

Advanced **Magnetic Field Measurements** Sensors, Instruments and Services











01-03

04-08

Introduction

Analog Magnetic Field Transducer vs. Digital Teslameter

# Magnetic Field Instruments & Customized Solutions

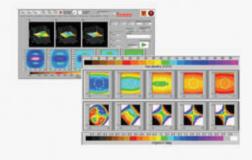






09-10

Magnetic Field Mapper







11-12

Services & Engineering







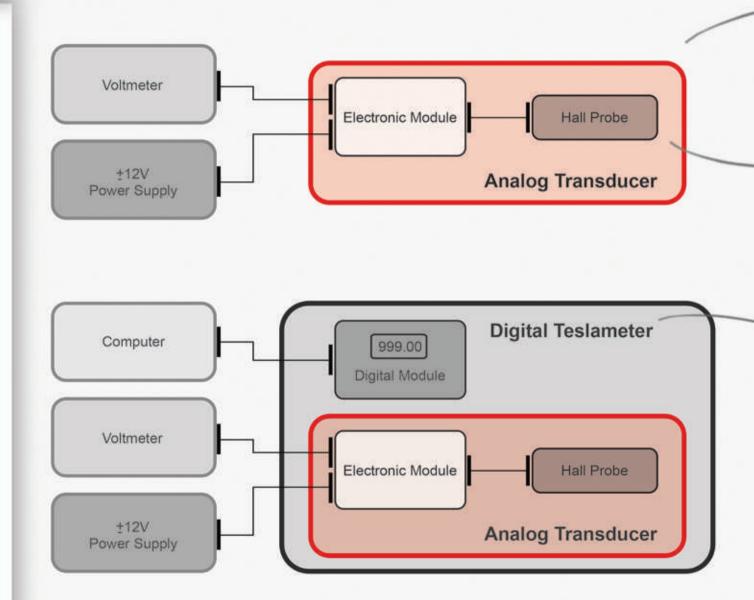
Analog Magnetic Field Transducer is an instrument that provides at its output a convenient-level voltage proportional to the measured magnetic field. A SENIS Hall magnetic field transducer is composed of two modules - Hall probe with the cable (Module H) connected to the analog electronics for the signal conditioning (Module E).

To build up a complete measurement system, the electronic module needs to be connected to an adequate power supply and to a voltmeter (or A/D converter) for each measured component

of the magnetic field.

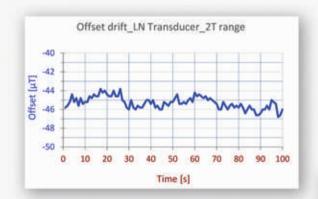
Digital Teslameter, or in short Teslameter or Gaussmeter, incorporates a magnetic field transducer, analog-to-digital converter, and a display, which shows the numerical value of the measured magnetic field. A PC can be connected to the serial interface of the Teslameter for visualization and analysis of measured data.

Both, Magnetic Transducer and Teslameter may measure 1, 2, or 3 components of magnetic field; accordingly, they are called 1-, 2-, or 3-axis Magnetic Transducer or Teslameter, respectively.



## The only fully integrated three-axis Hall probe

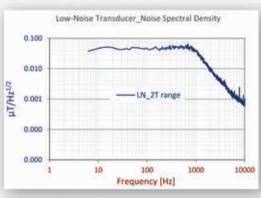






The smallest and thinnest Hall probe

The highest frequency bandwidth

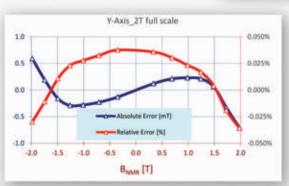


The highest accuracy

The highest magnetic resolution



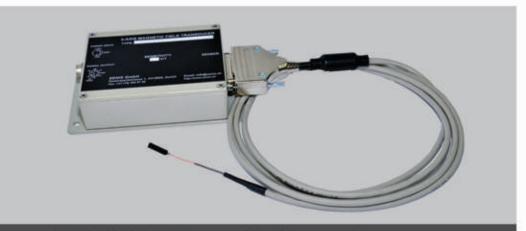




### Typical Application of Magnetic Field Transducers and Digital Teslameter

- Characterization and quality control of permanent magnets
- Development of magnet systems
- Quality control and monitoring of magnet systems (generators, motors, etc.)
- Magnetic field mapping
- Application in laboratories and in production lines

## Magnetic Transducers



## F3A/F1A Magnetic Transducers

The F1A denotes a range of SENIS Magnetic Field-to-Voltage Transducers with **fully integrated 1-axis Hall Probe**. It measures magnetic field perpendicular to the probe plane (By).

