

Fluxgate magnetometers and their applications



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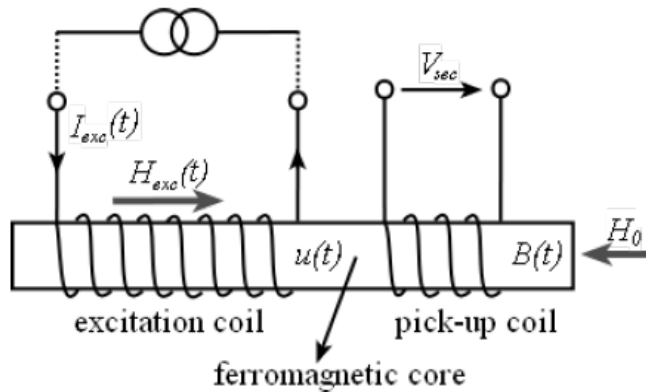
Bartington®
Instruments

Company Profile

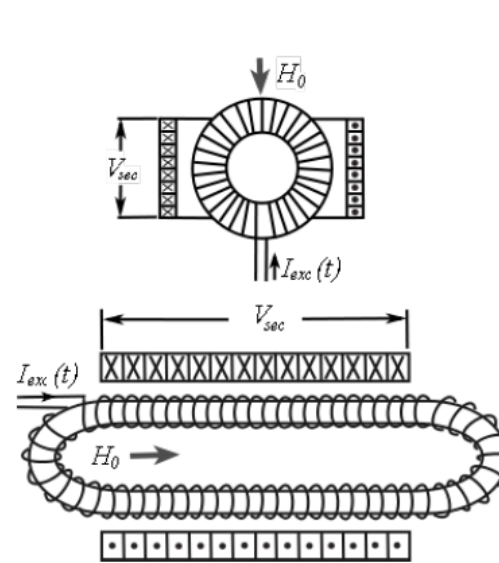
- Designs and manufactures fluxgate magnetometers, Helmholtz Coil systems, and magnetic susceptibility instrumentation.
- £4.4 million turnover (year ending 30.09.14).
- Worldwide network of agents and distributors, with customers in over 90 countries.
- Incorporated in 1985. Located in Witney, Oxfordshire, England, with circa 60 employees.



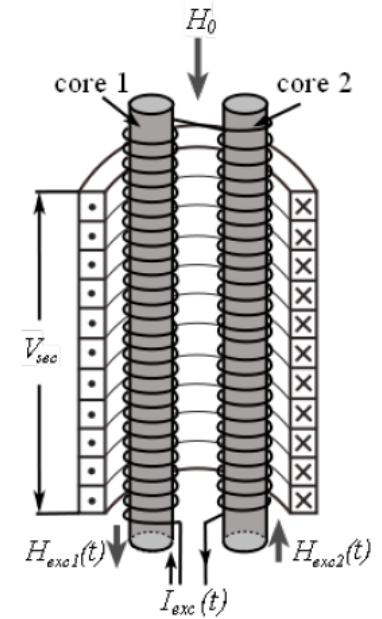
fluxgate principals and configurations



The basic FGM sensor configuration



Configuration of double-rod core, ring core and race-track core fluxgate sensors



Bartington's Double-rod Fluxgate Specifications

Functional:

- 3 axis Sensor
- Range of measurements: $\pm 2\text{mT}$, ($\pm 100\text{uT}$)
- Noise specification: $< 5\text{pT}_{\text{rms}} / \sqrt{\text{Hz}}$ at 1Hz ($< 10\text{pT}_{\text{rms}}$)
- Frequency range: DC to 15KHz, (DC to 3KHz)
- Linearity: 0.0015%
- Drift: $< 0.4\text{nT}$ in 10 hours
- Offset: $< 5\text{nT}$ ($< 20\text{nT}$)

Electrical:

- Power: $< 15\text{mW}$ (1W)

Environmental:

