DESCRIPTION

The *SENIS* 3-Axis Analog Nanoteslameter 3DANT-1 is a compact instrument that measures all 3 components of magnetic fields in the range of ±500µT (±5 gauss) with very high resolution.

The measurement probe contains a 3-Axis AMR sensor. The probe is connected with an electronic box, which provides the power to the probe, the Set/Reset pulses for "flipping" the analog outputs, amplifiers, demodulators and a Low-pass-filter (LPF) for suppressing unwanted spikes that come from flipping the outputs. The subtracting the two readings (after Set and after Reset pulse) eliminates any temperature induced drift and electronics offsets. This due to the fact that the polarity of the sensor output is reversed, while the offsets associated with the sensor and the signal conditioning electronics keeps its sign, so it can be synchronously canceled.

KEY FEATURES

- **Measurement range ±500µT (±5 gauss)**
- **Frequency bandwidth DC to 500Hz**
- **Magnetic field resolution better than 20nTrms**
- **Analog outputs in the range of ±10V**

TYPICAL APPLICATIONS

- **Mapping of low magnetic fields**
- **Contactless low current sensing**
- **Applications in research, medical, semicon and space and defense laboratories**

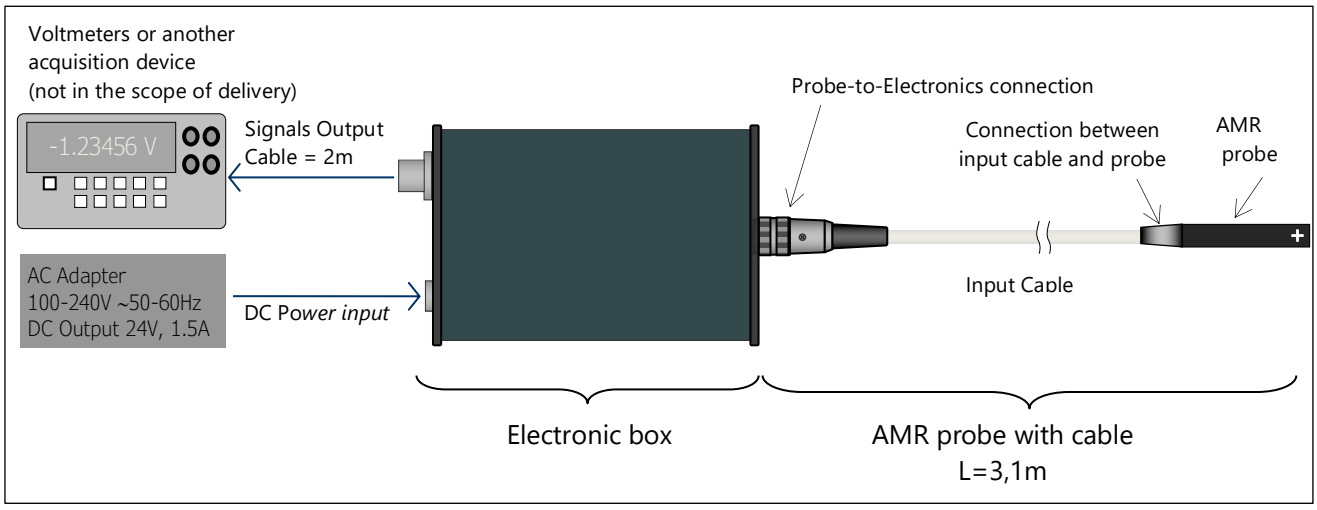


Figure 1: Typical measurement setup with 3DANT-1

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TECHICAL SPECIFICATIONS	
ELECTRICAL	
Full measurement range	±500µT
Magnetic resolution	Better than 20nTrms
Output Signals	3 differential outputs: for X, Y and Z axis (in range ±10V) and one ground-referred signal (0V-10V range) for the temperature probe environment reading.
Input Noise Spectral Density @ f > 10 Hz	Better than $400\mathrm{pT}/\sqrt{\mathrm{Hz}}$(1) .
Measurement bandwidth	DC – 500Hz (3dB)
Sensitivity	20±1% mV/µT Sensitivity along each axis can be expressed as a second-degree polynomial as a function of the measured voltage. For example, for the X-axis sensitivity can be calculated as: $S_x\left[\frac{mV}{\mu T}\right] = a_2 \cdot \left(V_{out_x}[V]\right)^2 + a_1 \cdot V_{out_x}[V] + a_0$ where: – $V_{out_x} = V_{meas_x} - V_{offset_x}$, – V_{meas_x} is measured voltage on X axis output and – V_{offset_x}, a_2, a_1 and a_0 are given values (1). The magnetic induction can be calculated as: $B_x[\mu T] = V_{out_x}[mV] / S_x[\frac{mV}{\mu T}]$, where $V_{out_x} = V_{meas_x} - V_{offset_x}$.
Offset	(1)
Estimated temperature Coefficient of the Offset	< 5nT/°C (< 0.1mV/°C)
Relative Error	< ±2%FS(1) , if nominal sensitivity of 20mV/µT is used < ±0.2%FS(1) , if a second-order polynomial is used to calculate the sensitivity
Temperature output	Temperature output slightly depends on magnetic flux density which sensor is exposed. See detailed specification for the probe and electronic box.(1)
Power consumption	0.25A @24VDC