The F3A denotes a range of SENIS Magnetic Field-to-Voltage Transducers with fully integrated 3-axis Hall Probe.

The Hall Probe of F3A Magnetic Transducer contains a CMOS integrated circuit, which incorporates three groups of mutually orthogonal Hall elements, biasing circuits, amplifiers, and a temperature sensor. The integrated Hall elements occupy very small area (150µm x 150µm), which provides very high spatial resolution of the Hall probe. The CMOS IC technology enables very high precision in the fabrication of the vertical and horizontal Hall elements, which gives high angular accuracy of the three measurement axes of the probe. The application of the spinning-current technique in the biasing of the Hall elements suppresses the planar Hall effect. The on-chip signal pre-processing enables a very high frequency bandwidth of the probe. On-chip signal amplification provides high output signals of the Hall probe, which makes the transducer immune to electromagnetic & electrostatic disturbances.

The Hall probe is connected with an electronic box that provides biasing for the Hall probe and additional conditioning of the Hall probe output signals: amplification, linearization, canceling offset, compensation of the temperature variations, and limitation of the frequency bandwidth.

### KEY FEATURES

- Fully integrated CMOS 3-axis (Bx, By, Bz) Hall Probe, of which one (F1A), two, or three channels (F3A) are used
- Very high spatial resolution (By: 0.03x0.005x0.03mm³; Bx & Bz: 0.15x0.01x0.15mm³)
- Measuring accuracy 0.1%
- Measurement ranges: 20mT, 200mT, 2T, 20T
- High angular accuracy (orthogonality error less than 0.1°)
- Virtually no planar Hall effect
- High frequency bandwidth (from DC up to 25kHz for F3A; from DC up to 75kHz for F1A)
- High disturbance immunity, i.e. very low electrostatic-, inductive- and cable-pickup
- Negligible inductive loops on the probe
- Integrated temperature sensor on the probe for temperature compensation



The I1A denotes a range of SENIS Magnetic Field-to-Voltage Transducers with integrated 1-axis Hall Probe. It measures magnetic field perpendicular to the probe plane (By). The IxA denotes a range of SENIS Magnetic Field-to-Voltage Transducers with integrated 1-, 2-, 3-axis Hall Probe (I1A,I2A,I3A).

The D3A denotes a range of SENIS Magnetic Field-to-Voltage Transducers with dual integrated 3-axis Hall Probe for very high magnetic resolution.

The Hall Probe contains a CMOS integrated circuit, which incorporates three groups of mutually orthogonal Hall elements and a temperature sensor. The integrated Hall elements occupy very small area (150µm x 150µm), which provides very high spatial resolution of the probe

The Hall probe is connected with an electronic box that provides biasing for the Hall probe and the application of the spinning-current technique, which cancels offset, low frequency noise and the planar Hall effect. The additional conditioning of the Hall probe output signals in the electronic box includes Hall signal amplification, high linearization, compensation of the temperature variations, and limitation of the frequency bandwidth.

