Voltage (±2.5 V) DT002

(for EcoLog XL)

The Voltage (±2.5 V) sensor is a regular voltage sensor, measuring between -2.5 and 2.5 V. The Voltage sensor is a differential sensor, capable of measuring both direct and alternate voltage current and it is ideal for use in a wide range of experiments in Physics and Chemistry.

The sensor is housed in the Fourier Systems plastic sensor case, and has two durable banana plugs for easy connection.

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

Typical Experiments

- EMF and internal resistance
- V-I characteristics of a wire, a light bulb and a diode
- Connections of batteries
- Resistance of a wire – Ohm's Law
- Series and parallel circuits
- Charging and discharging a capacitor
- Capacitor in alternating current
- Investigating the transformer
- Specific heat

How it Works

The Voltage (±2.5 V) sensor should be wired in parallel with the circuit.

The measured voltage passes an amplifier unit and is adjusted to the range of 0-5 V, which is the range accepted by the Analog-Digital converter. The proper result is then recorded and stored in the data logger's memory.

The Voltage sensor is equipped with buffer units, protecting the sensor from voltages of up to ±60 V.

Sensor Specification

Range:	± 2.5 V
Input Voltage:	AC or DC
Accuracy:	±3 % over entire range
Resolution:	5 mV
Sensor Inputs:	Differential and floating
Input Resistance:	>1 MΩ
Maximum Input Voltage:	60 V

Technical Notes

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

Calibration

The Voltage sensor requires no calibration.

Using the Voltage (±2.5 V) Sensor with Ecolog XL and EcoLab Software

1. Connect EcoLog XL to the computer.
2. Connect the Voltage sensor to the Ecolog XL's sensor input (starting from I/O-1). The sensor is automatically recognized by the EcoLab software.
3. If EcoLog XL is running in one of its stand-alone modes, press the **Stop** button on the EcoLog XL front panel.
4. Launch EcoLab.
5. In the **Setup** window deactivate the internal sensors by clicking the button next to the sensors' icon and program the EcoLog XL's sample rate and the recording time.

To begin online recording

1. Click **Run**  on the main toolbar.
2. EcoLab automatically opens a graph window displaying the data in real-time, plotting it on the graph as it is recorded.
3. You can stop recording at any time by clicking **Stop**  on the toolbar.

To conduct remote recording

For remote logging it is necessary to send the setting to Ecolog XL before disconnecting from the computer.

1. In the **Setup** window deactivate the internal sensors by clicking the button next to the sensors' icon and program the EcoLog XL's sample rate and the recording time.
2. Click **Send Setup**  on the main tool bar, wait until you will see the following message on the EcoLog XL screen:

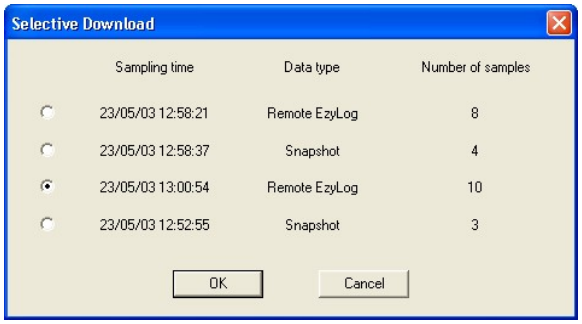
Remote logging Waiting for Go

3. Disconnect the EcoLog XL from the computer, place the EcoLog XL at the desired recording location and press the **Go**  button on the EcoLog XL front panel.

To download data that was recorded offline

EcoLog XL always stores the last four experiments. To download data that was recorded offline, or while EcoLog XL was not connected to the computer:

1. Connect the EcoLog XL to the computer and if EcoLog XL is collecting data, click **Stop**  to end collecting and to return to the main menu.
2. Launch EcoLab.
3. Click **Download**  on the main toolbar to open the **Selective Download** dialog:



The dialog contains details of the stored experiments: the starting time and date, the logging mode and the number of samples taken.

4. Click an option to select the experiment you wish to download, and then click **OK**. This will start the Post-experiment Data Transfer communication mode. Once the transfer is complete, the data will be displayed automatically in the graph window and in the table window.

An Example of using the Voltage (±2.5 V) Sensor

EMF, Voltage and Internal Resistance

The difference between ε, the electromotive force (E.M.F) of that source and V the potential difference between the terminals of a source, when a circuit is connected to the source, is caused by the internal resistance *r* of the source. The value of *V* will be: $V = \varepsilon - Ir$.

The graph of Voltage vs. Current is a linear graph and its slope is the internal resistance r of the source. See screenshot below:

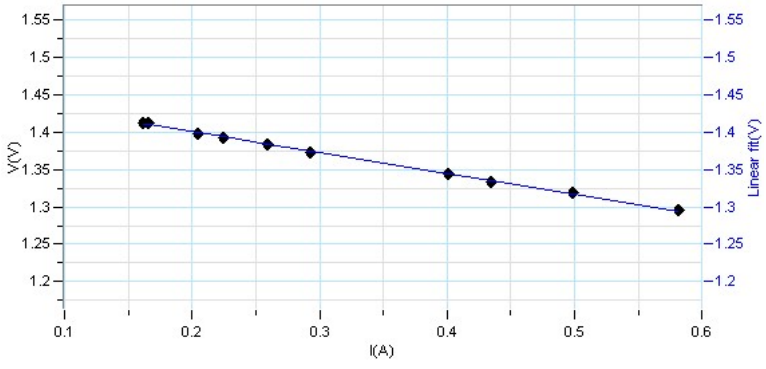


Figure 1: Voltage vs. Current

Technical Support

Please contact Fourier technical support as follows:

Web: http://www.fourier-sys.com/support_support.html
Email: support@fourier-sys.com

Consult the FAQs before contacting technical support:
http://www.fourier-sys.com/support_faq.html

Copyright and Warranty

All standard Fourier Systems sensors carry a one-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.