



KOERZIMAT 1.097

HCJ / J-H Measuring Systems



With the KOERZIMAT 1.097 HCJ FOERSTER offers a measuring system for the precise, geometry-independent and fast measurement of the coercive field strength H_{cJ} .

As the measurement is geometry-independent it enables especially for testing of specimen with complex shape.

Testing Method

- Open circuit acc. to IEC 60404-7

Measurements - HCJ

- Coercive field strength H_{cJ}
- Relative Remanence J_r

The extension module J-H measurement offers the possibility to determine the complete J-H Hysteresis on soft magnetic steel incl. the initial curve.

Measurements - J-H

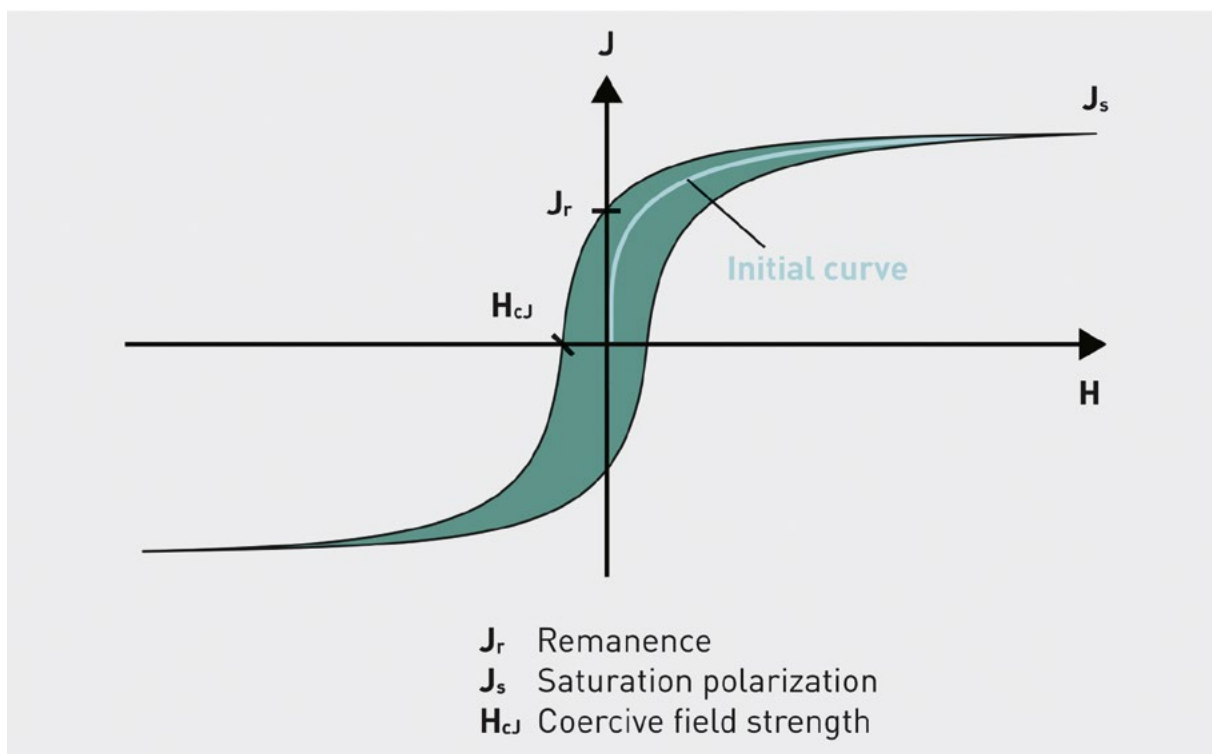
- Complete hysteresis J-H
- H_{max} and J_{max}
- Remanence J_r
- Coercive field strength H_{cJ}
- Relative Permeability μ_r (H)
- Hysteresis loss W