### KEY FEATURES

- Integrated CMOS 3-axis (Bx, By, Bz) Hall Probe, of which one (I1A), two, or three channels (I3A) are used
- Very high spatial resolution (By: 0.03x0.005x0.03mm³; Bx and Bz; 0.15x0.01x0.15 mm³)
- Very low noise and offset fluctuations
- Measuring accuracy 0.1%
- Measurement ranges: 20mT, 200mT, 2T, 20T
- High angular accuracy (orthogonality error less than 0.1°)
- Very high linearity
- Negligible inductive loops on the probe
- Integrated temperature sensor on the probe for temperature compensation



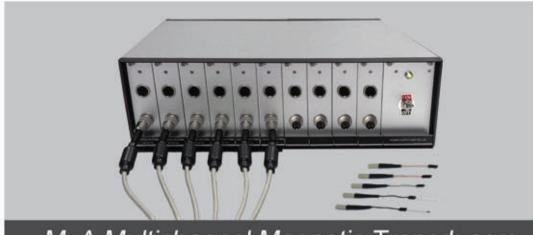
## HxA Low-Noise Magnetic Transducers

The HxA denotes a range of Low Noise SENIS Magnetic Field-to-Voltage Transducers with hybrid 1-, 2-, 3-axis Hall Probe (H1A,H2A,H3A) with discrete Hall elements. The Hybrid Hall Probe integrates three high-resolution with good angular accuracy (orthogonality error < 2°) of the three measurement axis of the probe and a temperature sensor.

The Hall probe is connected with an electronic box that provides biasing for the Hall probe and the application of the spinning-current technique, which very effectively cancels offset, low frequency noise and the planar Hall effect. The additional conditioning of the Hall probe output signals in the electronic box includes Hall signal amplification, high linearization, compensation of the temperature variations, and limitation of the frequency bandwidth. The outputs of the Magnetic Transducers are high-level differential voltages proportional with each of the measured components of a magnetic flux density; and a ground-referred voltage proportional with the probe temperature.

### KEY FEATURES

- Hybrid 1-, 2-, 3-axis (Bx, By, Bz) Hall Probe with discrete Hall elements, of which one, two, or three channels are used
- Ultra-low noise & offset fluctuations, allowing for very high resolution measurements (spectral density of noise down to 10 nT/Hz1/2)
- Spatial resolution: 0.15 x 0.15 x 0.001 mm³ per Hall element
- Measuring accuracy 0.25%
- Measurement ranges: 200mT, 2T, 20T
- Very high linearity
- Magnetic transducer based on much improved offset and noise reduction technique
- Very low planar Hall voltage
- Temperature sensor on the probe for temperature compensation



## MxA Multichannel Magnetic Transducers

The Multichannel chassis is utilized for multi-probe SENIS Magnetic Field-to-Voltage Transducer system with any of SENIS Hall Probes. It integrates up to ten SENIS' 1-, 2or 3-axis Hall probes and their signal processing electronic modules. The Multichannel Transducer can be used as a compact multi-point monitoring system of complex electromagnetic machines or processes.

Attribute Type	Probe Technology	Number of Axes	Spatial Resolution	Angular accuracy	Noise & Offset Fluctuations	Linearity	Frequency Bandwidth	Disturbance Immunity (induct el. static & cable pickup)
F3A	Fully Integrated with amplifier	1, 2, 3	•••	•••	0	••	••	•••
F1A	Fully Integrated with amplifier	1	0	0	0		•••	•••
IxA	Integrated 1,2 or 3 Hall & temp	1, 2, 3	•••	•••	•	•••	0	•
D3A	Dual Integrated	1, 2, 3	•••	•••	••	•••	0	••
IIA	Integrated Y-Hall & temp	1		0	••	•••	0	0
НхА	Hybrid 1,2 or 3 Hall & temp.	1, 2, 3	0	0	•••	0	0	••

## Hall Probes

### 1-, 2-, 3-Axis Integrated Hall Probes w/ and w/o On-chip Amplifier

### UNIQUE PERFORMANCE:

- Fully integrated CMOS 1-, 2-, 3-axis (Bx, By, Bz) Hall Probe with or without on-chip amplifier & signal processing
- Very high spatial resolution: By: 0.03 x 0.005 x 0.03mm³; Bx and Bz: 0.15 x 0.01 x 0.15 mm³
- High angular accuracy: orthogonality error less than 0.1°
- Absolute Accuracy: better than ± 0.1 % within ± 2T
- Full scale range: 20mT 20T, calibrated up to 2T
- White Noise (@ f > 10 Hz): 0.1 µT/√Hz @ 200mT
- Temperature Coefficient of Sensitivity: better than ± 100 ppm/°C (± 0.01 %/°C)
- High frequency bandwidth: from DC up to 75kHz for 1-axis; from DC up to 25kHz for 3-axis
- Virtually no planar Hall effect
- High immunity on electrostatic and inductive disturbances
- Negligible inductive loops on the Probe
- On-chip integrated temperature sensor for temperature compensation



#### Hall Probe A

Very robust integrated Hall probe for SENIS F3A, F1A and I1A magnetic transducers and for OEM customers.

