Pressure Sensors

22PC Series

Gage/Unamplified-Noncompensated

Basic Sensors

FEATURES

- Lowest priced pressure sensor
- Miniature package
- Can be used to measure with vacuum or positive pressure
- Operable after exposure to frozen conditions
- 2 mA constant current excitation significantly reduces sensitivity shift over temperature*

22PC SERIES PERFORMANCE CHARACTERISTICS at 10.0 ±0.01 VDC Excitation, 25°C

	Min.	Typ.	Max.	Units
Excitation	---	10	12	VDC
Null Shift, 25° to 0°, 25° to 50°C	---	±2.0	---	mV
Null Offset	−30	0	+30	mV
Linearity, P2 > P1, BFSL	---	±0.25	±1.0	%Span
Span Shift, 25° to 0°, 25° to 50°C	---	±6.0	---	%Span
Repeatability & Hysteresis	---	±0.15	---	%Span
Response Time	---	---	1.0	msec
Input Resistance	4.0 K	5.0 K	6.0 K	ohms
Output Resistance	4.0 K	5.0 K	6.0 K	ohms
Weight	---	2	---	grams

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	−40° to +85°C (−40° to +185°F)
Storage Temperature	−55° to +100°C (−67° to +212°F)
Shock	Qualification tested to 150 g
Vibration	Qualification tested to 0 to 2 kHz, 20 g sine
Media (P1 & P2)	Limited only to those media which will not attack polyetherimide, silicon, fluorosilicone, silicone, EPDM, and neoprene seals

22PC SERIES ORDER GUIDE

Catalog Listing	Pressure Range psi	Span, mV			Sensitivity mV/psi Typ.	Overpressure psi, Max.
		Min.	Typ.	Max.		
22PCA Type	1.0	25	42	59	42	20
22PCC Type	15	156	225	294	15	45
22PCF Type	100	147	225	303	2.3	200

SENSOR SELECTION GUIDE

2 Product Family	2 Circuit Type	PC Pressure Transducer	A Pressure Range	F Type of Seal	A Type of Port	6 Termination Style	G Pressure Measurement
2 20PC Family	**2** Noncompensated low cost		**A** 1 psi **C** 15 psi **F** 100 psi	**E** EPDM **F** Fluorosilicone **N** Neoprene **S** Silicone	**A** Straight **B** Barbed **D** Modular **J** Needle	**2** 2 x 2 **6** 1 x 4 (.600″)	**G** Gage

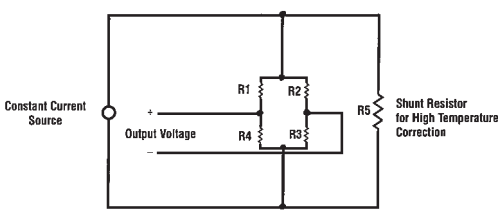
Example: 22PCAFA6G
Non-compensated low cost 1 psi sensor with fluorosilicone seal, straight port, 1 x 4 termination and gage pressure measurement.
See Accessory Guide, page 27.

Note: Not all catalog listings are established. Please refer to the Order Guides, or contact the MICRO SWITCH Application Center at the 800 number.

*Non-compensated pressure sensors, excited by constant current instead of voltage, exhibit temperature compensation of Span. Application Note #1 briefly discusses current excitation.

Constant current excitation has an additional benefit of temperature measurement. When driven by a constant current source, a silicon pressure sensor's terminal voltage will rise with increased temperature. The rise in voltage not only compensates the Span, but is also an indication of die temperature.

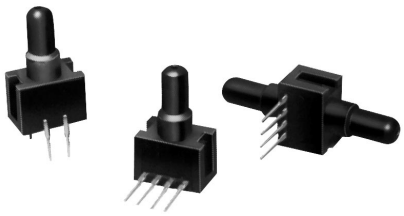
Constant Current Excitation Schematic



Pressure Sensors

Gage and Differential/Unamplified-Noncompensated

Basic Sensors



FEATURES

- Miniature package
- Variety of gage pressure port configurations - easily and quickly modified for your special needs
- Operable after exposure to frozen conditions
- Ideal for wet/wet differential applications
- Choice of termination for gage sensors
- 2 mA constant current excitation significantly reduces sensitivity shift over temperature*
- Can be used to measure vacuum or positive pressure

24PC SERIES PERFORMANCE CHARACTERISTICS at 10.0 ±0.01 VDC Excitation, 25°C

	Min.	Typ.	Max.	Units
Excitation	---	10	12	VDC
Null Offset	−30	0	+30	mV
Null Shift, 25° to 0°, 25° to 50°C	---	±2.0	---	mV
Linearity, P2 > P1, BFSL	---	±0.25	±1.0	%Span
Span Shift, 25° to 0°, 25° to 50°C	---	±5.0*	---	%Span
Repeatability & Hysteresis	---	±0.15	---	%Span
Response Time	---	---	1.0	msec
Input Resistance	4.0 K	5.0 K	6.0 K	ohms
Output Resistance	4.0 K	5.0 K	6.0 K	ohms
Stability over One Year	---	±0.5	---	%Span
Weight	---	2	---	grams

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	−40° to +85°C (−40° to +185°F)
Storage Temperature	−55° to +100°C (−67° to +212°F)
Shock	Qualification tested to 150 g
Vibration	Qualification tested to 0 to 2 kHz, 20 g sine
Media (P1 & P2)	Limited only to those media which will not attack polyetherimide, silicon, fluorosilicone, silicone, EPDM and neoprene seals.

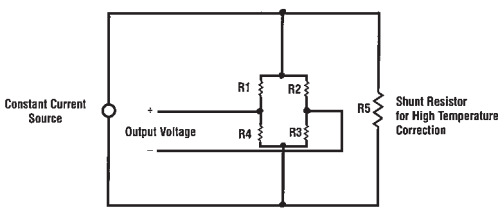
24PC SERIES ORDER GUIDE

Catalog Listing	Pressure Range psi	Span, mV			Sensitivity mV/psi Typ.	Overpressure psi Max.
		Min.	Typ.	Max.		
24PCE Type	0.5	24	35	46	70	20
24PCA Type	1.0	30	45	60	45	20
24PCB Type	5.0	85	115	145	23	20
24PCC Type	15	165	225	285	15	45
24PCD Type	30	240	330	420	11	60
24PCF Type	100	156	225	294	2.25	200
24PCG Type	250	145	212	280	0.85	500

*Non-compensated pressure sensors, excited by constant current instead of voltage, exhibit temperature compensation of Span. Application Note #1 briefly discusses current excitation.

Constant current excitation has an additional benefit of temperature measurement. When driven by a constant current source, a silicon pressure sensor's terminal voltage will rise with increased temperature. The rise in voltage not only compensates the Span, but is also an indication of die temperature.

Constant Current Excitation Schematic



Pressure Sensors

24PC Series

Gage and Differential/Unamplified-Noncompensated

SENSOR SELECTION GUIDE

2 Product Family	4 Circuit Type	PC Pressure Transducer	A Pressure Range	F* Type of Seal	A Type of Port	2 Termination Style	G Pressure Measurement
2 20PC family	**4** Noncompensated		**A** 1 psi **B** 5 psi **C** 15 psi **D** 30 psi **E** 0.5 psi **F** 100 psi **G** 250 psi	**E** EPDM **F** Fluorosilicone **N** Neoprene **S** Silicone	**A** Straight **B** Barbed **C** Luer **D** Modular **H** M5 Thread **I** 90° Port **J** Needle **K** Reverse 98 Port **L** 1/4 - 28 UNF w/Cable Lock **M** 1/4 - 28 UNF w/o Cable Lock **S** Manifold	**1** 1 x 4 (.400″) **2** 2 x 2 **6** 1 x 4 (.600″)	**G** Gage **D** Differential

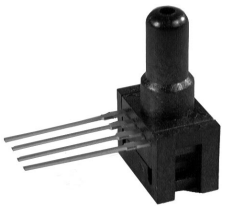
Example: 24PCAFA2G
Standard, non-compensated 1 psi sensor with fluorosilicone seal, straight port, 2 x 2 terminals, and Gage pressure measurement.
*Other media seal materials may be available.

See Accessory Guide, page 27.

Not all combinations are established. Contact 800 number before final design.

Pressure Sensors

Absolute Unamplified Noncompensated



NEW

FEATURES
- Absolute pressure measurement
- Miniature package
- 2-15 and 2-30 psi pressure ranges
- 2 mA constant current excitation significantly reduces sensitivity shift over temperature*

24PC PERFORMANCE SPECIFICATIONS

Accuracy Specifications @ 10.0 ± .01 VDC Excitation, 25°C

Parameter	Range psia	bar	Min.	Typ.	Max.	Units
Excitation			—	10	12	VDC
Null Shift	2-15	1		±2.0	±4.0	mV
0 to 25°C, 25 to 50°C	2-30	2		±2.0	±5.5	
Linearity	2-15	1		.10	.20	% Span
B.F.S.L. P2 < P1**	2-30	2		.15	.30	
Sensitivity Shift 0 to 25°C, 25 to 50°C	All			±5.0	±6.5	% Span
Repeatability & Hysteresis	All			±0.5		% Span
Input Resistance			4.0 K	5.0 K	6.0 K	Ohms
Output Resistance			4.0 K	5.0 K	6.0 K	Ohms
Weight			—	2.0	—	grams

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	−40 to +85°C (−40 to +185°F)
Storage Temperature	−55 to +100°C (−67 to +212°F)
Shock	Qualification tested to 150 G
Vibration	Qualification tested to 0 to 2 kHz, 20 G sine
Media Compatibility	Limited only to those media which will not attack polyetherimide, silicon, fluorosilicone and silicone seals.

*Span: the algebraic difference between output end points
**B.F.S.L.: Best Fit Straight Line

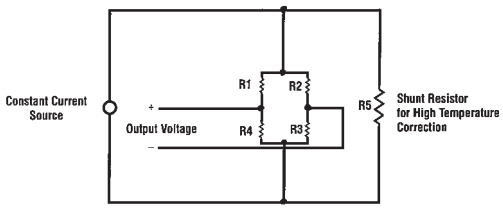
24PC ABSOLUTE ORDER GUIDE

Catalog Listing Type	Pressure Range psia	Span, mV			Null Offset mV			Sensitivity mV/psi Typ.	Over-pressure psia Typ.
		Min.	Typ.	Max.	Min.	Typ.	Max.		
24PCC	2-15	−140	−200	−260	−46	−16	+14	15	45
24PCD	2-30	−160	−300	−440	−61	−16	+29	11	60

* Non-compensated pressure sensors, excited by constant current instead of voltage, exhibit temperature compensation of Span. Application Note #1 briefly discusses current excitation.

Constant current excitation has an additional benefit of temperature measurement. When driven by a constant current source, a silicon pressure sensor's terminal voltage will rise with increased temperature. The rise in voltage not only compensates the Span, but is also an indication of die temperature.

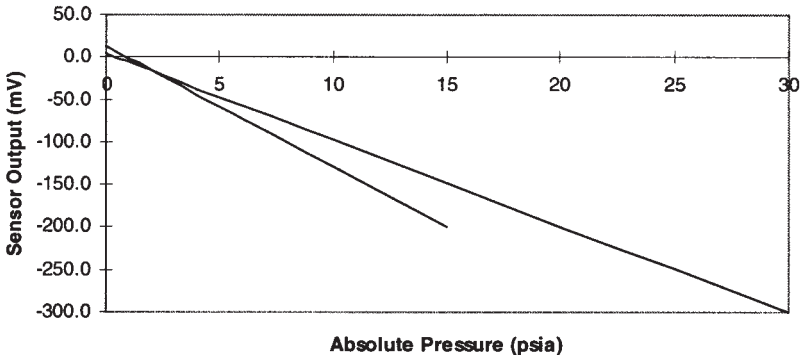
Constant Current Excitation Schematic



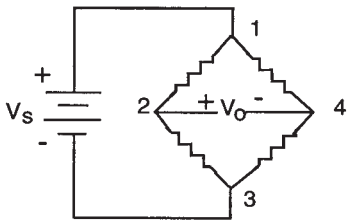
Pressure Sensors

Absolute Unamplified Noncompensated

24PC SERIES ABSOLUTE PRESSURE SENSOR OUTPUT CURVE



EXCITATION SCHEMATIC



TERMINATION STYLE
Style 6 - 1 x 4
Pin 1 = Vs (+)
Pin 2 = Output (+)
Pin 3 = Ground (–)
Pin 4 = Output (–)

Pin 1 is notched
Pin 2 is next to
Pin 1, etc.

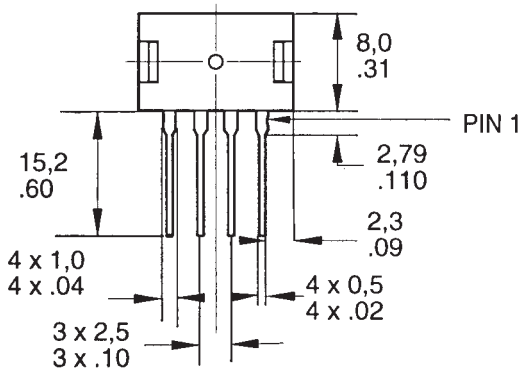
SENSOR SELECTION GUIDE

2 Product Family	4 Circuit Type	PC Pressure Transducer	C Pressure Range	F** Type of Seal	D* Type of Port (P1)	6 Termination Style	A Pressure Measurement
2 20PC Family	**4** Standard noncompensated		**C** 2-15 psia 1 bar **D** 2-30 psia 2 bar	**F** Fluoro-silicone	**A** Straight **D** Modular	**6** 1 x 4 (.600″ long)	**A** Absolute

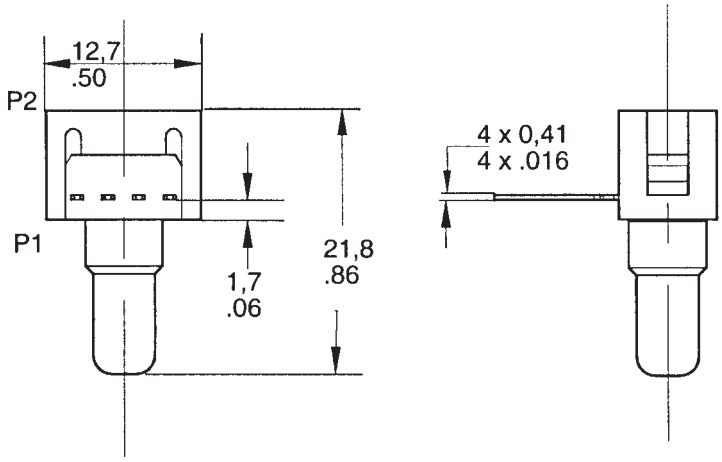
*Port type refers to P1
**Media seal is on P1 side and will not be in contact with media

Example: 24PCCFD6A
Non-compensated 15 psi Absolute sensor with fluorosilicone seal, modular port, 1 x 4 terminals, .600″ long.
See Accessory Guide, page 27.

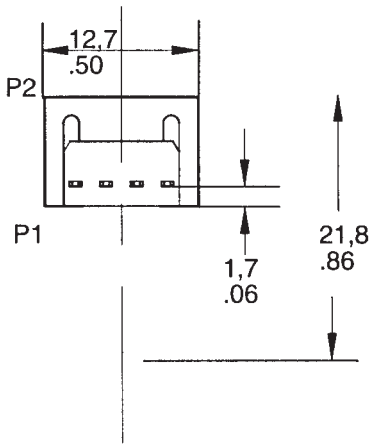
MOUNTING DIMENSIONS (for reference only)



A Straight Port



D Modular Port

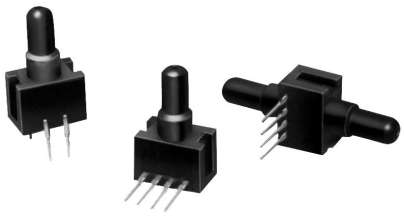


Pressure Sensors

26PC Series

Gage and Differential/Unamplified-Compensated

Temperature Compensated Sensors



FEATURES

- Lowest priced sensor with temperature compensation and calibration
- Variety of gage pressure port configurations - easily and quickly modified for your special needs
- Operable after exposure to frozen conditions
- Choice of termination for gage sensors
- Calibrated Null and Span
- Temperature compensated for Span over 0 to 50°C
- Provides interchangeability
- Can be used to measure vacuum or positive pressure
- Ideal for wet/wet differential applications

Unamplified

26PC SERIES PERFORMANCE CHARACTERISTICS at 10.0 ±0.01 VDC Excitation, 25°C

	Min.	Typ.	Max.	Units
Excitation	---	10	16	VDC
Repeatability & Hysteresis	---	±0.20	---	%Span
Response Time	---	---	1.0	msec
Input Resistance	5.5 K	7.5 K	11.5 K	ohms
Output Resistance	1.5 K	2.5 K	3.0 K	ohms
Stability over One Year	---	±0.5	---	%Span
Weight	---	2	---	grams

Total error calculation, see page 105.

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	−40° to 85°C (−40° to +185°F)
Storage Temperature	−55° to +100°C (−67° to +212°F)
Compensated Temperature	0° to +50°C (32° to +122°F)
Shock	Qualification tested to 150 g
Vibration	MIL-STD-202. Method 213 (150g halfsine, 11 msec)
Media (P1 & P2)	Limited only to those media which will not attack polyetherimide, silicon, fluorosilicone, silicone, EPDM, and neoprene seals.

26PC SERIES ORDER GUIDE

Catalog Listing	Pressure Range (psi)	Linearity (% span)		Null Shift (mV)		Null Offset (mV)			Span Shift (% span)		Span (mV)			Sensitivity mV/psi	Over-pressure psi
		Typ.	Max	Typ.	Max	Min.	Typ.	Max.	Typ.	Max.	Min.	Typ.	Max.	Typ.	Max.
26PCA TYPE	1	0.25	0.5	±0.5	±1.0	−1.5	0	+1.5	±1.0	±2.0	14.7	16.7	18.7	16.7	20
26PCB TYPE	5	0.4	0.5	±0.5	±1.0	−1.5	0	+1.5	±1.0	±1.5	47	50	53	10.0	20
26PCC TYPE	15	0.25	0.5	±0.5	±1.0	−1.5	0	+1.5	±0.75	±1.5	97	100	103	6.67	45
26PCD TYPE	30	0.1	0.2	±0.75	±1.5	−1.5	0	+1.5	±0.75	±1.5	97	100	103	3.33	60
26PCF TYPE	100	0.1	0.2	±1.0	±2.0	−2.0	0	+2.0	±0.5	±1.5	95	100	105	1.0	200
26PCJ TYPE	38*	0.1	0.5	±0.7	±1.5	−1.5	0	+1.5	±1.0	±1.5	37.5	39.5	41.5	2.63	60
26PCK TYPE	38*	0.1	0.5	±0.7	±1.5	−1.5	0	+1.5	±1.0	±1.5	37.5	39.5	41.5	2.63	60

*Accuracy specifications calculated at 15 psi.

Pressure Sensors

26PC Series

Gage and Differential/Unamplified-Compensated

SENSOR SELECTION GUIDE

2 Product Family	6 Circuit Type	PC Pressure Transducer	B Pressure Range	F* Type of Seal	A Type of Port	2 Termination Style	G Pressure Measurement
2 20PC family	**6** Compensated Calibrated		**A** 1 psi **B** 5 psi **C** 15 psi **D** 30 psi **F** 100 psi **J** 38 psi **K** 38 psi (passivated**)	**E** EPDM **F** Fluorosilicone **N** Neoprene **S** Silicone	**A** Straight **B** Barbed **C** Luer **D** Modular **H** M5 Thread **I** 90° Port **J** Needle **K** Reverse 90° Port **L** 1/4-28 UNF w/Cable Lock **M** 1/4 - 28 UNF w/o Cable Lock **S** Manifold	**1** 1 x 4 (.400″) **2** 2 x 2 **6** 1 x 4 (.600″)	**G** Gage **D** Differential

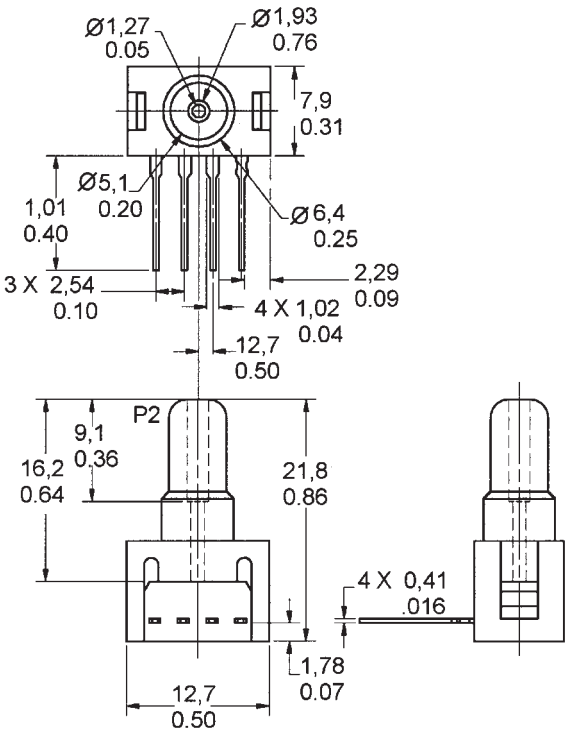
Example: 26PCBFA2G
Compensated and calibrated 5 psi sensor with fluorosilicone seal, straight port, 2 x 2 terminals, and Gage pressure measurement.
*Other media seal materials may be available.
**P2 side of die coated for environmental and dielectric protection.

See Accessories Guide, page 27.

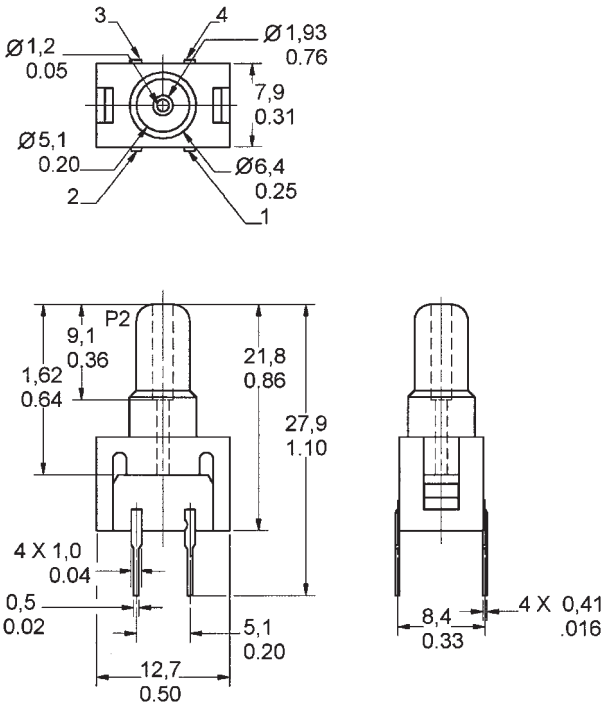
Not all combinations are established. Contact 800 number before final design.

GAGE SENSOR
Pressure is applied to port P2. Port P1 vents to ambient pressure

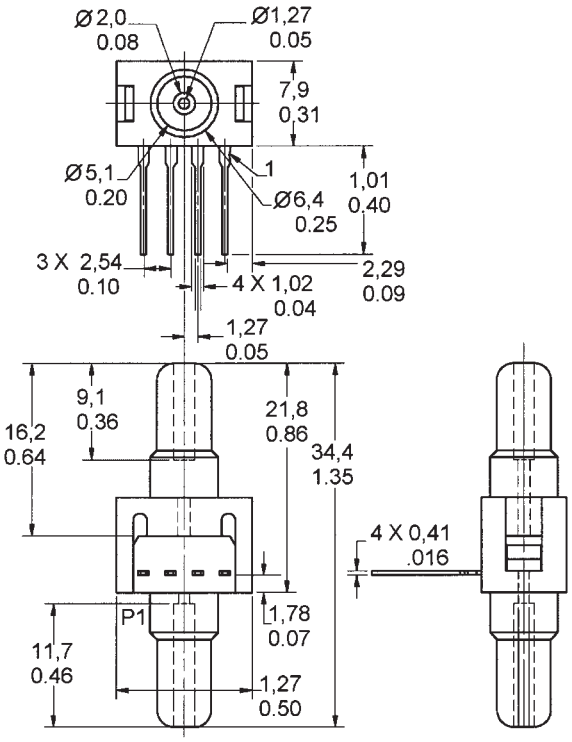
Mounting Dimensions (for reference only)
1 x 4 Termination (Style 1), Straight Port (Style A)
Pin 1 is notched, and is shown at the right of the package. Pin 2 is next to Pin 1, etc.



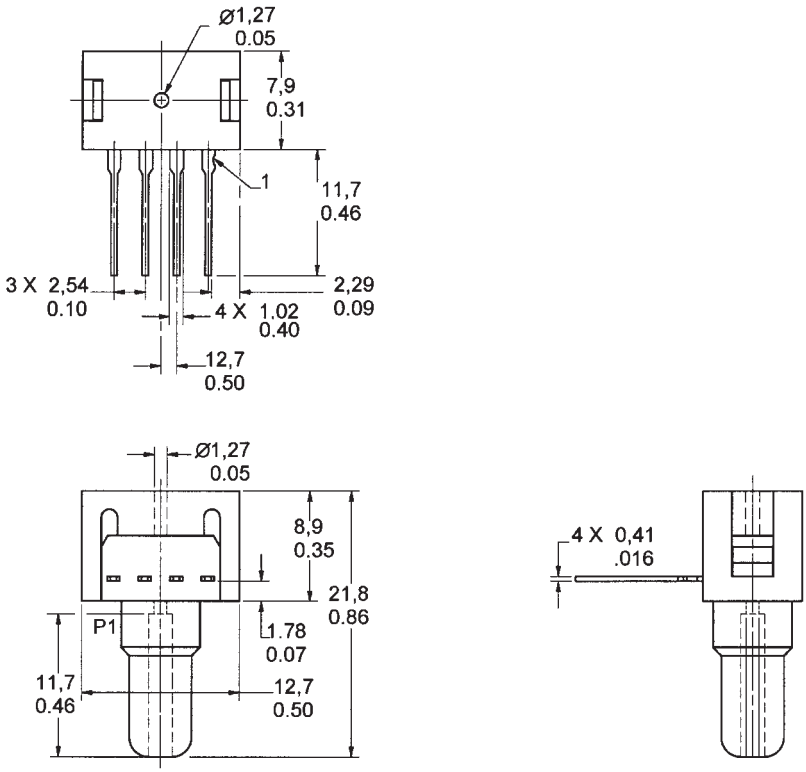
2 x 2 Termination (Style 2), Straight Port (Style A)
Pin 1 is notched and is shown at lower right corner. Pins 2, 3, and 4 are clockwise.



Straight Port, 1 x 4 Termination (Style 1) ONLY
Port 1 is near terminals

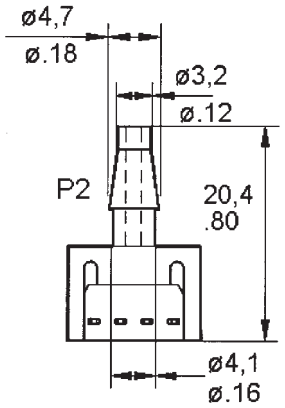


Absolute Sensor
1 x 4 Termination (Style 1), Port 1 is near terminals

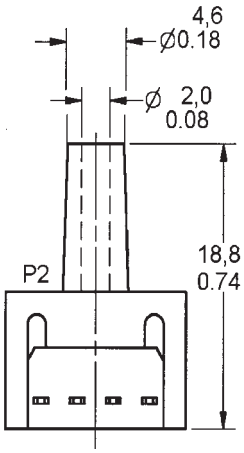


OTHER GAGE SENSOR PORT STYLES
(2 x 2 or 1 x 4 Termination)

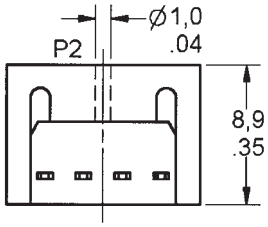
B Barbed



C Luer



D Modular



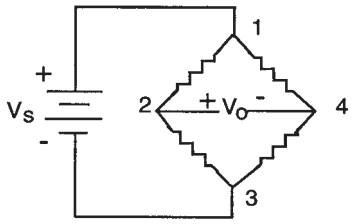
20PC SERIES CIRCUIT - NOTES

1. Circled numbers refer to Sensor Terminals (interface pins).
2. V_O increases with pressure change.
3. $V_O = V_2 - V_4$
4. Pin 1 designated with a notch.

Pin Designation

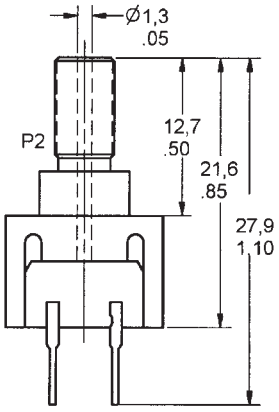
Pin 1 = V_S (+)
Pin 2 = Output (+)
Pin 3 = Ground (−)
Pin 4 = Output (−)

EXCITATION

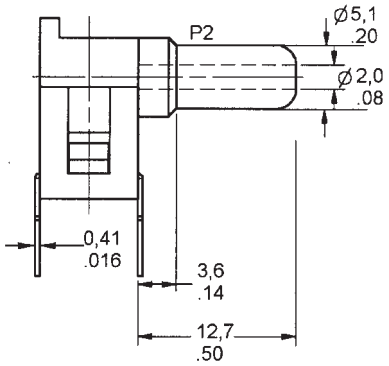


H M5 Thread

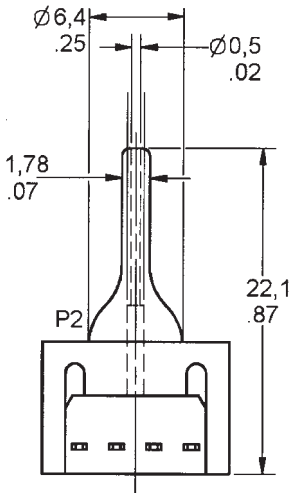
O-Ring Size 007 O-Ring Counterbore
1,02 mm (.040) deep ±0,13 (.005) x 7,6 mm (.30) ±0,8 (.003)



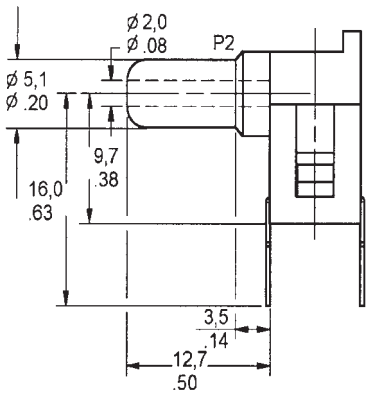
I 90°



J Needle



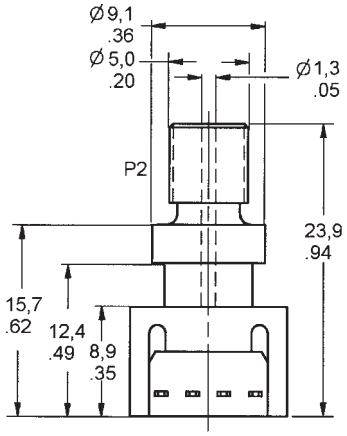
K Reverse 90°



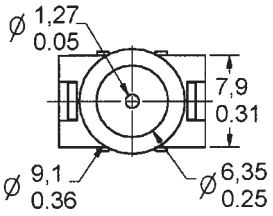
Unamplified

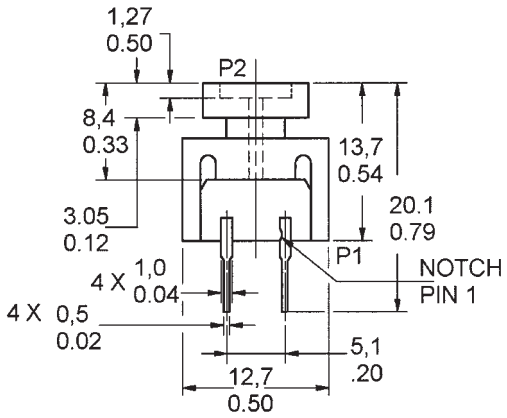
OTHER GAGE SENSOR PORT STYLES
(2 x 2 or 1 x 4 Termination)

M 1/4-28 UNF Thread
O-Ring Size 009 O-Ring Counterbore
1,02 mm (.040) deep ±0,05 (.002) x 9,1 mm (.360) ±0,8 (.003)

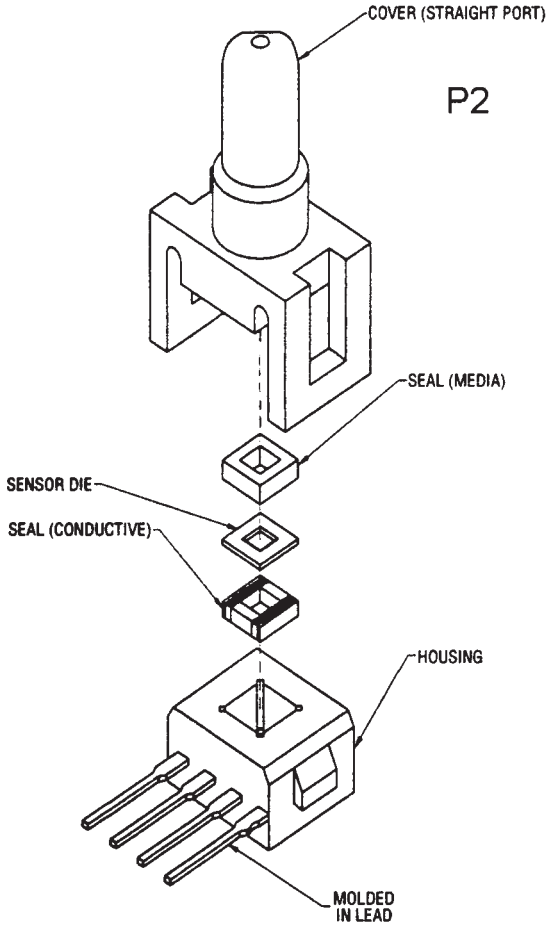


S Manifold





20PC Construction



Pressure Sensors

24PC Series

Gage Unamplified Noncompensated Flow-Through

FEATURES

- Measures positive and negative gage pressures
- Flow-through port design fits in-line with application
- Popular port sizes:
  - 8 mm (.315 in.) OD (1/4 in. ID tubing or standard connectors)
  - 0.144 in. OD (1/8 in. ID tubing)
- Medical grade ISO 10993-1 (USP Class 6) port material
- Silicon sensor chip
- 24 inch wire harness with splash proof connector
- Minimal deadspace — efficient cleansing and disinfecting

Unamplified

24PC SERIES PERFORMANCE CHARACTERISTICS at 10.0 ±0.01 VDC EXCITATION, 25°C

	Min.	Typ.	Max.	Units
Excitation	---	10	12	VDC
Null Shift, 25° to 0°, 25° to 50°C	---	±2.0	---	mV
Null Offset	−30	0	+30	mV
Linearity, P2 > P1, BFSL	---	±0.5	---	%Span
Span Shift, 25° to 0°, 25° to 50°C	---	±5.0	---	%Span
Repeatability & Hysteresis	---	±0.2	---	%Span
Response Time	---	---	1.0	msec
Input Resistance	4.0 K	5.0 K	6.0 K	ohms
Output Resistance	4.0 K	5.0 K	6.0 K	ohms
Stability over One Year	---	±0.5	---	%Span

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	−40° to +85°C (−40° to +185°F)
Storage Temperature	−55° to +100°C (−67° to +212°F)
Shock	Qualification tested to 150 g
Vibration	Qualification tested to 0 to 2 kHz, 20 g sine
Media Compatibility	Limited only to those media which will not attack polysulfone, silicon, fluorosilicone, silicone, EPDM, and neoprene seals

24PC SERIES FLOW THROUGH ORDER GUIDE

Catalog Listing	Pressure Range psi	Span, mV			Sensitivity mV/psi Typ.	Overpressure psi Max.
		Min.	Typ.	Max.		
24PCE Type	0.5	25	35	45	70	20
24PCA Type	1.0	30	45	60	45	20
24PCB Type	5.0	85	115	145	23	20
24PCC Type	15	165	225	285	15	45
24PCD Type	30	240	330	420	11	60
24PCF Type	100	156	225	294	2.25	200
24PCG Type	250	145	212	280	0.85	500

Pressure Sensors

24PC Series

Gage Unamplified Noncompensated Flow-Through

SENSOR SELECTION GUIDE

2 Product Family	4 Circuit Type	PC Pressure Transducer	A Pressure Range	F* Type of Seal	N Port Type	5 Termination Style	G Pressure Measurement
2 20PC Family	**4** Noncompensated		**A** 1 psi **B** 5 psi **C** 15 psi **D** 30 psi **E** 0.5 psi **F** 100 psi **G** 250 psi	**E** EPDM **F** Fluorosilicone **N** Neoprene **S** Silicone	**G** Small **N** Large (.350 dia.) **P** Large (.315 dia.)	**2** 4-pin DIP **5** Wire harness **6** 4-pin SIP	**G** Gage

Example: 24PCBFG5G
Non-compensated 5 psi sensor, fluorosilicone seal, small flow-through ports, wire harness, and gage pressure measurement.
*Other media seal materials may be available.

Note: Not all combinations are established. Contact 800 number before final design.

See Accessory Guide, page 27.

Pressure Sensors

26PC Series

Gage Unamplified Compensated Flow-Through

FEATURES

- Measure positive and negative gage pressures
- Flow-through port design fits in-line with application
- Popular port sizes:
  - 8 mm (.315 in.) OD (1/4 in. ID tubing or standard connectors)
  - 0.144 in. OD (1/8 in. ID tubing)
- Medical grade ISO 10993-1 (USP Class 6) port material
- Silicon sensor chip
- 24 inch wire harness with splash proof connector
- Minimal deadspace — efficient cleansing and disinfecting

Unamplified

26PC SERIES PERFORMANCE CHARACTERISTICS at 10.0 ±0.01 VDC Excitation, 25°C

	Min.	Typ.	Max.	Units
Excitation	---	10	16	VDC
Repeatability & Hysteresis	---	±0.20	---	%Span
Response Time	---	---	1.0	msec
Input Resistance	5.5 K	7.5 K	11.5 K	ohms
Output Resistance	1.5 K	2.5 K	3.0 K	ohms
Stability over One Year	---	±0.5	---	%Span
Weight	---	2	---	grams

Total error calculation, see page 105.

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	−40° to 85°C (−40° to +185°F)
Storage Temperature	−55° to +100°C (−67° to +212°F)
Compensated Temperature	0° to +50°C (32° to +122°F)
Shock	Qualification tested to 150 g
Vibration	MIL-STD-202. Method 213 (150g halfsine, 11 msec)
Media (P1 & P2)	Limited only to those media which will not attack polyetherimide, silicon, fluorosilicone, silicone, EPDM, and neoprene seals.

26PC SERIES ORDER GUIDE

Catalog Listing	Pressure Range (psi)	Linearity (% span)		Null Shift (mV)		Null Offset (mV)			Span Shift (% span)		Span (mV)			Sensitivity mV/psi	Over-pressure psi
		Typ.	Max	Typ.	Max	Min.	Typ.	Max.	Typ.	Max.	Min.	Typ.	Max.	Typ.	Max.
26PCA TYPE	1	0.25	0.5	±0.5	±1.0	−1.5	0	+1.5	±1.0	±2.0	14.7	16.7	18.7	16.7	20
26PCB TYPE	5	0.4	0.5	±0.5	±1.0	−1.5	0	+1.5	±1.0	±1.5	47	50	53	10.0	20
26PCC TYPE	15	0.25	0.5	±0.5	±1.0	−1.5	0	+1.5	±0.75	±1.5	97	100	103	6.67	45
26PCD TYPE	30	0.1	0.2	±0.75	±1.5	−1.5	0	+1.5	±0.75	±1.5	97	100	103	3.33	60
26PCF TYPE	100	0.1	0.2	±1.0	±2.0	−2.0	0	+2.0	±0.5	±1.5	95	100	105	1.0	200
26PCJ TYPE	38*	0.1	0.5	±0.7	±1.5	−1.5	0	+1.5	±1.0	±1.5	37.5	39.5	41.5	2.63	60
26PCK TYPE	38*	0.1	0.5	±0.7	±1.5	−1.5	0	+1.5	±1.0	±1.5	37.5	39.5	41.5	2.63	60

*Accuracy specifications calculated at 15 psi.

Pressure Sensors

26PC Series

Gage Unamplified Compensated Flow-Through

SENSOR SELECTION GUIDE

2 Product Family	6 Circuit Type	PC Pressure Transducer	A Pressure Range	F* Type of Seal	N Port Type	5 Termination Style	G Pressure Measurement
2 20PC Family	**6** Compensated, Calibrated		**A** 1 psi **B** 5 psi **C** 15 psi **D** 30 psi **F** 100 psi **J** 38 psi **K** 38 psi (passivated)	**E** EPDM **F** Fluorosilicone **N** Neoprene **S** Silicone	**G** Small **N** Large (.350 dia.) **P** Large (.315 dia.)	**2** 4-pin DIP **5** Wire harness **6** 4-pin SIP	**G** Gage

Example: 26PCBFG5G
Compensated, calibrated 5 psi sensor, fluorosilicone seal, small flow-through ports, wire harness, and gage pressure measurements.
*Other media seal materials may be available.

