

SOFT MAGNETIC MATERIALS

AMH SERIES

The AMH Permeameters are automatic measuring systems to characterize rings and strips in DC and AC conditions. Laboratorio Elettrofisico manufactures a complete line for soft magnetic materials for DC up to 1 MHz.

AMH SERIES SOFT MAGNETIC MATERIALS

DESCRIPTION

Characterize rings and strips at high solution in DC and AC

DC measurement provides analysis for the intrinsic and static properties. The AC measurement offers analysis for the behavior of the materials under dynamic conditions. Dynamic properties are affected by many factors depending on the particular application conditions.

Laboratorio Elettrofisico AC permeameter provides the designer with realistic characteristics of power losses, saturation field and induction performance relating to thickness of the material and the electrical resistivity.

KEY BENEFITS

- Remanence B_r , coercivity H_c , saturations values H_{sat} , B_{sat} , cycle area, relative permeability, losses, losses separation, etc
- **All DC/AC AMH meet the International Standards IEC 60404-2, IEC 60404-4, IEC 60404-6, IEC 60404-10 and Analogue ASTM standards**
- Automatic measurement of complete DC or AC hysteresis loop, normal magnetization curve, permeability curve
- The measuring cycle is fully automatic and is controlled by Laboratorio Elettrofisico exclusive software (Neon), resulting in complete characterization of the material under test

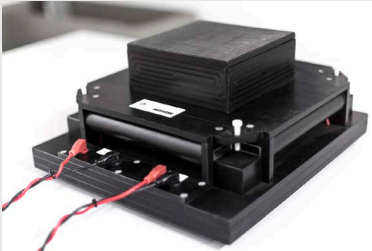
STANDARD CONFIGURATION

The main cabinet containing:

- Fluxmeter
- Arbitrary Function Generator
- Power amplifier
- Fast Acquisition Unit
- Reference sample for day-to-day control
- Dedicated software Neon
- PC and printer
- Connection tool for ring sample

AMH SERIES ACCESSORIES

EF-LF-0.4K EPSTEIN FRAME TEST SET- LOW FREQUENCIES



The EF-LF Epstein Frame Test Set is a 25 cm Epstein Frame designed for the magnetic characterization of electrical steel strip in accordance with IEC 60404-2, ASTM A343 and A348 test methods. When used in conjunction with one AMH-series, power losses and magnetizing characteristics at commercial frequencies can be measured by the means of a stack of rectangular strip specimens.

EF-MF-10K EPSTEIN FRAME TEST SET- MEDIUM FREQUENCIES



The EF-MF Epstein Frame is a 25 cm Epstein Frame designed for the magnetic characterization of electrical steel strip in the frequency range 400 Hz to 10 kHz, in accordance with IEC 60404-10 standard. Used in conjunction with one AMH-series, the magnetic characteristics and power losses can be measured by the means of a stack of rectangular strip specimens.

ST-100 SINGLE STRIP TEST FIXTURE



The Single Strip Test Fixture (ST-100) is used to characterize the magnetic properties of materials in accordance with ASTM A804 (standard test methods for alternating magnetic properties of materials at power frequencies using sheet type test specifications). The Single Strip Test is a relative test and should be correlated with Epstein Frame data if absolute measurements are required. If the Epstein Frame is used, the strips need to be cut the required size for the Epstein Frame.

RC-50-60-5 LF/HF Ring-coil

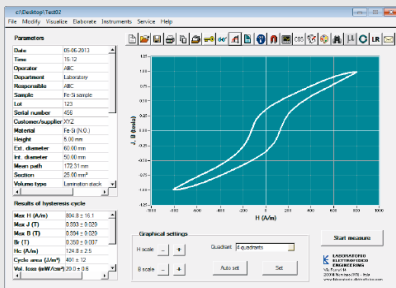


Ring coils (RC) are used to measure ring specimens without the necessity to wind turns on them. A ring coil consists basically of an open multipolar connector, in which its pins are connected to give NH excitation turns and NB measuring turns when closed. Ring coils are usually tailored on specific sizes, materials, frequencies, levels, since different measuring conditions require different NH and NB values. Most of the ring coils can be used in a wide range of measuring conditions.

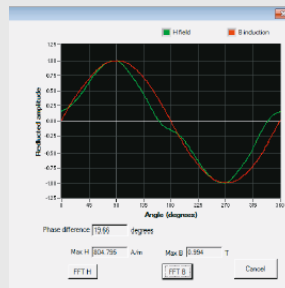
AMH SERIES SOFTWARE NEON 1/2

Our proprietary Neon software automatically manages measurements for the AMH, including comparison of different curves and statistical analysis. The software helps ensure the measuring process is accurate and absolute and helps prevent improper setting of the sample's parameters.