[1] ***See detailed specification for the specific probe and electronic box***

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TECHICAL SPECIFICATIONS	
MECHANICAL	
Electronic box	
Dimension (L x W x D)	230 x 108.5 x 45mm, see Figure 2.
Input connector	EGG.3B.322.CLL (LEMO) *Mating with probe connector* FGG.3B.322
Output signal connector	SACC-DSI-M12FS-8CON-M16 (PHOENIX CONTACT) Sensor/actuator flush-type socket, 8-pos., M12 SPEEDCON, rear/screw mounting with M16 thread, with straight solder connection, female *Mating plug:* M12-A1-P8, male
Output signal cable	CO20-X-V2 (2m length)
Power supply connector	DC POWER JACK PJ-066B *Mating plug:* EP501B - Power Barrel Connector, Plug, ID 2.5 mm, OD 5.5 mm)
Weight	0.7kg
Probe	
Probe connector	FGG.3B.312.CLAD62Z (LEMO)
Sensor type	AMR
Sensitivity area dimensions	1.45 mm x 1.45 mm x 0.25mm
Holder dimension	100mm x 4mm x 8.5±0.15mm, See Figure 3.
Sensitivity area position	See Figure 4.
Probe Cable Length/ Type	3±0.1m / 2-LifYCY 6x2x0.08qmm TP



Figure 2: Photo of Electronic Box and AMR Probe.

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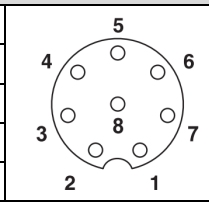
Signal Name	Pins	
Field signal X-, X+	4, 5	
Field signal Y-, Y+	6, 7	
Field signal Z-, Z+	1, 2	
Probe temperature Vpt	3	
Signal common (GND)	8	

Table 1: Output signal connector pin assignment, female side view.

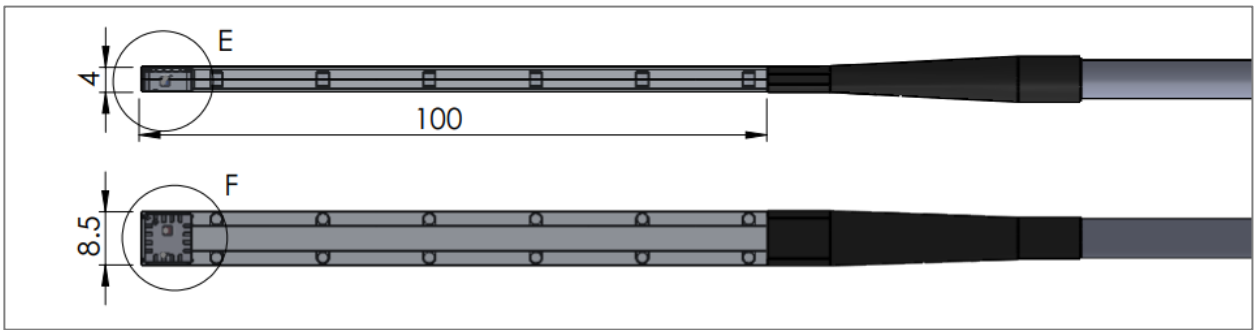


Figure 3: Holder dimension (all units are in millimeters).

