DESCRIPTION

3MTS is the USB handheld Teslameter/Gaussmeter developed in cooperation with SENIS' partner company Matesy.
The 3MTS incorporates a fully integrated 3-axis Hall Probe, which is integrated in a specially designed carbon-fiber holder to provide the mechanical protection of the probe. The probe holder is 4mm wide and only 1mm thick to allow a measurement of the magnetic field in narrow air gaps.
The Hall probe is connected to a compact and light electronic module, providing the measured signal conditioning; the 12bit AD conversion; the device calibration; and an USB connection to the host computer.
The Hall probe on-chip temperature sensor allows a temperature compensated output signal for each three magnetic field components (Bx, By and Bz).
The easy-to-use Teslameter software running on a MS Windows computer, tablet or smartphone is used for the data acquisition, Teslameter power supply and control and for measured data visualization. The measured data are visualized in numerical and graphical colored displays, allowing an easy readability and intuitive setup of alarm triggers, hold function and measured data storage. The total value of the magnetic field, as well as all three components of the magnetic field and the probe temperature are displayed. In addition, the min/max values of the magnetic field components can be presented.

KEY FEATURES

- **Teslameter/Gaussmeter with 3-axis Hall probe**
- **Very compact and light robust plastic packaging**
- **Version 1 (3MTS-1): Carbon-fiber probe holder for extreme robustness and flexibility**
- **Version 2 (3MTS-2): Probe connected by a thin cable (available cable lengths: 1m, 2m, 5m)**
- **Hall probe thickness, including the holder: 1mm**
  Calibrated measurement ranges: 0.1T, 0.5T, 2T
- **Non-calibrated measurement range: 20T**
- **Accuracy: better than ±1.0%**
- **Magnetic resolution: 20uT**
- **Frequency bandwidth: DC – 500Hz**
- **AD Conversion: 12bit**
- **Computer Interface: USB2, USB3**
- **EEPROM for calibration data storing**
- **User-friendly Teslameter software for PCs, tablets and smartphones**
- **Numerical and graphical visualization of all three components of the magnetic field, Bx, By and Bz as well as B_{Total}, B_{max}, B_{min} and probe temperature**
- **Alarm, Hold and Zeroing functionality**
- **Measured data storage**
- **Plastic packing case**

Figure 1: **3MTS USB Handheld Teslameter.**
On the right: Version 1: Carbon-fiber probe holder**; On the left:** Version 2: Probe connected by a thin cable

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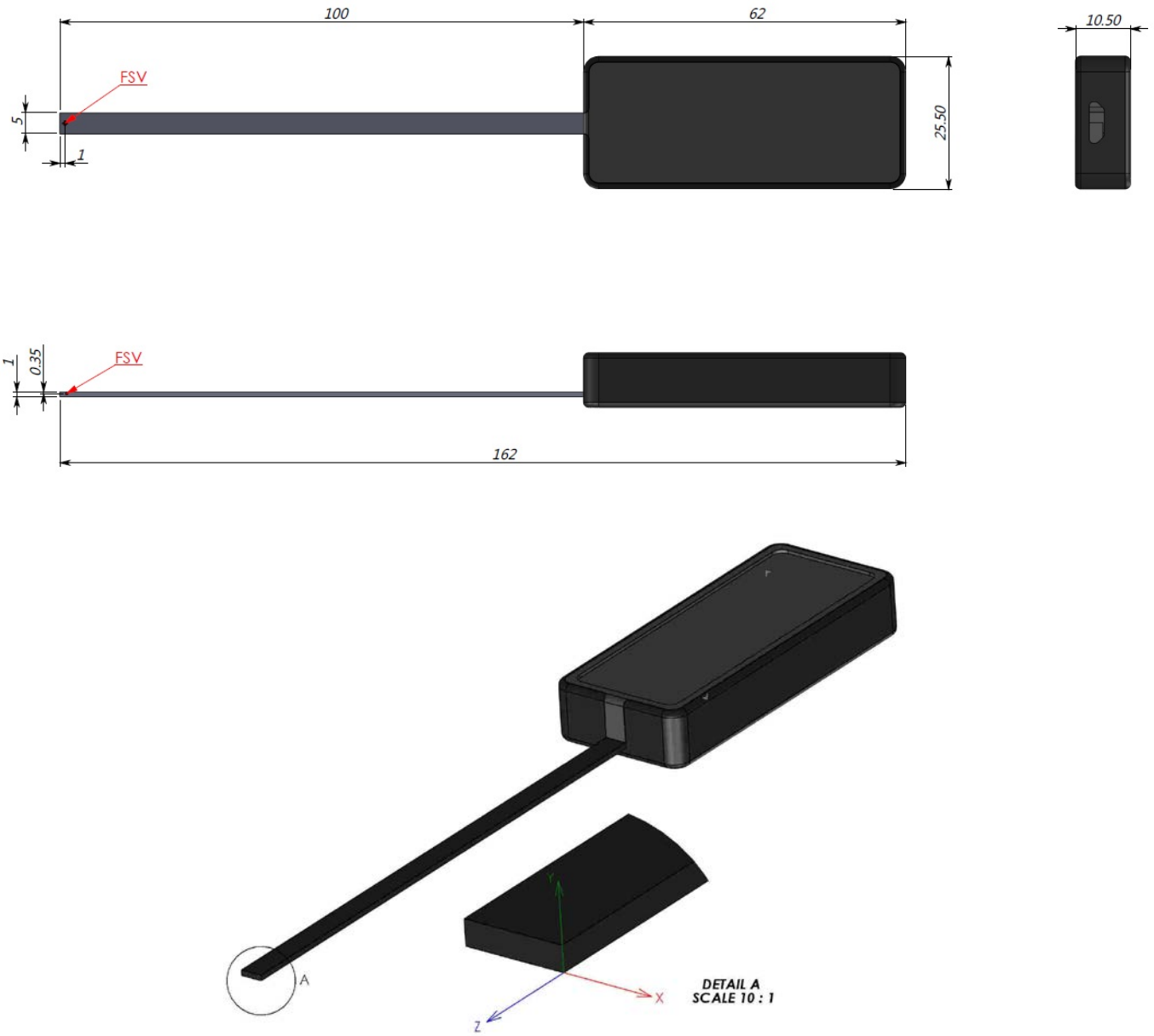
DETAILED SPECIFICATION - Version 1 (3MTS-1)



