



Features

- High operational temperature to 175°C
- High accuracy: $\pm 0.1^\circ$ for toolface (roll) and inclination, $\pm 0.3^\circ$ for azimuth
- Digital serial input/output
- Smallest diameter MWD sensor in the world (1.04" OD x 12.3" long)
- Accurate inclination while drilling

Applications

- EM and pulse based MWD systems
- High temperature drilling applications for oil, gas, and geothermal
- Directional drilling



The Applied Physics Systems Model 850HT Orientation Sensor enables high accuracy measurement of the toolface (roll), inclination (drift) and azimuth orientation angles in borehole logging and drilling applications in operational temperatures up to 175°C. Because of its small size, it is particularly well suited for use with coiled tubing drilling and completion systems.

The Model 850HT system contains both a 3-axis fluxgate magnetometer and a 3-axis accelerometer. The combination of these two sensor systems enables determination of the toolface, inclination, and azimuth angles of the 850HT sensor.

The Model 850HT transmits the instrument temperature and either the magnetometer and accelerometer outputs or the system orientation angles. The maximum transmission rate is 8 times per second for magnetometer and accelerometer outputs and 4 times per second for orientation angles.

To maintain high accuracy over the temperature range of the system, the sensors are temperature compensated. This enables an accuracy of $\pm 0.1^\circ$ for toolface and inclination and an accuracy of $\pm 0.3^\circ$ for azimuth to be achieved over the full temperature range of the system.

The Model 850HT communicates over a serial bidirectional TTL interface. The serial-in and serial-out lines operate at TTL/CMOS levels and are normally set to operate at 9600 baud with one stop bit and no parity. The user however can change the baud rate by setting bits in the system EEROM.

Two communication protocols are available, ASCII and binary:

- The ASCII protocol sends ASCII characters to the 850HT to obtain data. The data returned by the Model 850HT is transmitted as an ASCII data stream, complete with returns and line feeds, so that it can be easily displayed on a video terminal (provided a TTL to RS-232 conversion is made by the user).
- The binary protocol is used for high speed computer to computer interchange. In this case, one byte is sent to request data. The Model 850HT then responds with a multibyte data packet containing the desired data plus header and checksum.

The Model 850HT can also be configured to continuously send data in ASCII or binary protocol upon power up.

Model 850HT

High Temperature, Small Diameter Directional Sensor



Applied Physics
Systems



PHYSICAL

Outside Diameter (OD)	1.04" (26 mm)
Length	12.3" (312 mm)
Weight	0.53 lb (240 grams)
Main Connector	MDM9SH003P (ITT Cannon)
Mating Connector	MDM9PH003L (ITT Cannon)

ELECTRICAL

Input Voltage Range	+11 V to +30 V
Current Draw	70 mA @ 15 V
Logic Level	TTL/CMOS
Baud Rate	User programmable up to 9600 Baud
Protocol	User selectable: ASCII or binary
Logging Size	4 megabytes

ENVIRONMENTAL

Operating Temperature Range	0°C to 175°C
Storage Temperature Range	-25°C to +195°C
Shock	1000 G 1 ms half sine wave
Rotation	0 - 300 RPM
Vibration	2-axis ±50 gee full-scale

PERFORMANCE

Toolface (Roll) Accuracy	±0.1°
Azimuth Accuracy (@ n° inclination)	±0.3° @ 90°
	±0.1° @ 10°
	±0.2° @ 5°
Inclination Accuracy	±0.1°

Specifications are subject to change without notice.