

Spirometer (Breathing) DT037A



The Spirometer sensor can be connected either to the Nova5000, MultiLogPRO or TriLink data loggers. It is a breathing sensor which allows students to conduct experiments in physiology. Based on air speed, the Spirometer calculates the airflow rate and lung capacity of the user who is breathing into the sensor. By default, the results are shown in liters per minute.

The Spirometer sensor consists of Fourier's sensor case with a unique breath sensor tube and removable single-use plastic nozzle.

Typical Experiments

- Investigate the lung capacity of athletes versus non-athletes
- Compare lung capacity of smokers versus lung capacity of non-smokers
- Conduct respiratory experiments

How it Works

The Spirometer sensor is based on an extremely sensitive pressure sensor and a unique breath sensor tube. Inside this tube is a small disc, narrowing the middle of the tube. When air travels through the tube, pressure is created on one side of the disc and a vacuum on the other side. The pressure sensor senses this pressure and subsequently the output voltage changes. The Analog-Digital converter of the logger translates the voltage to the proper results accordingly. Note that when air travels through the tube in the opposite direction, the sensor will measure a negative value.



Sensor Specification

Range:	± 315 L/min ± 5.25 L/sec
Accuracy:	± 8 % over entire range
Resolution (12-bit):	0.16 L/min
Default Sample Rate:	10 samples per second

Equipment List DT037A

Spirometer DT037
Single-use plastic nozzle for Spirometer DT031

Calibration

The Spirometer sensor requires no calibration.

Safety

For hygienic reasons do not share the single-use plastic nozzle for the Spirometer.

Using the Spirometer Sensor with the Nova5000 and MultiLab Software

1. Launch the MultiLab CE software.
2. Connect the Spirometer sensor to the Nova5000's sensor input (starting from I/O-1). The sensor is automatically recognized by the MultiLab software.
3. Click **Setup** on the main toolbar and program the data logger's sample rate and number of samples. Click **Run** on the main toolbar to start the measurement.

Selecting Units

MultiLab displays the data in L/min. To change the display to L/sec:


1. Click **Logger** on the main MultiLab toolbar and then click **Preferences**.
2. Click the desired unit in the **Spirometer unit** menu and then click **OK**.

Using the Spirometer Sensor with the MultiLogPRO or TriLink and MultiLab Software

1. Launch the MultiLab software.
2. Connect the Spirometer sensor to the data logger's sensor input (starting from I/O-1). The sensor is automatically recognized by the MultiLab software.
3. Click **Setup** on the main toolbar and program the data logger's sample rate and number of samples. Click **Run** on the main toolbar to start the measurement.

Selecting units

MultiLab displays the data in L/min. To change the display to L/sec:

1. Click **Setup** on the main toolbar.
2. Click **Properties**  next to the Spirometer sensor input.
3. Select the checkbox next to the desired Spirometer unit and click **OK**.

An Example of using the Spirometer Sensor

Volume of air in the lungs

The Spirometer sensor is used to measure the volume of air in the lungs. The following graph is the airflow rate of breath using the Spirometer sensor.

By *Integrating* (one of the MultiLab processing functions), half a breathing cycle, the user's lung capacity (volume of the air) can be calculated.

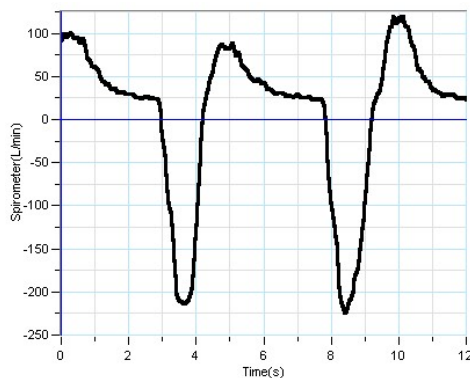


Figure 1: A breath measurement

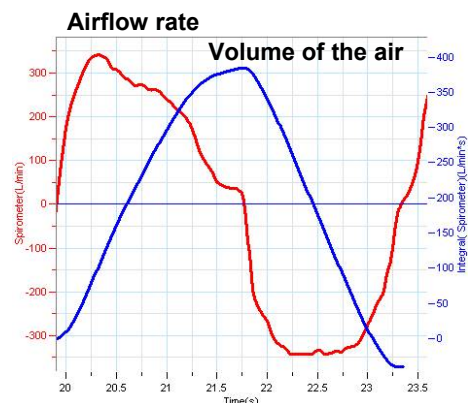


Figure 2: One cycle breath and lung volume



Technical Support

Please contact Fourier technical support as follows:

Web: http://www.fourier-sys.com/support_support.html

Email: support@fourier-sys.com

Consult the FAQs before contacting technical support:

http://www.fourier-sys.com/support_faq.html

Copyright and Warranty

All standard Fourier Systems sensors carry a one-year warranty, which states that for a period of twelve months after the date of delivery to you, it will be substantially free from significant defects in materials and workmanship.

This Warranty does not cover breakage of the product caused by misuse or abuse.

This Warranty does not cover Fourier Systems consumables such as electrodes, batteries, EKG stickers, cuvettes and storage solutions or buffers.