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Current Sensor

±2.5 A

Product Number: ENCRN005

Overview

The Current sensor is an ammeter, measuring current values between -2.5 A and 2.5 A. As a differential sensor it is capable of measuring both direct and alternating current and is ideal for use in a wide range of experiments in Electricity, Physics and Chemistry.

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

Typical experiments

Electricity

- EMF and Internal Resistance
- V-I Characteristics of a Wire, a Light Bulb and a Diode
- Resistance of a Wire – Ohm's Law
- Series and Parallel Circuits

- Magnetic Field of a Solenoid vs. Current
- AC Circuit - RCL Resonance

How it works

The sensor contains a 0.1 Ω resistor. According to Ohm's Law, the current can be determined by dividing the voltage flowing through a conductor divided by the resistance of the resistor — $I = \frac{V}{R}$.

Sensor specification

Range:	± 2.5 A
Input Current:	AC or DC
Accuracy:	±3 % over entire range
Resolution (12-bit):	1.25 mA
Default Sample Rate:	10 samples per second
Input Resistance:	0.1 Ω
Maximum Input Current:	5A

Note: sensor cables sold separately

Technical Notes

- Short the two leads of the Current sensor before connecting it to the data logger sensor inputs.
- For more accurate measurements connect the negative input (black) to the power source negative input (ground).

Calibration

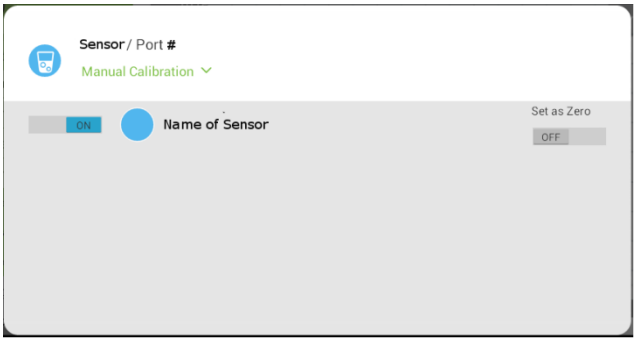
The Current sensor is shipped fully calibrated.

For more accurate results use the Set Zero function or two point calibration.

In MiLAB

Set Zero Calibration

Under Current Reading column flip the Set as Zero switch to set the current value as the zero or base value.



Two Point Calibration

1. Tap the Settings button next to the sensor's name
2. Tap Manual Calibration

3. Measure a current with a known value (e.g. 1 mA). Enter this known value in the Real Reading field
4. Measure the current and wait for the readings to stabilize.
5. Tap the lock button
6. Measure a current with a different known value (e.g. 2 mA). Enter this known value in the Real Reading field
7. Measure the current and wait for the readings to stabilize.
8. Tap the lock button
9. Tap 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.

MiLAB Desktop

Set Zero Calibration

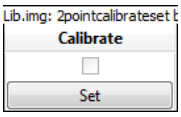
In the Current Reading column, click Set

to set the current value as the zero or base value. Reset

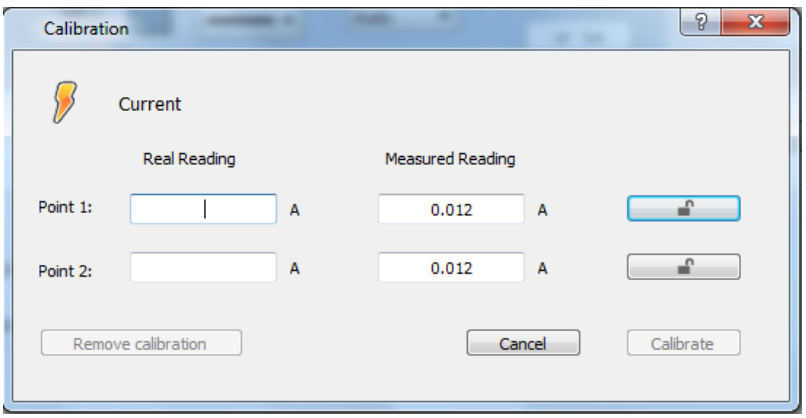
cancels this action

Two Point Calibration

1. Go to the Full Setup window and in the Calibrate column click Set



2. The Calibration window will appear



3. Measure a current with a known value (e.g. 1 mA). Enter this known value in the Real Reading field
4. Measure the current and wait for the readings to stabilize.

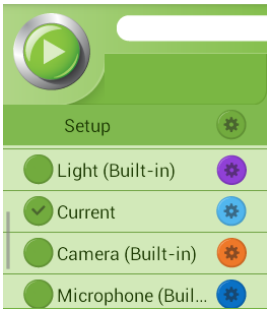
5. Click the lock icon
6. Measure a current with a different known value (e.g. 2 mA). Enter this known value in the Real Reading field
7. Measure the current and wait for the readings to stabilize.
8. Click the lock icon
9. Click Calibrate

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.

