

## Instruction Sheet

PN 51A-372/rev.B

January 2011

# Model 372 pH Sensor

# HF Resistant pH Sensor

For additional information, please visit our website at  
[www.emersonprocess.com/raihome/liquid/](http://www.emersonprocess.com/raihome/liquid/).

## SPECIFICATIONS

**Materials of Construction:** Ultem, Viton<sup>1</sup>, glass, Kynar

**Process Connections:** 3/4" forward (insertion) and 1" reverse (submersion) MNPT

**Insertion Depth:** 2.2 in. to 8.3 in.

**Measured Range:** 0 to 12 pH (0-14 pH if no sodium ions are present)

**Pressure Range:** -13 to 135 psig  
(6.9 to 1035 kPa abs)

**Temperature Range:** -5 to 50°C [23 to 122°F] (100°C [212°F] if no fluoride ions are present)

**Temperature Compensation:** Pt 100

**Weight/Shipping Weight:** 0.4 kg/0.9 kg (1 lb/ 2 lb)

**pH Glass Type:** Hemispherical

**Glass Diameter:** 7.8mm

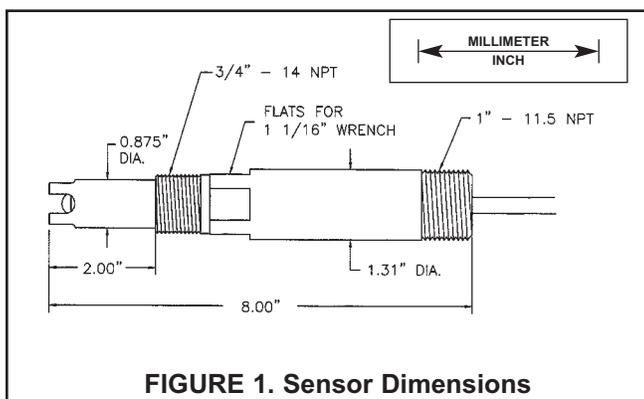
**Glass Impedance:** Less than 400 MΩ @ 25°C.

**Acidic Error:** Less than .01 pH in 1.0M HCl @0.0pH

**Reference Type:** Double junction with saturated KCL in cross-linked polymer

*Specifications subject to change without notice.*

<sup>1</sup> Viton is a registered trademark of E.I. du Pont de Nemours and Co.



## WARNING



Before removing the sensor, be absolutely certain that the process pressure is reduced to 0 psig and the process temperature is lowered to a safe level!

## CAUTION

### SENSOR/PROCESS APPLICATION COMPATIBILITY

The wetted sensor materials may not be compatible with process composition and operating conditions. Application compatibility is entirely the responsibility of the user.

## ATEX DIRECTIVE

### Special Conditions for safe use

1. All pH/ORP sensors have a plastic enclosure which must only be cleaned with a damp cloth to avoid the danger due to a build up of an electrostatic charge.
2. All pH/ORP sensor Models are intended to be in contact with the process fluid and may not meet the 500V r.m.s. a.c. test to earth. This must be taken into consideration at installation.

## STORAGE

1. It is recommended that electrodes be stored in their original shipping containers until needed.
2. Do not store at temperatures below -5°C (23°F).
3. Electrodes should be stored with a protective cap containing KCl solution (PN 9210342).
4. For overnight storage, immerse the sensor in tap water or a 4 pH buffer solution.
5. A pH glass electrode has a limited shelf life of one year.

## ELECTRODE PREPARATION

1. Remove electrode from shipping container.
2. Remove the protective boot covering the electrode bulb.
3. Rinse away salt film with clean water, then shake the electrode so that the internal solution fills the bulb, thus removing any air trapped there.

### NOTE

Do not allow lubricant to coat electrode bulb or reference junction. If it does, wipe it clean before installation.

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## INSTALLATION

For sensor orientation, see Figure 2.

For wiring, see Figures 3 and 4.

## TWO POINT BUFFER CALIBRATION

Select two stable buffer solutions, preferably pH 4.0 and 10.0 (pH buffers other than pH 4.0 and pH 10.0 can be used as long as the pH values are at least two pH units apart).

### NOTE

A pH 7 buffer solution reads a mV value of approx. zero, and pH buffers read approximately  $\pm 59.1$  mV for each pH unit above or below pH 7. Check the pH buffer manufacturer specifications for millivolt values at various temperatures since it may affect the actual value of the buffer solution mV/pH value.

