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Data Sheet
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MGC-1A AC Magnetic Field Sensor

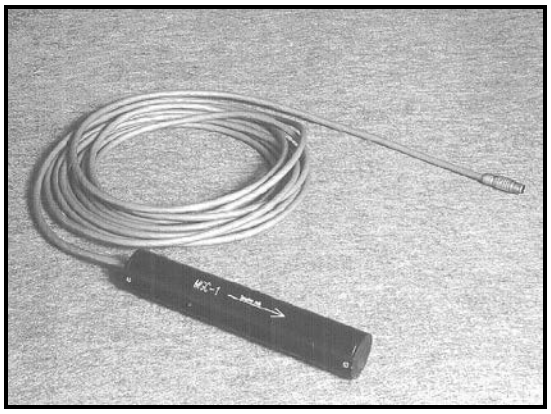
High Sensitivity AC Magnetic Field Sensor

The **MGC-1A** is a low noise high sensitivity single axis AC magnetic field sensor used for the measurement of audio frequency fields. Because of its innovative design, the **MGC-1A** amplitude response is insensitive to the frequency of the field over its 30 Hz to 10 kHz frequency band. Accuracy at 1 kHz is ±1%, and the amplitude response stays within 2 dB peak-to-peak over the bandwidth.

The **MGC-1A**'s superior performance is achieved by an optimum matching of the sensor preamplifier noise characteristics with the sensor coil properties. Its amplitude insensitivity to the magnetic field frequency over its bandwidth is accomplished by an innovative low noise current amplifier design.

The basic sensing element is a rod shaped induction coil with a ferromagnetic core. The core characteristics and winding parameters were carefully selected through computer optimization to match the noise characteristics of a custom designed low noise current preamplifier. This circuit topology produces an overall sensor transfer function that resembles a high pass filter with a corner frequency equal to $L/2\pi R$ where L is the coil inductance and R is the coil resistance. Beyond this frequency, the sensor amplitude is directly proportional to the magnetic field magnitude and insensitive to the field's frequency up to the coil's natural frequency.

The preamplifier is integrated with the sensing element in a cylindrical package that shields the coil from electrostatic fields while allowing the magnetic field to be accurately measured.



The **MGC-1A** also includes a calibration winding that can be used to verify performance or perform a health check.

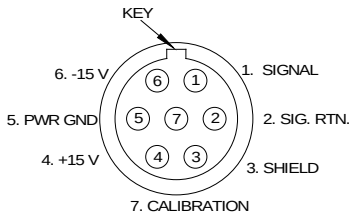
The **MGC-1A** output is a high level signal that can be safely transmitted through a cable connecting it to signal conditioning equipment without the introduction of additional noise. The SAM-3 portable signal conditioner was specifically designed by MEDA to provide power to and signal condition the MEDA series of AC magnetic field sensors.

Features

- Wide Bandwidth: 30 Hz to 10 kHz.
- Low Noise: $60\text{fT}/\sqrt{\text{Hz}}$ @ 1 kHz.
- High Accuracy: ±1% @ 1 kHz, 2dB p-p over bandwidth.
- Response Insensitive to Signal Frequency over its Bandwidth.
- Low Power: 70 milliwatts nominal.

SPECIFICATIONS

Output	
Field Range	800 nT peak-to-peak
Voltage Range	20 Volts peak-to-peak
Transfer Function	
Scale Factor	25 mV/nT
Accuracy	±1% @ 1 kHz, 2dB peak-to-peak over bandwidth
Frequency Response (3dB point)	30 Hz to 10 kHz
Noise (pT/√Hz)	
100 Hz	0.4
200 Hz	0.2
1 kHz	0.06
10 kHz	0.03
Calibration Winding	
Scale Factor	20 nT/Volt
Input Impedance	150 KΩ
Power Requirements	
Input Voltage	±(12 to 18 VDC)
+V Current Consumption	2.6 mA nominal
-V Current Consumption	2.0 mA nominal
Physical	
Size	6.5” L x 1.75” D
Weight	1.5 lbs
Cable Length	20 feet
Connector	LEMO FGG.1B.307.CLCD.72



SENSOR INPUT CONNECTOR
(VIEWED FROM FRONT SIDE)

For more information

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