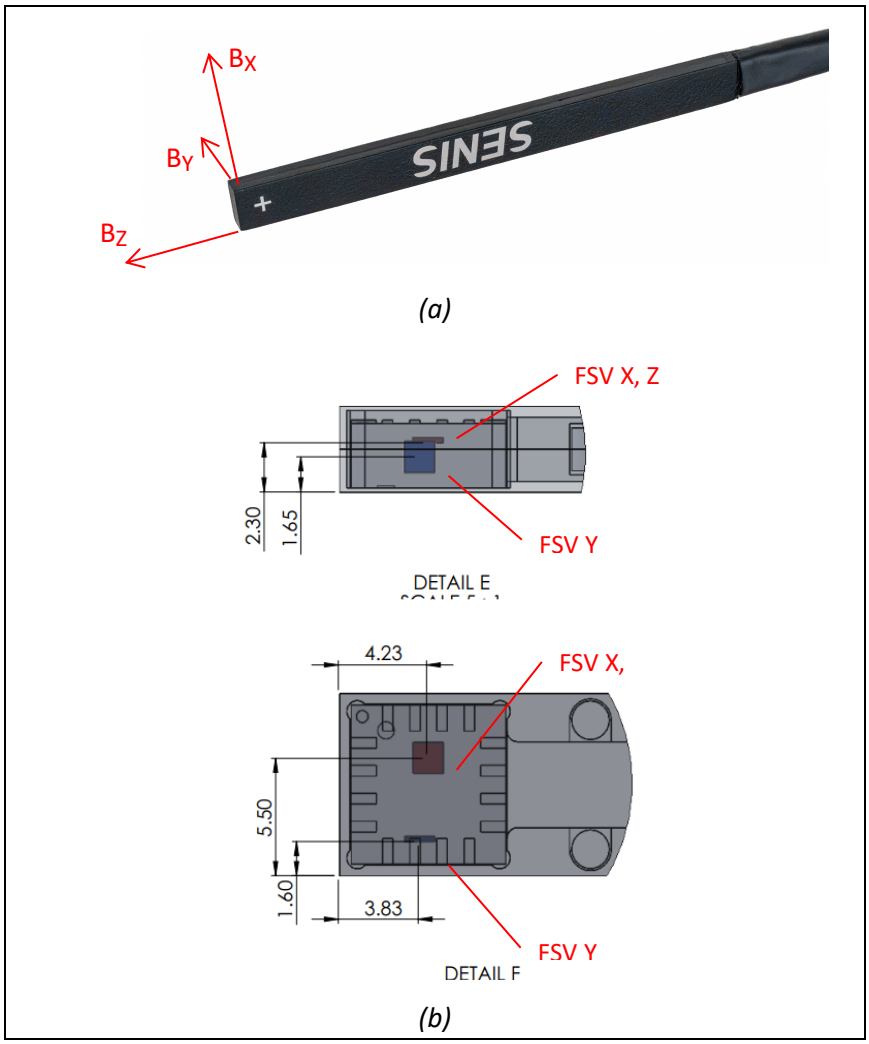


Figure 4a: Axis orientation; Figure 4b: FSV position (all units are in millimeters).

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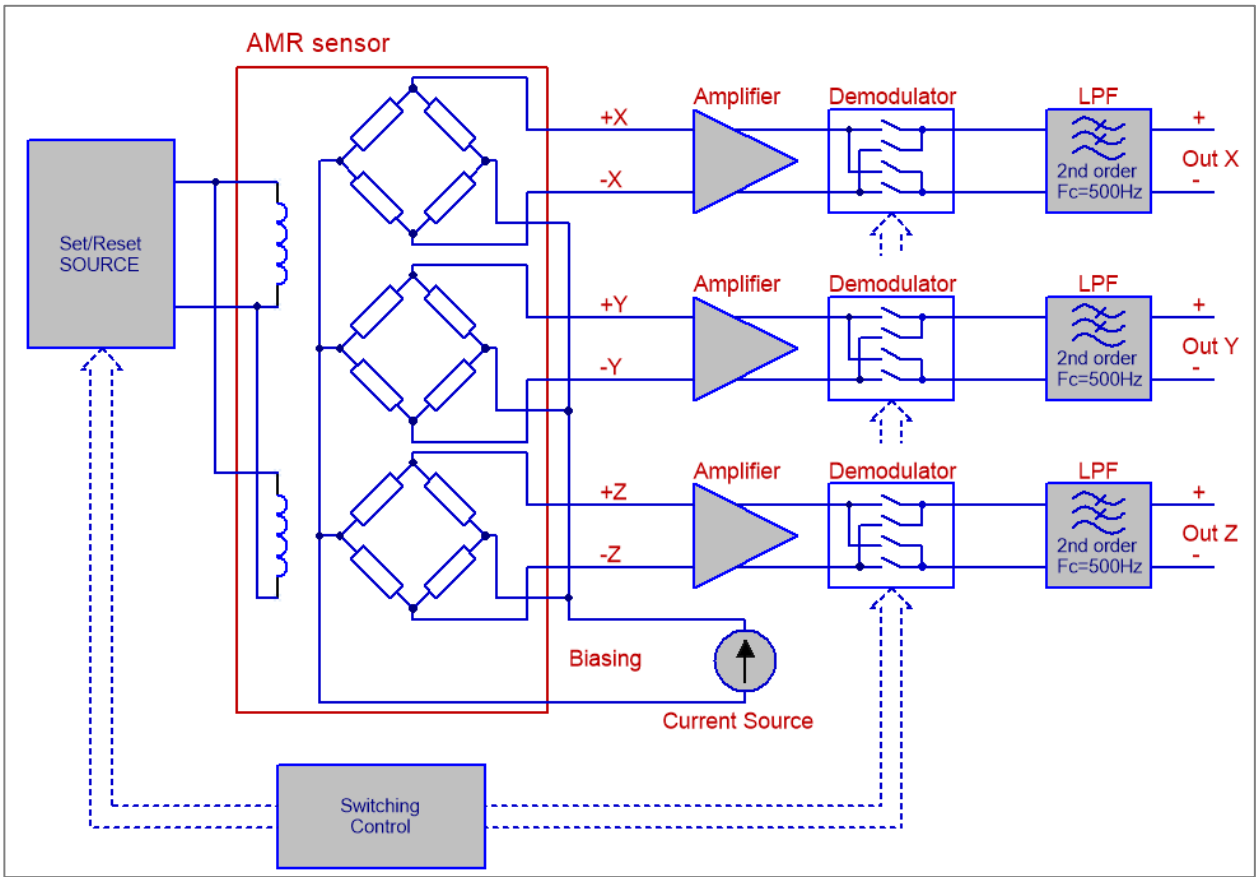


Figure 5: 3DANT-1 Block Diagram.

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