Atlas Scientific™
Environmental Robotics

V 2.3

Revised 9/8/16

pH Probe

Silver / silver chloride

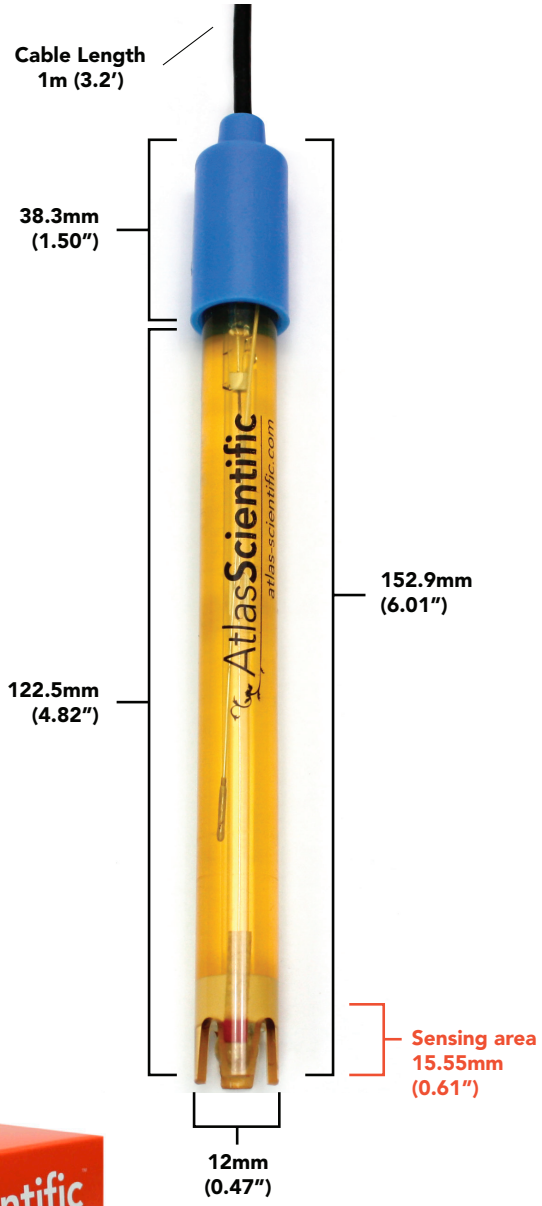
Range	**0 – 14**
Response time	**95% in 1s**
Max pressure	**100 PSI**
Temperature range °C	**1 – 99 °C**
Internal temperature sensor	**No**
Time before recalibration	**~1 Year**
Life expectancy	**~2.5 Years +**
Maintenance	**N/A**

AtlasScientific™
Environmental Robotics

pH Probe

Typical Applications
- Standard Lab use
- Field use
- Soil
- Low ionic and ultra-pure water
- High pH Solutions (up to 14pH)
- Samples containing Heavy metals
- Photography Development
- Beer, wine and other liquor
- Food Safe

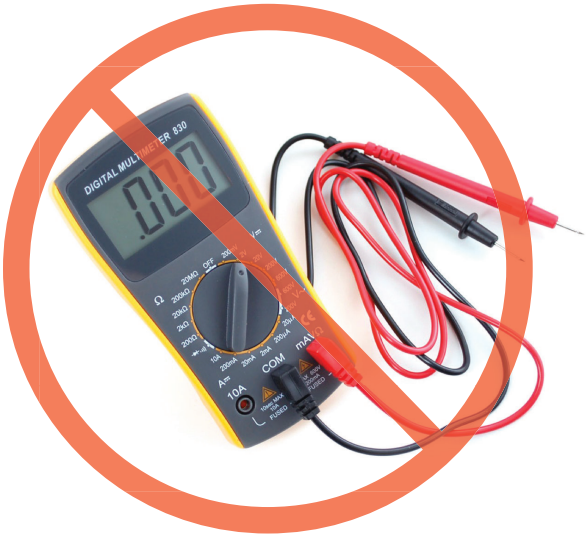
Specifications
- Silver/Silver chloride reference electrode
- Single junction
- pH Range: 0-14 (Na+ error at >12.3 pH)
- Operating temperature: 1°C - 99°C
- Max Pressure: 690 kPa (100PSI)
- Max Depth 60 M (197 ft)
- Cable length: 1 Meter
- Weight: 49 grams
- Speed of response: 95% in 1 second
- Isopotential point: pH 7.00 (0 mV)
- Dimensions 12mm X 150mm (1/2" X 6")
- BNC connector
- Sterilization
  - Chemical ✓
  - Autoclave X



