

The Model XZM12-2-2 is a high accuracy, high spatial resolution and temperature compensated two-axis magnetic field measurement system. It is particularly suitable for high resolution measurements of **undulator or wiggler magnet systems**. Cross-coupling effects between the axes in magnetic fields up to 2 tesla are smaller than 0.1%. The XZM12-2-2 has a basic accuracy of 1%.

The transducer consists of two modules connected by a flexible cable (see Fig.1). The magnetic field sensitive module H contains a very high quality 2-axis Hall element. The unique feature of this device is that it measures the axial and one transversal magnetic field component at a single point. To build up a complete measurement system, connect the module E with a simple power supply and two voltmeters. The system can be calibrated according to specific needs of field conditions.

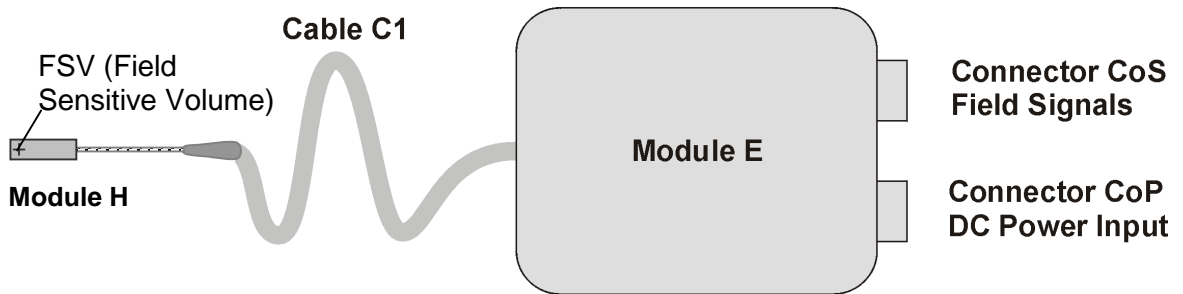


Figure 1: Structure of the Two-Axis Magnetic Field Hall Transducer XZM12-2-2

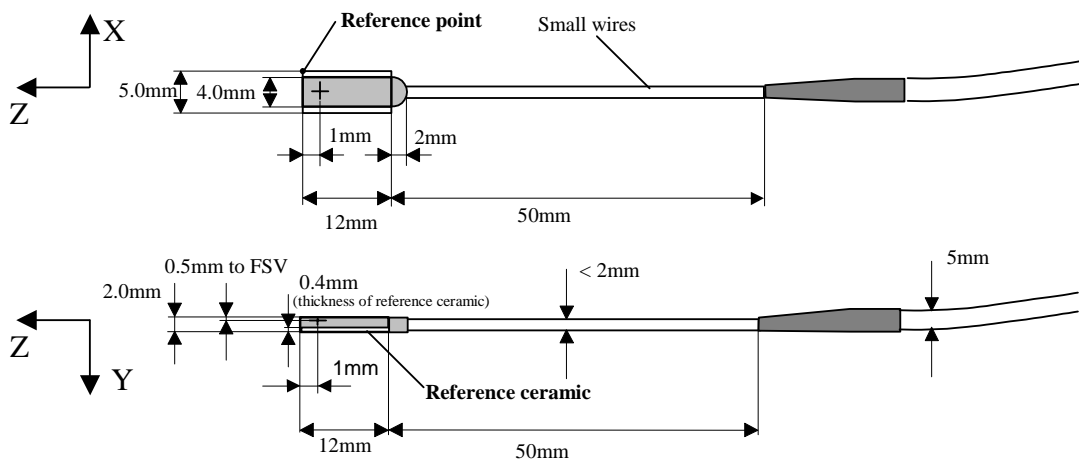


Figure 2: Probe dimensions of the Two-Axis Magnetic Field Hall Transducer XZM12-2-2 (Module H)

**Specifications:**

(Specifications are given at operating temperature of 23°C and after a warm-up time of 10 minutes.)

Output signal for channels X & Z

Maximum magnetic field	± 3 T
Linear magnetic field range	± 2 T (full scale)
Output voltage at full-scale (VB)	±10.000V, differential
Sensitivity to magnetic field	5 V/T ( 0.5mV/G )
Tolerance of sensitivity (B = 1T)	± 1 %

Non linearity along x-axis (B< 2T)	< 1%
Non linearity along z-axis (B< 2T)	< 1%
Cross-coupling between x and z outputs	< 0.1%
Temp. coefficient of sensitivity (T= 23 ± 10°C)	< 100 ppm /°C
Offset at B = 0T	< ± 1mV
Temp. coefficient of offset	< 0.1 mV/°C
Output noise and ripple (p-p) 0.01..100Hz	< +/-50µV (0.1 Gauss)
Output resistance	< 10 ohm, short circuit proof

**Frequency response**

Bandwidth X & Z- Channel (-3dB)	> 1kHz
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**Environmental**

Temperature (operating)	10° to 50°C
(storage)	-20° to 85°C
Electromagnetic	see EMC-Test conditions
RF conducted disturbances	IEC/EN 61000-4-6, ENV 50141
Radiated electromagnetic field	ENV 50140
Pulse modulated electromagnetic field	ENV 50140
Electrical fast transient burst	IEC/EN 61000-4-4
Electrostatic discharge	IEC/EN 61000-4-2 *

**Mechanical**

Coordinates	X	Y	Z
Field sensitive volume (FSV) physical	0.25 x	0.20 x	0.25 mm <sup>3</sup>
Field sensitive volume (FSV) electrical	0.20 x	0.05 x	0.20 mm <sup>3</sup>
Sensitive point (the center of FSV) in reference to the reference point	2.5,	1.5,	-1 mm
Angular accuracy of the axes	± 0.1° between axes ± 0.5° to the reference ceramic		
Probe total outside dimensions	5.0 x	2.0 x	14 mm
Probe-to-Electronics cable	permanently connected, shielded 2m standard length with ferrite sleeve		
Connector CoS	DIN KfV70, 7 pole, 60°. (Mating Plug, SV70) field signal X+, X- Pins 6 and 5 respectively field signal Z+, Z- Pins 2 and 1 respectively signal common Pin 7		
Connector CoP	DIN SFV50, 5 pole. (Mating Plug, KV50) power, +12V Pin 3 power, -12V Pin 1 power common Pin 2		
Electronics module	high mechanical strength, electrically shielded aluminum case 95 W x 120 L x 37 H mm with mounting provision.		

