

Datasheet:**Cylindrical-shaped 3-axis Hall probe for the SENIS K3A Cryogenic low-noise analog magnetic field transducers****DESCRIPTION:**

The newest SENIS cylindrical-shaped probe (OD < 3 mm, length 10 mm) is the world's smallest compact 3-axis cryogenic Hall probe that is specially designed for measuring the magnetic fields inside the apertures which cross-sections are ≥ 3 mm. With the three Hall sensors arranged along its longitudinal (Z) axis, this probe also features the world's smallest 3D magnetic field sensitive volume of < 0.4 mm³.

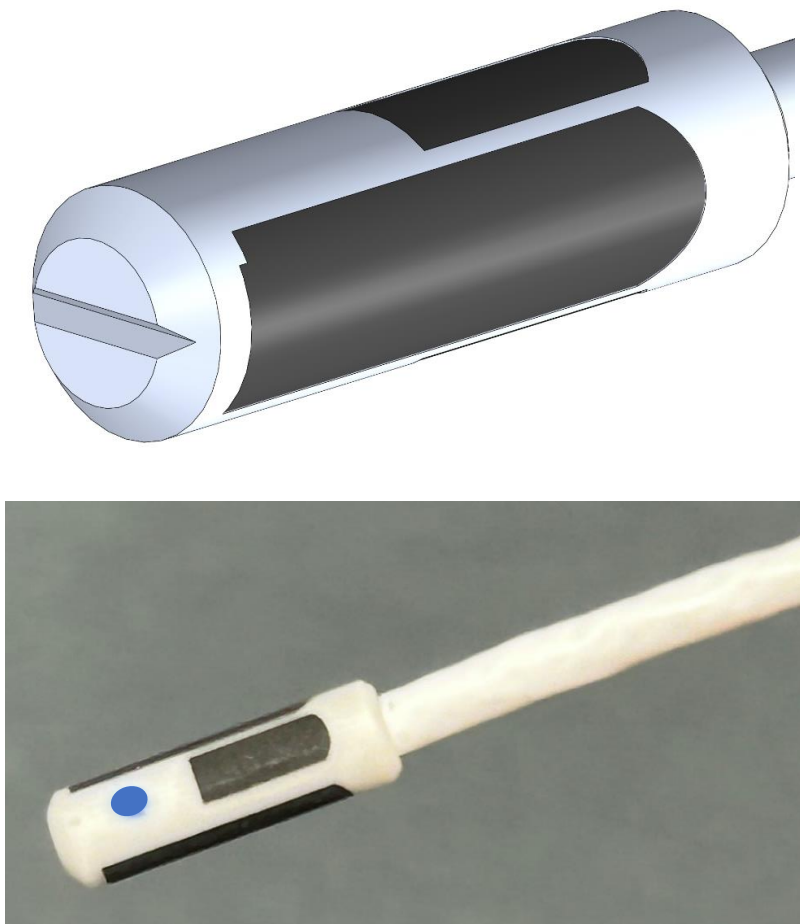


Figure 1: 3D cylindrical-shaped Hall probe type for K3A Cryogenic magnetic field transducers

The cryogenic Hall probe integrates three high-resolution discrete Hall sensors with good angular accuracy (orthogonality error < 2°) of the three measurement axes of the probe.

The cylindrical-shaped probe housing is a printed Alumina ceramic (Al₂O₃) part, which improves mechanical and electrical robustness of the probe.

The Hall probe is connected via a flexible shielded cable (OD < 2 mm) to an electronic box, which provides power to the Hall probe by using the spinning-current technique, which reduces the offsets, low-frequency noise and the planar Hall effect.

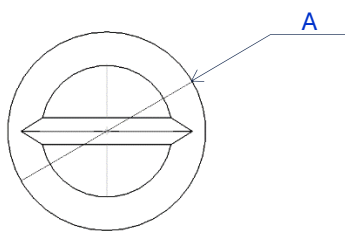
The additional conditioning of the Hall probe output signals in the electronic box includes Hall signal amplification and limitation of the frequency bandwidth.

Key features of the Hall probe:

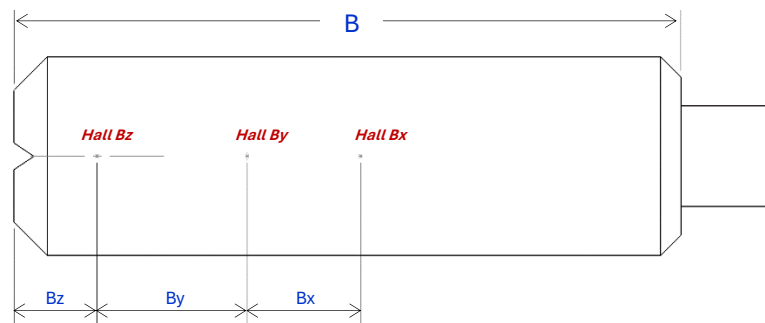
- Very compact and small cylindrical-shaped Hall probe made of a printed alumina ceramic (Al_2O_3)
- World smallest 3D cryogenic probe: external size of the probe is: length 10 mm, OD < 3 mm, which allows measurement of the magnetic fields inside the apertures which cross-sections are ≥ 3 mm
- 3-axis (B_x , B_y , B_z) Hall probe based on three discrete Hall sensors
- Smallest overall effective 3D (B_x , B_y , B_z) magnetic field sensitive volume: $< 0.4 \text{ mm}^3$ ($4 \times 0.3 \times 0.3 \text{ mm}^3$)
- Very low noise and offset fluctuations
- Very good angular accuracy: mutual orthogonality between the three measurement axes is $< \pm 2^\circ$
- Virtually no planar Hall Effect
- Negligible inductive loops on the Probe