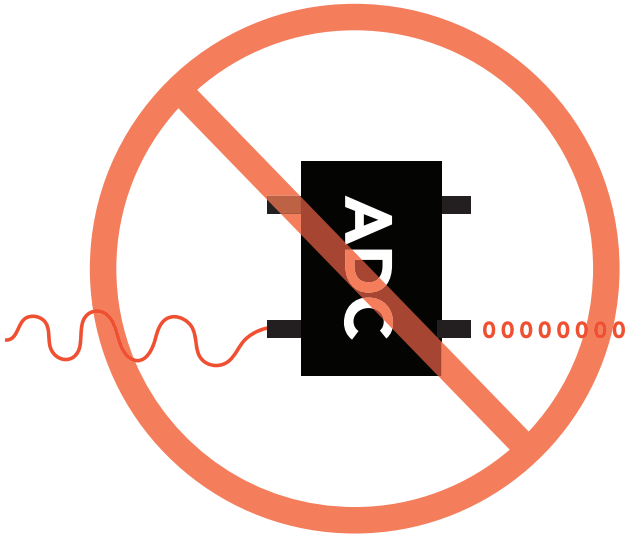
pH Probe

A pH electrode is a passive device that detects a current generated from hydrogen ion activity.

This current (which can be positive or negative) is very weak and cannot be detected with a multimeter, or an analog to digital converter. This weak electrical signal can easily be disrupted and care should be taken to only use proper connectors and cables.



Result will ***always*** read zero.



Result will ***always*** read zero.

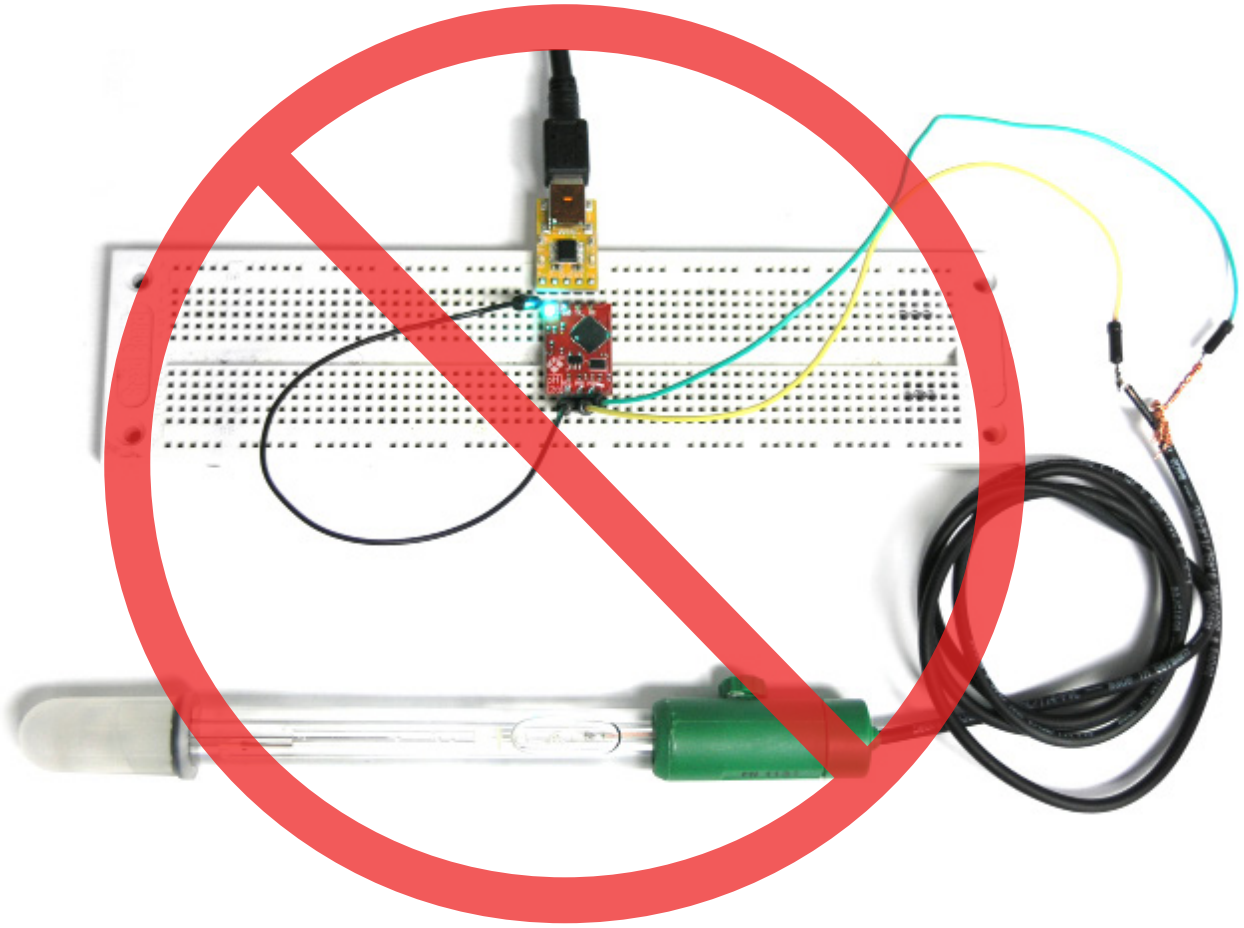
The current that is generated from the hydrogen ion activity is the reciprocal of that activity and can be predicted using this simple equation:

