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PAR Sensor
Photosynthetically Active Radiation

Product Number: ENPAR009-4

Overview

This high precision, quick response PAR sensor is designed for measurements of wave lengths in the range of visible spectrum.

The PAR sensor is an ideal sensor for both indoor and outdoor photosynthetic measurements and can be used in Biology, Ecology, and Aqua Culture experiments.

The PAR sensor can be connected to all einstein™ Tablets and einstein™ LabMate.

Typical experiments

Biology

- Plant physiology experiments
- Horticulture
- Environmental science studies
- Aqua culture
- Agriculture research

Physics

- Measuring the amount of radiant energy being transferred within the specified spectrum.
- Studying how energy from light contributes to heating materials, which ties into broader thermodynamic principles.
- Analyze how light is distributed and attenuated in different media, contributing to the understanding of photometric principles.
- Understanding how light is scattered and absorbed by different substances, which is a key topic in classical physics involving light-matter interaction.

How it works

The PAR sensor is a high precision Photoelectric cell. Inside this photoelectric cell there is a small plate made of elements called pin-diodes. When a reversed fixed voltage is applied to the photoelectric cell, any photon that hits the pin-diodes causes the photoelectric cell to release an electron. The result is that when light levels are higher, the current through the photoelectric cell is higher. The current from the cell then passes through a resistor. The voltage is measured on this resistor and adjusted to the range of 0 - 3 V which is sent to the Analog-Digital converter of the einstein™ device. The result is then displayed.

Sensor specification

Range:	0 – 2500 µmol/m2/sec
Accuracy:	±4 % over entire range
Resolution (12-bit):	0.1 µmol/m2/sec
Response Time:	‹1 second
Temperature Range:	-400C to 750C
Default Sample Rate:	10 samples per second
Spectral Response:	Visible light

Note: sensor cables 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

5. To Ensure the sensor is selected go to Sensors and check the checkbox is ticked.
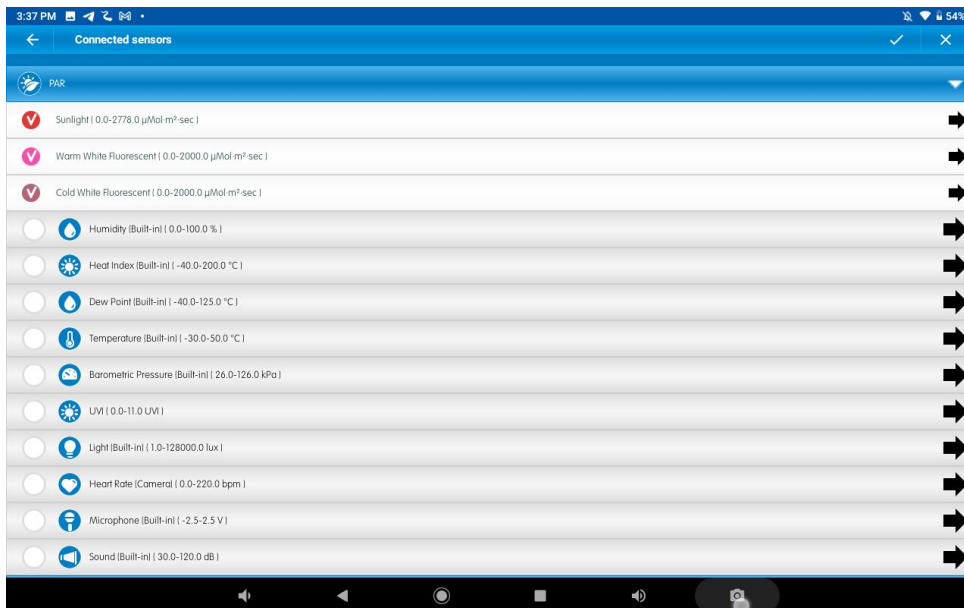
6. Touch V to confirm selection

7. 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.

