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Apr 2024

Pressure Sensor 20 – 400 kPa

Product Number: ENPRS015-4



Overview

The Pressure sensor measures gas pressure in a range of 20 to 400 kPa (0.2 to 3.9 atm or 200 to 4000 mbar). The sensor includes a Luer Lock Connector, suitable for experiments utilizing small containers as syringes and valves. The Pressure sensor is used for various Biology, Chemistry and Physics.

The Pressure sensor (20 to 400 kPa) can be connected to all types of einstein™ data loggers.

Typical experiments



Chemistry

- Boyle's Law
- Gay-Lussac's Law
- Measuring rate of chemical reaction



Biology

- Changes in oxygen pressure during photosynthesis experiments
- Changes in CO₂ pressure during respiration experiments
- Gas releasing reactions such as breakdown of hydrogen peroxide by catalase

How it works

The sensing unit inside the Pressure sensor changes its voltage as a result of a pressure change. This voltage is then normalized to a range of 0 - 3 V and recorded by loggers. The sensor also integrates a temperature compensation mechanism.

Sensor specification

Range:	20 to 400 kPa 0.2 to 3.9 atm 200 to 4000 mbar
Accuracy:	±1.5 % 0-85°C
Resolution (12-bit):	0.1 kPa
Default Sample Rate:	10 samples per second
Response Time (for 90% change in reading):	1 ms
Operating Temperature:	0 °C to 85 °C