- Temperature range: -269°C to 250°C (-40°C to 70°C)
- Temperature dependence: $< 1\text{nT}/^{\circ}\text{C}$ and $< 0.0.1\%/^{\circ}\text{C}$
- Pressure: Vacuum to 500 bars
- Shock: 1.3ms 150G peak shock

Applications 1: Magnetic Field Environment

- Compassing
(ROV, rockets, calibration of, directional drilling)
- Attitude and position sensing
(Satellite, ROV, magnetic field mapping)
- Earth Studies
(Magnetic field observatories, solar weather monitoring, earthquake prediction)
- Other magnetic field observation
(H&S for mobile phone systems, trains, cars, MRI; particles accelerators)
- Site survey and Magnetic field data correction
(MRI, electron microscopes, magnetic field calibration systems, compass pads)
- Magnetic field cancellation, active shielding
(Magnetometers calibration, science experiments)

Applications 2: Magnetic Signature of Metal Objects

- Magnetic Anomaly Detection
(Planes/submarine, fixed barriers/ROV and divers)
- Security perimeters and door entry systems
(Border control, prisons, MRI)
- Degaussing and cancellation systems
(Fixed installations, on-board systems)
- Signature range systems
(Land ranges, sea ranges, satellites)
- Quality control of non-magnetic parts
(MRI, demining, satellites, magnetometers/compasses)
- Non Destructive Testing
(magnetic signature faults)
- Buried Metal objects
(UXO detection)

Applications 3: Magnetic Signature of other Materials

Signature of soils

- Near-surface geophysics
(Archaeology, forensics, mineral exploration)
- Time Domain Electromagnetics (TDEM)
(Conductivity measurements, mineral exploration)
- Magnetotellurics (MT)
(Deep resistivity measurements, mineral exploration, earthquake)

Other Signatures

- Magnetic nanoparticles
(Manufacturing)
- Human body
(Muscle signature, Magneto encephalography)
- Large Electrical Currents
(Pipe & Cable Location)

Thank you

some USB sticks with application notes and case studies are available

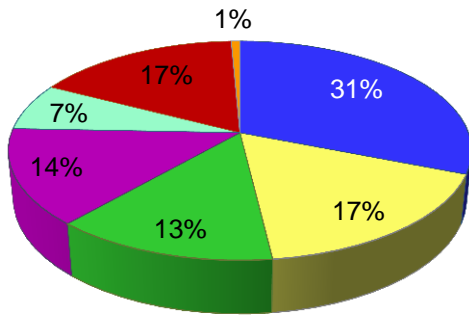
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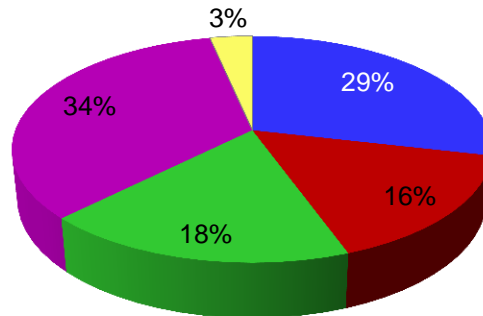
Sales 2013-2014

Sales by Market Sector



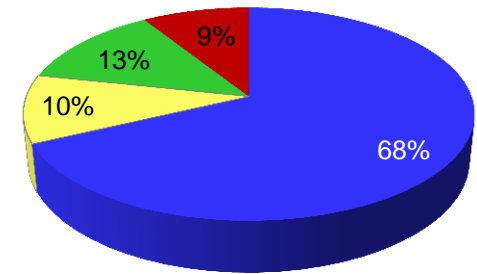
- Defence and Aerospace
- Geosciences
- Near Surface Geophysics
- Physics and Medical Sciences
- Oil, Gas and Mineral Exploration
- Industry
- Other

Sales by Region



- UK
- USA and Canada
- Europe
- Far East and Asia
- Rest of World

Sales by Product



- Fluxgate Magnetometers
- Fluxgate Gradiometers
- Magnetic Susceptibility Instruments
- Data Acquisition Systems