



Photogate Sensor

Product Number: ENFTG137



Overview

The Photogate sensor measures the time it takes for an object to pass between its arms. It is especially designed for work with the Timing Wizard available in MiLAB™ software. The sensor is designed to make experiments measuring speed, acceleration and velocity easy to conduct. It is often used in conjunction with the Fourier Smart Pulley attachment. The Photogate is used for a wide variety of experiments in physics and physical science.

The Photogate sensor can be connected to all types of einstein™ data loggers.

Typical experiments



Physics

- Measuring free fall acceleration
- Studying the swing of a pendulum
- Measuring the speed of a rolling object

How it works

The Photogate sensor projects a narrow, infrared beam between its two legs. Normally the sensor's output is 0 V and the LED is in an off state, but when an object breaks the beam the output increases to 3V and the LED on the gate lights up.

Sensor specification

Range:	0-3V
Detector Rise Time:	180 ns
Detector Fall Time:	180 ns
Infrared Source:	Peak at 875 nm
Data Logger Port:	Digital for Smart Pulley Analog for Photogate

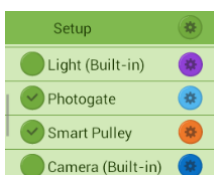
Calibration

The Photogate sensor is shipped fully calibrated.

Data logging and analysis

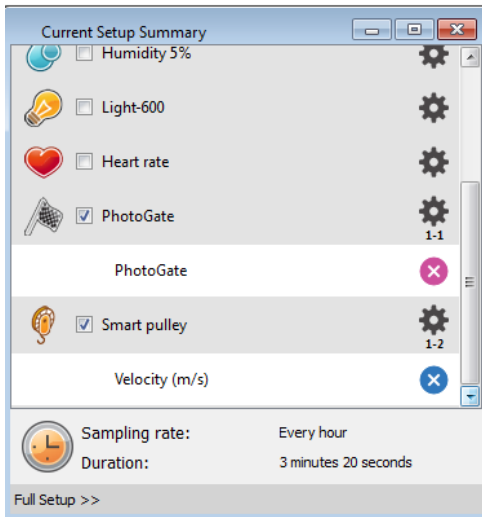
MiLAB™

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
3. Launch MiLAB
4. MiLAB will automatically detect the sensor and show it in the Launcher View
5. Check the icon next to the sensor (🟢) to enable it for logging

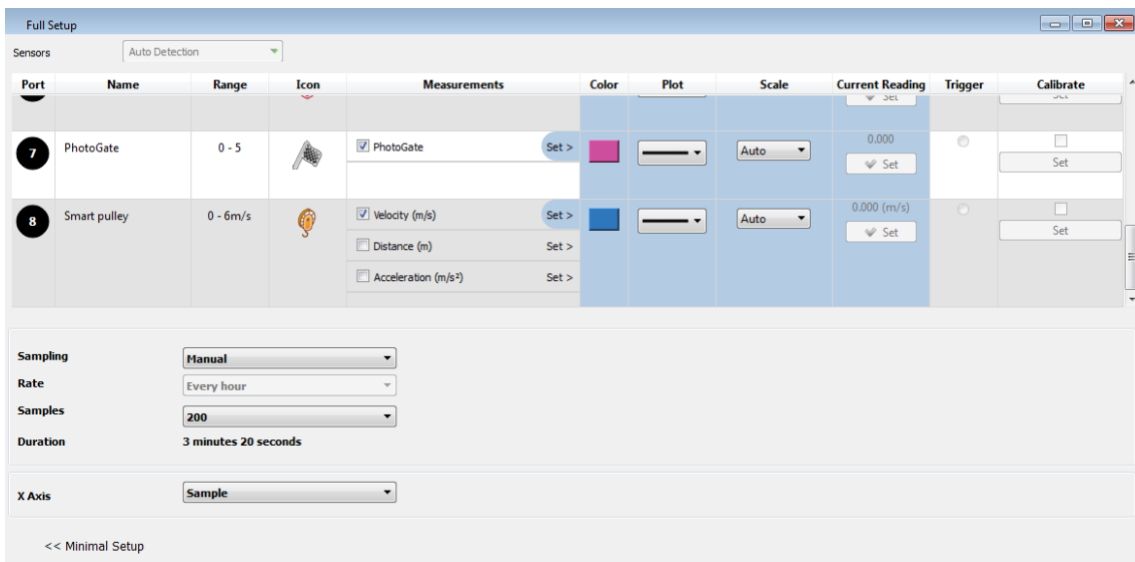


MiLAB™ Desktop

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 Desktop
4. MiLAB Desktop will automatically detect the sensor and show it in the Current Setup Summary window. It appears as both Photogate and Smart Pulley.