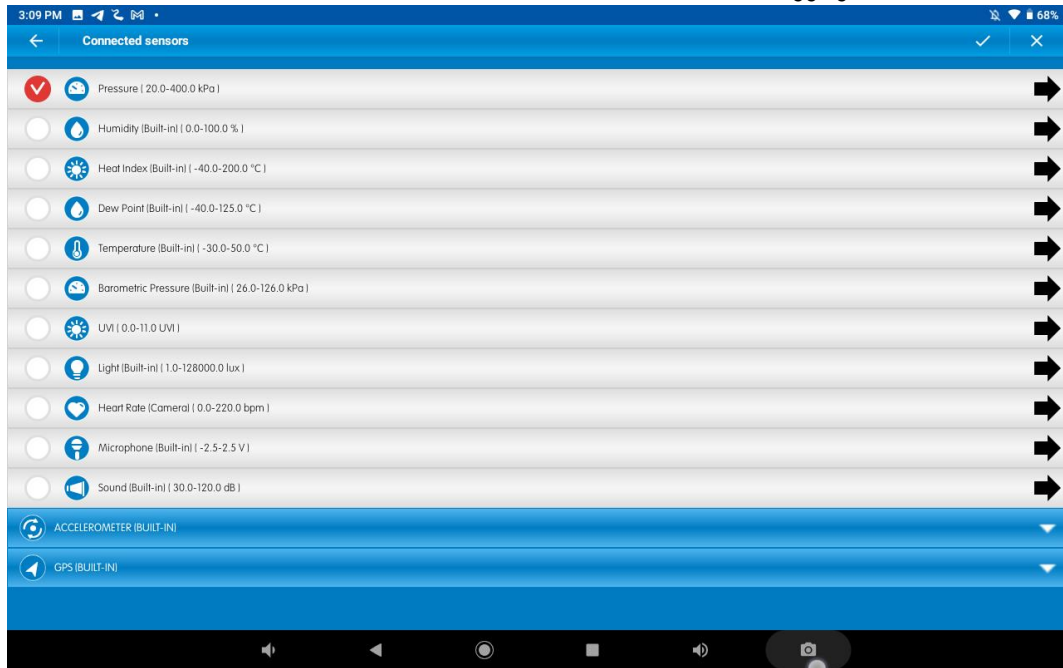
Note: sensor cables sold separately

Note: The einstein™ Pressure kit is sold separately

Data logging and analysis

Androi

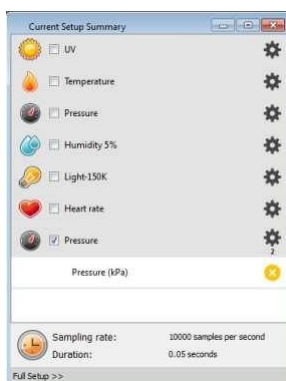
1. Take your einstein™ Tablet OR pair your einstein™ LabMate with your Android or iOS tablet via Bluetooth
2. Insert the sensor cable into one of the sensor ports
3. Launch MiLABEx and tap LAB start an Experiment
4. MiLABEx will automatically detect the sensor
5. Go to Sensors to make sure the icon next to the sensor is checked to enable it for logging



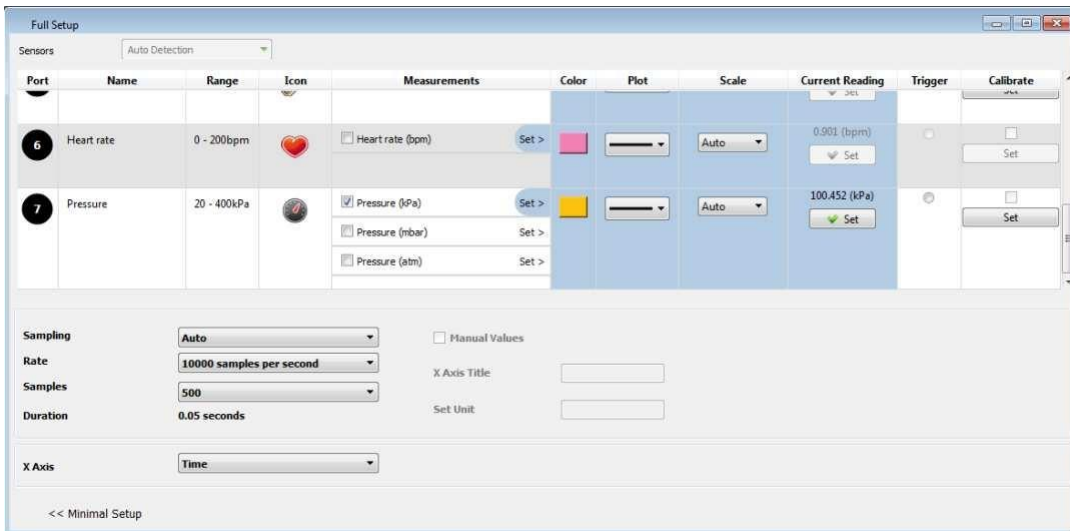
6. You are ready to start an Experiment

Desktop

1. Pair your einstein™ LabMate with your PC, MAC, or Linux machine via Bluetooth, or connect it via the USB cable (found in the einstein™ LabMate box).
2. Insert the sensor cable into one of the sensor ports
3. Launch MiLABEx
4. MiLABEx will automatically detect the sensor and show it in the Current Setup Summary window



5. Click Full Setup, located at the bottom of the Current Setup Summary window to program the data logger's sample rate, number of samples, units of measurement, and other options



