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Voltage Sensor

-25V to 25V
Product Number: ENVLT001

Overview

The Voltage sensor measures voltage between -25 to 25 V. This differential sensor is capable of measuring both direct and alternating voltages and it is ideal for use in a wide range of Physics and Chemistry experiments.

The Voltage sensor has floating inputs, meaning you can connect any number of voltage sensors to a circuit without shorting them.

The sensor has two durable banana plugs for easy connection.

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

Typical experiments

Electricity and Magnetic Fields

- 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
- Charging and discharging a capacitor
- Investigating the transformer
- Specific heat

Sensor specification

Range:	± 25 V
Input Voltage:	AC or DC
Accuracy:	±3 % over entire range
Resolution (12-bit):	12.2 mV
Input Resistance:	2MΩ
Maximum Input Voltage:	60 V

Note: sensor cables sold separately

Technical Notes

- **Warning** – extreme caution should be taken when experimenting with electricity. These experiments should only be conducted in the presence of a teacher or supervisor
- **Warning** – Keep all liquids away from any electricity experiments
- **Warning** - This sensor is designed for up to 25 volts, never use for higher voltages
- **Warning** - This sensor is not designed to measure line voltage. Never connect this sensor to a wall socket
- Short the two leads of the Voltage sensor before connecting it to the data logger sensor inputs
- For more accurate measurements connect the sensor's negative input (black) to the power source's negative input (ground).

Calibration

The Voltage sensor is shipped fully calibrated. For better accuracy the sensor can also be calibrated in one of two ways – Set Zero and Two Point Calibration

Calibration – MiLAB™

Set Zero Calibration

1. Tap the Settings button next to the sensor's name
2. 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
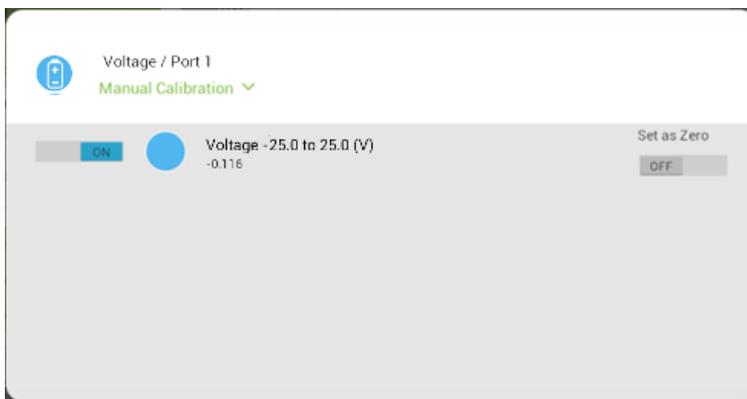
2. Tap Manual Calibration
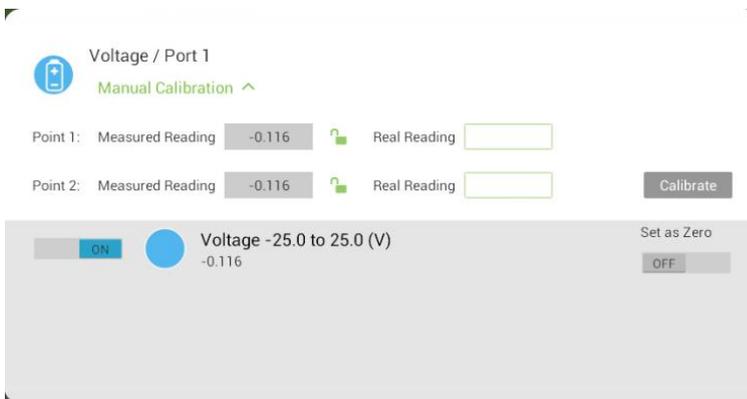
3. Prepare something of a known voltage. Enter this known value in the Point 1, Real Reading field
4. Measure the voltage and wait for the readings to stabilize.
5. Tap the lock icon
6. Prepare something of a known voltage. Enter this known voltage in the Point 2, Real Reading field
7. Measure the voltage and wait for the readings to stabilize.
8. Tap the lock icon
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.

Calibration – MiLAB™ Desktop

Set Zero Calibration

In the Current Reading column, click Set [✔ Set] to set the current value as the zero or base value. Reset [✖ Reset] cancels this action

Two Point Calibration

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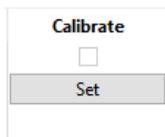
Calibrate
☐
Set

