DESCRIPTION

The *SENIS* 3-Axis AC Magnetic Transducer 3DACMT-1 is a compact instrument to measure all 3 components of alternating magnetic fields with very high resolution in a small volume.

It incorporates three groups of mutually orthogonal coils, analog integrators and amplifiers within a small cube and generates 3 high level output signals that are immune to electromagnetic disturbances. The sensing cube is completely non magnetic and therefore does not disturb the external field.

The *SENIS* 3DACMT-1 Transducer is ideally suited to measure and map AC magnetic fields in noisy environments with field resolution better than 1.5µT.

KEY FEATURES

- **Frequency range from 10kHz to 200kHz**
- **Magnetic field resolution better than 1.5µTrms**
- **Small probe volume of about 3.6 cm^3**
- **Non-invasive: The probe does not modify the measured magnetic field**
- **Highly linear response**
- **High transduction accuracy of ±1%**
- **High phase accuracy: <3° at 85kHz**
- **Excellent angular accuracy <±1°**
- **Negligible cross-talk**
- **Common center of coils for all three axis**
- **Insensitive to electrical fields or capacitive coupling**
- **Analog output**

PRELIMINARY TECHNICAL SPECIFICATIONS

Geometrical	**Value**
Size of sensing cube, A	15.3mm x 15.3mm x 15.3mm
Probe length (sensing cube with holder), L1	240mm
Cable length, L	3m ±10cm
Size electronic box (BxCxD)	150mm x 38mm x 95 mm
Orthogonality of different sensing directions	<1° in all 3 Cartesian directions
Electrical	
Full measurement range	±10mT
Output Signal	Bipolar, single—ended, amplitude from 0V to ±5V
Sensitivity	500mV/mT
Magnetic resolution	Better than 1.5µTrms for all three axis
Magnetic nonlinearity	< 1% for f<100kHz
Measurement bandwidth	10 - 200kHz
Phase shift	Better than 3° at 85kHz

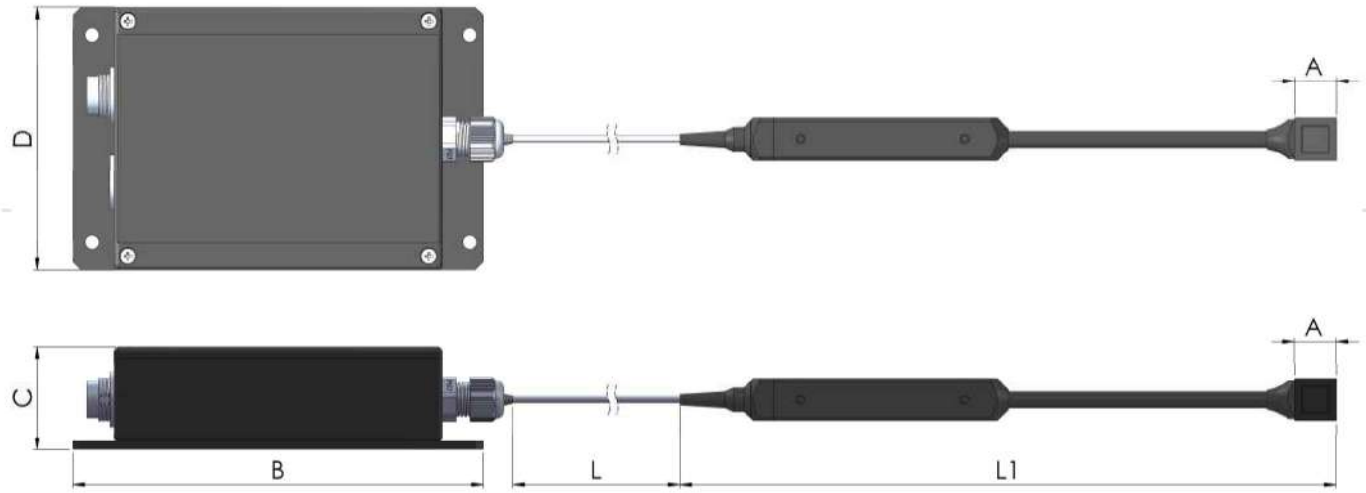


Figure 1. Geometry of the AC Transducer and Probe

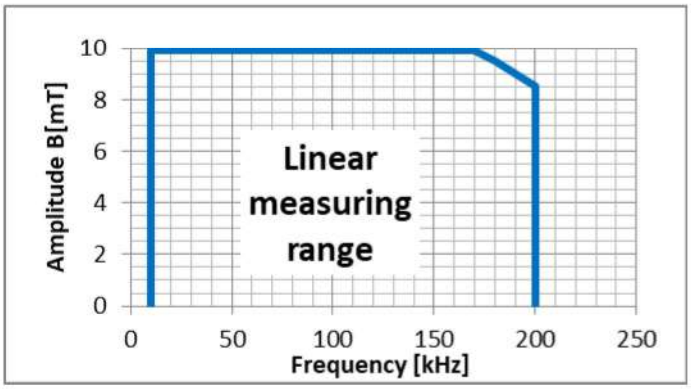


Figure 2. Linear Measuring Range.

