

DESCRIPTION:

The Hall Probe 03U for F3A Magnetic Transducers is an ultra-thin (0.25mm) and robust, single-chip fully integrated 3-axis Hall-Probe.

The Probe contains a CMOS integrated circuit, which incorporates three groups of Hall elements, biasing circuits, amplifiers, and a temperature sensor. The integrated Hall elements occupy very small area (150 x 150 μm), which provides very high spatial resolution of the probe.

The on-chip application of the spinning-current technique in the biasing of the Hall elements suppresses the planar Hall Effect. The signal pre-processing on the chip enables a very high frequency bandwidth (DC to 25 kHz) of the probe; and on-chip signal amplification provides high output signals of the Hall probe.

The sensor chip is embedded in the probe package and connected to the CaH cable, which makes this probe both mechanically and electrically very robust. The chip is glued onto a reference ceramic plate suitable for an appropriate fixing of the probe.

The outputs of the Hall Probe are high-level analog voltages proportional to each of the three measured components of a magnetic flux density and a voltage proportional with the probe temperature.

KEY FEATURES:

- **Ultra-thin 3-axis Hall Probe (0.25mm). The chip is encapsulated into a very thin ceramic package, allowing for an appropriate fixing of the probe**
- **High operating temperature of the Hall probe and cable (up to +155°C)**
- **Fully integrated CMOS 3-axis (Bx, By, Bz) Hall Probe, of which one, two, or three channels are used**
- **Very high spatial resolution (By: 30 x 5 x 30 μm^3 ; Bx and Bz: 150 x 10 x 150 μm^3)**
- **High angular accuracy (orthogonality error less than 0.1° after calibration)**
- **Virtually no planar Hall Effect**
- **High frequency bandwidth (DC up to 25 KHz)**
- **High disturbance immunity**
- **Negligible inductive loops on the Probe**
- **Integrated temperature sensor on the probe for temperature compensation**
- **The Hall Probe U for F3A Magnetic Transducers is consisting part (Module H) of the F3A Magnetic Field Transducer, Digital Teslameter and Magnetic Field Mapper**
- **Suitable as 3-axis (03U) Hall Probe**
- **Available as a separate unit for OEM customers**

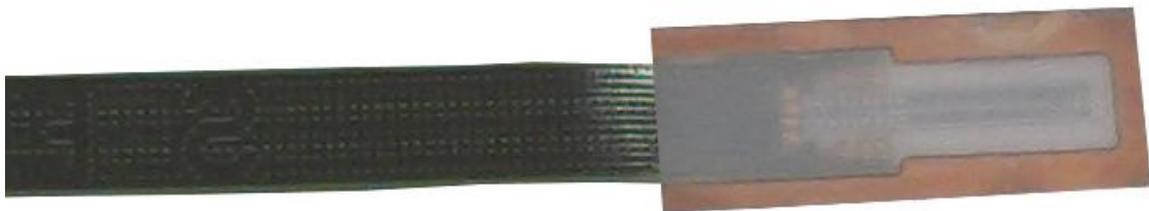
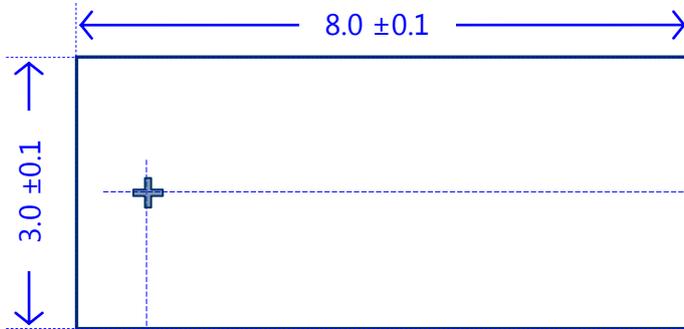


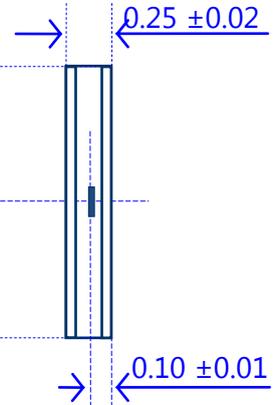
Figure 1. **SENIS fully integrated 3-Axis Hall probe 03U**

PROBE AND CABLE DIMENSIONS AND CHARACTERISTICS

TOP VIEW:



FRONT VIEW:



LEFT SIDE VIEW:

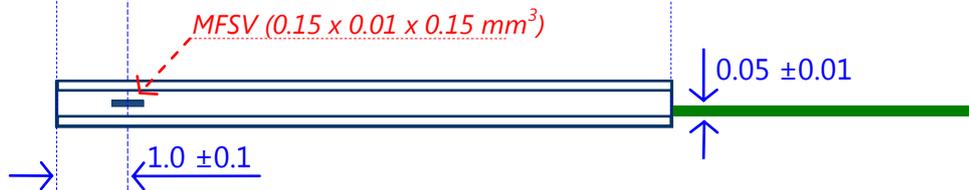


Figure 2. Dimensions and tolerances of the fully integrated 03U Hall probe and cable CaH (Module H)