- Click the Run button on the main toolbar of the Launcher View to start logging

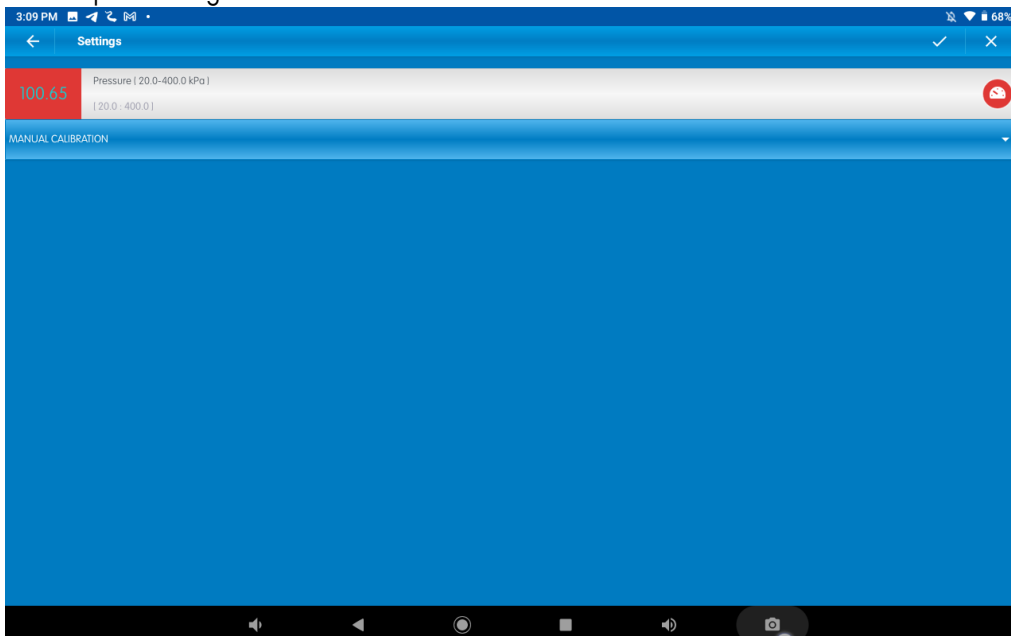
Calibration

The Pressure sensor is shipped fully calibrated.

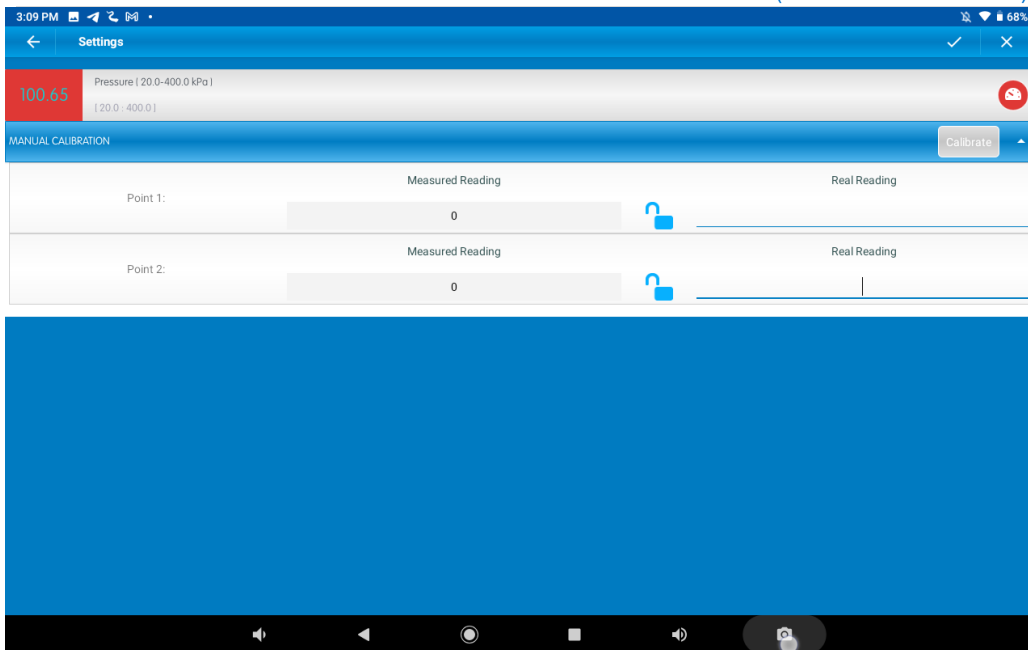
For greater accuracy the sensor can be calibrated as follows:

