DESCRIPTION

The 3MTS is an easy-to-use handheld Teslameter/Gaussmeter to measure all 3 magnetic field components simultaneously within a very small a volume. It comes in two different versions.

In the 3MTS-1 the 3-axis Hall probe is mounted in a thin but robust carbon-fiber holder attached to the electronic control module.

In the 3MTS-2 the small 3-axis hall probe is connected with a flexible cable to the electronic control module. This is ideal for measuring fields in difficult to access places.

The integrated on-chip temperature sensor allows to generate a temperature compensated measurement output.

The 3MTS is connected with an USB cable to a PC or tablet for control, data acquisition and data visualization. All three components and the total value of the magnetic field as well as the probe temperature are displayed by the 3MTS software graphically. The easy to use software supports export of the measured data and includes alarm triggers and min/max hold functions.

The 3MTS has been developed by Senis in cooperation with its partner company Matesy.

KEY FEATURES

- **Handheld Teslameter/Gaussmeter with 3-axis Hall probe**
- **Compact, light and robust packaging**
- **3MTS-1: Carbon-fiber probe holder for high robustness and flexibility**
- **3MTS-2-Xm: Ceramic probe connected by a thin cable**
- **Hall probe thickness, including holder: 1 mm**
- **Measurement ranges: 100 mT, 500 mT, 3 T and 20 T**
- **Calibration certificate for all measurement ranges included**
- **Accuracy: better than ±1.0 % of full range**
- **Frequency bandwidth: DC to 0.5 kHz**
- **AD Conversion: 12 bit**
- **Computer Interface: USB2, USB3**
- **User-friendly software for Windows**
- **Numerical and graphical visualization of all three components of the magnetic field, B_X, B_Y and B_z as well as B_{TOTAL}, B_{MAX}, B_{MIN} and probe temperature**
- **Alarm, MIN/MAX Hold and Zeroing functionality**
- **Data export to CSV / Excel**
- **Application programming interface (API) for integration in 3rd party software**



Figure 1: 3MTS-1 (left) and 3MTS-2-2m (right) USB Handheld Teslameters

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TECHNICAL SPECIFICATIONS

Magnetic measuring properties	Value			
Measurement ranges: B_{RANGE}	±100 mT	±500 mT	±3 T	±20 T
Noise level (peak to peak, 6σ)	400 µT	1.7 mT	10.0 mT	-
Noise level (1s averaging time, peak to peak, 6σ)	50 µT	120 µT	500 µT	-
Accuracy (% of B_{RANGE})	1 %	1 %	2 % (±2 T) 3 % (±3 T)	5 % (estimated)
Calibration at reference magnetic field	±80 mT	±80 mT	±80 mT	±80 mT
Field Sensitive Volume (FSV) XxYxZ	(150x10x150) µm			
Angular accuracy	<±2° with respect to the reference surface			
Long term stability	<1 % over 10 years			
Electrical properties				
AD Conversion	12 bit			
Sampling frequency	1 kHz			
Frequency bandwidth	DC to 0.5 kHz			
Operation temperature	(-20 to +85) °C			
Operation temperature ceramic probe and cable (3MTS-2)	(-20 to +160) °C			
General properties				
Product Versions	3MTS-1: Probe integrated in carbon probe holder 3MTS-2-X: Ceramic probe connected with cable (X: length of cable in m)			
Weight	20 g (3MTS-1)			
Dimensions (LxWxH)	3MTS-1: (162 x 22.5 x 10.5) mm Electronic box: (62 x 22.5 x 10.5) mm			
Scope of delivery	3MTS USB-Cable Memory stick with software, API, manuals Plastic carrying case			
Computer requirements	Microsoft Windows 7, 10 Compatible with USB 2.0 or 3.0			

