



SENSONETICS

Sensing today...with tomorrow's technology

SEN-400 MELT PRESSURE TRANSDUCER



Real time in process temperature and pressure measurements

- Fast response time < 100 microsec
- Infinite cycle life @ rated FSPR
- Abrasion-proof diaphragm
- No harmful mercury or NaK fill
- No signal decay
- No hysteresis
- Ideal for ISO-9000

On-board microprocessor performs thermal compensation

Optional microcomputer in each transducer for RS232

APPLICATIONS

- Blow molding
 - Compounding
 - Extrusion coating
 - Film and sheet
 - Vacuum pressure measurements
 - Pipe and profiles
 - Polymer finishing
 - Rubber extrusion
 - Wire and cable
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SERIES 400 POLYMER EXTRUSION MELT PRESSURE TRANSDUCER

Sensonetics' revolutionary new melt pressure transducer does not require temperature isolation of its sensing diaphragm, thus eliminating the need for mercury or NaK fill or push rod isolation. It uses state-of-the-art Silicon-on-Sapphire technology which has a proven track record in high-performance aerospace pressure applications.

Series 400 transducers are interchangeable with those offered by existing suppliers. Elimination of a liquid metal fill (mercury) assures safe use in applications involving food extrusion, food packaging, or extrusion of medical tubing, where mercury should not be used. It also eliminates the expensive costs of toxic waste disposal.

This new sensor is highly desirable for chemical applications such as processing photographic film, which are extremely sensitive to mercury contamination. Although some transducer manufacturers offer NaK as an alternative to mercury, this highly volatile chemical presents fire dangers in event of diaphragm rupture. NaK filled transducers should not be used in hazardous areas.

The sensing diaphragm is manufactured from sapphire, a single-crystal aluminum oxide which is the hardest of the oxide crystals and is chemically inert. Sapphire is extremely well suited to diaphragm use. It has a modulus of elasticity 30% greater than stainless steel and is five-times more abrasion resistant than tungsten carbide. The sapphire diaphragm is 5 to 8 times thicker than the 4.5 mil stainless steel diaphragms used in mercury-filled transducers. The sapphire's extra thickness and extreme hardness suit Series 400 transducers ideally to highly abrasive extrusion applications in which thinner mercury-filled devices wear out and release mercury into the process. The stiffer diaphragm also provides a response time up to 200 times faster than filled systems and those employing push rods.

Silicon is one of the most desirable strain gage materials for critical applications. In Silicon-on-Sapphire technology, piezoresistive silicon gages are epitaxially grown onto the sapphire diaphragm, forming a homogeneous single-crystal, radiation-hardened structure. Unlike stainless steel, this structure has virtually no hysteresis and provides excellent repeatability and long-term stability. It can be directly exposed to process media and can withstand operating temperatures up to 750°F.

An optional on-diaphragm temperature sensor (Silicon RTD) is available to sense the temperature of the melt stream at the flush diaphragm. Other combined Pressure/Temperature transducers utilize a thermocouple mounted in the stem of the sensor, resulting in an accurate measurement of the mounting-well temperature. The thermocouple also degrades over extended exposure to high temperature. The Silicon RTD on the Series 402 Pressure/Temperature transducer is mounted flush on the sapphire diaphragm directly exposed to the melt stream. The ceramic base further isolates the sensor from the mounting well, resulting in an accurate measurement of the melt stream. This arrangement is ideal for use in temperature control.



*In Sensonetics' exclusive
Silicon-on-Sapphire design
the strain gage bridge
and optional temperature
sensor are in direct contact
with the plastic melt,
making the transducers
free of Hg, NaK, push rods,
capillary tubes and
thermocouples.*

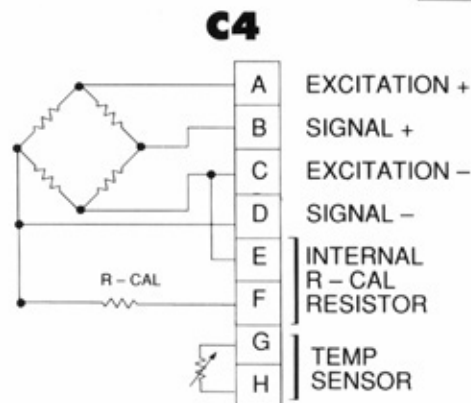
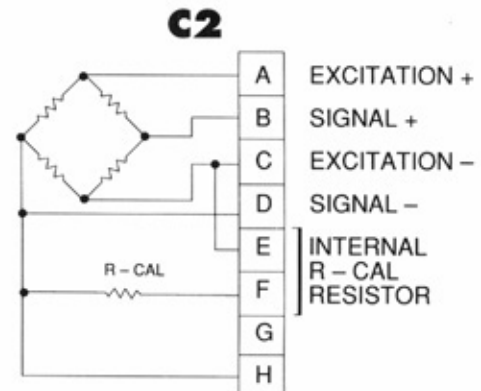
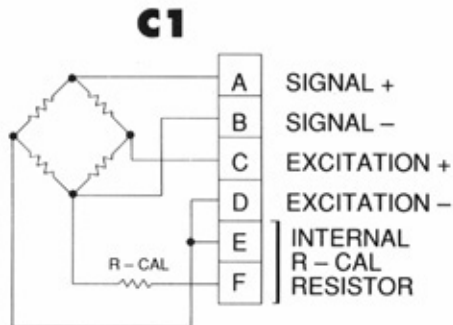
Patented