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 on the main toolbar of the Launcher View to start logging.
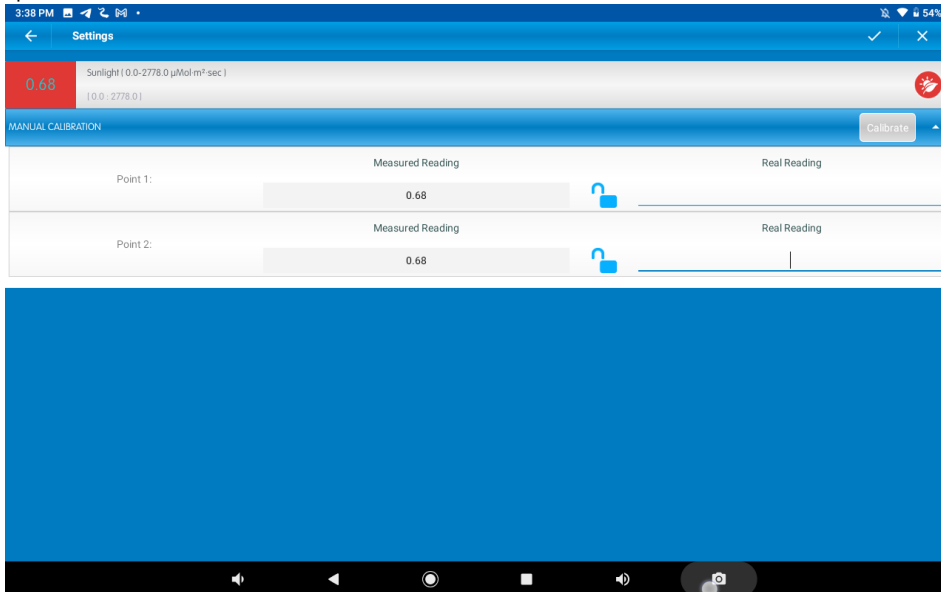
Calibration

The PAR sensor requires no calibration.

The Light sensor is shipped fully calibrated.

For more accurate results the sensor can be manually calibrated.

Android

1. Tap the sensors to go to sensors list
2. Tap on the arrow icon of the relevant type of measurement
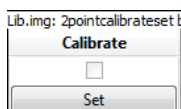3. Tap on Manual calibration

4. Measure a light of known value. Enter this known value in the Point 1, Real Reading field
5. Measure the light and wait for the readings to stabilize.
6. Tap the lock icon
7. Measure a light of a different known value. Enter this known value in the Point 2, Real Reading field
8. Measure the light and wait for the readings to stabilize.
9. Tap the lock icon
10. Tap Calibrate.
11. Tap V to save calibration
12. Tap V to save the sensors selection
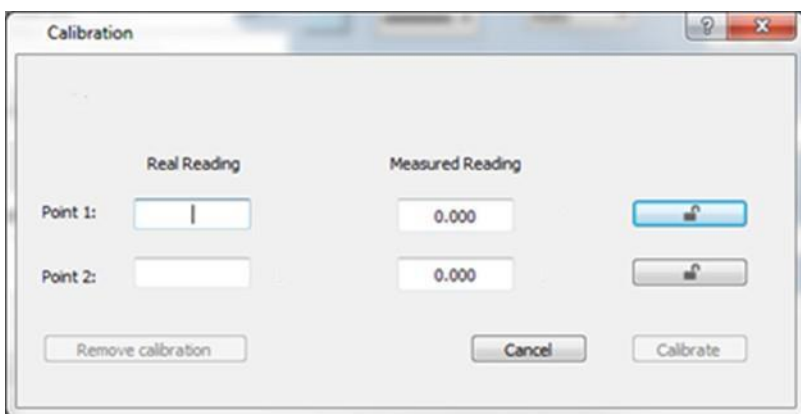13. You are ready to Start an Experiment

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

3. Measure a known value. Enter this known value in the Point 1, Real Reading field
4. Wait for the readings to stabilize.
5. Click the lock icon
6. Measure a different known value. 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
10. Minimize the full setup window
11. 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.

Troubleshooting

If the PAR sensor isn't automatically recognized by MiLABEx Desktop/ 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/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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