Model 50 Ground Loop pH Sensor
Model 55 Solution Ground pH Sensor

Features

- Patented Plunger[1] pH Electrode Design
- Patented Porous[2] Teflon® Liquid Junctions
- Double Junction Reference Cell
- Integral Differential Preamplifier or
- Solution Ground
- Optional ORP Measurement
- **New** TOP68 Quick Disconnect Cable

Applications

- Metal Tank Installations
- Plating Baths
- Waste Treatment
- Acid / Caustic Neutralization

Description

These rugged pH sensors feature the Plunger pH electrode design that permits 360º sensor mounting and withstands thermal shock from -5 to 150ºC (23 to 302ºF). The porous Teflon® liquid junction resists fouling and chemical attack. Double junction reference cells increase the service life in applications containing sulfides (H_2S) and metals such as lead, mercury and silver. The optional TOP68 quick disconnect cable system provides ease of use and the reliability of fixed cable. The TOP68 has an IP68 environmental rating, which means its water tight and corrosion resistant.

Specifications

Model 50 and 55	Specifications
Body Material	Ryton®, 316 SS Housing
O-Rings	Viton®
Process Connections	¾" MNPT
Insertion Depth	145 mm (5.75")
Measuring Range	0 to 14 pH
Temperature Range	-5 to 130ºC (23 to 266ºF)
Maximum Pressure @ 25ºC	10.3 bar (150 psig)
Drift	< 2.0 mV/week
Response Time @ 25ºC	95% of reading in 10 seconds
pH Glass Bulb Impedance @ 25ºC	Model 50 < 1.0 Megohm Model 55 ~ 300 Megohms

[1] United States Patent No. 4,333,812
[2] United States Patent No. 4,128,468
® Teflon and Viton are Registered Trademarks of E.I. Dupont de Nemours Company
® Ryton is a registered trademark of Philips 66 Co.

INNOVATIVE SENSORS INC.
REGISTERED TO ISO 9001
CERTIFICATE NO. 00-1011

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Innovative Sensors Inc.
4745 East Bryson Street
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Nov. 2000

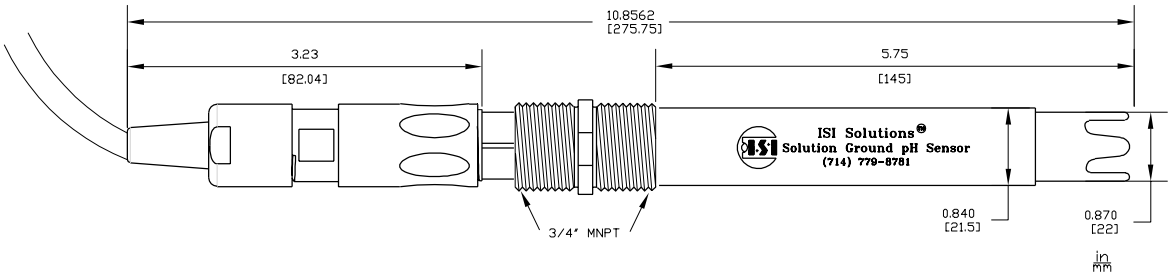
Model 50 Ground Loop pH Sensor
Model 55 Solution Ground pH Sensor

Ordering Information

The Model 50 Ground Loop pH sensor features a self-powered differential preamplifier to protect against ground loops, which can lead to pH offsets, drift, instability and may shorten sensor life. Typical applications include plating baths and other tank applications.

The Model 55 Solution Ground pH sensor provides a solution ground to accommodate pH analyzers and transmitters featuring pH glass electrode and reference cell diagnostics or differential input preamplifiers.