The Automatic Assistant notifies the operator and makes suggestion for the appropriate procedures or settings. The software also provides automatic creation for printing reports, database search feature and curve comparison.



Main panel with example of measurement (at 50 Hz)



Measured points



Comparison of curves with same Bv at different frequencies

KEY BENEFITS

TYPE OF MEASUREMENT

- Hysteresis loop, normal magnetization curve and relative permeability, in DC and AC conditions
- Sinusoidal B and sinusoidal H
- Optional: trapezoidal, triangular, PWM waveform
- Demagnetization of the sample
- Optional: anhysteretic

SETTING OF MEASURING PARAMETERS

- Manual or automatic settings of magnetizing and demagnetizing field, speed, resolutions and many other parameters
- Setting of acceptance limit for direct quality control

RESULTS

- Hsat, Bsat, Jsat, Br, Hc, loop area, realtive permeability, specific power losses, losses separation, Steinmetz coefficient and many advanced results
- Magnetic units in SI and CGS, measures in mm and inches, temperature in °C and °F

AMH SERIES SOFTWARE NEON 2/2

DATA ELABORATION

- Curve comparison
- Curve's interpolation, automatic or using a mathematical function from a list
- Automatic control of the Fluxmeter
- Merging of different curves

PRINTING A REPORT

- 3 pre-set reports with different sizes and contents
- Customized report option for changing the information and the language between English and Italian
- The report can be opened and saved with other word processor programs, like Microsoft Word™

DATA BASE AND FILE SEARCHING

- Data base of measuring files with fast search options, ordering, selection, etc.
- Compability with other spreadsheet programs, such as Microsoft Excel™

PROTECTION

- Password protection for restricting access according to selected parameters

SET OF MEASURES

- Ability to group together different measurements in the same graph. The software recognizes the group type and provides additional results such as losses separation and determination of Steinmetz coefficients
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AMH SERIES DIMENSIONS

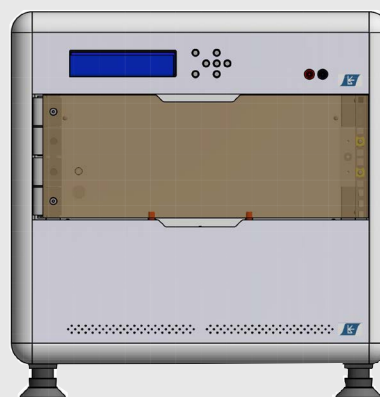
AMH-1K-S

Size

- L 543 x W 710 x H 556 mm
- L 21" x W 28" x H 21.8"

Weight

- 110 kg / 242 lb



AMH-200K-S

Size

- L 543 x W 710 x H 543 mm
- L 21" x W 28" x H 21"

Weight

- 80 kg / 176 lb



AMH SERIES DIMENSIONS

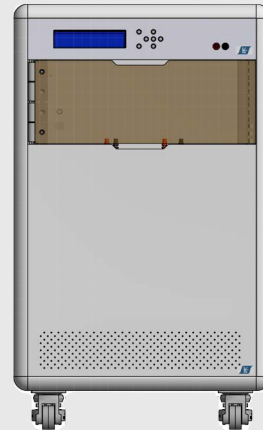
AMH-50K-S

Size

- L 543 x W 830 x H 889 mm
- L 21" x W 32.6" x H 35"

Weight

- 160 kg / 352 lb



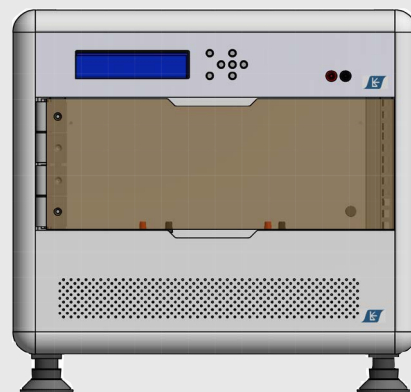
AMH-1M-S

Size

- L 543 x W 710 x H 514 mm
- L 21" x W 28" x H 20"

