

NEULOG TEMPERATURE LOGGER SENSOR GUIDE



NeuLog temperature logger sensor NUL-203 NL-2030

The NeuLog temperature sensor can be used to make temperature measurements in solids, liquids, or gases for any science experiment where a thermometer is required. It is used in the fields of Chemistry, Physics, 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-203 sensor are: monitoring of ecological systems, study of photosynthesis, effect of temperature on enzymes, endothermic and exothermic reactions, weather studies. This sensor is capable of measuring both in Celsius and Fahrenheit.

Celsius ($^{\circ}\text{C}$): The SI (International System of Units) unit of temperature.

Fahrenheit ($^{\circ}\text{F}$): The temperature measurement unit of the English System commonly used in the United States.

Included with sensor:

- NeuLog General Guide
- Stainless steel temperature sensor connected permanently to the NeuLog connection block

Sensor's specifications

| | |
|-------------------------|-----------------------------------|
| Range (Celsius) | -40 to +140 $^{\circ}\text{C}$ |
| Range (Fahrenheit) | -40 to +284 $^{\circ}\text{F}$ |
| Resolution | 12 Bits |
| Accuracy (Celsius) | $\pm 1\text{oC}$ |
| Accuracy (Fahrenheit) | $\pm 2\text{oF}$ |
| Resolution (Celsius) | 0.1 $^{\circ}\text{C}$ |
| Resolution (Fahrenheit) | 0.2 $^{\circ}\text{F}$ |
| Maximum sampling rate | 100 samples/second |
| Probe dimensions | 180 mm long, 3.2mm in diameter |

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)
- Stainless Steel tube

Note: NeuLog products are intended for educational use.

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Videos and experiment examples:

- Videos, literature and other probes can be found at www.NeuLog.com.
- In order to access the temperature sensor's page, choose "Products" on the main menu and then "Temperature logger sensor".
- In order to access the temperature sensor's experiments, choose "Example Labs":
 - Thermal Conductivity (P-38)
 - Enzyme Activity (B-7)
 - Gay-Lussac's Law (C-14)
 - Distillation – part 1 (C-15)
 - Distillation – part 2 (C-15)
 - and more..

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.

Inside of the stainless steel probe is a thermistor which is a variable resistor that varies significantly with temperature. The resistance increases nonlinearly with a decreasing temperature. During calibration, the sensor's internal controller creates the conversion formula from resistance to temperature.

Maintenance and storage:

- Never submerge the NeuLog plastic body in any liquid.
- Do not allow liquid into the NeuLog plastic body where the temperature tether enters the body.
- After using the probe, wipe off all excess material, liquid or residue from the temperature probe.
- Store in a box at room temperature out of direct sunlight.
- Do not put the plastic case or cord of the temperature probe in an acid or base.

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.

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