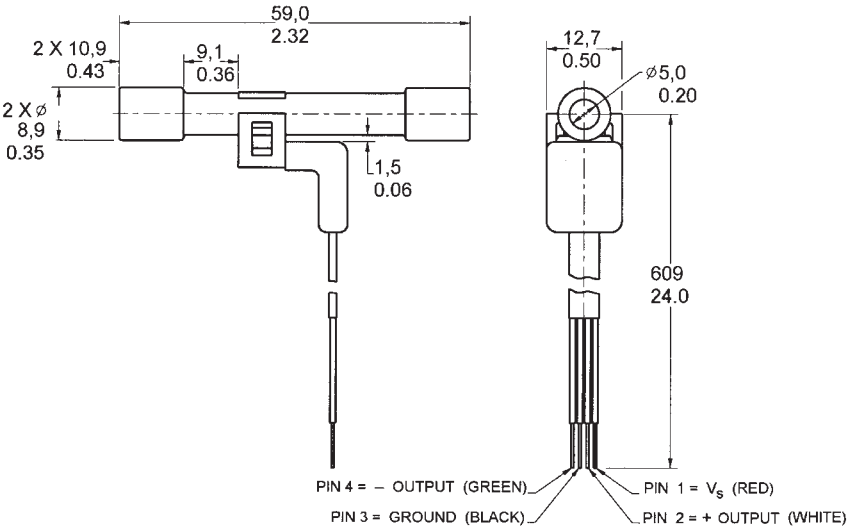
Note: Not all combinations are established. Contact 800 number before final design.

See Accessory Guide, page 27.

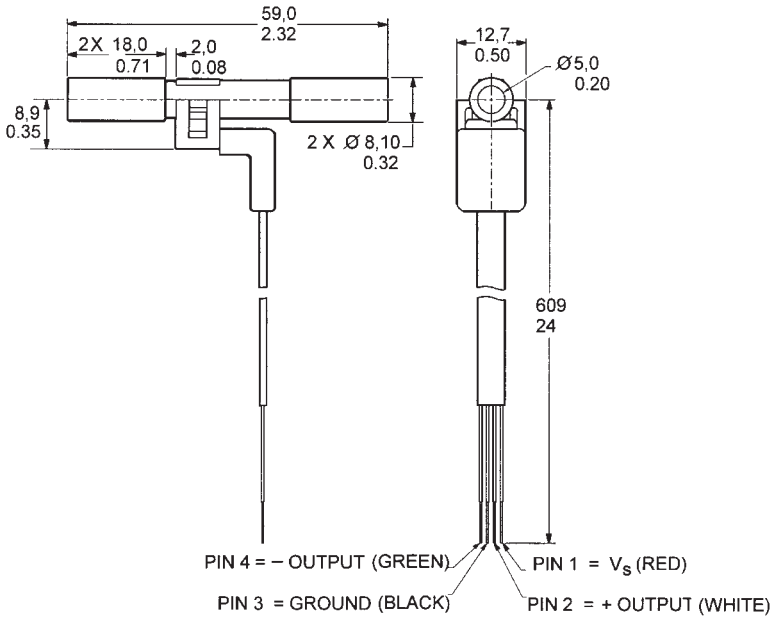
Gage Unamplified Flow-Through

MOUNTING DIMENSIONS (for reference only)

Large Port Sensor N



Large Port Sensor P



NOTE: Wire harness (PC-15175) may be purchased separately.

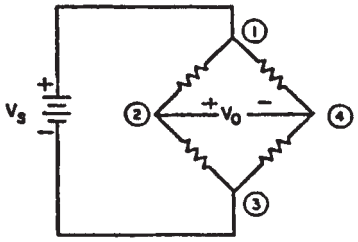
20PC CIRCUIT NOTES

1. Circled numbers refer to Sensor Terminals (interface pins).
2. V_0 increases with pressure change.
3. $V_0 = V_2 - V_4$

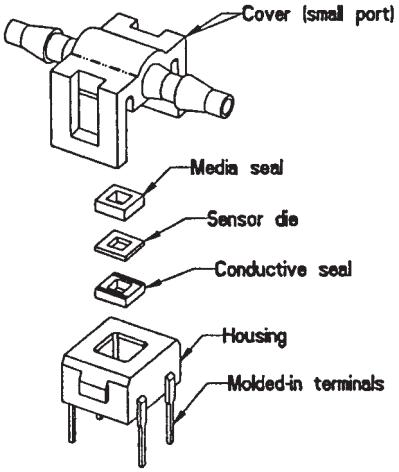
PIN DESIGNATION

Pin 1 = V_s (Red)
Pin 2 = Output, + (White)
Pin 3 = Ground, – (Black)
Pin 4 = Output, – (Green)

EXCITATION



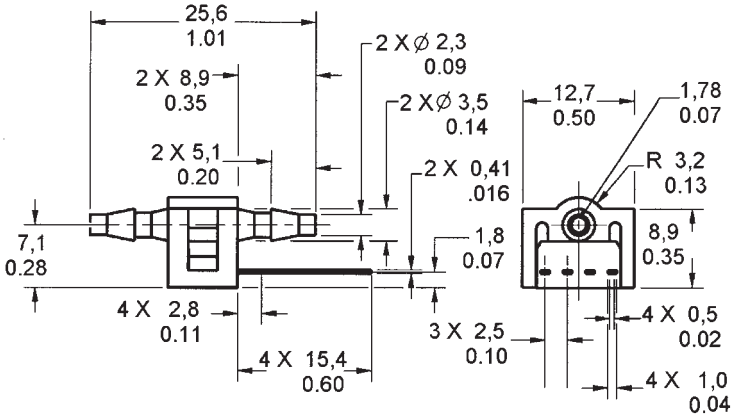
Flow-Through Construction



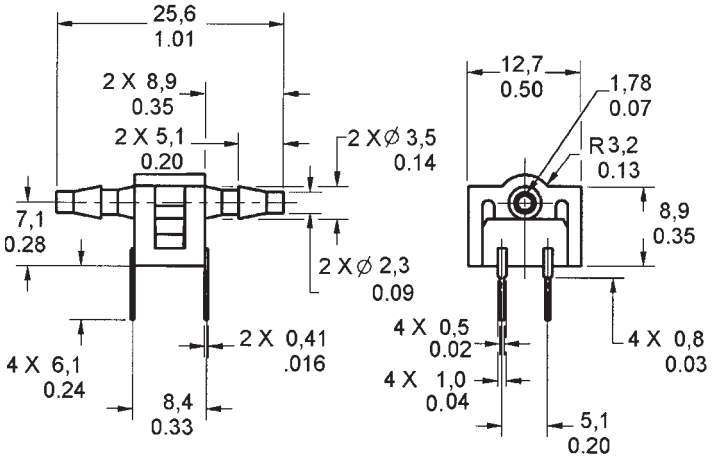
Unamplified

MOUNTING DIMENSIONS (for reference only)

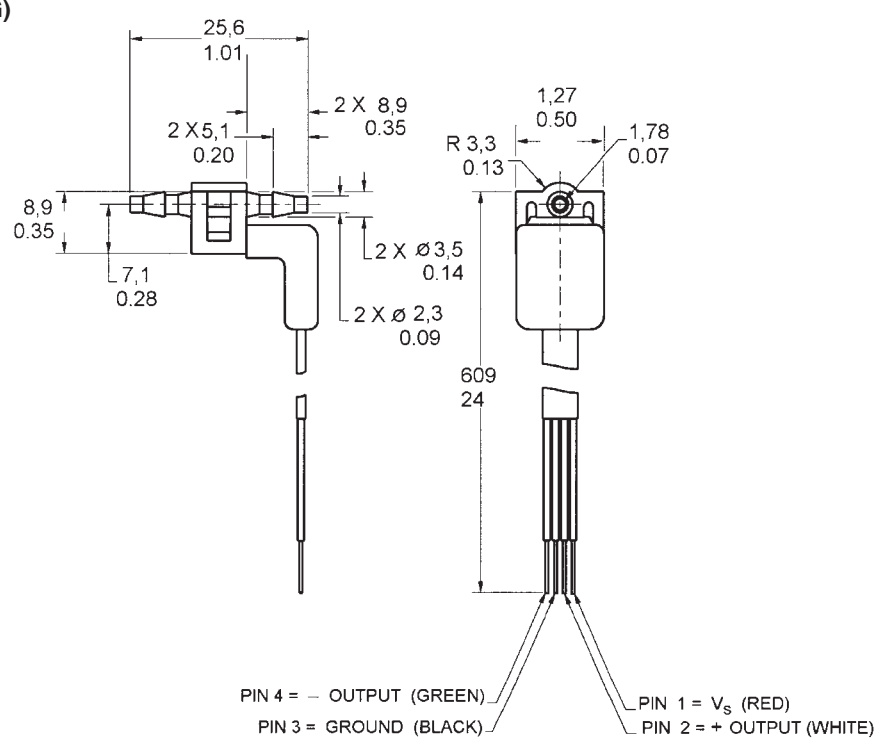
Small Port Sensor (1 x 4)



Small Port Sensor (2 x 2)



Small Port Sensor (G)



ACCESSORIES SELECTION GUIDE

Catalog Listing	Description	Drawing
PC-10182	Steel lockring (included with Port Style A, 1 x 4 terminals only) 22, 24, 26PC only	Figure 1
PC-15111	Cable retaining clip for large port Flow-Through sensor only	Figure 4
PC-15110	Single hole plastic bracket	Figure 3
PC-15015	Mounting bracket	Figure 6
PC-15132	Plastic Mounting bracket	Figure 5
20PCWHRC	Flow-Through wire harness and retaining clip	Figure 2
26PCBKT	Mounting bracket for large port Flow-Through sensor only	Figure 7
PC-15202	Mounting bracket for Luer Port	Figure 8
PC-15204	Mounting bracket for Straight Port	Figure 9

Figure 1 PC-10182
Steel Lockring

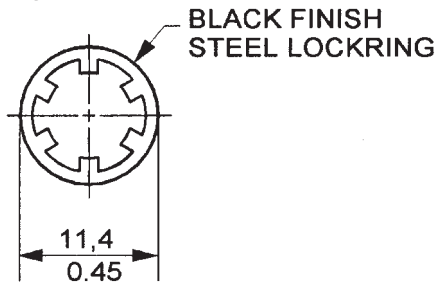


Figure 2 20PCWHRC
Wire Harness and Retaining Clip

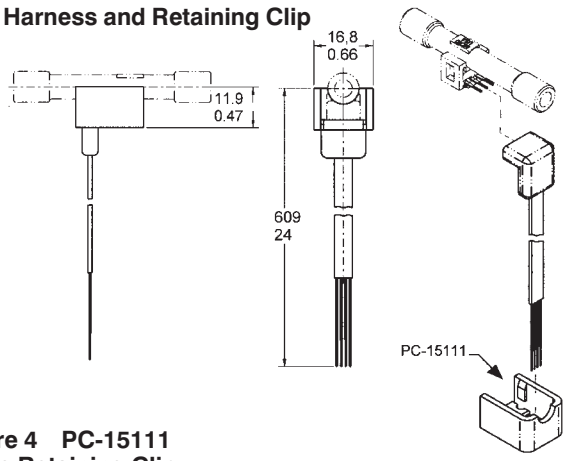


Figure 3 PC-15110
Single Hole Plastic Bracket

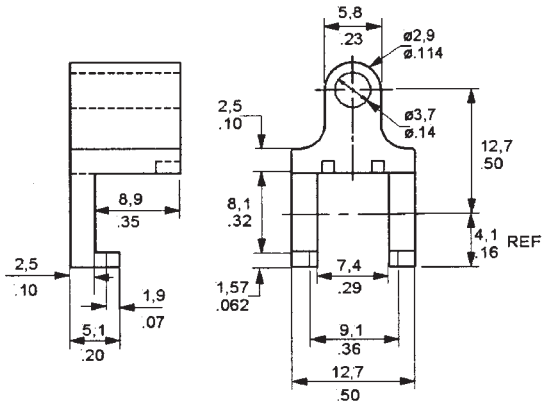


Figure 4 PC-15111
Cable Retaining Clip

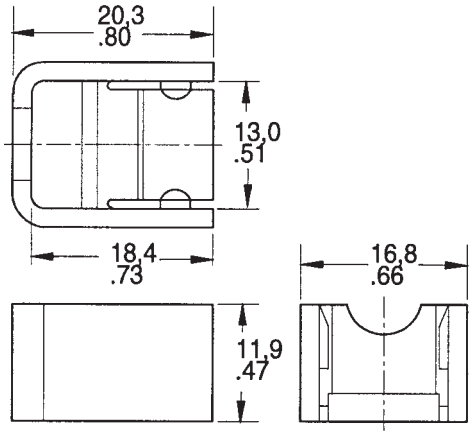


Figure 5 PC-15132
Plastic Mounting Bracket

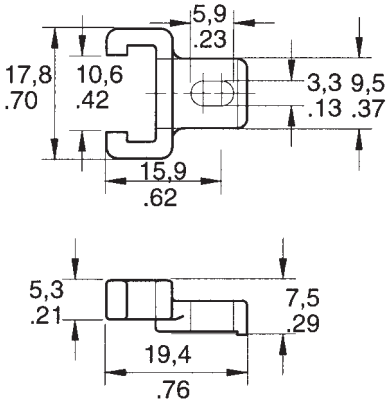
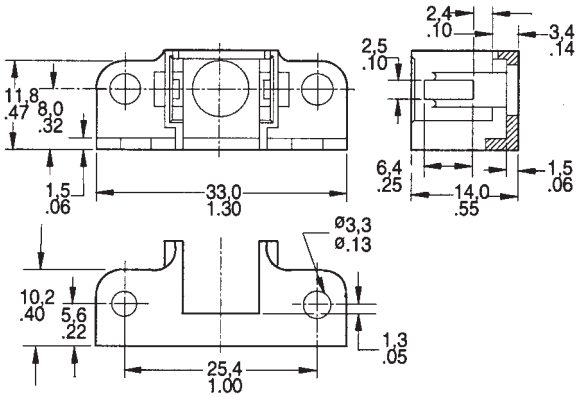


Figure 6 PC-15015
Mounting Bracket



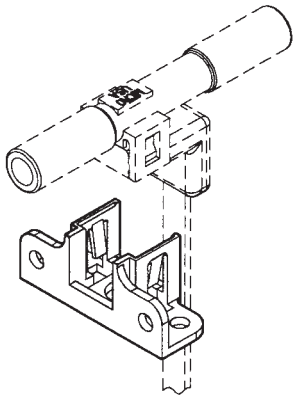
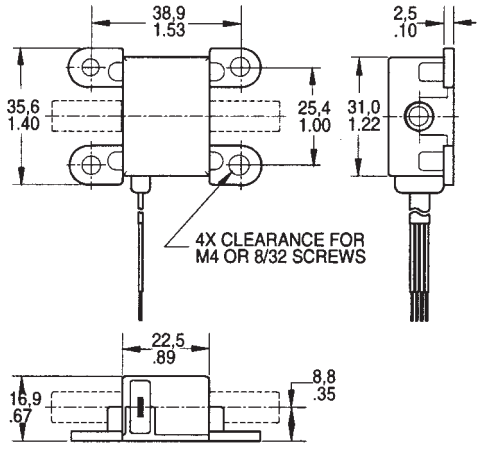


Figure 7 26PCBKT
For use with N, P Large Ports



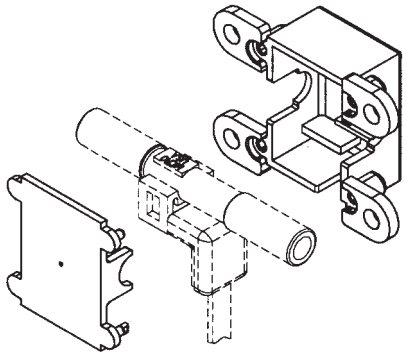


Figure 8 PC-15202
For use with C Luer Port

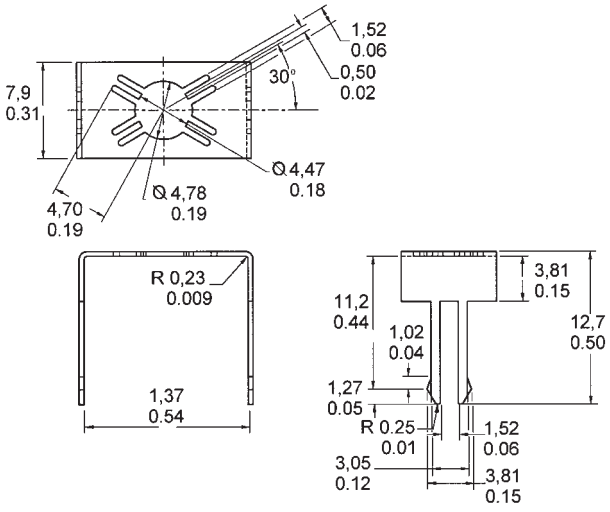
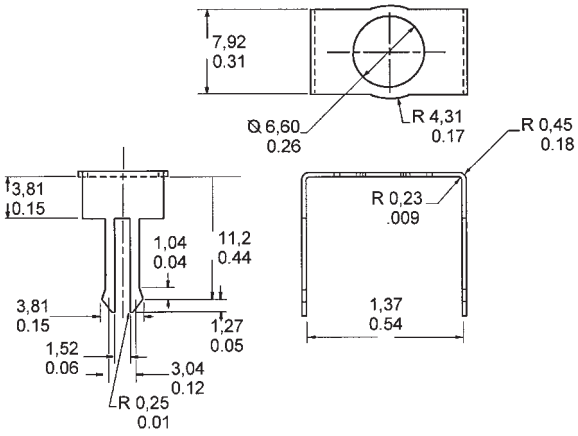


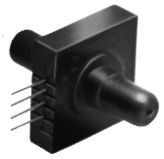
Figure 9 PC-15204
For use with A Straight Port



Note: PC-15202 and PC-15204 are Printed Circuit Board mountable and solderable; designed to be used in a .063 thick PC Board with a recommended mounting hole size of .125 ±.005 in.

Low Pressure Gage & Differential/Unamplified

Temperature Compensated Sensors



FEATURES

- Miniature package
- Low pressure measurement
- Calibrated Null and Span
- Temperature compensated for Span over 0 to 50°C
- Provides interchangeability

176PC SERIES PERFORMANCE CHARACTERISTICS at 10.0 ±0.01 VDC Excitation, 25°C

	Min.	Typ.	Max.	Units
Excitation	---	10	16	VDC
Null Offset	–2	0	+2	mV
Null Shift, 25° to 0°, 25° to 50°C	---	±3.0	---	mV
Sensitivity Shift, 25° to 0°, 25° to 50°C	--- ---	--- ---	±4.0[1] ±3.5[2]	%Span %Span
Repeatability & Hysteresis	---	±0.25	---	%Span
Response Time	---	---	1.0	msec
Input Resistance	---	6.3 K	---	ohms
Output Resistance	---	4.0 K	---	ohms
Stability over One Year	---	±0.5	---	%Span
Weight	---	7	---	grams

Key: 1 = 0-7″, 0-14″ H_2O only
2 = 0-28″ H_2O only

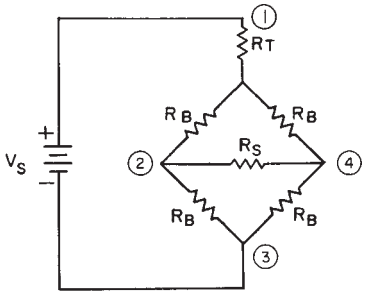
ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	–40° to +85°C (–40° to +185°F)
Storage Temperature	–55° to +125°C (–67° to +257°F)
Compensated Temperature	0° to +50°C (32° to +122°F)
Shock	MIL-STD-202, Method 213 (150 g, half sine, 11 msec)
Vibration	MIL-STD-202, Method 204 (10 to 2000 Hz at 20 g)
Media	P2 port Wetted materials; polyester housing, epoxy adhesive, silicon, borosilicate glass, and silicon-to-glass bond*
	P1 port Dry gases only

* Liquid media containing some highly ionic solutions could potentially neutralize the chip-to-glass tube bond.

ELECTRICAL CONNECTIONS

(Internal Circuitry Shown)



NOTES

1. Circled numbers refer to sensor termination.
2. $V_0 = V_2 - V_4$ (referenced to pin 3).
3. R_B = Strain gage resistors (~4.8 kΩ).
4. R_T = Sensitivity temperature compensation resistor.
5. R_S = Sensitivity calibration resistor.

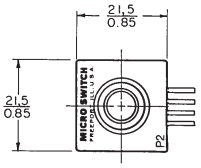
When a positive pressure is applied to port P2, the differential voltage $V_2 - V_4$ (voltage at pin 2, with respect to ground, increases and voltage at pin 4 decreases) increases linearly with respect to the input pressure. When a vacuum pressure is pulled at port P2 (or positive pressure applied to port P1) the voltage $V_2 - V_4$ decreases linearly with respect to the input pressure.

176PC SERIES ORDER GUIDE

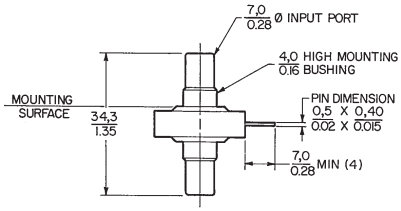
Catalog Listing	Pressure Range H_2O	Span, mV			Sensitivity mV/″H_2O	Overpressure ″H_2O	Linearity, %Span	
		Min.	Typ.	Max.	Typ.	Max.	P2 > P1 Max.	P2 < P1 Max.
176PC07HG2	0-7	26	28	30	4.00	140	±3.00	±1.50
176PC07HD2	0-7	26	28	30	4.00	140	±3.00	±1.50
176PC14HG2	0-14	33	35	37	2.50	140	±3.00	±1.50
176PC14HD2	0-14	33	35	37	2.50	140	±3.00	±1.50

MOUNTING DIMENSIONS (For reference only)

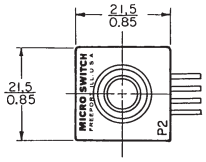
Differential Types

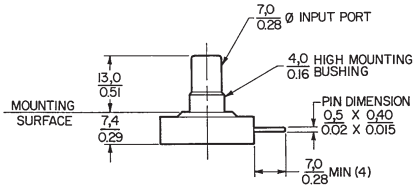


Terminals
1 – Vs (+)
2 – Output A
3 – Ground (–)
4 – Output B

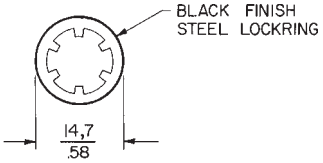


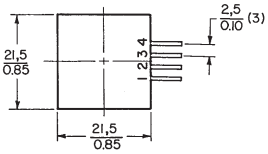
Gage Types



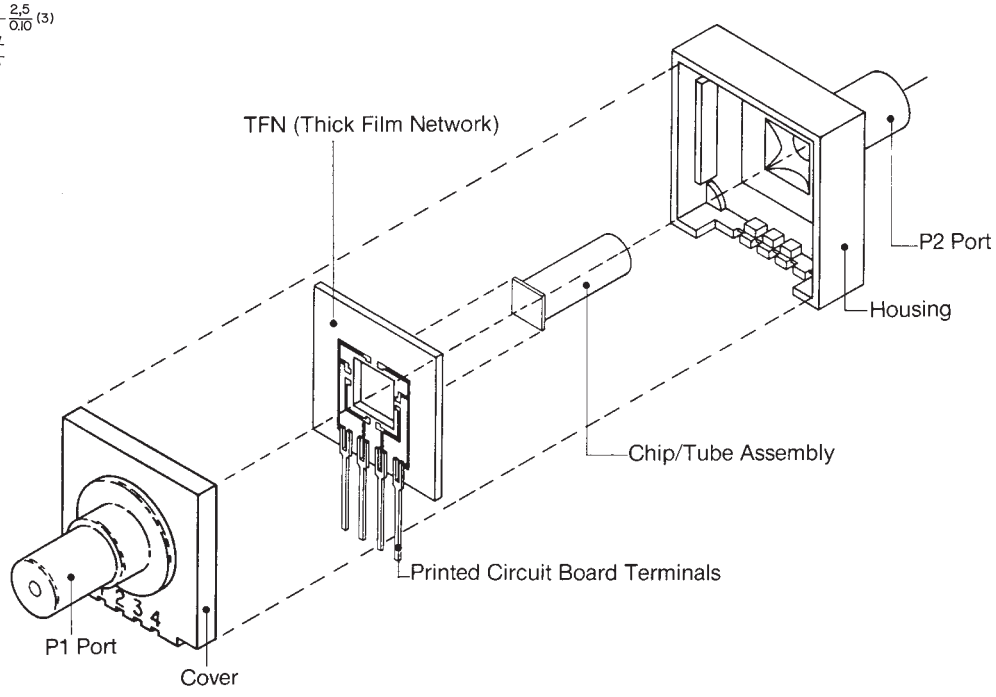


Mounting Hardware - PC10198

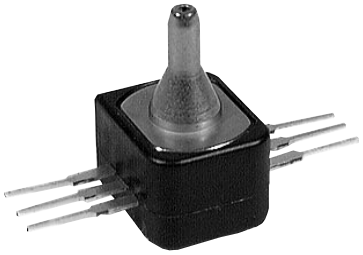




170PC CONSTRUCTION



Pressure Sensors
Miniature Signal Conditioned



NEW

FEATURES
- Smallest amplified sensor package
- Minimal PCB space
- Fully signal conditioned
- Operating temperature range from −45° to +125°C
- Silicon piezoresistive technology
- Monolithic design
- 6 Pin DIP package
- Port designed for O-ring interface
- Excellent media compatibility
- Accuracy of 0.2%

PERFORMANCE CHARACTERISTICS

Pressure Range	±50 mm Hg	0-15 psi	0-100 psi	0-150 psi	0-250 psi
Overpressure, max.	±170 mm Hg	45 psi	200 psi	300 psi	500 psi
Supply Voltage	5 VDC ±0.25				
Supply Current	10 mA max.				
Output Source Current	0.5 mA max.				
Output Sink Current	1.0 mA max.				
Operating Temperature	−45° to +125°C (−49° to +257°F)				
Storage Temperature	−55° to +125°C (−67° to +257°F)				
Hysteresis & Repeatability	0.15% Span, Typ.				
Ratiometricity (at 4.75 to 5.25 Supply Voltage)	±0.25% Span, Typ.				
Output Load Capacitance	0.05 microtarads, max.				
Full Scale					
−50 mm Hg	0.50 VDC Typ.				
+50 mm Hg	4.50 VDC Typ.				
All other pressure ranges	4.50 VDC Typ.				
Media Compatibility P1 port	DRY GASES ONLY: Media must be compatible with epoxy based adhesive				
P2 port	Media must be compatible with glass, silicon, stainless steel, invar, Sn/Ni plating or Sn/Ag solder				

Amplified

40PC SERIES ORDER GUIDE

Catalog Listing	Pressure Range psi	Pressure Type	Lead Style
40PC001B1A	±50 mm Hg	Bi-directional	1-unformed
40PC001B2A	±50 mm Hg	Bi-directional	2-formed away from port
40PC001B3A	±50 mm Hg	Bi-directional	3-formed towards port
40PC015G1A	0-15	Gage	1-unformed
40PC015G2A	0-15	Gage	2-formed away from port
40PC015G3A	0-15	Gage	3-formed towards port
40PC100G1A	0-100	Gage	1-unformed
40PC100G2A	0-100	Gage	2-formed away from port
40PC100G3A	0-100	Gage	3-formed towards port
40PC150G1A	0-150	Gage	1-unformed
40PC150G2A	0-150	Gage	2-formed away from port
40PC150G3A	0-150	Gage	3-formed towards port
40PC250G1A	0-250	Gage	1-unformed
40PC250G2A	0-250	Gage	2-formed away from port
40PC250G3A	0-250	Gage	3-formed towards port

Note: For tubing and O-Ring interface recommendations, see the 40PC Application Note in the Reference Section.

OUTPUT PERFORMANCE CHARACTERISTICS @ 25°C, 5VDC (unless otherwise noted)

Pressure Range	Null (VDC)	Span (VDC)	Sensitivity, Typ.	Linearity, B.F.S.L. (% Span) Max.		Null Shift (% Span) Max.	Span Shift (% Span) Max.	Combined Null and Span Shift (% Span) Max.
±50 mm Hg	2.50 ± 0.050	4.00 Typ.	40.0 mV/mm Hg	0.80	+25° to +50°C	±1.50	±1.50	—
					+25° to 0°C	±1.50	±1.50	—
0 to 15 psi	0.50 ± 0.11	4.00 ± 0.11	266.6 mV/psi	0.20	+25° to −18°C	±2.00	±0.75	±2.00
					+25° to +63°C	±2.00	±0.75	±2.00
					+25° to −45°C	±2.75	±1.00	±3.00
					+25° to +85°C	±2.75	±1.00	±3.00
					+25° to +125°C	—	—	—
0 to 100 psi	0.50 ± 0.04	4.00 ± 0.09	40.0 mV/psi	0.10	+25° to −18°C	±1.25	±0.75	±1.50
					+25° to +63°C	±1.25	±0.75	±1.50
					+25° to −45°C	±2.00	±1.00	±2.50
					+25° to +85°C	±2.00	±1.00	±2.50
					+25° to +125°C	±3.00	±2.00	±3.00
0 to 150 psi	0.50 ± 0.04	4.00 ± 0.07	26.6 mV/psi	0.10	+25° to −18°C	±0.75	±0.75	±0.75
					+25° to +63°C	±0.75	±0.75	±0.75
					+25° to −45°C	±1.00	±1.00	±1.00
					+25° to +85°C	±1.00	±1.00	±1.00
					+25° to +125°C	±1.50	±1.50	±1.50
0 to 250 psi	0.50 ± 0.04	4.00 ± 0.07	16.0 mV/psi	0.10	+25° to −18°C	±0.75	±0.75	±0.75
					+25° to +63°C	±0.75	±0.75	±0.75
					+25° to −45°C	±1.00	±1.00	±1.00
					+25° to +85°C	±1.00	±1.00	±1.00
					+25° to +125°C	±2.00	±2.00	±3.00

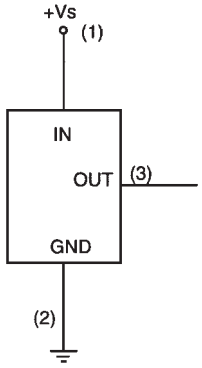
PERFORMANCE SPECIFICATIONS, TEMPERATURE/ACCURACY

Temperature Range	Total Accuracy (% Span) Max.			
	0 to 15 psi	**0 to 100 psi**	**0 to 150 psi**	**0 to 250 psi**
25°C	±0.4 (RSS)	±0.2 (RSS)	±0.2 (RSS)	±0.2 (RSS)
−18° to +63°C	±4.0	±2.5	±2.0	±2.0
−45° to +85°C	±4.0	±2.5	±2.0	±2.0
−45° to +125°C		±3.0	±2.5	±3.0

Note 1: Accuracy at 25°C is defined as RSS error for linearity, hysteresis, and repeatability.

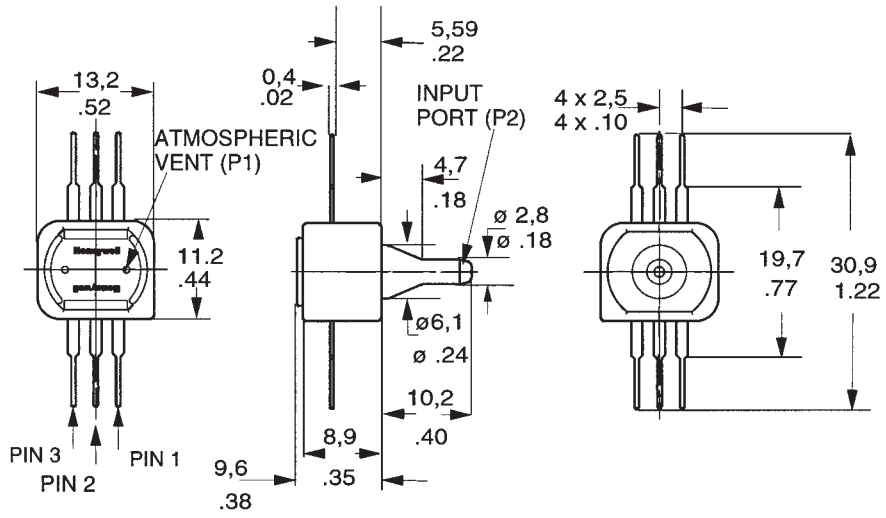
Note 2: Total accuracy is the maximum deviation from the 25°C reference transfer function at any pressure or temperature over the specified ranges. This calculation includes null, span, linearity, hysteresis, repeatability, null shift, and span shift.

ELECTRICAL CONNECTION



NOTES:
1. Square corner marks pin 1 (Vs).
2. Output is short circuit protected.

MOUNTING DIMENSIONS (for reference only) mm/In.

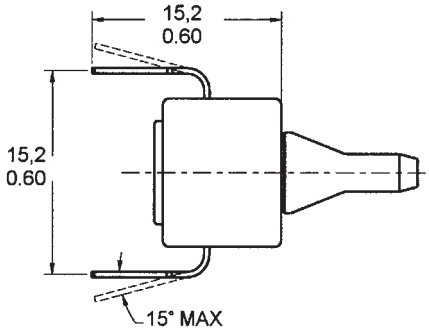


Lead Style 1

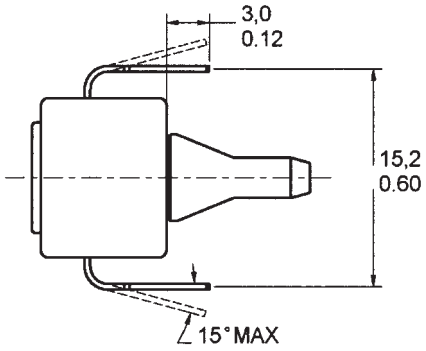
NOTE:
P1 - DRY GASES ONLY: Media must be compatible with epoxy based adhesive.
P2 - Media must be compatible with glass, silicon, stainless steel, invar, Sn/Ni plating or Sn/Ag solder.

Amplified

Lead Style 2



Lead Style 3



Pressure Sensors
Monolithic Signal Conditioned

NEW

FEATURES
- Operating temperature range – −45° to +125°C (−49° to +257°F)
- Monolithic design
- Compatible with media from dry air and water to refrigerant coolants and engine fuels
- 0.2% accuracy
- Rugged stainless steel and brass construction

The 4000 PC Series Package allows use in harsh environmental conditions, such as industrial and off-road applications. The sensor is available with a Packard Connector 12078090 or a connector harness with leadwires.

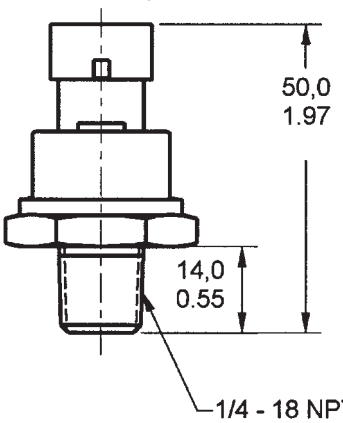
PERFORMANCE CHARACTERISTICS

Pressure Range	±50 mm Hg	0-15 psi	0-100 psi	0-150 psi	0-250 psi
Overpressure, max.	±170 mm Hg	45 psi	200 psi	300 psi	500 psi
Supply Voltage	5 VDC ±0.25				
Supply Current	10 mA max.				
Output Source Current	0.5 mA max.				
Output Sink Current	1.0 mA max.				
Operating Temperature	−45° to +125°C (−49° to +257°F)				
Storage Temperature	−55° to +125°C (−67° to +257°F)				
Hysteresis & Repeatability	0.15% Span, Typ.				
Ratiometricity (at 4.75 to 5.25 Supply Voltage)	±0.25% Span, Typ.				
Output Load Capacitance	0.05 microfarads, max.				
Full Scale					
	−50 mm Hg	0.50 VDC Typ.			
	+50 mm Hg	4.50 ± 0.12 VDC Typ.			
	All other pressure ranges	4.50 VDC Typ.			
Media Compatibility	Media must be compatible with fluorosilicone, fluorocarbon, glass, silicon, stainless steel, invar, Sn/Ni plating or Sn/Ag solder				

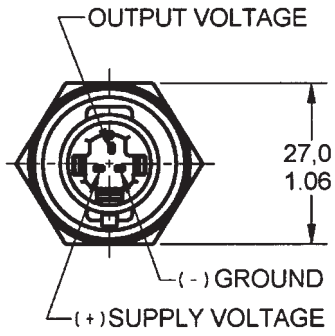
4000PC SERIES ORDER GUIDE

Catalog Listing	Gage Pressure Range	Termination
4040PC001B4D	±50 mm Hg	Packard Connector
4040PC001B5D	±50 mm Hg	Connector with Leadwires
4040PC015G4D	0 to 15 psi	Packard Connector
4040PC015G5D	0 to 15 psi	Connector with Leadwires
4040PC100G4D	0 to 100 psi	Packard Connector
4040PC100G5D	0 to 100 psi	Connector with Leadwires
4040PC150G4D	0 to 150 psi	Packard Connector
4040PC150G5D	0 to 150 psi	Connector with Leadwires
4040PC250G4D	0 to 250 psi	Packard Connector
4040PC250G5D	0 to 250 psi	Connector with Leadwires

MOUNTING DIMENSIONS
(for reference only)



ELECTRICAL CONNECTIONS



Leadwire Color Code
RED – Supply Voltage (+)
BLACK – Ground (−)
GREEN – Output

NOTE:
Output is short circuit protected.

OUTPUT PERFORMANCE CHARACTERISTICS @ 25°C, 5VDC (unless otherwise noted)

Pressure Range	Null (VDC)	Span (VDC)	Sensitivity, Typ.	Linearity, B.F.S.L. (% Span) Max.		Null Shift (% Span) Max.	Span Shift (% Span) Max.	Combined Null and Span Shift (% Span) Max.
±50 mm Hg	2.50 ± 0.050	4.00 Typ.	40.0 mV/mm Hg	0.80	+25° to +50°C	±1.50	±1.50	—
					+25° to 0°C	±1.50	±1.50	—
0 to 15 psi	0.50 ± 0.11	4.00 ± 0.11	266.6 mV/psi	0.20	+25° to −18°C	±2.00	±0.75	±2.00
					+25° to +63°C	±2.00	±0.75	±2.00
					+25° to −45°C	±2.75	±1.00	±3.00
					+25° to +85°C	±2.75	±1.00	±3.00
					+25° to +125°C	—	—	—
0 to 100 psi	0.50 ± 0.04	4.00 ± 0.09	40.0 mV/psi	0.10	+25° to −18°C	±1.25	±0.75	±1.50
					+25° to +63°C	±1.25	±0.75	±1.50
					+25° to −45°C	±2.00	±1.00	±2.50
					+25° to +85°C	±2.00	±1.00	±2.50
					+25° to +125°C	±3.00	±2.00	±3.00
0 to 150 psi	0.50 ± 0.04	4.00 ± 0.07	26.6 mV/psi	0.10	+25° to −18°C	±0.75	±0.75	±0.75
					+25° to +63°C	±0.75	±0.75	±0.75
					+25° to −45°C	±1.00	±1.00	±1.00
					+25° to +85°C	±1.00	±1.00	±1.00
					+25° to +125°C	±1.50	±1.50	±1.50
0 to 250 psi	0.50 ± 0.04	4.00 ± 0.07	16.0 mV/psi	0.10	+25° to −18°C	±0.75	±0.75	±0.75
					+25° to +63°C	±0.75	±0.75	±0.75
					+25° to −45°C	±1.00	±1.00	±1.00
					+25° to +85°C	±1.00	±1.00	±1.00
					+25° to +125°C	±2.00	±2.00	±3.00

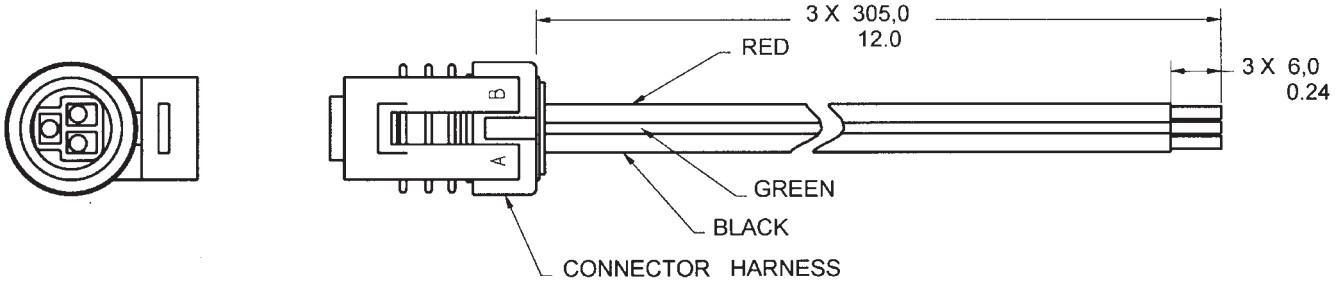
PERFORMANCE SPECIFICATIONS, TEMPERATURE/ACCURACY

Temperature Range	Total Accuracy (% Span) Max.			
	0 to 15 psi	**0 to 100 psi**	**0 to 150 psi**	**0 to 250 psi**
25°C	±0.4 (RSS)	±0.2 (RSS)	±0.2 (RSS)	±0.2 (RSS)
−18° to +63°C	±4.0	±2.5	±2.0	±2.0
−45° to +85°C	±4.0	±2.5	±2.0	±2.0
−45° to +125°C		±3.0	±2.5	±3.0

Note 1: Accuracy at 25°C is defined as RSS error for linearity, hysteresis, and repeatability.

