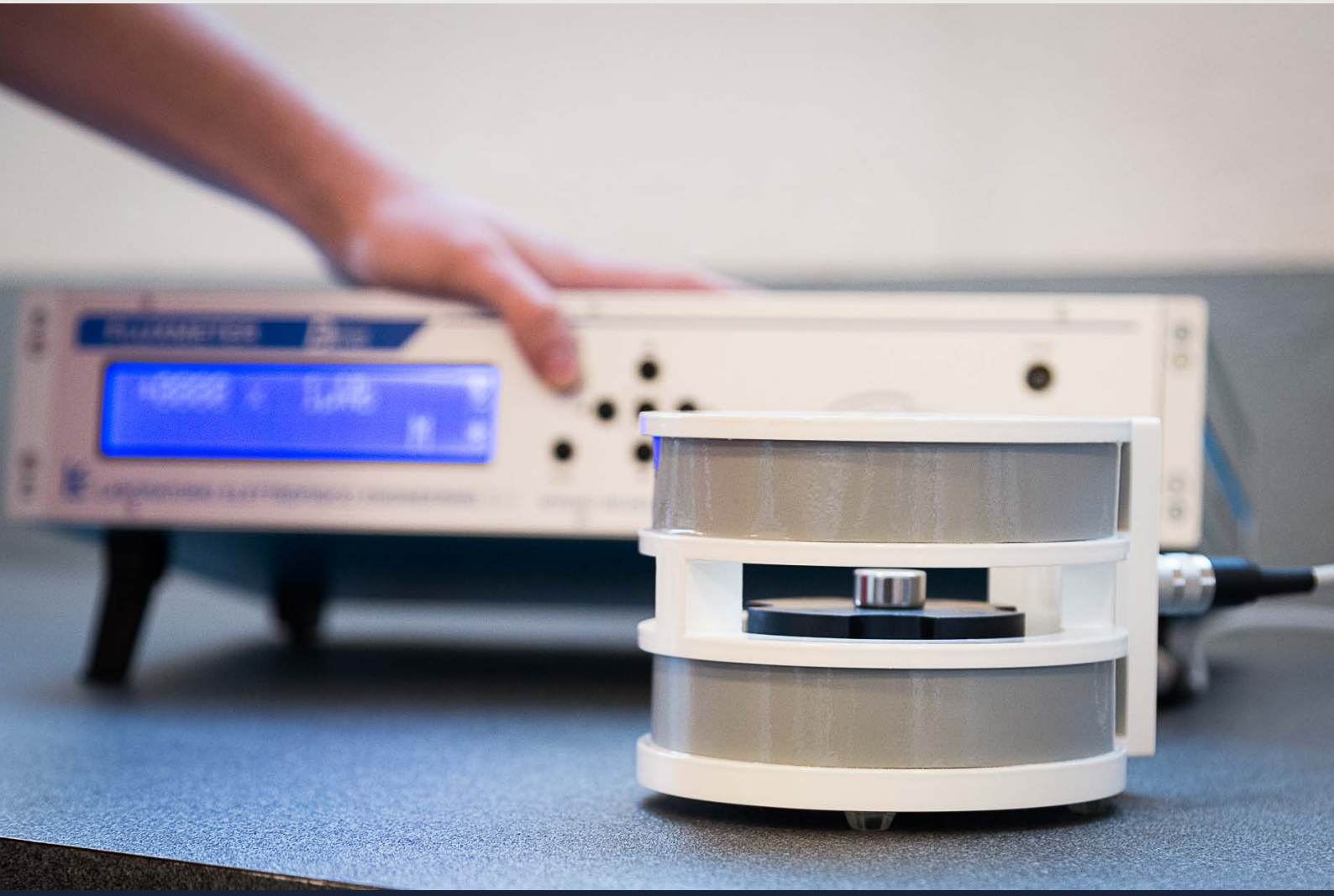
Laboratorio Elettrofisico
LE GROUP



HARD MAGNETIC MATERIALS

SINGLE AXIS

HELMHOLTZ COIL

The simple, economical solution that never goes out of style. Integrating fluxmeters are often used to control premanent magnet devices by the use of sense coils.

SINGLE AXIS HELMHOLTZ COIL

DESCRIPTION

The coils are an easy addition to any fluxmeter for a fast, accurate and low cost measuring techniche to control the quality of permanent magnets. Our design consists of a pair of identical wound coaxial coils, connected in series at a fixed distance equal to their radius. This configuration permits the sample to be placed in a large uniformity central volume.

KEY BENEFITS

- Easy to use
- Low cost
- Precise and accurate
- Meets international standards (IEC 60404-14)
- Non-destructive method of testing
- Feedback control for calibration and magnetization system

MEAURING PRINCIPLE

When connected to a fluxmeter, the Helmholtz coil provides an output flux Φ proportional to the magnetic moment of the sample: Φ=KH• M, where KH is the coil's constant (each coil is given with the proper certified constant).
This measurement procedure is described in the International Standard IEC 60404-14.
The magnetic moment is an essential magnetic property. For a permanent magnet sample, the magnetic moment M is the product of its magnetic polarisation Jd
(in the working point) and its volume V; this gives directly the Helmholtz coil's formula:

$$Jd = \frac{KH \bullet \varphi}{V}$$

For example: for ferrites and rare earth magnets, having essentially a linear J vs. H relationship in the second quadrant, the Jd is very close to the magnetic remanence Br.

HOW IT WORKS

When connected to a fluxmeter, the Helmholtz coil provides an output flux Φ proportional to the magnetic moment M of the sample: M=KH is the coil's constant (each coil is provided with is own certified costant). This measurement procedure is described in the International Standard IEC 60404-14.

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HOW TO MEASURE

CHOOSING THE RIGHT HELMHOLTZ COIL SIZE

The large volume with field uniformity in the center of the Helmholtz coils is approximately an ellipsoid having a major axis of 0.93 R and a minor axis of 0.62 R. The magnet to be measured should fit within this volume to have the best reading accuracy (uniformity within 1%).

The resulting Helmholtz coil measurement is an intrinsic quantity (the magnetic moment) of the sample than can used as the reference criteria for cross-comparision (between suppliers, customers, etc) and quality control (QC).

TECHNICAL SPECIFICATIONS

MODELS	DIAMETER	K_H (TYPICAL)	MEASUREMENT VOLUME
HM/R15	32 mm (1.18″)	$4.5 \cdot 10^{-6}$ m	12 mm (0.47″) - H 9 mm (0.35″)
HM/R32	64 mm (2.52″)	$5.0 \cdot 10^{-5}$ m	29 mm (1.14″) - H 19 mm (0.75″)
HM/R58	116 mm (4.57″)	$4.2 \cdot 10^{-4}$ m	53 mm (2.086″) - H 34 mm (1.338″)
HM/R100	200 mm (7.87″)	$2.8 \cdot 10^{-3}$ m	90 mm (3.543″) - H 60 mm (2.362″)
HM/R150	300 mm (11.81″)	$7.3 \cdot 10^{-3}$ m	135 mm (5.314″) - H 90 mm (3.543″)
HM/R250	500 mm (19.69″)	$8.8 \cdot 10^{-3}$ m	225 mm (8.86″) - H 150 mm (5.91″)

*Size 32/58/100 always in stock.
Customized models are also available upon request.

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