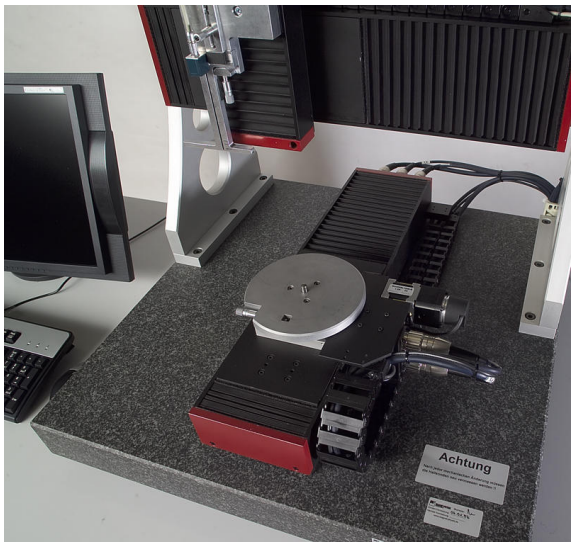
Magnetocomp® MC 4200

MEASURING DEVICE



Introduction

The Magnetocomp® MC4200 is a high precise measuring device for measurements of the magnetic field strength on the surface of magnets and magnet systems (field mapping). The measurements will be done with a hall probe. Probe and object can be moved relatively to each other in three axes and can also be turned.

The software MEASURING DEVICE MC4200 controls the measurements and supports the visualisation of the measuring results. Different multidimensional representations are possible. The measured values are saved onto a data bank.

The measuring device applies for the characterisation of the magnetisation of magnets and magnet systems. Especially for multipolar magnetised magnets, which for example are used in sensor systems or actuators. The MEASURING DEVICE MC4200 is a valuable implement for the assessment and optimisation of magnetic components.

Assembly

The 4-axes positioning device is built on a basis plate of hard stone. The Y-axis consists of a 200 mm linear unit, which is also built on the basis plate. The W-axis, which is built onto the Y-axis, consists out of a ∅ 60 mm rotation unit with precision-worm gear pair, on which a ∅ 120 mm adapter disk is mounted. The X-axis consists of a 200 mm linear unit, which is mounted on an aluminium construction. This construction runs in a height of approximately 150 mm over the Y-axis. The Z-axis mounted on the X-axis, consists out of a 100 mm linear unit. All axes are driven by a two-phase stepper motor. The absolute position is supervised by the incremental shaft encoder.

Sample Adapter Holder

For the exact positioning of the sample adapters, an adapter disk made of high-strength aluminium is situated on the W-axis. In the centre of the disk we have a ∅ 8 mm alignment pin serving the centring. For the exact angle position of the sample adapter, a stop face in a defined distance to the centre is provided, on which the ∅ 6 mm alignment pin of the adapter is pressed on by a knurled screw. This leads to a precise reproducibility of the position of the measuring samples.