Note 2: Total accuracy is the maximum deviation from the 25°C reference transfer function at any pressure or temperature over the specified ranges. This calculation includes null, span, linearity, hysteresis, repeatability, null shift, and span shift.

PC-15191 4000PC CONNECTOR HARNESS (for reference only)



Amplified

Monolithic Signal Conditioned

SOON TO BE INTRODUCED!

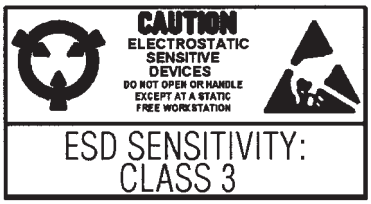
The 5000PC Series package allows use in harsh environmental conditions, such as industrial and off-road applications. The sensor is available with a Packard connector 12078090 or an integral connector with leadwires.

FEATURES

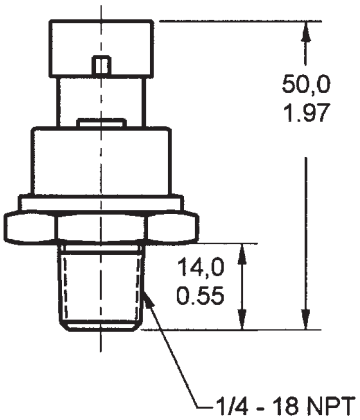
- Operating temperature range – −45° to +125°C (−49° to +257°F)
- Monolithic design
- Compatible with media from dry air and water to refrigerant coolants and engine fuels
- 0.2% accuracy
- Rugged stainless steel and brass construction
- Enhanced EMI performance
- Enhanced sealing for splash protection

PRELIMINARY PERFORMANCE CHARACTERISTICS

Pressure Range	0-15 psi	0-100 psi	0-150 psi	0-250 psi
Overpressure, max.	45 psi	200 psi	300 psi	500 psi
Supply Voltage	5 VDC ±0.25			
Supply Current	10 mA max.			
Output Source Current	0.5 mA max.			
Output Sink Current	1.0 mA max.			
Operating Temperature	−45° to +125°C (−49° to +257°F)			
Storage Temperature	−55° to +125°C (−67° to +257°F)			
Hysteresis & Repeatability	0.15% Span, Typ.			
Ratiometricity (at 4.75 to 5.25 Supply Voltage)	±0.25% Span, Typ.			
Full Scale				
	−50 mm Hg	0.50 VDC Typ.		
	+50 mm Hg	4.50 ± 0.12 VDC Typ.		
	All other pressure ranges	4.50 VDC Typ.		
Media Compatibility	Media must be compatible with fluorosilicone, fluorocarbon, glass, silicon, stainless steel, invar, Sn/Ni plating or Sn/Ag solder			



MOUNTING DIMENSIONS
(for reference only)



Pressure Sensors

Absolute, Differential, Gage, Vacuum Gage/Amplified

FEATURES

- PCB terminals on opposite side from the ports
- Fully signal conditioned

140PC SERIES PERFORMANCE CHARACTERISTICS at 8.0 ±0.01 VDC Excitation, 25°C

	Min.	Typ.	Max.	Units
Excitation	7.00	8.00	16.0	VDC
Supply Current	---	8.00	20.0	mA
Current Sourcing Output	---	---	10	mA
Null Offset (141/142PC)	0.95	1.00	1.05	V
Null Offset (143PC)*	3.45	3.50	3.55	V
Null Offset				
142PC15A @ 2 psia	1.62	1.67	1.72	V
142PC30A @ 2 psia	1.28	1.33	1.38	V
Output at Full Pressure	5.90	6.00	6.10	V
Span† (141/142PC)	4.95	5.00	5.05	V
Span† (143PC)*	---	5.00	---	V
Span				
142PC15A (2 to 15 psia)	4.28	4.33	4.48	V
142PC30A (2 to 30 psia)	4.62	4.67	4.72	V
Ratiometricity Error				
7 to 8 V or 8 to 9 V	---	±0.50	---	%Span
9 to 12 V	---	±2.00	---	
Stability over One Year	---	±0.50	---	%Span
Response Time	---	---	1.00	msec
Common Mode Pressure**	---	---	40	psi
Weight	---	28	---	grams
Short Circuit Protection	Output may be shorted indefinitely to ground			
Output Ripple	None, DC device			
Ground Reference	Supply and output are common			

*Positive and negative pressure measurement.
**Higher common mode pressures possible if sensor is not used over entire operating temperature range.
†Span is defined as the algebraic difference between end points. Please note: actual output is 1 V to 6 V (at 8.00 ±0.01 VDC). Span is then 5V.

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	−40° to +85°C (−40° to +185°F)	
Storage Temperature	−55° to +125°C (−67° to +257°F)	
Compensated Temperature	−18° to +63°C (0° to +145°F)	
Shock	MIL-STD-202, Method 213 (50 g, half sine, 6 msec)	
Vibration	MIL-STD-202, Method 204 (10 to 2000 Hz at 10 g)	
Media	P2 port	Wetted materials; polyester housing, epoxy adhesive, silicon, borosilicate glass, and silicon-to-glass bond*
	P1 port	Dry gases only

*Liquid media containing some highly ionic solutions could potentially neutralize the chip-to-glass tube bond.

140PC SERIES ORDER GUIDE, VACUUM GAGE TYPE

Catalog Listing	Pressure Range psi	Shift Null, Sensitivity, Combined**				Sensitivity V/psi	Overpressure psi Max.	Linearity, B.F.S.L.		Repeatability & Hysteresis %Span Typ.
		25 to 5° 25 to 45°C		25 to −18° 25 to +63°C	25 to −40° 25 to 85°C			P2 > P1	P2 < P1	
								%Span		
		Typ.	Max.	Max.	Max.			Max.	Max.	
141PC01G	0-−1	---	±1.50	---	---	5.000	20	---	±0.75	±0.30
141PC05G	0-−5	±0.50	---	±1.00	±2.00	1.000	20	---	±0.75	±0.25
141PC15G	0-−15	±0.50	---	±1.00	±2.00	0.333	45	---	±0.40	±0.15

140PC SERIES ORDER GUIDE, GAGE TYPE

Catalog Listing	Pressure Range psi	Shift Null, Sensitivity, Combined**				Sensitivity V/psi	Overpressure psi Max.	Linearity, B.S.F.L.		Repeatability & Hysteresis %Span Typ.
		25 to 5° 25 to 45°C		25 to −18° 25 to +63°C	25 to −40° 25 to 85°C			P2 > P1	P2 < P1	
								%Span		
		Typ.	Max.	Max.	Max.			Max.	Max.	
142PC01G	0-1	---	±1.50	---	---	5.000	20	±0.75	---	±0.30
142PC02G	0-2	---	±1.50	---	---	2.500	20	±0.75	---	±0.30
142PC05G	0-5	±0.50	---	±1.00	±2.00	1.000	20	±1.50	---	±0.25
142PC15G	0-15	±0.50	---	±1.00	±2.00	0.333	45	±0.75	---	±0.15
142PC30G	0-30	±0.50	---	±1.00	±2.00	0.167	60	±0.75	---	±0.15
143PC03G	±2.5	---	---	±1.00	±1.50	1.000	20	±0.75	---	±0.25
143PC05G	±5	---	---	±1.00	±1.50	0.500	30	±0.75	---	±0.15
143PC15G	±15	---	---	±1.00	±1.50	0.177	50	±0.75	---	±0.15

140PC SERIES ORDER GUIDE, DIFFERENTIAL TYPE

Catalog Listing	Pressure Range psi	Shift Null, Sensitivity, Combined**				Sensitivity V/psi	Overpressure psi Max.	Linearity, B.F.S.L.		Repeatability & Hysteresis %Span Typ.
		25 to 5° 25 to 45°C		25 to −18° 25 to +63°C	25 to −40° 25 to 85°C			P2 > P1	P2 < P1	
								%Span		
		Typ.	Max.	Max.	Max.			Max.	Max.	
142PC01D	0-1	---	±1.50	---	---	5.000	20	±0.75	±0.40	±0.30
142PC02D	0-2	---	±1.50	---	---	2.500	20	±0.75	±0.40	±0.30
142PC05D	0-5	±0.50	---	±1.00	±2.00	1.000	20	±1.50	±0.75	±0.25
142PC15D	0-15	±0.50	---	±1.00	±2.00	0.333	45	±0.75	±0.40	±0.15
142PC30D	0-30	±0.50	---	±1.00	±2.00	0.167	60	±0.75	±0.40	±0.15
143PC03D	±2.5	---	---	±1.00	±1.50	1.000	20	±0.75	±0.40	±0.25
143PC05D	±5	---	---	±1.00	±1.50	0.500	30	±0.75	±0.40	±0.15
143PC15D	±15	---	---	±1.00	±1.50	0.177	50	±0.75	±0.40	±0.15

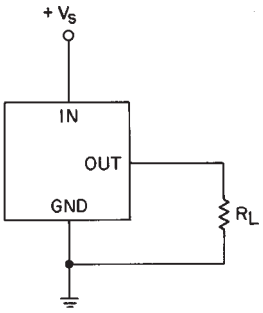
140PC SERIES ORDER GUIDE, ABSOLUTE TYPE*

Catalog Listing	Pressure Range psia	Shift Null, Sensitivity, Combined**				Sensitivity V/psi	Overpressure psi Max.	Linearity, B.F.S.L.		Repeatability & Hysteresis %Span Typ.
		25 to 5° 25 to 45°C		25 to −18° 25 to +63°C	25 to −40° 25 to 85°C			P2 > P1	P2 < P1	
								%Span		
		Typ.	Max.	Max.	Max.			Max.	Max.	
142PC15A	0-15	±0.50	---	±1.00	±2.00	0.333	45	---	±0.40	±0.15
142PC30A	0-30	±0.50	---	±1.00	±2.00	0.167	60	---	±0.40	±0.15

*Tested at 2 psia reference

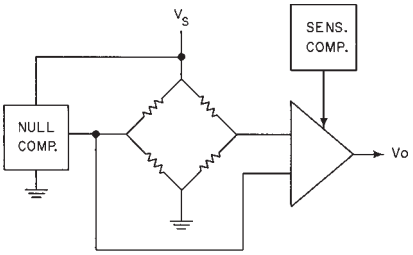
**% Span specification applies to each shift independently. (Null, sensitivity, or combined).

ELECTRICAL CONNECTION
Voltage Excitation

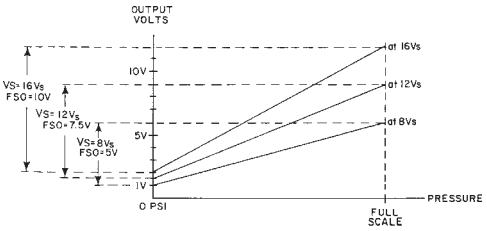


NOTES
1. Terminals are labeled on the sensor.
2. Input and output share a common ground.
3. R_L must be greater than or equal to 3000 ohms.

INTERNAL CIRCUITRY



RATIOMETRICITY

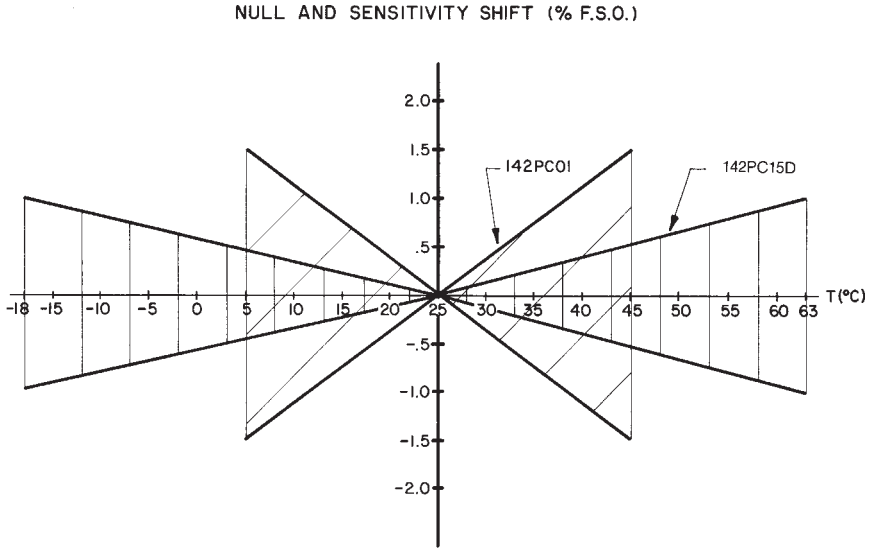


Ratiometricity refers to the output voltage being directly proportional to the supply voltage. 140PC sensors in this catalog are calibrated at 8 VDC supply voltage to provide a 1-6 volt (5V Span) output swing. For example, if supply increases by 50% to 12 VDC, the output voltage increases by 50% to 1.5-9 volts (7.5 V Span).

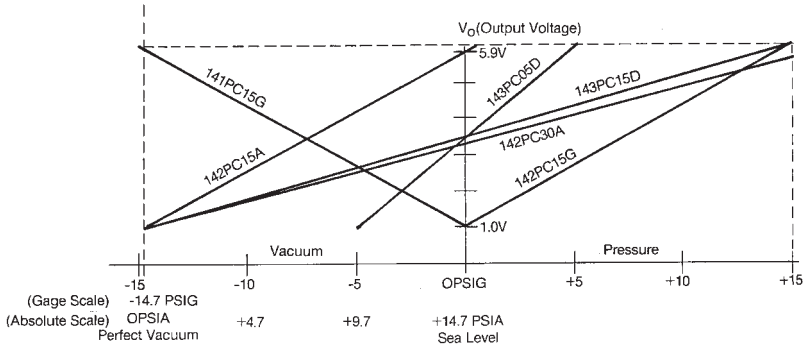
NOTE
The output is not perfectly ratiometric. See specifications for the degree of error.

NULL AND SENSITIVITY TEMPERATURE SHIFT
Amplified pressure sensors are 100% tested to insure that the maximum null and sensitivity temperature shift does not exceed the specification. The diagram below illustrates how null and sensitivity shift relates to temperature. Note that the maximum shift occurs at temperature extremes. Therefore, if a sensor is not exposed to the entire temperature range, the maximum null and sensitivity shift will actually be less than the value specified.

This diagram indicates the temperature shift pertaining to a few listings. Maximum null and sensitivity shift varies from listing to listing.



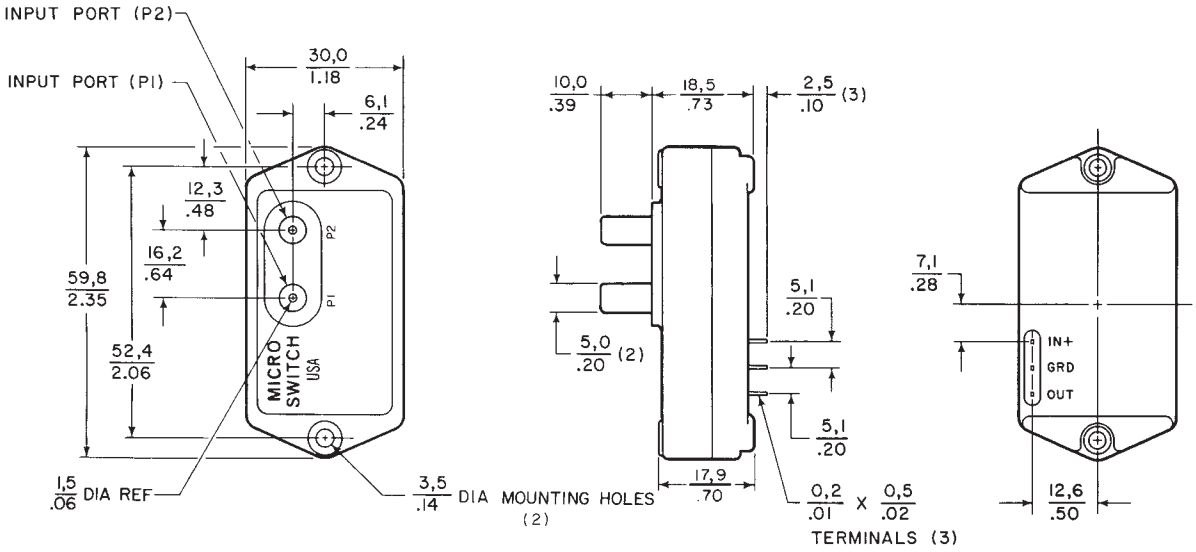
SCALING OF 140PC SERIES SENSORS WITH 8V EXCITATION



142PC15A	Absolute	V_o = 1 V at 0 psia & 6 V at 15 psia
142PC30A	Absolute	V_o = 1 V at 0 psia & 6 V at 30 psia
142PC15G	Gage	V_o = 1 V at 0 psig & 6 V at 15 psig
141PC15G	Vacuum Gage	V_o = 1 V at 0 psig & 6 V at −15 psig
143PC05D	Differential	V_o = 1 V at −5 psig & 6 V at 5 psig
143PC15D	Differential	V_o = 1 V at −15 psig & 6 V at 15 psig

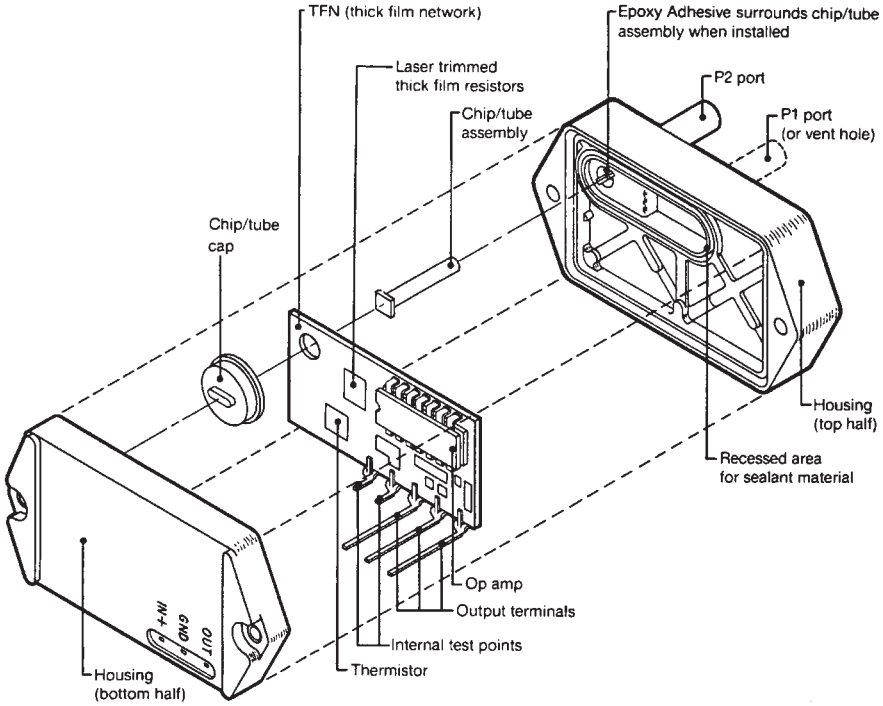
NOTE: 141PC sensors are scaled for vacuum pressure on P2.
142PC sensors are scaled for greater pressure on the P2 side of the chip. Input pressures on absolute units are applied to the P1 port.
Other scalings available upon request.

MOUNTING DIMENSIONS (For reference only)



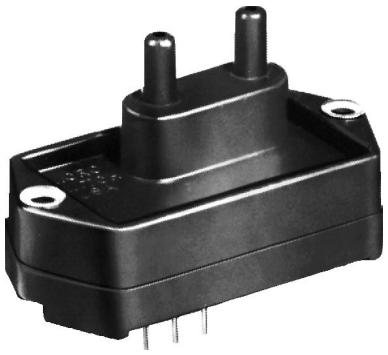
Dimensions shown apply to Differential and Absolute versions. Gage units are identical, except the P1 port is absent.

140PC CONSTRUCTION



Pressure Sensors

Low Pressure Differential, Gage, Vacuum Gage/Amplified



FEATURES
- Low pressure measurement
- PCB terminals on opposite side from the ports
- Fully signal conditioned

160PC SERIES PERFORMANCE CHARACTERISTICS at 8.0 ±0.01 VDC Excitation, 25°C (Exception 163PC at 10 ±0.01 VDC Excitation, 25°C)

	Min.	Typ.	Max.	Units
Excitation	6.00	8.00	16	VDC
Supply Current	---	8.00	20	mA
Current Sourcing Output	---	---	10	mA
Null Offset (161/162/164PC)*	0.95	1.00	1.05	V
Null Offset (163PC)**	3.45	3.50	3.55	V
Output at Full Pressure (161/162/164PC)	5.90	6.00	6.10	V
Output at Full Vacuum (163PC)	0.80	1.00	1.20	V
Span (161/162/164PC)	4.85	5.00	5.15	V
Span (163PC)**	---	5.00	---	V
Ratiometricity Error 7 to 8 V or 8 to 9 V 9 to 12 V	 --- ---	 ±0.50 ±2.00	 --- ---	 %Span
Stability over One Year	---	±0.50	---	%Span
Response Time	---	---	1.00	msec
Weight	---	28	---	grams
Short Circuit Protection	Output may be shorted indefinitely to ground			
Output Ripple	None, DC device			
Ground Reference	Supply and output are common			

*Positive (or negative) pressure measurement.
**Positive AND negative pressure measurement.

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	−40° to +85°C (−40° to +185°F)	
Storage Temperature	−55° to +125°C (−67° to +257°F)	
Compensated Temperature	−18° to +63°C (0° to +145°F)	
Shock	MIL-STD-202, Method 213 (50 g, half sine, 6 msec)	
Vibration	MIL-STD-202, Method 204 (10 to 2000 Hz at 10 g)	
Media	P2 port	Wetted materials; polyester housing, epoxy adhesive, silicon, borosilicate glass,and silicon-to-glass bond*
	P1 port	Dry gases only

*Liquid media containing some highly ionic solutions could potentially neutralize the chip-to-glass tube bond.

Low Pressure Differential, Gage, Vacuum Gage/Amplified

160PC SERIES ORDER GUIDE, VACUUM GAGE AND GAGE TYPE

Catalog Listing	Pressure Range ″H_2O	Shift Null, Sensitivity, Combined** 25 to 5° 25 to 45°C Max.	Shift Null, Sensitivity, Combined** 25 to −18° 25 to +63°C Max.	Shift Null, Sensitivity, Combined** 25 to −40° 25 to 85°C Max.	Sensitivity V/″H_2O	Overpressure psi Max.	Linearity, B.F.S.L. P2 > P1 %Span Max.	Linearity, B.F.S.L. P2 < P1 %Span Max.	Repeatability & Hysteresis %Span Typ.
161PC01D	0-27.68	---	±1.00	±2.00	0.18	5	---	±1.00	±0.15 Vacuum Gage
162PC01G	0-27.68	---	±1.00	±2.00	0.18	5	---	±1.00	±0.15 Gage

160PC SERIES ORDER GUIDE, DIFFERENTIAL TYPE

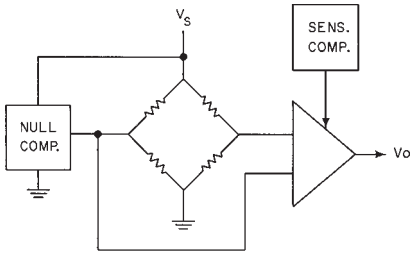
Catalog Listing	Pressure Range ″H_2O	Shift Null, Sensitivity, Combined** 25 to 5° 25 to 45°C Max.	Shift Null, Sensitivity, Combined** 25 to −18° 25 to +63°C Max.	Shift Null, Sensitivity, Combined** 25 to −40° 25 to 85°C Max.	Sensitivity V/″H_2O	Overpressure psi Max.	Linearity, B.F.S.L. P2 > P1 %Span Max.	Linearity, B.F.S.L. P2 < P1 %Span Max.	Repeatability & Hysteresis %Span Typ.
162PC01D	0-27.68	---	±1.00	±2.00	0.18	5	±2.00	---	±0.15
163PC01D36	±5	±1.00	---	---	0.50	5	±2.00	±1.00	±0.25
164PC01D37	0-10	±1.00	---	---	0.50	5	±2.00	---	±0.25
163PC01D75	±2.5	±1.25	---	---	1.00	5	±2.00	±1.00	±0.25
164PC01D76	0-5	±1.25	---	---	1.00	5	±2.00	---	±0.25

160PC SERIES ORDER GUIDE, DIFFERENTIAL TYPE @ 10 VDC ±0.01 EXCITATION, 25°C

Catalog Listing	Pressure Range cmH_2O	Shift Null, Sensitivity, Combined** 25 to 5° 25 to 45°C Max.	Shift Null, Sensitivity, Combined** 25 to −18° 25 to +63°C Max.	Shift Null, Sensitivity, Combined** 25 to −40° 25 to 85°C Max.	Sensitivity V/cmH_2O	Overpressure cmH_2O Max.	Linearity, B.F.S.L. P2 > P1 %Span Max.	Linearity, B.F.S.L. P2 < P1 %Span Max.	Repeatability & Hysteresis %Span Typ.
163PC01D48	−20 to +120	±0.75*	---	---	0.36	350	±1.5	---	±0.15

*Null shift. Span shift is ±1.00/Span
**% Span specification applies to each shift independently (Null, Sensitivity, or Combined)

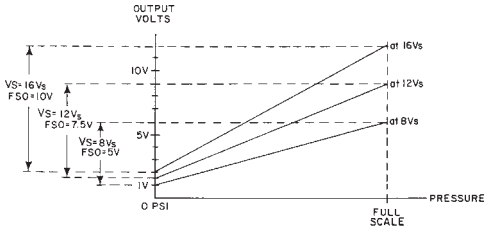
INTERNAL CIRCUITRY



NOTES

1. Terminals are labeled on the sensor.
2. Input and output share a common ground.
3. R_L must be greater than or equal to 3000 ohms.

RATIOMETRICITY



Ratiometricity refers to the output voltage being directly proportional to supply voltage. 160PC sensors in this catalog are calibrated at 8 VDC supply voltage (except 163PC) to provide a 1-6 volt (5 V Span) output swing. For example, if supply increases by 50% to 12 VDC, the output voltage increased by 50% to 1.5-9 volts (7.5 V Span).

NOTE

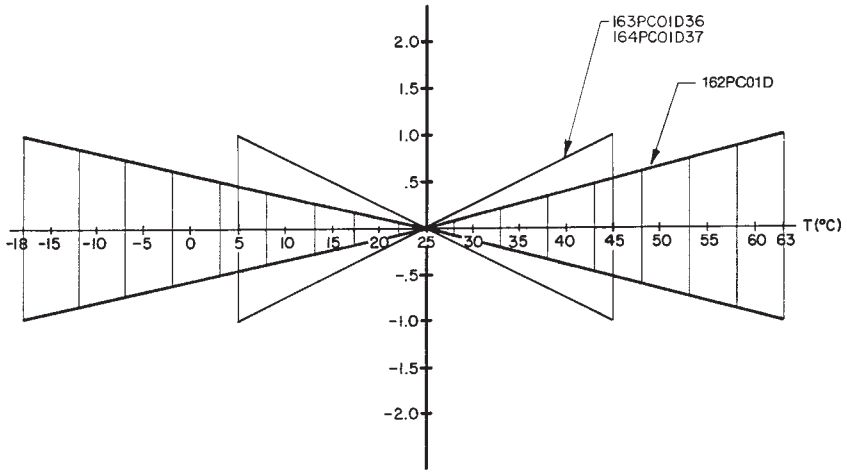
The output is not perfectly ratiometric. See Accuracy specifications for the degree of error.

NULL AND SENSITIVITY TEMPERATURE SHIFT

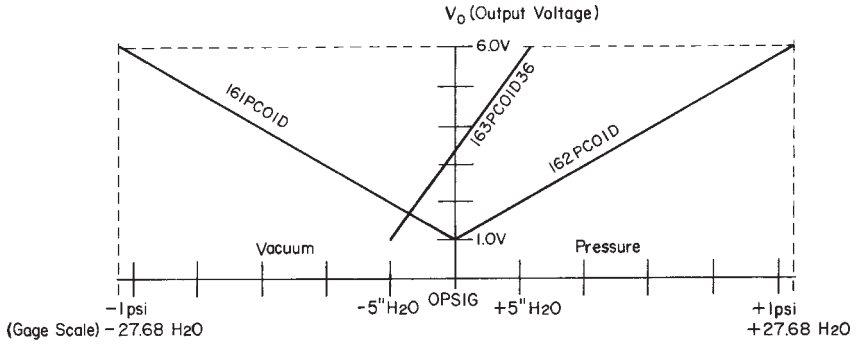
Amplified pressure sensor are 100% tested to insure that the maximum null and sensitivity temperature shift does not exceed the specification. The diagram below illustrates how null and sensitivity shift relates to temperature. Note that the maximum shift occurs at temperature extremes. Therefore, if a sensor is not exposed to the entire temperature range, the maximum null and sensitivity shift will actually be less than the value specified.

This diagram indicates the temperature shift pertaining to a few listings. Maximum null and sensitivity shift varies from listing to listing.

NULL AND SENSITIVITY SHIFT (% F.S.O.)



SCALING OF 160PC SERIES SENSORS WITH 8V EXCITATIONS



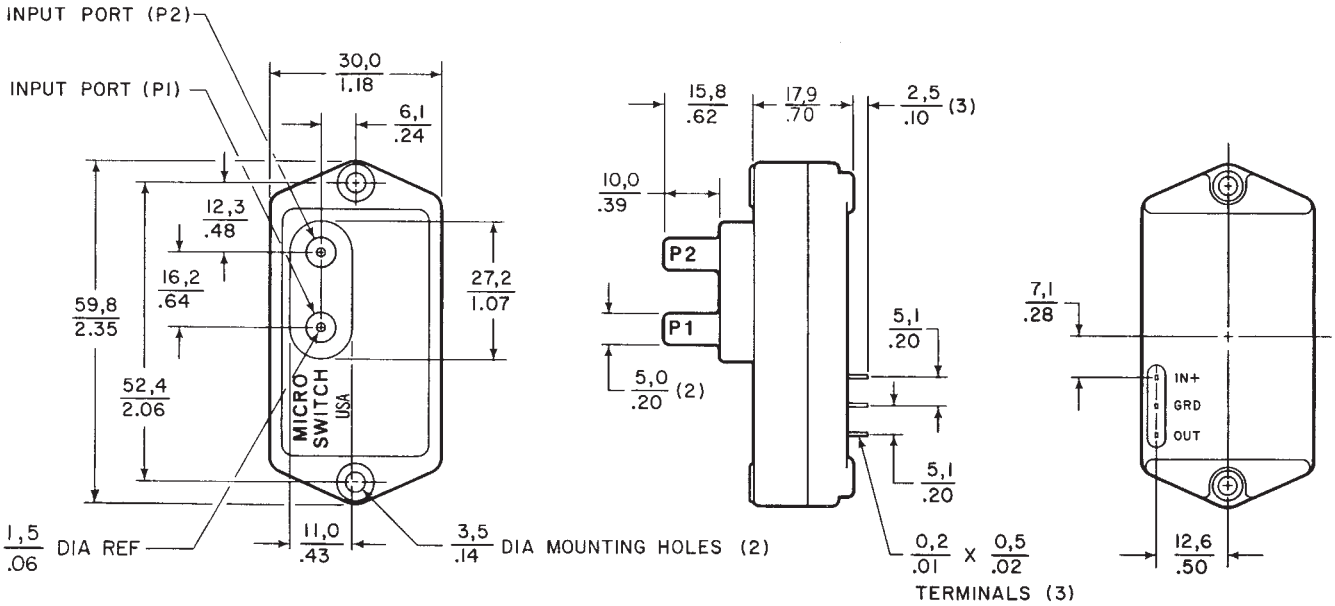
161PC01D	Vacuum Gage	V_o = 1 V at 0 psig & 6 V at −1 psig
162PC01D	Differential	V_o = 1 V at 0 psig & 6 V at 1 psig
163PC01D36	Differential	V_o = 1 V at −5″ H_2O & 6 V at −5″ H_2O

NOTE: 161PC sensors are scaled for greater pressure on the P1 side of the chip. 162PC sensors are scaled for greater pressure on the P2 side of the chip. Other scalings available upon request.

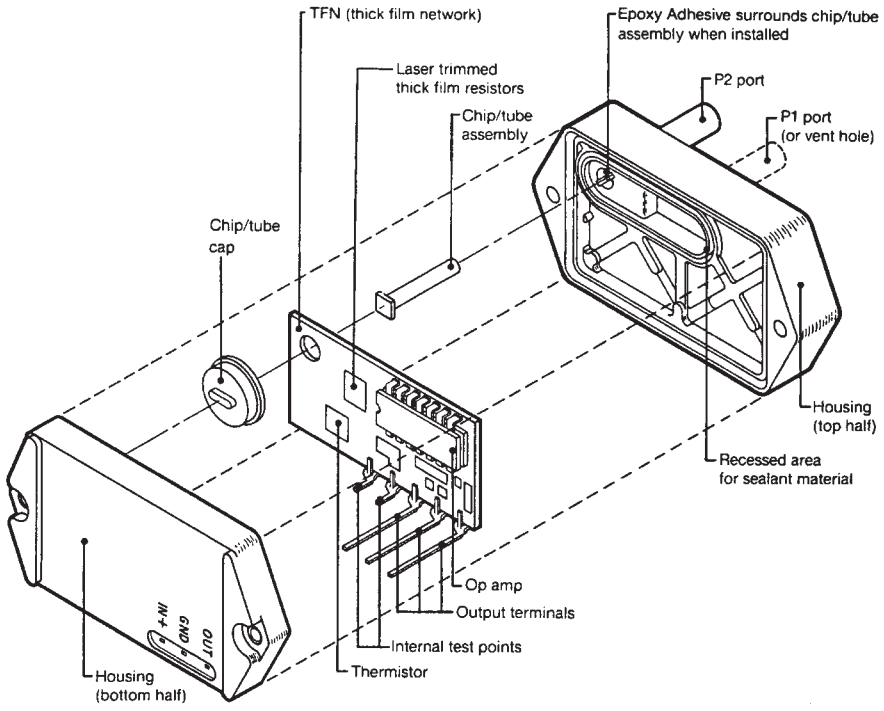
Amplified

Low Pressure Differential, Gage, Vacuum Gage/Amplified

MOUNTING DIMENSIONS (For reference only)

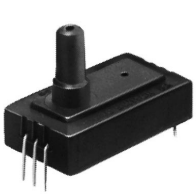


160PC CONSTRUCTION

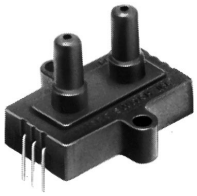


Pressure Sensors

Miniature Absolute, Differential, Gage/Amplified



Terminal Mount



Housing Mount

FEATURES

- Miniature plastic package
- Terminal and housing mount styles
- PCB termination
- Fully signal conditioned

180PC SERIES PERFORMANCE CHARACTERISTICS at 8.0 ±0.01 VDC Excitation, 25°C

	Min.	Typ.	Max.	Units
Excitation	7.00	8.00	16	VDC
Supply Current	---	---	6	mA
Current Sourcing Output	---	---	10	mA
Null Offset (184/185PC)	0.95	1.00	1.05	V
Null Offset (186PC)	3.45	3.50	3.55	V
Null Offset				
185PC15AT @ 2 psia	1.62	1.67	1.72	V
185PC30AT @ 2 psia	1.28	1.33	1.38	V
Output at Full Pressure (184/185PC, G,D)	5.90	6.00	6.15	V
Output at Full Pressure (185PC, A only)	5.85	6.00	6.15	V
Output at Full Pressure (186PC)	5.90	6.00	6.10	V
Span (184/185PC, G,D)	4.95	5.00	5.05	V
Span (185PC, A only)	4.90	5.00	5.10	V
Span (186PC)	---	5.00	---	V
Span (185PC15AT)	4.28	4.33	4.38	V
Span (185PC30AT)	4.62	4.67	4.72	V
Ratiometricity Error				
7 to 8V or 8 to 9V	---	±0.50	---	% Span
9 to 12V	---	±2.00	---	% Span
Temperature Error (Combined null and span)	−2%	0	+2%	% Span
Stability over One Year	---	±0.50	---	% Span
Response Time	---	---	1.00	msec
Weight	---	12	---	grams
Short Circuit Protection	Output may be shorted indefinately to ground			
Output Ripple	None, DC device			
Ground Reference	Supply and output are common			

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	−40° to +85°C (−40° to +185°F)	
Storage Temperature	−55° to +125°C (−67° to +257°F)	
Compensated Temperature	0° to +50°C (32° to +122°F)	
Shock	MIL-STD-202, Method 213 (50 g, half sine, 6 msec)	
Vibration	MIL-STD-202, Method 204 (10 to 2000 Hz at 10 g)	
Media	P2 port	Wetted materials; polyester housing, epoxy adhesive, silicon, borosilicate glass, and silicon-to-glass bond*
	P2 port	Absolute only: Factory sealed vacuum reference, no connection
	P1 port	Dry gases only

*Liquid media containing some highly ionic solutions could potentially neutralize the chip-to-glass tube bond.

Pressure Sensors

Miniature Absolute, Differential, Gage/Amplified

184PC SERIES ORDER GUIDE, VACUUM GAGE TYPE

Catalog Listing	Pressure Range psi	Overpressure psi Max.	Linearity, %Span	
			P2 > P1 Max.	P2 < P1 Max.
184PC05GT	0-−5	20	---	±1.00
184PC15GT	0-−15	45	---	±1.00

185PC SERIES ORDER GUIDE, DIFFERENTIAL TYPE, P2 > P1

Catalog Listing	Pressure Range psi	Overpressure psi Max.	Linearity, %Span	
			P2 > P1 Max.	P2 < P1 Max.
185PC05DT	0-5	20	±2.00	±1.00
185PC15DT	0-15	45	±2.00	±1.00
185PC30DT	0-30	60	±1.50	±0.75

186PC SERIES ORDER GUIDE, BI-DIRECTIONAL TYPE, P2-P1

Catalog Listing	Pressure Range psi	Overpressure psi Max.	Linearity, %Span	
			P2 > P1 Max.	P2 < P1 Max.
186PC03DT	±2.5	20	±2.00	±1.00
186PC05DT	±5.0	20	±2.00	±1.00
186PC15DT	±15	45	±2.00	±1.00

185PC SERIES ORDER GUIDE, ABSOLUTE TYPE

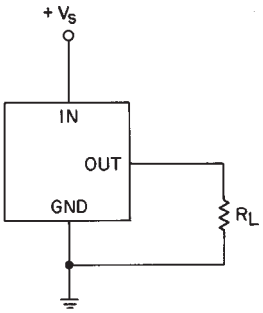
Catalog Listing	Pressure Range psi	Overpressure psi Max.	Linearity, %Span	
			P2 > P1 Max.	P2 < P1 Max.
185PC15AT	0-15	45	---	±1.00
185PC30AT	0-30	60	---	±0.75

HOW TO ORDER

Catalog listings in the order guide are shown with mounting version **T** (terminal mount). **H** (housing mount) also available. Contact 800 number.

ELECTRICAL CONNECTIONS

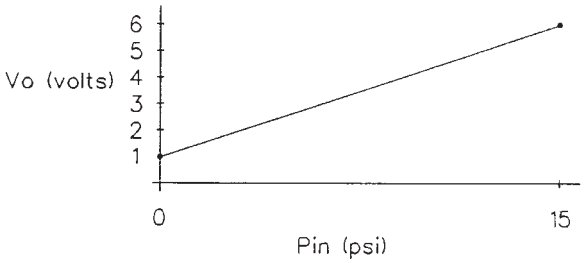
Voltage Excitation



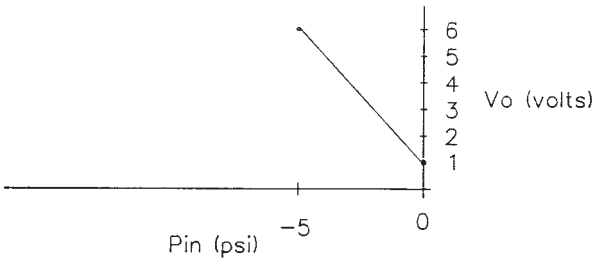
NOTES
1. Terminals are labeled on the sensor.
2. Input and output share a common ground.
3. R_L must be greater than or equal to 3000 ohms.