Dimensions (length, width, thickness in mm): 16.5 x 5.0 x 2.3



### Hall Probe B

Very robust fully integrated Hall probe for SENIS F3A magnetic transducers and for OEM customers.

Dimensions (length, width, thickness in mm): 16.5 x 4.0 x 2.0



### Hall Probe D

Fully integrated Hall probe with a transparent window over Hall elements for SENIS F3A magnetic transducers and for OEM customers.

Dimensions (length, width, thickness in mm): 16.5 x 5.0 x 2.3



### Hall Probe E

Fully integrated Hall probe with the naked Si chip for SENIS F3A magnetic transducers and for OEM customers.

Dimensions (length, width, thickness in mm): 3.0 x 0.64 x 0.28



### Hall Probe G

Very long and thin integrated Hall probe with the naked Si chip for SENIS F3A, F1A, I1A magnetic transducers and for OEM customers.

Dimensions (length, width, thickness in mm): 42.0 x 2.0 x 0.5



### Hall Probe H

Very long and thin integrated Hall probe with the protected Si chip for SENIS F3A, F1A, I1A magnetic transducers and for OEM customers.

Dimensions (length, width, thickness in mm): 42.0 x 2.0 x 1.1



### Hall Probe K

Very long and thin integrated Hall probe with the naked Si chip for SENIS F3A, F1A, I1A magnetic transducers and for OEM customers.

Dimensions (length, width, thickness in mm): 47.0 x 2.0 x 0.5

Fully integrated 3-axis Hall probe with on-chip amplifier and signal processing

frequency bandwidth from DC up to 75 kHz

50 um thin probe

ultra low noise 10 nT/Hz 10

resolution and stability 100 ppm

### 1-, 2-, 3- Axis Hybrid Hall Probes with Discrete Hall Elements

### UNIQUE PERFORMANCE:

- Ultra-low noise & offset fluctuation magnetic transducer, allowing for very high resolution measurements
- Spatial resolution: 0.15 x 0.15 x 0.001mm3 per Hall element
- Absolute Accuracy: better than ± 0.25 % within ± 2T; better than ± 0.1 % within ± 200mT
   Full scale range: 200mT 2T, calibrated
   White Noise (@ f > 10 Hz): 15nT/√Hz @ 200mT
   Temperature Coefficient of Sensitivity: better than ± 25 ppm/°C (± 0.0025 %/°C)

- Verv high linearity
- Pt-100 temperature sensor mounted onto the probe for temperature compensation



### Hall Probe I

Very robust hybrid Hall probe for SENIS H3A magnetic transducers.

Dimensions (length, width, thickness in mm): 16.5 x 5.0 x 1.5



### Hall Probe J

Very robust and thin hybrid Hall probe for SENIS H3A magnetic transducers.

Dimensions (length, width, thickness in mm): 31.0 x 3.0 x 1.5



### Hall Probe N

Very robust hybrid Hall probe for SENIS H3A magnetic transducers.