Dimension	X [mm]	Y [mm]	∠ [mm]
Magnetic field sensitive volume (MFSV)	0.14	0.01	0.14
Position of the center of MFSV	-2.5 ±0.1	0.65±0.05	-1 ± 0.1

Figure 2: **Standard dimensions of 3MTS Handheld Teslameter, the carbon-fiber probe holder and position of the field sensitive volume (FSV)**

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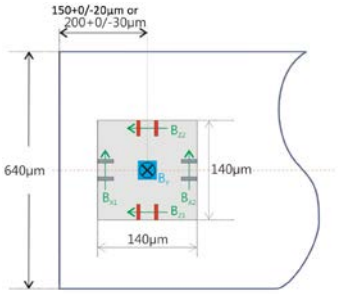

Figure 3: **Dimension of Field Sensitive Volume of the fully integrated 3-axis Hall sensor chip**

DETAILED SPECIFICATION - Version 2 (3MTS-2-1m; 3MTS-2-2m; 3MTS-2-5m)

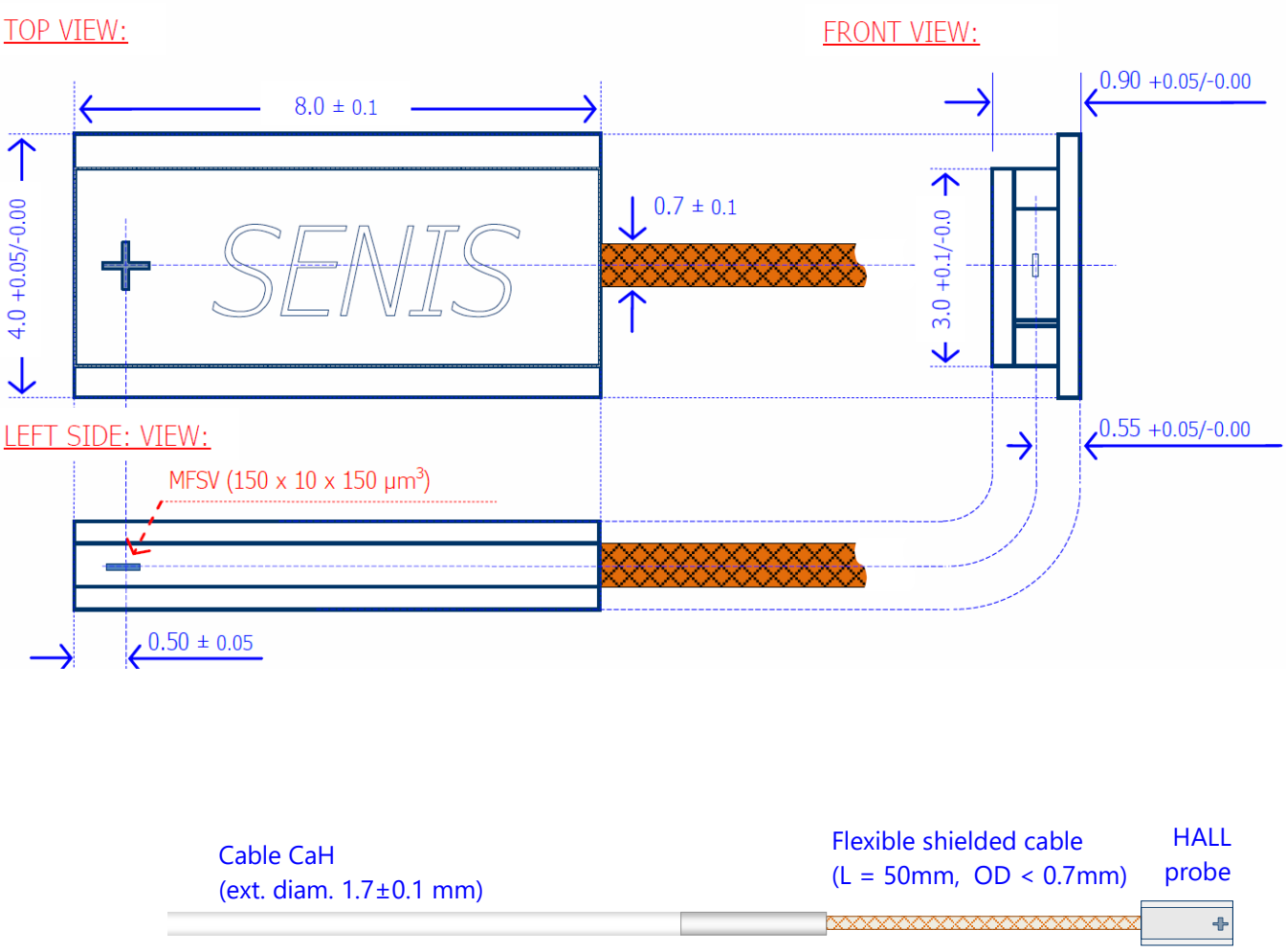

Figure 4: **Dimensions of the C-type Hall probe and Cable CaH (available lengths: 1m, 2m, 5m). All measures are given in millimeters.**

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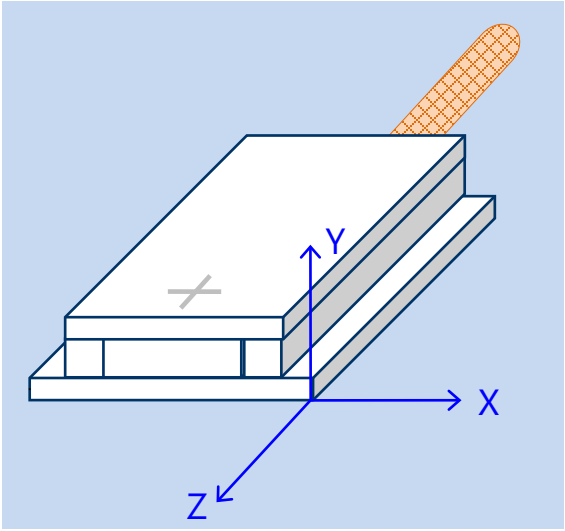

Figure 5: **Reference Cartesian coordinate system of the integrated C-type Hall probe**

Dimension	X [mm]	Y [mm]	Z [mm]
Magnetic field sensitive volume (MFSV)	0.15	0.01	0.15
Position of the center of MFSV (see Figures 4 and 5)	-2.0 ±0.1	0.55 ±0.05	-1.0 ±0.1
Total Probe external dimensions	4.0 ±0.05	0.90 ±0.05	8.0 ±0.1
Angular accuracy of the axes	< ±2° with respect to the reference surface		
CaH Cable (construction and characteristics)	Thin Cable:	Copper braided flexible cable, ext. diameter < 0.7 mm	
	Conductor:	Silver plated soft copper core, 7 x 44 AWG	
	Insulation:	PFA (Perfluoro Alkoxy), diameter ≈ 0.3 mm	
	Twisting:	15 x Diameter	
	Shield:	Silver plated soft copper braid	
	Jacket:	PFA (Perfluoro Alkoxy)	
	Service temp.:	-196 / +200 °C	
	Linear resistance:	1.4 Ω/m	
	Rated voltage:	150 Vac	
	RoHS compliance:	Yes	
Total length of the CaH cable:	- Standard: 1 m - Optional: 2m and 5m		

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MAGNETIC AND ELECTRICAL SPECIFICATION

Unless otherwise noted, the specifications summarized in the table below apply for all three measurement channels Bx, By, and Bz at the room temperature (23°C) and after a 15 minutes' device warm-up time.

