

Magnetic Field Sensor

DT156



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

The Magnetic Field sensor has two ranges and it is ideal for a large variety of experiments in electricity and magnetism. The low sensitivity range can be used to explore the nature and strengths of magnetic fields of solenoids, electrical devices and permanent magnets and high sensitivity range to explore the Earth's magnetic field. The sensor is housed in the Fourier Systems sensor case and is equipped with an offset calibration screw.

Typical Experiments

- Measuring the Earth's magnetic field
- Investigating the magnetic field near a permanent magnet
- Investigating the magnetic field near a current carrying wire
- Investigating the magnetic field inside a solenoid
- Magnetic field of Helmholtz coils
- Measuring the induction current and electromotive force

How it Works

The sensor uses a Hall Effect transducer, which produces a voltage, which is proportional to the magnetic field. The sensor measures the axial component of the magnetic field (parallel to the sensor tube).

The line mark at the front of the sensor indicates the exact location of the hall element. The Magnetic Field sensor measures positive values when the magnetic field points towards the sensor (see figure below).

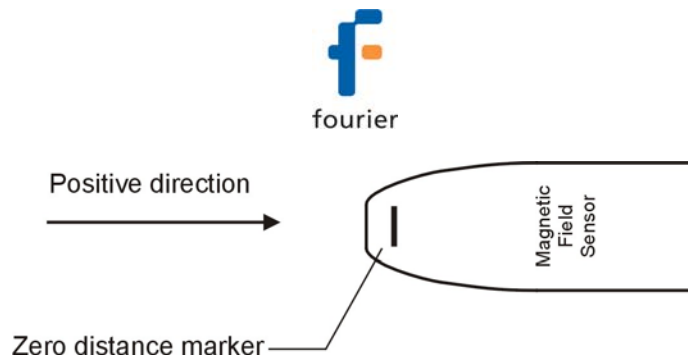


Figure 1: Magnetic Field sensor

Sensor Specification

Range:	± 10 mT ± 0.2 mT
Accuracy:	± 6 % over entire range
Resolution (12-bit):	For: 0 – 10 mT: 5 μ T For: 0 – 0.2 mT: 0.1 μ T
Default Sample Rate:	10 samples per second
Feature:	Equipped with an offset calibration screw

Calibration

The DT156 ships fully calibrated. For further calibration an offset calibration screw is located at the top of the sensor tube. Place the sensor in a known magnetic field and start recording. Insert a flat screwdriver to the calibration hole and slowly turn the calibration screw until the reference value is reached.

Selecting the Range

Flick the sensitivity switch on the top of the sensor tube to the desired range: High (± 0.2 mT) or Low (± 10 mT).

Using the Magnetic Field Sensor with the Nova5000, and MultiLab Software


1. Launch the MultiLab CE software.
2. Connect the Magnetic Field 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.

Using the Magnetic Field Sensor with the MultiLogPRO or TriLink and MultiLab Software


1. Launch the MultiLab software.
2. Connect the Magnetic Field 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.

Selecting units

MultiLab displays the data in mT. To change the display to gauss unit:

1. Click **Setup** on the main toolbar.
2. Click **Properties**  next to the Magnetic Field sensor input.
3. Select the checkbox next to the desired magnetic field unit.
4. Click **OK**.

Setting the Current Reading of the Magnetic Field Sensor to Zero

1. Launch the MultiLab software (from either your PC or Nova5000).
2. Connect the Magnetic Field sensor to the data logger's first sensor input I/O-1.
3. The Magnetic Field sensor is automatically recognized by the MultiLab software.
4. Click **Setup** on the main toolbar.
5. Click **Properties**  next to the Magnetic Field sensor input.
6. Click the **Set Zero** tab.
7. Check the box next to **Set the current reading to zero**.
8. Click **OK**.
9. 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 Magnetic Field Sensor

Magnetic Field of Helmholtz Coils

In this experiment we map the magnetic field along the axis of Helmholtz coils, using the Magnetic Field sensor and the Distance sensor:

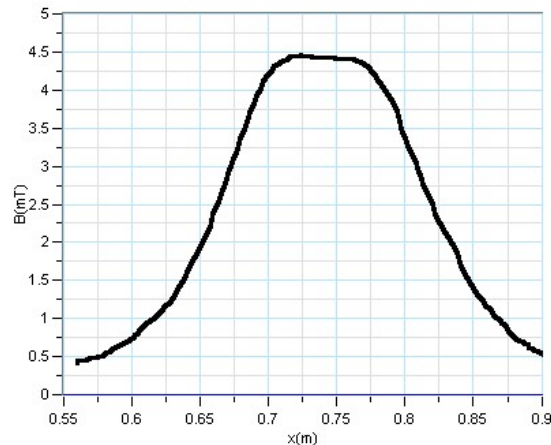


Figure 2: Magnetic field produced by a pair of Helmholtz coils

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.