Model 50 and 55 Ordering Information	Description
M - 50	Ground Loop pH Sensor Double Junction Reference Cell, KCl/AgCl and KNO_3 Differential preamplifier Solution Ground ¾" Process Connections No Temperature Compensation 146mm (5.75") Insertion Length 6.1m (20.0 ft.) Cable with BNC Connector
M-55	Solution Ground pH Sensor without Differential preamplifier
Options	**Description**
T68	TOP68 Quick Disconnect
1.5	38mm (1.5") Insertion Length
ORP	Platinum ORP electrode
PT100	Temperature Compensation, 100 Ohm Platinum RTD
PT1000	Temperature Compensation, 1000 Ohm Platinum RTD
3KTC	Temperature Compensation, 3000 Ohm Thermister
M-50-T68-PT100	**Example Order Number**



Insertion Installation

- Select installation location that provides easy access for routine maintenance
- Seal pipe threads with Teflon® tape
- Optimum flow rate is 3 to 5 GPM
- Sensor must remain in solution at all times

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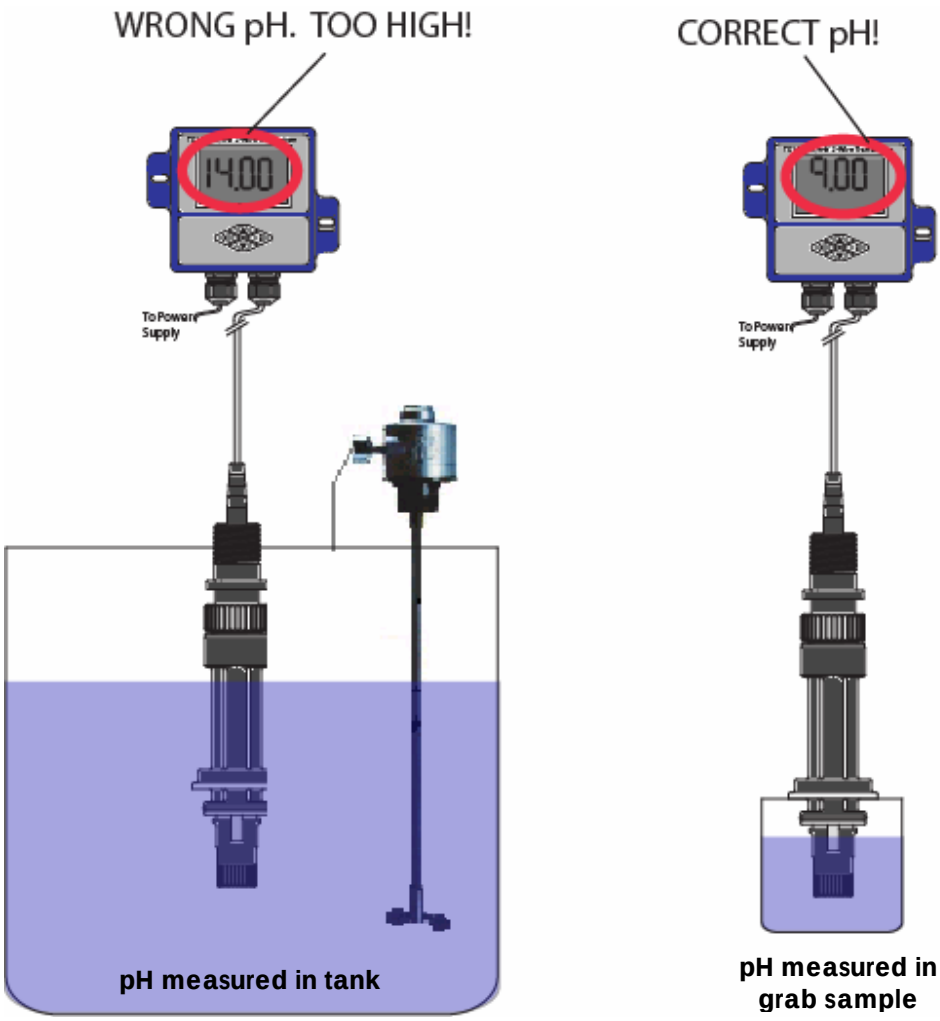
Electrical Ground Loops in pH and ORP Installations
by Scott Edwards

A common common complaint I hear when talking to customers is that their pH electrode calibrates in buffers but when they place the electrode into the tank or line, the pH is not close to their expectation or the pH or ORP reading is off scale. The cause of these type of symptoms is an electrical ground loop.



