



## Features

- Miniature size: 0.785" diameter x 1.430" height
- High accuracy over the -20°C to +85°C temperature range
- Higher temperature models available
- High shock and vibration tolerance
- Rugged hermetically sealed packaging
- Low noise level
- Low temperature coefficient bias and scale factor
- Digital interface

## Applications

- Navigation systems
- Inertial guidance systems
- Magnetic anomaly detection
- Electronic compass applications
- Measurement of the Earth's magnetic field



The technology employed in the Applied Physics Systems magnetometer product line is generally referred to as a fluxgate technology. Fluxgate magnetometers employing saturable cores driven by a high frequency carrier parametrically up convert low frequency magnetic field variations to sidebands on the carrier. This approach produces a low noise, high accuracy sensor; noise level of 0.2 nanotesla RMS/ $\sqrt{\text{Hz}}$  and an offset drift of less than 5 nanotesla/ $^{\circ}\text{C}$  are specifications for the Model 20 fluxgate magnetometer system.

The fluxgate magnetometer electronics consists of a miniaturized 3-axis servo system which nulls magnetic field changes applied to the saturable cores. This design produces a very linear response over the entire dynamic range of the system.

Figure 1 shows the external dimensions of the MicroMag. Specifications are shown in Table 2. The outstanding performance parameters of these systems are the bias and scale factor stability over temperature and time.

Recently there has been speculation on the stability of the Earth's magnetic field. The Earth's magnetic field magnitude is roughly 0.5 Gauss and the MicroMag can be used to measure this with great accuracy. When used as a magnetic compass, the magnetometers can be used to determine the azimuth angle of the system to which they are mounted. Specific compass applications include use in directional drilling and logging systems and use in direction finding equipment. The low noise level of the magnetometers enables magnetic anomaly detection in applications such as locating buried ordinance.

The Model 20 system outputs include 3-axis analog outputs plus an RS-232 serial digital interface. As an option, internal compensation of the system bias and scale factor can be ordered. This internal compensation increases the system accuracy over temperature and eliminates the need for the system user to perform external temperature compensation.

# Model 20

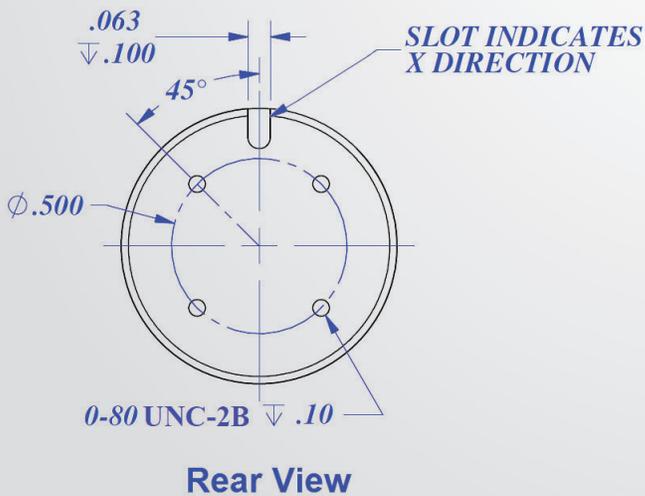
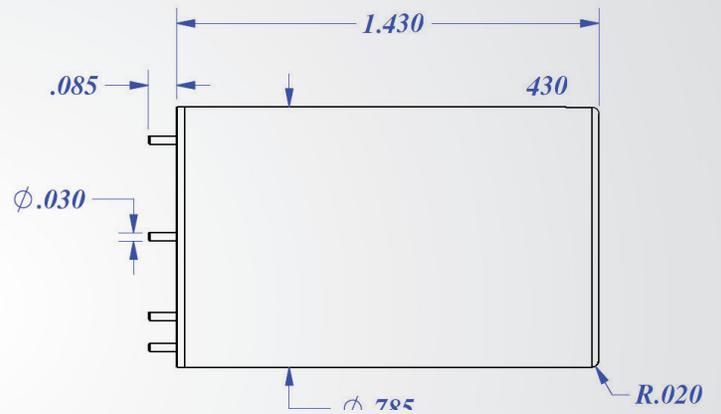
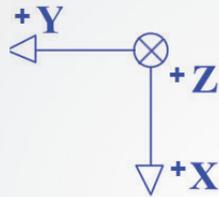
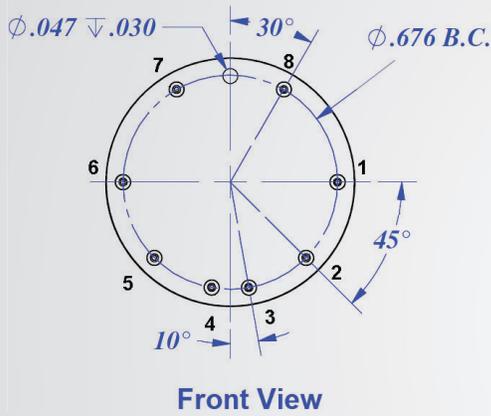
MicroMag Magnetometer



Applied Physics  
Systems

**Table 1. Electrical Connections**

PIN	FUNCTION
1	Z Output
2	Serial In (TTL)
3	+ Voltage In (+5 V)
4	NC
5	Serial Out (TTL)
6	Ground
7	X Output
8	Y Output



ARROWS SHOW  
MAGNETIC FIELD DIRECTION  
FOR POSITIVE VOLTAGE OUTPUT

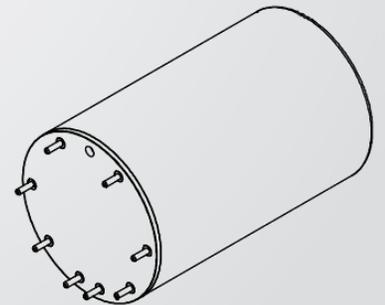


Figure 1. Model 20 MicroMag Magnetometer

# Model 20

## MicroMag Magnetometer



**Table 2. Magnetometer Specifications**

Operational Temperature	-20°C to +85°C
Scale Factor	
Analog Scale Factor at 25°C	3.000 V/100 microtesla (3V/Gauss)
Temperature Sensitivity of Scale Factor	< 150 ppm/°C
Bias	
Initial Bias at 25 °C	< ±100 nanoTesla (< ±1 mGauss)
Temperature Sensitivity of Bias	< ±5 nanotesla/°C (±.005 mGauss/ °C)
Axis Alignment	< ±1°
Noise Level (white)	< 0.2 nanotesla RMS/√Hz (.0002 mG RMS/√Hz)
Frequency Response	DC to 300 Hz (-3 dB)
Linearity	> 0.1% Full Scale
Analog Dynamic Range	1.2 x 10 <sup>-4</sup> Tesla (1.2 Gauss)
Polarity	Positive output for all axes results when field is applied in positive X, Y, and Z directions.
Voltage	+5 V at 35 mA
Weight	30 grams
Shock	1000 gee, 1 millisecond, half sine wave
Vibration	20 gee RMS, random 20 to 200 Hz
Size (cylindrical shape)	0.785 inch diameter x 1.430 inches height
Packaging	Hermetically sealed nonmagnetic nitronic 50 enclosure

Specifications are subject to change without notice.

Export classification of these magnetometers is under review to determine if they fall within the Export Administration Regulations (EAR) and/or the International Traffic in Arms Regulations (ITAR).