Applicatios

- Hard metal testing acc. to ASTM B887
- Determination of carbon content and grain size of hard metals
- Quality control of metal powders for the production of magnets or hard metals
- Quality control of the annealing and mechanical stress condition of soft magnetic components [SMC]
- Determination of the J-H hysteresis, relative permeability, hysteresis loss on round soft magnetic steel bar probes
- Control of electromechanical components in the electronics-, automotive, computer and clock industries; core loss for polarity reversal to be concluded from this
- Monitoring of the magnetic properties during the production of components and materials influenced by i.e. mechanical machining, final annealing, sealing in plastic, cutting, molding and forming.
- Monitoring the magnetic properties of thermal treated steel

Mode of Operation

The KOERZIMAT 1.097 HCJ measuring system can be applied for measurement methods employed with magnetically hard or soft material. The coercive field strength H_{cJ} is determined in the KOERZIMAT coil according to IEC 60404-7 in an open magnetization circuit. To do so, the specimen is magnetized to saturation in the H_{cJ} coil. The polarization of the specimen is measured by fluxgates (FOERSTER-probes) and then an opposing field is built up until the polarization is zero. The strength of the opposing field H at which the polarization in the specimen is zero is the coercive field strength H_{cJ} .



For magnetization into saturation polarization J_s , a magnetization field of up to 200 kA/m is available. Additionally a pulse magnetization of 450 kA/m for hard magnetic specimen with H_{cJ} more than 50 kA/m is available as an option.

The KOERZIMAT coils, with an inner diameter of 40 mm or 60 mm are equipped with a magnetic screen for suppression of interfering external static and dynamic magnetic fields. This allows the measurement of the magnetic polarization independent from the earth magnetic field and disturbances resulting from industrial environment.

By use of the appropriate J-sensor the J-H hysteresis incl. the initial curve for round bars with diameters from 8 to 14 mm can be determined very easily. There is no need to prepare grinded test bars.

Specimen dimensions and sensitivity of the measuring system

HCJ Measurement

Due to the given distance of the specimen to the measuring sensors, the sensitivity limits only depend on the portion respectively volume of the magnetizable material.

Almost geometry-independent the following maximum specimen dimensions are possible:

- | | |
|--------------------------|--|
| ■ Coil 40 (Ø max. 40 mm) | L ≤ 130 mm (measuring position ±20 mm) |
| | L ≤ 90 mm (measuring position ±40 mm) |
| ■ Coil 60 (Ø max. 60 mm) | L ≤ 80 mm (measuring position ±20 mm) |
| | L ≤ 40 mm (measuring position ±40 mm) |

Using the KOERZIMAT internal probe, it is possible to measure extremely small and low magnetized components with a magnetic stray flux < 0,02 µT. However, due to its design, this no longer allows geometry-independent measurements. A measurement according to IEC 60404-7 is only possible for ellipsoid-shaped samples.

J-H Measurement

The maximum probe size is determined by the homogenous magnetization range of the magnetized coil.

■ Probe dimensions

■ Round bar probes

Diameter 8 to 14 mm (other diameters upon request)
Length / diameter ratio: 10:1

■ Sheet metal probes

Width: 10 mm
Thickness 1.6/2.00 mm (other sheet thicknesses and width upon request)

KOERZIMAT 1.097 HCJ / J-H



Features

- Fast and precise measuring
- Simple specimen fitting on the specimen slide
- Temperature monitored compensation of the coil
- Magnetic screening of the detection coil

KOERZIMAT 1.097 HCJ

- No special specimen preparation needed
- Geometry-independent measuring
- Coverage of the complete specimen volume
- Specimen chamber with a diameter up to 60 mm
- Highest sensitivity even for smallest test specimen by means of the internal probe
- Large measuring range up to 100 kA/m
- Calibration traceable to national standards [PTB]