Weight

- 50 kg / 110 lb



ACCESSORIES SPECIFICATIONS

	EF - LF - 0.4K	EF - MF - 10K
FREQUENCY RANGE	DC - 400 Hz	400-10.000 Hz
MAGNETIC COMPENSATION	Yes	Yes
MAXIMUM CURRENT	10 A peak	3 A peak
MAXIMUM H FIELD	7500 A/m (95 Oe)	640 A/m (8 Oe)
EFFECTIVE LENGTH OF MAGNETIC PATH	0,94	0,94
TURNS ON PRIMARY WINDING N_H	700	200
TURNS ON SECONDARY WINDING N_B	700	200
RECOMMENDED DIMENSIONS (STRIPS)	30 x 280 mm (thickness from 0,05 to 0,5 mm)	30 x 280 mm (thickness from 0,05 to 0,5 mm)
DIMENSIONS OF MEASURING CHAMBER	32 x 10 mm	32 x 5 mm
OVERALL DIMENSIONS	360 x 326 x 166 mm	360 x 326 x 139 mm
WEIGHT	10 kg	7 kg

	ST - 100
FREQUENCY RANGE	DC - 400 Hz
MAX SAMPLE CROSS SECTION	45 x 0,8 mm
MINIMUM SAMPLE LENGHT	160 mm
MAXIMUM H FIELD	9000 A/m (110 Oe)
MAGNETIC COMPENSATION	Yes
OVERALL DIMENSIONS	186 x 106 x 162 mm
WEIGHT	5 kg

ACCESSORIES SPECIFICATIONS

	RC - 50 - 60 - 5 - LF	RC - 50 - 60 - 5 - HF
MODEL	DC	DC (recom. 1 kHz)
MIN FREQUENCY	1 kHz	20 kHz
MAX FREQUENCY	49 mm	49 mm
MIN I.D. OF SAMPLE	80 mm	80 mm
MAX O.D. OF SAMPLE	10 mm	10 mm
MAX CURRENT	13 A (peak)	13 A (peak)
N _H	28	20
N _B	9	6

TECHNICAL SPECIFICATIONS 1/2

GENERAL	AMH-1K-S	AMH-200K-S	AMH-50K-S	AMH-1M-S
FREQUENCY RANGE	DC ÷ 1.2 kHz	DC ÷ 200 kHz	DC ÷ 50 kHz	DC ÷ 1 MHz
MAX POWER	2200 VA peak	2200 VA peak	6600 VA peak	450 VA peak
MEASURABLE MATERIALS	Soft Magnetic Materials			
MEASURABLE QUANTITIES	Bsat, Jsat, Hsat, Br, Hc, cycle area, μ rel. specific losses P, losses separation			
MEASURBLE SHAPES	Ring, strip (with optional Epstein frame)			
SAMPLE SIZE RING	No physical limitation (size affects the max H field)			
SAMPLE SIZE STRIP (EPSTEIN)	30 mm x 300 (multiple of 4)			
TYPICAL ACCURACY RING	Bsat, Br: $\pm 1\%$; Hsat; Hc: ± 1 , μ : $\pm 2\%$; Losses: $\pm 3\%$			
TYPICAL ACCURACY STRIP	Bsat, Br: $\pm 1\%$; Hsat; Hc: ± 1 , μ : $\pm 2\%$; Losses: $\pm 3\%$			
TEST TIME	60 - 180 seconds (typical)			
OPERATING T RANGE	15 ÷ 40 °C			

ACQUISITION

UNIT

ADC RESOLUTION	16 bits	10 up to 16 bit	10 up to 16 bit	10 up to 16 bit
SAMPLING RATE	1.00 MS/s	2,5 GS/s	2,5 GS/s	2,5 GS/s
MAX VOLTAGE RANGE	± 11 V	± 20 V	± 20 V	± 20 V

FUNCTION

GENERATOR

FREQUENCY	1 μ Hz to 20 MHz (1 μ Hz resolution) max measuring frequency is limited by acquisition unit			
VOLTAGE AMPLITUDE	20 mVpp to 20 Vpp (4 digit resolution)			
AMPLITUDE RESOLUTION	16 bits			
THD	<0.04%			

TECHNICAL SPECIFICATIONS 2/2

FLUXMETER

AMH-1K-S

AMH-200K-S

AMH-50K-S

AMH-1M-S

MODEL

Digital Flux

RANGES

(1, 2, 5, 10, 20, 50, 100) x 2000 μ Wb

RESOLUTION

from 1 μ Wb (range 1) to 100 μ Wb (range 100)

ACCURACY

$\pm 0.5\%$

DRIFT

Less than 1 digit/minute

PC AND

SOFTWARE

OPERATING SYSTEM

Windows

SOFTWARE

Neon (English or Italian)

CONNECTION

LAN

MAIN CABINET

POWER SUPPLY

220 Vac 50/60 Hz, 16 A absorption

(380 Vac 3 phase + neutral + ground, 50/60 Hz, 32 A absorption AMH-50K-S only)






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