

NEULOG RESPIRATION MONITOR BELT LOGGER SENSOR GUIDE



NeuLog respiration monitor belt logger sensor NUL-236

The NeuLog respiration sensor can be used for any science experiment which involves respiration measurements such as in the fields of Exercise Science, Biology, Physiology, Human Health, 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-236 sensor are: exercise studies, human health studies, athlete comparisons, respiration abnormalities, and many more.

The respiration sensor's measurement units are:
Arbitrary analog units (Arb): An arbitrary unit to demonstrate wave functions without units.

Using the respiration monitor belt:

To accurately record respiration rates, you must first properly attach the respiration monitor belt to the user. **Note:** The belt works through clothing though try to minimize layers for the best readings possible.

1. Unwrap the respiration belt and locate the Velcro connection pads.
2. Place the respiration belt so the Velcro pads are facing outwards.
3. Wrap the respiration belt tightly, without causing discomfort, around the user's lower ribs and diaphragm area.

4. Ensure that the rubber tubing connected directly to the respiration belt is situated above the user's naval facing downwards.
5. Close the air pressure release valve by twisting the metallic knob until it tightens.
6. Use the hand-pump to fill the respiration belt's bladder until it forms a snug but not uncomfortable fit.
7. Run an experiment following one of the following guides.

Included with the sensor:

- NeuLog General Guide
- Respiration monitor belt attached directly to the sensor by flexible rubber tubing
- Hand pump with pressure release valve attached directly to the respiration monitor belt

Sensor's specifications	
Range and operation modes	0 to 20,000 arbitrary units
ADC resolution	15 bit
Resolution	1
Max sample rate (S/sec)	100

Experiment Duration: 1 second to 31 days.

Sensor's features:

- Fully digital data
- Rugged plastic ergonomic case
- Respiration monitor belt attached to the sensor body by a flexible rubber hose

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- Hand pump with pressure valve for increasing and decreasing pressure attached directly to the respiration monitor belt by a flexible rubber hose
 - 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 respiration monitor belt sensor's page, choose "Products" on the main menu and then "Respiration monitor belt logger sensor".
- In order to access the respiration monitor belt sensor's experiments, choose "Example Labs":
 - Respiration Rates (B-43)

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 respiration sensor uses the [piezoresistive](#) effect. The transducer is based on silicon between metal foils that changes its resistance according to pressure. One side of it is at complete vacuum that enables to measure the absolute pressure on its other side.

This transducer is built as a strain gauge with Wheatstone bridge circuit so its output is a voltage that depends on its absolute pressure.

When the user inhales, a pressure is applied directly to the respiration monitor belt's air bladder and it is detected by the internal sensing unit and converted to a voltage.

The voltage reading is easily converted into arbitrary units and the pressure changes to monitor respiration rate.

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Maintenance and storage:

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

W: www.neulog.com

E: info@neulog.com

A: 850 St Paul Street, Suite 15, Rochester, NY 14605

P: 1.866.553.8536

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