KOERZIMAT 1.097 J-H

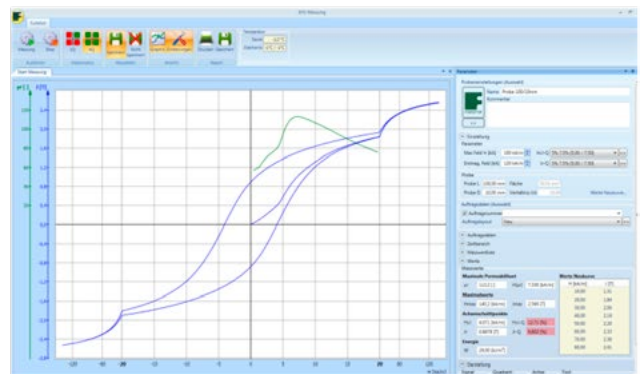
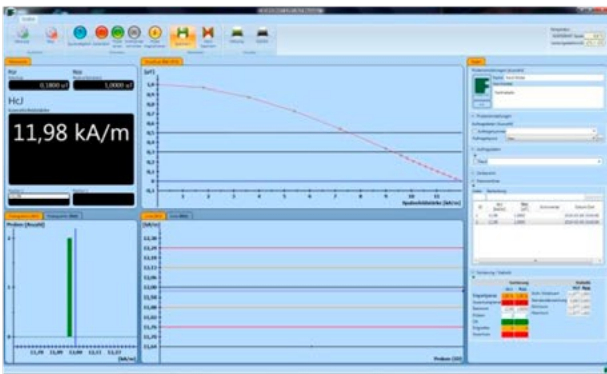
- Easiest sample preparation
- Magnetisation in the open magnetic circuit
- No mechanical load of the probes
- Magnetization field strength up to 100 kA/m
- Measuring range μ_r 100 – 2500



KOERZIMAT Controller / Software HCJ / J-H

The compact KOERZIMAT Controller with H_{cJ} Software and an optional J-H extension kit form a unit as a display and user interface for the H_{cJ} (J-H) measuring. The KOERZIMAT HCJ (J-H) Software runs under Windows 8 Pro / 10. Intuitive touch screen functionalities are available and assist the handling of the measuring control.

All measuring data are stored in a database (FOERSTER-owned format – from software version 6.0 upwards) and can be printed in a report or exported in a text file for further processing.

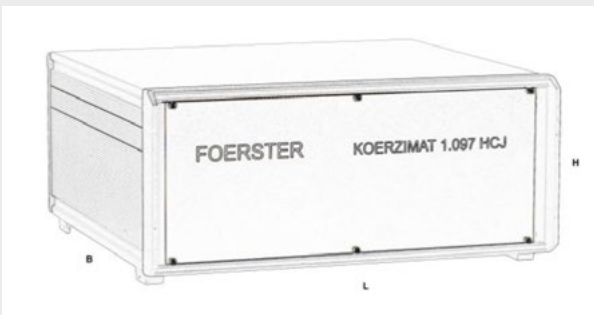


Features

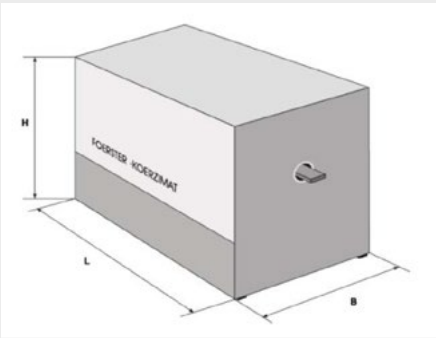
- User interface language: GERMAN, ENGLISH, FRENCH, JAPANESE, RUSSIAN
- WINDOWS 8 /10 country settings/languages online selectable
- Touchscreen operation
- Clearly structured display elements for measuring adjustments, value output in listed form
- Series measurement graphics, histogram, sorting groups and statistics
- Generating, print out and export of measured values/ statistics
- Password protected user levels for administration of functions and user access
- FOERSTER-owned database format – software version 6.0, storage of measuring data and parameters
- Synchronization of the database whilst measuring HCJ and MS
- Export of data via data interface in XML format (from software version 6.1 upwards)
- Remote-client-program is included in the scope of supply