TRANSDUCER OUTLINES

SERIES 400

PLASTIC MELT PRESSURE TRANSDUCER

CONNECTOR	NO. OF PINS	R-CAL	TEMP SENSOR	CONNECTOR	MATING CONNECTOR
C1	6	YES	NO	PTIH-10-6P	PT06A-10-6S(SR)
C2	8	YES	NO	PCIH-12-8P	PC06A-12-8S(SR)
C4	8	YES	YES	PCIH-12-8P	PC06A-12-8S(SR)



ORDERING GUIDE for Series 400 Plastic Melt Pressure Transducers

MODEL	RANGE	OUTLINE	STEM LENGTH	CONNECTOR
SEN-401 (no temp sensor)	1.5 C = 150 psi	10 = No. 10 (1/2 - 20 UNF)	3 = 3 inch	C1 = 6-pin
	2.5 C = 250psi		6 = 6 inch	
	5 C = 500 psi		9 = 9 inch	C2 = 8-pin
	7.5 C = 750 psi		12 = 12 inch	
	1 M = 1000 psi		15 = 15 inch	
	1.5 M = 1500 psi		18 = 18 inch	
SEN-402 (with temp sensor)	3 M = 3000 psi	10 = No. 10 (1/2 - 20 UNF)	3 = 3 inch	C4 = 8-pin
	5 M = 5000 psi		6 = 6 inch	
	7.5 M = 7500 psi		9 = 9 inch	
	10 M = 10,000 psi		12 = 12 inch	
	15 M = 15,000 psi		15 = 15 inch	
30 M = 30,000 psi	18 = 18 inch			
EXAMPLE				
SEN-401-	5M -	10 -	6 -	C1

SERIES 400 SPECIFICATIONS

PERFORMANCE CHARACTERISTICS

PRESSURE RANGES	0-150, 0-250, 0-500, 0-750, 0-1000, 0-1500, 0-3000, 0-5000, 0-7500, 0-10,000, 0-15,000, 0-30,000 psi
COMBINED ERROR	Better than $\pm 0.5\%$ FSO
REPEATABILITY	Better than $\pm 0.1\%$ FSO
RESOLUTION	Infinite
FREQUENCY RESPONSE	4000 Hz
MAXIMUM PRESSURE	2x full scale; 25,000 psi maximum
WETTED MATERIAL	Sapphire
CASE MATERIAL	17-4pH & 300 series stainless steel; hastelloy 'C' optional
MOUNTING TORQUE	40 in-lbs nominal, 50 in-lbs maximum

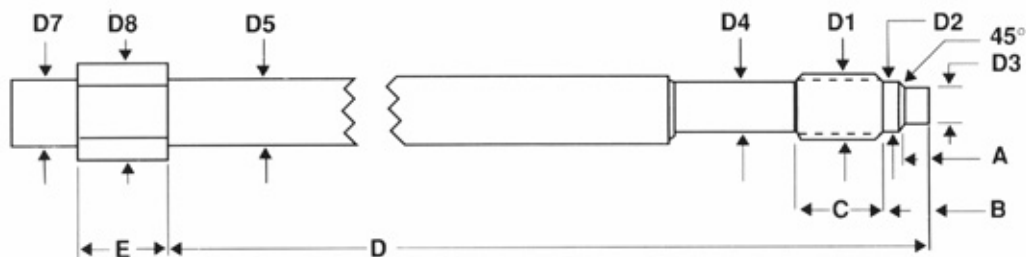
ELECTRICAL CHARACTERISTICS

CONFIGURATION	4-active-arm strain-gage bridge
BRIDGE RESISTANCE	2500 Ω nominal
FULL SCALE OUTPUT	33.3 mV @ 10 VDC nominal. Consult factory for other outputs
ZERO BALANCE	$\pm 5\%$ FSO
EXCITATION	6 to 10 VDC, 15V maximum
INTERNAL SHUNT (R-CAL)	80% FSO nominal
INSULATION RESISTANCE	Greater than 100 M Ω @ at 50 VDC

TEMPERATURE CHARACTERISTICS

MAXIMUM DIAPHRAGM TEMPERATURE	750°F (400°C)
THERMAL ZERO SHIFT	Better than $\pm 0.01\%$ FSO/°F at 500°F
THERMAL SENSITIVITY SHIFT	Better than $\pm 0.005\%$ FSO/°F at 500°F

In normal operation thermal effects on zero and span are "zeroed out" during startup calibration.



OUTLINE DRAWING	D1	D2	D3	D4	D5	D7	D8	A	B	C	D	E
No. 10 (inches)	1/2 X 20	.400	.305	.420	.500	.500 to .750	3/4 HEX	.209	.44	.62	6 or 12.5	.500

METRIC ADAPTOR AVAILABLE

Consult factory for brochures on other models and on pressure indicators.
Specifications subject to change without notice.