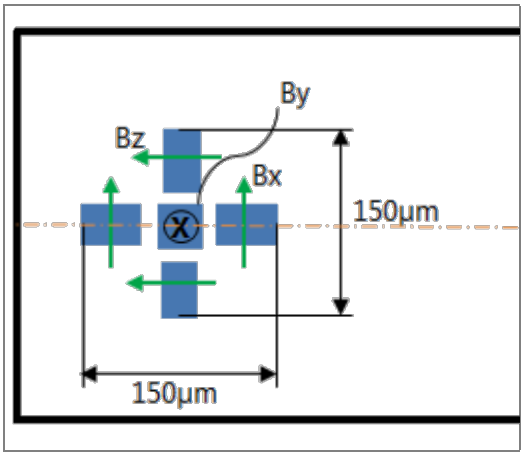


Figure 2: Dimensions of the field-sensitive volume of the fully integrated 3-axis Hall sensor chip.



Figure 3: Plastic carrying case

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3MTS-1 SPECIFICATIONS

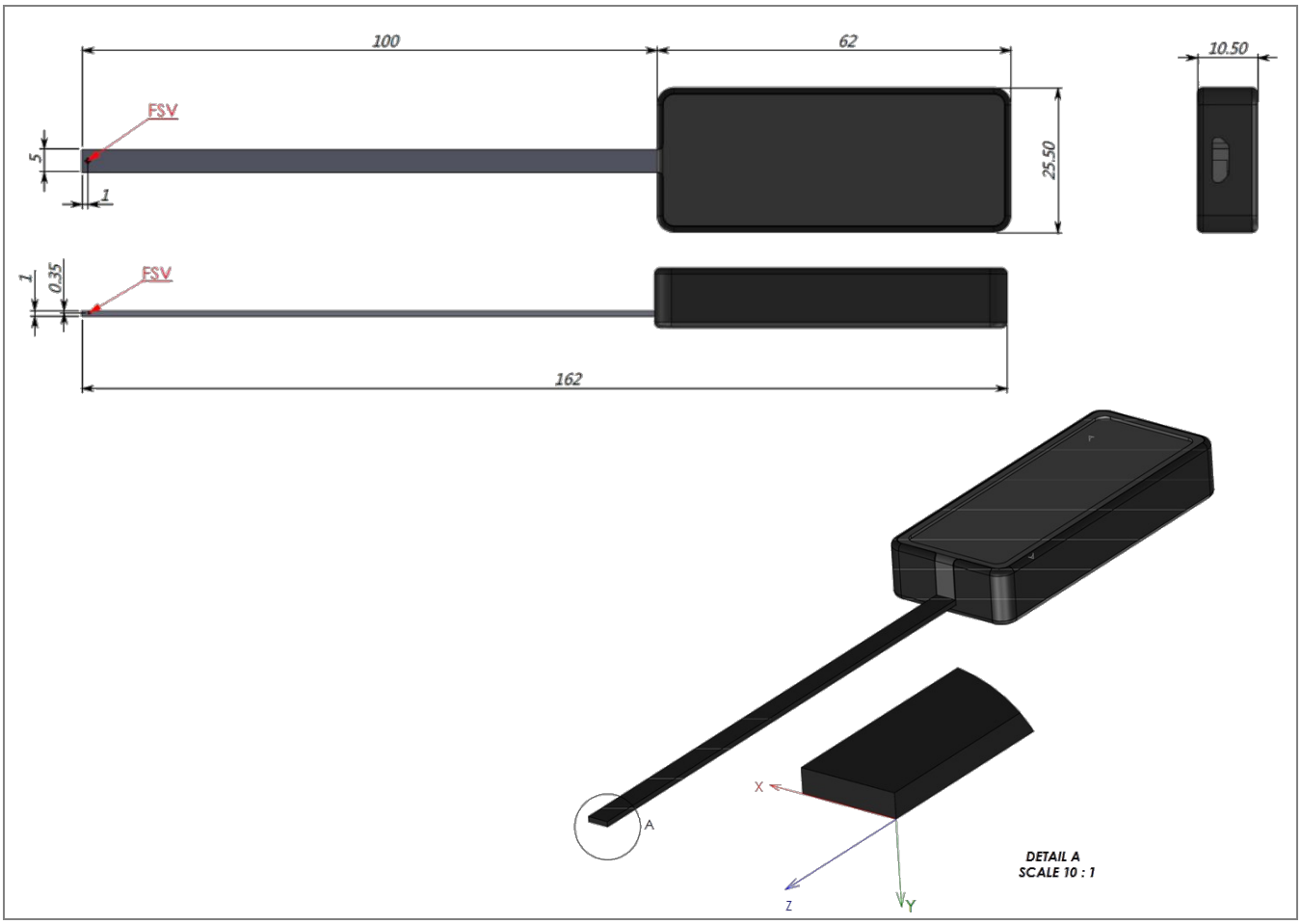


Figure 4: Standard dimensions of 3MTS Handheld Teslameter, the carbon-fiber probe holder and position of the field sensitive volume (FSV). All measures are given in millimeters.

