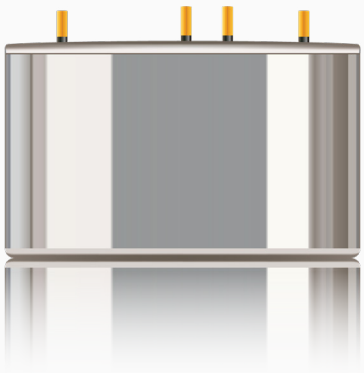
MODEL 80
ACCELEROMETER SENSOR

FEATURES

- High accuracy over an extended temperature range
- Low noise level and high shock tolerance
- High shock and vibration tolerance
- Rugged hermetically sealed packaging
- Standard sizes and miniaturized sized units available



APPLICATIONS

- Borehole Logging
- Inertial Guidance systems
- Structural Health Monitoring
- Navigation Systems
- Platform Stabilization

The technology employed in the APS accelerometer product line is generally referred to as a torque balance system incorporating an amorphous quartz hinge supporting a proof mass. Additional features of this technology include a permanent magnet torquer, top and bottom flux pole pieces, a capacitive pickoff system, and miniaturized servo electronics.

The accelerometer product line consists of the following:

- Model 80 MiniAcc
- Model 60 MicroAcc

The principal difference between these systems is size.

The outstanding performance parameters of these systems are the bias and scale factor stability over temperature and time. This stability results in very high system accuracy and is due principally to the stability of the quartz hinge supported proof mass.

The Applied Physics line of accelerometer sensors offer unique innovative features not available in other accelerometers which makes them an ideal choice to incorporate into new systems.

The accelerometer electronics consists of a low power miniaturized servo control system which produces an analog output proportional to acceleration. As an option, all systems can be configured with a digital asynchronous data interface. To produce the digital interface, a 16-bit analog to digital converter and microprocessor are included in the system electronics.

Systems that include the digial interface have internal compensation of the system bia and the scale factor over an standard and extend temperature ranges. This internal compensation increases the system accuracy over temperature and eliminates the need for the system user to perform external temperature compensation.

The Model 80 accelerometer generates an analog voltage output with a default scale factor of 1.000 V ±0.01 V/gee, which can be increased by adding an external resistor. For example, a 10K resistor between Ground (pin 6) and Gain Select (pin 4) doubles the scale factor to 2.000 V ±0.01 V/gee.

APPLIED PHYSICS RESEARCH

HEADQUARTERS
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ELECTRICAL

Input Voltage Range (reverse polarity protected)	±8 V to ±12 V
Maximum Applied Voltage	±15 V
Current (analog output only)	±5 mA
Current (option S, analog and digital interface)	+10 mA and -5mA
Polarity	Positive output for acceleration in the +X direction
Digital Asynchronous Serial Interface (option S)	5V TTL level
Baud Rate	User Programmable up to 38400 baud
Protocol (option S)	User Selectable: ASCII or binary

ENVIRONMENTAL

Operating Temperature Range	-55°C to +85°C (Model 80) -40°C to +150°C (Model 80HT)
Storage Temperature Range	-25°C to +160°C
Shock	1000 G 1 ms half sine wave, without bias shift
Vibration	20 GRMS, 20 Hz to 200 Hz, 30 minutes

PERFORMANCE

Analog Scale Factor at 25°C	1.000 V ±0.01 V/gee
Temperature Sensitivity of Scale Factor	< 30 microgee/°C
Initial Bias at 25°C	< ±2 milligee
Temperature Sensitivity of Bias	< $2x10^{-5}$ gee/°C
Axis Alignment	< ±0.2°
Noise Level	3 microgee RMS/√Hz
Frequency Response	DC to 100 Hz flat to ±5%
Linearity	> 0.05% Full Scale
Vibration Rectification Coefficient	< 100 microgee/gee2

ANALOG DYNAMIC RANGE

APPLIED VOLTAGE for a Scale Factor of 1V/gee	DYNAMIC RANGE
±8V	±6.0 gees
±10	±8.0 gees
±12	±10.0 gees

PHYSICAL

Cylindrical diameter	1.00" (25.4 mm)
Height	0.720" (18.288 mm)
Weight	35 grams
Packaging	Hermetically sealed 304L stainless steel enclosure

Specifications are subject to change without notice.

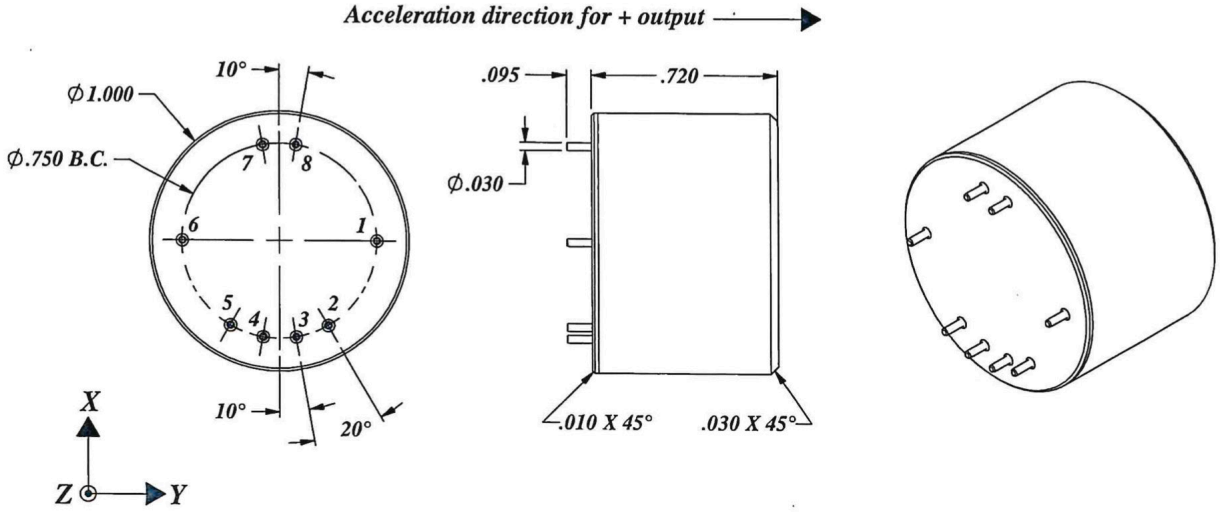

Figure 1. Model 80 MiniAcc Accelerometer

ELECTRIAL CONNECTIONS

PIN	FUNCTION
1	Analog Out
2	Serial Data In
3	NC
4	Gain Select
5	Serial Data Out
6	Ground
7	-Voltage In (-8 to -12 VDC)
8	+Voltage In (-8 to -12 VDC)