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Mar 2024

Accelerometer Sensor

Product Number: ENACL138

Overview

The Accelerometer sensor is a highly accurate sensor measuring accelerations in the range of ±6 g along three axes. 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 Accelerometer sensor

Typical experiments

Physics

- Studying Newton's laws
- Investigating centripetal acceleration on a rotating platform
- Investigating acceleration on an inclined plan
- Measuring the acceleration of cars, amusement park apparatus, bungee jumpers

How it works

The Accelerometer sensor uses a body with certain mass attached to a basis at a few points called anchors. This body is free to move in the direction of any sensed acceleration. When force is applied on the sensor, the body is displaced from its position, causing an imbalance which causes an electrical charge deviation. That charge deviation is measured and translated into acceleration.

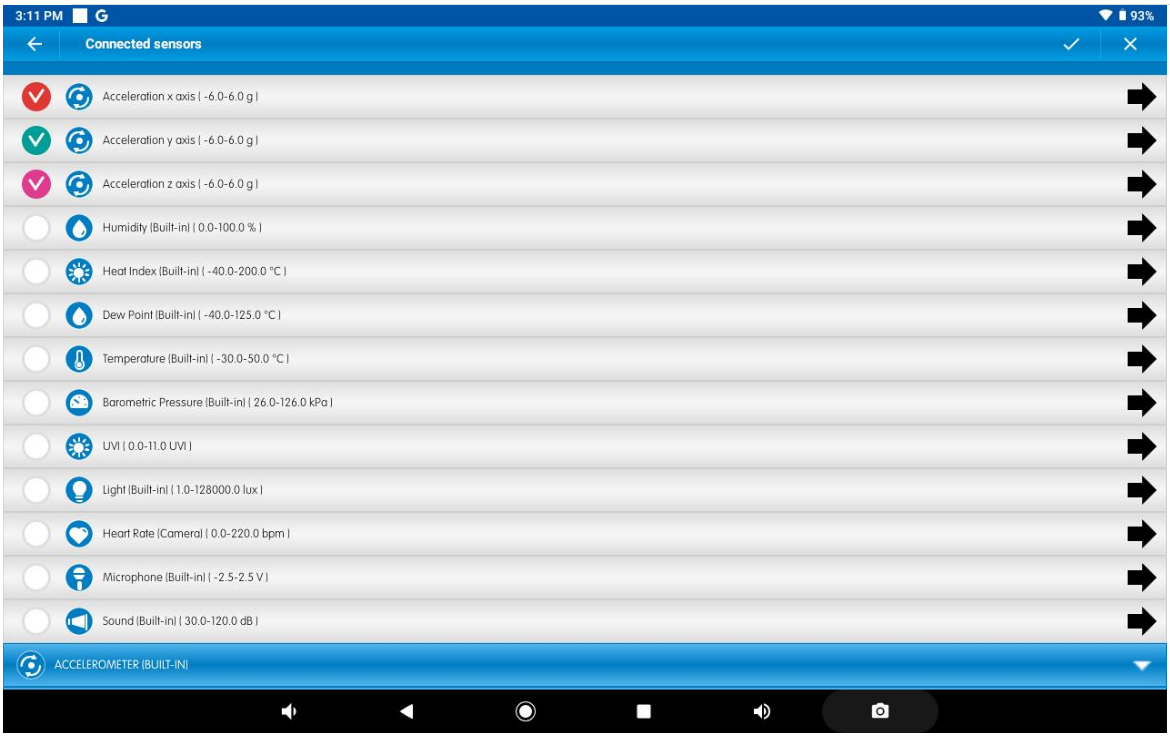
Sensor specification

Range:	±6 g
Accuracy	±0.05 g
Resolution (12-bit):	0.003 g

Data logging, Calibrating and Analysis

MiLABExTM Android & IOS

1. Take your einstein™ Tablet and open MiLABEx
   Or open MiLABEx with your android/iOS device, go to LAB and “Connect a device” selecting your einstein™ LabMate™
2. Connect the sensor to the logger