Dimensions (length, width, thickness in mm): 16.5 x 4.0 x 2.0

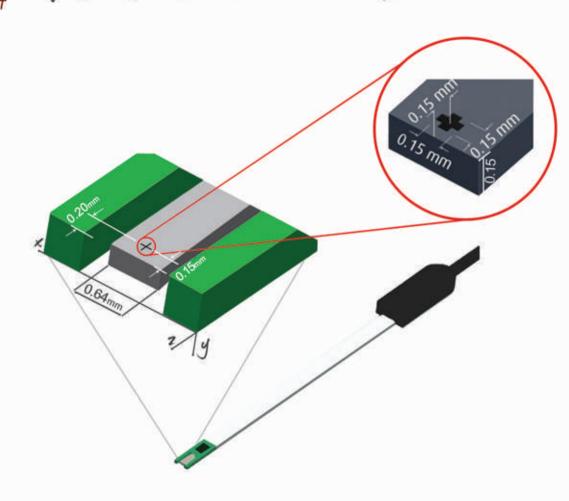


### Hall Probe P

Very robust hybrid Hall probe for SENIS H3A magnetic transducers.

Dimensions (length, width, thickness in mm): 16.5 x 5.0 x 2.0

3-axis Hall Probe with Field Sensitive Volume of 0.25 x 0.25 x 0.25 mm? (small cross on the chip)



## Digital Teslameters



## 3MH3 Teslameter for Industrial Aplications

Teslameter with fully integrated 1-, 2-, 3-axis Hall Probe incorporates a high accuracy magnetic field-to-analog-voltage transducer with a high-level, temperature compensated output signal for each of the three components of the measured magnetic field (Bx, By and Bz). A digital module is additionally applied to the analog transducer to form the digital Teslameter. The digital module provides the accuracy of 0.05% and allows displaying the measured values on LCD display on the device.

Digital Teslameter provides the possibility of automatic data acquisition via USB serial port by a host computer. In this way, customers can easily integrate a measurement routine into their measurement system using its programming tools such as Basic, C, C++, Delphi, LabVIEW, etc.

The temperature measurement feature allows a user to obtain current temperature values while monitoring the magnetic field.

The transducer consists of two modules, Hall probe and cable, and an electronic module. To build up a complete measurement system the electronic module needs to be connected to an adequate power supply and to computer for measured data acquisition and visualization.

### KEY FEATURES

- Teslameter with fully integrated 1-, 2-, 3-axis Hall Probes for measuring DC & AC magnetic fields (up to 1kHz)
- Resolution of 100ppm at ± 20mT, 200mT, 2T, 20T
- Accuracy up to 0.05%
- Auto range capability (± 20mT, 200mT, 2T, 20T)
- LCD Digital display, displaying Bx, By and Bz components and the temperature value
- measured on the Hall Probe. Graphic LCD for fast signal analysis
- Data Acquisition & Visualization PC Software via USB (Windows operating system)
- Remote software access for measurement monitoring (LabVIEW VI)



## 3MH5 Teslameter for Laboratory Applications

Low-Noise Teslameter with fully integrated 1-, 2-, 3-axis Hall Probe incorporates a high accuracy magnetic field-to-analog-voltage transducer with a high-level, temperature compensated output signal for each of the three components of the measured magnetic field (Bx, By and Bz). A digital module is additionally applied to the analog transducer to form the digital Teslameter. The digital module provides the accuracy of approx. 0.001% and allows displaying the measured values on a TFT LCD display on the device.

Digital Teslameter provides the possibility of automatic data acquisition via USB serial port by a host computer. In this way, customers can easily integrate a measurement routine into their measurement system using its programming tools such as Basic, C, C++, Delphi, LabVIEW, etc.

The temperature measurement feature allows a user to obtain current temperature values while monitoring the magnetic field.

The transducer consists of two modules, Hall probe and cable, and an electronic module. Each Transducer is calibrated with the individual correction data for the connected probe, so the probe is replaceable.

### KEY FEATURES

- Teslameter with integrated 1-,2-,3-axis Hall Probes for measuring DC & AC magnetic fields up to 5kHz
- Very High Resolution: 1ppm at magnetic field range: 0.2T, 2T, 20T
- Accuracy up to approx. 0.001%
- High temperature stability (< 20ppm/°C)</li>
- Auto range, zeroing, hold reading capability
- Trigger input/output
- Signal Analysis (signal frequency measurement, rms value, min/max value, etc.)
- Units in gauss (G), tesla (T) or Oersted (Oe)
- TFT LCD graphic display (107x71mm), displaying Bx, By and Bz components and the temperature value measured on the Hall Probe
- Data Acquisition & Visualization PC Software runs on Windows operating system
- Remote software access for measurements monitoring (LabVIEW VI)

## Customized Solutions

SENIS' strengths are the ability to implement the customized innovative solutions to fullfill the higheest requirements with an unique and extraordinary performance.





