

## DESCRIPTION

The NTA1 Nanoteslameter is a high performance magnetic field measuring instrument based on the high magnetic resolution Anisotropic Magneto Resistance (AMR) sensors, for measurement of the magnetic field from nT (nano Tesla) up to 100 $\mu$ T (1 gauss). SENIS provides 1-, 2-, or 3-axis Nanoteslameters that include one compact AMR probe with very high spatial resolution (few millimeters), an electronic module for signal conditioning and user-friendly LabVIEW software for data acquisition and visualization. The electronic module made of non-ferrite materials includes a power supply unit, data acquisition card with 16bit AD converters, signal amplifiers, temperature compensation and probe biasing unit. The probe cable can be extended up to 40m by use of a special electronic interface.

## KEY FEATURES

- **Measurement range: 1nT – 0.1mT**
- **Measurement accuracy: <1%**
- **Magnetic field resolution: 500pT**
- **Noise Spectral Density: 1nT/ $\sqrt$ Hz**
- **1-, 2-, 3-axis AMR probe**
- **Very small probe dimensions**
- **High spatial resolution: 1.25x0.5x0.25mm**

## TYPICAL APPLICATIONS

- **Monitoring and active cancelation of environmental magnetic fields**
- **Measuring stray magnetic fields of electrical machines**
- **Directional drilling**



Figure 1: Photograph of the Figure 1: Photograph of the FigureNanoteslameter

## Dimensions and characteristics

Probes for Nanoteslameter are based on the Anisotropic Magneto Resistance sensors (AMR) for measurement of very low magnetic fields from nT (nano Tesla) up to  $100\mu\text{T}$  (1 gauss). Probes can be assembled to measure one component of the magnetic field, two components or all three components of the magnetic field.

All probes have same dimensions and are made very small and compact in order to allow magnetic field measurements in a small spatial area. The photograph of the probe shown in figure 2, dimensions of the field sensitive volume (FSV) is shown in figure 3 and dimensions of the AMR probe and the FSV position are shown in figure 4.