IDEAL OUTPUT AT Vs = 8.00 ± 0.01 VDC

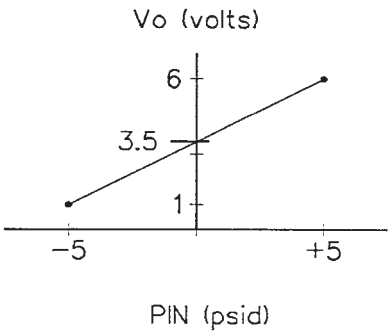
Differential
Example: 185PC15DT when P_{IN} = P2-P1



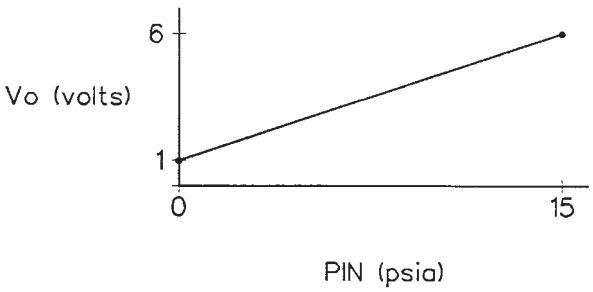
Vacuum Gage
Example: 184PC05GT where P2 = P_{IN} P1 = Ambient



Bi-directional
Example: 186PC05DH where P_{IN} = P2-P1



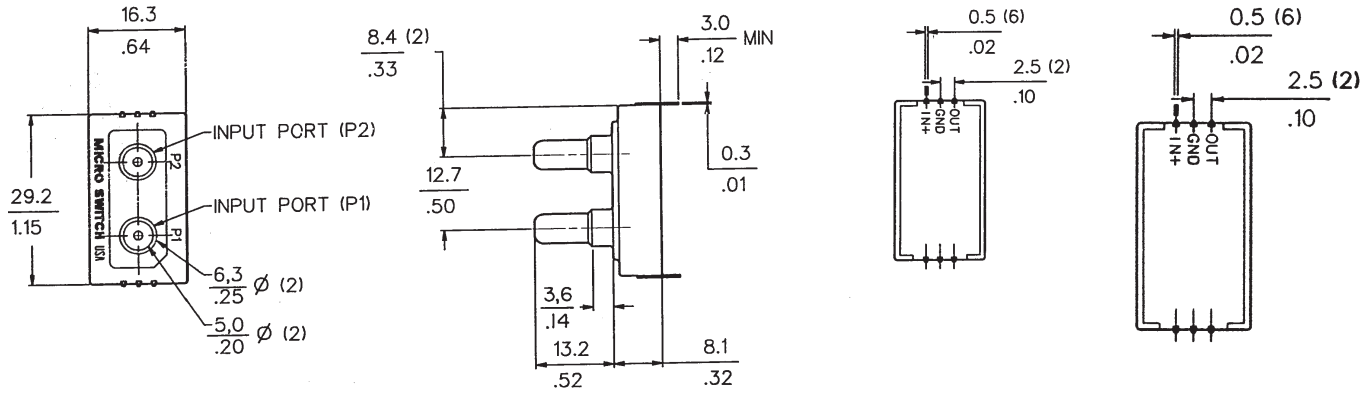
Absolute
Example: 185PC15AP where P1 = P_{IN} P2 = Factory sealed vacuum



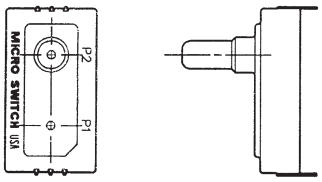
Amplified

MOUNTING DIMENSIONS 0.0 = mm
0.00 = in.

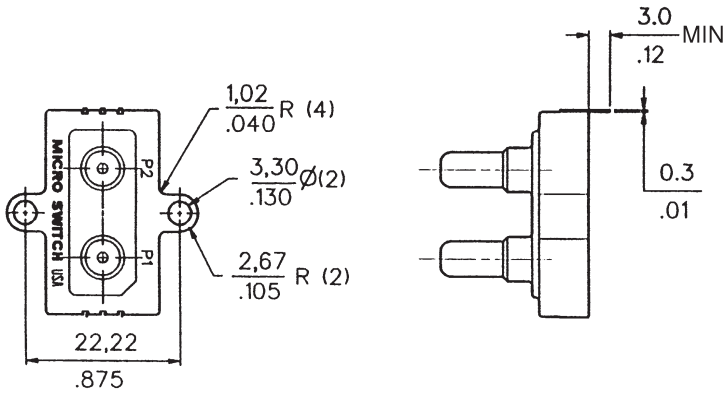
Terminal Mount (Differential "D" or Absolute "A" Housing)

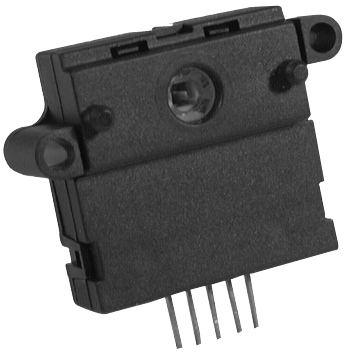


(Gage "G" Housing)



Housing Mount





NEW

FEATURES
- Manifold mount/O-ring sealed
- Fully signal conditioned
- PCB termination
- Operating temperature up to 125°C
- Glass chip tube (non-outgassing)

189PC PERFORMANCE CHARACTERISTICS @ 8.0 ±0.01 VDC Excitation, 25°C

	Min	Typ	Max	Units
Excitation	7.00	8.00	16.0	VDC
Supply Current	—	—	6	mA
Current Sourcing Output	—	—	10	mA
Null Offset	0.95	1.00	1.05	V
Output at Full Pressure	5.80	6.00	6.15	V
Ratiometricity Error				
7 to 8V or 8 to 9V	—	±0.50	—	% Span
9 to 12 V	—	±2.00	—	% Span
Temperature Error (Combined null and span)	−2	0	+2	% Span
Stability over One Year	—	±0.50	—	%Span
Response Time	—	—	1.00	mS
Weight	—	12	—	grams
Short Circuit Protection	Output may be shorted indefinitely to ground			
Output Ripple	None, DC Device			
Ground Reference	Supply and output are common			

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature		−40°C to +85°C (−40° to +185°F)
Storage Temperature		−55° to +125°C (−67° to +257°F)
Compensated Temperature		0° to +50°C (32° to +122°F)
Shock		MIL-STD-202, Method 213 (50g, half sine, 6 msec)
Vibration		MIL-STD-202, Method 204 (10 to 2000 Hz at 10 g)
Media	P2 port	Wetted materials; polyester housing, epoxy adhesive, silicon, borosilicate glass, and silicon-to-glass bond*

*Liquid media containing some highly ionic solutions could potentially neutralize the chip-to-glass tube bond.

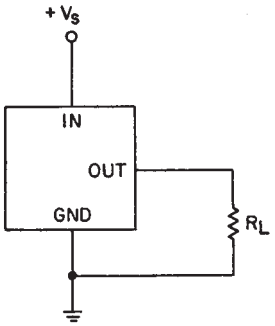
Pressure Sensors
Gage Amplified

189PC SERIES ORDER GUIDE GAGE TYPE

Catalog Listing	Pressure Range psi	Overpressure psi Max.	Linearity, %Span P2 > P1 Max.
189PC15GM	0-15	45	±2.00
189PC100GM	0-100	250	±1.50
189PC150GM	0-150	250	±1.50

Electrical Connections

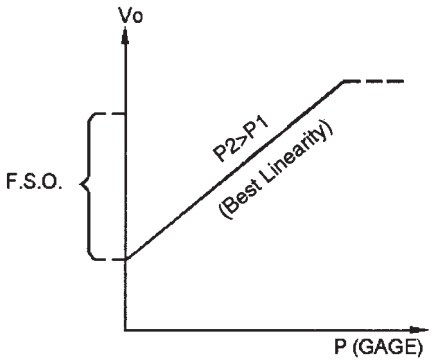
Voltage Excitation



Pin Designation

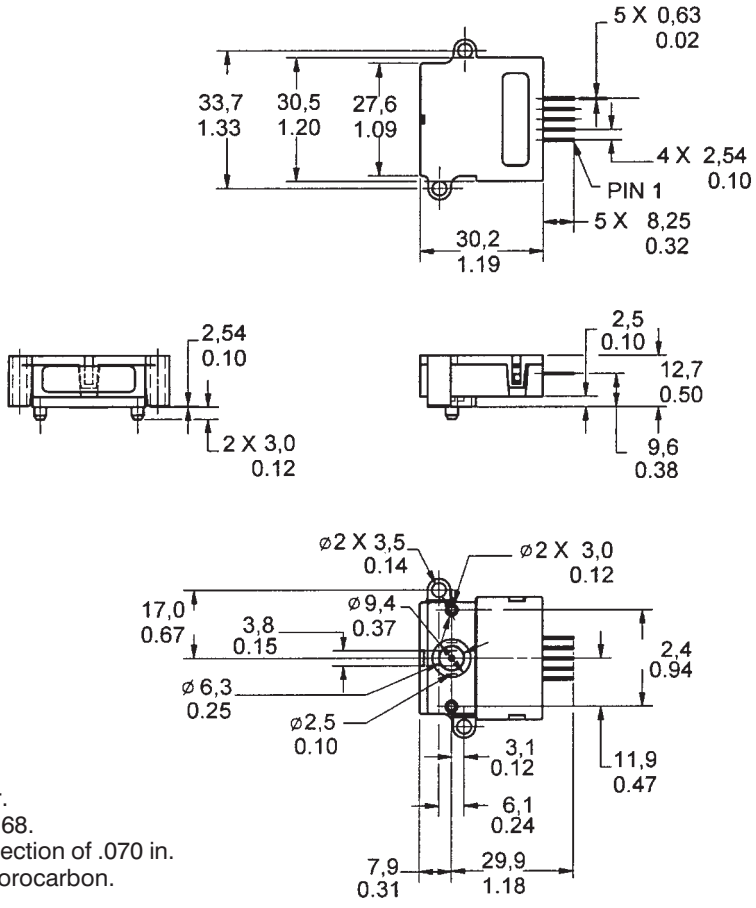
Pin 1 = V_{SS}
Pin 2 = V_{out}
Pin 3 = GND
Pin 4 = No Connect
Pin 5 = V_{CC}

Pressure Reference Gage



NOTES
1. Input and output share a common ground.
2. R_L must be greater than or equal to 3000 ohms.

MOUNTING DIMENSIONS (for reference only)



O-Ring provided with sensor.
O-Ring Part Number: SS-12168.
O.D. of .114 in. and a cross section of .070 in.
Material is 70 Durometer Fluorocarbon.

Pressure Sensors

240PC Series

High Pressure Gage, Vacuum Gage/Amplified

FEATURES

- Internal O-Ring seals for contamination resistance
- Screw-in or flat-pack mounting
- Rugged aluminum housing

240PC SERIES PERFORMANCE CHARACTERISTICS at 8.0 ±0.01 VDC Excitation, 25°C

	Min.	Typ.	Max.	Units
Excitation	7.00	8.00	16.0	VDC
Supply Current	---	8.00	20.0	mA
Current Sourcing Output	---	---	10	mA
Null Offset (241/242PC)*	0.95	1.00	1.05	V
Null Offset (243PC)**	3.45	3.50	3.55	V
Output at Full Pressure**	5.80	6.00	6.20	V
Span (241/242PC)	4.80	5.00	5.20	V
Span (243PC)	---	±2.5	---	V
Ratiometricity Error 7 to 8 V or 8 to 9 V 9 to 12 V	 --- ---	 ±0.50 ±2.00	 --- ---	 %Span
Stability over One Year	---	±0.50	---	%Span
Response Time	---	---	1.00	msec
Weight	---	85	---	grams
Short Circuit Protection	Output may be shorted indefinitely to ground			
Output Ripple	None, DC device			
Ground Reference	Supply and output are common			

*Positive (or negative) pressure measurement
**Positive and negative pressure measurement

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	−40° to +85°C (−40° to +185°F)	
Storage Temperature	−40° to +85°C (−40° to +185°F)	
Compensated Temperature	−18° to +63°C (0° to +145°F)	
Shock	MIL-STD-202, Method 213 (50 g, half sine, 6 msec)	
Vibration	MIL-STD-202, Method 204 (10 to 2000 Hz at 10 g)	
Media	P2 port	Wetted materials; die-cast aluminum housing, O-ring seal, silicon, borosilicate glass, and silicon-to-glass bond*

*Liquid media containing some highly ionic solutions could potentially neutralize the chip-to-glass tube bond.

High Pressure Gage, Vacuum Gage/Amplified

241/242PC SERIES ORDER GUIDE, GAGE AND VACUUM GAGE, Buna-N O-Ring Port Seal

Catalog Listing	Pressure Range psi	Null & Sensitivity Shift (%Span)		Sensitivity V/psi	Overpressure psi Max.	Linearity, %Span B.F.S.L., Max.	Repeatability & Hysteresis %Span Typ.
		25 to −18° 25 to +63°C Max.	25 to −40° 25 to 85°C Typ.				
241PC15M*	0-−15	±1.0	±2.0	0.330	45	±1.50	±0.25
242PC15M*	0-15	±1.0	±2.0	0.330	45	±1.50	±0.25
242PC30M*	0-30	±1.0	±2.0	0.167	60	±1.50	±0.25
242PC60G	0-60	±1.5	±2.0	0.083	120	±0.50	±0.25
242PC100G	0-100	±1.0	±2.0	0.050	200	±0.50	±0.25
242PC150G	0-150	±1.5	±3.0	0.033	300	±0.50	±0.25
242PC250G	0-250	±1.0	±2.0	0.020	500	±0.50	±0.25

242PC SERIES ORDER GUIDE, GAGE, Ethylene propylene O-Ring Seal

Catalog Listing	Pressure Range psi	Null & Sensitivity Shift (%Span)		Sensitivity V/psi	Overpressure psi Max.	Linearity, %Span B.F.S.L., Max.	Repeatability & Hysteresis %Span Typ.
		25 to −18° 25 to +63°C Max.	25 to −40° 25 to 85°C Typ.				
242PC60GS	0-60	±1.5	±2.0	0.083	120	±0.50	±0.25
242PC100GS	0-100	±1.0	±2.0	0.050	200	±0.50	±0.25
242PC150GS	0-150	±1.5	±3.0	0.033	300	±0.50	±0.25
242PC250GS	0-250	±1.0	±2.0	0.020	500	±0.50	±0.25

243PC SERIES ORDER GUIDE, VACUUM GAGE, Buna-N Port Seal

Catalog Listing	Pressure Range psi	Null & Sensitivity Shift (%Span)		Sensitivity V/psi	Overpressure psi Max.	Linearity, BFSL		Repeatability & Hysteresis %Span Typ.
		25 to −18° 25 to +63°C Max.	25 to −40° 25 to 85°C Typ.			P2 > P1 Max.	P2 < P1 Max.	
243PC15M*	±15	±1	±2.0	0.167	50	±1.50	±0.75	±0.25

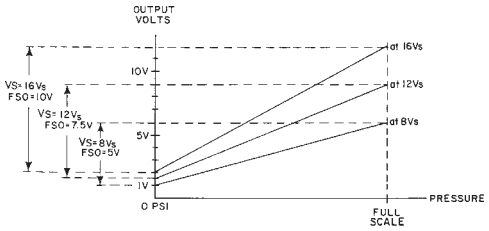
*Adhesive between thermoplastic and aluminum instead of O-ring seal.

PORT SEAL O-RING

Material	Resistant To:
Buna-N (general use)	Petroleum products, freon 12 and others
Ethylene propylene	Phosphate esters and others

High Pressure Gage, Vacuum Gage/Amplified

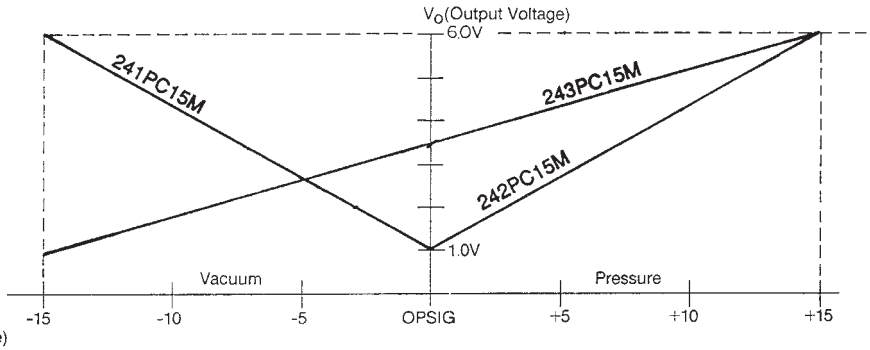
RATIOMETRICITY



Ratiometricity refers to the output voltage being directly proportional to supply voltage. 240PC sensors in this catalog are calibrated at 8 VDC supply voltage to provide a 1-6 volt (5 V Span) output swing. For example, if supply increases by 50% to 12 VDC, the output voltage increased by 50% to 1.5-9 volts (7.5 V Span).

NOTE
The output is not perfectly ratiometric. See Accuracy specifications for the degree of error.

SCALING OF 240PC SERIES WITH 8V EXCITATION



242PC15M	Gage	V_o = 1 V at 0 psig & 6 V at 15 psig
241PC15M	Vacuum Gage	V_o = 1 V at 0 psig & 6 V at −15 psig
243PC15M	Gage	V_o = 1 V at −15 psig & 6 V at 15 psig

NOTE: 241PC sensors are scaled for greater pressure on the P1 side of the chip. 242PC sensors are scaled for greater pressure on the P2 side of the chip.
Other scalings available upon request.

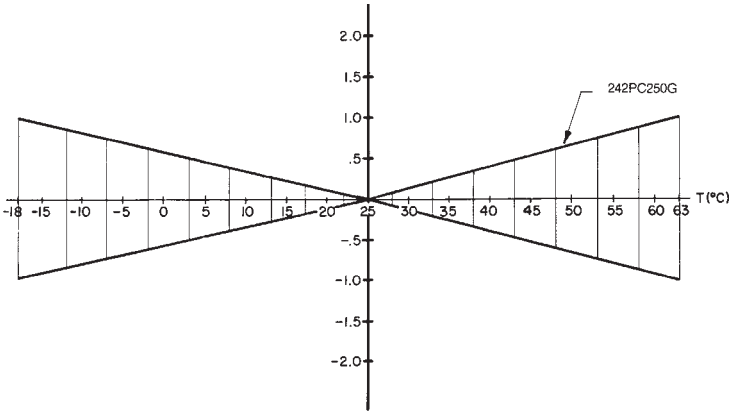
High Pressure Gage, Vacuum Gage/Amplified

NULL AND SENSITIVITY TEMPERATURE SHIFT

Amplified pressure sensors are 100% tested to ensure that the maximum null and sensitivity temperature shift does not exceed the specification. The diagram illustrates how null and sensitivity shift relates to temperature. Note that the maximum shift occurs at temperature extremes. Therefore, if a sensor is not exposed to the entire temperature range, the maximum null and sensitivity shift will actually be less than the value specified.

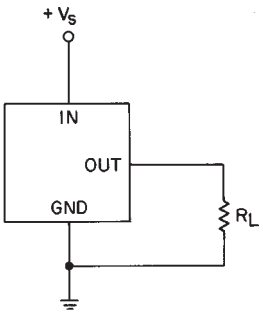
This diagram indicates the temperature shift pertaining to a few listings. Maximum null and sensitivity shift varies from listing to listing.

Null and Sensitivity Shift (% Span)



ELECTRICAL CONNECTIONS

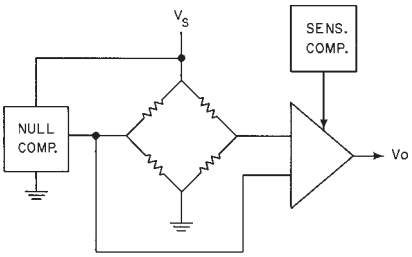
Voltage Excitation



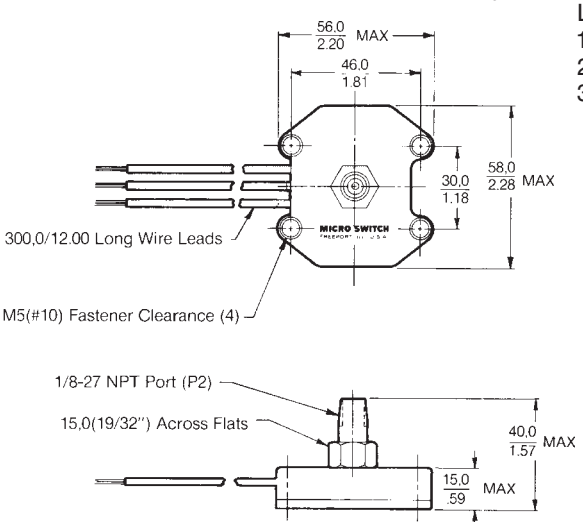
NOTES

1. Terminals are labeled on the sensor.
2. Input and output share a common ground.
3. R_L must be greater than or equal to 3000 ohms.

INTERNAL CIRCUITRY



MOUNTING DIMENSIONS (For reference only)



Leadwires
1 - Red, Vs
2 - Black, Ground (–)
3 - Green, Output

Pressure Sensors
Pressure-to-Current/Amplified

FEATURES
- Unidirectional gage pressure measurement
- 2-wire, causes a 4-20 mA change in current, linearly proportional to pressure input
- Screw-in or flat-pack mounting
- Rugged die-cast aluminum housing

249PC SERIES PERFORMANCE CHARACTERISTICS at 24.0 ±0.01 VDC Excitation, 25 Ohm Load, 25°C

	Min.	Typ.	Max.	Units
Excitation	10.0	24.0	32.0	VDC
Response Time	---	---	1.00	msec
Supply Voltage Sensitivity 20-24 VDC and 24-28 VDC	---	±0.15	---	%Span
Stability over One Year	---	±1.0	---	%Span
Current Output				
249PC15G at 3 psig	3.7	4.0	4.3	mA
249PC15G at 15 psig	19.7	20.0	20.3	
Null (0-100 & 0-250 psig)	3.7	4.0	4.3	
Full pressure (0-100 & 0-250 psig)	19.5	20.0	20.5	
Weight	---	85	---	grams
Output Ripple	None, DC device			

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	−40° to +85°C (−40° to +185°F)
Storage Temperature	−40° to +85°C (−40° to +185°F)
Compensated Temperature	−18° to +63°C (0° to +145°F)
Shock	MIL-STD-202, Method 213 (50 g, half sine, 6 msec)
Vibration	MIL-STD-202, Method 204 (10 to 2000 Hz at 10 g)
Media	P2 port Wetted materials; die-cast aluminum housing, O-ring seal, silicon, borosilicate glass, and silicon-to-glass bond*

*Liquid media containing some highly ionic solutions could potentially neutralize the chip-to-glass tube bond.

249PC SERIES ORDER GUIDE, GAGE, Buna-N O-Ring Port Seal

Catalog Listing	Pressure Range psi	Null & Sensitivity Shift 25 to 0°C, 25 to 50°C Max.	Sensitivity mA/psi	Overpressure psi %Span Max.	Linearity & Hysteresis %Span Max.	Repeatability B.F.S.L. Typ.
249PC15M*	3-15	±1.0	1.330	45	±0.75	±0.25
249PC100G	0-100	±1.0	0.160	200	±0.75	±0.25
249PC250G	0-250	±1.0	0.064	500	±1.00	±0.25

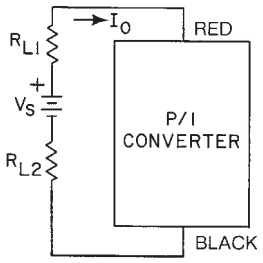
*Adhesive between thermoplastic and aluminum instead of O-ring seal.

249PC SERIES ORDER GUIDE, GAGE, Ethylene Propylene O-Ring Port Seal

Catalog Listing	Pressure Range psi	Null & Sensitivity Shift 25 to 0°C, 25 to 50°C Max.	Sensitivity mA/psi	Overpressure psi %Span Max.	Linearity & Hysteresis %Span Max.	Repeatability B.F.S.L. Typ.
249PC100GS	0-100	±1.0	0.160	200	±0.75	±0.25
249PC250GS	0-250	±1.0	0.064	500	±1.00	±0.25

Pressure-to-Current/Amplified

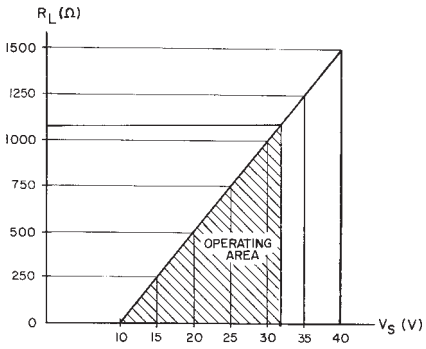
ELECTRICAL CONNECTION



NULL AND SENSITIVITY SHIFT

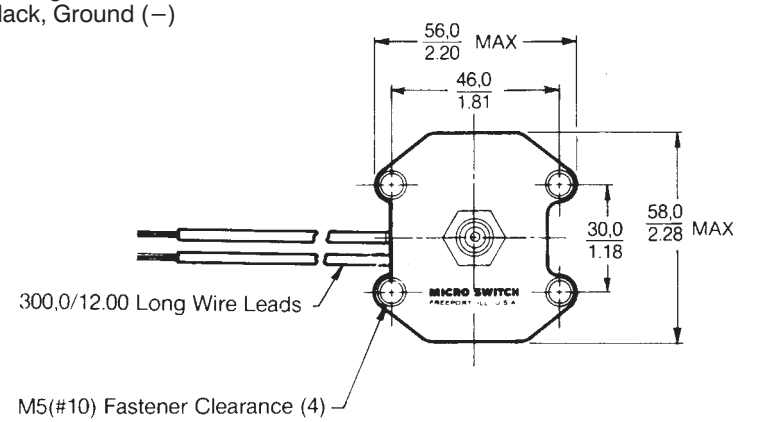
Current output pressure sensors are 100% tested to insure that the maximum null and sensivity temperature shift does not exceed the specification. The maximum shift occurs at temperature extremes. Therefore, if a sensor is not exposed to the entire temperature range, the maximum null and sensitivity shift will actually be less than the value specified.

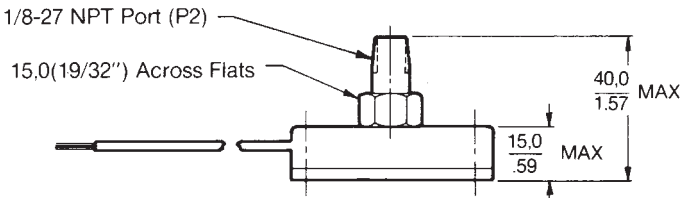
EXTERNAL LOAD RESISTANCE VS SUPPLY VOLTAGE



MOUNTING DIMENSIONS (For reference only)

Leadwires
1 – Red, V_S
2 – Black, Ground (–)

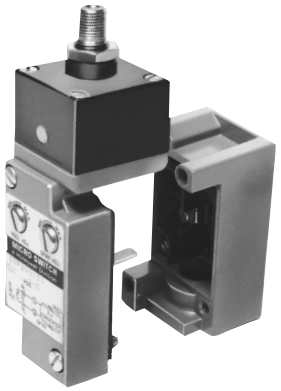




Pressure Sensors

SSPB Series

Heavy Duty DC Adjustable, 2-Wire Analog



FEATURES

- Silicon sensor chip is enclosed in stainless steel welded diaphragm
- Rugged diecast zinc plug-in limit switch style housing
- 2-wire, 4-20 mA output current linearly proportional to pressure
- Sealed to meet NEMA 1, 3, 3R, 4, 6, 6P, 12, 13
- Field adjustable null and span
- Protected against false pulse, transients and industrial noise
- 0 to +50°C operating and compensated temperature
- UL Listed.

SSPB SERIES PERFORMANCE CHARACTERISTICS, 25°C

	Min.	Typ.	Max.	Units
Supply Voltage	12.0	---	36.0	VDC
Hysteresis & Repeatability				
@ nominal span	---	---	±0.5	%Span
@ max. span comp.	---	---	±1.5	
Temperature Error @ nom. span & max. comp.	---	±6.0	±10.0	%Span
Response Time	---	---	2.0	msec
Weight	414 grams (.91 lb.) Note: w/o receptacle			
Change in Current	4 to 20 mA proportional to pressure			
Null Pressure Setting (4 mA output)	Can be adjusted from 0 to 25% of full pressure range			
Full Pressure Setting (20 mA output)	Can be adjusted from 75 to 100% of full pressure range			

ENVIRONMENTAL SPECIFICATIONS

Storage Temperature	−25° to +85°C (−13° to +185°F)
Operating and Compensated Temperature	0° to 50°C (32° to 122°F)
Sealing	NEMA 1, 3, 3R, 4, 6, 6P, 12, 13*
Media	Limited only to those media which will not attack 316 stainless steel

***Application Note:** Enclosures are based, in general, on the broad definitions outlined in NEMA standards. Therefore, it will be necessary for the user to determine that a particular enclosure is adequate when exposed to the specific conditions that might exist in intended applications. Except as might otherwise be noted, all references to products relative to NEMA enclosure types are based on MICRO SWITCH evaluation only.

SSPB SERIES ORDER GUIDE, GAGE PRESSURE

Catalog Listing	Nominal Pressure Range psig	Over Pressure Max. psi	Sensitivity (1) Range mA/psi
SSPB0015V	0-15	30	1.07 to 4.27
SSPB0100V	0-100	200	0.16 to 0.64
SSPB0250V	0-250	500	0.064 to 0.256

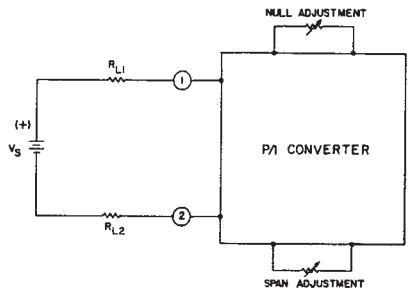
Mating Receptacle LSZ 4001

(1) NOTE: Sensitivity = $\frac{16\text{ mA}}{\text{Upper Pressure Setting - Lower Pressure Setting}}$

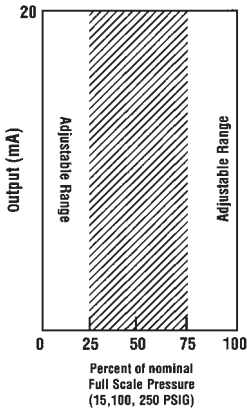
ELECTRICAL CONNECTIONS

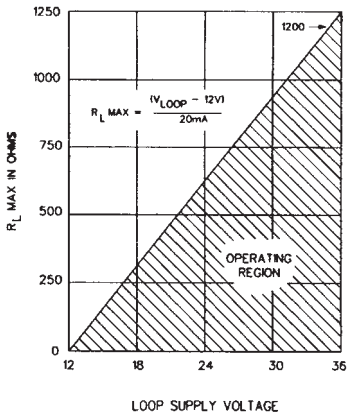
An ammeter, resistor (current output generates a voltage drop across the resistor) or any current sensing device is placed in series with a DC voltage source and the pressure sensor for proper operation. The load, represented by R_L, can be placed on either or both sides of the voltage source. Total load resistance must be within operating area. Output and Power LEDs do not require separate wiring.

$$R_{L(max.)} = \frac{V_S - 12\text{ volts}}{0.020\text{ Amps}}$$



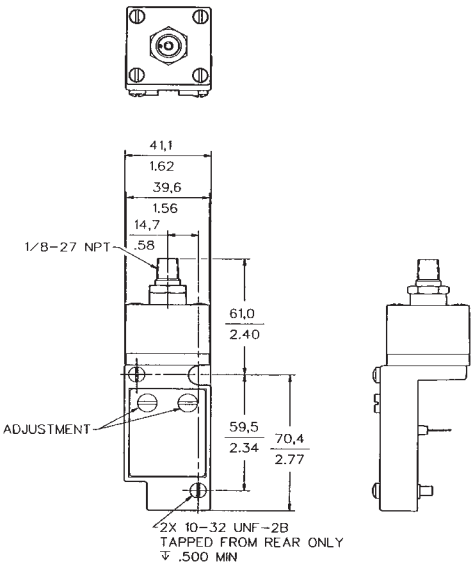
MAXIMUM EXTERNAL LOAD RESISTANCE VERSUS SUPPLY VOLTAGE





MOUNTING DIMENSIONS

(for reference only)

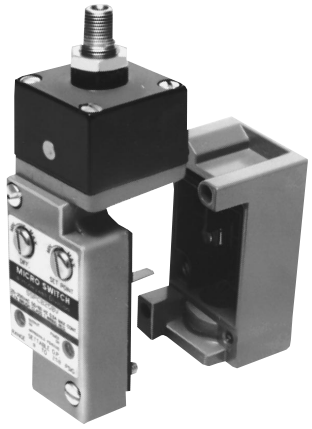


Amplified

Pressure Sensors

SSPC Series

Heavy Duty AC Adjustable Setpoint/2-Wire Digital

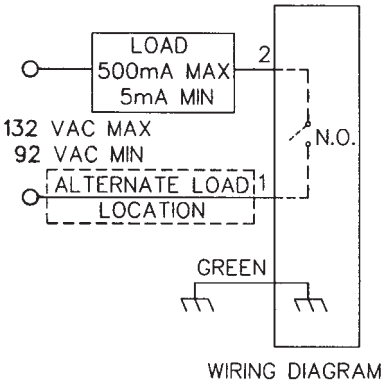


FEATURES

- Silicon sensor chip is enclosed in stainless steel welded diaphragm
- Rugged diecast zinc plug-in limit switch style housing
- Field adjustable setpoint and differential
- Sealed to meet NEMA 1, 3, 3R, 4, 6, 6P, 12, 13
- Protected against false pulse, transients, industrial noise and NEMA noise
- −25 to +85°C storage temperature
- 0 to +50°C operating and compensated temperature
- UL Listed

WIRING DIAGRAM

Output and Power LEDs do not require separate wiring.



WIRING DIAGRAM

SSPC SERIES PERFORMANCE CHARACTERISTICS, 25°C

	Min.	Typ.	Max.	Units
Supply Voltage	92.0	115	132	VAC
Repeatability				
@ 25°C	---	---	±0.5	% of Adjustable range
Comp. temp. range	---	---	±3.0	
Response Time Max (no time delay)	On - 20 msec		Off - 10 msec	
Rate of Operation	---	---	900	per minute
Power Dissipation	0.35 VA excluding load			
Saturation Voltage	9V max with 0.5 Amp load			
Load Current (N.O.)	0.5 Amp max. continuous over full temperature range 2.7 Amp. max. inrush			
Leakage Current (Off state)	2.0 mA RMS, max.			
Protection	False pulse, transients, Industrial noise, NEMA noise			
Weight	414 grams (.91 lb.) Note: w/o receptacle			

ENVIRONMENTAL SPECIFICATIONS

Storage Temperature	−25° to +85°C (−13° to 185°F)
Operating and Compensated Temperature	0° to 50°C (32° to 122°F)
Sealing	NEMA 1, 3, 3R, 4, 6, 6P, 12, 13*
Media	Limited only to those media which will not attack 316 stainless steel

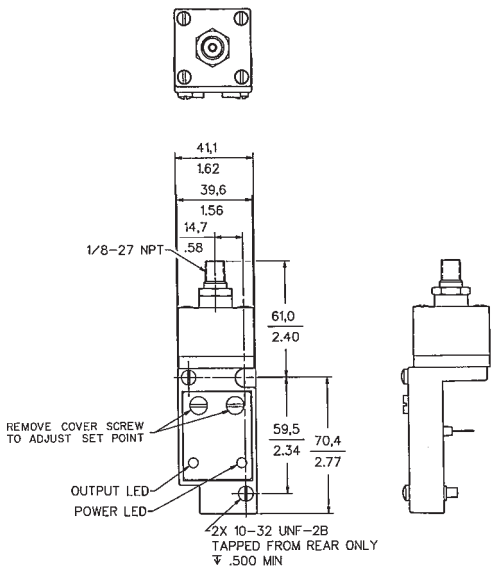
***Application Note:** Enclosures are based, in general, on the broad definitions outlined in NEMA standards. Therefore, it will be necessary for the user to determine that a particular enclosure is adequate when exposed to the specific conditions that might exist in intended applications. Except as might otherwise be noted, all references to products relative to NEMA enclosure types are based on MICRO SWITCH evaluation only.

SSPC SERIES ORDER GUIDE, GAGE PRESSURE

Catalog Listing	Nominal Pressure Range psig	Over-Pressure Max. psi	Adjustable Setpoint Range	Differential Min.
SSPC0015V	0-15	30	1.5-15	30% @ 1.5 psi, 10% @ F.S.
SSPC0100V	0-100	200	10-100	10%
SSPC0250V	0-250	500	25-250	10%

Mating Receptacle LSZ 4001

MOUNTING DIMENSIONS (for reference only)



Pressure Sensors

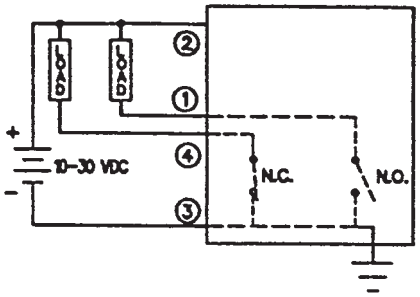
SSPD Series

Heavy Duty DC Adjustable Setpoint, 4-Wire Current Sinking

FEATURES

- Silicon sensor chip is enclosed in stainless steel welded diaphragm
- Rugged diecast zinc plug-in limit switch style housing
- Field Adjustable setpoint and differential
- Sealed to meet NEMA 1, 3, 3R, 4, 6, 6P, 12, 13
- Protected against false pulse, transients and industrial noise
- −25 to +85°C storage temperature
- 0 to +50° operating and compensated temperature
- UL Listed

WIRING DIAGRAM



Amplified

SSPD SERIES PERFORMANCE CHARACTERISTICS, 25°C

Supply Voltage	10 to 30 VDC
Load Current (N.O. & N.C.)	200 mA Max (NPN)
Leakage current, N.C. state	10 μA Max
Voltage Drop, Max	1.25V with 200 mA load
Response Time, Max	15 Milliseconds
Protection	Power up protection, transients, industrial noise
Repeatability (Stability)	±0.5% of Set Points (@25°C) ±3.0% of Set Points (0°C to +50°C)

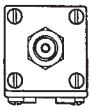
ENVIRONMENTAL SPECIFICATIONS

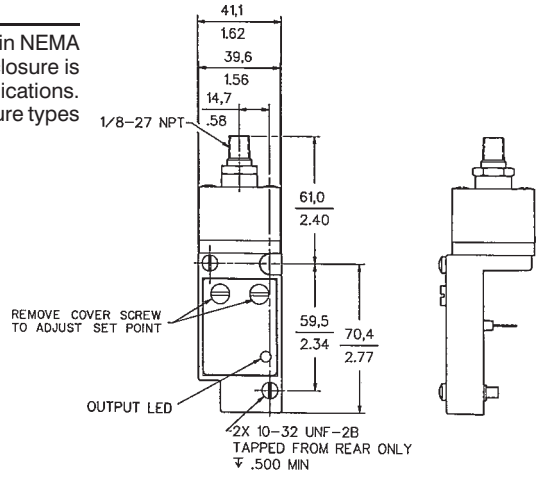
Storage Temperature	−25° to +85°C (−13° to 185°F)
Operating and Compensated Temperature	0° to 50°C (32° to 122°F)
Sealing	NEMA 1, 3, 3R, 4, 6, 6P, 12, 13*
Media	Limited only to those media which will not attack 316 stainless steel

***Application Note:** Enclosures are based, in general, on the broad definitions outlined in NEMA standards. Therefore, it will be necessary for the user to determine that a particular enclosure is adequate when exposed to the specific conditions that might exist in intended applications. Except as might otherwise be noted, all references to products relative to NEMA enclosure types are based on MICRO SWITCH evaluation only.

MOUNTING DIMENSIONS

(for reference only)





SSPD SERIES ORDER GUIDE, GAGE PRESSURE

Catalog Listing	Input Pressure Max. psig	Over-Pressure Max. psi	Adjustable Setpoint Range	Differential Min.
SSPD0015V	1.5-15	30	15	30% @ 1.5 psi, 10% @ F.S.
SSPD0100V	100	200	10-100	10%
SSPD0250V	250	500	25-250	10%

Mating Receptacle LSZ 4001

SSPD Series has one bicolor Output LED.

