

# Analogue Magnetic Field Transducers

Standard and custom-made 1-, 2- or 3-Axis Transducers

## • MAGNETIC FIELD TRANSDUCERS BASED ON FULLY INTEGRATED 3-AXIS HALL SENSORS:

### FEATURES:

- Measurement of all three magnetic field components with a high angular accuracy and high spatial resolution
- Field Sensitive Volume (FSV) of the Hall probe is only  $0.15 \times 0.01 \times 0.15 \text{ mm}^3$
- Hall voltage amplified on the probe results in low inductive voltage and high disturbance immunity
- Frequency response: from DC up to 25kHz
- High-level analog voltage output
- Standard Measurement ranges: 100mT, 500mT, 3T, 20T
- A wide range of the Hall probe geometries available
- Single-axis version: frequency response from DC up to 75kHz and improved resolution

### APPLICATIONS:

- Mapping magnetic fields
- Development of Magnet Systems
- Quality Control of permanent magnets
- Application in laboratories and in production lines
- Monitoring of magnet systems (generators, motors, etc.)



	Range 0.1T	Range 2T
Sensitivity	100 V/T (10 mV/G)	5 V/T (0.5 mV/G)
Accuracy	0.1%	0.1%
Linear range	$\pm 0.1\text{T}$	$\pm 2\text{T}$
Non-linearity	0.03%	0.05%
Noise Spectral Density	$< 0.8 \mu\text{T}/\text{Hz}^{1/2}$	$< 2 \mu\text{T}/\text{Hz}^{1/2}$
RMS Noise (DC to Bw)	$< 40 \mu\text{T}$	$< 100 \mu\text{T}$
Frequency Bandwidth (Bw)	2.5 kHz	2.5 kHz
Offset Drift (0.01-10 Hz)	$< 40 \mu\text{Tpp}$	$< 100 \mu\text{Tpp}$
Temperature stability	$< 100 \text{ ppm}/^\circ\text{C}$	$< 100 \text{ ppm}/^\circ\text{C}$

**NEW!!!**

## • HIGH RESOLUTION MAGNETIC FIELD TRANSDUCERS BASED ON DISCRETE HALL SENSORS:

### FEATURES:

- Ultra-low noise: noise spectral density down to  $10 \text{ nT}/\text{Hz}^{1/2}$
- Very low offset and offset drift
- Very low planar Hall voltage
- 1 and 2-Axis available

### APPLICATIONS:

- Mapping magnetic fields
- Characterization of undulator systems
- Current sensing



	Range 0.2T	Range 2T
Sensitivity	50 V/T (5 mV/G)	5 V/T (0.5 mV/G)
Calibration Accuracy	10 ppm	10 ppm
Linear range	$\pm 0.2\text{T}$	$\pm 1\text{T}$
Non-linearity	0.1%	0.2%
Noise Spectral Density	$< 0.016 \mu\text{T}/\text{Hz}^{1/2}$	$< 0.05 \mu\text{T}/\text{Hz}^{1/2}$
RMS Noise (DC to Bw)	$< 40 \mu\text{T}$	$< 100 \mu\text{T}$
Frequency Bandwidth (Bw)	5 kHz	400 Hz
Offset Drift (0.01-10 Hz)	$< 0.1 \mu\text{Tpp}$	$< 0.4 \mu\text{Tpp}$
Temperature stability	$< 25 \text{ ppm}/^\circ\text{C}$	$< 25 \text{ ppm}/^\circ\text{C}$

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### North America Distributor: GMW Associates

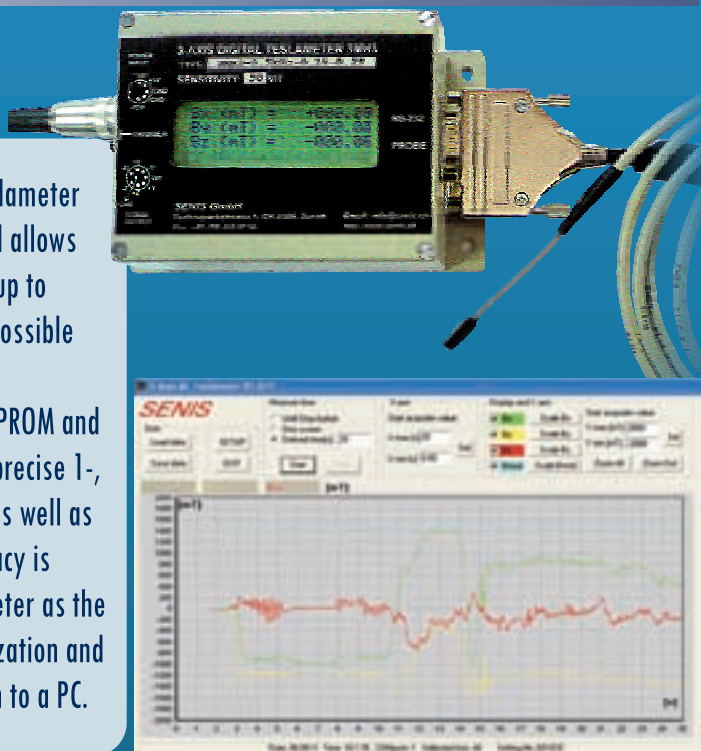
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# Digital Teslameters

