SENSONETICS

Sensing today....with tomorrow's technology

SEN-100 SILICON-ON-SAPPHIRE PRESSURE TRANSDUCERS

- **Unsurpassed stability at high and widely varying temperatures**
- **-320 to +750°F operating capabilities**
- **Excellent media compatibility**
- **Flight-qualified**
- **Withstands high levels of shock and vibration**
- **Electron-beam welded**
- **On-diaphragm temperature sensor (optional)**

APPLICATIONS

- Aerospace
- Flight testing
- Jet engine testing
- Materials testing

15402 Electronic Lane, Huntington Beach, CA 92649 (714) 799-1616 * (714) 799-4116 Fax

SILICON-ON-SAPPHIRE PRESSURE TRANSDUCERS

PATENT PENDING

Series 100 Silicon-on-Sapphire Pressure Transducers assure unsurpassed levels of performance for aerospace and other precision measurements. They provide high (5mV/V) sensitivity with excellent accuracy and stability, over widely varying temperatures ranging to as low as –320°F or as high as +750°F, and are compatible with virtually all media encountered in unfriendly environments.

Sensonetics piezoresistive strain gages are epitaxially grown onto a sapphire diaphragm to form a homogeneous single-crystal radiation-hardened structure with virtually undetectable hysteresis or non-repeatability. Since sapphire is a perfect electrical insulator, there is no need for diode isolation junctions found in traditional silicon pressure transducers. This feature, coupled with sapphire's modulus of elasticity which is 30% greater than that of stainless steel, enables high-temperature operation not previously attainable.

A proprietary hermetic seal between the sapphire diaghragm and the electron-beam-welded stainless steel case provides the ultimate in temperature coefficient match between internal structures. The seal also allows direct contact with corrosive and conductive media, without use of barrier diaphragms or transfer fluids.

Sensonetic pressure transducers are designed to comply with MIL standards for vibration, acceleration, shock, sand, dust, salt, humidity, EMI and other environments. The case is internally stress-isolated to inhibit response to mounting torque and other external stresses.

An on-diaphragm silicon RTD is available as an option. It has a time constant identical to that of the silicon strain gages and is used as a reference to enhance data error correction when using curve-fitting algorithms or lookup tables. This option may also be used for temperature measurement in some applications.

Sensonetic pressure transducers enable aircraft and aerospace engineers to perform critical measurements with greater accuracy and over broader temperature ranges than previously possible. Series 100 transducers are available in several pressure and vacuum configurations, with standard ranges from 0-5 psi to 0-10,000 psi, and with a choice of three levels of accuracy and stability.

Series 100 Pressure Transducers are available in the following configurations:

Absolute (A) (PSIA)	Referenced to vacuum (0 PSIA)
Vented Gage (G) (PSIG)	Referenced to atmosphere via small hole in side of case
Sealed Gage (SG) (PSIS)	Referenced to standard atmospheric pressure. Same construction as an absolute transducer
Wet/Wet Gage (WG) (PSIG)	Referenced to atmosphere via a wet/wet differential configuration with vent tube flush with case. Enables transducer to breathe in condensing humidity applications
Vacuum (V) (PSIV)	Same as vented gage, except electrical output increases with decreasing pressure (vacuum)

SERIES 100 SPECIFICATIONS

ABSOLUTE, GAGE AND VACUUM TRANSDUCERS*

Model Number	Pressure Range (psi)	Sensitivity (mV/V)	Static Accuracy [1,2] (%FSO@75°F)	Thermal Zero Shift [2] (%FSO/°F)	Thermal Sensitivity [2] (%FSO/°F)	Overall Error Band [3] (%FSO)	Transducer Outline No.
SEN-101	0-5 to 0-15	2–5	± 0.25	± 0.0175	± 0.0175	N/A	7
SEN-102	0-20 to 0-250	5					1
SEN-103	0-250 to 0-10,000	5					5
SEN-104	0-5 to 0-15	2–5	±0.25	±0.009	±0.009	±2	7
SEN-105	0-20 to 0-250	5					1
SEN-106	0-250 to 0-10,000	5					5
SEN-107	0-5 to 0-15	2–5	±0.25	± 0.005	± 0.005	±1	7
SEN-108	0-20 to 0-250	5					1
SEN-109	0-250 to 0-10,000	5					5

1 Includes non-linearity, hysteresis & non-repeatability using BFSL least squares method. Higher accuracies available upon request.
2 Transducers SEN-104 through 109 have the indicated Static Accuracy, Thermal Zero Shift, and Thermal Sensitivity, unless Overall Error Band is specified.
3 Includes electrical, mechanical and temperature effects on zero shift and sensitivity, over compensated range, using BFSL least-squares method.