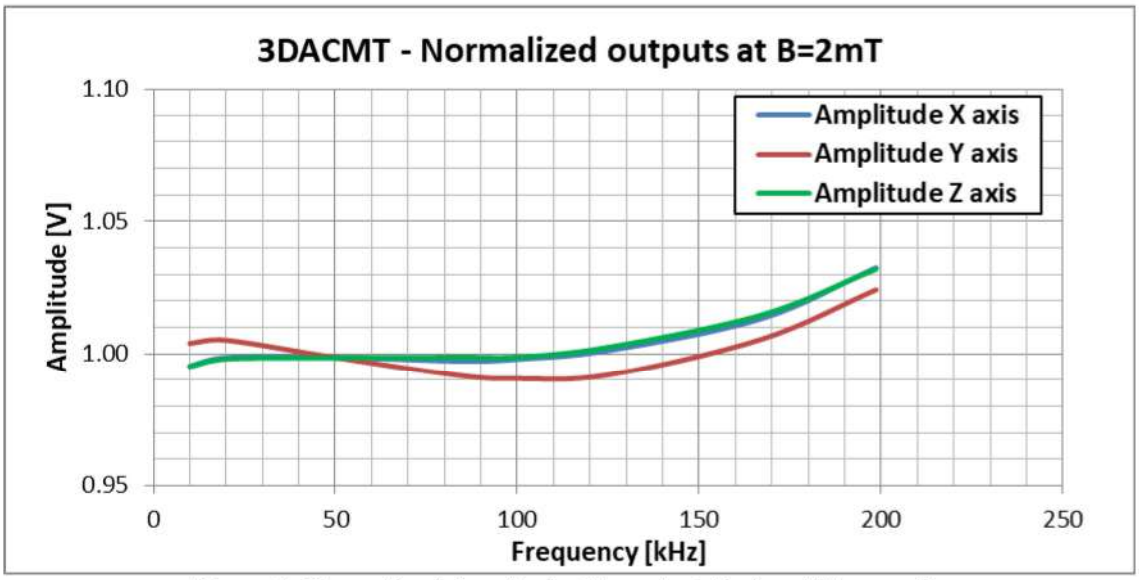


Figure 3: Normalized Amplitude Characteristic for all three axis.

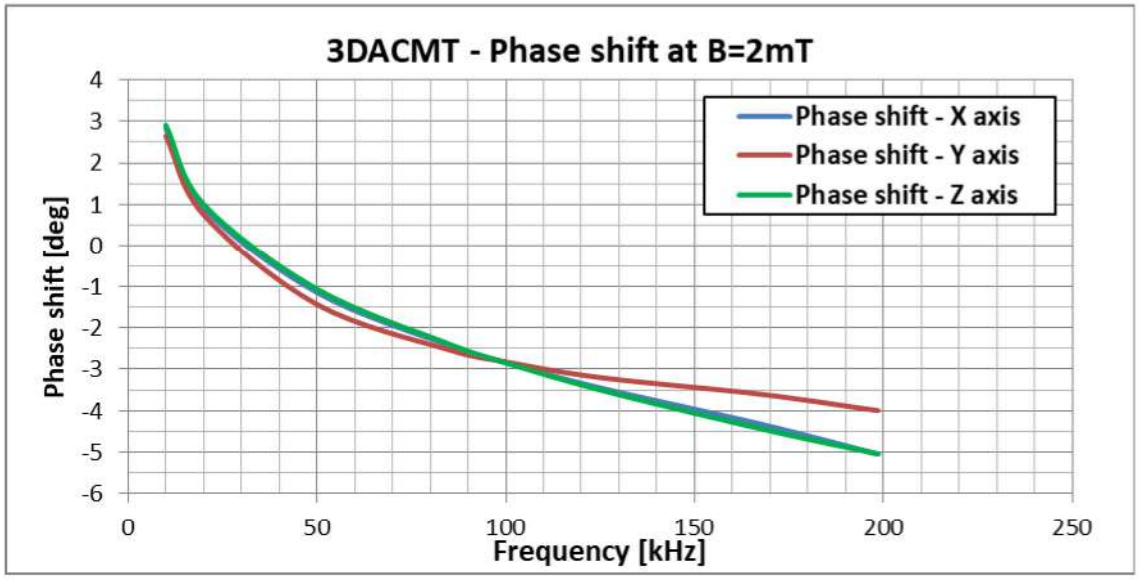


Figure 4: Phase Shift for all three axis.

