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Pressure Sensor
50 to 1150 mbar

Product Number: ENPRS015

Overview

One of the key factors in almost every experiment involving gases is pressure. The Pressure sensor measures gas pressure in the range of 150 to 1150 mbar (0.148 to 1.134 atm or 15 to 115 kPa). The sensor includes a Luer Lock Connector, allowing the sensor to be used with a wide range of equipment including small containers, syringes, and valves. It is ideal for various experiments in biology, chemistry, and physics. The sensor can also be used as a barometer and altimeter giving it even greater variety of uses.

The Pressure sensor can be connected to all einstein™ data loggers.

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Typical experiments

Biology

- Investigating the evaporation of water from terrestrial plants - transpiration
- Measuring the photosynthesis rate in plants
- Measuring the respiration rate of germinating seeds or any other organisms
- Investigating the effect of light on photosynthesis rate

Chemistry

- Investigating the Ideal Gas Law
- Explore reactions that emit gasses, such as metal with acid or calcium carbonate with acid

How it works

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

Sensor specification

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Range:	150 to 1150 mbar
	0.148 to 1.134 atm
	15 to 115 kPa
Accuracy	±1.5 % over entire range @ 0-85ºC
Resolution (12-bit):	0.27 mbar
Temperature Compensation	Yes
Response Time (for 90% change in reading):	1 ms

Note: sensor cables sold separately

Note: The einstein™ Pressure kit is sold separately

Data logging and analysis

Android

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

4. MiLABEx will automatically detect the sensor you can ensure that it is checked by tapping Sensors.
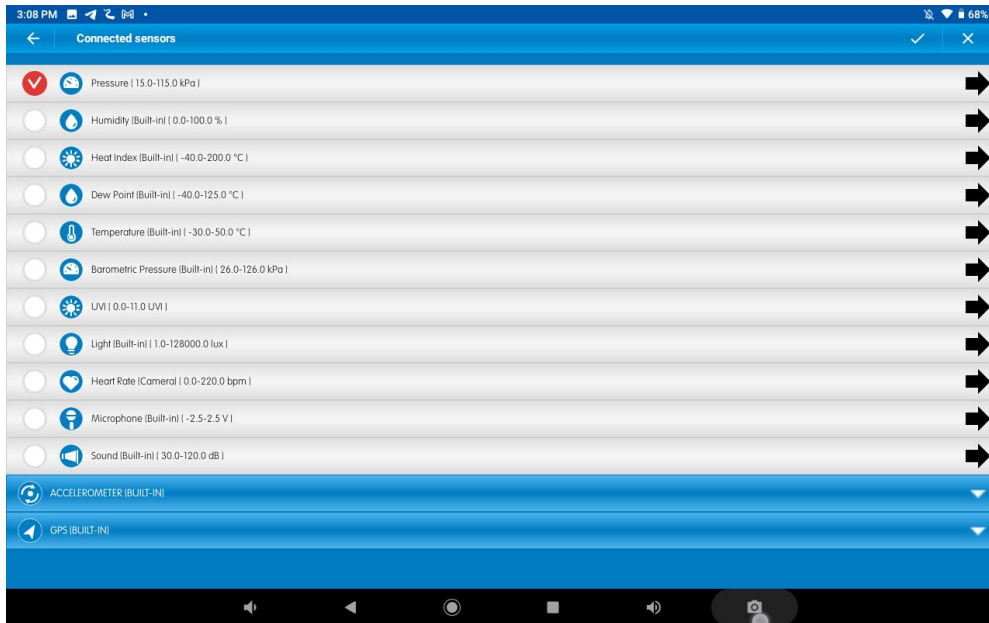