Standard and custom-made 1D and 3D Teslameters

## • 3D DIGITAL TESLAMETER 3MH3:

The model 3MH3 is a high performance Hall-effect Digital Teslameter with digital correction to provide up to  $\pm 0.05\%$  accuracy and allows you to measure simultaneously three components of an AC (up to 1kHz) or DC magnetic field at exactly the same spot. This is possible thanks to the unique SENIS' single-chip 3-Axis Hall probe. The calibration data of the 3D Hall probe are stored in an EEPROM and allow to build a long term stable and precise instrument for precise 1-, 2- or 3-Axis magnetic field mapping, magnetic field control, as well as permanent magnets quality inspection. The calibration accuracy is verified against a Nuclear Magnetic Resonance (NMR) Teslameter as the measuring standard. The 3MH3 software enables you visualization and automatic data acquisition via a RS-232 serial communication to a PC.



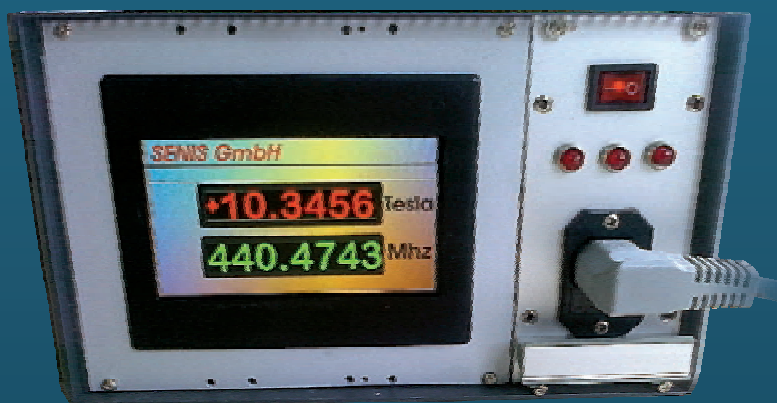
## • SINGLE-AXIS DIGITAL TESLAMETER 3MH5

**NEW!!!**

The 3MH5 is a high accuracy temperature independent instrument for precise determination of magnetic field. Each instrument is calibrated with individual correction data for the probe; therefore the probe is replaceable. The 3MH5 is supplied with the data acquisition software (for Windows XP/7 OS) and the User Manual. Free software updates available.

### FEATURES:

- High calibration accuracy verified against NMR standard
- Resolution and Stability:  $< 100\text{ppm}(0.01\%)$
- Measurement ranges: 20mT; 200mT; 2T; 20T (manual or auto ranging; disabled for high magnetic fields  $> 10\text{T}$ )
- High temperature stability:  $< 20\text{ ppm}/^\circ\text{C}$
- PC Interface: USB 2.0
- TFT LCD graphic display: 107 x 71 mm
- Up to 10 fully corrected measurements per second
- Analog output: connection to DAQ card
- 1, 2 and 3-axis versions available



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# SENIS Hall Probes

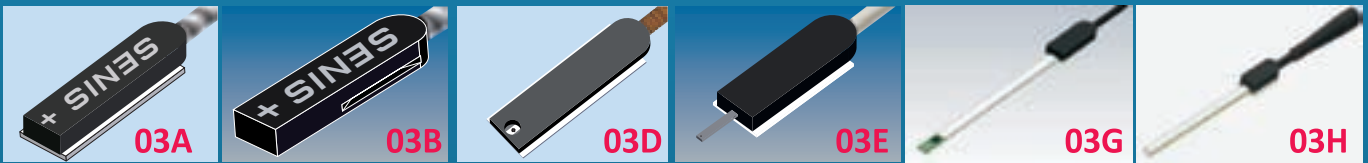
## Standard and custom-made 1-, 2- or 3-Axis

### FULLY INTEGRATED THREE-AXIS HALL PROBES:

The SENIS 3-Axis Hall probes are based on a single-chip integrated 3-Axis Hall Probe System. The core of the device represents a silicon sensor chip (based on CMOS technology), which contains Hall elements, biasing circuits, amplifiers, and a temperature sensor. The probe gives a high-level analog voltage output for each of the three component (Bx, By and Bz) of the measured magnetic flux density, as well as for the chip temperature.