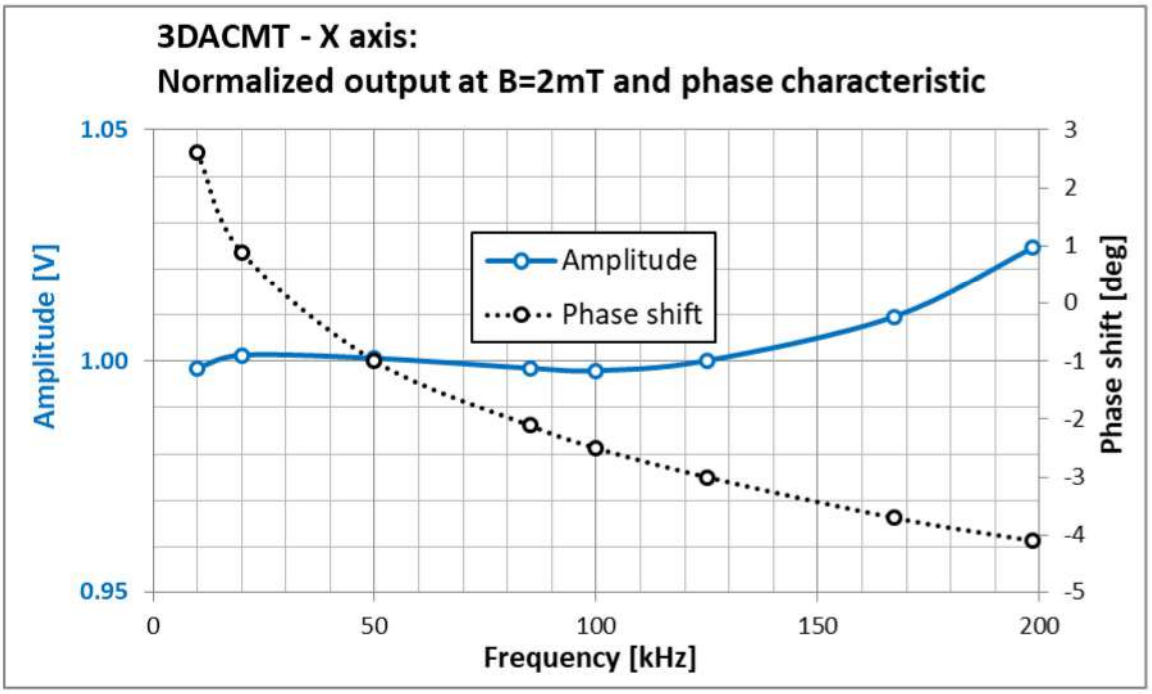


Figure 5: X axis - Normalized Output and Phase Shift.

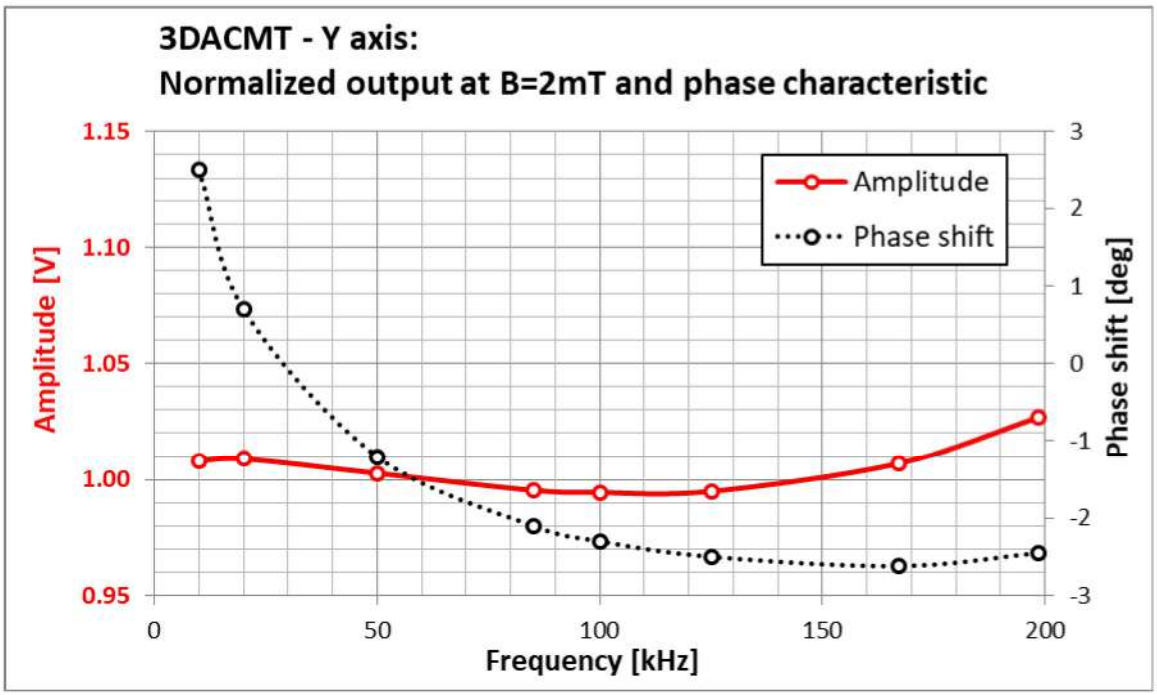


Figure 6: Y axis - Normalized Output and Phase Shift.