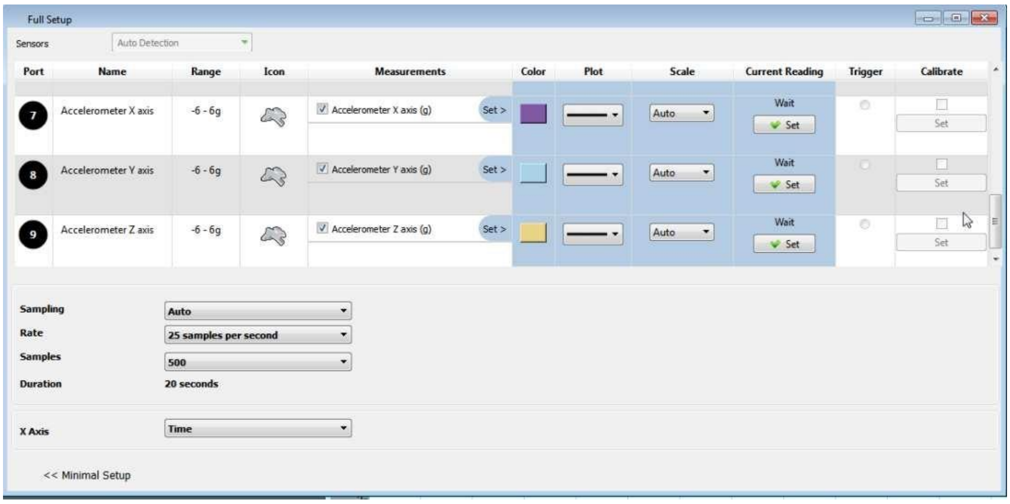


3. **The logger is ready to use.**

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 MiLAB
4. MiLAB will automatically detect the sensor and show it in the Current Setup Summary window
5. The sensor measures acceleration in three directions. Check the box ( ) next to the axis or axes you want to measure.

6. Click Full Setup, 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

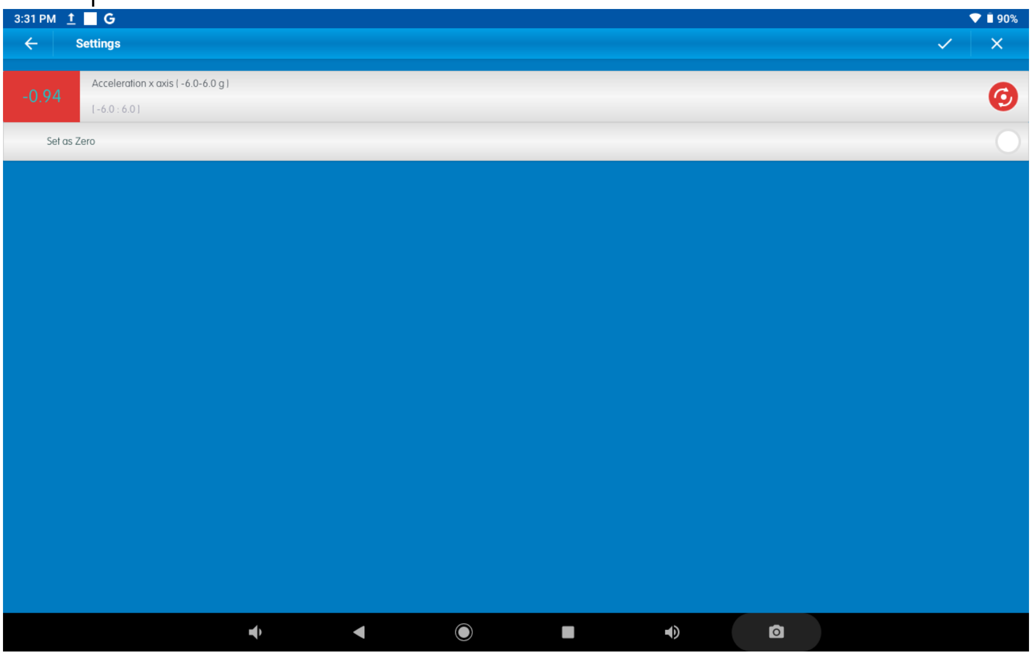
Calibration

The Accelerometer sensor is shipped fully calibrated.

