then insert the electrode into the bottle and firmly tighten the cap. If the solution in the soaker bottle is missing (CHLORIDE ONLY), fill the bottle with pH 4 buffer.

## ELECTRODE CLEANING

Coating of the ISE sensing surface can lead to erroneous readings including shortened span (slope). The type of coating and ISE sensing surface will determine the cleaning technique. Soft coatings can be removed by vigorous stirring or by the use of a squirt bottle. **Chloride and Fluoride sensors only** can be cleaned by gently wiping with paper towel or other non-abrasive towel. If cleaning does not restore performance, the electrode should be discarded and a new electrode purchased. *Do not use brush or abrasives on electrode (SEE FIG 5).*



## ELECTRODE SPECIFICATIONS

<b>Dimensions:</b>	6.50" (165 mm) H x 0.476"(12 mm) OD
<b>Wetted Materials:</b>	ISE pellet (F <sup>-</sup> , Cl <sup>-</sup> ) ISE membrane (NH <sub>4</sub> <sup>+</sup> , NO <sub>3</sub> <sup>-</sup> , K <sup>+</sup> ) Body: Epoxy Junction: Silicone/Pellon
<b>Temperature Range:</b>	0-60°C (F <sup>-</sup> , Cl <sup>-</sup> only) 0-40°C (NH <sub>4</sub> <sup>+</sup> , NO <sub>3</sub> <sup>-</sup> , K <sup>+</sup> )
<b>Isopotential Point:</b>	NH <sub>4</sub> <sup>+</sup> = 0 +/-20mV (1ppm) K <sup>+</sup> = 0 +/-20mV F <sup>-</sup> = 240 +/-20mV NO <sub>3</sub> <sup>-</sup> = 200 +/-20mV Cl <sup>-</sup> = 225 +/-20mV (10ppm)
<b>Slope:</b>	56 +/-4mV
<b>pH Range:</b>	Cl <sup>-</sup> : 2 -10 pH NH <sub>4</sub> <sup>+</sup> : 4 -10 pH NO <sub>3</sub> <sup>-</sup> : 3-11 pH K <sup>+</sup> : 3-11 pH F <sup>-</sup> : 5-7 pH
<b>Concentration Range:</b>	Cl <sup>-</sup> : 5x10 <sup>-5</sup> to 1M NH <sub>4</sub> <sup>+</sup> : 1 x 10 <sup>-6</sup> to 1M NO <sub>3</sub> <sup>-</sup> : 7 x 10 <sup>-6</sup> to 1M K <sup>+</sup> : 1 x 10 <sup>-6</sup> to 1M F <sup>-</sup> : 1 x 10 <sup>-5</sup> to 1M
<b>Response Time:</b>	90% in1 minute
<b>Interfering ions:</b>	NH <sub>4</sub> <sup>+</sup> = K <sup>+</sup> , Li <sup>+</sup> , Na <sup>+</sup> , Cs <sup>+</sup> K <sup>+</sup> = Cs <sup>+</sup> , NH <sub>4</sub> <sup>+</sup> , H <sup>+</sup> , Li <sup>+</sup> , Na <sup>+</sup> , Ag <sup>+</sup> F <sup>-</sup> = OH <sup>-</sup> , H <sup>+</sup> complexes NO <sub>3</sub> <sup>-</sup> = Cl <sup>-</sup> , NO <sub>2</sub> <sup>-</sup> , Br <sup>-</sup> , CN <sup>-</sup> , ClO <sub>3</sub> <sup>-</sup> , I <sup>-</sup> , ClO <sub>4</sub> <sup>-</sup> CL = S <sup>-2</sup> , I <sup>-</sup> , Br <sup>-</sup> , CN <sup>-</sup> , OH <sup>-</sup>

Parts covered by this product instruction sheet include:

IS200CD-NH4, IS200CD-CL, IS200CD-F, IS200CD-NO3, IS200CD-K, IS222CD-NH4, IS222CD-CL, IS222CD-F, IS222CD-NO3, IS222CD-K