Axis Control

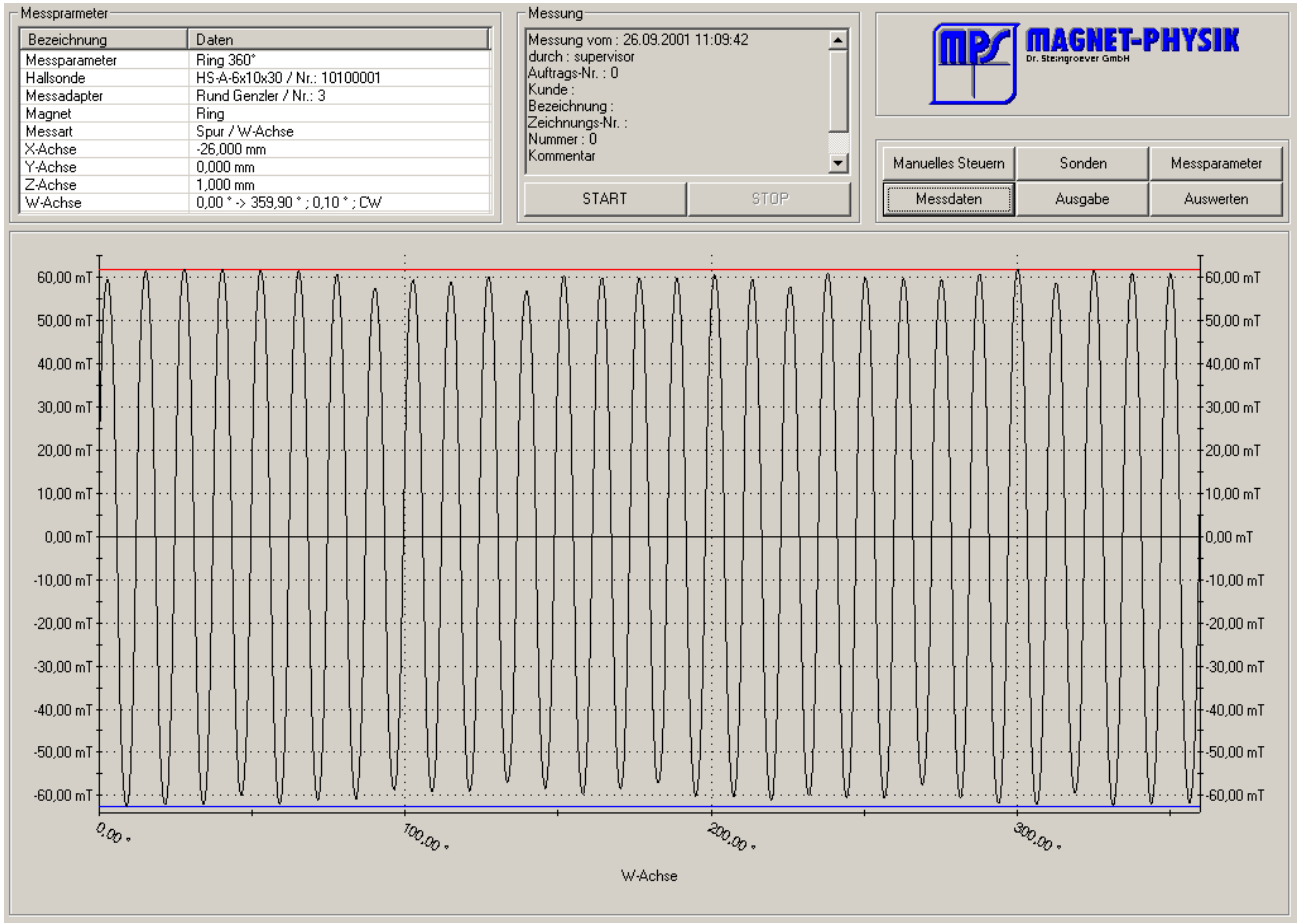
All stepper motors are driven by micro-step-amplifiers. For the determination of the home-positions the axes have a proximity switch, the stepper motors an incremental shaft encoder with index. Additionally, the linear axes have a proximity switch for the end positions. The control and positioning works in the “Close-Loop” process, by using a stepper-controller-card, which is built into the PC. The resolution for the way is 0,001 mm and for the angle 0,01°.

Hall Probes

A probe for axial and transverse measurements is included in the program. The sustainers are of high-strength aluminium, in which hall generators have been inserted. For fixing the hall probes, a fine sustainer plate is mounted on the Z-axis. For the exact positioning of the hall probes we have a relief with three even and rectangular surfaces. The hall probe is pressed to this surface by a knurled screw. The flux density is measured by a hall generator. The supply of the generator and the measurement of the hall voltage works with a analogue-I/O-card built into the PC. The analogue output as well as the analogue input have a 16-bit resolution. Therewith, a resolution of 0,01 mT is possible.

Software

The Magnetocomp® MC4200 software controls the whole device. The program runs under Windows 2000, which allows an easy handling by keyboard and mouse and gives a good overview. The measured values are directly represented on the screen. This allows to have a look at the results while measuring. The measured values are saved onto a data bank and can be printed. It is also possible to produce a data file which can be processed in a program like Excel for example, for being able to carry out analysis. To facilitate the work, it is possible to save the adjusted measuring parameter. This gives us the advantage that only a few inputs are necessary to repeat a certain measurement.