For more accurate results you can use the Set Zero function.

Android

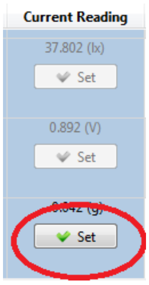
1. Rest the Accelerometer on a desktop – make sure it is not moving
2. Tap the Setup Button
3. Flip the Set Zero switch to On



It needs to be done on each of the axis separately.

Desktop:

1. Rest the Accelerometer on a desktop – make sure it is not moving
2. Go to the Full Setup window
3. Click on the Set Button under Present Reading



4. Click Reset to turn set the reading to Zero

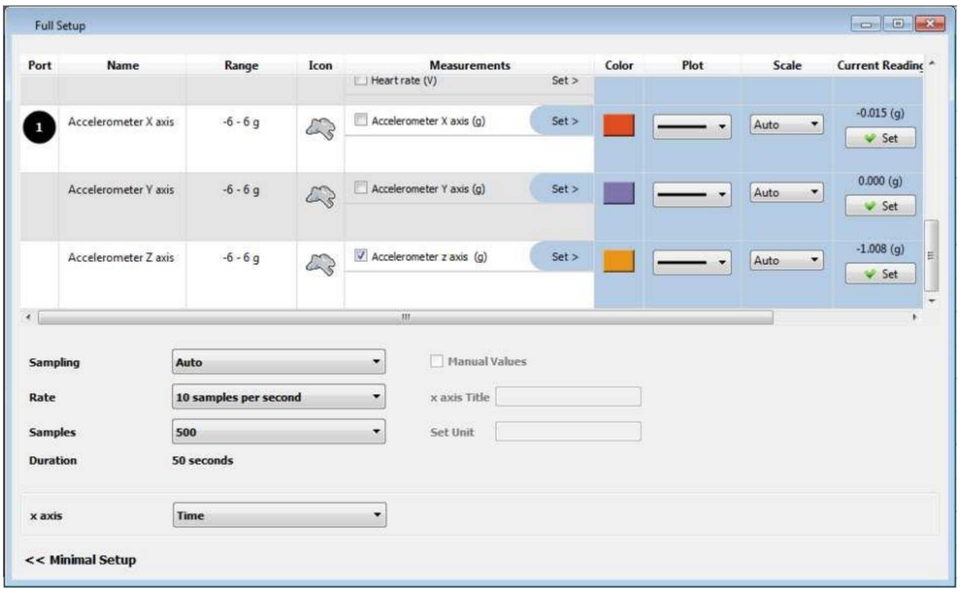
Experiment Set-up

The Accelerometer comes equipped with:
Accelerometer sensor

An example of using the Accelerometer Sensor

Acceleration of Gravity

1. Click Full Setup and check only the "Accelerometer Z axis (g)":



2. Place the sensor on a flat table with the z-axis up (the z-axis is marked on the sensor).

3. Click the Run button ( ) to start logging.
4. Reverse the sensor's position so the z-axis points down.
5. Click Stop button ( ).
6. Your graph should display +1 g and -1 g. (See Figure 1)