Technical Specification

KOERZIMAT 1.097 HCJ–Measuring Module

Power supply	230 VAC, 50/60 Hz
Permitted main voltage variation	±10 % of nominal value
Permitted main voltage frequency variation	±1 Hz
Power consumption	Momentary for magnetization 3700 VA, average consumption 100 to 800 VA, depending on setting
Permitted ambient temperature range	0 up to +40 °C
Dimensions Length (L) x Width (W) x Height (H)	 <p>465×445×220 mm</p>
Protection class	IP32
Weight	approx. 18 kg

KOERZIMAT 1.097 HCJ – Coil 40 / 60

	Coil 40	Coil 60
∅ Coil ID, clear width	40 mm	60 mm
Magnetization field strength*	200 kA/m	200 kA/m
with additional pulse magnetization (option) * *) Typical for a coil temperature $t_u=25\text{ °C}$	450 kA/m	350 kA/m
Max. measuring field strength	100 kA/m	50 kA/m
Homogeneous field area (deviation $\Delta H_c < 1\%$)	170 mm	120 mm
Weight	Approx. 65 kg	Approx. 85 kg
Permitted ambient temperature range	0 up to +40 °C	
Abmessungen Spule 40 /60 Lenght (L)×Width (W)×Height (H)	 <p>550×340×420 mm</p>	
Cooling	by means of two fans	
Protection class	IP32	
Sensor	Fluxgate (FÖRSTER-Probe)	

KOERZIMAT-Internal Probe 40 / 60

For specimen with a residual field < 0,02 μ T, we recommend the use of the internal probe.

Max. measuring field strength using the internal probe	up to 25 kA/m
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J Sensor 40 / 60

The available diameters are 8/10/12/14 mm including integrated fluxmeter and cable connection to the measuring module.

H_{CJ} Measurement

Measurement uncertainty	< ± 1 % of the measured value with respect to IEC 60404-7
Measurement modes	Automatic
Coercive field strength measuring range	Auto range 0 up to 100 kA/m
Coercive field strength measuring time	3 s (fixed)
Magnetization time	Adjustable from 0,2 up to 40 s
Measurement uncertainty of the measuring field	$\pm 0,2$ % of measured value

J-H Measurement

Measurement modes	Automatic
Measuring time – complete hysteresis incl. initial curve	Approx. 2 min
Relative permeability–measuring range	μ_r 100-2500

Standard Kits

KOERZIMAT 1.097 HCJ Coil 40

KOERZIMAT 1.097 HCJ Coil 40 with pulse magnetization

each package consisting of:

- KOERZIMAT HCJ Measuring module
- KOERZIMAT Coil 40
- accessory kit

KOERZIMAT 1.097 HCJ Coil 60

KOERZIMAT 1.097 HCJ Coil 60 with pulse magnetization

each package consisting of:

- KOERZIMAT HCJ Measuring module
- KOERZIMAT Coil 60
- accessory kit

KOERZIMAT CONTROLLER + KOERZIMAT HCJ Software

consisting of:

- 23,8" Touch screen
- Powerful processor
- 8 GB RAM
- SSD hard disk 256 GB
- Touch panel
- Interface: USB, LAN (RJ45), HDMI, Display port
- Incl. keyboard and mouse
- Win10 Pro (64 Bit)
- KOERZIMAT HCJ software with dongle

Additional Options

KOERZIMAT 1.097 Internal probe 40

Slide for internal probe 40

KOERZIMAT 1.097 Internal probe 60

Slide for internal probe 60

J-H Software Upgrade

J Sensor 40

Sensors for round cylinder: Probe diameters 8/10/12/14 mm

Sensors for metal sheets: Width 10 mm / Maximum thickness 1.6 mm bzw. 2.0 mm

(other dimensions upon request)

Adapter for coil 60

Calibration/ Reference standards

HCJ Reference standard soft, approx. 30 A/m

with certificate

HCJ Calibration standard hard, approx. 20 kA/m

with certificate

J-H Reference standard

with certificate



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