

Charge Sensor

DT261A



The Charge sensor can be connected to the Nova5000, MultiLogPRO or TriLink data loggers.

The sensor is a dual range, all purpose Charge sensor that can be used in many electrostatic experiments. It will replace the traditional electroscope in most cases, isn't affected by humidity and has the advantages of performing quantitative measurements and indication of charge polarity.

The Charge sensor is housed inside the Fourier Systems plastic sensor case and is equipped with zero button and range switch.

Typical Experiments

- Measuring the charge produced by friction
- Measuring the charge by induction
- Investigating conductive and isolating materials
- Quantifying the charge on a capacitor plate
- Investigating how the wave pattern changes when the amplitude and the frequency are changed
- Exploring the relationship between the charge and the voltage drop across a parallel plate capacitor

How it Works

The Charge sensor is a voltage amplifier with a very high input resistance ($10^{12} \Omega$). A capacitor is connected to the amplifier input. The applied charge charges the input capacitor, resulting in a voltage drop across it. The voltage is amplified and adjusted



to the range of 0-5 Volts, 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 sensor is equipped with buffer units, protecting the sensor from voltages of up to ± 60 Volts.

Sensor Specifications

Range:	$\pm 0.25 \mu\text{C}$ $\pm 0.025 \mu\text{C}$
Resolution (12-bit):	0.12 nC for $\pm 0.25 \mu\text{C}$ 12.2 pC for $\pm 0.025 \mu\text{C}$
Default Sample Rate:	10 samples per second
Input Capacitance:	0.1 μF
Input Resistance:	$10^{12} \Omega$
Input Over Voltage Protection:	$\pm 60 \text{ VDC}$
Features:	Zero button range switch

Equipment List DT261A

Charge sensor with BNC coaxial cable	DT261A
Charge sensor only	DT261
BNC coaxial cable only	DT229

Technical Notes

- Due to the sensor's high sensitivity, it is recommended to use a shielded BNC/alligator cable connecting the sensor to the charge under test.
- Use the Zero button before every measurement when discharging the input capacitor.

Calibration

The Charge sensor requires no calibration.

Using the Charge Sensor with Fourier Data Loggers and MultiLab Software

1. Launch the MultiLab software (from either your PC or Nova5000).
2. Connect the Charge sensor to the data logger's sensor input (starting from I/O-1). The sensor is automatically recognized by the MultiLab software.
3. Click **Setup** on the main toolbar and program the data logger's sample rate and number of samples. Click **Run** on the main toolbar to start the measurement.

An Example of using the Charge Sensor

Charge and voltage drop across a parallel plate capacitor

When a parallel plate capacitor is connected to a power supply, the surfaces of the plates are charged with equal and opposite charges. The charge on each plate is proportional to the applied voltage. The graph in Figure 1 below shows this relationship:

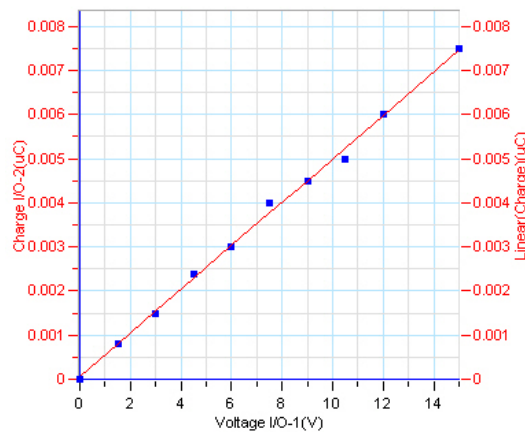


Figure 1: Relationship between charge and voltage drop across a parallel plate capacitor

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.