

SenSym

SDXL010D 0 - 10 In. H₂O

LOW PRESSURE COMPENSATED PRESSURE SENSORS IN A DIP PACKAGE

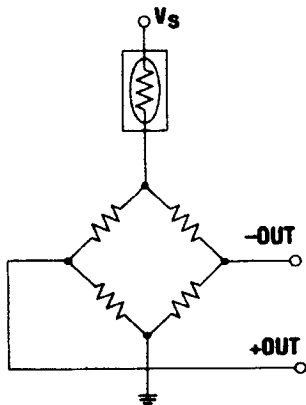
FEATURES

- Low Cost DIP
- Temperature Compensation
- Calibrated Zero and Span
- Small Size
- Low Noise
- High Impedance for Low Power Applications

APPLICATIONS

- Medical Equipment
- Computer Peripherals
- Pneumatic Controls
- HVAC

EQUIVALENT CIRCUIT



GENERAL DESCRIPTION

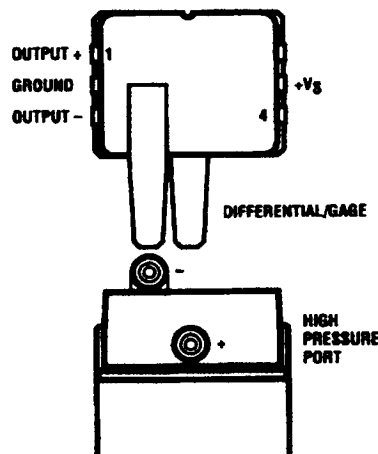
The SDX series sensors will provide a very cost effective solution for pressure applications that require small size plus performance. These calibrated and temperature compensated sensors give an accurate and stable output over a 0°C to 50°C temperature range. This series is intended for use with non-corrosive, non-ionic working fluids such as air, dry gases and the like.

The SDXL010D parts are specifically designed to measure low pressures with a 0 to 10 In. H₂O full scale range.

The output of the bridge is ratiometric to the supply voltage and operation from any D.C. supply voltage up to +20V is acceptable.

The SDX devices feature an integrated circuit sensor element and laser trimmed thick film ceramic housed in a compact solvent resistant case. The package is a double wide (i.e., 0.600" lead spacing) dual-inline-package. This is the same familiar package used by IC manufacturers except it has integral pressure port (s).

ELECTRICAL CONNECTION



The pc board area used by each DIP is approximately 0.26 square inches. This extremely small size enables the use of multiple sensors in limited available space. The DIP provides excellent isolation to external package stress.

The DIP mounts on a pc board like a standard IC with through-hole pins. The pins anchor the pressure sensor to the pc board and provides a more secure and stable unit than other types of packages.

PRESSURE SENSOR CHARACTERISTICS

MAXIMUM RATINGS

Supply Voltage, V_S	+20V _{DC}
Maximum Pressure On Any Port	50 psig
Lead Temperature (Soldering 2-4 seconds)	250°C
Burst Pressure	10 psi

ENVIRONMENTAL SPECIFICATIONS

Temperature Ranges	
Compensated	0°C to 50°C
Operating	-40°C to +85°C
Storage	-55°C to +125°C
Humidity Limits	0 to 100% RH

STANDARD PRESSURE RANGES

Part Number	Operating Pressure	Proof Pressure	FULL-SCALE SPAN ⁽²⁾		
			Min.	Typ.	Max.
SDXL010D	0 – 10 In. H ₂ O	200 In. H ₂ O	24.5mV	25.0mV	25.5mV

PERFORMANCE CHARACTERISTICS ⁽¹⁾

Characteristic	Min.	Typ.	Max.	Unit
Zero Pressure Offset	-1.0	0	+1.0	mV
Combined Linearity and Hysteresis ⁽³⁾	—	±0.2	±1.0	%FSS
Temperature Effect on Span (0–50°C) ⁽⁴⁾	—	±0.4	±2.0	% Reading
Temperature Effect on Offset (0–50°C) ⁽⁴⁾	—	±0.2	±0.6	mV
Repeatability ⁽⁵⁾	—	±0.2	—	%FSS
Input Impedance ⁽⁶⁾	—	20.0	—	kΩ
Output Impedance ⁽⁷⁾	—	7.0	—	kΩ
Common-Mode Voltage ⁽⁸⁾	0.75	3.0	5.5	V _{DC}
Response Time ⁽⁹⁾	—	100	—	μsec
Long Term Stability of Offset and Span ⁽¹⁰⁾	—	±0.1	—	%FSS

Specification Notes:

- Note 1:** Reference Conditions (unless otherwise noted): Supply Voltage, $V_S = 12V_{DC}$, $T_A = 25^\circ C$, Common-Mode Line Pressure = 0 psig, Pressure Applied to Port 2.
- Note 2:** Span is the algebraic difference between the output voltage at full-scale pressure and the output at zero pressure. Span is ratiometric to the supply voltage.
- Note 3:** Hysteresis is the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure.
- Note 4:** Maximum error band of the offset voltage and the error band of the span, relative to the 25°C reading.
- Note 5:** Maximum difference in output at any pressure with the operating pressure range and temperature within 0°C to +50°C after:
a) 100 temperature cycles, 0°C to +50°C
b) 1.0 million pressure cycles, 0 psi to full-scale span.
- Note 6:** Input impedance is the impedance between V_S and ground.
- Note 7:** Output impedance is the impedance between the + and - outputs.
- Note 8:** This is the common-mode voltage of the output arms for $V_S = 12V_{DC}$.
- Note 9:** Response time for a 0 psi to full-scale span pressure step change, 10% to 90% rise time.
- Note 10:** Long term stability over a one year period.

