

Accelerometer Sensor

Product Number: ENACL138



Overview

The Accelerometer sensor is a highly accurate sensor measuring accelerations from ± 5 g. As we experience acceleration, like on a roller coaster, we feel a force pushing against us. This is acceleration and it is measured in g's. When this sensor is at rest it measures 1 g when pointing downward, -1 g when pointing upward and zero when positioned horizontally.

The sensor is ideal for use in Physics experiments. The Acceleration sensor can be connected to the LabMate, Labmate+, einstein™Tablet, and einstein™Tablet+.

Typical experiments



Physics

- Studying Newton's laws
- Investigating centripetal acceleration on a rotating platform
- Investigating the acceleration on an inclined plane

- Measuring the acceleration of cars, amusement park apparatus, bungee jumpers

How it works

The Accelerometer sensor uses a mass suspended by two springs lying on the sensor's lengthwise axis. The mass can move along this axis only. The movement of this mass is measured with a capacitor that consists of two fixed plates at either end and one central plate attached to the mass. Acceleration unbalances the capacitor, which changes its voltage in proportionally to the movement of the mass. This movement is the mass's acceleration.

Sensor specification

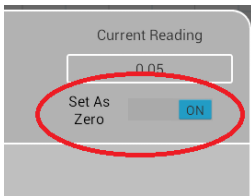
Range:	$\pm 5g$
Accuracy:	$\pm 0.02 g$
Resolution (12-bit):	0.0025 g or 0.025 m/s ²
Default Sample Rate	10 samples per second
Maximum Sample Rate:	100 samples per second

Calibration

The Accelerometer sensor uses Set Zero Calibration.

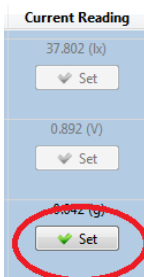
In MiLAB™:

1. Tap the Setup Button 
2. Flip the Set Zero switch to On



In MiLAB™ for Desktops:

1. Go to the Full Setup window
2. Click on the Set Button under Present Reading




3. Click Reset to turn off the Set Zero calibration

Data logging and analysis

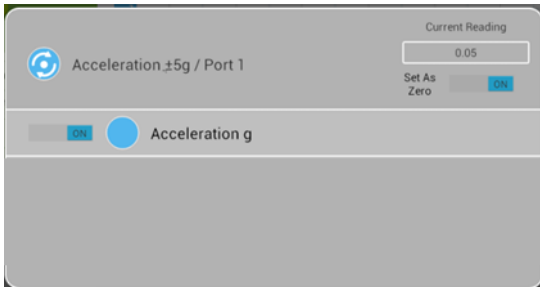
MiLAB™

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 via the DT to einstein™

- Sensor Adaptor
3. Launch MiLAB
 4. In Launcher View, tap the box marked "Empty" and select Acceleration from the dropdown list
 5. Check the icon next to the sensor () to enable it for logging

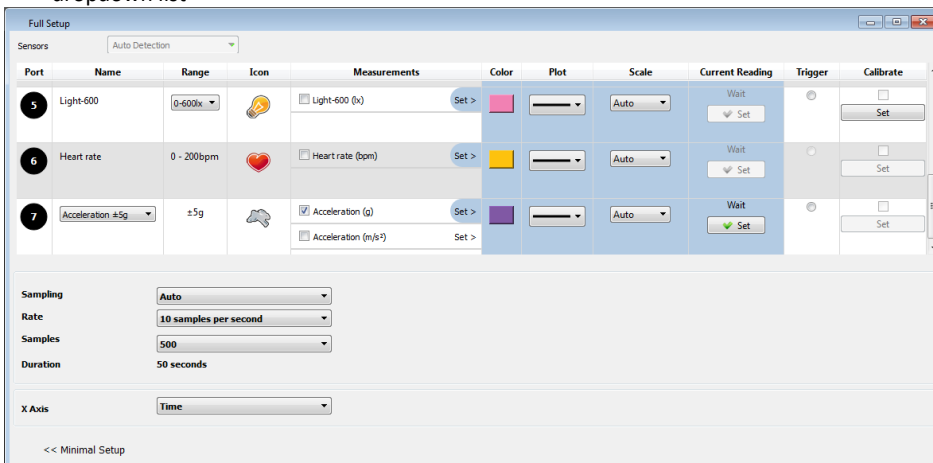



6. Tap the Setup button  for further options



MiLAB™ for Desktops

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 via the DT to einstein™ Sensor Adaptor
3. Launch MultiLab4
4. Click on Full Set up in the Current Setup Summary Box
5. Scroll down to the box marked "Empty" and select Acceleration from the dropdown list



6. In Full Setup, you will be able to program the data logger's sample rate, number of samples, units of measurement, and other options
7. Click the Run button () on the main toolbar of the Launcher View to start logging

Experiment Set-Up

The Accelerometer comes equipped with:

- Accelerometer sensor
- DT- to einstein™ sensor convertor

An example of using the Accelerometer Sensor

Centripetal Acceleration

When a body is moving in a uniform circular motion it undergoes centripetal acceleration, an acceleration that is pointed toward the center of the motion. Using a turntable the relationship between centripetal acceleration and the angular velocity of the circular path can be investigated.

The centripetal acceleration is directly proportional to the square of angular speed and the centripetal acceleration vs. the angular speed graph is parabolic.

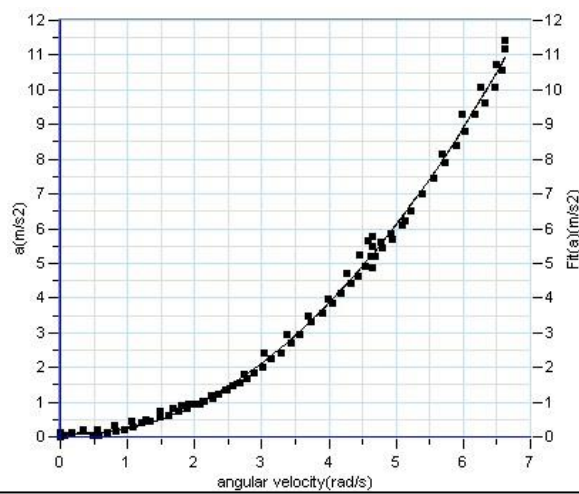


Figure 1: A measurement of centripetal acceleration vs. angular velocity

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

Phone (in the US): (877) 266-4066

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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