Android

- Tap the Settings button next to the sensor's name



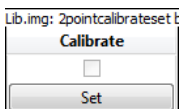
- Tap Manual Calibration



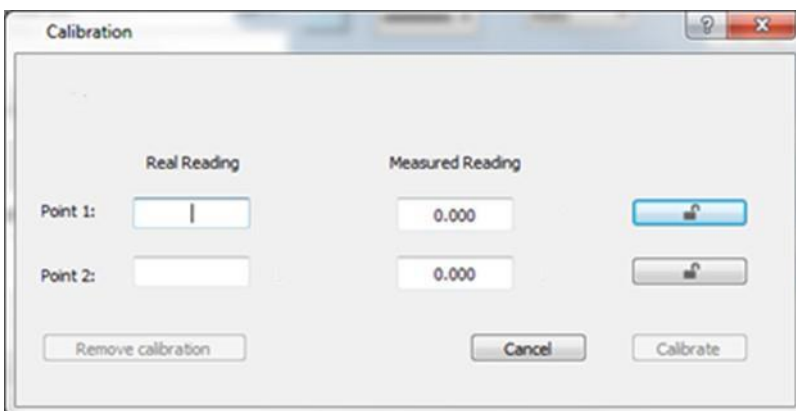
3. Measure a known pressure (e.g., 20 kPa). Enter this known value in the Point 1, Real Reading field
4. Measure the pressure and wait for the readings to stabilize.
5. Tap the lock icon
6. Measure a second, different, known pressure (e.g., 200 kPa). Enter this known value in the Point 2, Real Reading field
7. Measure the pressure and wait for the readings to stabilize.
8. Tap the lock icon
9. Tap Calibrate.

Desktop

1. Go to the Full Setup window and in the Calibrate column click Set



2. The Calibration window will appear



3. Measure a known pressure (e.g., 20 kPa). Enter this known value in the Point 1, Real Reading field
4. Measure the substance and wait for the readings to stabilize.
5. Click the lock icon

6. Measure a second, different, known pressure (e.g., 200 kPa). Enter this known value in the Point 2, Real Reading field
7. Measure the substance and wait for the readings to stabilize.
8. Click the lock icon
9. Click Calibrate

Note: For the most accurate results try to calibrate the sensor with one Real Reading under the expected results and one Real Reading over the expected results.

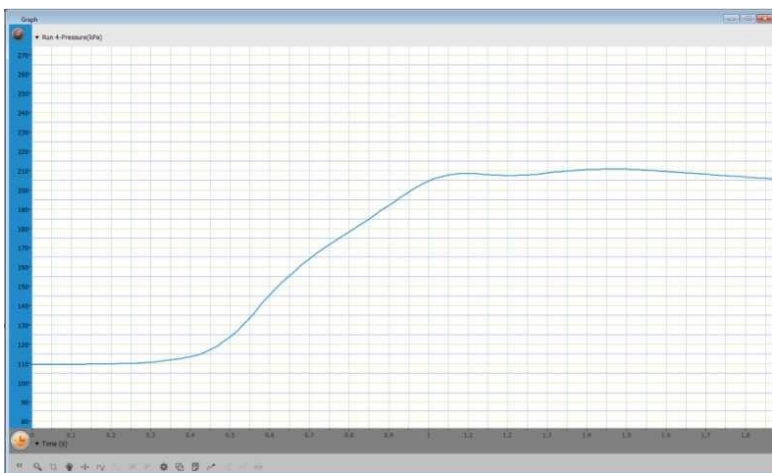
An Example of using the Pressure Sensor

Boyle's Law

One of the distinguishing features of gases is their ability to be compressed into much smaller volumes. According to Boyle's Law, the volume of a sample of gas at a given temperature varies inversely with the applied pressure: $P \propto 1/V$.

In this experiment we investigate the relationship between pressure and volume, by measuring the effects of

changes in air volume in a sealed flask at a constant temperature.



Troubleshooting

If the Pressure sensor isn't automatically recognized by MiLAB, please contact Fourier Education's technical support.

Technical support

For technical support, you can contact the Fourier Education's technical support

team at: Web: www.einsteinworld.com/support

Email: support@fourieredu.com

Copyright and Warranty

All standard Fourier Systems sensors carry a one (1) 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.

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