#### KEY FEATURES:

- Measurement of all three magnetic field components with a high angular accuracy and high spatial resolution; the Field Sensitive Volume (FSV) of the probe is only  $0.15 \times 0.01 \times 0.15 \text{ mm}^3$
- Frequency response: up to 25kHz
- Measurement ranges: 100 mT, 500 mT, 3T and 20T
- Virtually no planar Hall effect
- Negligible inductive loops
- No crosstalk between the channels
- The probe provides a high-level temperature signal for an efficient compensation of temperature effects



### • HIGH RESOLUTION LOW-NOISE TWO-AXIS (transverse and axial) DISCRETE HALL PROBES:

The SENIS Two-Axis high resolution low-noise Hall-Probe System contains two high-resolution spatially shifted Hall elements and a temperature sensor. The sensors are embedded in the probe package and connected to the Probe cable. The probe is glued onto a reference ceramic plate suitable for an appropriate positioning and fixing of the probe.

#### FEATURES:

- Low noise
- Virtually no planar Hall effect
- Negligible inductive loops
- The probe provides a temperature signal for an efficient compensation of temperature effects.



#### SPECIFICATIONS:

SPECIFICATIONS:		Type	Dimension (mm)			Sensitive Area (FSV)	Frequency Bandwidth	Full Scale Ranges	Corrected Accuracy	Temp. Coeff. Sensitivity	Operating Temperature	Temperature Sensor
			L	W	H							
Integrated Hall Probes	3-Axis	03A	16.5	5.0	2.3	0.15 x 0.15 x 0.01 mm <sup>3</sup>	DC to 25 kHz	0.1 T 0.5 T 3 T 20 T	better than ± 0.1% up to ± 2T	better than ± 100 ppm/°C (adjusted)	standard: +5°C to +45°C special: up to +95°C	Yes, a temp. sensor is integrated into the CMOS silicon sensor chip
		03B	16.5	4.0	2.0							
		03D	16.5	5.0	2.3							
		03E *	14.5	5.0	2.0							
		03G	42.0	2.0	0.5							
		03H	42.0	2.0	1.1							
	* The dimensions of the thin Probe tip are 3.0 x 0.64 x 0.28 mm <sup>3</sup>											
	1-Axis	0YA	16.5	5.0	2.3	0.40 x 0.04 x 0.01 mm <sup>3</sup>	DC to 75 kHz	0.1 T 0.5 T 3 T 20 T	better than ± 0.1% up to ± 2T	better than ± 100 ppm/°C (adjusted)	+5°C to +45°C	Yes, the chip contains a temp. sensor
		0YK	42.0	2.0	0.5							
0YL		42.0	2.0	1.1								
Discrete 2-Axis High-resolution Low-Noise Hall Probes		YZI	16.5	5.0	1.5	0.3 mm diameter	DC to 5kHz or DC to 500Hz	0.1 T 0.2 T 1 T 2 T	better than ± 0.25% up to ± 1T	better than ± 25 ppm/°C (adjusted)	+5°C to +45°C	Yes, a Pt-100 sensor is mounted into the Probe
		YZJ	31.0	3.0	1.5							
		YZN	20.0	3.0	1.5							
		YZP	16.5	5.0	2.0							

All types of the SENIS Hall probes need various external adjustment and compensations to reach their full accuracy. To obtain its full specifications, each Hall probe should be connected to the appropriate analogue Electronics processing module, on such a way making a SENIS Analogue Magnetic Field Transducer.