- 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 () to start logging

Experimental Setup

The Photogate sensor comes equipped with:

- Photogate sensor
- Mounting Bar

The Photogate sensor is most commonly used along with the Timing Wizard found in MiLAB™ software. Please refer to the documentation in those programs for more details.

An example of using the Photogate Sensor

Measure the Acceleration of a Freely Falling Body

Equipment:

- Photogate sensors

- Picket fence bar
1. Connect the Photogate sensor to your einstein™ device
 2. Make sure the Photogate sensor is selected
 3. Select Run
 4. Drop the Picket Fence through the arms of the Photogate (see Figure 1)
 5. Use the results to calculations from the results below calculate the gravity acceleration.

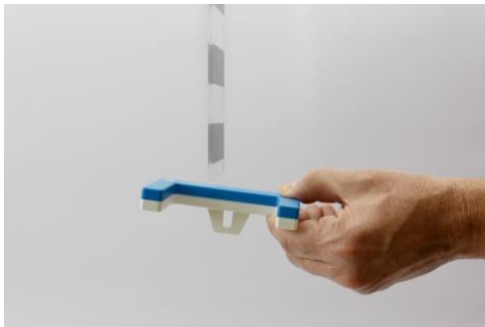
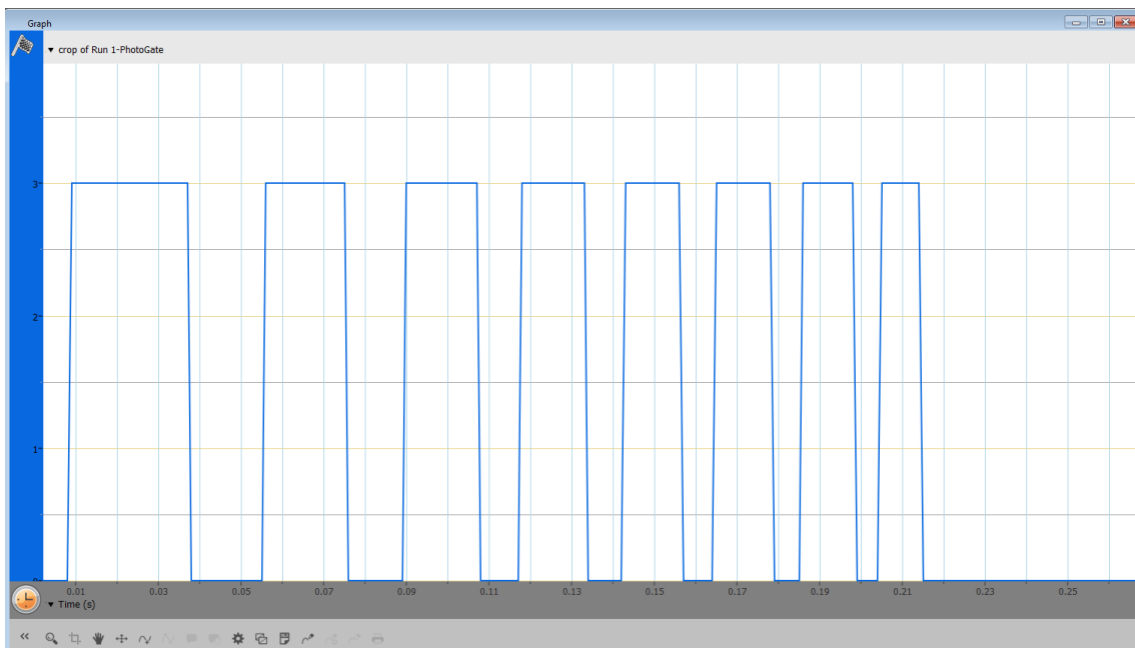


Figure 1. Dropping the picket fence



Troubleshooting

If the 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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