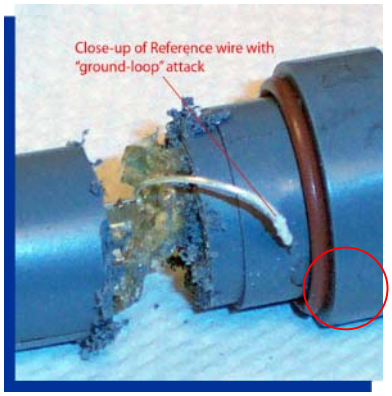
A ground loop commonly occurs due to the following conditions:

Cause

1. **Use of plastic pipe and tanks**
2. **Dirty electrical motors, pumps, mixers, valves, etc.**
3. **Conductivity probes or other sensors which induce electrical voltage into the solution.**
4. **Dirty earth grounds in facility.**

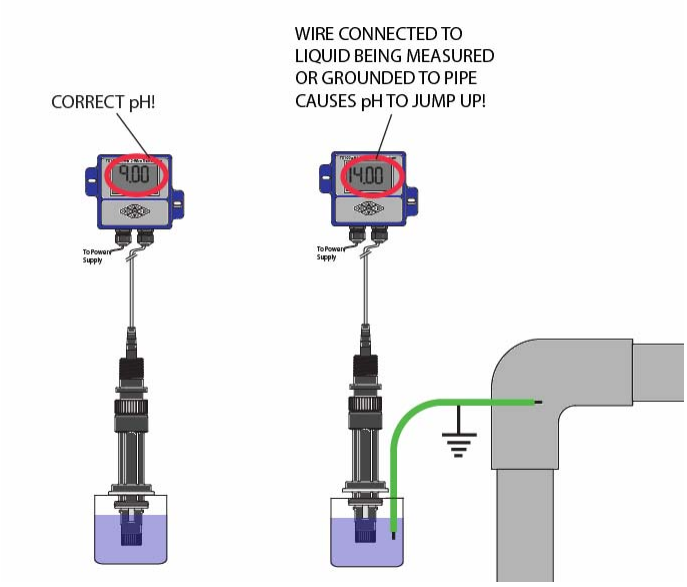
Effect

1. **pH electrodes are not isolated which allows voltage to flow through electrode.**
2. **Voltage seeks to escape from system through paths of least resistance.**
3. **Reference of electrode acts as this path and is connected to circuit common or earth ground.**
4. **Reference wire loses chloride ion from Silver chloride dip and reference output shifts significantly causing pH or ORP reading to shift.** **(AgCl + e- → Ag+ + Cl-)**



Diagnosing a Ground Loop

1. **Take a sample out of the tank or line and place it in a beaker or bucket.**
2. **Remove the pH or ORP electrode from the tank or line and use it to test pH/ORP of solution in beaker.**
3. **If the pH or ORP reading in the tank differs significantly >0.2pH then an electrical ground loop is the problem.**
4. **You can also connect a wire from the tank to the beaker and should now read the same pH in the beaker as in the tank indicating that the wiring transmitted the current from the tank into the beaker.**



5. **To measure the exact level of ground loop place the + connection of a digital volt meter into the fluid and the – to a grounded pipe or other device. Measure DC and AC voltage. If voltage > 3V DC consult an electrician!!!**

Solution

1. **Stop voltage flow through electrode and provide a path of lesser resistance for voltage flow by grounding the solution in the tank to a good earth ground.**

2. **If using old Sensorex sensors, change to DA series electrodes.**