

DESCRIPTION:

Hall Probe 03C for F3A Magnetic Transducers is a very 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 the measured transverse (Y) component of a magnetic flux density and a voltage proportional with the probe temperature.

KEY FEATURES:

- **Very robust Hall Probe. The chip is glued onto a reference ceramic plate suitable for an appropriate fixing of the probe**
- **High operating temperature of the Hall probe and cable (up to +160°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: 0.03 x 0.005 x 0.03mm³; Bx and Bz: 0.15 x 0.01 x 0.15 mm³)**
- **High angular accuracy (orthogonality error less than 0.1°)**
- **Virtually no planar Hall Effect**
- **High frequency bandwidth (from DC up to 25kHz)**
- **High disturbance immunity**
- **Negligible inductive loops on the Probe**
- **Integrated temperature sensor on the probe for temperature compensation**
- **The Hall Probe C 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 (03) Hall Probe**
- **Available as a separate unit for OEM customers**

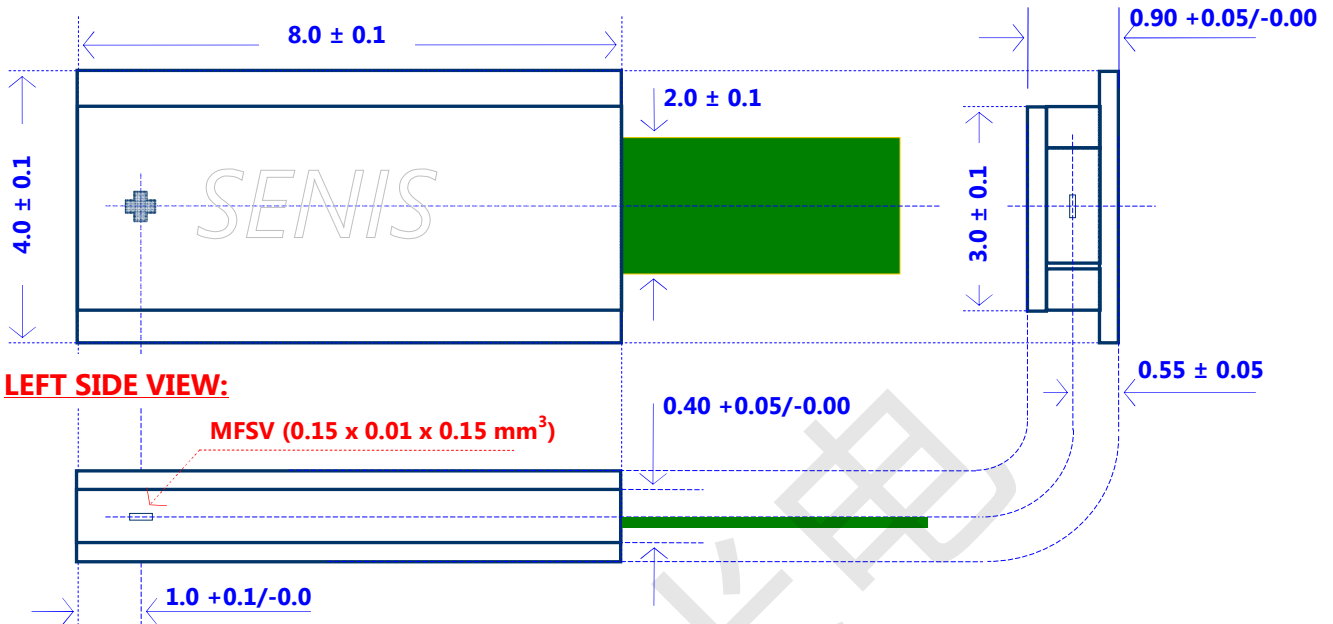


Figure 1. **SENIS fully integrated 3-Axis Hall probe 03C**

PROBE AND CABLE DIMENSIONS AND CHARACTERISTICS

TOP VIEW:

FRONT VIEW:



Cable CaH
(L=2.0±0.1 m, Ø1.7±0.1 mm)

Flexible cable
(L=33mm, W=2mm)

HALL
Probe



Figure 2. Dimensions of the standard F3A-03C02C Hall probe and cable CaH (Module H)

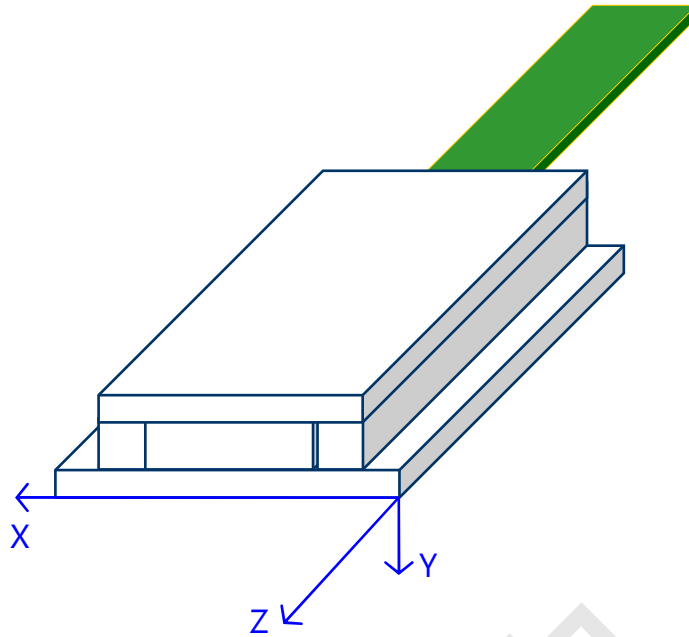


Figure 3: Isometric view with reference Cartesian coordinate system of the 03C Probe head

Dimension	X [mm]	Y [mm]	Z [mm]
Magnetic field sensitive volume (MFSV)	0.15	0.01	0.15
Position of the center of MFSV (corresponding to FSP, see Figures 2 and 3)	2.0 ± 0.1	-0.55 ± 0.05	-1.0 ± 0.1
Total Probe external dimensions	4.0 ± 0.1	$0.90 +0.05/-0.00$	8.0 ± 0.1
Angular accuracy of the axes	$\pm 0.5^\circ$ with respect to the reference surface		
CaH Cable (construction and characteristics)	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 temperature: $-196 / +200^\circ\text{C}$		
	Linear resistance: 1.4 Ω/m		
	Rated voltage: 150 Vac		
Total length of the CaH cable:	RoHS compliance: Yes		
	<ul style="list-style-type: none"> ▪ Standard: 2 m (Probe notation: 03C02) ▪ Optional: XX m (Probe notation: 03CXX) 		
	NOTE: Various cable lengths are available upon request.		

INSTALLATION MANUAL FOR THE F3A-03C HALL PROBE

Although the 03C 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 then required to hold the probe in its mounting.



- In order to prevent 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!