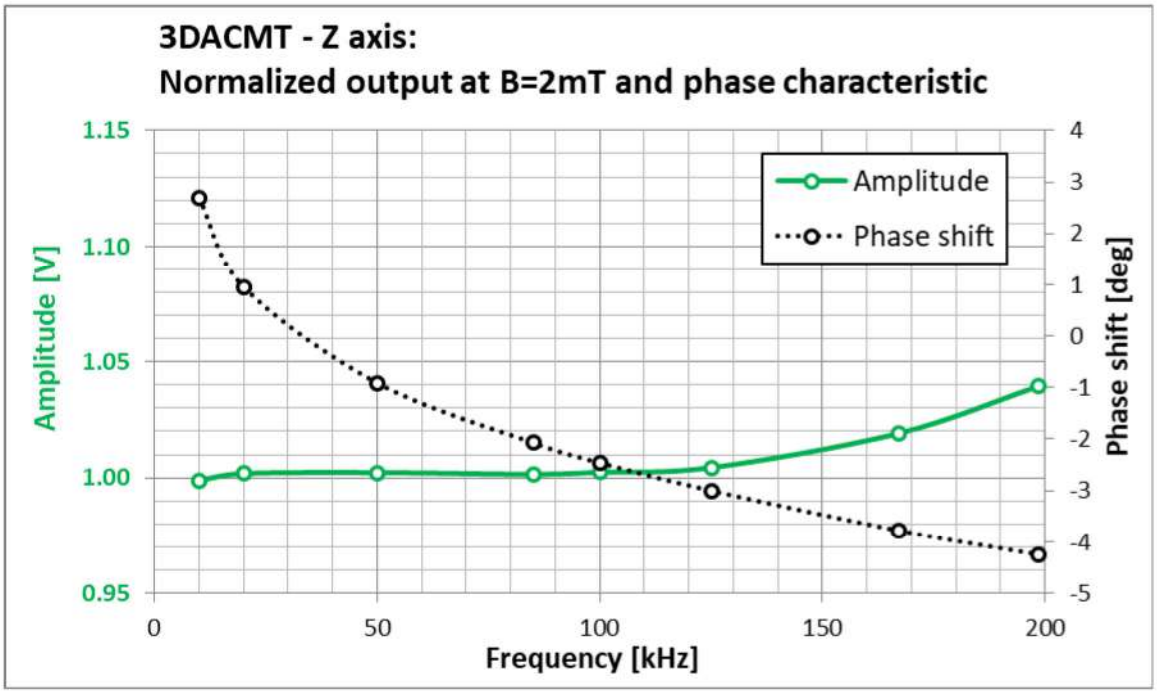


Figure 7: Z axis - Normalized Output and Phase Shift.

