

# KOERZIMAT J-H



Determine the complete J-H hysteresis of soft magnetic materials



## Simple method for determining the entire J-H hysteresis

The KOERZIMAT J-H measuring system is an extension of the KOERZIMAT 1.097 HCJ. It determines the complete J-H hysteresis, including the initial magnetization curve of soft magnetic materials in an open magnetic circuit. The hysteresis is determined by means of a J-sensor and a simple, user-friendly measuring procedure. Measurements can be taken on round bars (diameter 8–14 mm, length/diameter  $\geq 10$  mm) or sheets (width 10 mm, thickness 1.6 / 2.00 mm, length <150 mm). Before measurement, the (bar) specimens need not be precisely ground or mechanically loaded.

## Your advantages at a glance

- Fast and precise measurement of J(H)- / B(H)-DC hysteresis, incl. initial magnetization
- Magnetization in open magnetic circuit
- Magnetization field strength up to 100 kA/m
- Measuring range 100 – 4,000  $\mu$ r
- Simple specimen fitting on the specimen slide
- Magnetically shielded measuring coil
- Minimal effort for sample preparation
- No mechanical stress on the samples

# Functionality & areas of application

## Determining the J-H hysteresis

The KOERZIMAT J-H measuring system is used for quasistatic measurement of the hysteresis curve for magnetically soft round bars and sheets. This is determined in an open magnetic circuit, where the magnetic induction is measured as a function of the external magnetic field  $H_a$ . While all magnetic characteristics except  $H_cJ$  and  $J_S$  are originally influenced by demagnetization effects, depending on sample geometry and permeability, the KOERZIMAT J-H software corrects for these influences; one can choose between single- and multi-point correction. The measurement results are displayed either as a  $J(H)$  or as a  $B(H)$  curve for the sample under test.

## Qualification of magnetically soft raw material

The quality of the raw materials is decisive for the ultimate performance of electromagnetic actuators and sensors. Because the KOERZIMAT J-H determines the complete magnetic hysteresis including all key parameters, it can be used to qualify the suitability of a given material. The inspection can be conducted either directly while producing the raw material or as part of an incoming goods inspection before further processing. In this way, quality is continuously monitored and documented.

The total  $J(H)$  hysteresis represents the resulting energy losses (remagnetization losses) of the component

while the actuators were operating; an important indicator of this is the coercivity  $H_cJ$ , whereas the relative permeability  $\mu_r$  characterizes a dynamic behavior of the component in the magnetic circuit. The higher the relative permeability  $\mu_r$ , the more quickly the components can become magnetized in the electromagnetic system, contributing to an increase in the system's dynamics.

This method of measuring in an open magnetic circuit offers a fast and easy way to determine the complete magnetic DC hysteresis of magnetically soft materials under industrial conditions; using the precise J-coil, one can test the whole important key characteristic parameters.

## Technical data

The KOERZIMAT HCJ forms the basis for the KOERZIMAT J-H. The add-on to the HCJ includes a special J-sensor and corresponding software. The dimensions and specifications of the J-sensor are subject to a dedicated application case.

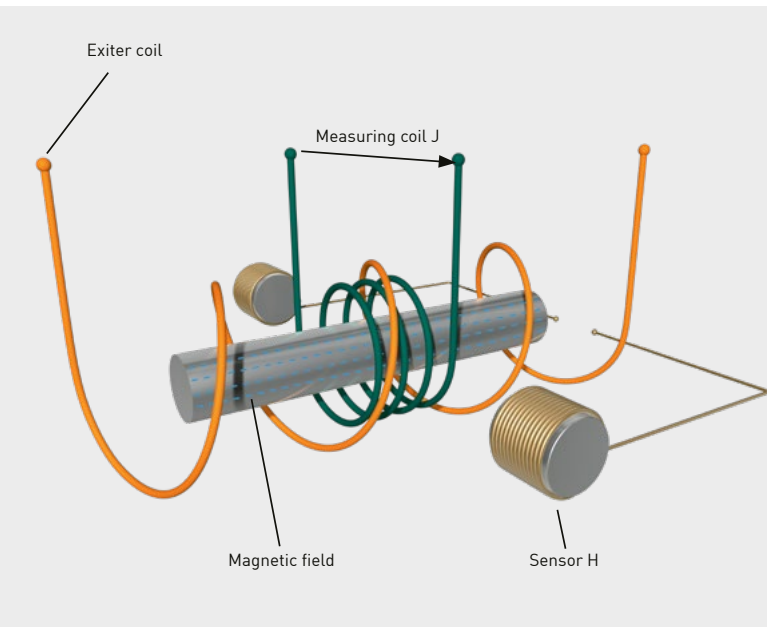


Fig. 1.: Functioning of the determination of the J-H hysteresis

Product characteristics	KOERZIMAT J-H
Permissible ambient temperatures	0 to +40 °C
IP	IP32
Magnetization field strengths	100 kA/m
Measuring time – complete hysteresis incl. initial magnetization	approx. 2 min
Measuring range – relative permeability	100 – 4,000 $\mu_r$

# The KOERZIMAT J-H measuring system – Simple and intuitive operation

## Fast measurement, detailed documentation

The KOERZIMAT J-H measuring system consists of a magnetizing coil, the measuring coils (J-sensors) and the measuring module with the KOERZIMAT J-H software.

Electronics for powering, measuring and controlling – along with connections for the magnetizing coil and J-sensors – are all contained in the measuring module, which also provides the power supply for the magnetizing coil. The J-sensor uses a fluxmeter to measure the magnetic induction  $B$  of the sample in the open magnetic circuit.

The compact controller together with J-H software act as a display and user interface for controlling of the  $J(H)$  /  $B(H)$  measurement. Its primary purpose is to carry

out cutting-edge measurements in a user-friendly way. The J-H software is not only designed to be intuitive and effective, it also provides for visualization and summary of all important measurement parameters.

Correction for demagnetization is automatically carried out by the J-H software via calculations of the fluxmetric demagnetization factors; the measurement results are displayed in the form of the “true”, sheared hysteresis.

All measurement data are stored in database files and thus can be presented in report form or exported as a text file for further processing.





## Coils and sensors for precise measurement results

### HCJ coils in 40 mm and 60 mm diameter

A magnetization field strength of up to 100 kA/m is available for magnetizing the sample; magnetization and demagnetization is done using HCJ coils with an inner diameter of 40 mm or 60 mm. The integrated magnetic shielding suppresses external static and dynamic magnetic interference fields, making the measurement of magnetic polarization independent of the earth's magnetic field or interference fields.

### J-sensor with electronics and sample holder with integrated coil

With the appropriate J-sensor, the J-H hysteresis plus initial magnetization can also be determined for round bars and sheet samples. Precise grinding of the bar samples is not necessary. Individual adaptations to accommodate other specimen sizes available on request.

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