NEULOG PH LOGGER SENSOR GUIDE

NeuLog pH logger sensor
NUL-206

The NeuLog pH sensor can be used for any science experiment where pH readings are required. It is used in the fields of Chemistry, Pharmacology, Biochemistry, Biology, Earth Science, Environmental Science, etc.

The sensor comes pre-calibrated so you can start experimentation right out of the box using this guide.

Among hundreds of possible experiments that can be performed with the NUL-206 sensor are: monitoring of ecological systems, effect of pH on enzymes, static pH measurements, chemical reactions with changing pH such as titrations, waste measurements, water testing, etc.

The unit of measurement for this sensor is the pH scale.
pH: The universal measurement for pH which directly measures the concentration of hydrogen ions using a scale of 0 to 14. Since pH is a logarithmic scale, a difference of one pH unit is equivalent to a tenfold difference in hydrogen ion concentration.

Sensor offset:

Although the NeuLog pH sensor does not need to be calibrated prior to each use, it is recommended to offset its probe.

Materials Needed*:*

- pH 7 Buffer Solution (for qualitative measurements, distilled or even tap water can be used instead)

Procedure:

1. Connect the pH sensor to a voltage source (USB-200 or BAT-200).
2. Remove the pH sensor probe's tip from the plastic storage solution bottle.
3. Rinse the pH sensor's tip with distilled water.
4. Insert the pH sensor's tip into a pH 7 buffer; if no buffer is available, you can use tap water instead (although it is not as accurate).
5. Press and hold the pH sensor's push button for 3 seconds.

Included with sensor:

- NeuLog General Guide
- NeuLog pH Logger Sensor
- NeuLog electrode with storage solution container (attached to the sensor)

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Sensor specifications:	
Range and operation modes	0 to 14 pH
ADC resolution	15 bit
Resolution	0.01 pH
Max sample rate (S/sec)	100
Electrode specifications:	
Body diameter	12mm
Overall length	150mm
Cap	16mm OD ± 30mm Long
Construction	Epoxy body, round bulb ASG VIII pH glass, sealed, gel-filled single-junction reference with fiber frit, Ag/AgCl wire, ATC
Range/output	• 0 – 14 pH • mV output with isopotential point at 0 ± mv at 25°C
Response time	98% of full response in 30 seconds at 25°C

Experiment Duration: 1 second to 31 days.

Sensor's features:

- Fully digital data
- Rugged plastic ergonomic case
- Push button switch for Start/Stop experiments in off line mode
- LED indicator of experiment status (blinks while collecting data)
- Attached electrode cased in durable plastic for pH detection
- Plastic storage solution bottle

Note: NeuLog products are intended for educational use.

Videos and experiment examples:

- Videos, literature and other probes can be found at www.neulog.com
- In order to access the pH sensor's page, choose "Products" on the main menu and then "pH logger sensor".
- In order to access the pH sensor's experiments, choose "Example Labs":
  - Acid Rain (C-8)
  - Titration of a Strong Acid and a Strong Base (C-10)
  - Properties of Sea water and Fresh water (E-1)

Technical background:

The philosophy behind NeuLog's plug and play technology is based on each sensor's ability to store its own data due to an internal flash memory chip and micro-controller in each plastic NeuLog body. This technology allows the sensor to collect and then store the digital data in the correct scientific units (^{o}C, ^{o}F, Lux, %, ppm, for example).

Building the conversion formula of the pH sensor is done by measuring at least 3 different pH level buffers.

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The sensor is pre-calibrated at the factory. The built-in software in the logger can be upgraded for free at any time using the provided firmware update. In spite of that, the probe needs to be offset to pH 7 prior to initial use; please review the "Sensor offset" guide at the beginning of this document for detailed instructions.

The pH electrode houses a sensitive glass bulb which detects the H^+ concentration in the fluid being tested; this is then translated to a voltage reading and passed along a silver-chloride wire. The voltage reading is compared with the second component, the reference electrode to compare voltage differences. The voltage reading is calculated and translated back into pH.

Maintenance and storage:

- Never submerge the NeuLog plastic body in any liquid.
- Do not allow liquid into the pH sensor's body.
- After use, gently wipe away any foreign material from the pH sensor plastic body.
- Rinse the electrodes with distilled water before and after measuring a sample. Never wipe the electrode to remove excess water – wiping can create static charges that interfere with correct pH measurement.
- When storing your sensor, always keep your pH electrode wet. We recommend that you store your electrode in either a commercially prepared storage solution, or a 1:1 solution of pH 4 buffer and 4M KCl.
- If you do not have the pH 4 buffer + 4M KCl solution available, a pH 4 buffer can be used. If you do not have a pH 4 buffer available, a pH 7 buffer can be used.
- Do not store the electrode in distilled or deionized water – this will cause ions to leach out of the glass bulb and render your electrode useless.
- Store in a box at room temperature out of direct sunlight.

Warranty:

We promise to deliver our sensor free of defects in materials and workmanship. The warranty is for a period of 3 years from the date of purchase and does not cover damage of the product caused by improper use, abuse, or incorrect storage. Sensors with a shelf life such as ion selective probes have a warranty of 1 year. Should you need to act upon the warranty, please contact your distributor. Your sensor will be repaired or replaced.

Thank you for using NeuLog!

NeuLog

Flexible, simple, fast, forward thinking.

W: www.neulog.com
E: info@neulog.com
A: 850 St Paul Street, Suite 15, Rochester, NY 14605
P: 1.866.553.8536

V2015.5