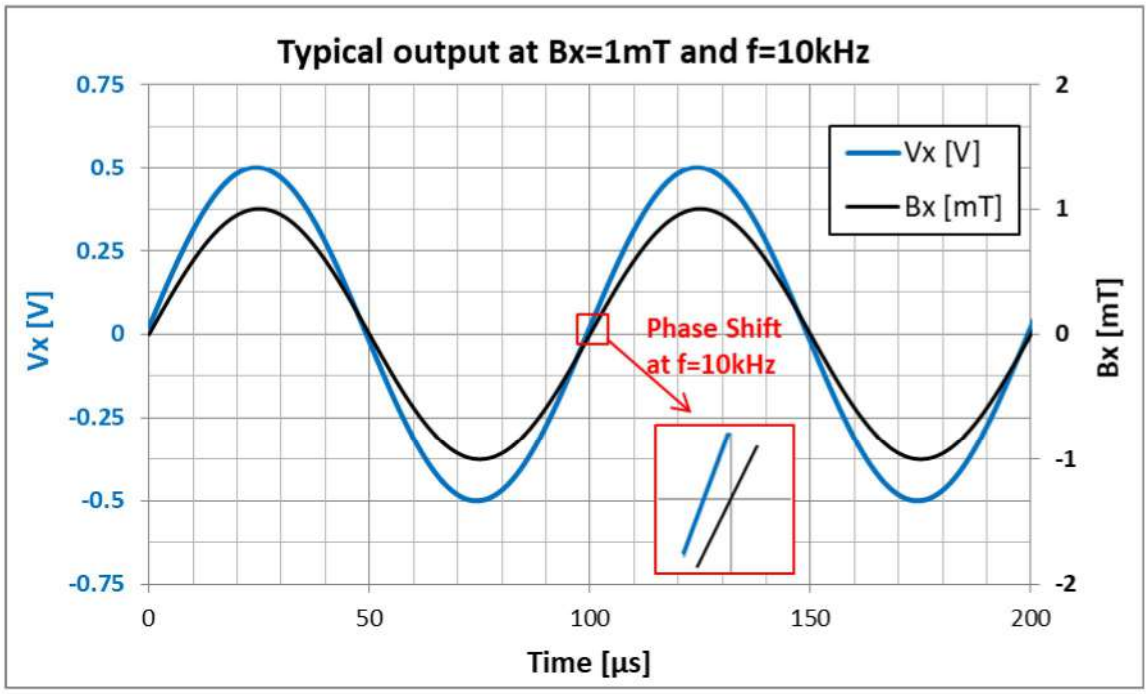


Figure 8: Typical output at B=1mT and f=10kHz

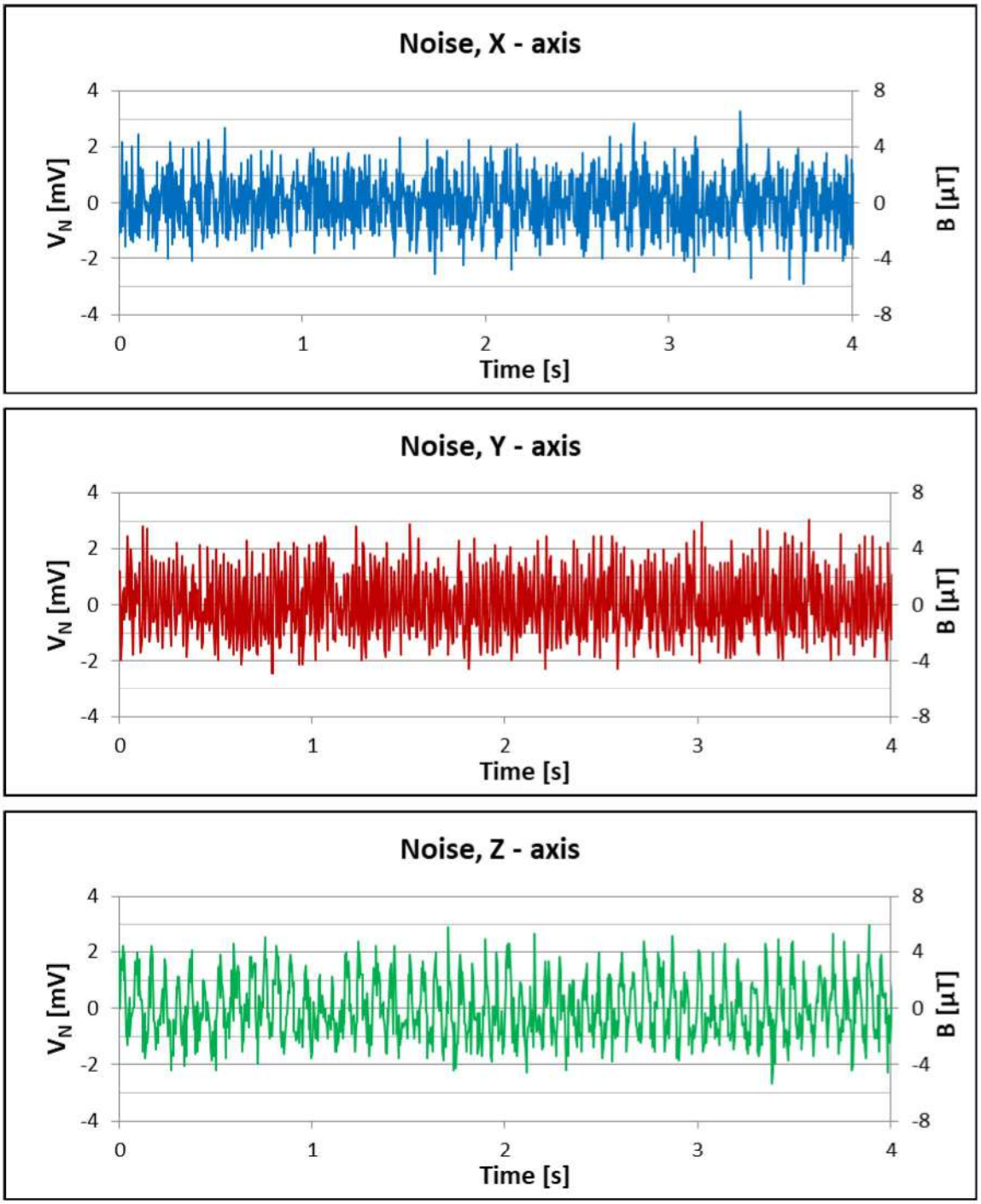


Figure 9: Typical Noise measured with test instruments with BW=20MHz.

