

NEULOG CONDUCTIVITY LOGGER SENSOR GUIDE



NeuLog conductivity logger sensor NUL-215

The NeuLog Conductivity Sensor can be used for any science experiment which utilizes liquid samples that can conduct electrical currents such as in the fields of Chemistry, Biology, Earth Science, Environmental Science, Biochemistry, Physics, etc.

Electrical conductivity is a property of materials measured by how easily the material conducts electrical currents. A current is the flow of an electrical charge (electrons). In liquids, the current flows through ions. This sensor is designed for detecting electrical currents specifically in liquid solutions.

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-215 sensor are: Monitoring of ecological systems, chemical analysis and identification, environmental health testing, water quality testing, etc.

There are three units in which data can be collected:

- $\mu\text{s}/\text{cm}$ – micro Siemens per centimeter
- mg/L – milligram per liter
- ppm – parts per million

Probe usage and care:

The probe has two flat electrodes with known surface areas and distance between them. A signal is supplied to the electrodes and by testing the signal behavior, the conductivity of the solution is calculated.

General care:

- During measurements, make sure that the electrodes (in the shape of a circle with a dot inside) are covered by the liquid.
- Avoid as much as possible touching the probe's flat surface.
- Never submerge the probes plastic body in any liquid.
- Gently rinse the probe with distilled water after each use and between samples to avoid damage and contamination.
- Handle and store with care to avoid damaging or chipping the probe.

Included with the sensor:

- NeuLog General Guide
- Conductivity probe directly attached to the sensor's plastic body

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Sensor specifications:

Range and operation modes	ADC resolution	Resolution	Max sample rate (S/sec)
0 to 20,000 $\mu\text{S/cm}$	17 bit	0 to 2000 $\mu\text{S/cm}$ 0.1 $\mu\text{S/cm}$ Over 2000 1 $\mu\text{S/cm}$	100
0 to 18,000 mg/L		0 to 1000 mg/L 0.1 mg/L Over 1000 1 mg/L	
0 to 18,000 ppm		0 to 1000 ppm 0.1 ppm Over 1000 1 ppm	

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)
- Pre-calibrated sensing equipment
- Conductivity sensing electrodes on the probe attached directly to the sensor's plastic body.

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 conductivity sensor's page, choose "Products" on the main menu and then "Conductivity logger sensor".
- In order to access the conductivity sensor's experiments, choose "Example Labs":
 - Ions in Solution (C-3)
 - Diffusion in Biology (B-2)

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 ($^{\circ}\text{C}$, $^{\circ}\text{F}$, Lux, %, ppm, for example).

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.

There are two electrodes of known surface area on the conductivity probe with a known distance between them which allows the sensor to determine the conductivity of solutions.

The electrodes on the conductivity probe have an electrical potential difference applied to them to generate a current through the solution. If ions are present, the current flows between the electrodes. Current flows through solutions via ion transport, therefore the higher number

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of ions present in a solution the easier an electrical current can flow and a higher conductivity value will be measured.

The sensor's controller calculates the solution conductivity according to the measured current.

The electrodes alternate polarities to prevent a total ion migration to either pole which could cause polarization and electrolysis.

Maintenance and storage:

- Never submerge the NeuLog plastic body in any liquid.
- Do not allow liquid into either the sensor's or probe's plastic body.
- After using the probe, rinse it with distilled water and then blot or let air dry.
- Store in a box at room temperature out of direct sunlight.
- The temperature working range is 0° C - 80 °C.
The temperature compensation range (where temperature does not affect the reading) is 0 °C - 50 °C.
- Never place the probe in viscous heavy oils, glycerin, ethylene glycol, acetone or organic solvents such as pentane or hexane.

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!



Flexible, simple, fast, forward thinking.

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