GENERAL DISCUSSION

The SDX series devices give a voltage output which is directly proportional to applied pressure. The gage devices will give an increasing positive going output when increasing pressure is applied to the pressure port. The devices are ratiometric to the supply voltage and changes in the supply voltage will cause proportional changes in the offset voltage and full-scale span.

PNEUMATIC INTERFACE

The DIP also provides convenient mounting and pressure ports for ease of use with standard $\frac{1}{16}$ " ID, $\frac{1}{8}$ " OD, $\frac{1}{32}$ " wall, flexible plastic tubing for pressure connection.

The small tubing has several advantages over larger tubing commonly used with pressure sensors:

- 1) The tubing can be formed in a much smaller radius without kinking.
- 2) The tubing is easier to handle.
- 3) The tubing is available in a variety of colors such as clear, white, yellow, blue, green, etc. to enable color coding of pneumatic circuits with multiple pressure sensors in the same way that wiring harnesses are color coded in electrical circuits. This greatly simplifies troubleshooting.
- 4) Less stress is placed on the pressure sensor package resulting in less potential for offset shifts.
- 5) Less physical space is required for the small tubing.
- 6) The lower volume of air in the small tubing results in faster pressure sensor response.

USER CALIBRATION

The SDX devices are fully calibrated for offset and span and should therefore require little user adjustment in most applications. For more precise span and offset adjustments, contact the SenSym factory.

VACUUM REFERENCE (Absolute Devices)

Absolute sensors have a hermetically sealed vacuum reference chamber. The offset voltage on these units is therefore measured at vacuum, 0 psia. Since all pressure is measured relative to a vacuum reference, all changes in barometric pressure or changes in altitude will cause changes in the device output.

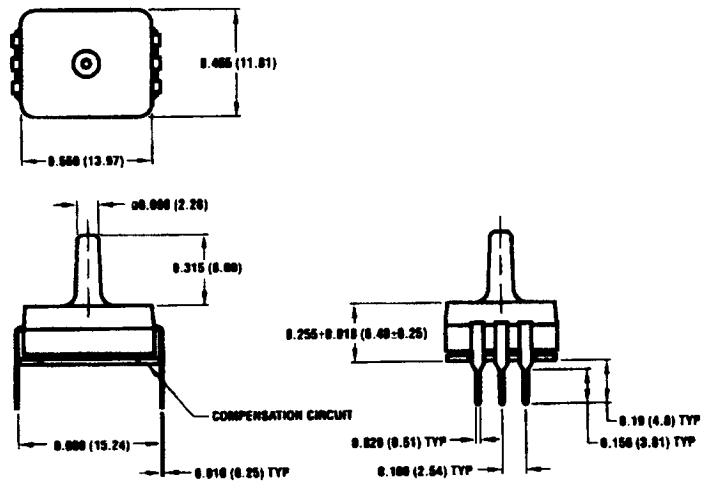
MEDIA COMPATIBILITY

SDX devices are compatible with most non-corrosive gases. For questions concerning media compatibility, contact the factory.

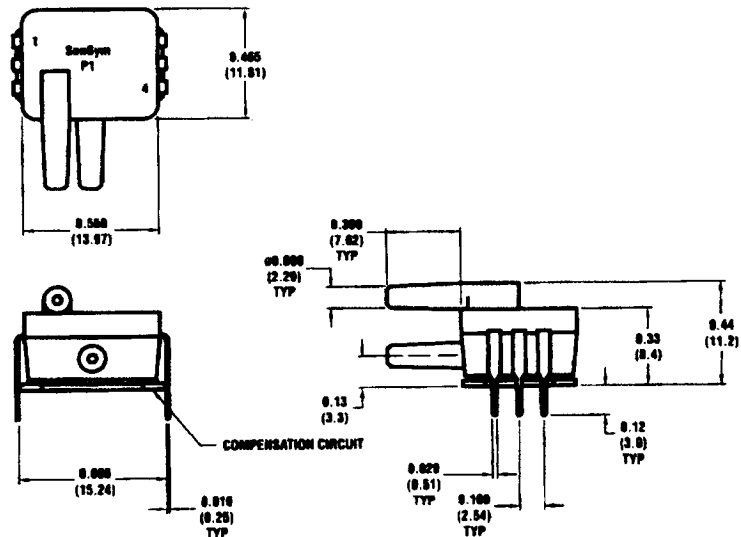
APPLICATION INFORMATION

The Application Information found in Section 2 of the SenSym Solid-State Sensors Handbook on the SCX series is applicable to this series.

PHYSICAL DIMENSIONS



SDX A2/G2 Package



SDX D4 Package

ORDERING INFORMATION

To order, use the following part number(s):

Pressure Range	Differential/Gage
0 - 10 In. H ₂ O	SDXL010D4

See Section 10 for Package Styles and Dimensions

Tolerances, unless otherwise noted

- ± 0.01 For Two Decimal Places
- ± 0.005 For Three Decimal Places