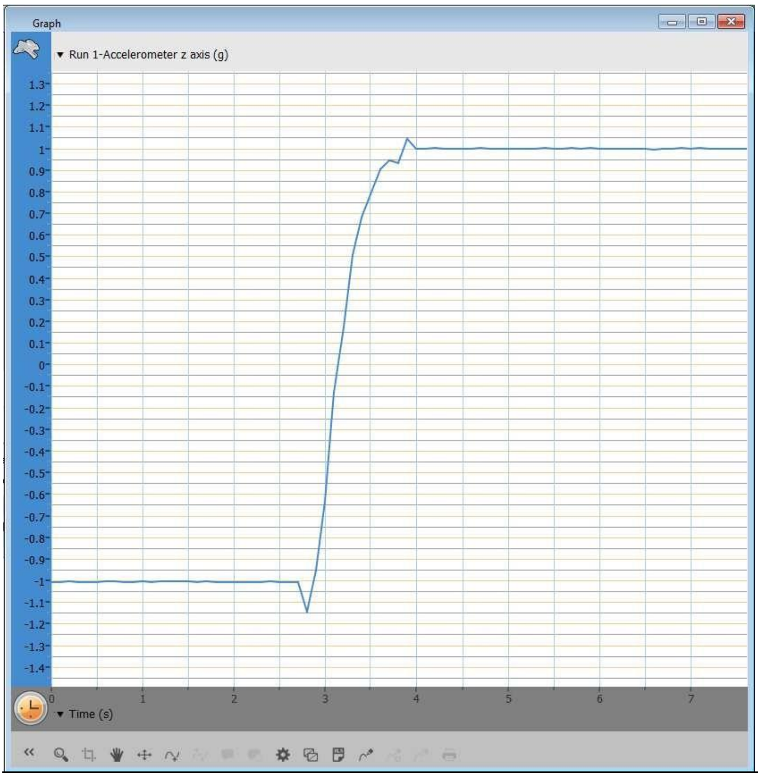


Figure 1: A measurement of Acceleration of Gravity at Z-axis

7. Place the sensor with the z-axis up on a small horizontal surface which you can lift. Locate the sensor (positive Z-axis direction up) on small horizontal flat surface which can change its inclination.
8. Click the Run button ( ) to start logging.
9. While logging, slowly lift up the surface at one end, increasing the slope.
10. Click Stop button ( ).
11. You may calculate and verify the gravity vector for a specific slope angle.
12. Figure 2 shows the expected results.

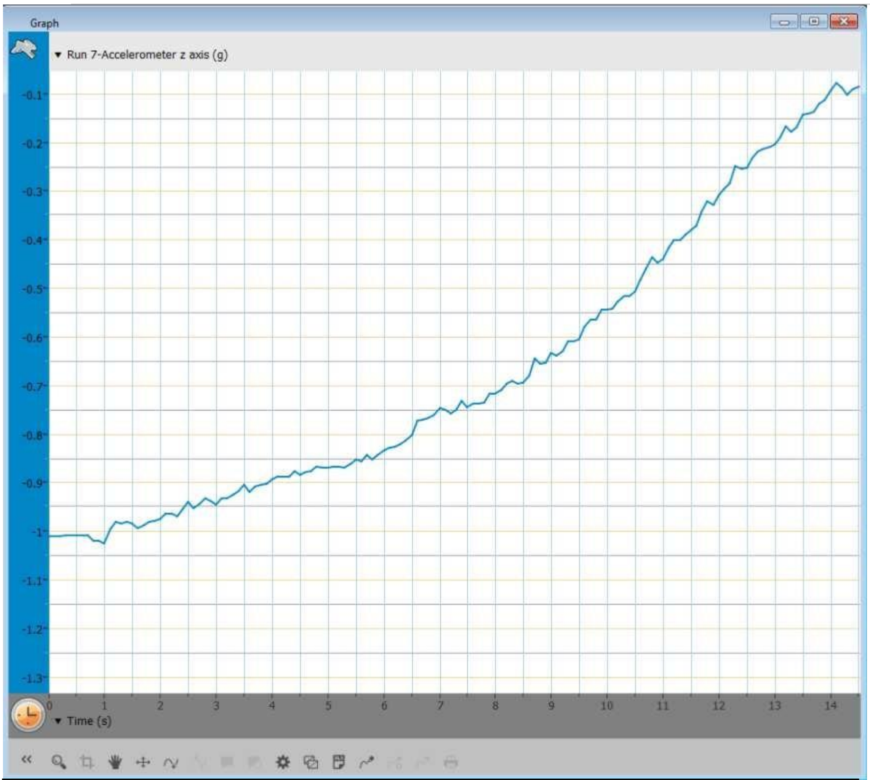


Figure 1: Measuring of acceleration on an inclined plane

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.