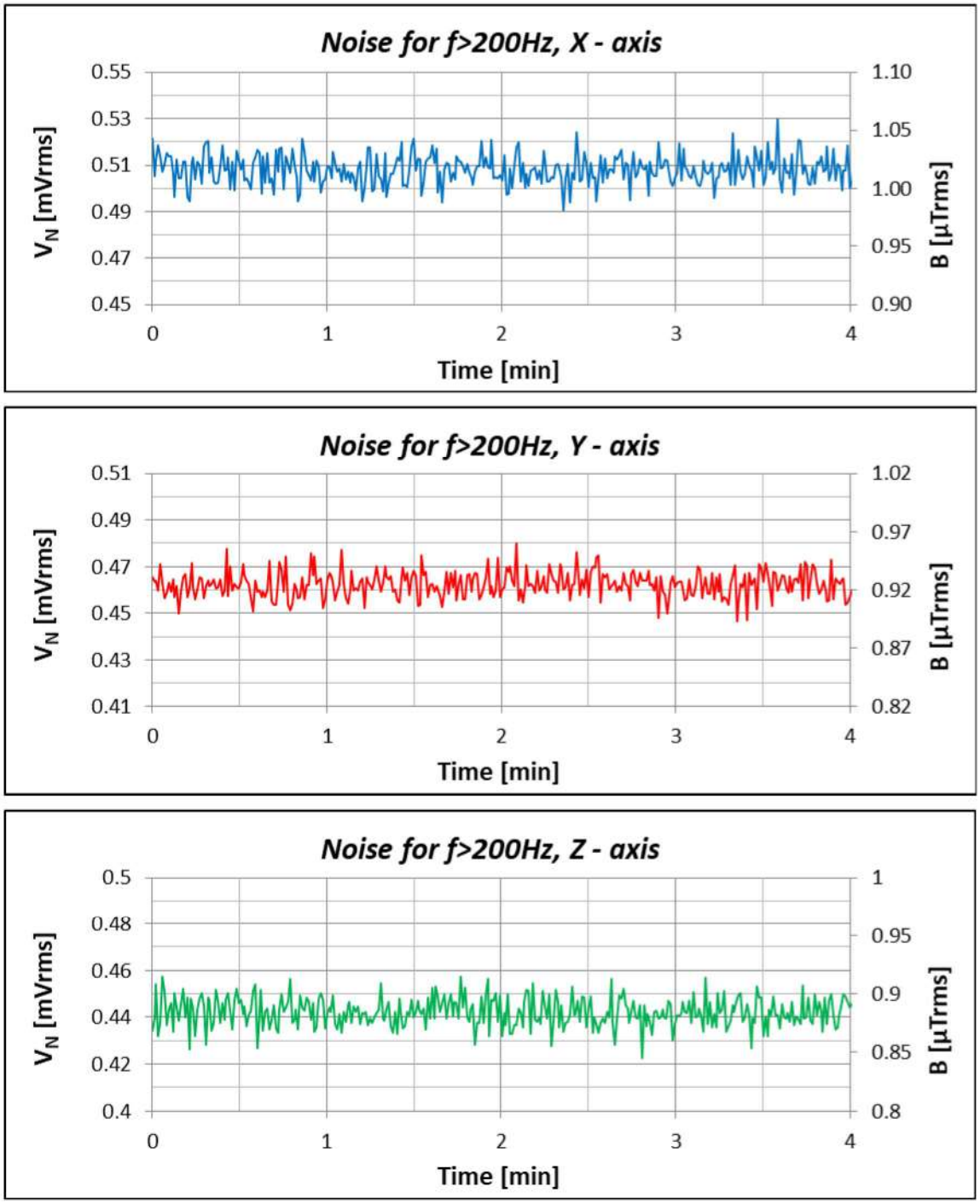


Figure 10: Typical Noise for f>200Hz, rms Value.