5. You are ready to start an experiment.

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 Desktop

4. MiLABEx Desktop will automatically detect the sensor and show it in the Current Setup Summary window

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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
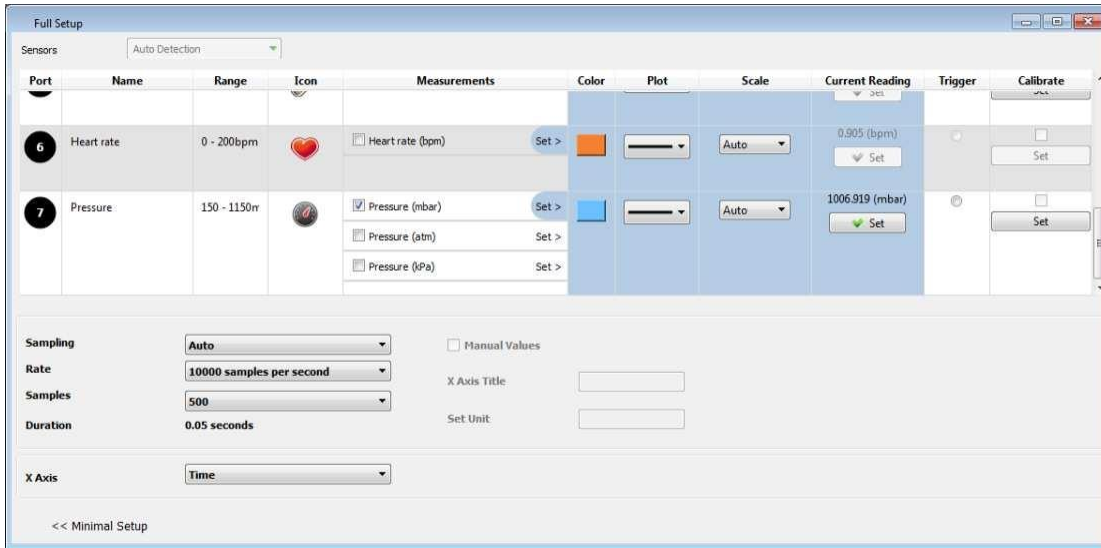
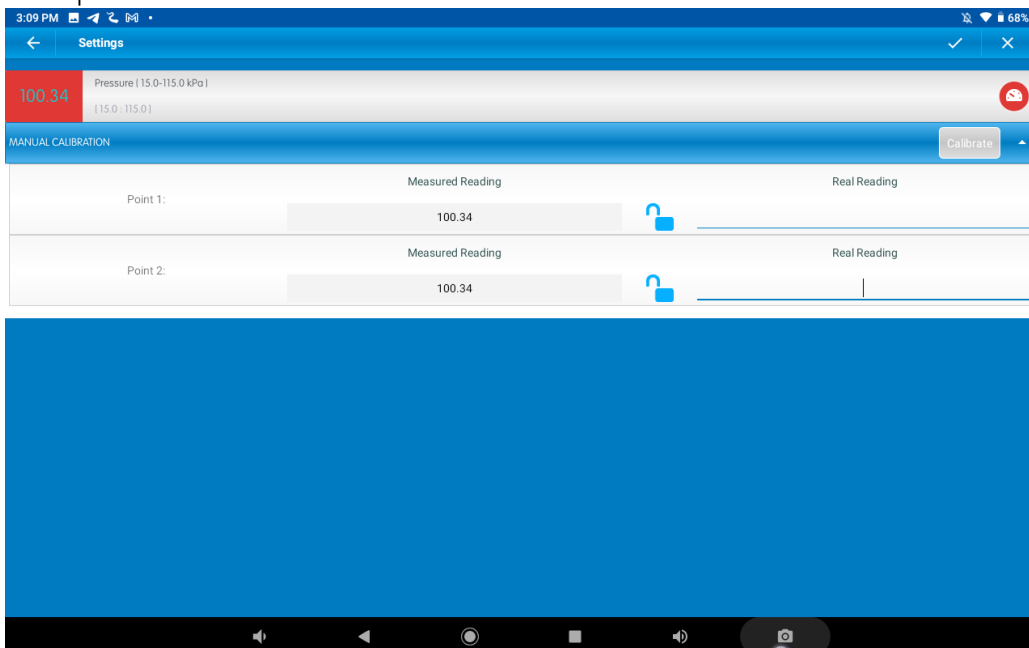6. Click the Run button to start logging

Calibration

The Pressure sensor is shipped fully calibrated.

For greater accuracy there is also a manual calibration process.