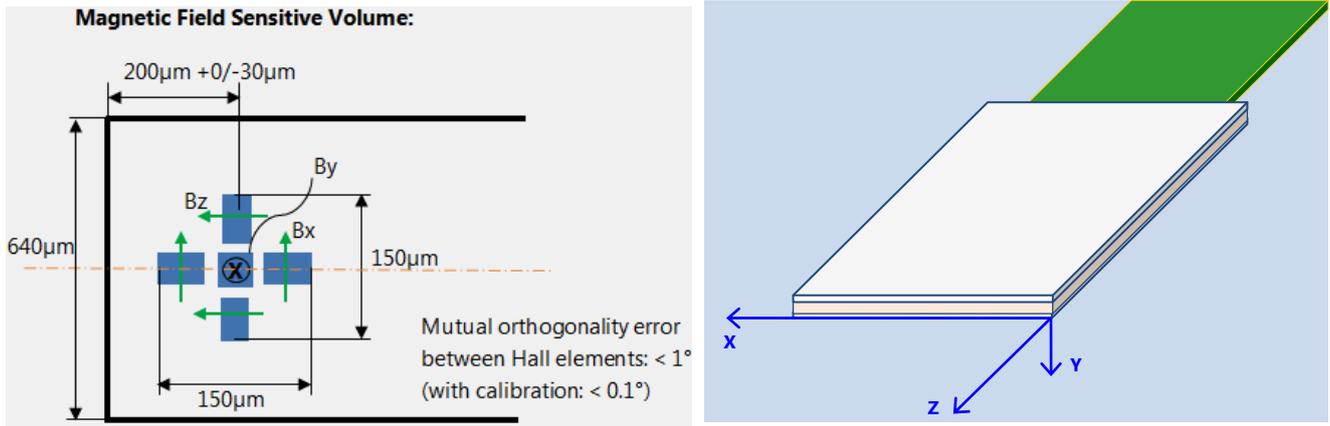


Figure 3. **Left:** Magnetic field sensitive volume of the applied integrated 3D Hall sensor; **Right:** Reference Cartesian coordinate system of the 03U Hall probe

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 2 and 3)	1.5 ±0.1	-0.10 ±0.01	-1.0 ±0.1
Total Probe external dimensions	3.0 ±0.1	0.25 ±0.02	8.0 ±0.1
Angular accuracy of the axes	< ±2° with respect to the reference surface better than ±0.1° after calibration		
CaH Cable (construction and characteristics)	Flexible PCB:	Polyamide, 50 µm thickness, thin copper wires 15 µm	
	Conductor:	Silver plated soft copper core, 7 x 44 AWG	
	Insulation:	PFA (Perfluoro Alkoxy), diameter 0.30 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:	<ul style="list-style-type: none"> ▪ Standard: 2 m (Probe notation: F3A-03U02) ▪ Optional: XX m (Probe notation: F3A-03UXX) <p>NOTE: Various cable lengths are available upon request.</p>		

INSTALLATION MANUAL FOR THE 03U HALL PROBE

Although the 03U probe is very robust with respect to its size, it should be handled with special care. Considering that we deal with a high-precision device of very small dimensions, following precautions should help to avoid damage to the probe during installation and handling, and ensure that the device's accurate calibration remains preserved:

- The Hall Probe is sensitive to Electrostatic Discharge (ESD). Be sure to ground yourself and follow proper procedure when handling the Hall probe.
- The Hall Probe must be connected to the Electronic module before applying power.
- The mounting of the Probe should be carried out by application of very low pressure to its head and particularly on the thin flexible PCB.
- Do not apply more force than required to hold the probe in its place. Damage to either the ceramics package of the Hall sensor or flexy PCB will destroy the Probe. We strongly suggest storing the probe in its protective case when not in use.
- If the probe head is clamped, the user needs to make sure that the environment surface in contact with the reference plane of the probe is flat and covers as much of the probe reference surface as possible (see image below). Do not apply more force than required to hold the probe in its mounting.



- In order to prevent a rupture of the flexible PCB wires from the probe head, the user should fix and secure the probe cable in the proximity of the head. The thin wires of the **flexible section** of the probe need to be folded with care; repeated sharp bending should be strongly avoided.
- Avoid any high pressure and bending of the **transient section** between the flexible PCB and the Probe cable.
- Although the Hall probe is operable even on the higher temperatures (almost up to +160°C) it is strongly recommendable to avoid its exposing to rapid temperature changes!