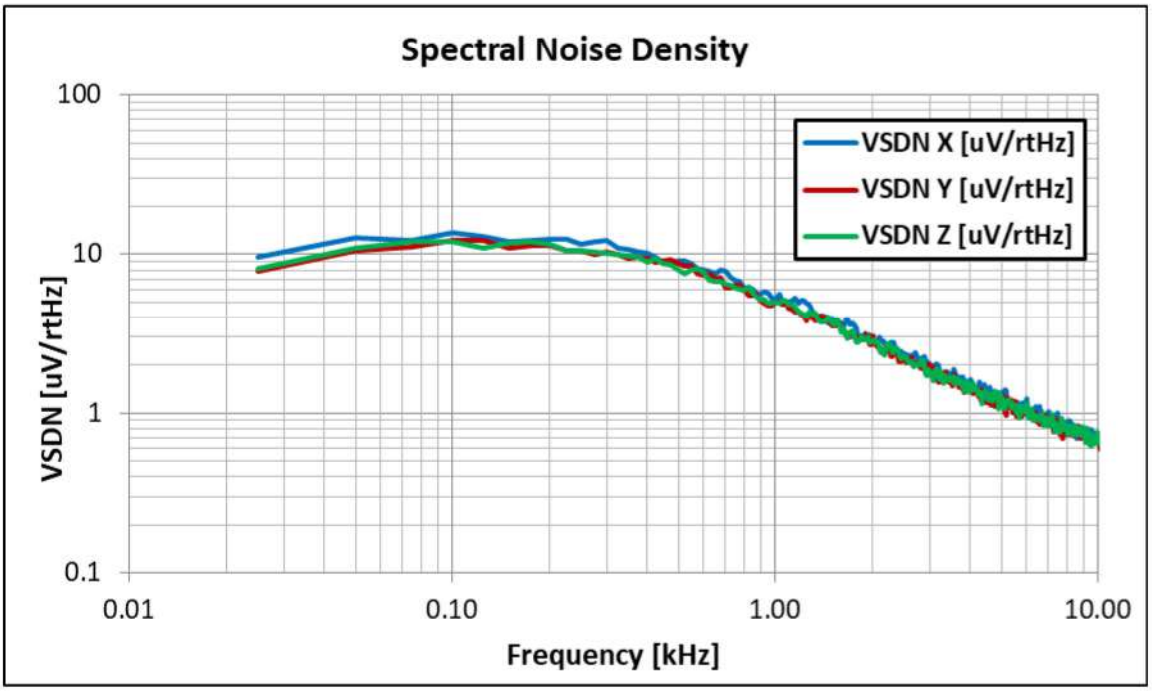


Figure 11: Spectral Noise Density.

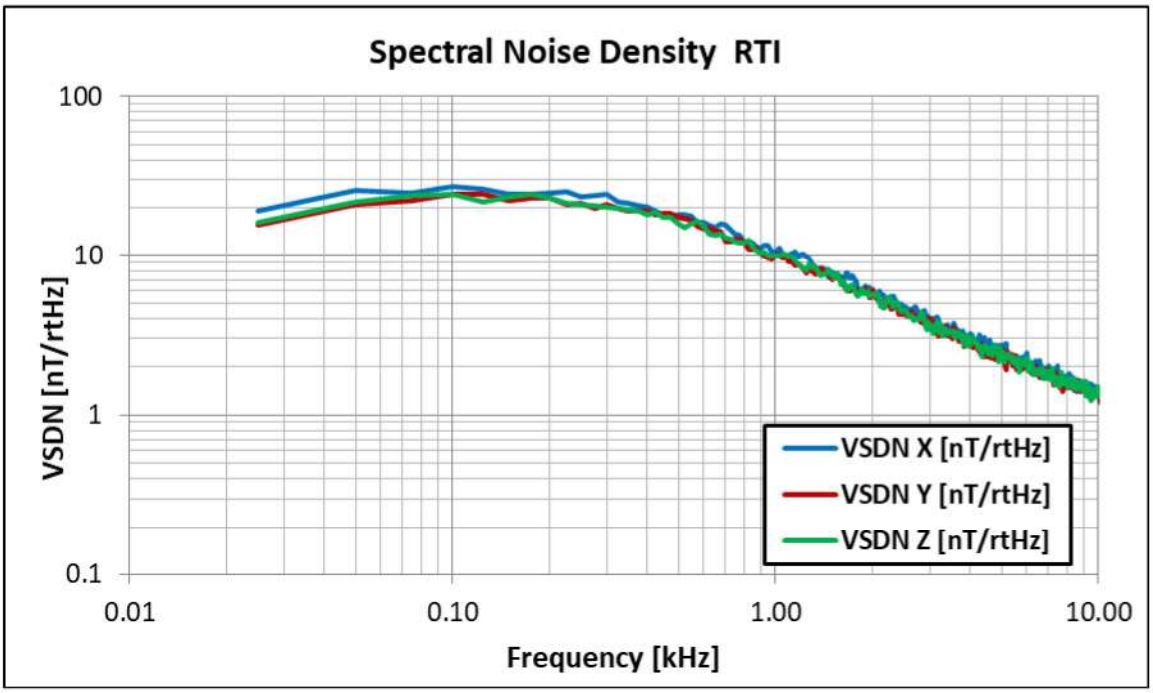


Figure 12: Spectral Noise Density RTI (Referred To Input).

Figure 13: Photo of 3D AC Magnetic Field Transducer.

Figure 14: Probe photo.

Pin No.	Output signal
1	Not used
2	**Z axis**
3	Not used
4	**X axis**
5	**Y axis**
6	Not used
7	Not used
8	**GND (Common)**

Figure 15: Output signal connector KVF 81 (matching with cable SV81 connector - pin out, front view