Magnetic Camera (multi-probe array) for Magnetic Field Mapping





Triple Probe integrated in the single package (left)





Carbon-Tube protected Hall probes for Magnetic Transducers, Teslameters and Magnetic Field Mappers





Detection of cracks in uncoated and coated permanent magnets



Long Aluminium Probe Holder for measuring magnetic fields generated due to currents in Alu Melts

Low Noise Dual Chip Integrated Hall Probe with heater/cooler and coil for calibration

### Accessories



### DC Power Supply S12-5

Switch mode power supply for magnetic transducers; +12V/-12V



### Differential-to-Single Ended Signals Adapter 3DSA-05/1DSA-05

Converts differential transducer output signal to the single-ended-signal (for use with osciloscopes, data acquisition systems; etc)



### Zero Gauss Chamber ZG12

Chamber for ofset cancelling



### **Probe Head Support PHS-B**

The Probe Head Support PHS-B can be used as a holder for Hall Probe types A and E



### **Output Signal Cable CoXX-G**

The Output Signal Cable CoXX-G, (XX:= 20, 50, 100) is available with the following lengths: 2m, 5m, 10m. This cable is suitable for SENIS F3A, F1A, IxA magnetic transducers



### **Output Signal Cable COSxx-A**

Output Signal Cable for SENIS H3A low-noise magnetic transducers

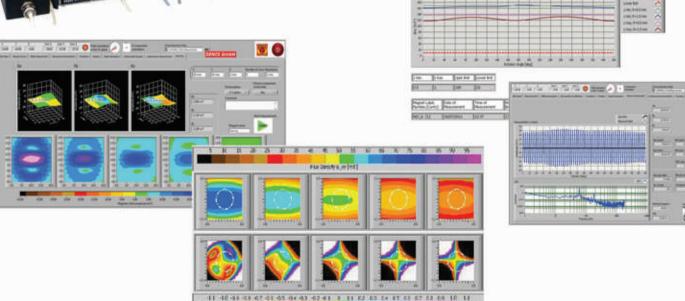
## Magnetic Field Mapper



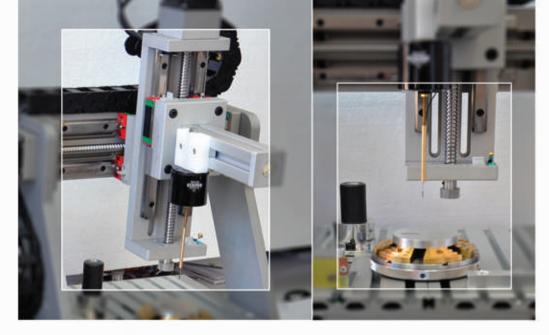
SENIS Magnetic Field Mapping System MMS-1-RS allows users to perform a fast and high resolution mapping of the magnetic field around an electromagnet or permanent magnet. The map of the magnetic field can be presented in different forms: color coded 2D or 3D isometric visual display, table of numerical values of the three components, the total magnetic field value, etc. Due to the unique features of the applied fully integrated CMOS Hall probe, all three components of the magnetic field (Bx, By, Bz) are measured simultaneously at virtually the same point. Optionally, a Hall probe can provide up to four adjustable magnetic field measuring ranges. The mapping system is controlled by an easy-to-use-software built on MS Windows platform and LabVIEW.

At the measurement start, the probe moves automatically to its "Home position". The coordinates of the "Home position" are stored relative to the mapper coordinate system that is defined by three optical boundary switches (one for each moving direction).

A Tactile Sensor (available as option) prevents a mechanical probe damage. It serves as an emergency stop provision, which is triggered whenever an object is touched by the probe during the measurement process. In addition, the tactile (touch) sensor is utilized for the absolute positioning of measured objects. When touching the characteristic points of the measured object the mapper captures the geometry and the absolute position of measured object relative to the mapper coordinate system.