**Power**

Voltage	+12V, -12V nominal, ±10%.
Current	ca. 50mA

**Magnetic Induction Field (B) Units** 1T = 10kG, 1µT = 10mG

**Recommended accessories:** Power supply S12-5 (±12 V) 110/220V  
Zero gauss chamber ZG12  
Output cable 1.5 meter: CO15

### Installation manual: YM12, XZM12 and 3M12 – Transducers with miniature Hall-probe

The YM12, XZM12 and 3M12 Hall-Transducer consists of a unique very small encapsulated hall-sensor element. The probe head is build as robust as possible for a small precision device, however, it has to be handled with care. The following precautions will help not to damage the probe when installing or handling and to preserve their accurate calibration.

*The probe has to be mounted with very low pressure on probe head and their thin wires. If the probe head is attached, make sure that the surface in contact with the ceramic plate is flat and covers the whole of the ceramic plate. The ceramic plate has to be clamped and used as mechanical reference. Don't apply more force then required to hold the probe in place. The probe cable has to be clamped nearbey the probe head, so the very thin wires can't be torn away from the probe head. The thin wires of the flexible section at the probe head can be folded carefully, repeated strong flexing should be avoided.*

The small probe head is shipped protected by a plexiglas tube. The tube protects the flexible section and the probe head against mechanical damage and against direct high voltage discharge. Remove the protection tube only when there is no danger of a mechanical shock or electronic discharge.

#### EMC-Test conditions:

- The transducer YM12, 3M12 was supplied with Senis' "S12" power supply which corresponds to the directives 73/23/EEC and 89/336/EEC.
- The output cable was a Senis' "CO15" shielded cable with ferrite RI-14-28 (25MHz , 177 ohm). The "Gnd" output contact was grounded.
- For the ESD\*\* Test, the flexible section (thin wires) and the probe head were sheltered in the protection tube delivered with the transducer.

During the EMC test temporary degradation of the transducers function like offset drift can occur. After the EMC tests no damage or change of the sensor parameter appears, the transducer continues to operate according to its specifications. In order to improve the operations in a electrically noisy environment, the probe head and the thin wires of the flexible section has to be mounted in a grounded metal shelter.

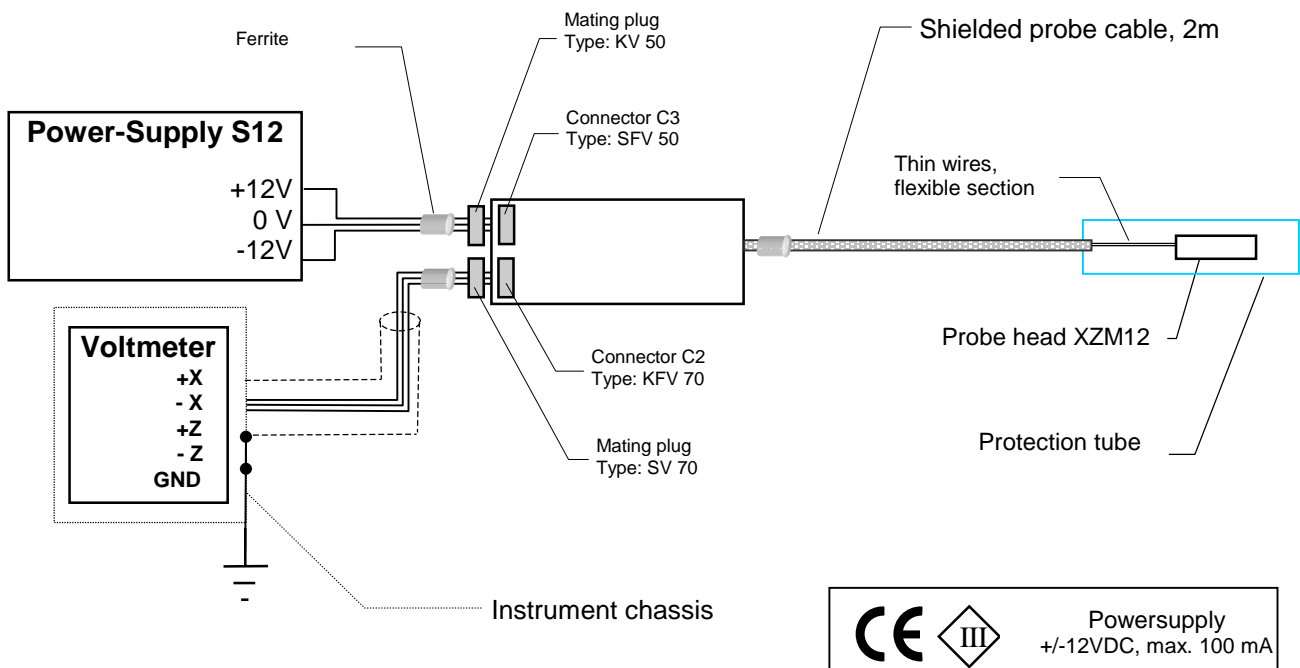


Figure 3: Set-up for all EMC-test