2. The Calibration window will appear
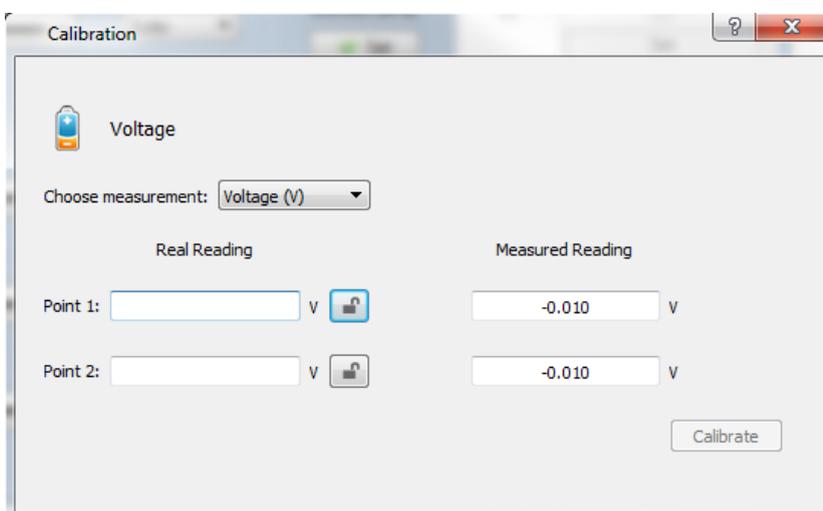
10. Prepare something of a known voltage. Enter this known value in the Point 1, Real Reading field
11. Measure the voltage and wait for the readings to stabilize.
12. Tap the lock icon 🔒
13. Prepare something of a known voltage. Enter this known voltage in the Point 2, Real Reading field
14. Measure the voltage and wait for the readings to stabilize.
15. Tap the lock icon 🔒
16. 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.

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
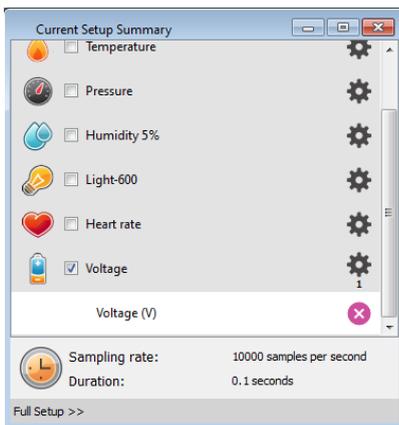
5. Click Full Setup, located at the bottom of the Current Setup Summary window to program the data logger's sample rate, number of samples, units of measurement, and other options
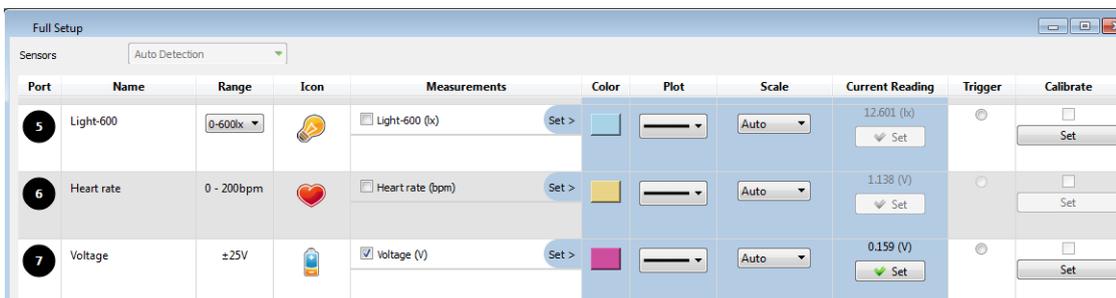
6. Click the Run button ( ) to start logging

An example of using the Voltage Sensor

1. Connect the Voltage sensor to a power supply –set to zero.

2. Click the Run button ( ) start logging.

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3. Gradually increase the voltage output of the power supply

4. When the measurement reaches 25V click the Stop button (   ).

5. See expected result - figure 1.
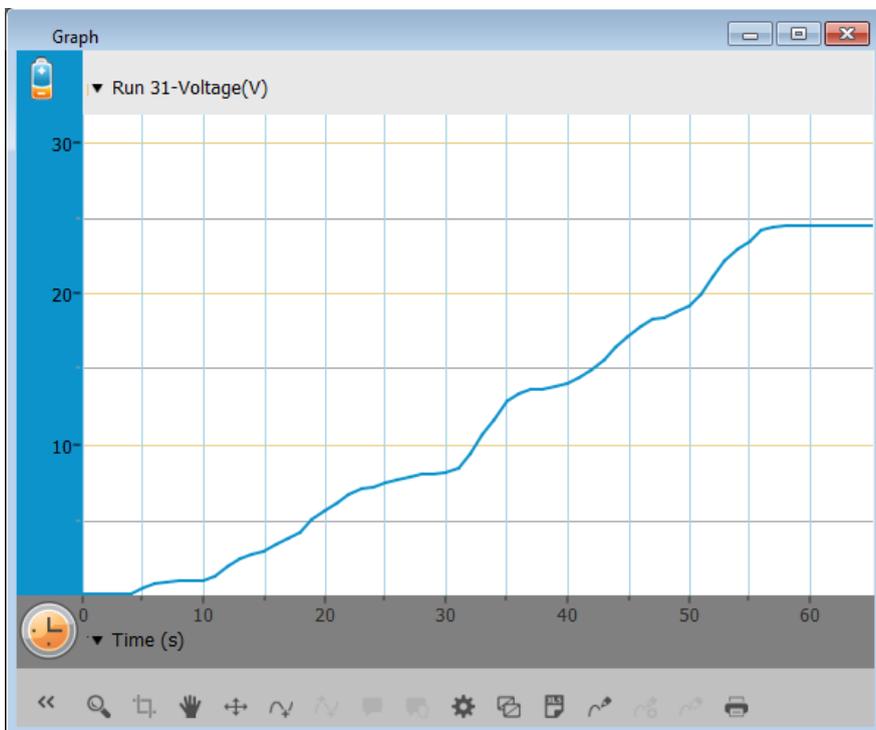

Figure 1

Troubleshooting

If the Voltage 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
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.