einstein™
imagine • explore • learn
May 2025

Infrared

Product Number: ENIR001

Overview

The Fourier einstein™ Infrared (IR) Sensor (ENIR001) is a sensor designed for measuring surface IR radiation, making it ideal for experiments in physics, chemistry, biology, and environmental science. It detects infrared emissions, with a range of 0-1,300 w/m^2 and a default sample rate of 25 samples/second. Common uses include comparing surface radiations of different materials or body parts, monitoring chemical reactions, tracking soil radiation, and studying plant physiology and animal behavior. The sensor connects to the einstein™ LabMateII or tablet 3 PRO via cable or Blue tooth and is compatible with MiLABEx software for Android, iOS, and desktop. It is automatically detected by the software and is fully calibrated at delivery, though manual calibration is possible for greater accuracy. Students can easily measure radiation by pointing the sensor 5–10 cm from a surface and recording the stabilized value.

Typical experiments

Physics	• Compare IR readings from different colored or textured surfaces. • Thermal conductivity, insulation, energy efficiency. Wrap containers in various materials and measure temperature
Chemistry	• Use an IR sensor to measure radioantion changes without touching chemicals during reactions. • Combustion, energy content of fuels: point an IR sensor at a flame or heated substance to measure its temperature. • Monitor surface cooling during evaporation using IR sensors.
Biology	• Use IR sensors to measure and compare surface radiation of different body parts. • Detect radiation differences in leaves during transpiration. • Use IR motion detectors to study nocturnal animal movement or lab animal activity patterns.
Environmental Science and Biology	• Compare surface radiation of concrete, grass, soil, and shaded areas using IR sensors. • Use an IR sensor to track soil temperature at various times and locations.

How it works

Sensor specification

|	
Range:	0-1300 w/m^2
Default Sample Rate:	25 samples per second

Note: sensor cables sold separately

Data logging and analysis

MiLABEx 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 and then click on LAB start an Experiment

www.einsteinworld.com

4. MiLABEx will automatically detect the sensor and show it in the Current Setup Summary window
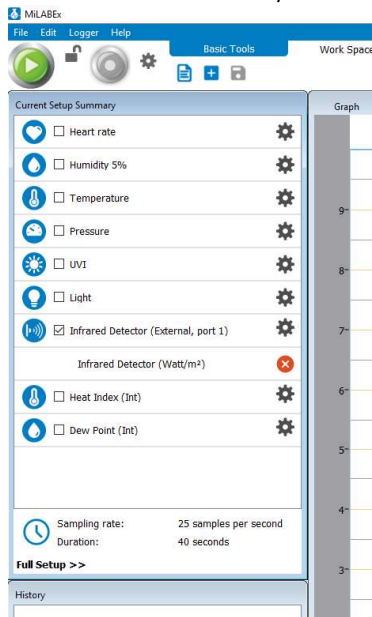
5. IF needed, click Full Setup, located at the bottom of the Current Setup Summary window to program the data logger's sample rate, number of samples, units of measurement, and other options
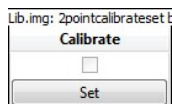6. You are ready to start an experiment.

Calibration

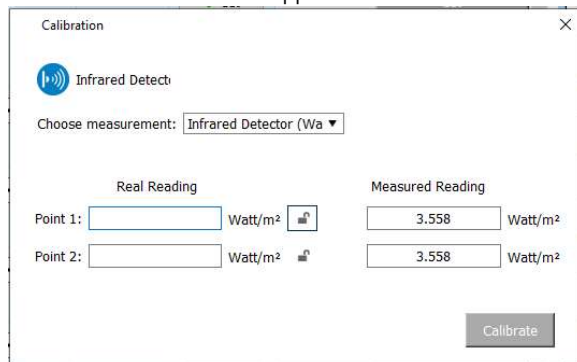The Infrared sensor is shipped fully calibrated.

For more accurate results the sensor can be manually calibrated.

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 w/m². Enter this known value in the Point 1, Real Reading field
4. Measure the light and wait for the readings to stabilize.
5. Click the lock icon

6. Measure a known w/m^2. Enter this known value in the Point 2, Real Reading field
7. Measure the light 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 Infrared sensor

Measuring Surface Rdiation with an IR Sensor

Goal: Measure and compare surface radiation of different body parts using an IR sensor.

You will need:

- Infrared (IR) sensor or infrared thermometer
- einstein™ data logger (e.g., LabMateII, tablet3 PRO with MiLABEx software)
- A partner (optional, for help)

Steps:

1. **Turn on the IR sensor** and connect it to the data logger.
2. **Go to the settings** and choose manual measurement
3. **Choose body parts** to measure (e.g., forehead, hand, arm, neck).
4. **Hold the sensor** about 5–10 cm away from the surface of the body part.
5. **Aim the sensor directly** and press record
6. **Repeat** for other body parts.
7. **Compare** the radiations and look for patterns.
8. **Compare** the results to surface bogy temperature of the art you measured, and look for patterns. What is your conclusion

   For example:

Item	Run 1-Infrared Detector(Watt/m^2)
Hand paw	491
Forehead	583
Bell	540
Foot	455

Troubleshooting

If the Light sensor isn't automatically recognized by MiLABEx, 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

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.

ALBERT EINSTEIN and EINSTEIN are either trademarks or registered trademarks of The Hebrew University of Jerusalem. Represented exclusively by CMG Official licensed merchandise.