Pressure Sensors

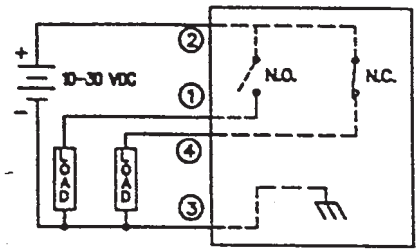
SSPE Series

Heavy Duty DC Adjustable Setpoint, 4-Wire Current Sourcing

FEATURES

- Silicon sensor chip is enclosed in stainless steel welded diaphragm
- Rugged diecast zinc plug-in limit switch style housing
- Field Adjustable setpoint and differential
- Sealed to meet NEMA 1, 3, 3R, 4, 6, 6P, 12, 13
- Protected against false pulse, transients and industrial noise
- −25 to +85°C storage temperature
- 0 to +50° operating and compensated temperature
- UL Listed

WIRING DIAGRAM



SSPE SERIES PERFORMANCE CHARACTERISTICS, 25°C

Supply Voltage	10 to 30 VDC
Load Current (N.O. & N.C.)	200 mA Max (sourcing)
Leakage current, N.C. state	10 μA Max
Voltage Drop, Max	1.25V with 200 mA load
Response Time, Max	15 Milliseconds
Protection	Power up protection, transients, industrial noise
Repeatability (Stability)	±0.5% of Set Points (@25°C) ±3.0% of Set Points (0°C to +50°C)

ENVIRONMENTAL SPECIFICATIONS

Storage Temperature	−25° to +85°C (−13° to 185°F)
Operating and Compensated Temperature	0° to 50°C (32° to 122°F)
Sealing	NEMA 1, 3, 3R, 4, 6, 6P, 12, 13*
Media	Limited only to those media which will not attack 316 stainless steel

***Application Note:** Enclosures are based, in general, on the broad definitions outlined in NEMA standards. Therefore, it will be necessary for the user to determine that a particular enclosure is adequate when exposed to the specific conditions that might exist in intended applications. Except as might otherwise be noted, all references to products relative to NEMA enclosure types are based on MICRO SWITCH evaluation only.

SSPE SERIES ORDER GUIDE, GAGE PRESSURE

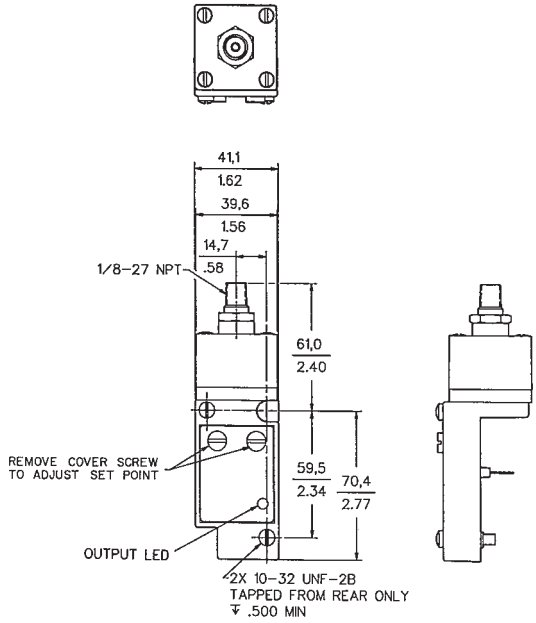
Catalog Listing	Input Pressure Max. psig	Over-Pressure Max. psi	Adjustable Setpoint Range	Differential Min.
SSPE0015V	15	30	1.5-15	30% @ 1.5 psi, 10% @ F.S.
SSPE0100V	100	200	10-100	10%
SSPE0250V	250	500	25-250	10%

Mating Receptacle LSZ 4001

SSPE Series has one bicolor Output LED

MOUNTING DIMENSIONS

(for reference only)



Commercial Grade High Pressure Sensors

20PC Family

20PC Series

FEATURES

- Lowest priced sensor with temperature compensation and calibration
- Variety of gage pressure port configurations; easily modified for special needs
- Operable after exposure to frozen conditions
- Choice of terminations for gage sensors
- Calibrated Null and Span
- Temperature compensated for Span over 0ºC to 50ºC provides interchangeability
- Measures vacuum or positive pressure
- Ideal for wet/wet applications

TYPICAL APPLICATIONS

Medical

- Oxygen and nitrogen gas distribution in hospitals
- Dental chairs
- Water flow measurement

Environmental

- Water control valves
- Instrumentation
- Irrigation equipment
- Filter monitoring equipment

Industrial Instrumentation

- Robotics
- Pressure valves
- Leak detection
- Air compressors

Analytical Instrumentation

- Gas chromatography

The 20PC family has added a new range to its already high pressure sensor family. The 250 psi range is now being offered in our 26PC family. This pressure range completes a full complement of pressure ranges that are compensated over temperature and calibrated at zero and full scale. The addition of the 250 psi pressure range permits greater flexibility in the design of this product family.

The factory calibrated 26PC Series sensors are temperature compensated (0 to 50°C), allowing part interchangeability, high performance, reliability, and accuracy. The lower cost noncompensated 24PC Series sensors are ideal for on-system calibration applications. These versatile 20PC Series products can meet many pressure sensing requirements in the commercial/consumer marketplace. Pressure ranges are from 0.5 psi to 250 psi in the 20PC family.

The extensive port options available for the 20PC Series sensors promote the application flexibility of Honeywell's commercial grade high pressure sensing options.

⚠WARNING

MISUSE OF DOCUMENTATION

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Failure to comply with these instructions could result in death or serious injury.

⚠WARNING

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Commercial Grade High Pressure Sensors

20PC Family

20PC Series

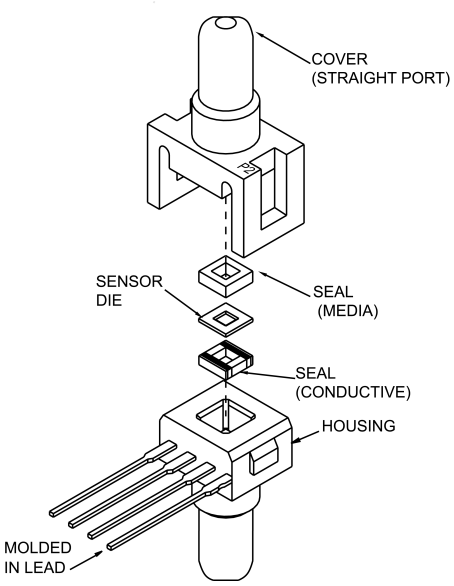
26PC Series Performance Characteristics at 10.0 ± 0.01 Vdc Excitation, 25°C

	Min.	Typ.	Max.	Units
Excitation	—	10	16	Vdc
Response Time	—	—	1.0	ms
Input Resistance	5.5 k	7.5 k	11.5 k	Ohm
Output Resistance	1.5 k	2.5 k	3.0 k	Ohm
Weight		2		gram

Environmental Specifications

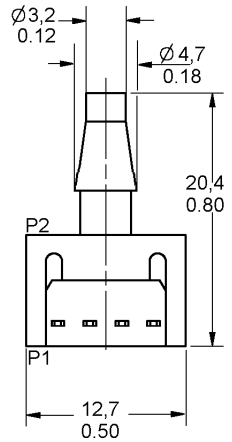
Operating Temperature	-40°C to +85°C (-40°F to +185°F)
Storage Temperature	-55°C to +100°C (-67°F to +212°F)
Compensated Temperature	0°C to +50°C (32°F to +122°F)
Shock	Qualification tested to 150 g
Vibration	MIL-STD-202, Method 213 (0 to 2 kHz, 20 G sine)

NOTE: For media compatibility specifications, refer to Catalog 15, 007908-11, or web site: www.honeywell.com/sensing

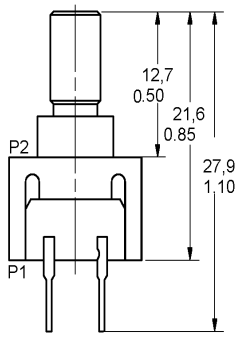


26PC PORT VARIATIONS (dimensions for reference only) mm/in

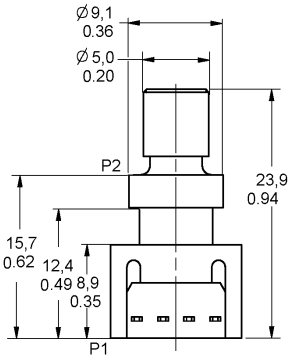
B Barbed



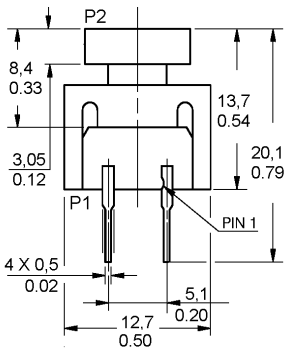
H M5 Thread*



M ¼-28 Thread**



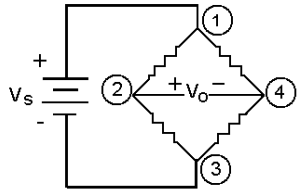
S Manifold



*Recommended torque for sealing is 4 in-lb. Do not exceed 6 in-lb of torque. Use size 007 O-Ring. O-Ring counterbore dimensions are 0.04 ± .005 in D x 0.300 ± .003 in Dia.

**Recommended torque for sealing is 8 in-lb. Do not exceed 12 in-lb. Use size 009 O-Ring. O-Ring counterbore dimensions are .040 ± .002 in D x 0.360 ± .003 in Dia.

26PC CIRCUIT TERMINATION



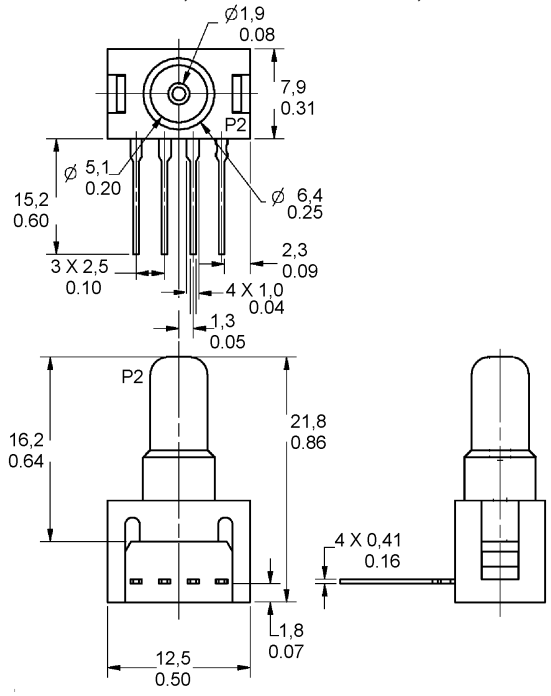
Pin 1 = Vs (+)
Pin 2 = Output (+)
Pin 3 = Ground (-)
Pin 4 = Output (-)
Pin 1 is notched, Pin 2 is next to Pin 1, etc.

MOUNTING DIMENSIONS (for reference only) mm/in

GAGE SENSOR

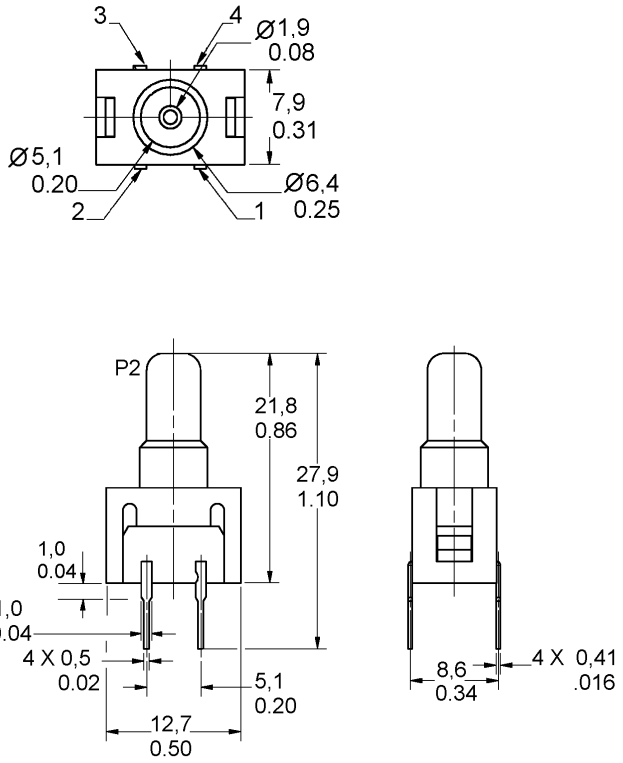
1 x 4 Termination (Style 6) Port Style A, Straight

Pin 1 is notched, Pin 2 is next to Pin 1, etc.



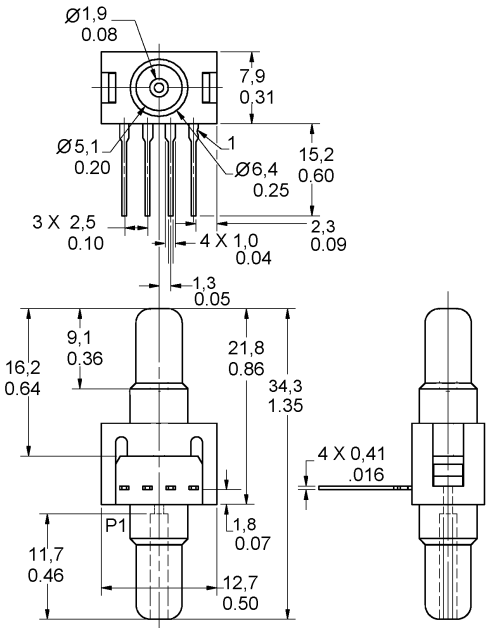
2 x 2 Termination (Style 2) Port Style A, Straight

Pin 1 is notched, Pin 1 is shown at lower right corner. Pins 2, 3, 4 are clockwise.



DIFFERENTIAL SENSOR

1 X 4 Termination (Style 6) Port Style A, Straight (Only)



Commercial Grade High Pressure Sensors

20PC Pressure Sensors

20PC Series

26PC FAMILY SENSOR SELECTION GUIDE

2	6	PC	G	F	A	2	G
Product Family	**Circuit Type**	**Pressure Sensor**	**Pressure Range**	**Seal Type**	**Port Type**	**Termination Style**	**Pressure Measurement**
2 20PC Family	**6** Compensated Calibrated		**A** 1 psi **B** 5 psi **C** 15 psi **D** 30 psi **F** 100 psi **G** 250 psi **J** 38 psi **K** 38 psi*	**E** EPDM **F** Fluorosilicone **N** Neoprene **S** Silicone	**A** Straight **B** Barbed **H** **M5** Thread **M** **1/4-28** Thread **S** Manifold	**2** 4-pin DIP **6** 4-pin SIP	**G** Gage **D** Differential

Example: 26PCGFA2G
Compensated, calibrated 250 psi sensor with fluorosilicone seal, straight port, 2 X 2 termination and gage pressure measurement.
* Passivated (P2 side of die is coated for environmental and dielectric protection)

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

For application assistance, current specifications, or name of the nearest Authorized Distributor, check the Honeywell web site or call:
1-800-537-6945 USA
1-800-737-3360 Canada
1-815-235-6847 International
FAX
1-815-235-6545 USA
INTERNET
www.honeywell.com/sensing
info.sc@honeywell.com

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Honeywell

Microstructure Pressure Sensors

24PC SMT (1 psi, 5 psi, 15 psi)

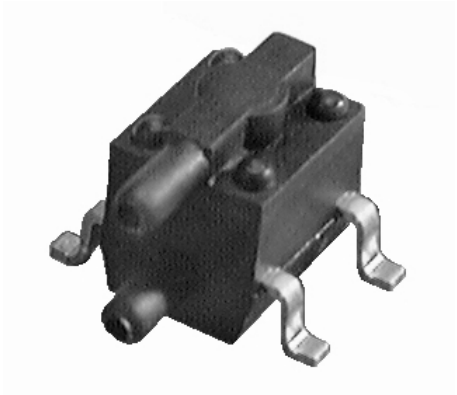
24PC SMT Series

FEATURES

- Alignment pins for position accuracy
- Small package size (less than one half the size of the 24PC) and compact surface mount profile
- 3,18 mm [0.125 in] diameter pick-up feature for use in pick and place machines
- Max peak reflow temperature of 260 °C [500 °F]
- Gage, vacuum gage, differential, wet/wet differential sensing available in one package
- True wet/wet differential sensing
- Proven elastomeric interconnections of the 20PC family
- Sensor consists of only five components
- Elastomeric construction
- Wide operating temperature range of -40 °C to 85 °C [-40 °F to 185 °F]

TYPICAL APPLICATIONS

- Blood glucose monitors
- Oxygen conservers
- Infusion pumps
- Ventilators
- CPAP (Continuous Positive Airway Pressure) equipment
- Residential fuel cells



The 24PC SMT (Surface Mount Technology) Series provides a small, low cost, high value, pressure sensing solution for use with printed circuit boards (PCBs). Based on the long established reliability and accuracy of the 24PC pressure sensor, the 24PC SMT offers reduced size with true surface mount capability. The smaller size reduces the sensor's footprint on the PCB, thereby reducing the size of the PCB. The 24PC SMT been designed to be used with other PCB SMT components, helping to lower installation costs and eliminate secondary operations.

The sensor features Wheatstone bridge construction, silicon piezoresistive technology, and ratiometric output for proven application flexibility, design simplicity and ease of manufacture.

Although primarily designed for the medical industry, the SMT Series of pressure sensors may be applied in almost any industry that requires a surface mount pressure sensor.

⚠WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices, or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

⚠WARNING

MISUSE OF DOCUMENTATION

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24PC SMT PERFORMANCE CHARACTERISTICS (AT 10 VDC ±0.01 VDC EXCITATION, 25 °C [77 °F])

	Min.	Typ.	Max.	Units
Excitation Voltage	—	10.0	12.0	Vdc
Response Time	—	—	1.0	ms
Input Resistance	4.5 k	5.0 k	5.5 k	Ohm
Output Resistance	4.5 k	5.0 k	5.5 k	Ohm
Span P2>P1[1]	**Min.**	**Typ.**	**Max.**	
0 to 1	25.0	45.0	65.0	mV
0 to 5	60.0	115.0	150.0	mV
0 to 15	160.0	225.0	290.0	mV
Null Offset	**Min.**	**Typ.**	**Max.**	
0 to 1	-30.0	0	+30.0	mV
0 to 5	-30.0	0	+30.0	mV
0 to 15	-30.0	0	+30.0	mV
Linearity (BFSL P2>P1)		**Typ.**	**Max.**	
0 to 1	—	±0.15	±0.4	% span
0 to 5	—	±0.10	±0.2	% span
0 to 15	—	±0.10	±0.3	% span
Null Shift 25 °C to 0 °C, 25 °C to 50 °C[2]		**Typ.**	**Max.**	
0 to 1	—	±1.0	---	mV
0 to 5	—	±1.0	---	mV
0 to 15	—	±1.0	---	mV
Span Shift 25 °C to 0 °C, 25 °C to 50 °C[2]		**Typ.**	**Max.**	
0 to 1	—	±5.0	---	% span
0 to 5	—	±5.0	---	% span
0 to 15	—	±5.0	---	% span
Repeatability and Hysteresis		**Typ.**	**Max.**	
0 to 1	—	±0.15	—	% span
0 to 5	—	±0.15	—	% span
0 to 15	—	±0.15	—	% span
Overpressure P2>P1; P1>P2		**Typ.**	**Max.**	
0 to 1	—	—	20	psi
0 to 5	—	—	20	psi
0 to 15	—	—	45	psi

Notes:

1. Span is the algebraic difference between output at maximum rated operating pressures and output at 0 psi.
2. Temperature error is calculated with respect to 25 °C [77 °F].

SPECIFICATIONS

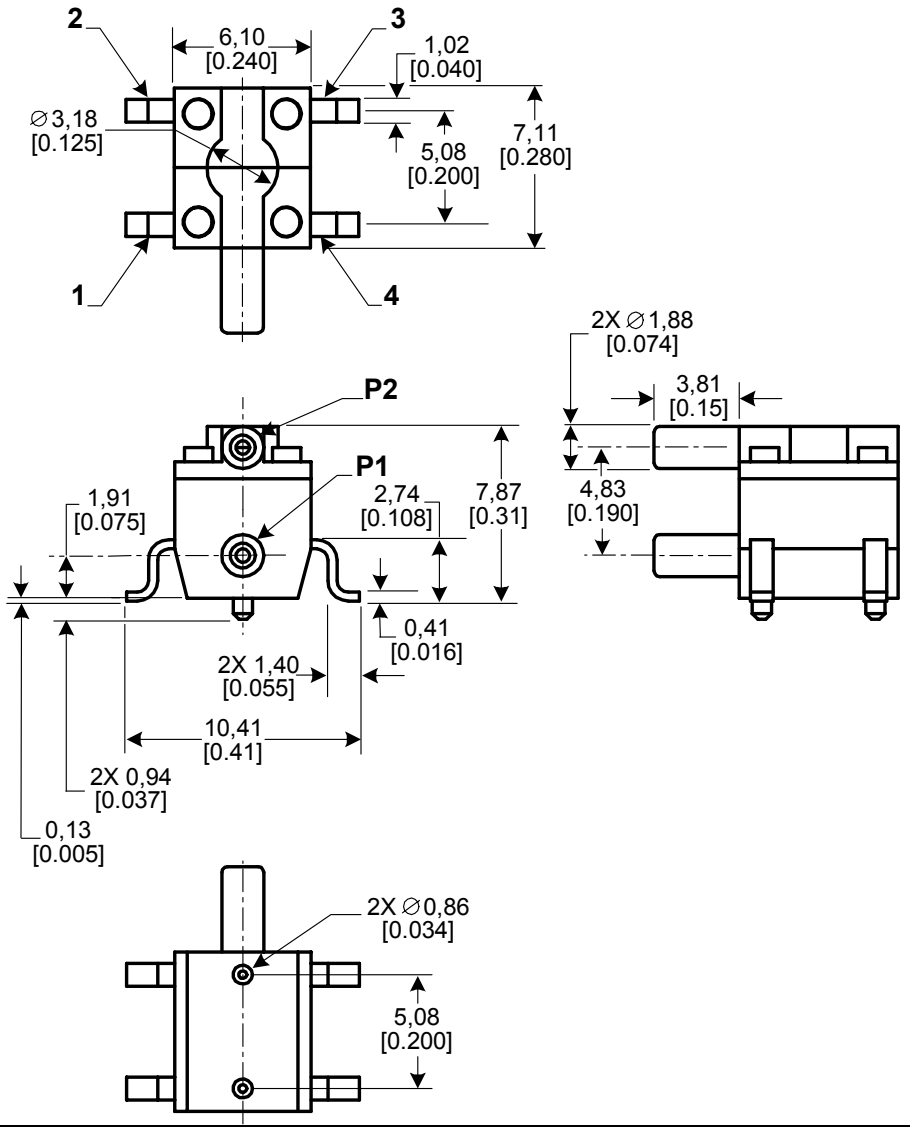
Characteristic	Description
Storage Temperature	-55 °C to 100 °C [-67 °F to 212 °F]
Operating Temperature	-40 °C to 85 °C [-40 °F to 185 °F]
Compensated Temperature	None
Alignment Pins	0,86 mm [0.034 in] diameter pins extend through PCB
Port Diameter	1,88 mm [0.074 in] diameter uses standard 0,59 mm [0.0625 in] ID tubing
Port Orientation	Parallel to PCB (low profile on board)
Pick Up Feature	3,18 mm [0.125 in] feature on port cover
SMT Solder	• Sn 96.5 Ag 3.5 No Clean Flux • Sn 63 Pb 37 No Clean Flux
SMT Reflow Profile	Max peak temperature of 260 °C [500 °F] for 10 seconds
Media Compatibility	Both ports are limited to media that are compatible with polyphthalamide, fluorosilicone and silicon.
Shock	Qualification tested to 150 g
Vibration	MIL-STD-202. Method 213 (150 g half sine 11 ms)
Weight	0.5 grams [0.0176 oz]

Microstructure Pressure Sensors

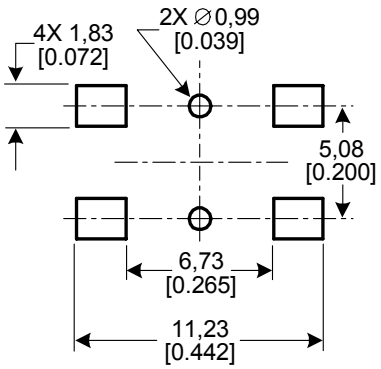
24PC SMT (1 psi, 5 psi, 15 psi)

24PC SMT Series

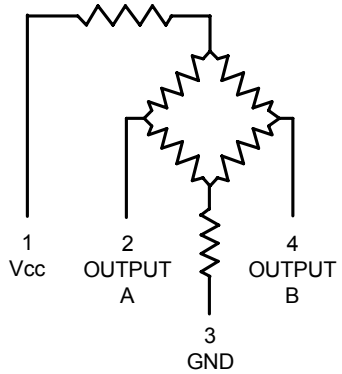
MOUNTING DIMENSIONS mm[in] (for reference only)



SUGGESTED LAND PATTERN



CIRCUIT DIAGRAM



OUTPUT VOLTAGE

Output A increases as P2 pressure increases.

Output B decreases as P2 pressure increases.

Microstructure Pressure Sensors

24PC SMT (1 psi, 5 psi,15 psi)

24PC SMT Series

DATE CODE

_ _ _ _ _ _

Week: Two Digits

Year: Four Digits

CATALOG LISTING NOMENCLATURE

24 PC __ SMT

Package Style: SMT (Surface Mount Technology)

Pressure Range:
01 = 1.0 psi
05 = 5.0 psi
15 = 15.0 psi

Family: PC

Type: Uncompensated

BRANDING SCHEME

4 __ F

Seal: Fluorosilicone

Pressure Range:
01 = 1.0 psi
05 = 5.0 psi
15 = 15.0 psi

Type: Uncompensated

TECHNICAL NOTES

Technical Notes that provide further application information on the 24PC SMT are available on the Honeywell web site at: ***http://www.honeywell.com/sensing/prodinfo/pressure/20pc***

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1-800-537-6945 USA
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1-815-235-6847 International
FAX
1-815-235-6545 USA
INTERNET
www.honeywell.com/sensing
info.sc@honeywell.com

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Sensing and Control
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Freeport, Illinois 61032
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Microstructure Pressure Sensors

26PC SMT (1 psi, 5 psi, 15 psi)

26PC SMT Series

FEATURES

- Alignment pins for position accuracy
- Small package size (less than one half the size of the 26PC) and compact surface mount profile
- 3,18 mm [0.125 in] diameter pick-up feature for use in pick and place machines
- Max peak reflow temperature of 260 °C [500 °F]
- Gage, vacuum gage, differential, wet/wet differential sensing available in one package
- True wet/wet differential sensing
- Proven elastomeric interconnections of the 20PC family
- Temperature compensation
- End point calibration
- Sensor consists of only five components
- Elastomeric construction
- Wide operating temperature range of -40 °C to 85 °C [-40 °F to 185 °F]

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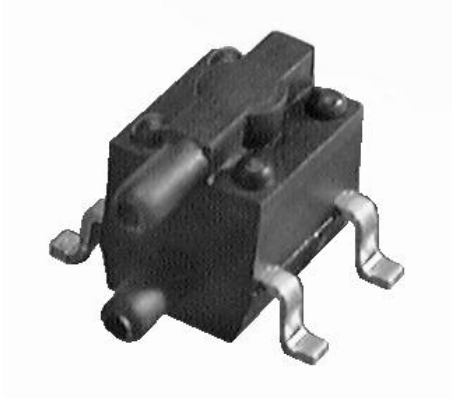
- Blood glucose monitors
- Oxygen conservers
- Infusion pumps
- Ventilators
- CPAP (Continuous Positive Airway Pressure) equipment
- Residential fuel cells



The 26PC SMT (Surface Mount Technology) Series pressure sensor, the first offering in the 20PC SMT family of pressure sensors, is a small, low cost, high value, pressure sensing solution for use with printed circuit boards (PCBs). Based on the long established reliability and accuracy of the 26PC pressure sensor, the 26PC SMT offers reduced size with true SMT capability. The smaller size reduces the sensor's footprint on the PCB, thereby reducing the size of the PCB. The 26PC SMT is the first pressure sensor capable of being used with other SMT components on the PCB, helping to lower installation costs and eliminate secondary operations.

The sensor features Wheatstone bridge construction, silicon piezoresistive technology, and ratiometric output for proven application flexibility, design simplicity and ease of manufacture.

Although primarily designed for the medical industry, the 20PC SMT pressure sensor may be applied in any industry that requires a surface mount pressure sensor.

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26PC SMT PERFORMANCE CHARACTERISTICS (AT 10 VDC ±0.01 VDC EXCITATION, 25 °C)

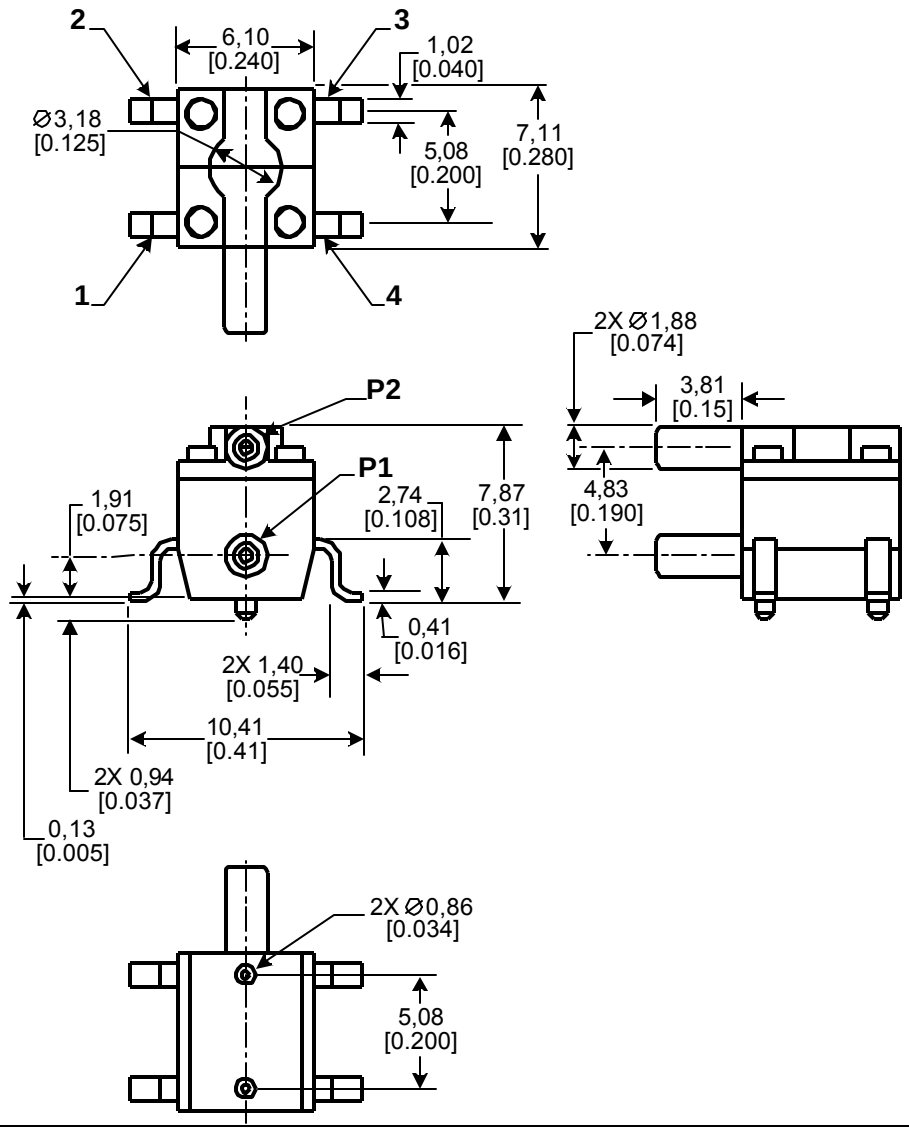
	Min.	Typ.	Max.	Units
Excitation Voltage	—	10.0	16.0	Vdc
Response Time	—	—	1.0	ms
Input Resistance	5.5 k	7.5 k	11.5 k	Ohm
Output Resistance	1.5 k	2.5 k	3.0 k	Ohm
Span P2>P1[1]	**Min.**	**Typ.**	**Max.**	
0 to 1	14.7	16.7	18.7	mV
0 to 5	47	50	53	mV
0 to 15	96	100	104	mV
Null Offset	**Min.**	**Typ.**	**Max.**	
0 to 1	-2.0	0	+2.0	mV
0 to 5	-2.0	0	+2.0	mV
0 to 15	-2.0	0	+2.0	mV
Linearity (BFSL P2>P1)		**Typ.**	**Max.**	
0 to 1	—	±0.50	±1.75	% span
0 to 5	—	±0.50	±1.5	% span
0 to 15	—	±0.50	±1.0	% span
Null Shift 25 °C to 0 °C, 25 °C to 50° C[2]		**Typ.**	**Max.**	
0 to 1	—	—	±1.0	mV
0 to 5	—	—	±1.0	mV
0 to 15	—	—	±1.0	mV
Span Shift 25 °C to 0 °C, 25 °C to 50° C[2]		**Typ.**	**Max.**	
0 to 1	—	±1.5	±4.5	% span
0 to 5	—	±1.0	±1.7	% span
0 to 15	—	±0.75	±1.5	% span
Repeatability and Hysteresis		**Typ.**	**Max.**	
0 to 1	—	±0.2	—	% span
0 to 5	—	±0.2	—	% span
0 to 15	—	±0.2	—	% span
Overpressure P2>P1; P1>P2		**Typ.**	**Max.**	
0 to 1	—	—	20	psi
0 to 5	—	—	20	psi
0 to 15	—	—	45	psi

Notes:
1. Span is the algebraic difference between output at maximum rated operating pressures and output at 0 psi.
2. Temperature error is calculated with respect to 25 °C.

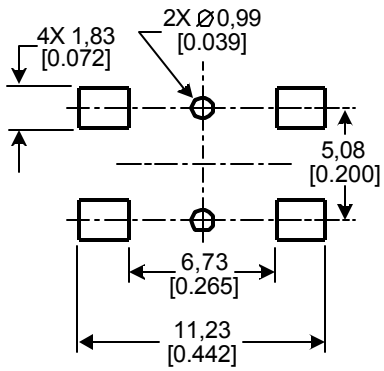
SPECIFICATIONS

Characteristic	Description
Storage Temperature	-55 °C to 100 °C [-67 °F to 212 °F]
Operating Temperature	-40 °C to 85 °C [-40 °F to 185 °F]
Compensated Temperature	0 °C to 50 °C [32 °F to 122 °F]
Alignment Pins	0,86 mm [0.034 in] diameter pins extend through PCB
Port Diameter	1,88 mm [0.074 in] diameter uses standard 0,59 mm [0.0625 in] ID tubing
Port Orientation	Parallel to PCB (low profile on board)
Pick Up Feature	3,18 mm [0.125 in] feature on port cover
SMT Solder	• Sn 96.5 Ag 3.5 No Clean Flux • Sn 63 Pb 37 No Clean Flux
SMT Reflow Profile	Max peak temperature of 260 °C [500 °F] for 10 seconds
Media Compatibility	Both ports are limited to media that are compatible with polyphthalamide, fluorosilicone and silicon.
Shock	Qualification tested to 150 g
Vibration	MIL-STD-202. Method 213 (150 g half sine 11 ms)
Weight	0.5 grams [0.0176 oz]

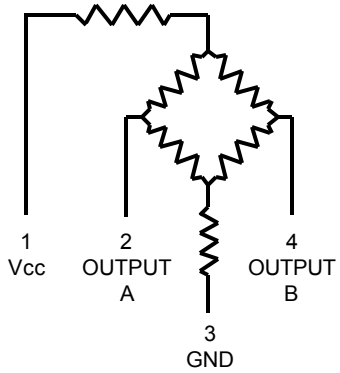
MOUNTING DIMENSIONS mm[in] (for reference only)



SUGGESTED LAND PATTERN



CIRCUIT DIAGRAM



OUTPUT VOLTAGE

Output A increases as P2 pressure increases.

Output B decreases as P2 pressure increases.

Microstructure Pressure Sensors
26PC SMT (1 psi, 5 psi,15 psi)

26PC SMT Series

DATE CODE

_ _ _ _ _ _

Week: Two Digits
Year: Four Digits

CATALOG LISTING NOMENCLATURE

26 PC __ SMT

Package Style: SMT (Surface Mount Technology)
Pressure Range:
01 = 1 psi
05 = 5 psi
15 = 15 psi
Family: PC
Type: Compensated

BRANDING SCHEME

6 __ F

Seal: Fluorosilicone
Pressure Range:
01 = 1 psi
05 = 5 psi
15 = 15 psi
Type: Compensated

TECHNICAL NOTES

Technical Notes that provide further application information on the 26PC SMT are available on the Honeywell web site at: ***http://www.honeywell.com/sensing/prodinfo/pressure/20pc***

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

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While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

For application assistance, current specifications, or name of the nearest Authorized Distributor, check the Honeywell web site or call:
1-800-537-6945 USA
1-800-737-3360 Canada
1-815-235-6847 International
FAX
1-815-235-6545 USA
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Honeywell

1800/1805 Series

TO-8, 0 psi to 3 psi, 0 psi to 150 psi Silicon Pressure Sensors

DESCRIPTION

The 1800/1805 Series sensors are high performance TO-8 pressure transducers specifically designed to address a variety of both low and medium pressure original equipment manufacture applications.

The transducers offer two performance grades and a variety of compensation options, including span and calibration to within ±2 mV (normalized output). The 1800/1805 Series can operate with either constant current or voltage excitation.

The 1800/1805 Series contains a solid state piezoresistive pressure sensor mounted in a standard TO-8 package. They are printed circuit board and pin-for-pin compatible with other TO-8 pressure sensors.

FEATURES

- Standard pressure ranges from 0 psi to 3 psi, 0 psi to 150 psi
- Gauge, absolute or differential models
- Voltage or constant current excitation
- Choice of temperature compensation options
  - Laser trim, normalized output
  - Laser trim, standard output
  - Resistor compensation
- Uncompensated version available for microprocessor-based designs

POTENTIAL APPLICATIONS

- Instrumentation calibration
- Avionics/aerospace
- Medical equipment
- HVAC
- Pneumatic controls

1800/1805 Series
TO-8, 0 psi to 3 psi, 0 psi to 150 psi

ENVIRONMENTAL SPECIFICATIONS (All devices)

Characteristic	Parameter	Characteristic	Parameter
Supply voltage, V_S	10 Vdc	Insulation resistance	100 MOhm at 50 Vdc
Compensated temperature range	-1 °C to 54 °C [34 °F to 129 °F]	Humidity	50 % ± 10 %
Operating temperature tange	-40 °C to 121 °C [-40 °F to 257 °F]	Common-mode pressure	150 psig
Vibration	10 g rms at 20 Hz to 200 Hz	Max. soldering temperature	260 °C [500 °F] 10 s max.
Shock	100 g for 11 ms	Excitation voltage V_S	Supply voltage V_s =15 Vdc max.
Life	100 million cycles	Excitation current	Supply current I_s = 2 mA max.

PERFORMANCE CHARACTERISTICS(1)

Characteristic	Min.	Typ.	Max.	Unit
Zero pressure offset(1)	–	–	±0.5	mV
Zero pressure offset (3 psi to 5 only) (1)	–	–	±1	mV
Full-scale span(2)				
Standard output–current excitation	75	–	150	mV
Standard output–voltage excitation	40	–	120	mV
Normalized output–current excitation	98	–	102	mV
Normalized output–current excitation (3 psi only)	73	–	77	mV
Normalized output–voltage excitation	38	–	42	mV
Pressure non-linearity(3)	–	±0.15	±0.20	%FSS
Pressure hysteresis(3)	–	–	±0.0125	%FSS
Repeatability	–	–	±0.0125	%FSS
Temperature effect on offset(4)	–	–	±0.5	mV
Temperature effect on offset (3 psi and 5 psi only) (4)	–	–	±1	mV
Temperature effect on span	–	–	±0.5	mV
Temperature effect on span (3 psi and 5 psi only) (4)		–	±1	mV
Thermal hysteresis	–	±0.1	–	%FSS
Response time(5)	–	–	1	ms
Long term stability of offset and span(6)	–	–	±0.2	%FSS
Common mode voltage(7)				
Standard output–current excitation	–	50 %	–	input
Standard output–voltage excitation	–	50 %	–	input
Normalized output–current excitation	–	35 %	–	input
Normalized output–voltage excitation	–	25 %	–	input
Input resistance	–	–	–	–
Current excitation	2.0	–	8.0	kΩ
Voltage excitation	8.0	–	40	kΩ
Output resistance	3.5	–	6.0	kΩ

PRESSURE RANGE SPECIFICATIONS

Catalog Listing	Pressure Range	Top Side Overpressure(8)	Bottom Side Overpressure(9)
1805-00 (G,D) - (K,L) (0..4) (M,L,N)	0 psi to 3 psi	15 psi	9 psi
1805-01 (G,D) - (K,L) (0..4) (M,L,N)	0 psi to 5 psi	25 psi	15 psi
1800-02 (G,D) - (K,L) (0..4) (M,L,N)	0 psi to 10 psi	50 psi	30 psi
1800-03 (G,D) - (K,L) (0..4) (M,L,N)	0 psi to 15 psi	65 psi	45 psi
1800-07 (G,D) - (K,L) (0..4) (M,L,N)	0 psi to 30 psi	250 psi	50 psi
1800-08 (G,D) - (K,L) (0..4) (M,L,N)	0 psi to 50 psi	350 psi	50 psi
1800-09 (G,D) - (K,L) (0..4) (M,L,N)	0 psi to 100 psi	350 psi	50 psi
1800-10 (G,D) - (K,L) (0..4) (M,L,N)	0 psi to 150 psi	350 psi	50 psi

Notes:

1. Reference conditions (unless otherwise noted); T_A = 25 °C [77 °F], Supply V_S = 10 Vdc ±0.01 Vdc or I_S = 1.5 mA ±0.0015 mA.
2. Full-scale span (FSS) is the algebraic difference between the output voltage at full-scale pressure and the output at zero pressure. FFS is ratiometric to the supply voltage.
3. Pressure non-linearity is based on best-fit straight line from the zero to the full-scale pressure. Pressure hysteresis is the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure.
4. Maximum error band of the offset voltage or span over the compensated temperature range, relative to the 25 °C [77 °F] reading.
5. Response time for a 0 psi to full-scale span pressure step change, 10 % to 90 % rise time.
6. Long term stability over a six month period.
7. Common mode voltage as measured from output to ground. For higher levels of common mode voltage, contact the factory.
8. Pressure overrange: Top: 5 x full-scale pressure or ≤350 psi, whichever is less.
9. Pressure overrange: Bottom: 3 x full-scale or ≤50 psi, whichever is less.

