The 3M15-3-2-0.02T is a three-axis, 0.1% accuracy, high linearity, high stability magnetic field to analog voltage transducer with an analog output for each of the three components of the measured magnetic field. The transducer consists of two modules connected by a flexible cable (see Fig.1). The magnetic field sensitive module H contains a high quality 3-D Hall generator. The unique feature of this device is that it measures all three components of a magnetic field at a single point. To build up a complete measurement system, connect the module E with a simple power supply and three voltmeters



Figure 1: Structure of the Three-Axis Magnetic Field Hall Transducer 3M15-3-2-0.02T



Figure 2: Probe dimensions and position of the active zone for the Three-Axis Magnetic Field Hall Transducer 3M15-3-2-0.02T (module H)

Specifications

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

Output signal for channels X, Y and Z:

Maximum magnetic field	± 0.04 T
Linear magnetic field range	± 0.02 T (full scale)
Output voltage at full-scale (VB)	±10.000V, differential
Sensitivity to magnetic field	500 V/T (50mV/G)
Tolerances of sensitivity (B = 0.02T)	± 0.1 %
Non Linearity of output	(B <= 0.02T) < 0.1 %
Long term instability	< 1 % over 10 years

Temp. coefficient of sensitivity (T= $23 \pm 10^{\circ}$ C) < 100 ppm /°C

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Offset at B = 0T Temp. coefficient of offset Output noise and ripple (peak) 0.0110Hz Output noise spectral density, $f = 1$ Hz Output resistance	< ± 5 mV (10 µT) < 1 mV / °C (2 µT / °C) < 5 mV (10 µT) < 0.15 mV / v Hz (300 nT / v Hz) < 10 Ohm, short circuit proof
<i>Frequency response</i> Typical frequency response (1% error) Typical Bandwidth (-3dB)	>1kHz 5kHz
<u>Environmental</u> Temperature (operating) (storage) Electromagnetic RF conducted disturbances Radiated electromagnetic field Pulse modulated electromagnetic field Electrical fast transient burst Electrostatic discharge, ESD**	10° to 50°C -20° to 85°C see EMC-Test conditions IEC/EN 61000-4-6, ENV 50141 ENV 50140 ENV 50140 IEC/EN 61000-4-4 IEC/EN 61000-4-2 **
<u>Mechanical</u> Coordinates:	X Y Z
Field sensitive volume (FSV) Sensitive Point (the center of FSV) Angular accuracy of the axes Probe total outside dimensions Probe-to-Electronics cable Connector CoS Connector CoP	0.25 x 0.20 x 0.25 mm ³ 2.5 , 1.45, -1.0 mm \pm 0.1° between axes 5.0 x 2.0 x 17 mm permanently connected, shielded 2m standard length with ferrite sleeve DIN KFV70, 7 pole, 60°. (Mating Plug, SV70) field signal X+, X- Pins 6 and 5 respectively field signal Y+, Y- Pins 4 and 3 respectively field signal Z+, Z- Pins 2 and 1 respectively signal common Pin 7 DIN SFV50, 5 pole. (Mating Plug, KV50) power, +12V Pin 3 power, -12V Pin 1 power common Pin 2 high mechanical strength, electrically shielded aluminum case 95 W x 120 L x 37 H mm with mounting provision.
<u>Power</u>	
Voltage Current	+12V, -12V nominal, ±10%. ca. 50mA
Magnetic Induction Field (B) Units	$1T = 10kG, \ 1\mu T = 10mG$
Recommended accessories:	Power supply S12-5 (±12 V) 110/220V Zero gauss chamber: ZG12

Installation manual 3M15-3-2-0.02T Transducer

The 3M15 Hall-Transudcer 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 demage the probe when installing or handling and to preserve their accurate calibration.

The probe has to be mounted with very low preasure on probe head and their thin wires. If the probe head is clamped, make sure that the surface in contact with the ceramic plate is flat and covers the whole of the ceramic plate. 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 demage 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 3M15-3-2 was supplied with Senis's "S12" power supply which corresponds to the directives 73/23/EEC and 89/336/EEC.
- The output cable was a Senis's "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.





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