$$E = E^0 + \frac{RT}{F}\ln(\alpha_{H+}) = E^0 - \frac{2.303RT}{F}pH$$

Where **R** is the ideal gas constant.
T is the temperature in Kelvin.
F is the Faraday constant.

Because a pH probe is a passive device it can pick up voltages that are transmitted through the solution being measured. This will result in incorrect readings and will slowly damage the pH probe over time.

pH Probe



DO NOT CUT THE CABLE WITHOUT REFERING TO THIS DOCUMENT!

NEVER EXTEND THE CABLE WITH CHEAP JUMPER WIRES.

This pH Probe can be *fully submerged* in fresh water or salt water, up to the BNC connector indefinitely.

How often do you need to recalibrate a pH probe?

Because every use case is different, there is no set schedule for recalibration.

If you are using your probe in a fish tank, a hydroponic system or any environment that has generally weak levels of acids and bases you will only need to recalibrate your probe once per year for the first 2 years. After that every ~6 months.

If you are using the pH probe in batch chemical manufacturing, industrial process, or in a solution that is known to have strong acids and bases, then calibration should be done monthly or in extreme cases after each batch.

Extending the length of the probe cable

You can extend the cable to 100 meters with no loss of signal, however you run the risk of turning your pH probe into an antennae, picking up noise along the length of your cable. If you want to extend your cable, we recommend that you use proper isolation, such as the **PWR-ISO**, or **Tentacle Shield**. Be sure to calibrate your probe with the extended cable.

Extending a probe cable can be easily done with our **BNC Extension Cable**. Simply connect the BNC end of the probe to the Extension cable, and you are all set. If you need to water proof a BNC connection, we highly recommend using a product like **Coax-Seal** to safely cover and prevent any water damage that may occur.

COAX-SEAL®
"The Original Connector Sealant!"

Helpful operating tips

1 The pH Probe is shipped in a plastic bottle containing pH Probe Storage Solution. The probe should remain in the bottle until it is used. If the probe is used infrequently, the bottle and its solution should be saved and the probe stored in it. Take out the probe by loosening the plastic top of the bottle counter clockwise and pulling the probe out. Slide the cap and O-ring off the probe. **(SEE FIGS 1 & 2)**.