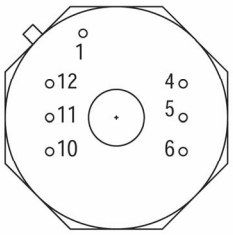
STANDARD COMPENSATION AND TRIM CHOICES
For maximum convenience, the 1800/1805 Series is temperature compensated from -1 °C to 54 °C [34 °F to 129 °F]. Other temperature ranges are available upon request.

Normalized Output Option: For design convenience and sensor interchangeability, the 1800/1805 Series is available with normalized output (100 ±2 mV dc in current excited versions with pressure range >3 psi). Normalized output for current excited 3 psi devices is 75 ±2 mV dc.

Laser Trim: Compensation is accomplished by using an in-house laser trim facility that allows for tighter product performance control and improved flexibility in response to special customer performance requirements.

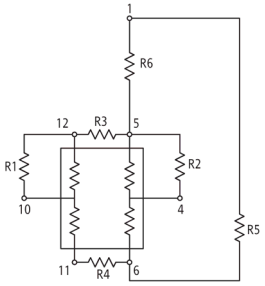
Resistors: This option includes a printout of suggested temperature compensation and zero offset resistor values for each individual sensor.

ELECTRICAL CONNECTIONS



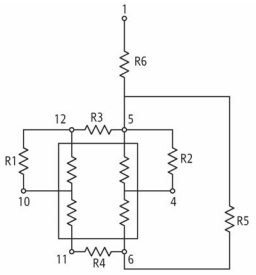
Pin 1 on normalized and voltage excited standard output.

CURRENT EXCITATION



Normalized output shown.
Standard output on pin 5 R6 shorted.

VOLTAGE EXCITATION



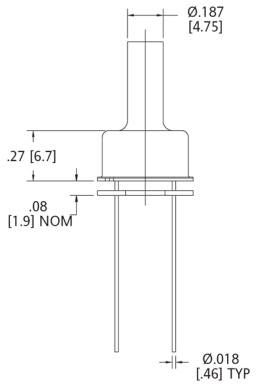
R5 open for standard output.

EXTERNAL CONNECTIONS

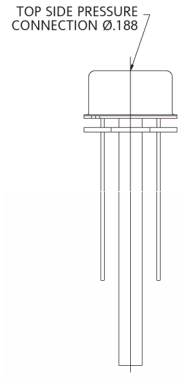
POSITIVE PRESSURE ON TOP AND BOTTOM SIDES								Current or Voltage Excitation – Normalized Output	
Current Excitation – Standard Output				Voltage Excitation – Standard Output					
Discrete Resistor		Laser Trim Board		Discrete Resistor		Laser Trim Board		Laser Trim Board	
Pin	**Connection**	**Pin**	**Connection**	**Pin**	**Connection**	**Pin**	**Connection**	**Pin**	**Connection**
4	+ Output	4	+ Output	4	+ Output	4	+ Output	4	+ Output
5	+ Input	5	+ Input	5	+ Input	5	NC	5	NC
6	- Input	6	- Input	6	- Input	6	- Input	6	- Input
10	- Output	10	- Output	10	- Output	10	- Output	10	+ Output
11	NC	11	NC	11	NC	11	NC	11	NC
12	NC	12	NC	12	NC	12	NC	12	NC
						1	+ Input	1	+ Input

PRESSURE CONNECTION OPTIONS

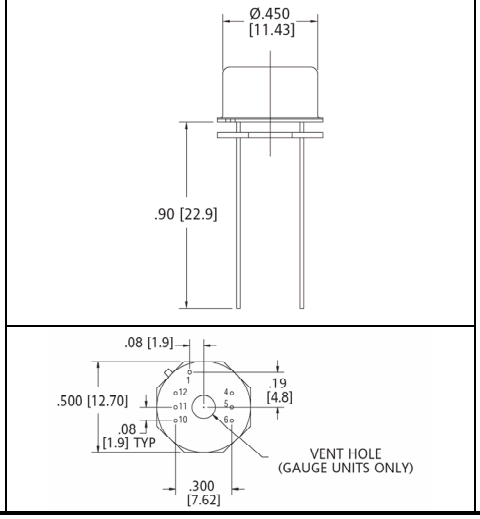
OPTION 0



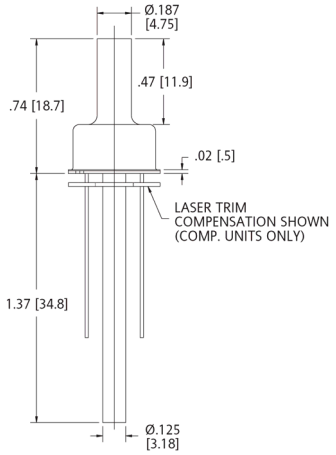
OPTION 1



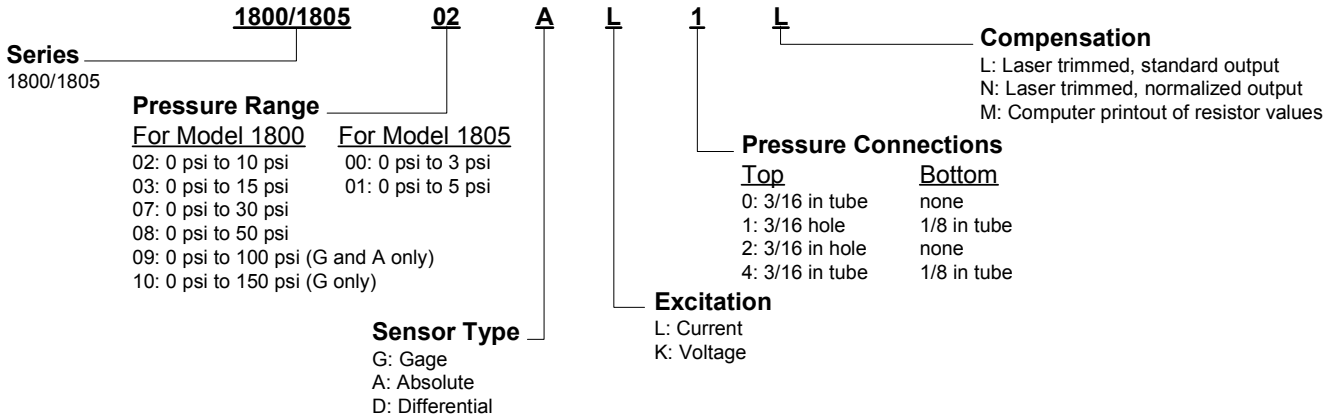
OPTION 2



OPTION 4



ORDER GUIDE



Note:

Transducer recommended for use with non-corrosive, non-condensing gases.

⚠ WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

SALES AND SERVICE

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

E-mail: info.sc@honeywell.com
Internet: www.honeywell.com/sensing
Phone and Fax:

Asia Pacific	+65 6355-2828
	+65 6445-3033 Fax
Europe	+44 (0) 1698 481481
	+44 (0) 1698 481676 Fax
Latin America	+1-305-805-8188
	+1-305-883-8257 Fax
USA/Canada	+1-800-537-6945
	+1-815-235-6847
	+1-815-235-6545 Fax

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Freeport, Illinois 61032
www.honeywell.com/sensing

Honeywell

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October 2005

Honeywell

Microstructure Pressure Sensors

Signal Conditioned

0 psi to 1 psi up to 0 psi to 150 psi

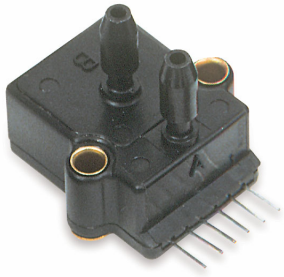
ASCX Series

FEATURES

- 5 Vdc Supply
- High Level Voltage Output
- Field Interchangeable
- Calibrated and Temperature Compensated
- Small Form Factor
- Low Power
- Offset Adjust

TYPICAL APPLICATIONS

- Medical Equipment
- Industrial Controls
- Pneumatic Controls



This series is a signal-conditioned version of Honeywell's proven performer and industry leading SCX series sensor.

This amplified ASCX device is in a package the same as the SCX but it offers a high level (4.5 V span) output on a very cost-effective basis. This family is fully calibrated and temperature compensated over a range of 0 °C to 70 °C [32 °F to 158 °F] but can be operated from -25 °C to 105 °C [-13 °F to 221 °F]. These sensors are intended for use with non-corrosive, non-ionic working fluids such as air and dry gases.

Devices are available to measure absolute, differential and gage pressures from 1 psi (ASCX01) up to 150 psi (ASCX150). The absolute devices (A) have an internal vacuum reference and an output voltage proportional to absolute pressure. Differential devices (D) allow application of pressure to either side of the sensing diaphragm and can be used for gage or differential pressure measurements.

The ASCX series devices feature an integrated circuit (IC) sensor element and laser trimmed thick film ceramic housed in a compact solvent resistant case. It provides excellent corrosion resistance and isolation to external packaging stresses. The package has convenient mounting holes and pressure ports for ease of use with standard plastic tubing for pressure connection.

All ASCX devices are calibrated for span to within ± 1 % (typically ± 0.2 %) of FSO. The devices are characterized for operation from a single 5 volt supply although sensitivity is ratiometric to the supply voltage and any dc supply from 5 Vdc to 16 Vdc is acceptable.

The ACSX series requires very low quiescent current compared to other signal conditioned pressure sensors, thus, this series is ideal for battery-powered applications.

The 100 microseconds response time makes this series an excellent choice for computer peripherals and pneumatic control applications.

Contact your local honeywell representative, or go to Honeywell's website at www.honeywell.com/sensing for additional details.

⚠ WARNING

PERSONAL INJURY

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Microstructure Pressure Sensors

Signal Conditioned
0 psi to 1 psi up to 0 psi to 150 psi

ASCX Series

PRESSURE RANGE SPECIFICATIONS

				Full-Scale Span [1]		
Model *	**Operating Pressure**	**Proof Pressure [2]**	**Sensitivity [3]**	**Min.**	**Typ.**	**Max.**
ASCX01DN	0 psid to 1 psid	20 psid	4.5V/psi	4.43 V	4.50 V	4.57 V
ASCX05DN	0 psid to 5 psid	20 psid	0.9V/psi			
ASCX15AN	0 psia to 15 psia	30 psia	0.3V/psi	4.455 V	4.50 V	4.545 V
ASCX15DN	0 psid to 15 psid	30 psid	0.3V/psi			
ASCX30AN	0 psia to 30 psia	60 psia	0.15V/psi			
ASCX30DN	0 psid to 30 psid	60 psid	0.15V/psi			
ASCX100AN	0 psia to 100 psia	150 psia	45mV/psi			
ASCX100DN	0 psid to 100 psid	150 psid	45mV/psi			
ASCX150AN	0 psia to 150 psia	150 psia	30mV/psi			
ASCX150DN	0 psid to 150 psid	150 psid	30mV/psi			

*** Ordering information:** Order model number.

MAXIMUM RATINGS

Characteristic	**Description**
Supply Voltage (V_S)	4.5 Vdc to 16 Vdc
Output Current	
Source	5 mA
Sink	3 mA
Lead Soldering Temperature (2 seconds to 4 seconds)	250 °C [482 °F]
Maximum Pressure On Any Port	150 psi
Quiescent Current	4 mA

PARAMETER REFERENCE CONDITIONS

Model	**Reference Conditions**
Supply Voltage	5.01 ± 0.01 Vdc
Reference Temperature	25 °C [77 °F]
Load Condition	200 kOhm
Common Mode Pressure	0 psig

ENVIRONMENTAL SPECIFICATIONS

Characteristic	**Description (Maximum Ratings) All Devices**
Compensated Operating Temperature	0 °C to 70 °C [32 °F to 158 °F]
Operating Temperature	-25 °C to 105 °C [-13 °F to 221 °F]
Storage Temperature	-55 °C to 125 °C [-67 °F to 257 °F]

Microstructure Pressure Sensors

Signal Conditioned
0 psi to 1 psi up to 0 psi to 150 psi

ASCX Series

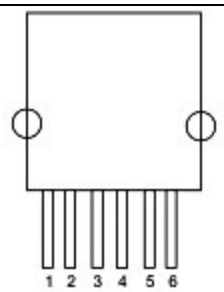
ASCX PERFORMANCE CHARACTERISTICS [4]

Characteristic	Min.	Typ.	Max.	Unit
Offset [5]				
Models ASCX15/30/100/150xN	0.205	0.250	0.295	Volts
Models ASCX01/05DN	0.180	0.250	0.320	Volts
Output @ FS Pressure		4.750		Volts
Combined Pressure Linearity and Hysteresis [6]	–	±0.1	±0.5	% FSO
Temperature Effect on Span 0 °C to 70 °C [32 °F to 158 °F] [7]				
Models ASCX15/30/100/150xN	–	±0.2	±1.0	% FSO
Models ASCX01/05DN	–	±0.2	±1.5	% FSO
Temperature Effect on Offset 0 °C to 70 °C [32 °F to 158 °F] [7]				
Models ASCX15/30/100/150xN	–	±0.5	±1.0	% FSO
Models ASCX01/05DN		±0.5	±1.5	% FSO
Repeatability [8]	–	±0.2	±0.5	% FSO
Response Time [9]	–	100	–	Microsec.

SPECIFICATION NOTES

Note 1: Full-Scale Span is the algebraic difference between the output voltage at full-scale pressure and the output at zero pressure.
Note 2: Maximum pressure above which causes permanent sensor failure.
Note 3: Sensitivity is ratiometric to supply voltage.
Note 4: Performance specs are shown at reference conditions. Specifications apply for absolute pressure devices with pressure applied to Port A. For gage devices, pressure is applied to Port B and Port A is left open for ambient. For differential pressures, Port B is the high-pressure port. All differential devices feature dual pressure ports and can be used as gage or differential sensors. For absolute devices, Port B is inactive.
Note 5: Offset calibration is at the lowest pressure for each given device.
Note 6: Linearity refers to the best straight line fit as measured for offset, full scale and ½ full-scale pressure.
Note 7: Temperature errors are the maximum shift over 0 °C to 70 °C [32 °F to 158 °F], relative to the 25 °C [77 °F] reading.
Note 8: Maximum difference in output at any pressure within the operating pressure range and the temperature within 0 °C to 70 °C [32 °F to 158 °F] after:
a) 100 temperature cycles, 0 °C to 70 °C [32 °F to 158 °F]
b) 1.0 million pressure cycles, 0 psi to Full-Scale Span.
Note 9: Response time for a 0 psi to Full-Scale Span pressure step change, 10 % to 90 % rise time.

ELECTRICAL CONNECTION

Pinout	ASCX Series
	PIN 1) External Offset Adjustment PIN 2) V_s PIN 3) + Output PIN 4) Ground PIN 5) N/C PIN 6) Do Not Use

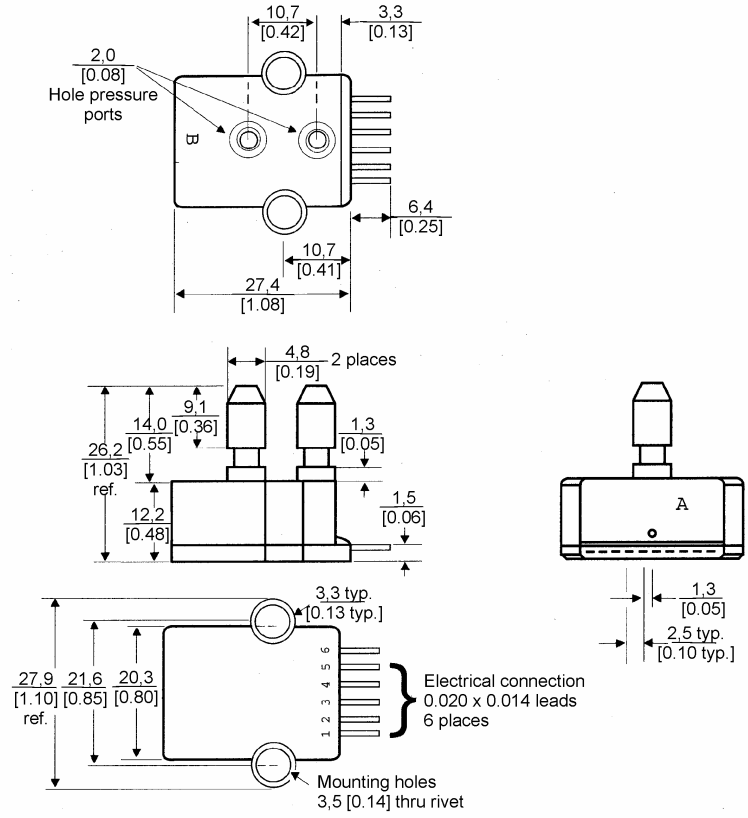
Microstructure Pressure Sensors

Signal Conditioned

0 psi to 1 psi up to 0 psi to 150 psi

ASCX Series

PHYSICAL DIMENSIONS for Reference Only (mm/in)



Dimensions: mm [in]
Weight: 5 grams
Case material: Glass-filled nylon

Wetted material
Port A: Glass-filled nylon, RTV, Silgel
Port B: Glass-filled nylon, Silicon, RTV
See physical construction drawing

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. **The foregoing is Buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

For application assistance, current specifications, or name of the nearest Authorized Distributor, contact a nearby sales office. Or call:

1-800-537-6945 USA/Canada
1-815-235-6847 International

FAX

1-815-235-6545 USA

INTERNET

www.honeywell.com/sensing
info.sc@honeywell.com

Honeywell

Sensing and Control
www.honeywell.com/sensing
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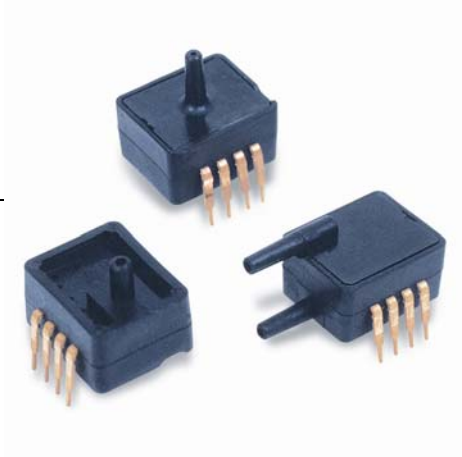
11 West Spring Street
Freeport, Illinois 61032

008104-1-EN IL50 GLO 1203 Printed in USA

Honeywell

ASDX Series

Pressure Sensors
0 psi to 1 psi through
0 psi to 30 psi



DESCRIPTION

The ASDX Series is an amplified version of Honeywell's proven performer and industry leading SDX Series sensor. The ASDX sensor's footprint is slightly larger than the SDX; however, it offers a high level output (4.0 Vdc span) on a very cost-effective basis. This series is fully calibrated and temperature compensated with on-board Application Specific Integrated Circuitry (ASIC).

These DIP (Dual In-line Package) sensors are designed for use with non-corrosive, non-ionic working fluids; such as air and dry gases.

Sensors are available to measure absolute, differential and gage pressures. The absolute sensors have an internal vacuum reference and an output voltage proportional to absolute pressure. The differential sensors allow application of pressure to either side of the sensing diaphragm and may used for differential or gage measurements. Bidirectional versions are also available.

All ASDX Series sensors are accurate to within ±2.0% full scale and are designed for operation from a single 5.0 Vdc supply.

FEATURES

- ASIC-enhanced output
- Wide compensated temperature range 0 °C to 85 °C [32 °F to 185 °F]
- Available in absolute, differential and gage types
- Pressure ranges from 0 psi to 1 psi through 0 psi to 30 psi
- Accuracy ±2.0% max. V full scale
- Quantization step of 3 mV
- Response time of 8 ms

POTENTIAL APPLICATIONS

- Flow calibrators
- Ventilation and air flow monitors
- Gas flow instrumentation
- Dialysis equipment
- Sleep apnea monitoring and therapy equipment
- Barometry
- HVAC controls
- Pneumatic controls

TABLE 1. GENERAL SPECIFICATIONS

Supply voltage (Vs)[1]	4.75 Vdc to 5.25 Vdc
Maximum supply voltage[1]	6.50 Vdc (max.)
Consumption current	6 mA (typ.)
Output current (sink)	2 mA (max.)
Output current (source)	2 mA (max.)
Lead temperature	2 s to 4 s at 250 °C [482 °F]
Compensated temp. range	0 °C to 85 °C [32 °F to 185 °F]
Operating temp. range	-20 °C to 105 °C [-4 °F to 221 °F]
Storage temp. range	-40 °C to 125 °C [-40 °F to 257 °F]
Vibration	10 g at 20 Hz to 2000 Hz
Shock	100 g for 11 ms
Life	1 million cycles minimum

Note:

1. The sensor is not reverse polarity protected. Incorrect application of excitation voltage or ground to the wrong pin can cause electrical failure. Application of supply voltage above the maximum can cause electrical failure.

TABLE 2. PRESSURE RANGE SPECIFICATIONS

Catalog Listing	Pressure Range	Burst Pressure[1]	Sensitivity
ASDX001	0 psi to 1 psi	5 psi	4.00 V/psi
ASDX005	0 psi to 5 psi	20 psi	0.80 V/psi
ASDX015	0 psi to 15 psi	30 psi	0.267 V/psi
ASDX030	0 psi to 30 psi	60 psi	0.133 V/psi

Note:

1. If the maximum burst pressure is exceeded, even momentarily, the package may leak or burst, or the pressure sensing die may fracture.

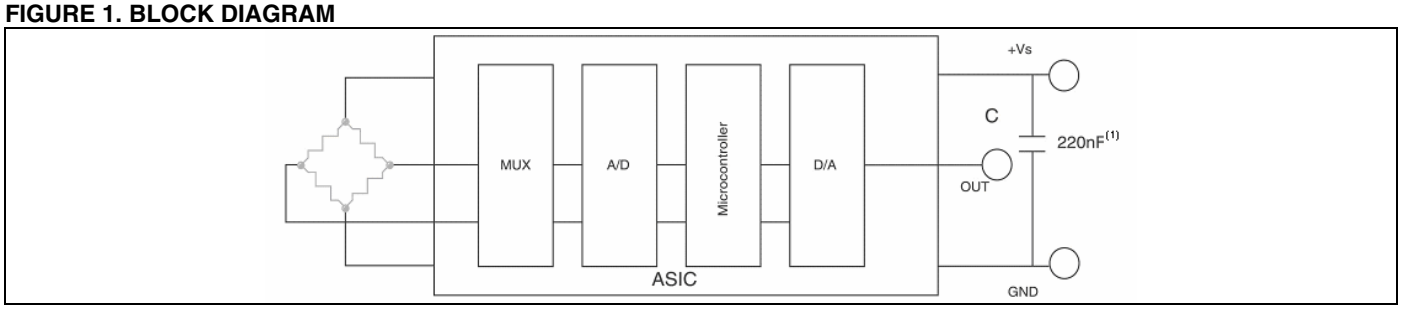
TABLE 3. PERFORMANCE SPECIFICATIONS[1]

Characteristic	Symbol	Min.	Typ.	Max.	Unit	Note
Zero pressure offset	Voff	0.420	0.500	0.580	Vdc	–
Full scale span	Vfss		4.00	–	Vdc	2
Output at FS pressure	Vfso	4.420	4.500	4.580	Vdc	–
Accuracy	–	–	–	±2.0	%V	3
Response time	–	–	8	–	ms	4
Quantization step	–	–	3	–	mV	5

Notes:

1. Reference conditions (unless otherwise noted): Supply voltage, V_S=5.0 ±0.01 Vdc; T_A=25 °C [77 °F]. Output is ratiometric within the supply voltage range (Vs).
2. Span is the algebraic difference between the output voltage at the specified pressure and the output at zero pressure. Span is ratiometric to the supply voltage.
3. Accuracy is the combined errors from offset and span calibration, linearity, pressure hysteresis, and temperature effects. Linearity is the measured deviation based on a straight line. Hysteresis is the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure. Calibration errors include the deviation of offset and full scale from nominal values.
4. Response time for a 0 psi to full-scale pressure step change, 10% to 90% rise time.
5. The smallest change in the output voltage, given any change in pressure.

FIGURE 1. BLOCK DIAGRAM

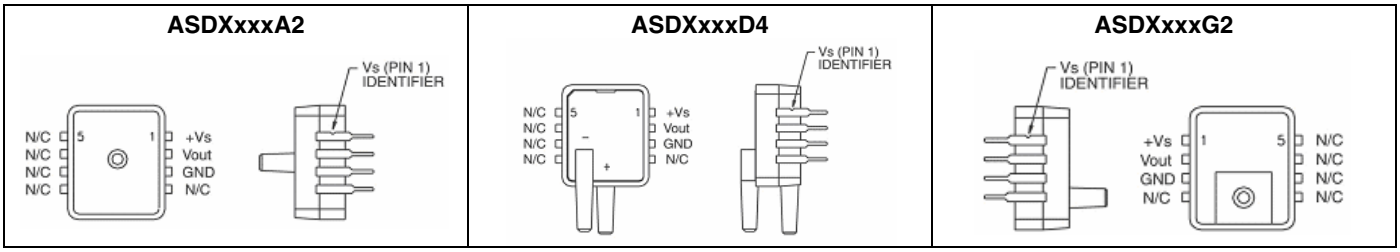


Note:

1. 220 nF capacitor is required between +Vs and GND. 15 nF capacitor between Vout and ground is optional.

Pressure Sensors, 0 psi to 1 psi through 1 psi to 30 psi

FIGURE 2. PIN OUT[1, 2]



Notes:

1. N/C means no connection. Connecting to ground will damage the sensor.
2. Pins 4, 5, 6, 7 and 8 are internal connections and should not be connected to external circuitry or ground.

FIGURE 3. PERFORMANCE CHARACTERISTICS (Error Band Multiplier Over -20 °C to 105 °C [-4 °F to 221 °F])

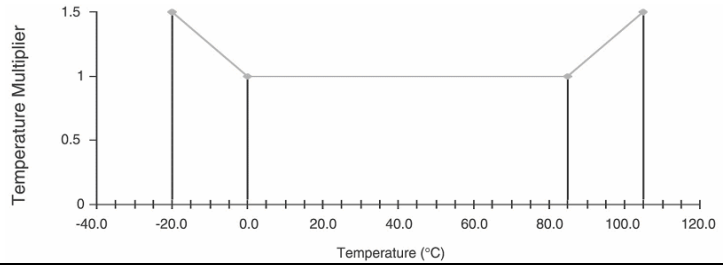
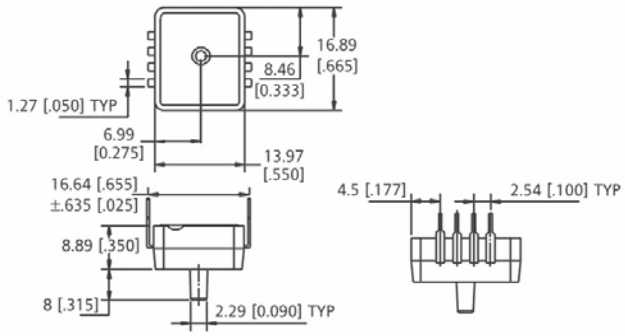
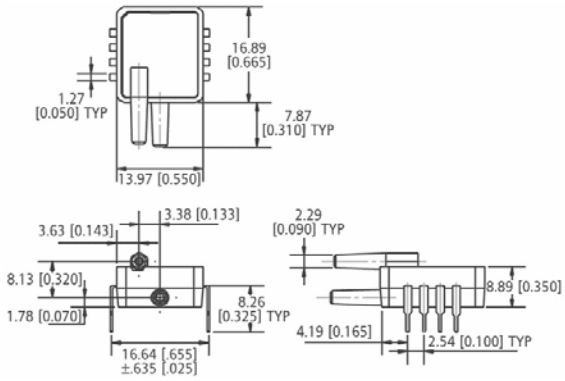


FIGURE 4. DIMENSIONAL DRAWINGS (For reference only: mm [in].)

A2 Package



D4 Package



G2 Package

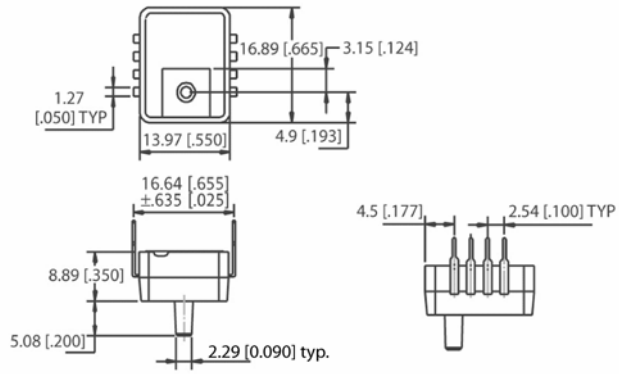
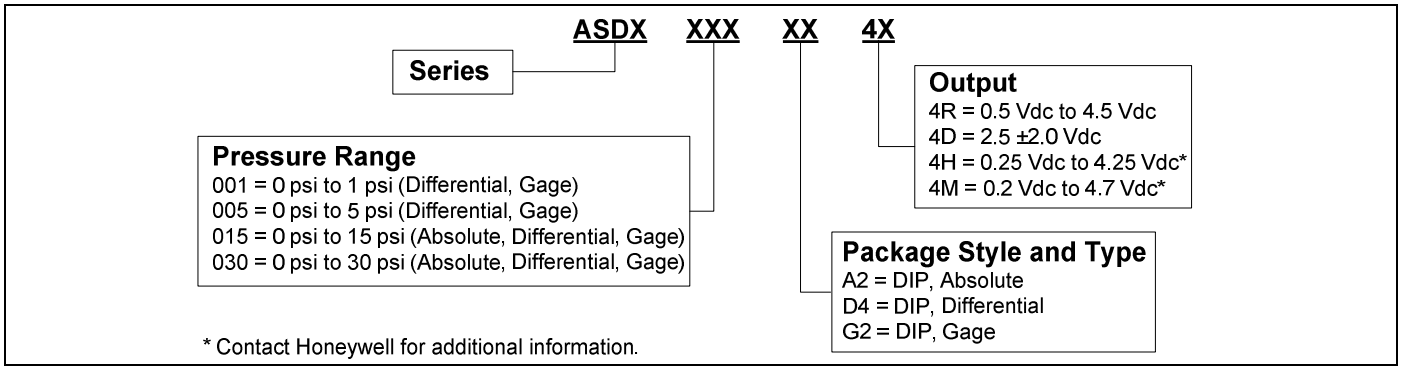


FIGURE 5. NOMENCLATURE TREE



ORDER GUIDE

Absolute Catalog LIsting	Differential[1] Catalog LIsting	Gage Catalog Listing	Bidirectional Catalog Listing	Pressure Range
–	ASDX001D44R	ASDX001G24R	ASDX001D44D	0 psi to 1 psi
–	ASDX005D44R	ASDX005G24R	ASDX005D44D	0 psi to 5 psi
ASDX015A24R	ASDX015D44R	ASDX015G24R	ASDX015D44D	0 psi to 15 psi
ASDX030A24R	ASDX030D44R	ASDX030G24R	ASDX030D44D	0 psi to 30 psi

Note:
1. May also be used in gage applications.

⚠ WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

SALES AND SERVICE

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

E-mail: info.sc@honeywell.com

Internet: www.honeywell.com/sensing

Phone and Fax:

Asia Pacific	+65 6355-2828; +65 6445-3033 Fax
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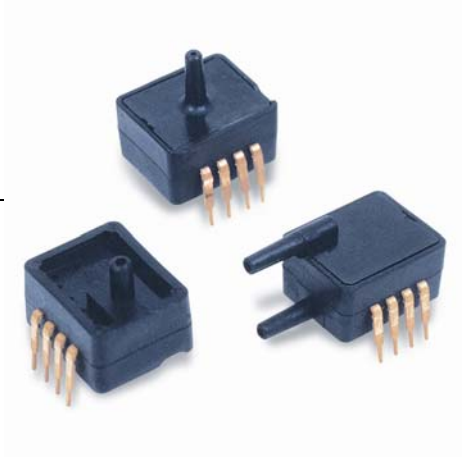
December 2007

Honeywell

ASDX DO Series

Digital Output Pressure Sensors 0 psi to 1 psi through 0 psi to 30 psi



DESCRIPTION

The ASDX DO Series pressure sensors are fully calibrated and temperature compensated with on-board Application Specific Integrated Circuitry (ASIC). These DIP (Dual In-line Package) sensors provide digital correction of sensor offset, sensitivity, temperature coefficients and non-linearity and are designed for use with non-corrosive, non-ionic working fluids such as air and dry gases.

The ASDX DO Series uses I^2C-compatible protocol, which allows easy interfacing to most commonly used microcontrollers and microprocessors, without additional components and electronic circuitry.

The 2-wire I^2C interface has a Serial Clock Line (SCL) input and serial digital output data line. Sensor output is a corrected pressure value in hexadecimal format with 12-bit resolution.

Sensors are available to measure absolute, differential and gage pressures. The absolute versions have an internal vacuum reference and an output voltage proportional to absolute pressure. Differential versions allow application of pressure to either side of the sensing diaphragm and may be used for differential or gage measurements.

All ASDX DO Sensors are accurate to within ±2.0% full scale and are designed for operation from a single 5 Vdc supply.

FEATURES

- I^2C-compatible protocol
- ASIC-enhanced output
- Calibrated and temperature-compensated output
- Wide compensated temperature range 0 °C to 85 °C [32 °F to 185 °F]
- Available in absolute, differential and gage types
- Pressure ranges from 0 psi to 1 psi through 0 psi to 30 psi
- Response time of 8 ms

POTENTIAL APPLICATIONS

- Flow calibrators
- Ventilation and air flow monitors
- Gas flow instrumentation
- Dialysis equipment
- Sleep apnea monitoring and therapy equipment
- Barometry
- HVAC controls
- Pneumatic controls

TABLE 1. GENERAL SPECIFICATIONS

Characteristic	Parameter	Characteristic	Parameter
Supply voltage (Vs)[1]	4.75 Vdc to 5.25 Vdc	Compensated temp. range	0 °C to 85 °C [32 °F to 185 °F]
Maximum supply voltage[1]	6.50 Vdc (max.)	Operating temp. range	-20 °C to 105 °C [-4 °F to 221 °F]
Consumption current	6 mA (typ.)	Storage temp. range	-40 °C to 125 °C [-40 °F to 257 °F]
Output current (sink)	2 mA (max.)	Vibration	10 g at 20 Hz to 2000 Hz
Output current (source)	2 mA (max.)	Shock	100 g for 11 ms
Lead soldering temperature	2 s to 4 s at 250 °C [482 °F]	Life	1 million cycles minimum

Note:

1. The sensor is not reverse polarity protected. Incorrect application of excitation voltage or ground to the wrong pin can cause electrical failure. Application of supply voltage above the maximum can cause electrical failure.

TABLE 2. PERFORMANCE CHARACTERISTICS

Characteristic	Symbol	Min.	Typ.	Max.	Unit	Note
4R DO						1, 2
Zero pressure offset	Hoff	158	19A	1DB	counts hex	–
Full scale span (FSS)	Hfss	–	CCC	–	counts hex	3
Output at full scale pressure	Hfso	E25	E66	EA8	counts hex	–
Accuracy	–	–	–	±2.0	%H full scale	4
Response time	–	–	8	11	ms	5
4R DO						1, 2
Zero pressure offset	Hoff	7BE	800	841	counts hex	–
Full scale span (FSS)	Hfss	–	CCC	–	counts hex	3
Output at full scale pressure (P2)	Hfso	E25	E66	EB8	counts hex	6
Output at full scale pressure (P1)	Hfso	158	19A	1DB	counts hex	6
Accuracy	–	–	–	±2.0	% FSS	4
Output resolution	–	–	12	–	bit	–
Response time	–	–	8	11	ms	5

Notes:

1. Reference conditions (unless otherwise noted): supply voltage, V_S=5.0 ±0.01 Vdc, Ta=25 °C [77 °F].
2. Read operation: *Start, Slave Address, R/W =1, Data Byte 1 (MSB), Ackn Bit, Data Byte 2 (LSB).* The output is corrected pressure as unsigned 12 bits. Slave Address is F0h. Acknowledge Bit - pull data line LOW, master generates an extra clock pulse for this purpose.
3. Span is the algebraic difference between the output voltage at the specified high pressure and the output at lowest pressure. Span is ratiometric to the supply voltage.
4. Accuracy is the combined errors from offset and span calibration, linearity, pressure hysteresis, and temperature effects. Calibration errors include the deviation of offset and full scale from nominal values Linearity is the measured deviation based on a straight line. Hysteresis is the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure and temperature.
5. Response time for 0 PSI to full scale pressure step change, 10% to 90% rise time.
6. Sensor output when maximum positive pressure is applied on the back side (P2) or the front side (P1) of the sensing element.

TABLE 3. PRESSURE RANGE SPECIFICATIONS

Catalog Listing	Pressure Range	Burst Pressure[1]
ASDX001xxxx-DO	0 psi to 1 psi	5 psi
ASDX005xxxx-DO	0 psi to 5 psi	20 psi
ASDX015xxxx-DO	0 psi to 15 psi	30 psi
ASDX030xxxx-DO	0 psi to 30 psi	60 psi

Note:

1. If maximum burst pressure is exceeded, even momentarily, the package may leak or burst, or the pressure sensing die may fracture.

FIGURE 1. PERFORMANCE CHARACTERISTICS (Error Band Multiplier Over -20 °C to 105 °C [-4 °F to 221 °F])

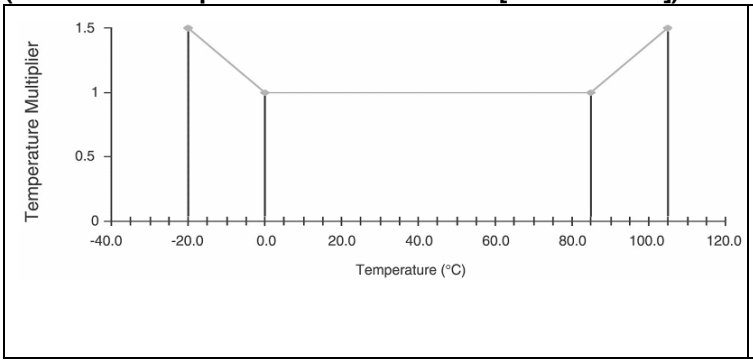
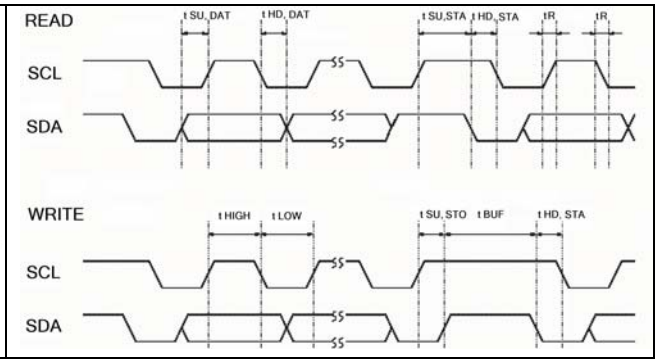


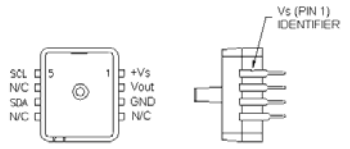
FIGURE 2. SERIAL INTERFACE TIMING CHARACTERISTICS



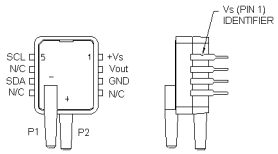
Digital Output Pressure Sensors, 0 psi to 1 psi thru 0 psi to 30 psi

FIGURE 3. PINOUT[1, 2]

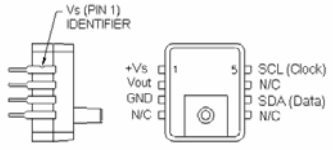
ASDXxxxA2DO



ASDXxxxD4DO



ASDXxxxG2DO



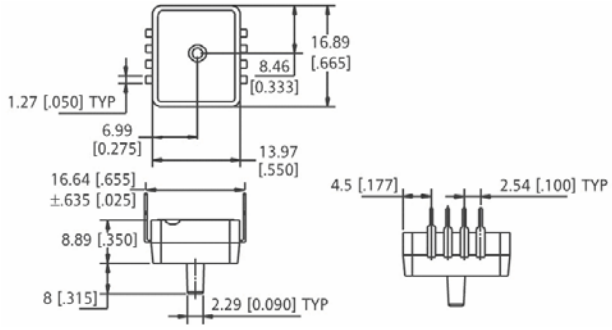
Notes:
1. N/C means no connection. Connecting to ground will damage the sensor.
2. Pin 6 must be left open.