Android

1. Tap on Sensors
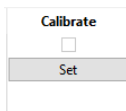2. Tap on the Arrow Icon
3. Tap Manual Calibration

4. Prepare an environment with a known pressure. Enter this known value in the Point 1, Real Reading field

5. Measure the pressure and wait for the readings to stabilize.

6. Tap the Lock icon

7. Measure a second environment with a known value. Enter this known value in the Point 2, Real Reading field

8. Measure the pressure and, wait for the readings to stabilize.

9. Tap the Lock icon

10. Tap Calibrate.

11. Tap V to confirm settings

12. Tap V to confirm sensors and return to LAB
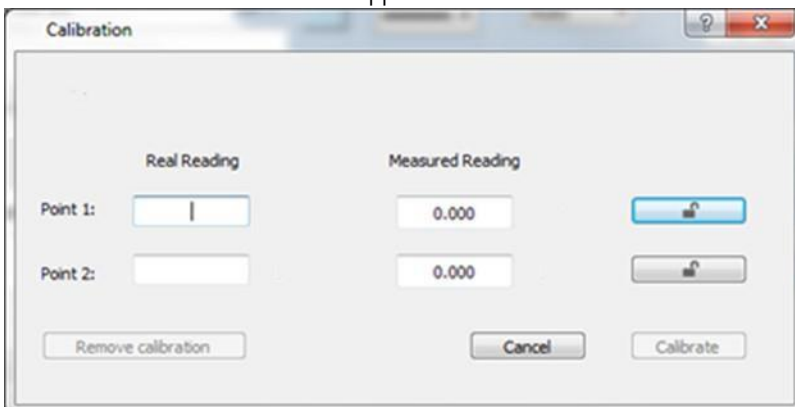
13. You are ready to Start an experiment

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.

Desktop

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

2. The Calibration window will appear

14. Prepare an environment with a known pressure. Enter this known value in the Point 1, Real Reading field

15. Measure the pressure and wait for the readings to stabilize.

16. Click the Lock icon

17. Measure a second environment with a known value. Enter this known value in the Point 2, Real Reading field

18. Measure the pressure and, wait for the readings to stabilize.

19. Click the Lock icon

20. Tap 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.

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1. Connect the Pressure sensor to your einstein™ device
2. Attach the Pressure sensor to a syringe (with the plunger down to 1 cm above the bottom)
3. Start MiLABEx
4. Select Run
5. Slowly pull back on the plunger
6. Your graph should be similar to the one below
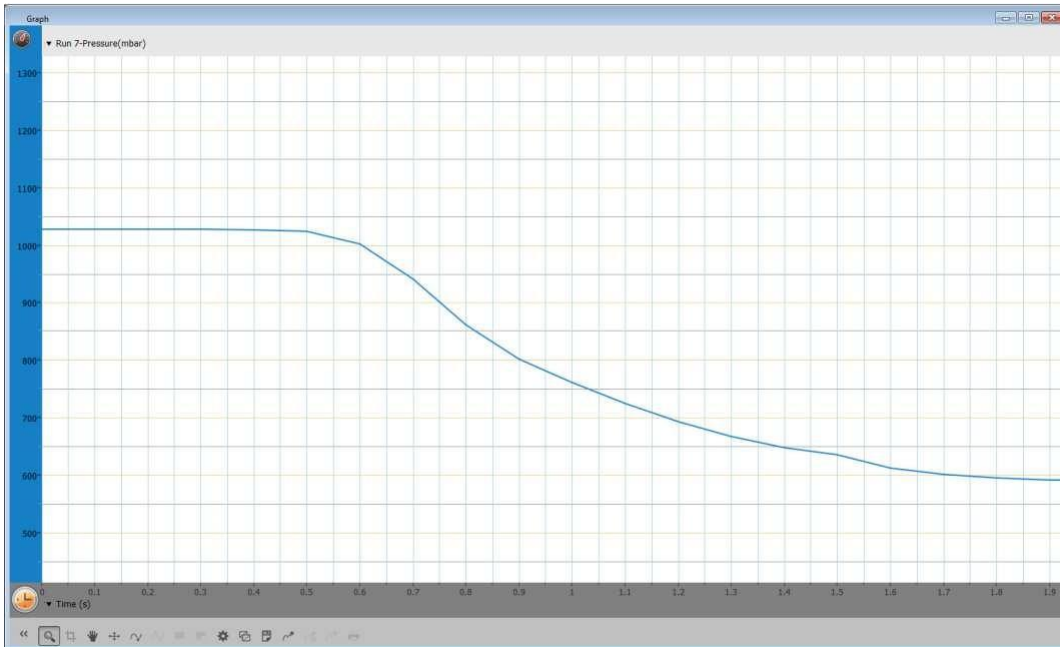
Troubleshooting

If the Pressure sensor isn't automatically recognized by MiLABExEx, 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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