

# Model 544

## Miniature Orientation Sensor



### Datasheet

## Features

- High accuracy — Operates to 70°C with option to operate to 125°C (544H)
- Calculates and outputs roll, pitch, yaw data
- Miniature size 0.75" x 0.80" x 4.6"
- Digital serial data output
- Contains both a 3-axis magnetometer and a 3-axis accelerometer

## Applications

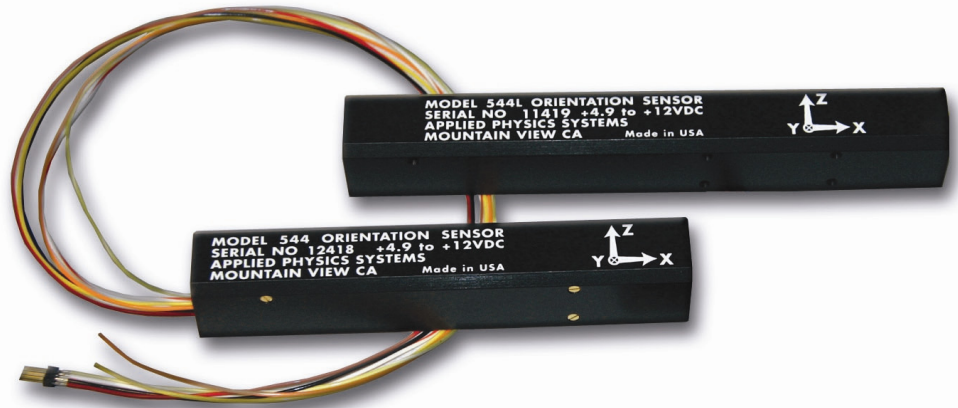
- Borehole logging and drilling
- Orientation determination for buoys, sonar systems, etc.
- Magnetic compass

## Description

The Model 544 system contains both a 3-axis fluxgate magnetometer and a 3-axis accelerometer. These sensors are sampled by an internal A to D converter and microprocessor subsystem which outputs 16 bit digital data representing the magnetometer and accelerometer readings. The system can also be configured to transmit the roll, pitch and azimuth orientation angles of the Model 544 system. These angles are calculated before transmission from the accelerometer and magnetometer sensor output data.

The accelerometer and magnetometer sensors and all of the system electronics are mounted in a rectangular package of dimensions 0.80" x 0.75" x 4.6". The package corners are rounded so that the unit will fit inside a cylinder with an inside diameter of 1". Input power range is from +4.9V to +12V.

Communication with the 544 system is accomplished by means of a bi-directional serial data link which can be configured to be TTL compatible or RS232 compatible. The system baud rate is user programmable, up to a maximum of 9600 baud.



Commands to the 544 and data from the 544 are both in the form of ASCII characters. A high speed binary communications protocol is also available, and can be enabled by the user.

The Model 544 scale factors, zero bias factors and alignment angles are measured by placing the system in precision rotational and magnetic field applying fixtures. Scale and offset calibration factors are typically measured over the 0 to 70°C temperature range for the standard Model 544 sensor. In addition, the Model 544H is available which calibrates the sensor over the temperature range of 0 to 125°C. The integral microprocessor corrects for alignment, scale and offset factors at any given temperature before outputting data. The system calibration data is stored in the system EEROM and is directly accessible to the user.

The magnetometer noise level is  $5 \times 10^{-6}$  Gauss and the accelerometer noise level is  $2 \times 10^{-4}$  Gee. The maximum data throughput is approximately 3 readings per second if all 6 outputs are transmitted. When viewed as a roll, pitch and yaw sensor, the temperature compensated 544 system has an overall accuracy of  $\pm 0.5^\circ$  for roll and pitch and  $\pm 1.0^\circ$  for azimuth.

## 1. Specifications

**Table 1. Model 544(H) Specifications**

<b>Noise Level</b>	
Magnetometer Accelerometer	5 x 10 <sup>-6</sup> G 2 x 10 <sup>-4</sup> Gees
<b>Linearity</b>	±0.1% FS
<b>Angular Accuracy</b>	
Roll and pitch Azimuth	±0.5° ±1.0°
<b>Axis Alignment</b>	
Axis alignment Alignment of axes with package reference frame	±0.2° ±0.2°
<b>Temperature Range</b>	
544 544H	0 to 70°C 0 to 125°C
<b>Power</b>	
Power	+4.9 to +12V @ 71 mA
<b>Physical</b>	
Weight Size	50 g 0.80" x 0.75" x 4.6"
<b>I/O</b>	
Communications Leads	RS232 or TTL @ 9600 baud Flying leads 6" long