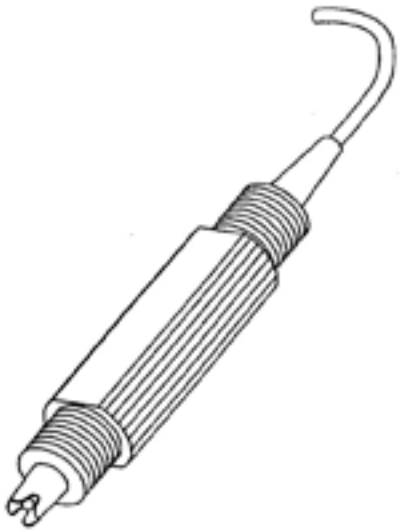
Enviro Solutions

SENSORS

INSTRUCTION

MANUAL



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UNPACKING

Unpack and check that the sensor has been supplied undamaged and that it is the correct option as ordered. If you have any problems please contact your supplier.

PREPARATIONS FOR USE

All sensors are shipped with the measuring end covered with a wetting cap. Remove the wetting cap by turning it counter-clockwise and gently easing it off It is recommended that this cap be retained for future long term storage. Rinse the measuring end with distilled water. The sensor is now ready for use.

Find a suitable signal measuring point to connect the sensor Mount and connect the sensor cable to the transmitter.

NOTE: The sensor should be calibrated prior to pipeline or vessel installation (Refer to Calibration).

CALIBRATION

It is essential to calibrate the sensor to the instrument before installation and after routine maintenance. Calibration should be carried out using automatic temperature compensation and with buffer temperatures as close as possible to that of the process.

To perform a calibration, two buffer solutions with known pH values are required. It is recommended that one buffer solution should have a value of pH 7 and that the second buffer should be either acidic or caustic depending on the expected sample value to be measured (e.g. 4.01 or 9. 18).

Immerse the sensor in the pH 7 buffer and adjust the transmitter to read pH 7 with the appropriate "Zero" control.

Rinse with water.

Immerse the sensor in the second buffer and adjust the transmitter reading to the known value with the "Slope" control.

Rinse with water.

Repeat calibration routine until no further adjustment of controls is necessary. The sensor is now ready to be mounted into the process.

STORAGE

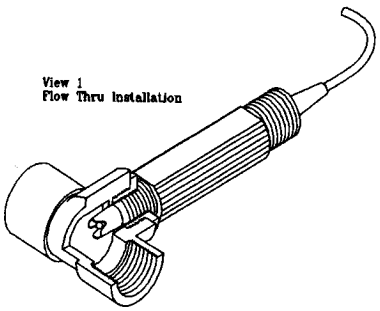
Single junction sensors should be stored in pH 4 buffer with KCl. Double junction sensors should be stored in pH 4 buffer with KNO_3. If not available, store sensors in tap water with added table salt (NaCl).

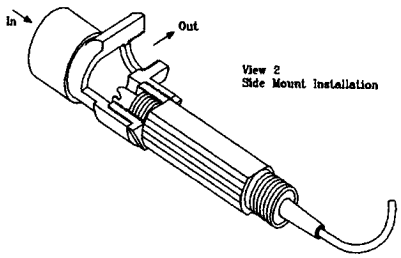
MOUNTING

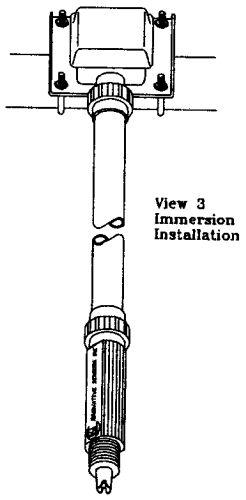
After a successful calibration has been performed, prepare the male thread with PTFE tape and mount the sensor. (Refer to the Installation Guide). If the sensor has been removed from the process and recalibrated, the PTFE tape should be replaced. For mounting and calibration of the sensor allow approximately 18" of clearance.

RECOMMENDED INSTALLATIONS

NOTE: Hand-tighten sensors in place. Do not use a wrench to install the sensor as this could cause breakage. Use a wrench to remove the sensor if unable to do so by hand.







CARE AND MAINTENANCE

Prior to servicing, the sensor must be removed from the process. To avoid spillage it is advised to drain or stop the flow in the appropriate process line or vessel where the sensor is mounted.