Optionally amplifiers with other technical data are available.
They depend on the samples to be measured.

Measuring methods

Angular measurements
When measuring over an angle, the hall probe is positioned at a fix point and the measuring sample will be turned in the W-axis.

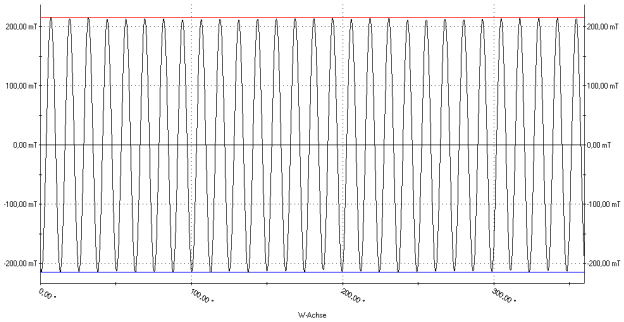
Transversal-probe
The measurement is made in a constant distance to the centre of the W-axis. By turning the W-axis in the stated angle resolution, a track of the sample is measured magnetically. For being able to scan a surface, several tracks are measured by changing the Z-axis.

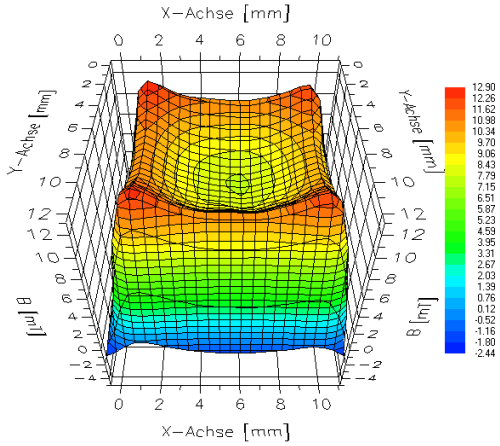
Axial-probe
The measurement is made in a constant distance to the surface of the W-axis. By turning the W-axis in the stated angle resolution, a track of the sample is measured magnetically. For being able to scan a surface, several tracks are measured by changing the X-axis.

Straight measurements
When measuring linearly, the hall probe is positioned at a fix point and will then be regulated in the X-, Y- or Z-axis.

Transversal-probe
The measurement is made in a constant distance to the surface of the W-axis. By regulating the X- and Y-axis in the stated angle resolution, a track of the sample is measured magnetically. For being able to scan a surface, several tracks are measured by changing the X- or the Y-axis respectively.

Axial-probe
The measurement is made in a constant distance to the surface of the W-axis. By regulating the X-, Y- or Z-axis in the stated angle resolution, a track of the sample is measured magnetically. For being able to scan a surface, several tracks are measured by changing the X- or the Y-axis respectively.





Technical Data

Positioning unit		
Depth	630	mm
Width	630	mm
Height	870	mm
Weight	75	kg
Control unit		
Depth	600	mm
Width	600	mm
Height	340	mm
Power supply	230V, 10A,	50/60Hz
Weight	20	kg
Characteristic quantities		
Scan area	100x100x100	mm
Max. sample weight	2	kg
Linear resolution	1	µm
Angular resolution	0,01	°
Measuring range	± 999,99	mT
Resolution	0,01	mT
X-axis	200	mm
Encoder resolution	0,2	µm
Reproducibility	± 0,31	µm
Accuracy of positioning	± 3,00	µm
Y-axis	200	mm
Encoder resolution	0,2	µm
Reproducibility	± 0,31	µm
Accuracy of positioning	± 3,00	µm
Z-axis	100	mm
Encoder resolution	0,2	µm
Reproducibility	± 0,31	µm
Accuracy of positioning	± 3,00	µm
W-axis	360	°
Encoder resolution	0,0004	°
Reproducibility	± 0,0025	°
Accuracy of positioning	± 0,010	°

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