TABLE 4. SERIAL INTERFACE PARAMETERS

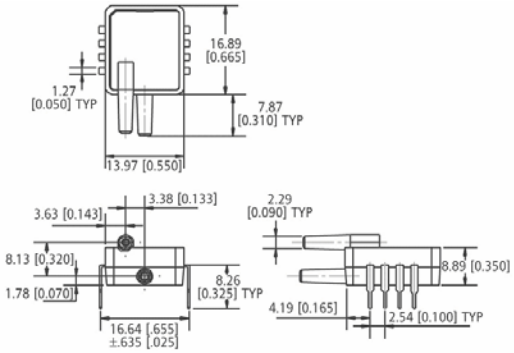
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input high level	V_{IH}	–	4.5	–	1	Vs
Input low level	V_{IL}	–	0	–	0.5	Vs
Output low level	V_{OL}	open drain I_{OL} = -4 mA	–	–	0.1	Vs
Pull up current	V_{OH}	pin SCL and SDA	5	–	20	µA
Load capacitance SDA	CL_{SDA}	–	–	–	400	pF
SCL clock frequency	f_{SCL}	–	–	–	100	kHz
Bus free time between STOP and START condition	t_{BUF}	–	4.7	–	–	µs
Hold time (repeated) START condition	$t_{HD, STA}$	to first clock pulse	4.0	–	–	µs
LOW period of SCL	t_{LOW}	–	4.7	–	–	µs
High period of SCL	t_{HIGH}	–	4.0	–	–	µs
Setup time repeated START condition	$t_{SU, STA}$	–	4.7	–	–	µs
Data hold time	$t_{HD, DAT}$	–	0	–	–	ns
Data setup time	$t_{SU, DAT}$	–	250	–	–	ns
Rise time of both SDA and SCL	t_R	–	–	–	300	ns
Fall time of both SDA and SCL	t_F	–	–	–	300	ns
Setup time for STOP condition	$t_{SU, STO}$	–	4	–	–	µs
Input filter spike suppression	t_{sp}	spikes on SDA or SCL of that length are suppressed	–	–	50	µs

FIGURE 4. DIMESIONAL DRAWING (For reference only: mm [in].)

A2 Package



D4 Package



G2 Package

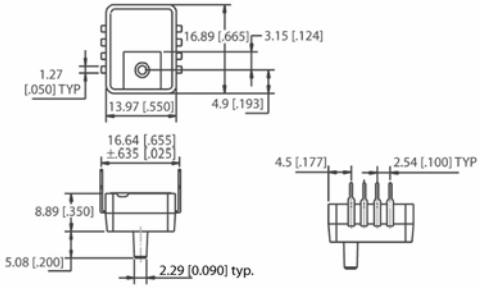
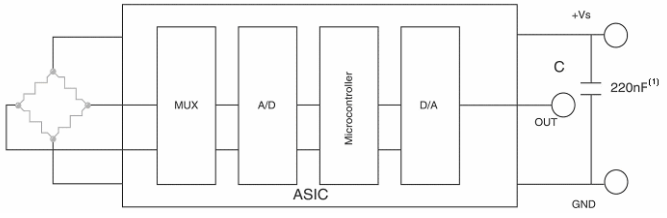
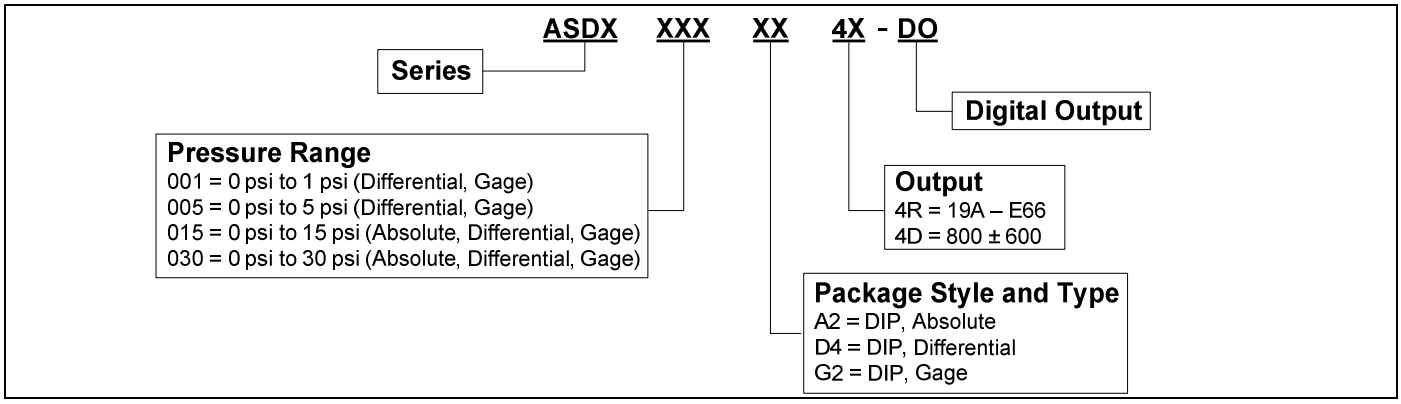


FIGURE 5. BLOCK DIAGRAM



Note:
1. 220 nF capacitor is required between +Vs and GND.

FIGURE 6. NOMENCLATURE TREE



ORDER GUIDE

Differential Catalog Listing[1]	Gage Catalog Listing	Absolute Catalog Listing	Pressure Range	Output
ASDX001D44R-DO	ASDX001G24R-DO	–	0 psi to 1.0 psi	19A – E66
ASDX001D44D-DO	–	–	–	800 ± 600
ASDX005D44R-DO	ASDX005G24R-DO	–	0 psi to 5.0 psi	19A – E66
ASDX005D44D-DO	–	–	–	800 ± 600
ASDX015D44R-DO	ASDX015G24R-DO	ASDX015A24R-DO	0 psi to 15 psi	19A – E66
ASDX015D44D-DO	–	–	–	800 ± 600
ASDX030D44R-DO	ASDX030G24R-DO	ASDX030A24R-DO	0 psi to 30 psi	19A – E66
ASDX030D44D-DO	–	–	–	800 ± 600

Note:
1. May also be used in gage applications.

⚠ WARNING

PERSONAL INJURY
DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.
Failure to comply with these instructions could result in death or serious injury.

WARRANTY/REMEDY
Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

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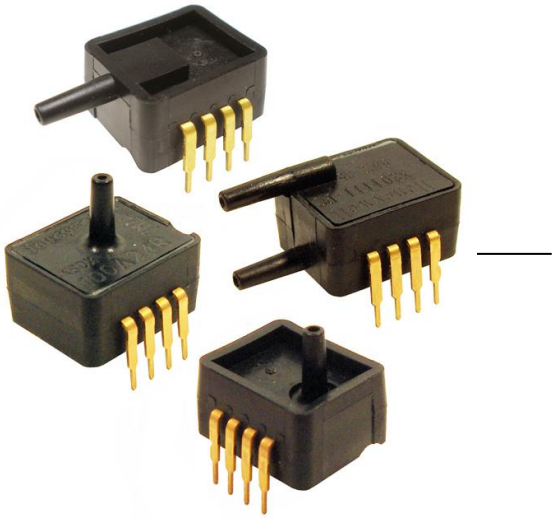
008095-5-EN IL50 GLO Printed in USA
December 2007

Honeywell

ASDX Series Silicon Pressure Sensors

Low Pressure and Ultra-Low Pressure Analog Output, ±2% Total Error Band, 10 Inches H_2O to 100 psi



DESCRIPTION

The ASDX Series is a Silicon Pressure Sensor offering a ratiometric analog interface for reading pressure over the specified full scale pressure span and temperature range.

The ASDX is fully calibrated and temperature compensated for sensor offset, sensitivity, temperature effects and non-linearity using an on-board Application Specific Integrated Circuit (ASIC). Calibrated output values for pressure are updated at approximately 1 kHz.

The standard ASDX is calibrated over the temperature range of 0 °C to 85 °C [32 °F to 185 °F]. The sensor is characterized for operation from a single power supply of either 3.3 Vdc or 5.0 Vdc.

These sensors are available to measure absolute, differential and gage pressures. The absolute versions have an internal vacuum reference and an output value proportional to absolute pressure. Differential versions allow application of pressure to either side of the sensing diaphragm. Gage versions are referenced to atmospheric pressure and provide an output proportional to pressure variations from atmosphere.

The ASDX Series sensors are intended for use with non-corrosive, non-ionic working fluids such as air and dry gases. They are designed and manufactured according to standards in ISO 9001.

FEATURES

- Ratiometric 12-bit analog output
- Precision ASIC conditioning and temperature compensated over 0 °C to 85 °C [32 °F to 185 °F] temperature range
- Low operating voltage
- Absolute, differential and gage types
- Pressure ranges from 10 inches H_2O to 100 psi
- Standard calibrations in inches H_2O, cm H_2O, psi, mbar, bar, kPa
- Total error band of ±2.0% of full scale span maximum
- RoHS compliant

POTENTIAL APPLICATIONS

- Flow calibrators
- Ventilation and air flow monitors
- Gas flow instrumentation
- Sleep apnea monitoring and therapy equipment
- Barometry
- Pneumatic controls
- HVAC

ASDX Series Silicon Pressure Sensors

Table 1. Absolute Maximum Ratings[1]

Parameter	Min	Max	Unit
Supply voltage (V_{supply})	-0.3	6.0	Vdc
Voltage to any pin	-0.3	V_{supply} + 0.3	Vdc
ESD susceptibility (human body model)	3	-	kV
Storage temperature	-50 [-58]	125 [257]	°C [°F]
Lead temperature (2 s to 4 s)	-	250 [482]	°C [°F]
External capacitance between V_{supply} and ground[2]	100	470	nF

Table 2. Operating Specifications

Parameter	Min.	Typ.	Max.	Unit
Supply voltage: (V_{supply})[3] 3.3 Vdc 5.0 Vdc *Sensors are either 3.3 Vdc or 5.0 Vdc per the order guide (see Figure 1).*	 3.0 4.75	 3.3[4] 5.0[4]	 3.6 5.25	Vdc
Supply current	1.5	2.5	3.5	mA
Compensated temperature range[5]	0 [32]	-	85 [185]	°C [°F]
Operating temperature range[6]	-20 [-4]	-	105 [221]	°C [°F]
Overpressure[7]	2X operating pressure range minimum			
Burst pressure[8]	3X operating pressure range minimum			
Startup time (power up to data ready)	-	-	5	ms
Response time	-	1.0	-	ms
Upper output clipping limit	97.5	-	-	V_{supply}
Lower output clipping limit	-	-	2.5	V_{supply}
Minimum load resistance	5.0	-	-	kOhm
Total error band[9]	-	-	2.0	%FSS[10]
Output resolution	12	-	-	bits

Table 3. Environmental Specifications

Parameter	Characteristic
Humidity	0% to 95% RH non-condensing
Vibration	10 G at 20 Hz to 2000 Hz
Shock	100 G for 11 ms
Life	1 million cycles minimum

Table 4. Wetted Materials[11]

Parameter	Port 1 (Pressure Port)[12]	Port 2 (Reference Port)[12]
Covers	glass-filled PBT	glass-filled PBT
Adhesives	silicone	silicone and epoxy
Electronic components	silicon and glass	silicon, glass, and gold

Notes:

1. Absolute maximum ratings are the extreme limits that the device will withstand without damage to the device.
2. An external bypass capacitor is **required** across the supply voltage (Pins 1 and 3 – see Figure 4) as close to the sensor supply pin as possible for correct sensor operation.
3. Ratiometricity of the sensor (the ability of the output to scale to the input voltage) is achieved within the specified operating voltage for each option. Other custom supply voltages are available, please contact Honeywell Customer Service.
4. The sensor is not reverse polarity protected. Incorrect application of excitation voltage or ground to the wrong pin may cause electrical failure.
5. The compensated temperature range is the temperature range (or ranges) over which the sensor will produce an output proportional to pressure within the specified performance limits.
6. The operating temperature range is the temperature range over which the sensor will produce an output proportional to pressure but may not remain within the specified performance limits.
7. Overpressure is the maximum pressure which may safely be applied to the product for it to remain in specification once pressure is returned to the operating pressure range. Exposure to higher pressures may cause permanent damage to the product.
8. Burst pressure is the maximum pressure that may be applied to any port of the product without causing escape of pressure media. Product should not be expected to function after exposure to any pressure beyond the burst pressure.
9. Total error band is the maximum deviation in output from ideal transfer function over the entire compensated temperature and pressure range. Includes all errors due to offset, full scale span, pressure non-linearity, pressure hysteresis, repeatability, thermal effect on offset, thermal effect on span and thermal hysteresis. Specification units are in percent of full scale span (%FSS).
10. Full scale span (FSS) is the algebraic difference between the output signal measured at the maximum (Pmax.) and minimum (Pmin.) limits of the pressure range.
11. Consult Honeywell Customer Service for detailed material information.
12. For AC pressure port configuration, the “pressure” and “reference” ports are reversed.

Figure 1. Nomenclature and Order Guide

Package Selection[13] *Calibration Selection*

ASDX **X** **A**

Series

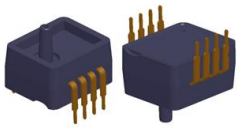
Power Supply Voltage
3 = 3.3 Vdc
5 = 5.0 Vdc

Transfer Function Limits[14]
A = 10% to 90% calibration
B = 5% to 95% calibration

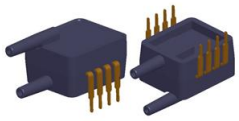
Output Type[15]
A = Analog voltage

Pressure Port

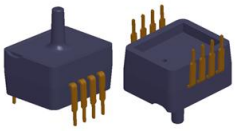
AV = Axial port on top, vented cover on bottom



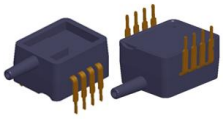
RR = Radial port on top, radial port on bottom



AC = Axial port, sealed cover (commonly used for absolute)



RV = Radial port, single



Future Option

Pressure Range[16, 17, 18]

Gage	Differential	Absolute
-	**005ND** = ±5 in H_2O	-
010NG = 10 in H_2O	**010ND** = ±10 in H_2O	-
-	**015CD** = ±15 cm H_2O	-
025CG = 25 cm H_2O	**025CD** = ±25 cm H_2O	-
001PG = 1 psi	**001PD** = ±1 psi	-
005PG = 5 psi	**005PD** = ±5 psi	-
015PG = 15 psi	**015PD** = ±15 psi	**015PA** = 15 psi
030PG = 30 psi	**030PD** = ±30 psi	**030PA** = 30 psi
100PG = 100 psi	-	**100PA** = 100 psi
-	**015MD** = ±15 mbar	-
025MG = 25 mbar	**025MD** = ±25 mbar	-
050MG = 50 mbar	**050MD** = ±50 mbar	-
100MG = 100 mbar	**100MD** = ±100 mbar	-
200MG = 200 mbar	**200MD** = ±200 mbar	-
500MG = 500 mbar	**500MD** = ±500 mbar	-
001BG = 1 bar	**001BD** = ±1 bar	**001BA** = 1 bar
002BG = 2 bar	**002BD** = ±2 bar	**002BA** = 2 bar
007BG = 7 bar	-	**007BA** = 7 bar
003KG = 3 kPa	**003KD** = ±3 kPa	-
004KG = 4 kPa	**004KD** = ±4 kPa	-
005KG = 5 kPa	**005KD** = ±5 kPa	-
010KG = 10 kPa	**010KD** = ±10 kPa	-
020KG = 20 kPa	**020KD** = ±20 kPa	-
050KG = 50 kPa	**050KD** = ±50 kPa	-
100KG = 100 kPa	**100KD** = ±100 kPa	**100KA** = 100 kPa
200KG = 200 kPa	**200KD** = ±200 kPa	**200KA** = 200 kPa
700KG = 700 kPa	-	**700KA** = 700 kPa

Notes:

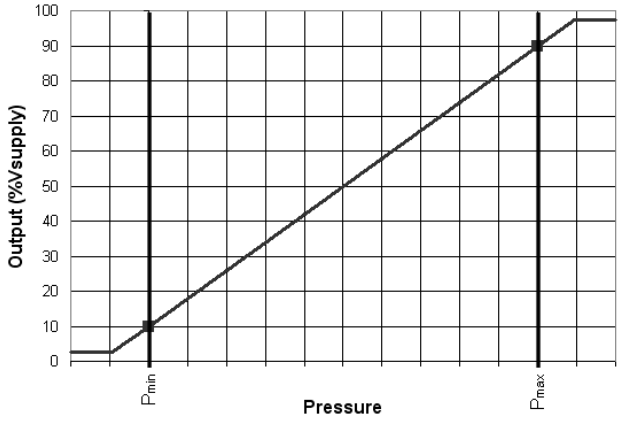
13. Other package combinations are possible, please contact Honeywell Customer Service.
14. The transfer function limits define the output of the sensor at a given pressure input. By specifying the output signal at the maximum (Pmax.) and minimum (Pmin.) limits of the pressure range, the complete transfer curve for the sensor is defined. See Figure 2 for a graphical representation of each calibration.
15. For a digital output, please refer to the ASDX Digital Series.
16. Custom pressure ranges are available, please contact Honeywell Customer Service.
17. The pressure units (inches H_20, cm H_20, psi, mbar, bar, kPa) define the units used during calibration and in the application.
18. See Table 5 for an explanation of sensor types.

Table 5. Sensor Types

Type	Description
Absolute	Output is proportional to difference between applied pressure and built-in reference to vacuum (zero pressure).
Gage	Output is proportional to difference between applied pressure and atmospheric (ambient) pressure.
Differential	Output is proportional to difference between pressure applied to each of the pressure ports (Port 1 – Port 2).

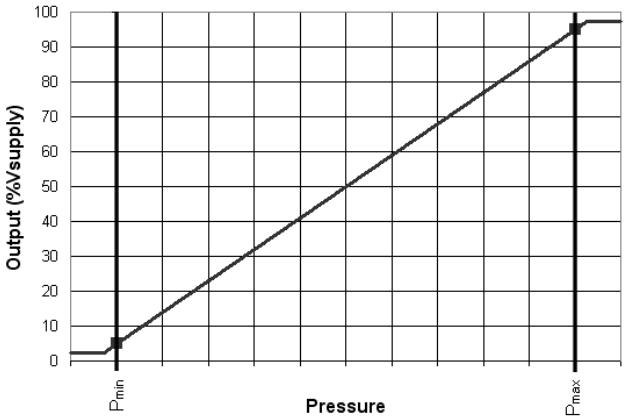
Figure 2. Transfer Functions and Limits

A Calibration, 10% to 90%



$$\text{Output (volts)} = \frac{0.8 \cdot V_{supply}}{P_{max} - P_{min}} \cdot (\text{Pressure}_{applied} - P_{min}) + 0.10 \cdot V_{supply}$$

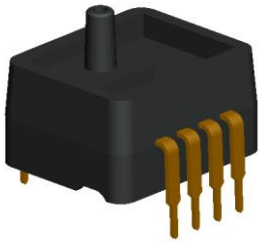
B Calibration, 5% to 95%



$$\text{Output (volts)} = \frac{0.9 \cdot V_{supply}}{P_{max} - P_{min}} \cdot (\text{Pressure}_{applied} - P_{min}) + 0.05 \cdot V_{supply}$$

Figure 3. Completed Catalog Listing Example

ASDXAVX001PGAA3:
AV pressure port, 1 psi gage, analog output, 10% to 90% calibration at 3.3 Vdc operation.



ASDXAV001PGAA3 Output vs. Pressure

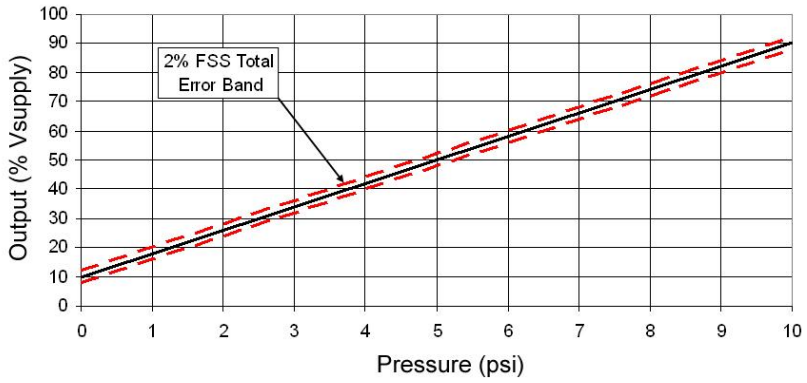
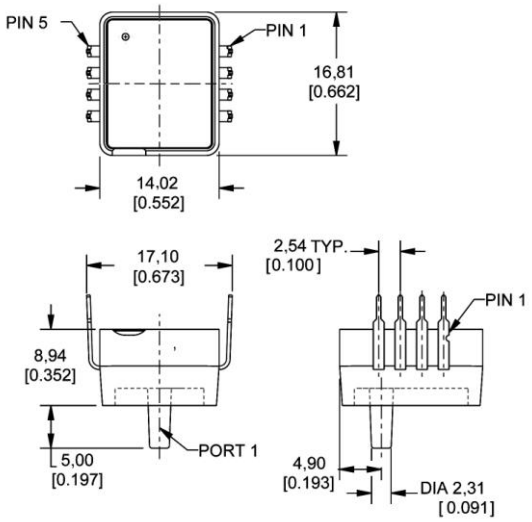
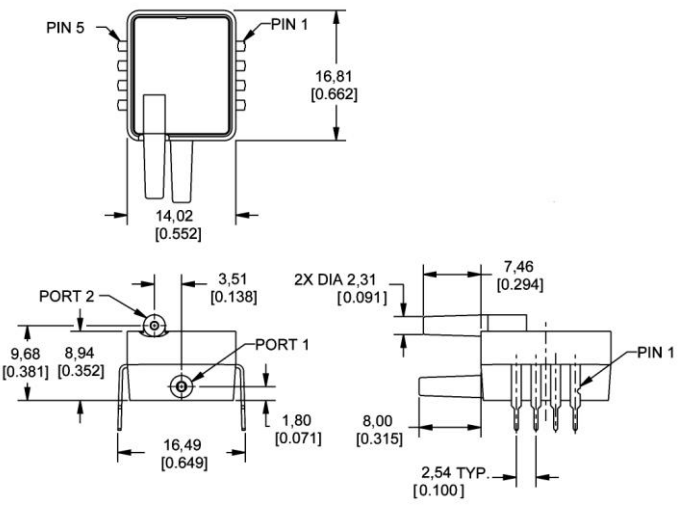


Figure 4. Dimensional Drawings (For reference only: mm [in].)

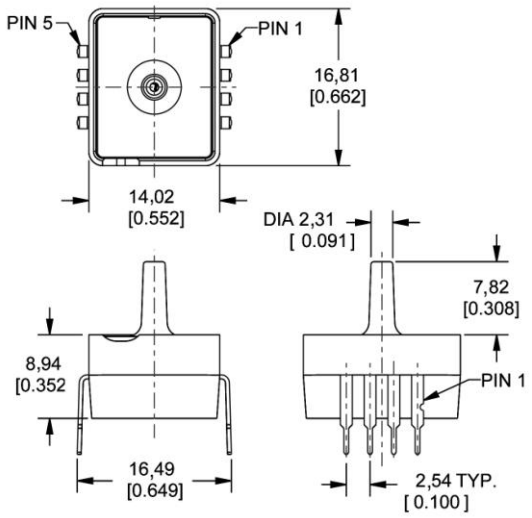
AV Package (Legacy G2)



RR Package (Legacy D4)



AC Package (Legacy A2)



RV Package

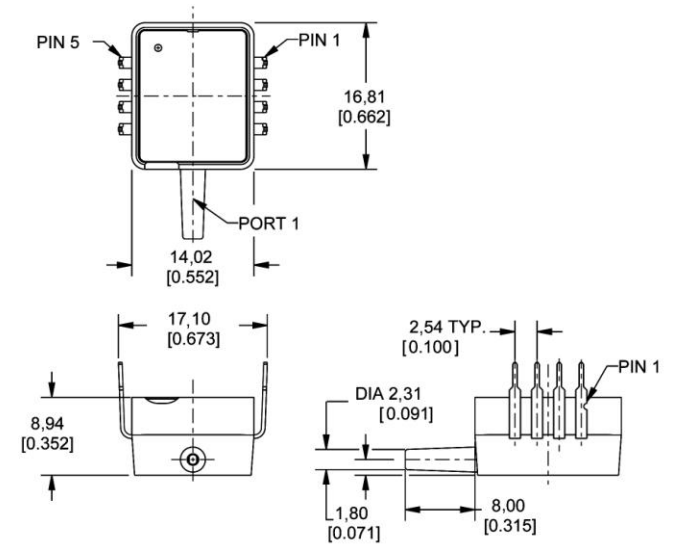


Table 7. Pinout

Pin	Definition	Type	Description
1	Vsupply	supply	power supply source
2	Vout	analog output	provides the analog output
3	GND	supply	power supply ground
4	N/C	not used	do not connect in the application
5	N/C	not used	do not connect in the application
6	N/C	not used	do not connect in the application
7	N/C	not used	do not connect in the application
8	N/C	not used	do not connect in the application

⚠ WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

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Latin America	+1-305-805-8188; +1-305-883-8257 Fax
USA/Canada	+1-800-537-6945; +1-815-235-6847 +1-815-235-6545 Fax

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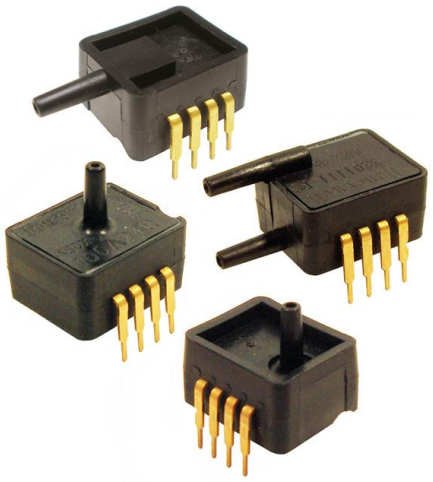

DESCRIPTION

The ASDX Series is a Silicon Pressure Sensor offering either an I^2C or SPI digital interface for reading pressure over the specified full scale pressure span and temperature range.

The ASDX is fully calibrated and temperature compensated for sensor offset, sensitivity, temperature effects and non-linearity using an on-board Application Specific Integrated Circuit (ASIC). Calibrated output values for pressure are updated at approximately 1 kHz.

The standard ASDX is calibrated over the temperature range of 0 °C to 85 °C [32 °F to 185 °F]. The sensor is characterized for operation from a single power supply of either 3.3 Vdc or 5.0 Vdc.

These sensors are available to measure absolute, differential and gage pressures. The absolute versions have an internal vacuum reference and an output value proportional to absolute pressure. Differential versions allow application of pressure to either side of the sensing diaphragm. Gage versions are referenced to atmospheric pressure and provide an output proportional to pressure variations from atmosphere.

The ASDX Series sensors are intended for use with non-corrosive, non-ionic working fluids such as air and dry gases. They are designed and manufactured according to standards in ISO 9001.

FEATURES

- Output options: I^2C- or SPI-compatible 12-bit digital
- Precision ASIC conditioning and temperature compensated over 0 °C to 85 °C [32 °F to 185 °F] temperature range
- Low operating voltage
- Absolute, differential and gage types
- Pressure ranges from 10 inches H_20 to 100 psi
- Standard calibrations in inches H_20, cm H_20, psi, mbar, bar, kPa
- Total error band of ±2.0% of full scale span maximum
- RoHS compliant

POTENTIAL APPLICATIONS

- Flow calibrators
- Ventilation and air flow monitors
- Gas flow instrumentation
- Sleep apnea monitoring and therapy equipment
- Barometry
- Pneumatic controls
- HVAC

Table 1. Absolute Maximum Ratings[1]

Parameter	Min	Max	Unit
Supply voltage (V_{supply})	-0.3	6.0	Vdc
Voltage to any pin	-0.3	V_{supply} + 0.3	Vdc
Digital clock frequency: I^2C SPI	 100 50	 400 800	kHz
ESD susceptibility (human body model)	3	-	kV
Storage temperature	-50 [-58]	125 [257]	°C [°F]
Lead temperature (2 s to 4 s)	-	250 [482]	°C [°F]
External capacitance between V_{supply} and ground[2]	100	470	nF

Table 2. Operating Specifications

Parameter	Min.	Typ.	Max.	Unit
Supply voltage: (V_{supply})[3] 3.3 Vdc 5.0 Vdc *Sensors are either 3.3 Vdc or 5.0 Vdc per the Order Guide (see Figure 1).*	 3.0 4.75	 3.3[4] 5.0[4]	 3.6 5.25	Vdc
Supply current	2.0	3.5	5.0	mA
Compensated temperature range[5]	0 [32]	-	85 [185]	°C [°F]
Operating temperature range[6]	-20 [-4]	-	105 [221]	°C [°F]
Overpressure[7]	2X operating pressure range minimum			
Burst pressure[8]	3X operating pressure range minimum			
Startup time (power up to data ready)	-	2.8	7.3	ms
Response time	-	0.46	-	ms
I^2C or SPI voltage level low	-	-	0.2	V_{supply}
I^2C or SPI voltage level high	0.8	-	-	V_{supply}
Pull-up on SDA and SCL (I^2C output only)	1	-	-	kOhm
Total error band[9]	-	-	2.0	%FSS[10]
Output resolution	12	-	-	bits

Table 3. Environmental Specifications

Parameter	Characteristic
Humidity	0% to 95% RH non-condensing
Vibration	10 G at 20 Hz to 2000 Hz
Shock	100 G for 11 ms
Life	1 million cycles minimum

Table 4. Wetted Materials[11]

Parameter	Port 1 (Pressure Port)[12]	Port 2 (Reference Port)[12]
Covers	glass-filled PBT	glass-filled PBT
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Electronic components	silicon and glass	silicon, glass, and gold

Notes:
1. Absolute maximum ratings are the extreme limits that the device will withstand without damage to the device.
2. An external bypass capacitor is **required** across the supply voltage (Pins 6 and 3 – see Figure 4) as close to the sensor supply pin as possible for correct sensor operation.
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10. Full scale span (FSS) is the algebraic difference between the output signal measured at the maximum (Pmax.) and minimum (Pmin.) limits of the pressure range.
11. Consult Honeywell Customer Service for detailed material information.
12. For AC pressure port configuration, the “pressure” and “reference” ports are reversed.

Figure 1. Nomenclature and Order Guide

Package Selection[13] *Calibration Selection*

ASDX **X** _ _ _ _ _ _ _ _ _

Series

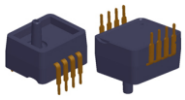
Power Supply Voltage
3 = 3.3 Vdc
5 = 5.0 Vdc

Transfer Function Limits[14]
A = 10% to 90% calibration
B = 5% to 95% calibration

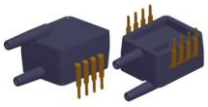
Output Type[15]
S = SPI
2 = I^2C, Address 0x28
3 = I^2C, Address 0x38
4 = I^2C, Address 0x48
5 = I^2C, Address 0x58
6 = I^2C, Address 0x68
7 = I^2C, Address 0x78

Pressure Port

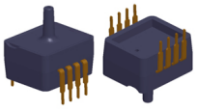
AV = Axial port on top, vented cover on bottom



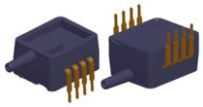
RR = Radial port on top, radial port on bottom



AC = Axial port, sealed cover (commonly used for absolute)



RV = Radial port, single



Future Option

Pressure Range[16, 17, 18]

Gage	Differential	Absolute
-	**005ND** = ±5 in H_2O	-
010NG = 10 in H_2O	**010ND** = ±10 in H_2O	-
-	**015CD** = ±15 cm H_2O	-
025CG = 25 cm H_2O	**025CD** = ±25 cm H_2O	-
001PG = 1 psi	**001PD** = ±1 psi	-
005PG = 5 psi	**005PD** = ±5 psi	-
015PG = 15 psi	**015PD** = ±15 psi	**015PA** = 15 psi
030PG = 30 psi	**030PD** = ±30 psi	**030PA** = 30 psi
100PG = 100 psi	-	**100PA** = 100 psi
-	**015MD** = ±15 mbar	-
025MG = 25 mbar	**025MD** = ±25 mbar	-
050MG = 50 mbar	**050MD** = ±50 mbar	-
100MG = 100 mbar	**100MD** = ±100 mbar	-
200MG = 200 mbar	**200MD** = ±200 mbar	-
500MG = 500 mbar	**500MD** = ±500 mbar	-
001BG = 1 bar	**001BD** = ±1 bar	**001BA** = 1 bar
002BG = 2 bar	**002BD** = ±2 bar	**002BA** = 2 bar
007BG = 7 bar	-	**007BA** = 7 bar
003KG = 3 kPa	**003KD** = ±3 kPa	-
004KG = 4 kPa	**004KD** = ±4 kPa	-
005KG = 5 kPa	**005KD** = ±5 kPa	-
010KG = 10 kPa	**010KD** = ±10 kPa	-
020KG = 20 kPa	**020KD** = ±20 kPa	-
050KG = 50 kPa	**050KD** = ±50 kPa	-
100KG = 100 kPa	**100KD** = ±100 kPa	**100KA** = 100 kPa
200KG = 200 kPa	**200KD** = ±200 kPa	**200KA** = 200 kPa
700KG = 700 kPa	-	**700KA** = 700 kPa

Notes:

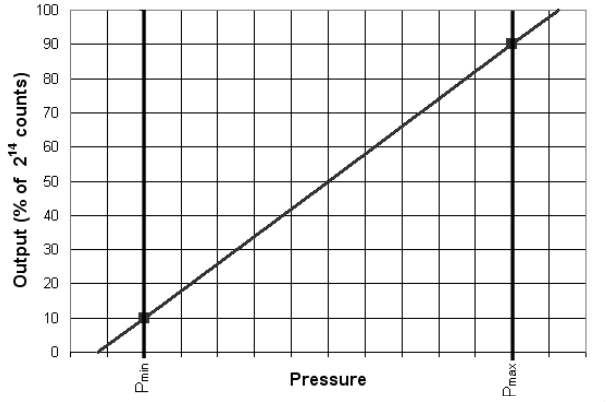
13. Other package combinations are possible, please contact Honeywell Customer Service.
14. The transfer function limits define the output of the sensor at a given pressure input. By specifying the output signal at the maximum (Pmax.) and minimum (Pmin.) limits of the pressure range, the complete transfer curve for the sensor is defined. See Figure 2 for a graphical representation of each calibration. For the 12-bit digital output, Table 6 provides the output of the sensor at significant percentages. These outputs are valid at the rated input voltage of the sensor.
15. The output type defines which communication protocol the sensor uses to communicate. Available protocols are I^2C or half duplex SPI (sensor acts only as a slave). This communication protocol is not field selectable, and must be defined when ordering the sensor.
16. Custom pressure ranges are available, please contact Honeywell Customer Service.
17. The pressure units (inches H_20, cm H_20, psi, mbar, bar, kPa) define the units used during calibration and in the application.
18. See Table 5 for an explanation of sensor types.

Table 5. Sensor Types

Type	Description
Absolute	Output is proportional to difference between applied pressure and built-in reference to vacuum (zero pressure).
Gage	Output is proportional to difference between applied pressure and atmospheric (ambient) pressure.
Differential	Output is proportional to difference between pressure applied to each of the pressure ports (Port 1 – Port 2).

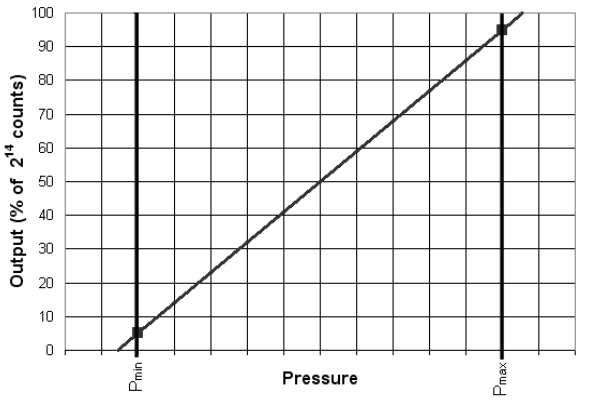
Figure 2. Transfer Functions and Limits

A Calibration, 10% to 90%



$$\text{Output (\% of } 2^{14} \text{ counts)} = \frac{80\%}{P_{max} - P_{min}} \cdot (\text{Pressure}_{applied} - P_{min}) + 10\%$$

B Calibration, 5% to 95%



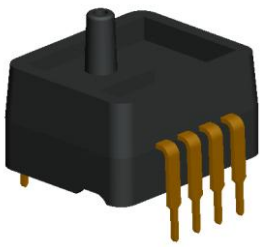
$$\text{Output (\% of } 2^{14} \text{ counts)} = \frac{90\%}{P_{max} - P_{min}} \cdot (\text{Pressure}_{applied} - P_{min}) + 5\%$$

Table 6. Sensor Output at Significant Percentages

% Output	Digital Counts (dec)	Digital Counts (hex)
0%	0	0x0000
5%	819	0x0333
10%	1638	0x0666
50%	8192	0x2000
90%	14746	0x399A
95%	15565	0x3CCD
100%	16383	0x3FFF

Figure 3. Completed Catalog Listing Example

ASDXAVX001PG2A3:
AV pressure port, 1 psi gage, I^2C output (Address 0x28), 10% to 90% calibration at 3.3 Vdc operation.



ASDXAVX001PG2A3 Output vs Pressure

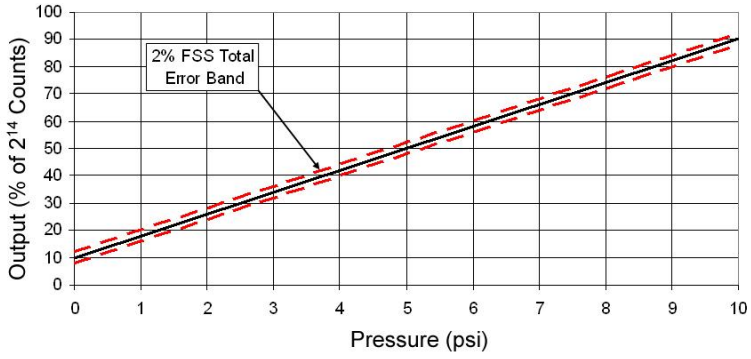
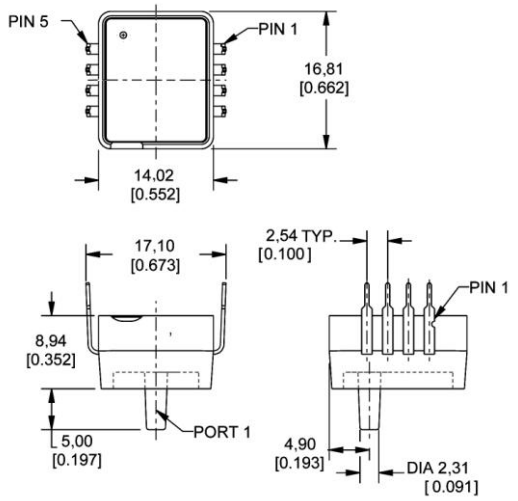
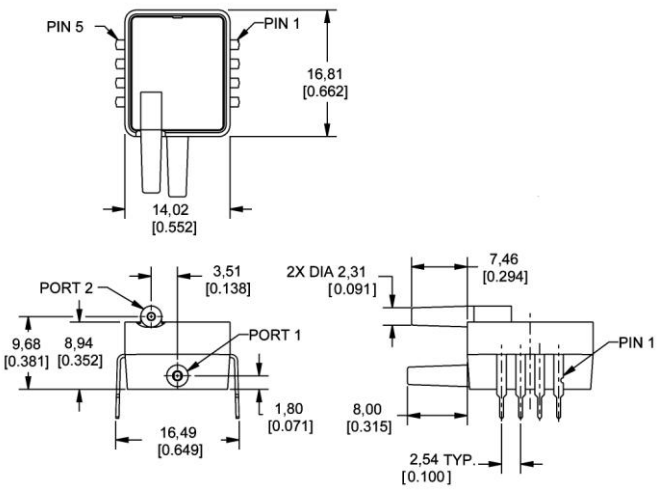


Figure 4. Dimensional Drawings (For reference only: mm [in].)