1. Remove the sensor from the process by turning counter-clockwise until fully released.
2. Spray with water and/or detergent, using a soft brush to dislodge any particulate matter.
3. Visually inspect the sensor for signs of damage.
4. Calibrate the sensor.
5. Replace the PTTE tape and remount into the process, taking care to avoid torsion on the cable by first rotating it counter-clockwise prior to tightening the process connection.

Slow response or non-reproducible measurements are signs that the sensor has become coated or clogged.

The pH glass is susceptible to coating by many substances. The speed of response, normally 95% of the reading in less than 10 seconds, is dramatically degraded when the pH glass is coated.

To restore the speed of response, clean the bulb with a high quality detergent methyl alcohol or other suitable solvent using a "Q-tip". Rinse well with distilled water and retest. If the sensor now responds, but erratically, soak the sensor in 0. 1 Molar HCl for 5 minutes. Remove and rinse with water and place in 0. 1 Molar NaOH for 5 minutes. Remove, rinse again and then place the sensor in pH 4.0 buffer for 10 minutes before use.

NOTE: The use of non-polar solvents such as tri-chloroethylene, toluene or hexane is not recommended as these will break up the gel-layer on the glass bulb. The sensor will then need to remain soaked in water for at least 12 hours before functioning normally again.

If the electrode loses pH sensitivity, follow the etching procedure below:

NOTE: THIS PROCEDURE USES HAZARDOUS CHEMICALS AND SHOULD ONLY BE PERFORMED BY A QUALIFIED PERSON, FAMILIAR WITH FLUORIDE COMPOUNDS.

1. Prepare a 10% solution of ammonium bifluoride.
2. Immerse the glass bulb in this solution for 10-20 seconds only. Rinse with tap water.
3. Immerse in 5-6 Molar HCl for 5 minutes to remove any excess bifluoride and rinse again with tap water
4. Soak in pH 4.0 buffer for at least 1 hour before use.

ELECTRODE TROUBLESHOOTING GUIDE

SYMPTOM	POSSIBLE CAUSE	CHECK
Meter reads continuously pH 14 or drifts off scale high (overrange)	Open circuit in either glass or reference electrode	1. Inspect the cable and connector of the faulty electrode for evidence of a crushed or broken cable jacket, or brittleness of the cable due to exposure to heat. Discard sensor if damage is present. 2. Manipulate meter sensor connections to check for intermittent continuity. Replace connector(s) if faulty. 3. Inspect the bulb making sure it is filled with solution. If not, shake down in die same manner as a clinical thermometer to displace air in the pH bulb. Retest. 4. Inspect the bulb for signs of coating. If present, refer to "Care and Maintenance". 5. Inspect reference junction. If clogged, clean with a suitable brush, rinse well and retest. If the sensor still reads as an open circuit, place in 3.5 Molar KCl (or water is KCl is not available) and heat to approximately 80°C for 15 minutes. Allow to cool and retest.
Slow response and/or erratic readings	Very high impedance in either glass or reference electrode. **NOTE:** If the sensor is of high impedance type, i.e. ruggedized bulb configuration, high temperature glass or high pH glass, then improper shielding may yield noisy and erratic readings.	1. Inspect the pH bulb and reference junction for coating or clogging. If affected, refer as above. 2. The sensor must be kept wet at all times. If allowed to dry out the impedance will be raised dramatically. To restore performance, soak in 0.1 Normal HCl for 30 minutes and rinse well with distilled water. 3. Chemical degredation of pH glass can occur rapidly in a high temperature or high pH environment yielding sluggish response. For cleaning refer "Care and Maintenance". 4. Low temperature environments can double impedance every 8°C of temperature drop from 25°C. 5. A high impedance sensor is extremely sensitive to electrical noise, i.e. oscillating electrical fields generated by motors, generators or discharges from electrical thermostats. A free hanging cable swinging due to air currents will also generate erratic signals. 6. Manipulate mew sensor cable and connections to check for intermittent continuity. Replace as necessary.
No response to pH change	Cracked glass bulb	If the sensor gives readings between 5.8 and 6.2 pH in all solutions, inspect glass bulb. If damaged, discard.
	Short circuit	If a constant reading of 7.0 pH or 0.0mV is obtained, inspect the cable. If no visible damage, remove the connector and test for short circuit. Replace if faulty.
	High impedance bridge	Inspect connector for moisture or corrosion. If wet rinse well with distilled water and dry thoroughly. Cause of wetness should be ascertained and corrected.