Dimensions	X [mm]	Y [mm]	Z [mm]
Center of the field sensitive volume (FSV)	2.5 ± 0.1	-0.65 ± 0.05	-1 ± 0.1
Dimensions of carbon probe holder dimensions	5.0	100	1.0

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3MTS-2 SPECIFICATIONS

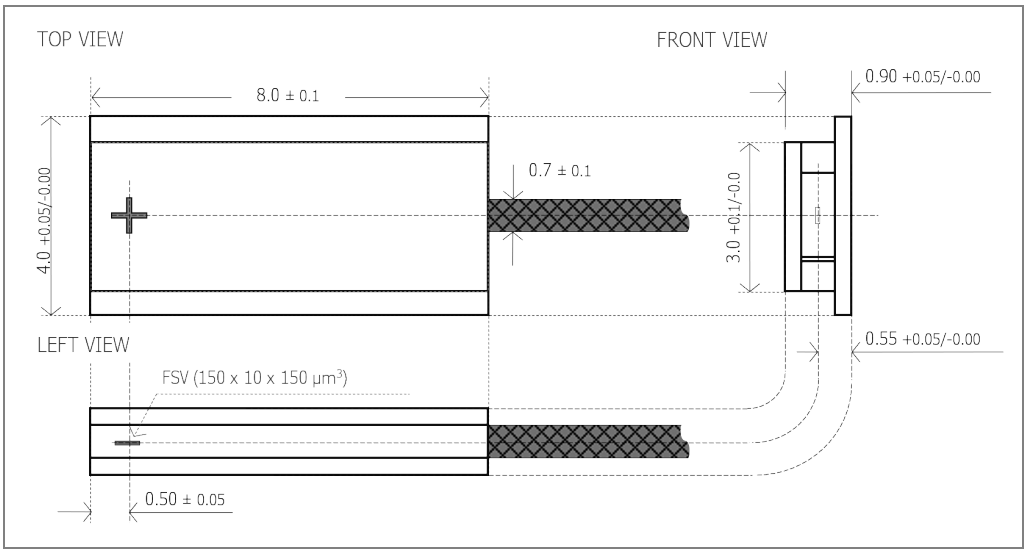


Figure 5: Dimensions of the Hall probe and position of the Field Sensitive Volume (FSV)