PERFORMANCE

Pressure range: See table above.

Proof pressure: 150% FSPR.

Burst pressure: 300% FSPR, 25,000 psi maximum.

Accuracy and thermal shift: See table.

Compensated temperature range: See ordering guide for standard ranges from –65 to +500°F. Optional ranges available from –320 to +750°F.

ELECTRICAL

Sensitivity: See table.

Excitation: 5 to 20VDC.

Zero balance: ± 2mV.

Bridge configuration: 4-active-arm piezoresistive-strain-gage bridge.

Bridge resistance: 350,1000, 2500 (standard), or 5000Ω.

Isolation (ambient): Case isolated. Greater than 100MΩ at 50V.

Temperature sensor: On-diaphragm silicon RTD (optional).

PHYSICAL

Fittings: See outline drawings. Consult factory for specials.

Connectors: See outline drawings. Consult factory for other connectors or for 26 AWG pigtail lead terminations.

MATERIAL

Case: 300 Series SS. All-welded hermetic seal.

Wetted materials: Case and sapphire (aluminum oxide)

Dimensions: See outline drawings.

Weight: Up to 6 oz.

ENVIRONMENTAL

Long-term stability: Within ± 0.05% FSO over 12-month period.

Other: Designed to comply with MIL standards for vibration, acceleration, shock, sand, dust, salt, humidity, RFI, etc.

*Consult factory for brochures on differential and other models. Specifications subject to change without notice.

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SERIES 100
ORDERING INFORMATION

EXAMPLE OF MODEL NO.

Basic Model No. — SEN-102A-100A-250-1-A-S

- SEN-102A: Temperature Sensor
  - A. No temp. sensor
  - B. With temp. sensor
- 100A: Pressure Range
- 250: Bridge Resistance
- 1: Transducer Outline No.
- A: Compensated Temperature Range
  - A. +75 to +500° F.
  - B. −55 to +300° F.
  - C. −25 to +250°F.
  - D. −65 to +250°F.
- S: Special

Type: A(Absolute), G(Vented Gage), SG(Sealed Gage), WG(Wet/WetGage), V(Vacuum)

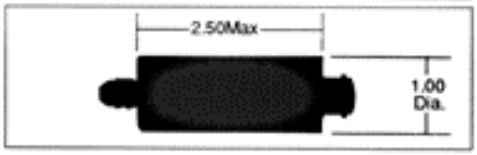
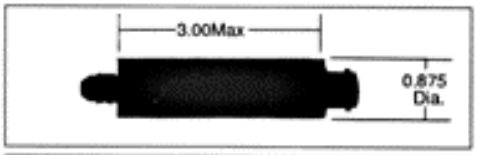
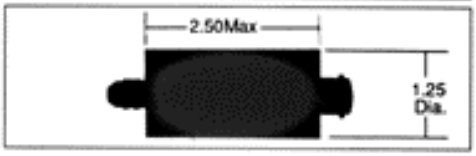
PRESSURE RANGE
(psi full scale)

SUFFIX	5	10	15	25	50	100	200	500	1M	2M	5M	10M
	5	10	15	25	50	100	200	500	1,000	2,000	5,000	10,000

BRIDGE RESISTANCE
(ohms)

SUFFIX	35	100	250	500
	350	1,000	2,500 (standard)	5,000

TRANSDUCER OUTLINE

Transducer Outline No.	Fitting Type	Connector Type	Dimensions (inches)
1	MS-33656-E4	Equivalent to PTIH-10-6P [mates with PT06A-10-6S(SR)]	
5			
7			

PINOUTS AND COLOR CODE

	+Exc.	+Out	−Out	−Exc.	Temp Sensor
Connector	A	B	C	D	E/F
Wire Leads	Red	White	Black	Orange	Green/Green

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