

SEN-1000 SUBMINIATURE DOWNHOLE PRESSURE TRANSDUCER/TRANSMITTER



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- Silicon-on-Sapphire Diaphragm
- Fast response time <100 microseconds
- Infinite cycle life @ rated FSPR
- Abrasion-proof diaphragm
- All Stainless Steel 316 or Inconel construction
- Shock and vibration proof design
- No signal decay
- No hysteresis

OPTIONAL

- Media Temperature Measurement
- Millivolt Output
- 4-20 mA Output
- 0-5 VDC, 0-10 VDC Outputs
- Custom configuration

APPLICATIONS

- Livewire Logging
- Cementing
- Fracturing
- Measurement While Drilling
- Logging
- Wellhead Measurements
- Logging While Drilling

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State-of-the-art Silicon-on-Sapphire pressure transducers and transmitters have a proven track record in the aerospace, flight test, plastics and downhole markets. Piezoresistive strain gauges grown onto a single-crystal radiation-hardened structure have negligible hysteresis. Silicon-on-Sapphire is a perfect electrical insulator that does not require silicon diode isolation junctions found on diffused semiconductor pressure transducers and transmitters. Silicon-on-Sapphire is chemically inert allowing compatibility with virtually all measured media.

A Silicon-on-Sapphire pressure transducer offers a significant improvement in performance over bonded foil strain gauge and diffused semiconductor technologies at competitive prices. These pressure transducers and transmitters are perfect for high volume OEM applications on hydraulic test stands, engine test stands, injection molding machines, paper machines, sterilizers, liquid level, gas pipelines, subsea, downhole and any other applications where a highly accurate pressure and temperature measurement is required.

A Silicon-on-Sapphire pressure transducer provides a total error of $\pm 0.1\%$ FSO with effectively no hysteresis. Long term drift of less than $\pm 1\%$ FSO and proof pressures up to 5X the rated line pressure are additional features of these versatile transducers.

Electron beam welded stainless steel construction compliant with MRO-175 for corrosive service and rated for depths of 6000 meters (20,000 ft) are standard features.

The welded construction protects from shock and vibration limits equivalent or exceeding military standard specification Mil-STD 167-2 as well as exceeding Nav-Sea standards for shipboard shock.

During ADCAP MARK48 Naval Torpedo Program our transducers excelled and outperformed all other transducers due to our Silicon-On-Sapphire principle and construction. Our sensors met or exceeded shipboard shock in excess of $750 \pm 75G$ $1.0 \pm 0.1ms$.

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PRODUCT SPECIFICATIONS

OUTPUT SIGNAL FOR TRANSDUCER: (final test data is sent with each device)	1-6 mV/V \pm 10% (diaphragm and pressure dependant)
OUTPUT SIGNAL FOR TRANSMITTER: (board is attached with flying leads)	4-20 mA 0-5 VDC 0-10 VDC
ZERO OFFSET FOR mV OUTPUT TRANSDUCER:	\pm 5% FSO
LINEARITY/REPEATABILITY/HYSTERESIS ERROR:	\pm 0.25% FS @ 70°F (BFSL)
LONG-TERM STABILITY:	\pm 0.20% FS/Year
COMPENSATED TEMPERATURE:	-65°F to +390°F
TEMPERATURE EFFECT ON ZERO:	\pm 0.02% FS/°F
TEMPERATURE EFFECT ON SPAN:	\pm 0.015% FS/°F
INPUT VOLTAGE FOR mV TRANSDUCER:	10 VDC Typical (other voltages available)
INPUT VOLTAGE FOR TRANSMITTER: (transmitter board is attached with flying leads)	14-24 VDC for 4-20 mA 14-36 VDC for 0-5 V (12 V battery option available) 14-36 VDC for 0-10 V (12 V battery option available)
INSULATION RESISTANCE:	100 MEGAOHMS @ 50 VDC
DIELECTRIC STRENGTH:	500 VAC. 50-60 HZ, 5 mA MAX. 1 Min.
REVERSE POLARITY:	Current Limiting
PROOF PRESSURE:	150% of Rated Range
BURST PRESSURE:	300% of Rated Range.
OPERATING LIFE:	100 Million Cycles
EMI/RFI:	100 Volts/Meter up to 1.0 GHz
WETTED PARTS:	Sapphire, 316L, 17-4PH or Inconel
ENCLOSURE:	316L or Inconel
MAXIMUM OPERATING TEMPERATURE:	-65°F to +390°F
VIBRATION:	3 g's 10-450 Hz for 20 minutes, 3 axes
SHOCK:	500 g's for 1.3 seconds, 2500 shocks/4 axes