### KEY FEATURES

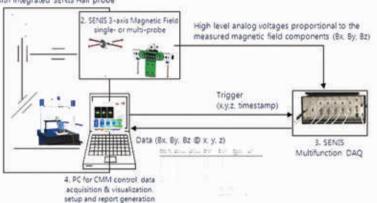
- Maximal Scanning volume (X x Y x Z):
  - standard: 135 x 135 x 135 mm3
  - optional: 500 x 500 x 135 mm³
- Scanning speed:
  - standard: adjustable, up to 50 mm/s
  - optional: adjustable, up to 100 mm/s
- Incremental rotational encoder for high resolution and high speed
- Scanning spatial resolution: down to 5 μm (down to 1 μm with incremental encoder)
- Point-to-point and continuous (on-the-fly) scanning
- Absolute magnet positioning utilizing Tactile (Touch) Sensor
- Rotation stage for the magnet under test
- 3-axis fully integrated CMOS Hall probe (Bx, By, Bz) with the spatial resolution (By: 0.03 x 0.005 x 0.03mm³; Bx and Bz: 0.15 x 0.01 x 0.15 mm³) and high angular accuracy (orthogonality error less than 0.1°)
- Up to 4 selectable magnetic field measurement ranges
- Accuracy of magnetic field measurement: better than 0.1%
- User's calibration of probe's sensitive area and of Hall sensor orthogonality utilizing a current conducting filament tool
- DC and AC field measurements from DC up to 2.5kHz (-3dB point); optional: up to 25kHz for 3-axis probe and 75 kHz for 1-axis probe
- Protection cabinet for safety operation
- Easy to use software on MS Windows platform
- Color coded 2D and 3D isometric representation of the magnetic field

### **OPTIONS**

- Tactile (touch) Sensor as:
  - emergency stop provision
  - absolute positioning of measured objects
- Incremental Rotational Encoder for step motor drivers, to provide a step motor control feedback (for higher resolution and higher speed)
- Protection Cabinet (to satisfy the CE directives for the production environments)
- In-field Calibration Tools

## PAGE 10 Magnetic Field Mappers

1. Coordinate Measuring Machine with integrated SENIS Hall probe-

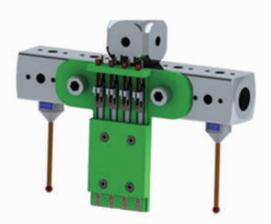


# Magnetic Field Mapper integrated in commercially available Coordinate Measuring Machine

The Magnetic Field Mapper System MMS-xI-CMM combines commercially available Coordinate Measuring Machine with the SENIS magnetic field-to-voltage transducer. The SENIS mapper system can be integrated in a newly purchased or in an already existing customer's CMM. The main system components are:

- Coordinate Measuring Machine (e.g. Carl Zeiss CMM) for automatic positioning of Hall Probes that allows magnetic field mapping within a preset distance over a curved concave or convex surface around the permanent magnet under test.
- High-resolution magnetic-field-to-voltage transducer, which consists of a 3-axis Hall probes (Bx, By, Bz) and an electronic module for analog signal processing.
- Multifunction data acquisition system, which receives data from transducer and sends them to a computer (USB interface).
- 4.PC that provides reports of the measured magnetic field values together with the corresponding measured coordinates (tables, 2D, 3D isometric displays).





Contract R&D

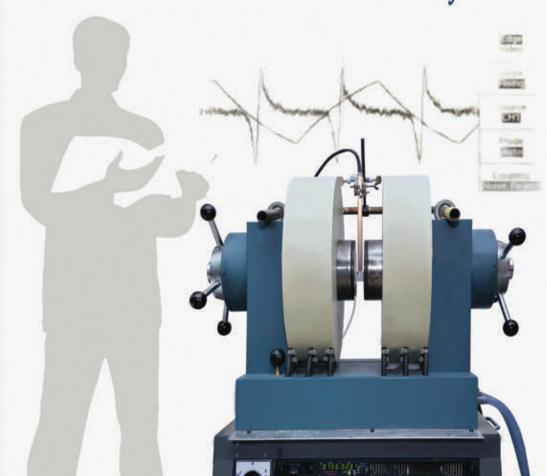
Engineering

AC Calibration

DC Calibration

Test Services

On-site and at our facilities



SENIS offers DC and AC calibration services for magnetic field measurement equipment in the field range of 1µT up to 8T. SENIS performs the calibration of the magnetic field measurement equipment according to the IEEE 1309-1996 standard.