H-Module (3-axis Hall Probe & Cable) - Mechanical specifications:

FRONT side view:



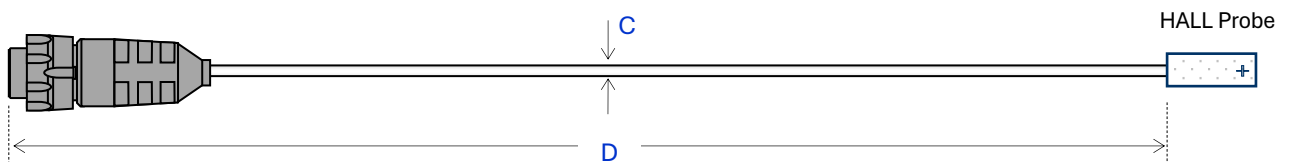
LEFT side view:



Dimension	Measure (mm)
Bx	1.70 ± 0.10
By	2.25 ± 0.10
Bz	1.25 ± 0.10

Hall Probe Connector:
Switchcraft 18P MALE CORD

Probe Cable CaH



Dimension	Measure (mm)
A	$\varnothing 2.95 \pm 0.03$
B	10.0 ± 0.1
C	$\varnothing 1.7 \pm 0.1$
D	Standard lengths of the probe Cable are: 2 m and 5 m. Different lengths are available on a demand.

Figure 2: Dimensions of the cylindrical cryogenic Hall probe and cable

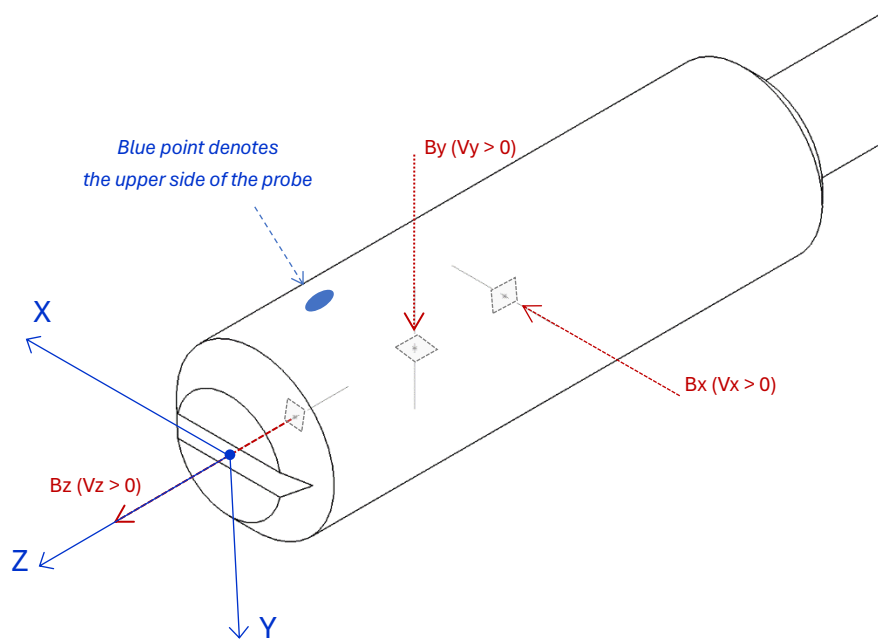


Figure 3: Reference Cartesian coordinate system (X, Y, Z) of the cylindrical-shaped 3-axis cryogenic Hall probe

Hall probe Specifications:			
Dimensions	X (mm)	Y (mm)	Z (mm)
Magnetic field sensitive volume (MFSV)	each Hall sensor: 300 μ m(OD) x 1 μ m		
Position of the FSV centre of X-sensor	0.0 \pm 0.1	0.0 \pm 0.1	-1.25 \pm 0.1
Position of the FSV centre of Y-sensor	0.0 \pm 0.1	0.0 \pm 0.1	-3.95 \pm 0.1
Position of the FSV centre of Z-sensor	0.0 \pm 0.1	0.0 \pm 0.1	-5.20 \pm 0.1
External dimensions of the probe	OD: \varnothing 2.95 \pm 0.03 mm / Length: 10.0 \pm 0.1 mm		
Positioning accuracy:			
Mutual orthogonality between the measurement axes	< \pm 2°		
Cable properties:			
Conductor:	Silver plated soft copper core, 7 x 44 AWG		
Insulation:	PFA (Perfluoro Alkoxy), diameter 0.30 mm		
Diameter (OD):	1.7 \pm 0.1 mm		
Minimum bending radius:	15 x OD		
Shield:	Silver plated soft copper braid		
Jacket:	PFA (Perfluoroalkoxy)		
Service temperature:	(-196, +200) °C		
Linear resistance:	1.4 Ω /m		
Rated voltage:	150 Vac		
RoHS compliance:	Yes		
Hall probe connector:	Standard circular connector Switchcraft EN3C18M26X, 18-pins		