2 During shipment the air bubble in the probes stem may move into the bulb area. If bubbles are seen in the bulb area, hold the probe by its top cap and shake downward as done with a clinical thermometer **(SEE FIG 3)**.

3 Vigorously stir the probe in the sample, calibration solution, or rinse solution. This action will bring solution to the probes surface quicker and improve the speed of response.

FIG. 1

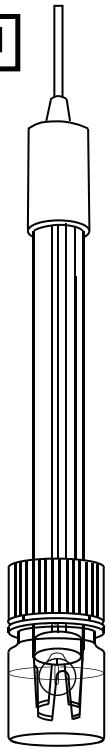


FIG. 2

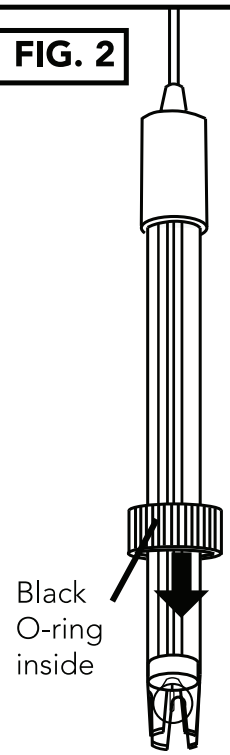
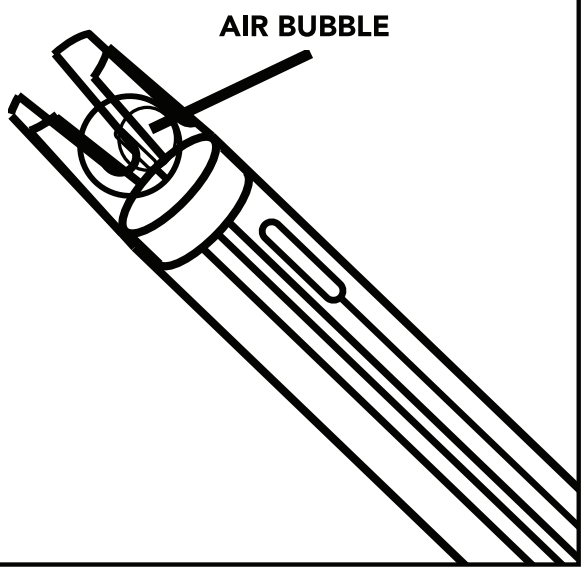
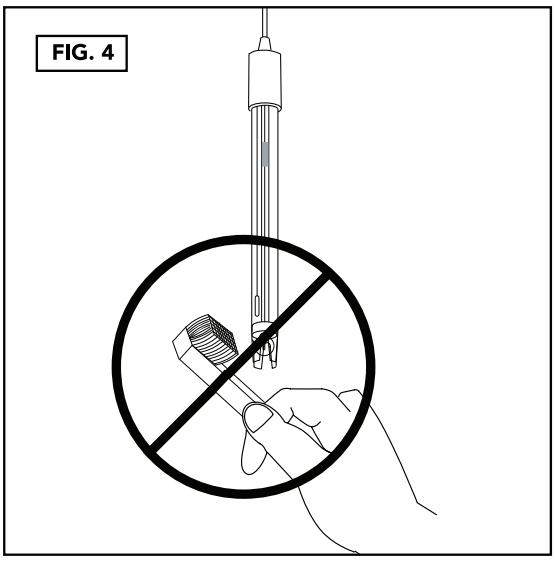


FIG. 3



Probe cleaning

Coating of the pH bulb can lead to erroneous readings including shortened span (slope). The type of coating will determine the cleaning technique. Soft coatings can be removed by vigorous stirring or by the use of a squirt bottle. Organic chemical, or hard coatings, should be chemically removed. A 5-10% hydrochloric acid (HCl) soak for a few minutes, often removes many coatings. If cleaning does not restore performance, reconditioning may be tried. Do not use brush or abrasives on the probe **(SEE FIG 4)**.



Electrode reconditioning

When reconditioning is required due to probe aging, we recommend you use The Atlas Scientific pH Probe Reconditioning Kit.