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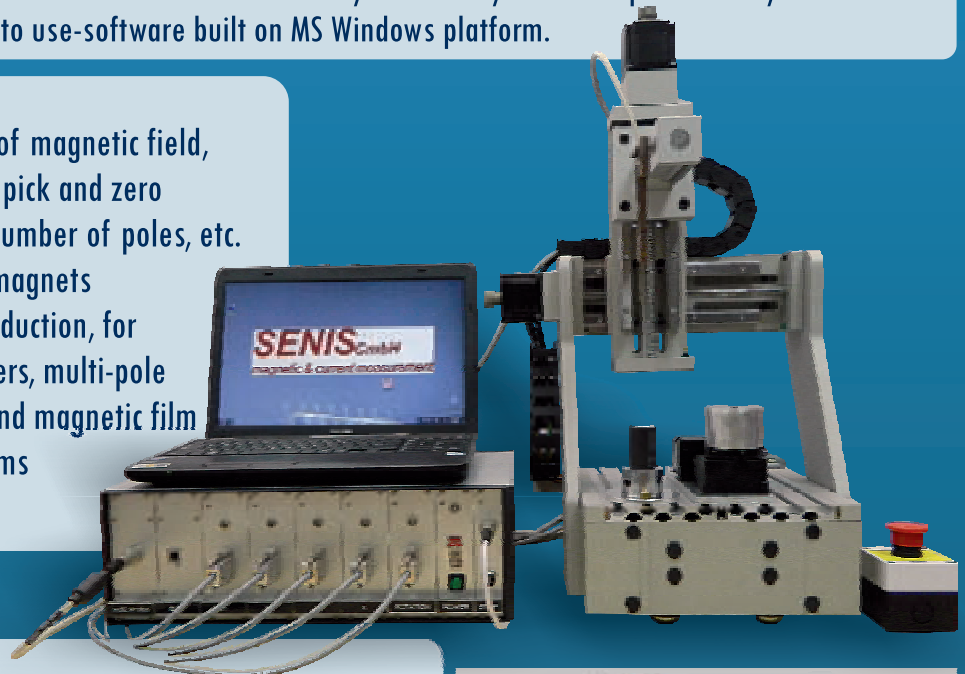
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# Magnetic Field Mapping System MMS-1-R

Magnetic Field Mapping System MMS-1-R allows a user to do a high resolution mapping of the magnetic field around an electromagnet or permanent magnet. The map of the magnetic field may be given in the form of color coded 2D or 3D isometric visual display on PC screen, tables of the numerical values of the three components, the total magnetic field, and so on. Due to the unique features of the applied integrated Hall probe, all three components of the magnetic field are measured simultaneously at virtually the same point. The system is controlled by an extremely easy-to use software built on MS Windows platform.

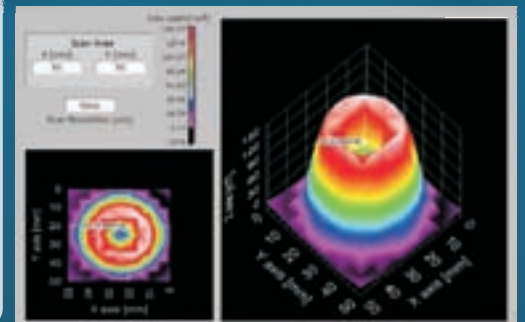
## TYPICAL APPLICATIONS:

- Measurement of all three axes of magnetic field, magnetic angle measurement, pick and zero value detection, counting the number of poles, etc.
- Quality control of permanent magnets
- Quality assessment tool in production, for assemblies such as loudspeakers, multi-pole magnets, photocopier rollers and magnetic film
- Development of magnet systems
- AC magnetic field mapping



## FEATURES:

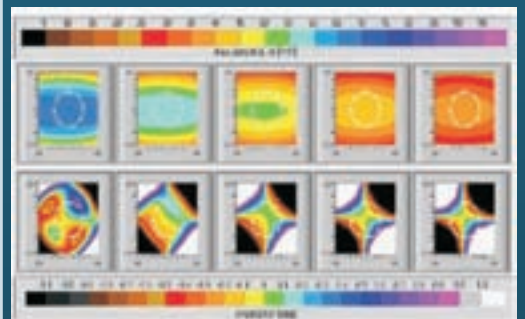
- Scanning Volume (X x Y x Z): 100 x 100 x 100 mm<sup>3</sup> (standard)
- Scanning spatial resolution: down to 10 µm
- Rotation stage for the magnet under test (optional)
- 3-Axis integrated Hall probe with the spatial resolution of 0.1mm
- High accuracy of the magnetic field measurement (better than 0.1%)
- DC and AC field measurements from DC to 2.5 kHz (-3dB point)



## SOFTWARE:

The software, based on LabVIEW on MS Windows platform, offers the following options:

- Automatic color coding of magnetic field with appropriate legend
- User defined scanning area and resolution
- Zoom and rotate 3D image
- Movable cursor displaying X and Y coordinate and magnetic flux density value
- Probe returns to the start measuring point after the full scan is performed



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