Data logging and analysis

MiLAB™

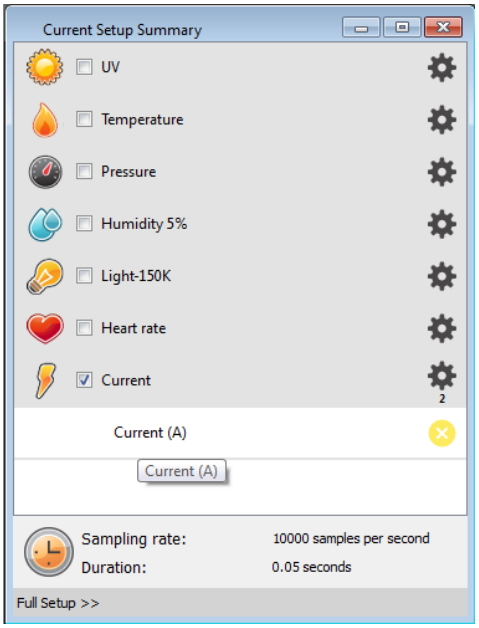
1. Take your einstein™ Tablet OR pair your einstein™LabMate with your Android or iOS tablet via Bluetooth
2. Insert the sensor cable into one of the sensor ports
3. Launch MiLAB
4. MiLAB will automatically detect the sensor and show it in the Launcher View



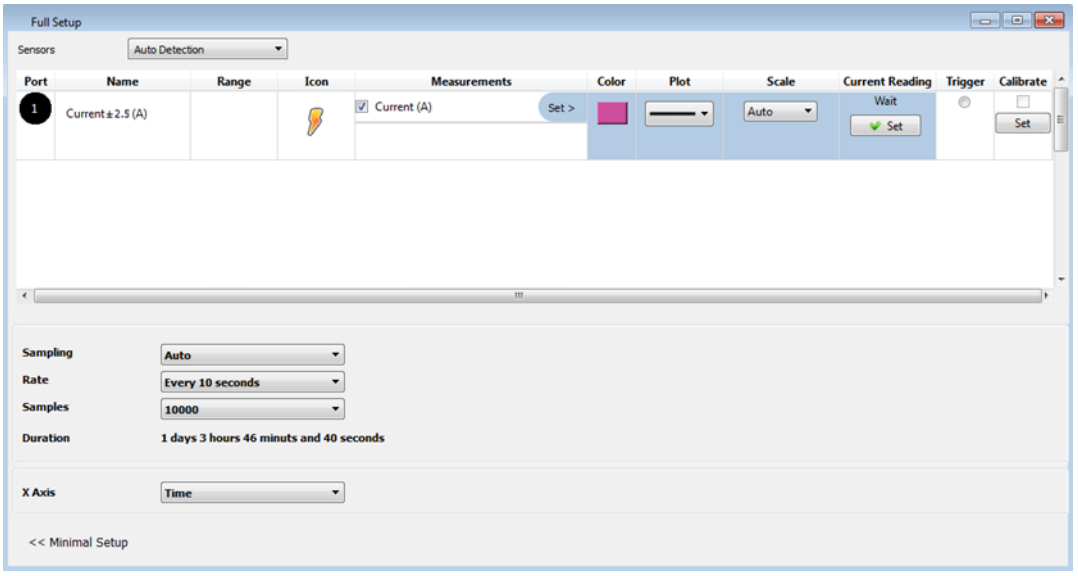
5. Check the icon next to the sensor ( ) to enable it for logging

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
4. MiLAB 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

Example of using the Current ±2.5A Sensor

Build a simple circuit with a high power ceramic resistor, 3.3 ohm , serially connected to the Current sensor and to a 8V power supply.
(You can use any other values within the sensor's range).

1. Click the Run button ( ) on the main toolbar of the Launcher View to start logging.
2. Gradually reduce the output voltage of the power supply and see how it affects the current measured.
3. When the measurement reaches 100mA , click the Stop button ( ).
4. See the expected results - Figure 1.

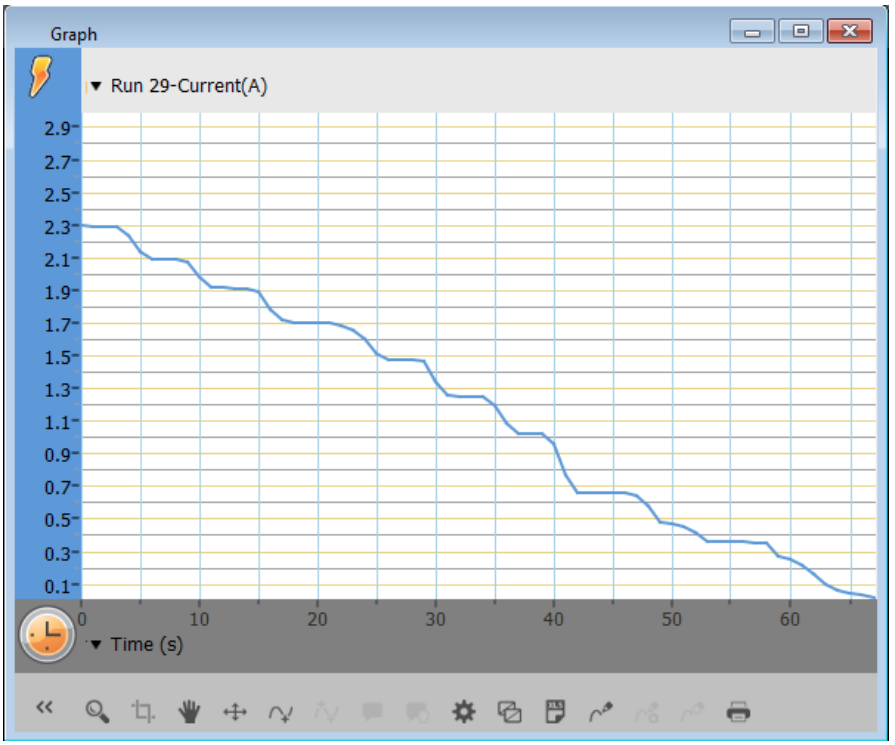


Figure 1. Sample graph from the above experiment

Troubleshooting

If the Current sensor isn't automatically recognized by MultiLab4/ 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
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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