### DC Calibration

DC calibration table provides the actual values of the magnetic transducer output voltage for the test DC magnetic field. The standard calibration table covers the linear range of magnetic field. Further calibration tables are available upon request.

By the utilization of the calibration table, the accuracy of DC and low-frequency magnetic field measurements can be increased up to the limit given by the resolution.

Field Range:

Low magnetic fields: 1µT (low-noise transducers) up to 45mT;
 Calibration equipment utilized: Helmholtz coils

Standard magnetic fields: 43mT up to 2.1T;
 Calibration equipment utilized: Precision NMR Teslameter

· Higher magnetic fields: up to 8T;

Calibration equipment utilized: Cryogenics system (bore diameter 50mm)

### Probe Dimensions:

 Length x Width x Thickness: 14-45mm x 2-5mm x 0.5-2.5mm (1-axis, 2-axis, 3-axis Probes)

Calibration Accuracy:

Better than 0.1% (1000ppm) for magnetic field < 2T</li>

 Better than 0.01% (100ppm) for magnetic field < 2T (with calibration table Vout vs. BNMR)

 Optionally, SENIS provides the measurement of the angular errors of the magnetic sensing axes (tilt, roll and pitch angles referenced to probe coordinate system)

Calibration Temperature:

Standard calibration temperature: 23°C ±3°C (room temperature)

 Optionally, calibration can be performed at higher temperatures, declared as the probe operating temperatures: max. +100°C

### AC Calibration

Calibration table of the frequency response provides the actual values of the transducer transfer function (complex sensitivity and Bode plots) for a reference AC magnetic field (Small Signal Characterization). The standard frequency response calibration table covers the transducer bandwidth. Further calibration tables are available upon request.

Utilization of the frequency calibration table allows an accuracy increase of the AC magnetic measurements almost up to the limit given by the resolution.

- Hall probe dimensions are not a limited factor (calibration set-up can be customized)
- Max amplitude of the periodic magnetic field used for calibration: 10mT
- Calibration temperature: 23°C ±3°C (room temperature)
- Frequency response can be provided for the magnetic field transducers with the dynamic range of magnetic flux density up to 10T

#### **Test Services**

Senis provides to its customers various Test Services for permanent magnets and magnetic and electromagnetic systems:

- Magnetic field mapping around small simple or multipole magnets
- · Mapping of magnetic field around large coils
- · High temperature treatment of magnets
- Detection of cracks in permanent magnets

### Consulting, Engineering, Contract R&D

- Hall Probes
- Integrated Magnetic Sensors
- Magnetic Measurements
- Current Measurements
- Low-Noise Interface Electronics
- Test & Measurement Systems



## Senis Distributors



North American Distributor
GMW Associates, USA
www.gmw.com
sales@gmw.com

### Asian Distributor

IMS co., Itd, Japan www.ims-jp.com www.senis.jp info@ims-jp.com sales@senis.jp

Russian Distributor
RTI Cryomagnetic Systems, Russia
www.cryo.ru
e.kostrov@cryo.com

### SENIS AG

Switzerland www.senis.ch info@senis.ch

# ▶▶▶ Our World Records:

the only fully integrated 3-axis Hall Probe on the market

the smallest and thinnest 3-axis Hall Probe

magnetic field transducer & teslameter

with the highest resolution

and the highest frequency bandwidth

magnetic field measurements with the highest accuracy

### **SENIS AG**

Switzerland

Phone: +41 43 205 2637 Phone: +41 43 205 2638 e-mail: info@senis.ch

