

NEULOG SOIL MOISTURE SENSOR GUIDE



NeuLog soil moisture logger sensor NUL-229

The NeuLog soil moisture sensor can be used for any science experiment which utilizes accurate soil moisture levels such as in the fields of Environmental Science, Ecology, Animal Behavior, Biology, Chemistry, etc.

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

Among hundreds of possible experimental subjects that can be studied with the NUL-229 sensor are: monitoring habitats, ecosystem health, animal behavior, soil chemistry, soil comparisons, ecological monitoring, and many more.

This logger sensor is based on measurements of the vacuum pressure in a tensiometer. A tensiometer is a closed tube full with water with a special ceramic part in its end. In dry soil, water goes out by diffusion through the ceramic holes and vacuum pressure is created in the tensiometer. The vacuum pressure is proportional to the soil dryness.

The soil moisture sensor's measurement units are:
Centibar (cbar): The bar is a non-SI unit of pressure defined as 100,000 Pascals. The centibar is defined as one kilopascal.
Kilopascal (kPa): the SI derived unit of pressure.

Setting up the soil moisture probe:

The NeuLog soil moisture sensor requires only a minimal setup prior to each use. Be sure to properly configure your NeuLog sensor using one of the following guides (computer/smart device/viewer) prior to data collection.

1. Remove the soil moisture probe's cap which is wired directly into the sensor's body.
2. Immerse the ceramic cone in tap water. It is recommended to leave it in the water for 15 minutes.
3. Fill the probe's ceramic cone with tap water. Note: More water will last longer and provide more accurate results though be sure to allow some room for air at the top of the column.
4. Replace the plastic cap and firmly press down to form a strong seal.
5. Gently press the probe (ceramic cone side first) vertically into the soil that you want to test.
6. Ensure that the entire ceramic cone has been pressed into the soil.
7. Begin collecting data.

Included with the sensor:

- NeuLog General Guide
- Blumat soil moisture probe attached directly to the NeuLog sensor's body

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Sensor's specifications		
	cbar	kPa
Range and operation modes	-20 to 50 cbar	-20 to 50 kPa
ADC resolution	15 bit	
Resolution	0.01 cbar	0.01 kPa
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)
- 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 soil moisture sensor's page, choose "Products" on the main menu and then "Soil moisture logger sensor".
- In order to access the soil moisture sensor's experiments, choose "Example Labs":
 - Soil Moisture (B-20)

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.

The soil moisture sensor is a very technological complex system which utilizes a Blumat soil moisture probe in conjunction with the NeuLog sensor's hardware and software.

After the probe has been filled with water and placed into a soil sample, the specialized ceramic cone tip allows for water diffusion across a gradient. A vacuum is formed inside the probe when the cap is sealed and the sensor is automatically calibrated.

When the soil has less moisture than the probe, water diffuses out of the ceramic cone creating a larger volume vacuum. When the soil's moisture content is higher than the probe's, water will diffuse into the probe through the ceramic cone creating a smaller volume vacuum.

The NeuLog soil moisture sensor directly measures the pressure of the vacuum so the soil moisture reading is presented in pressure units.

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Maintenance and storage:

- Never submerge the NeuLog plastic body in any liquid.
- Do not allow liquid into the soil moisture sensor's body.
- After use, gently wipe away any foreign material from the soil moisture sensor.
- 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!



Flexible, simple, fast, forward thinking.

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