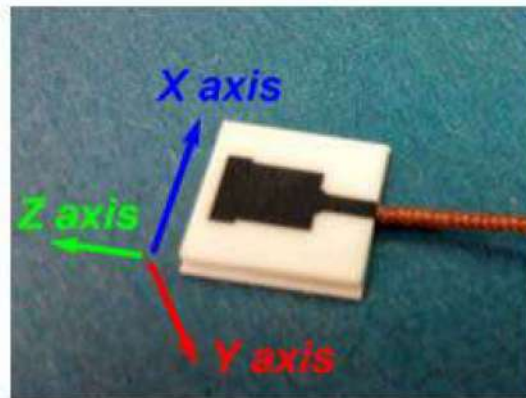


Figure 2: Sensitivity axis of AMR probes

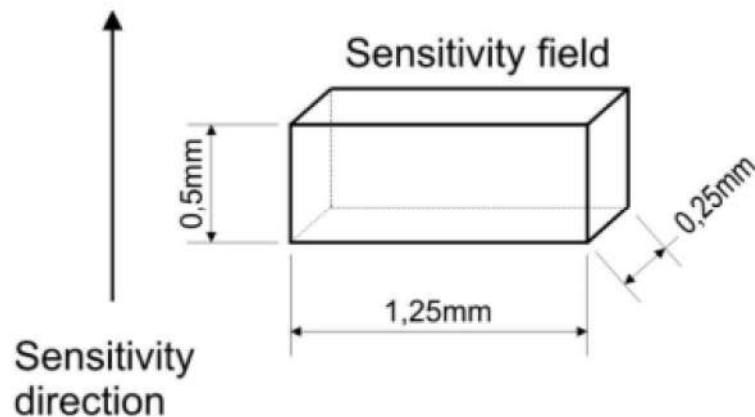


Figure 3: Field sensitive volume (FSV) of one AMR sensor

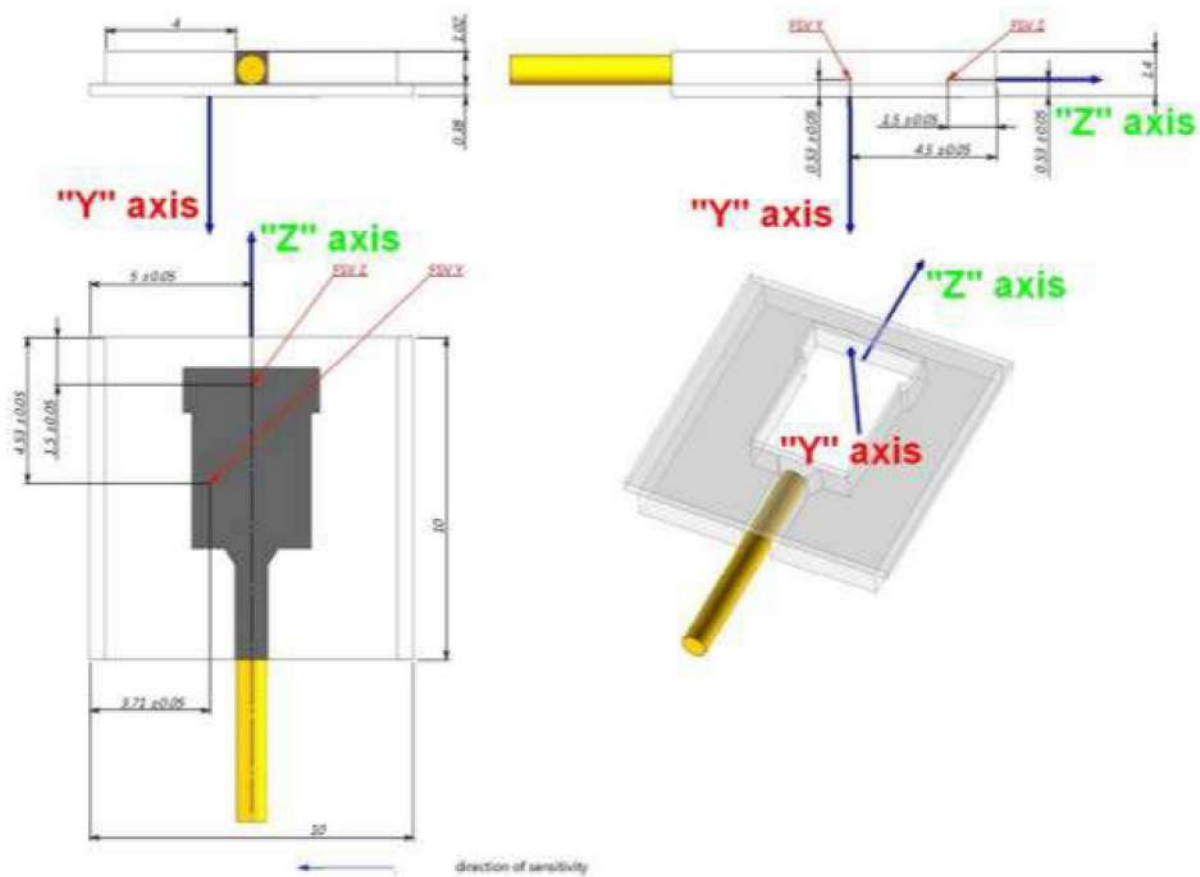


Figure 4: Dimensions of 2-axis AMR probe and position of FSV (field sensitive volume) of AMR sensors (dimensions are in millimeters)



Figure 5: Electronic module with 16 bits ADS and sampling rate 400 kS/s. Dimensions are 235x133x255mm.



Figure 6: Cable extension electronic interface: the cable length from 2m to 40m and more

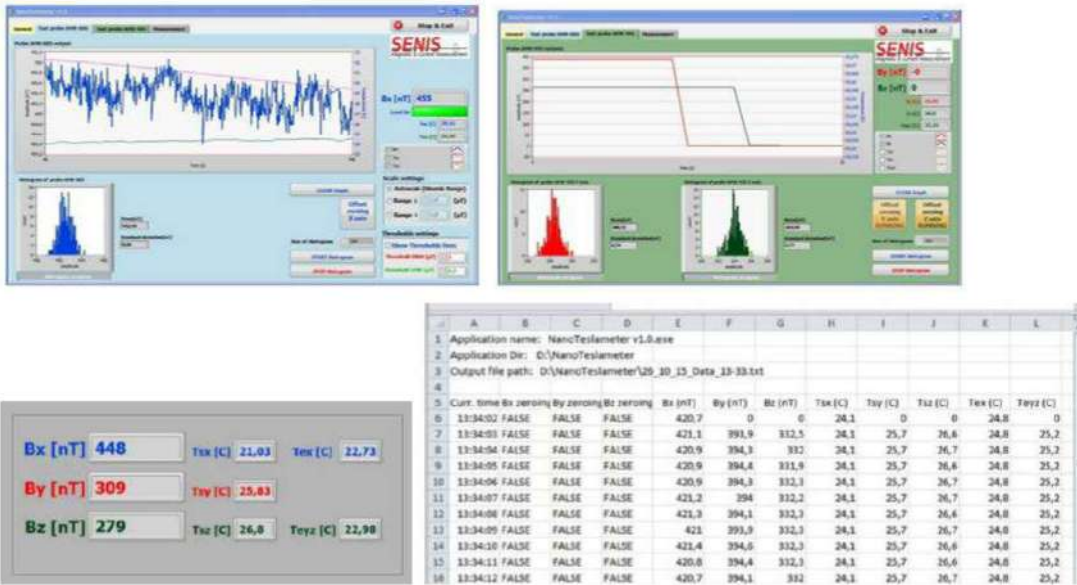


Figure 7: Nanoteslameter Software: measured data visualitation with histogramms, test data for calibration, measured data export to excel sheet for further analysis



### 3NTA1 Nanoteslameter specifications

Unless otherwise noted, the given specifications apply at room temperature (23°C) and after a device warm-up time of 15 minutes.

Parameter	Nominal value	Remarks
<b>Range</b>		
Temperature range	+15°C to +35°C	Optimal temperature range
Measured range	±0,1mT	Optimal measurement range
<b>Accuracy</b>		
Resolution	1nT rms	rms - Root Mean Square
Base accuracy	<1%	
<b>Sensitivity</b>		
Nominal sensitivity	0,1582mV/nT (for X axis)	
	0.1076mV/nT (for Y axis)	
	0,1073mV/nT (for Z axis)	
Tolerance of sensitivity	±0.02% of $S_{NOM}$	
Temperature coefficient of sensitivity	-0.02%/°C	
Long-term instability of sensitivity	<1% over 10 years	
<b>Offset</b>		
Offset (B = 0T) $B_{Off}$	448nT on "X" axis	Can be canceled during measurements
	309nT on "Y" axis	
	279nT on "Z" axis	
Offset temperature coefficient	0.2nT/°C	
<b>Frequency response</b>		
Bandwidth	DC - 1 Hz	
<b>Cables for interconnection</b>		
From PC to Electronic interfaces	USB2.0 A-B High Speed	