

NEULOG TURBIDITY LOGGER SENSOR GUIDE



NeuLog turbidity logger sensor NUL-231

The NeuLog turbidity sensor can be used for any science experiment which uses samples with suspended particles in liquids such as in the fields of Chemistry, Biology, Microbiology, Earth Science, Environmental Science, Biochemistry, etc.

Turbidity is a measurement of the concentration of suspended particles in a solution. The particles could be anything from sand and non-dissolved nutrients to bacterial cells. A turbid liquid is often referred to as cloudy or hazy. This sensor measures turbidity by sending a beam of light through a cuvette and sensing the scattered light from the beam.

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

Three cuvettes with lids are included with the sensor, which load directly into the opening on the sensor's faceplate.

Among hundreds of possible experiments that can be done with the NUL-231 sensor are: Monitoring of ecological systems, bacteria or yeast culturing, studying colonies of Protozoa, environmental health testing, water quality testing, etc.

The turbidity sensor's measurement unit is:

- NTU – Nephelometric Turbidity Unit

Cuvette usage and handling:

It is important to maintain a standard for cuvette usage as their quality will directly make an impact on the results of your experiments. If the cuvette has fingerprints, smudges or cracks, the sensor will detect them and give off an improper turbidity reading. Smudges left from handling can easily be wiped off with tissue paper.

Proper usage:

1. Carefully remove the cuvettes from their packaging.
2. Load your liquid sample into the cuvette before placing it into the sensor to prevent spilling and damaging the sensor.
3. Plug the cap into the cuvette and gently invert a few times. Do not shake since this could create air bubbles which would be detected by the sensor and give an incorrect reading.
4. Before placing the cuvette in the sensor, hold it as far toward the top as you can and wipe the bottom part of the cuvette with a tissue. Be careful not to touch the bottom of the cuvette again as this could leave residues which could affect the results of the experiment.
5. Load the cuvette into the square hole on the sensor's faceplate and press down gently to slide the cuvette into place.
6. After experimentation, empty your samples, gently rinse out the cuvettes with distilled water and then let them air-dry.

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Included with the sensor:

- NeuLog General Guide
- Three plastic cuvettes with three lids

Sensor's specifications

Range and operation modes	0 to 200 NTU
ADC resolution	16 bit
Resolution	0.20 NTU
Max sample rate (S/sec)	100

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)
- Internal photodiode for collecting scattered infrared light
- Pre-calibrated sensing equipment

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 turbidity sensor's page, choose "Products" on the main menu and then "Turbidity logger sensor".
- In order to access the turbidity sensor's experiments, choose "Example Labs":
 - Monitoring Yeast Growth (B-38)

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.

Samples are poured into cuvettes which are then placed inside the turbidity sensor for analysis. An infrared light is directed at the cuvette and it is scattered off by any suspended particles present in the sample.

A photodiode positioned perpendicular to the light source loses free electrons (photoelectrons) when the scattered photons hit it, creating a readable voltage.

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The amount of light being scattered and then detected, is directly proportional to how many solid particles are present in the sample. Turbidity is calculated in Nephelometric Turbidity Units (NTU) based on the voltage reading.

Maintenance and storage:

- Never place anything into the turbidity sensor opening other than the cuvettes.
- Never submerge the NeuLog plastic body in any liquid.
- Do not allow liquid into the NeuLog plastic body.
- After using the probe, wipe off all excess material liquid or residue from the turbidity sensor.
- Store in a box at room temperature out of direct sunlight.
- The cuvette usage guide can be found at the beginning of this document.

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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