Parameter	Value			
Standard measurement ranges	± 100mT	± 500mT	± 3T	± 20T
Linear/Calibrated range of magnetic flux density (± B_{LR})	± 100mT	± 500mT	± 2T	± 2T
Total Accuracy (@ B < ± B_{LR})	1 % of B_{range}			
Planar Hall Voltage impact (@ B < ± B_{LR})	< 0.01 % of $B_{perpendicular}$			
Long-term instability	< 1% over 10 years			
Magnetic Resolution (no averaging)	< 400 µT	< 1.8 mT	< 11 mT	-
Magnetic Resolution (with averaging; integration time 1s)	< 20 µT	< 70 µT	< 320 µT	-
AD Conversion	12bits			
Sampling frequency	1kHz per measurement channel			
Frequency bandwidth	DC - 500 Hz			
Operating temperature range 3MTS-1	-20°C - +85°C			
Operating temperature range 3MTS-2	Calibrated range (electronic part): -20°C - +85°C Hall probe with cable: -20°C - +160°C			

Figure 6: **Plastic Packing Case**

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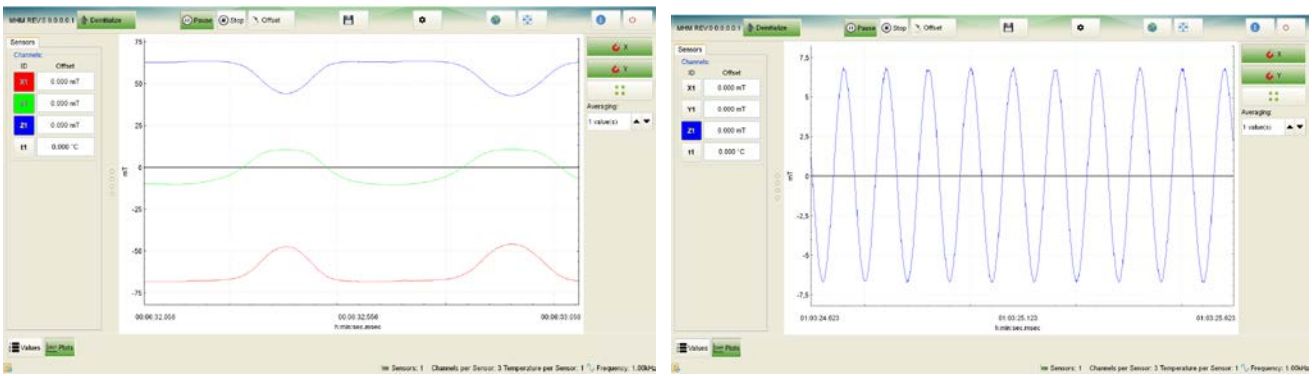
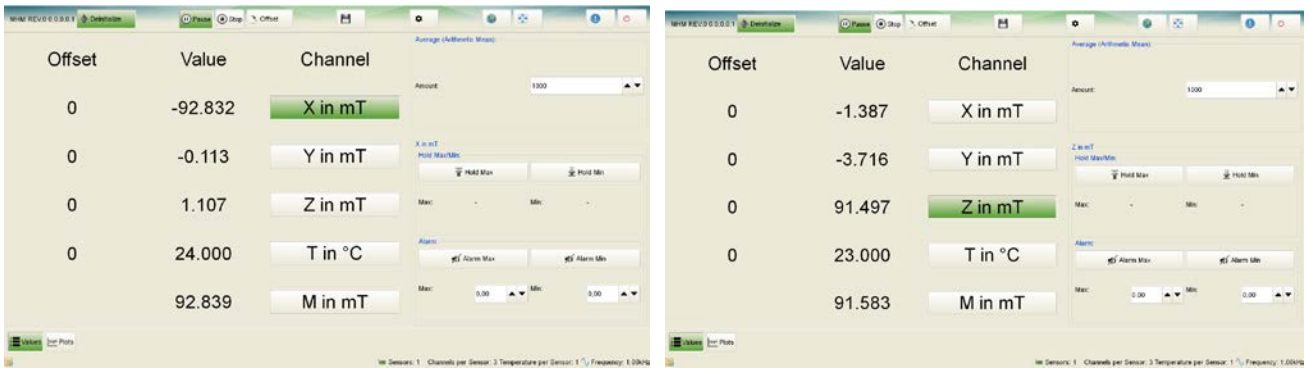
TESLAMETER SOFTWARE

a)



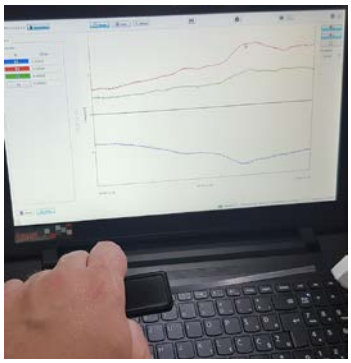
b)



c)

Figure 7: **a) Graphical visualization of the measured data (Bx, By, Bz, Btotal, T°); b) Numerical presentation of the measured data (Bx, By, Bz, Btotal, T°), as well as Hold function, Bmin, Bmax data, hold and alarm function; c) Setup tab and data store settings.**

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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