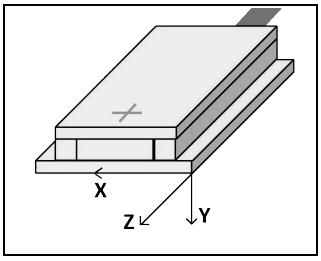


Figure 6: Coordinate system

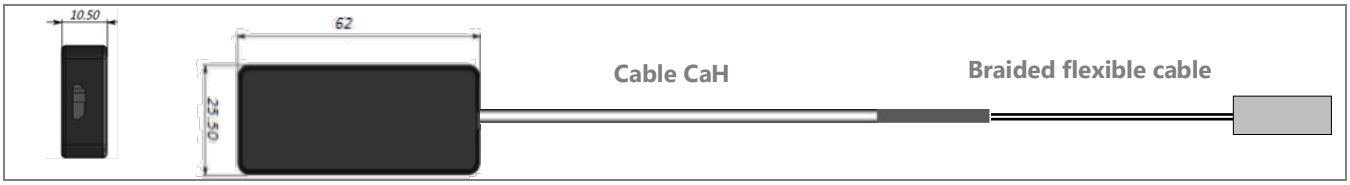


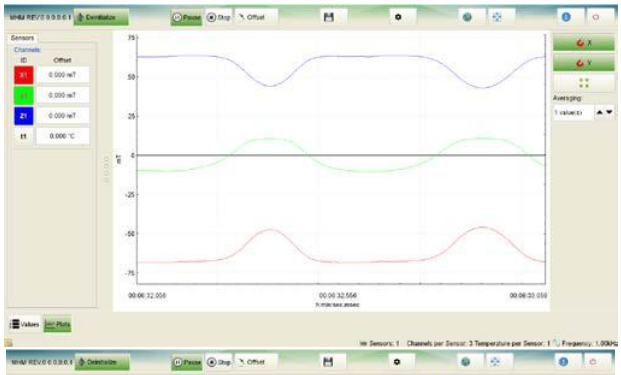
Figure 7: Conceptual design of electronic box and cabling of Hall probe

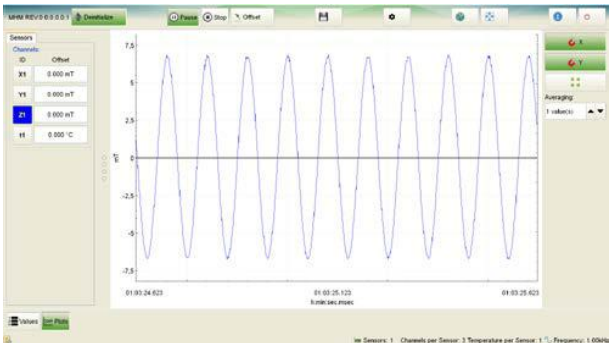
Cable specification	Description
Copper braided flexible cable	∅ 0.7mm x 50 mm
CaH cable	∅ 1.7 mm ± 0.1 mm x 1 m (optional 2 m and 5 m) Twisting: 15 x Diameter Shield: Silver plated soft copper braid Jacket: PFA

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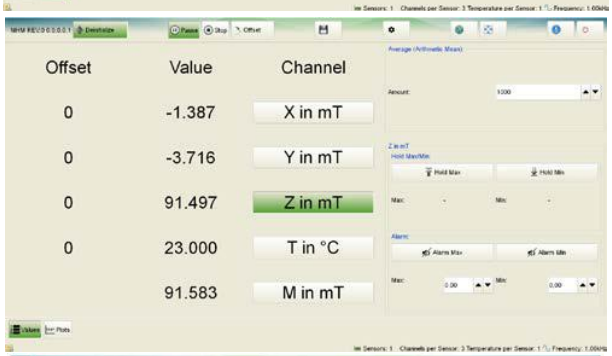
a)





b)





c)





Figure 8: a) Graphical visualization of the measured data (B_X, B_Y, B_Z, B_{TOTAL}, T); b) Numerical presentation of the measured data (Bx, By, Bz, Btotal, T), Hold MAX/MIN and alarm function; c) Setup tab and data output

Typical Applications

- **Quality control and monitoring of permanent magnets & magnet systems**
- **Measurement of the environmental magnetic field**
- **Development of magnet systems & process control**
- **Magnetic field mapping**
- **Applications in production lines and laboratories**

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