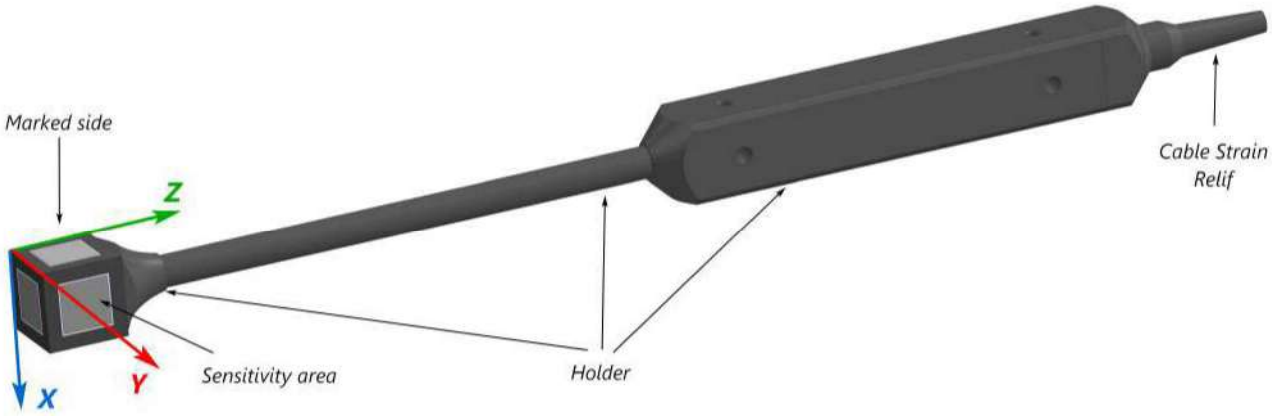
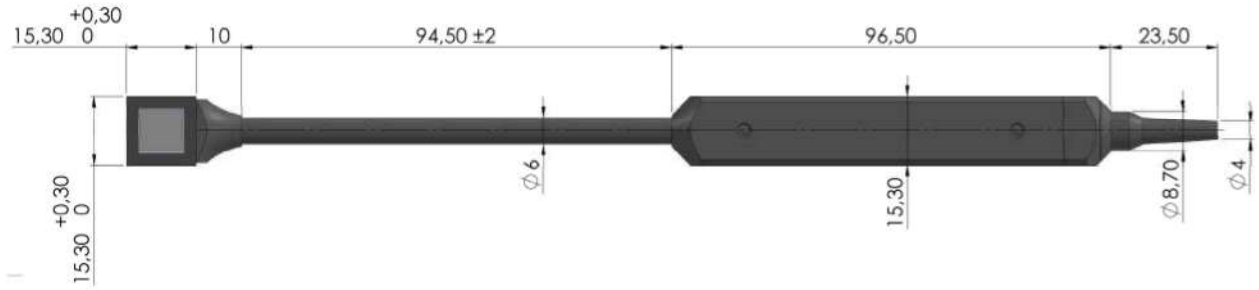
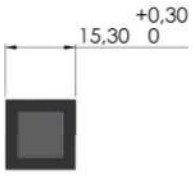


Figure 15: Probe – drawing.



a.)



b.)

Figure 16: Probe – dimensions (all dimensions are in mm):
a.) – Side View;
b.) – Front View.

Appendix A

Relations between Power Supply AC lines, Common and +/- voltage rails

Connection between Power Supply S12-5 and 3DACMT-1 is given of Figure a1.

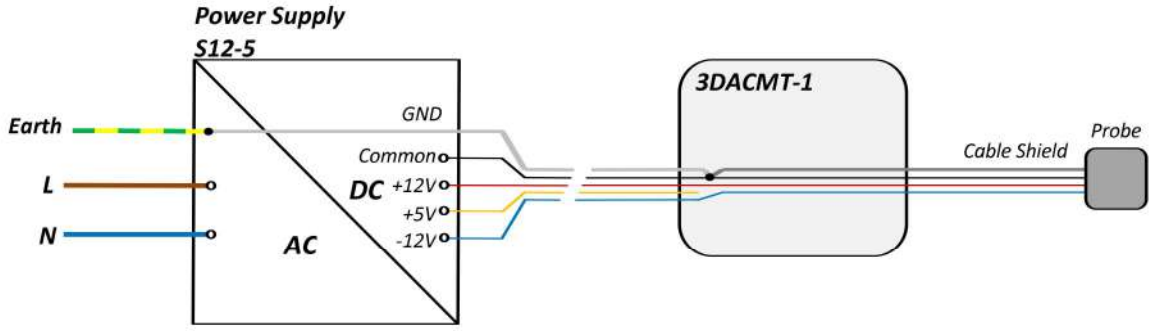


Figure a1.

On Figure a2 is given shield connection of Power Supply S12-5.

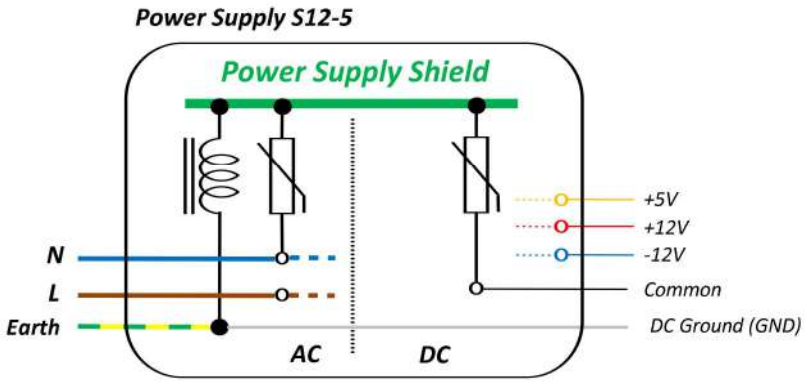


Figure a2.