1. Immerse sensor in the first buffer solution. Allow sensor to equilibrate to the buffer temperature (to avoid errors due to temperature differences between the buffer solution and sensor temperature) and wait for reading to stabilize. Value of buffer can now be acknowledged by analyzer/transmitter.
2. Once the first buffer has been acknowledged by the analyzer/transmitter, rinse the buffer solution off of the sensor with distilled or deionized water.
3. Repeat steps 1 and 2 using the second buffer solution.
4. The theoretical slope value, according to the Nernst equation for calculating pH, is approximately 59.17 mV/pH. Over time the sensor will age, both in the process and in storage, and will result in reduced slope values. To ensure accurate readings, it is recommended that the electrode be replaced when the slope value falls below 47 to 49 mV/pH.

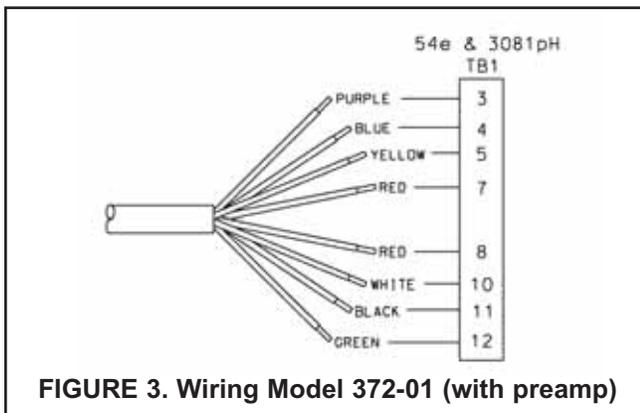


FIGURE 3. Wiring Model 372-01 (with preamp)

## RECOMMENDED pH SENSOR STANDARDIZATION

For maximum accuracy, the sensor can be standardized on-line or with a process grab sample after a buffer calibration has been performed and the sensor has been conditioned to the process. Standardization accounts for the sensor junction potential and other interferences. Standardization will not change the sensor's slope but will simply adjust the analyzer's reading to match that of the known process pH.

## MAINTENANCE

Electrodes should respond rapidly. Sluggishness, offsets, and erratic readings are indicators that the electrodes may need cleaning or replacement.

1. To remove oil deposit, clean the electrode with a mild non-abrasive detergent.
2. To remove scale deposits, soak electrodes for 30 to 60 minutes in a 5% hydrochloric acid solution.
3. Temperature effect on life expectancy: If glass electrode life expectancy is 100% @ 25°C (77°F), then it will be approximately 25% @ 80°C (176°F), and approximately 5% @ 120°C (248°F).

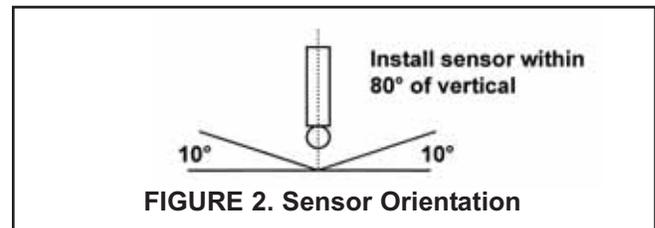


FIGURE 2. Sensor Orientation

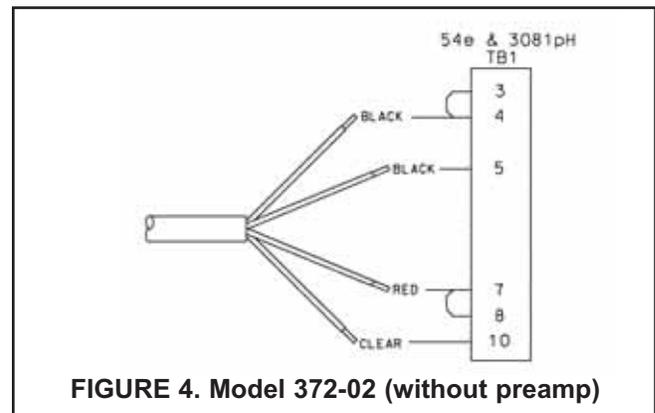


FIGURE 4. Model 372-02 (without preamp)

## ORDERING INFORMATION

MODEL	
372	pH SENSOR
Code	Cable (Required Selection)
01	25 ft cable with integral preamp for Models 54e, 1055, 3081, 4081, and 5081
02	15 ft cable for remote preamp (Models 54e, 1055, 3081, 4081, and 5081)
<b>372</b>	<b>-01 EXAMPLE</b>

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