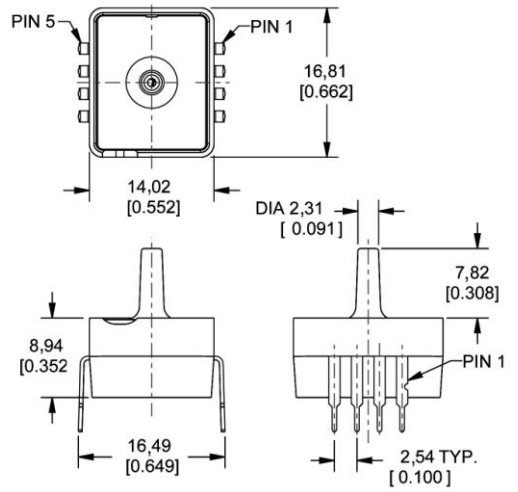
AV Package (Legacy G2)



RR Package (Legacy D4)



AC Package (Legacy A2)



RV Package

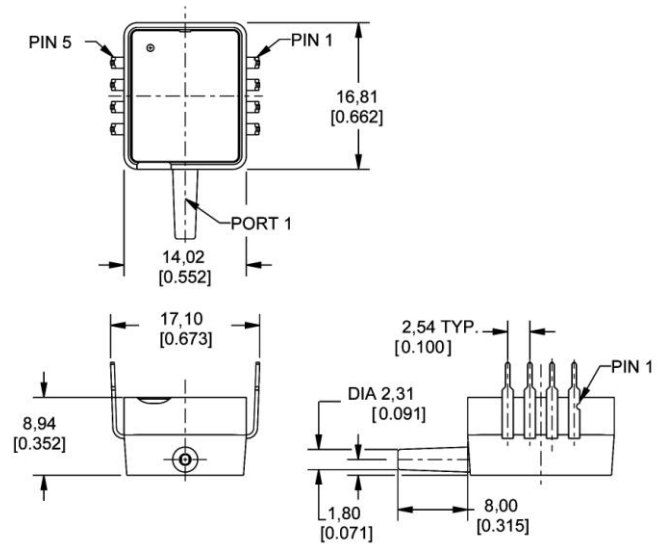


Table 7. Pinout

I²C				SPI			
Pin	**Definition**	**Type**	**Description**	**Pin**	**Definition**	**Type**	**Description**
1	SDA	digital I/O	serial bidirectional data; data is clocked in or out on clock edge of SCL	1	MISO	digital output	"Master In Slave Out" - serial output data; data is clocked out on clock edge of SCK
2	SCL	digital input	serial clock input; used to clock data on SDA	2	SCK	digital input	serial clock input; used to clock data on MISO
3	GND	supply	power supply ground	3	GND	supply	power supply ground
4	N/C	not used	do not connect in the application	4	N/C	not used	do not connect in the application
5	SS	digital output	interrupt signal (conversion complete output)	5	SS	digital input	slave select
6	Vsupply	supply	power supply source	6	Vsupply	supply	power supply source
7	N/C	not used	do not connect in the application	7	N/C	not used	do not connect in the application
8	N/C	not used	do not connect in the application	8	N/C	not used	do not connect in the application

⚠ WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

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SALES AND SERVICE

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July 2010

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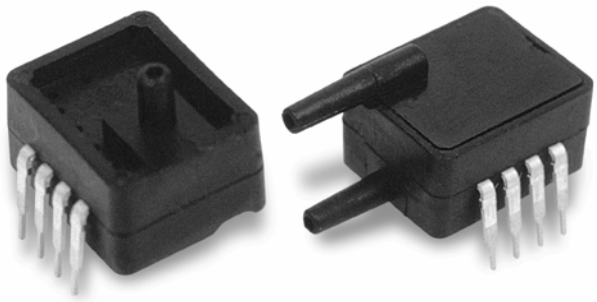
ASDXL Series

Microstructure Pressure Sensors
0 in to ±5 in H_2O, 0 in to 10 in H_2O, 0 in to ±10 in H_2O



DESCRIPTION

The ASDXL Series pressure sensors are fully calibrated and temperature compensated with on-board Application Specific Integrated Circuitry (ASIC). This ASDXL sensor is in a DIP format (Dual In-line Package) and provides digital correction of sensor offset, sensitivity, temperature coefficients and non-linearity. The ASDXL Series has an analog output that is ratiometric with supply voltage over the compensated supply range with 11-bit resolution.

All ASDXL sensors are accurate to within ±2.5 % Full Scale Span (FSS) and are intended for use with non-corrosive, non-ionic working fluids such as air and dry gases. (Contact factory for media compatibility on G2/D4 packages).

This series is designed and manufactured in accordance with ISO 9001 standards and is compliant with the WEEE and RoHS directives.

FEATURES

- Available in differential and gage packages
- Calibrated and temperature compensated output
- Analog output with 11-bit resolution
- Pressure ranges from 0 in to ±5 in H_2O, 10 in H_2O, ±10 in H_2O
- Response time of 8 ms
- DIP package
- ASIC-enhanced output

POTENTIAL APPLICATIONS

- Medical equipment
- HVAC controls
- Pneumatic controls

ASDXL Series
0 in to ±5 in H_2O, 0 in to 10 in H_2O, 0 in to ±10 in H_2O

GENERAL SPECIFICATIONS

Characteristic	Parameter	Characteristic	Parameter
Supply voltage (Vs)	4.75 Vdc to 5.25 Vdc	Lead soldering temperature	4 s at 250 °C [482 °F]
Maximum supply voltage	6.50 Vdc max.	Vibration	10 g at 20 Hz to 2000 Hz
Current consumption	6 mA typ.	Shock	100 g for 11 ms
Output current - sink	2 mA max.	Life	1 million cycles min.
Output current - source	2 mA max.	Position sensitivity	50 μV/V/g typical

ENVIRONMENTAL SPECIFICATIONS

Characteristic	Range
Compensated	0 °C to 85 °C [32 °F to 185 °F]
Operating	-20 °C to 105 °C [-4 °F to 221 °F]
Storage	-40 °C to 125 °C [-40 °F to 257 °F]

PRESSURE RANGE SPECIFICATIONS

Listing	Pressure Range	Burst Pressure [1]
ASDXL05	0 in to ±5 in H_20	3 PSI
ASDXL10	0 in to 10 in H_20 0 in to ±10 H_20	3 PSI

PERFORMANCE CHARACTERISTICS 4D [2]

Characteristic	Min.	Typ.(5)	Max.	Unit
Full scale span (FSS) [3,4]	–	4.000	–	V
Zero pressure offset [4]	2.400	2.500	2.600	V
Output at full scale pressure (P2) [4,5]	4.400	4.500	4.600	V
Output at full scale pressure (P1) [4,5]	0.400	0.500	0.600	V
Accuracy [6]	–	–	±2.5	% FSS
Quantization error [7]	2.44	–	–	mV
Response time [8]	–	8	11	ms

PERFORMANCE CHARACTERISTICS 4R [2]

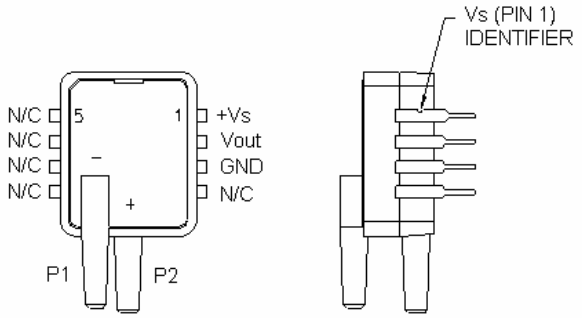
Characteristic	Min.	Typ.	Max.	Unit
Full scale span (FSS) [3,4]	–	4.000	–	V
Zero pressure offset [4]	0.400	0.500	0.600	V
Output at full scale pressure [4]	4.400	4.500	4.600	V
Accuracy [6,7]	–	–	±2.5	% FSS
Quantization error [7]	2.44	–	–	mV
Response time [8]	–	8	11	ms

Notes:

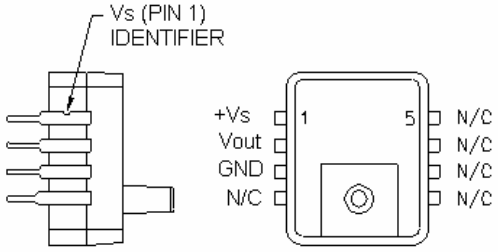
1. If burst pressure is exceeded, even momentarily, the package may leak or the pressure sensing die may fracture.
2. Reference conditions (unless otherwise noted): supply voltage, V_S=5.0 ±0.01 Vdc, Ta=25 °C [77 °F].
3. Span is the algebraic difference between the output voltage at the specified pressure and the output at zero pressure.
4. Output is ratiometric within the supply voltage range (Vs).
5. Output of the device when maximum positive pressure is applied on the backside (P2) or the front side (P1) of the sensing element.
6. Accuracy is the combined errors from offset and span calibration, linearity, pressure hysteresis, and temperature effects. Calibration errors include the deviation of offset and full scale from nominal values Linearity is the measured deviation based on a straight line. Hysteresis is the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure and temperature.
7. Minimum step size in the output due to a change in the input pressure.
8. Response time for 0 PSI to full scale pressure step change, 10% to 90% rise time.
9. 220 nF capacitor required between +Vs and GND.

ELECTRICAL CONNECTIONS [1,2,3]

ASDXLYYD4ZZ



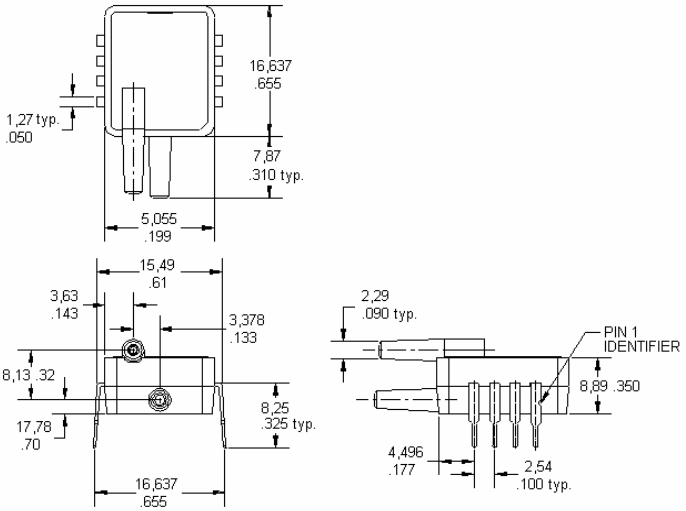
ASDXLYYG2ZZ



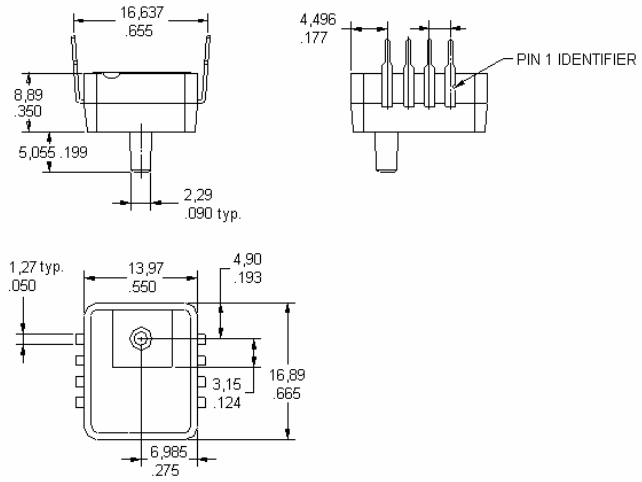
Notes:
1. N/C means no connection. Connecting to ground or other potential may damage sensor
2. Capacitor 220 nF required between +Vs and GND.
3. The sensor is not reverse polarity protected. Incorrect application of excitation voltage or ground to the wrong pin can cause electrical failure. Application of supply voltage above the maximum can cause electrical failure.

DIMENSIONS (For reference only, mm/in.)

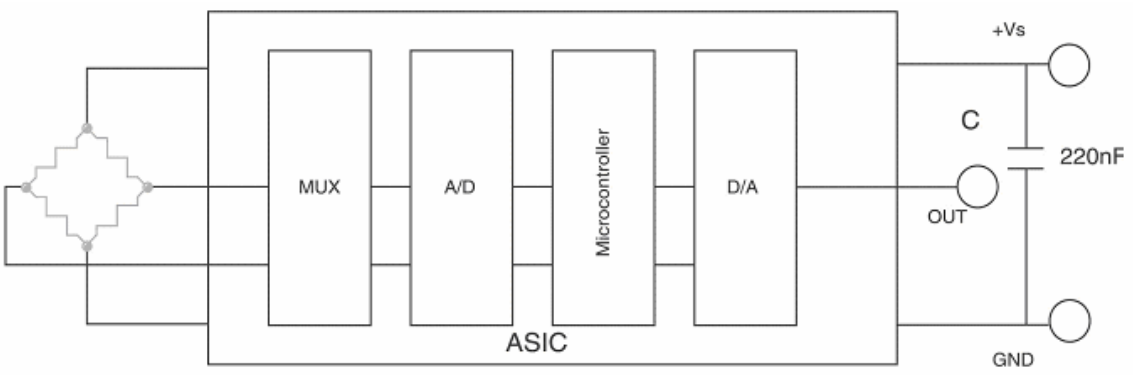
D4 Package



G2 Package



BLOCK DIAGRAM



ORDERING INFORMATION

Pressure Range	Gage	Differential	Bidirectional
0 in to ±5 in H_2O	–	–	ASDXL05D44D
0 in to 10 in H_2O	ASDXL10G24R	ASDXL10D44R	–
0 in to ±10 in H_2O	–	–	ASDXL10D44D

⚠ WARNING

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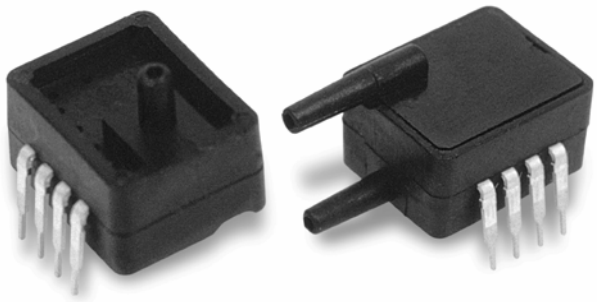
ASDXL DO Series

Microstructure Pressure Sensors
0 in to ±5 in H_2O, 0 in to 10 in H_2O, 0 in to ±10 in H_2O



DESCRIPTION

The ASDXL DO Series pressure sensors are fully calibrated and temperature compensated with on-board Application Specific Integrated Circuitry (ASIC). This ASDXL DO sensor is in a DIP format (Dual In-line Package) and provides digital correction of sensor offset, sensitivity, temperature coefficients and non-linearity. The ASDXL DO Series has 12-bit I^2C compatible protocol interface which allows easy interfacing to most commonly used microcontrollers and microprocessors.

The 2-wire I^2C interface has a Serial Clock Line input (SCL) and serial digital output data line. The output of the device is a corrected pressure value in hexadecimal format with 12-bit accuracy (unsigned) and not ratiometric to the supply voltage.

All ASDXL DO sensors are accurate to within ±2.5 % Full Scale Span (FSS) and are intended for use with non-corrosive, non-ionic working fluids such as air and dry gases. (Contact factory for media compatibility on G2/D4 packages.)

This series is designed and manufactured in accordance with ISO 9001 standards and is compliant with the WEEE and RoHS directives.

FEATURES

- Available in differential and gage packages
- Calibrated and temperature compensated output
- 12-bit digital output (I^2C compatible protocol)
- Pressure ranges from 0 in to ±5 in H_2O, 10 in H_2O, ±10 in H_2O
- Response time of 8 ms
- DIP package
- ASIC-enhanced output

POTENTIAL APPLICATIONS

- Medical equipment
- HVAC controls
- Pneumatic controls

ASDXL DO Series
0 in to ±5 in H_2O, 0 in to 10 in H_2O, 0 in to ±10 in H_2O

GENERAL SPECIFICATIONS

Characteristic	Parameter	Characteristic	Parameter
Supply voltage (Vs)	4.75 Vdc to 5.25 Vdc	Lead soldering temperature	4 s at 250 °C [482 °F]
Maximum supply voltage	6.50 Vdc max.	Vibration	10 g at 20 Hz to 2000 Hz
Current consumption	6 mA typ.	Shock	100 g for 11 ms
Output current - sink	2 mA max.	Life	1 million cycles min.
Output current - source	2 mA max.	Position sensitivity	50 µV/V/g typical

ENVIRONMENTAL SPECIFICATIONS

Characteristic	Range
Compensated	0 °C to 85 °C [32 °F to 185 °F]
Operating	-20 °C to 105 °C [-4 °F to 221 °F]
Storage	-40 °C to 125 °C [-40 °F to 257 °F]

PRESSURE RANGE SPECIFICATIONS

Listing	Pressure Range	Burst Pressure [1]
ASDXL05	0 in to ±5 in H_2O	3 PSI
ASDXL10	0 in to 10 in H_2O 0 in to ±10 H_2O	3 PSI

PERFORMANCE CHARACTERISTICS 4D DO [2,3]

Characteristic	Min.	Typ.(5)	Max.	Unit
Full scale span (FSS) [4,5]	–	CCC	–	counts hex
Zero pressure offset [5]	07AE	0800	0851	counts hex
Output at full scale pressure (P2) [5,6]	0E14	0E66	0EB8	counts hex
Output at full scale pressure (P1) [5,6]	0147	019A	01EB	counts hex
Accuracy [7]	–	–	±2.5	% FSS
Output resolution	–	12	–	bit
Response time [8]	–	8	11	ms

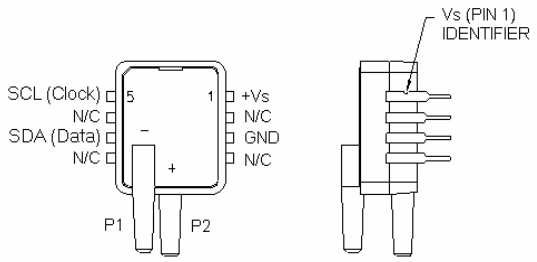
PERFORMANCE CHARACTERISTICS 4R DO [2,3]

Characteristic	Min.	Typ.	Max.	Unit
Full scale span (FSS) [4,5]	–	CCC	–	counts hex
Zero pressure offset [5]	0147	019A	01EB	counts hex
Output at full scale pressure [5]	0E14	0E66	0EB8	counts hex
Accuracy [7]	–	–	±2.5	% FSS
Output resolution	–	12	–	bit
Response time [8]	–	8	11	ms

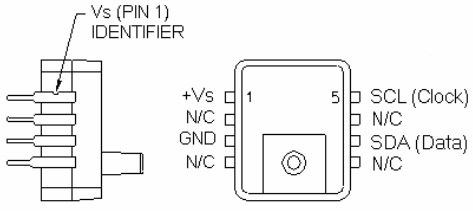
Notes:
1. If burst pressure is exceeded, even momentarily, the package may leak or the pressure sensing die may fracture.
2. Reference conditions (unless otherwise noted): supply voltage, V_S=5.0 ±0.01 Vdc, Ta=25 °C [77 °F].
3. Read operation: *Start, Slave Address, R/W =1, Data Byte 1 (MSB), Ackn Bit, Data Byte 2 (LSB).* The output is corrected pressure as unsigned 12 bits. Slave Address is F0h. Acknowledge Bit - pull data line LOW, master generates an extra clock pulse for this purpose.
4. Span is the algebraic difference between the output voltage at the specified pressure and the output at zero pressure.
5. Output is non-ratiometric within the supply voltage range (Vs).
6. Output of the device when maximum positive pressure is applied on the backside (P2) or the front side (P1) of the sensing element.
7. Accuracy is the combined errors from offset and span calibration, linearity, pressure hysteresis, and temperature effects. Calibration errors include the deviation of offset and full scale from nominal values Linearity is the measured deviation based on a straight line. Hysteresis is the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure and temperature.
8. Response time for 0 PSI to full scale pressure step change, 10% to 90% rise time.
9. 220 nF capacitor required between +Vs and GND.

ELECTRICAL CONNECTIONS [1,2,3]

ASDXLYYD4ZZ-DO



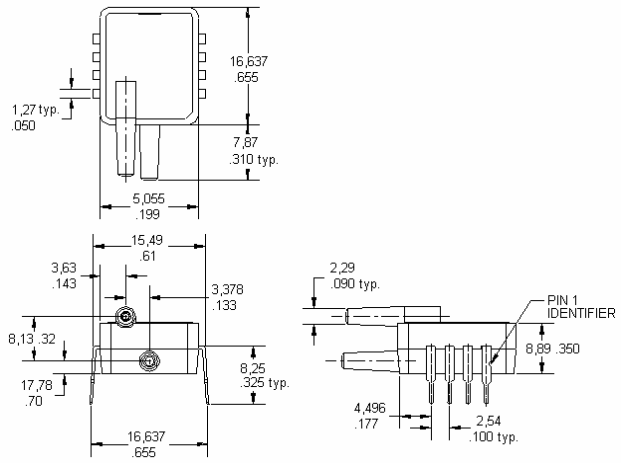
ASDXLYYG2ZZ-DO



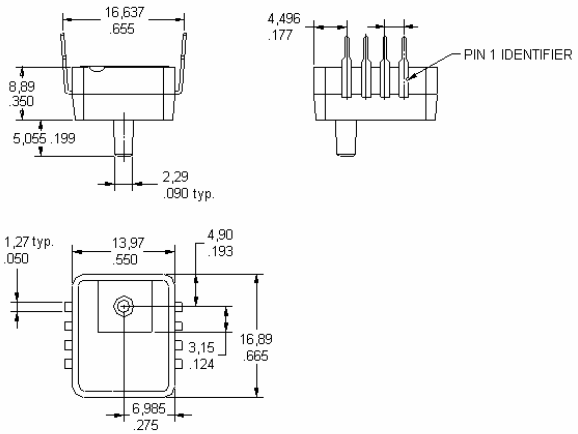
Notes:
1. N/C means no connection. Connecting to ground or other potential may damage sensors.
2. Capacitor 220 nF required between +Vs and GND.
3. The sensor is not reverse polarity protected. Incorrect application of excitation voltage or ground to the wrong pin can cause electrical failure. Application of supply voltage above the maximum can cause electrical failure.

DIMENSIONS (For reference only, mm/in.)

D4 Package



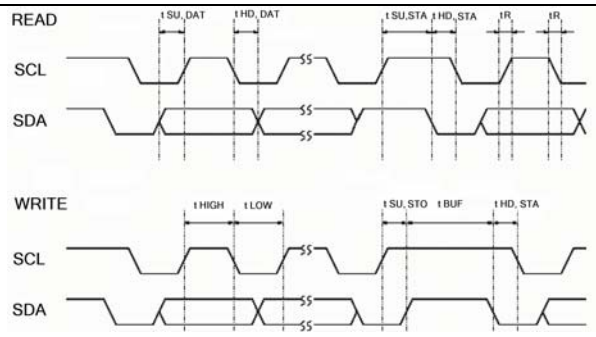
G2 Package



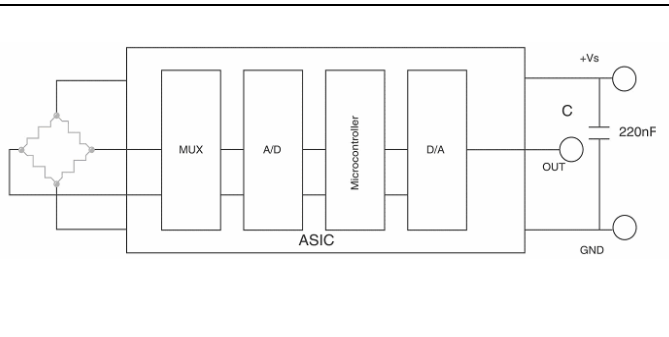
SERIAL INTERFACE PARAMETERS

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input high level	VIH	–	4.5	–	1	Vs
Input low level	VIL	–	0	–	0.5	Vs
Output low level	VOL	open drain IOL = -4 mA	–	–	0.1	Vs
Pull up current	VOH	pin SCL and SDA	5	–	20	µA
Load capacitance SDA	CLSDA	–	–	–	400	pF
SCL clock frequency	fSCL	–	–	–	100	kHz
Bus free time between STOP and START condition	tBUF	–	4.7	–	–	µs
Hold time (repeated) START condition	tHD,STA	to first clock pulse	4.0	–	–	µs
LOW period of SCL	tLOW	–	4.7	–	–	µs
High period of SCL	tHIGH	–	4.0	–	–	µs
Setup time repeated START condition	tSU, STA	–	4.7	–	–	µs
Data hold time	tHD, DAT	–	0	–	–	ns
Data setup time	tSU, DAT	–	250	–	–	ns
Rise time of both SDA and SCL	tR	–	–	–	300	ns
Fall time of both SDA and SCL		–	–	–	300	ns
Setup time for STOP condition	tSU, STO	–	4	–	–	µs
Input filter spike suppression	tsp	spikes on SDA or SCL of that length are suppressed	–	–	50	µs

SERIAL INTERFACE TIMING CHARACTERISTICS



BLOCK DIAGRAM



ORDERING INFORMATION

Pressure Range	Gage	Differential	Bidirectional
0 in to ±5 in H_2O	–	–	ASDXL05D44D-DO
0 in to 10 in H_2O	ASDXL10G24R-DO	ASDXL10D44R-DO	–
0 in to ±10 in H_2O	–	–	ASDXL10D44D-DO

⚠ WARNING

PERSONAL INJURY

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WARRANTY/REMEDY

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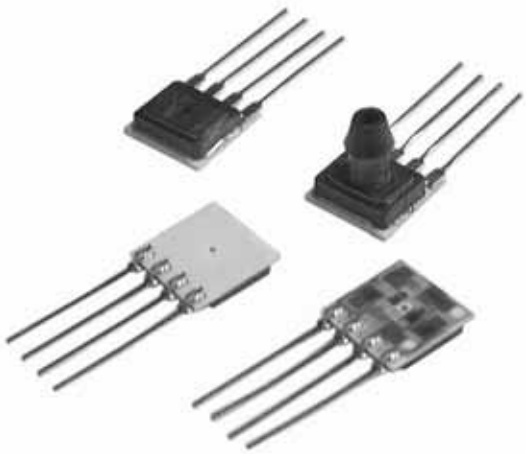
008140-3-EN IL50 GLO Printed in USA
June 2006

Honeywell

CPC/CPCL and CPX/CPXL Series

Uncompensated/Compensated and Compensated Calibrated Silicon Pressure Sensors



DESCRIPTION

The CPX/CPXL and the CPC/CPCL Series sensors integrate silicon micromachined sensing technology, temperature compensation, and calibration in a complete family of low cost packages. This series offers the most cost-effective solution for design requirements.

These piezoresistive pressure sensors use micromachined silicon chips mounted on a ceramic and protected with a plastic cap. Several tube arrangements with nylon housings are available for various pressure applications.

On devices of 5 psi and above, the top side of the chip is protected against humidity by a Silgel coating. While the sensors are designed for use with non-corrosive, nonionic pressure media, they accommodate many gases that are used in medical applications.

The CPC Series is designed for the lowest cost and smallest profile. The standard packages have only a plastic cap for OEM applications. The CPC axial port option accommodates pressure measurements in tube applications.

FEATURES

- Low cost, small size
- Temperature compensated
- Zero and span calibrated
- Millivolt output
- Differential, gage and absolute pressure
- Constant voltage excitation
- High impedance - low current

POTENTIAL APPLICATIONS

- Medical applications
- Applications requiring small size
- Applications requiring vacuum and positive
- Pressure reference, or both

CPC/CPCL and CPX/CPXL Series

ELECTRICAL SPECIFICATIONS

Characteristic	CPC/CPCL at 12 Vdc, 25 °C [77 °F]				CPX/CPXL at 5 Vdc, 25 °C [77 °F]			
	Min.	Typ.	Max.	Unit	Min.	Typ.	Max.	Unit
Excitation voltage	3.0	12.0	16.0	Vdc	3.0	5.0	12.0	Vdc
Null	-1.0	0	1.0	mV	-50	0	50	mV
Offset temperature shift[1] 0 °C to 25 °C [32 °F to 77°F] 25 °C to 70 °C [77 °F to 158 °F][2]	–	–	±1.0	mV	–	±0.5		mV
Full scale temperature shift[2] 0 °C to 25 °C [32 °F to 158 °F] 25 °C to 70 °C [77 °F to 158 °F][2]	–	–	±2	PPM/°C	–	-2200	–	PPM/°C
Linearity, hysteresis error[3]	–	0.25	1.0	% span		0.25	1.0	% span
Input resistance	5.0	–	–	kOhm	5.0	–	–	kOhm
Output resistance	–	3.0	–	kOhm	–	3.0	–	kOhm
Operating temperature	-25 [-13]	–	85 [185]	°C [°F]	-25 [-13]	–	85 [185]	°C [°F]
Storage temperature	-40 [-40]	–	125 [257]	°C [°F]	-40 [-40]	–	125 [257]	°C [°F]
Common mode pressure	–	–	50	psi	–	–	50	psi
Weight	–	2	–	g	–	2	–	g

Notes:

1. Pressure specs obtained with pressure applied to the front of the sensor.
2. Shift is relative to 25 °C [77 °F].
3. Measured at ½ full scale rated pressure using BFSL.

ABSOLUTE OUTPUT

FS Pressure	CPC at 12 Vdc, 25 °C [77 °F] Output Full Scale Span (mV)			CPX at 5 Vdc, 25 °C [77 °F] Output Full Scale Span (mV)			Overpressure (psi)
	Min.	Typ.	Max.	Min.	Typ.	Max.	Max.
5 psi	57	60	63	112	168.5	225	15
15 psi	85	90	95	168	253	338	45
30 psi	85	90	95	168	253	338	90
60 psi	85	90	95	189	263.5	338	180
100 psi	95	100	105	210	295	380	250

GAGE/DIFFERENTIAL[1] OUTPUT

FS Pressure	CPC/CPCL at 12 Vdc, 25 °C [77 °F] Output Full Scale Span (mV)			CPX/CPXL at 5 Vdc, 25 °C [77 °F] Output Full Scale Span (mV)			Overpressure (psi)
	Min.	Typ.	Max.	Min.	Typ.	Max.	Max.
4 in H_2O	23	25	27	50	68	86	3
10 in H_2O	19	20	21	40	78.5	112	3
1 psi	17	18	19	40	75	110	3
5 psi	57	60	63	112	168.5	225	15
15 psi	85	90	95	168	253	338	45
30 psi	85	90	95	168	253	338	90
60 psi	85	90	95	189	263.5	338	180
100 psi	95	100	105	210	295	380	250
150 psi	85	90	95	187	262.5	338	250

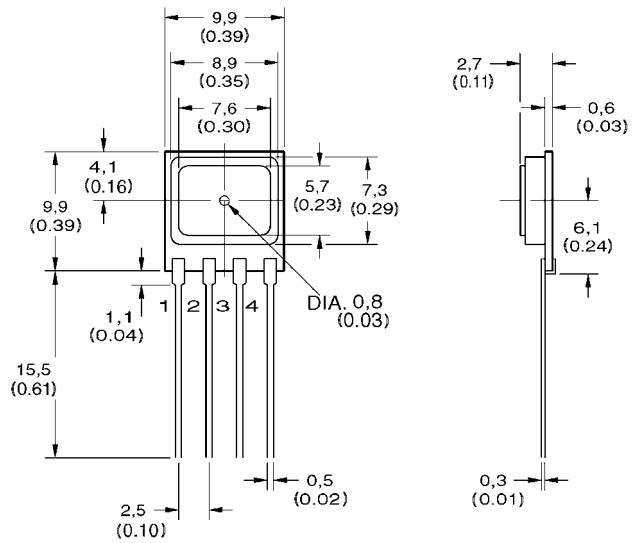
Note:

1. Differential common mode pressure should not exceed 50 psi.

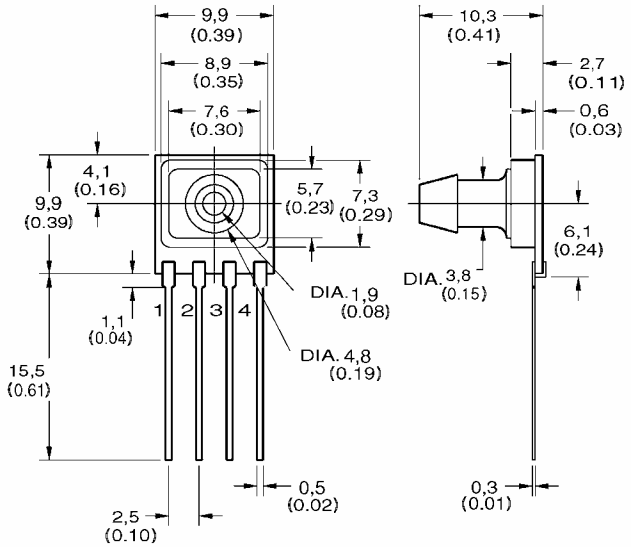
Uncompensated/Compensated and Compensated Calibrated Silicon Pressure Sensors

MOUNTING DIMENSIONS (For reference only: mm [in].)

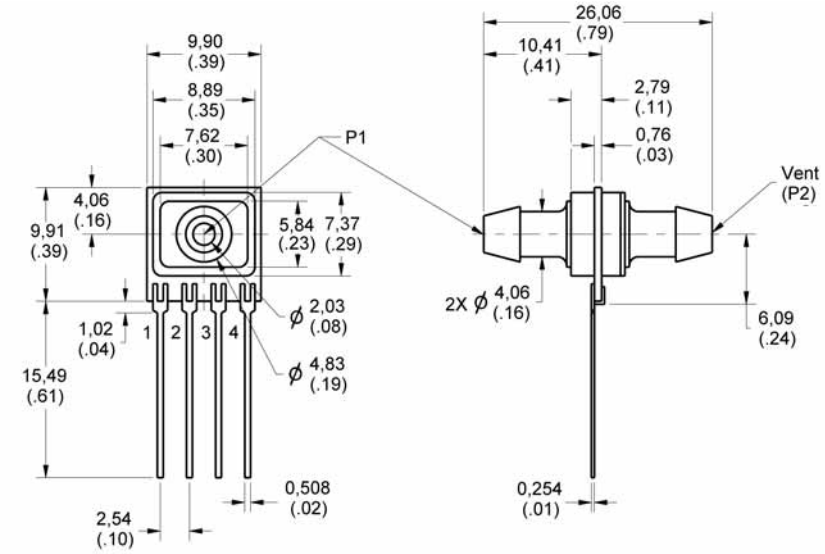
Non-ported Package



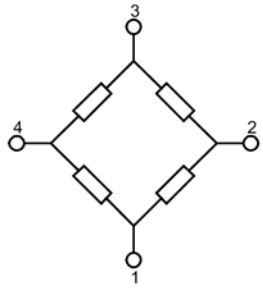
AF and GF Package



DF Package



EQUIVALENT CIRCUIT



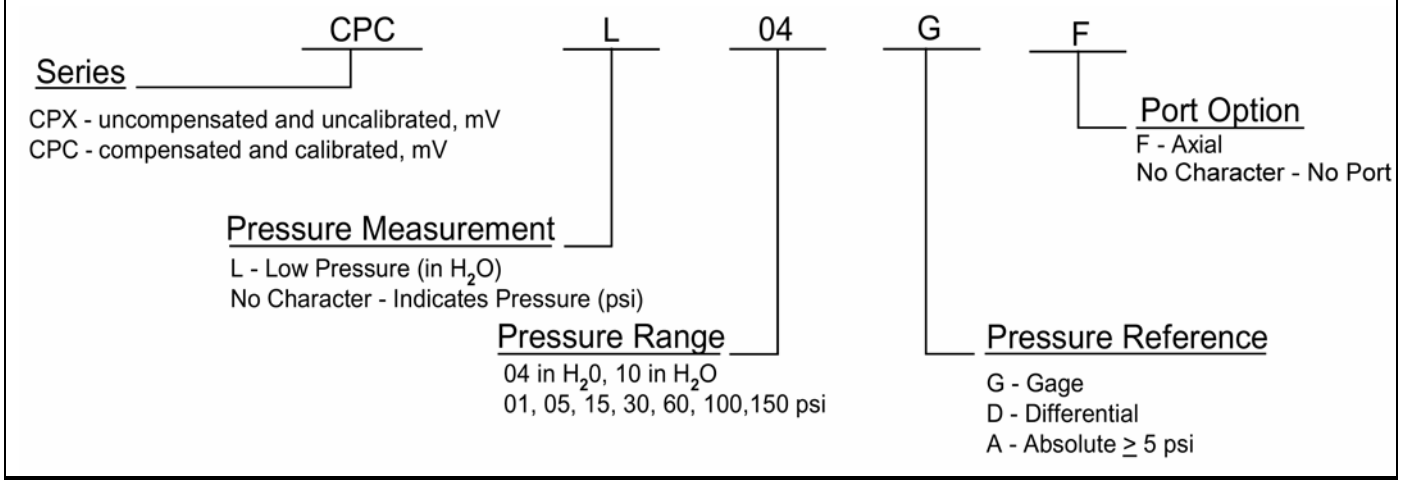
Pinout

1. - V Excitation
2. + Output Signal
3. +V Excitation
4. - Output Signal

MEDIA COMPATIBILITY: Clean, dry gases only

Port 1: Media must be compatible with epoxy-based adhesive.
Port 2: Media must be compatible with nylon housing, epoxy adhesive and silicon.

ORDER GUIDE



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July 2007

Honeywell

Silicon Pressure Sensors

Ultra Low Pressure Sensing

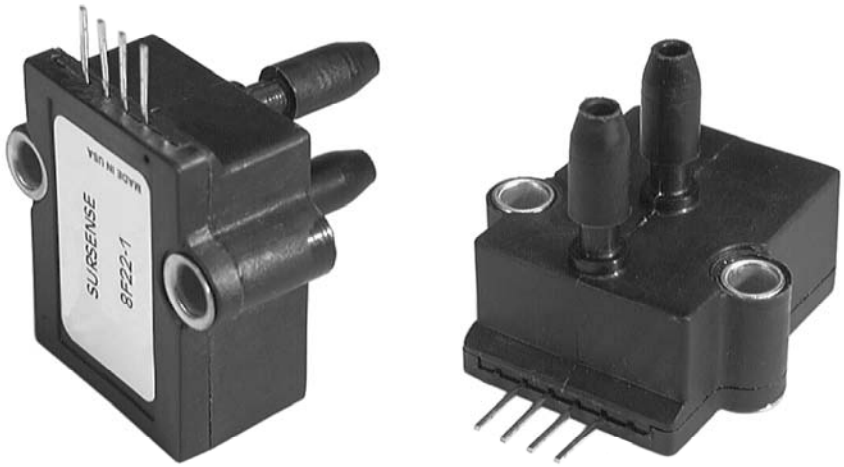
DC Series

FEATURES

- Ultra Low Pressure Sensing, down to 2.5 mBar
- ASIC Technology
- Available in Gage and Differential Pressure Ranges
- Available in Ratiometric and Regulated
- Temperature Compensated over 0 °C to 50°C [32 °F to 122 °F]
- Combined Linearity and Hysteresis error < ±0.25 % Span

TYPICAL APPLICATIONS

- Medical Instrumentation
- HVAC
- Environmental Controls
- Portable Monitors



GENERAL DESCRIPTION

The DC Series pressure sensors combine SURSENSE™ precision high sensitivity silicon sensing capabilities with the latest in Application Specific Integrated Circuitry ASIC technology to produce one of the most precise, reliable pressure sensors in the market. The SURSENSE technology provides Dynamic Self Compensation which substantially reduces offset errors due to changes in temperature, stability to warm up, long term instability and position sensitivity.

When operated with an unregulated 7.0 Vdc to 16.0 Vdc supply the DC sensors provides a ratiometric 0.50 to 4.50 Vdc output (4.0 Vdc span).

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ELECTRICAL SPECIFICATIONS

Ouput	Pressure Reference	Excitation (Vdc)	Offset[1] Voltage (Vdc)	Output Span (Vdc)	Supply Current (max.)	Output Source Current (max.)	Output Sink Current @ null (max.)
C4 Ratiometric	Gage	5 ±0.1	0.25	4	4 mA	2.0 mA	20 µA
	Differential	5 ±0.1	2.25	±2	4 mA	2.0 mA	20 µA
R4 Regulated	Gage	7 to 16	0.25	4	8 mA	2.0 mA	20 µA
	Differential	7 to 16	2.25	±2	8 mA	2.0 mA	20 µA
R5 Regulated	Gage	7 to 16	0.25	5	8 mA	2.0 mA	20 µA
	Differential	7 to 16	3.5	±2.5	8 mA	2.0 mA	20 µA

PERFORMANCE SPECIFICATIONS[2]

Pressure Ranges	Overpressure	Offset Position Sensitivity	Total Error (Typical)	Total Error[3] (Max.)	Accuracy[4]
±0.5 in H_2O	100 in H_2O	±10 mV	±2.0 %	±3.0 %	±0.25 %
1 in H_2O	100 in H_2O	±10 mV	±2.0 %	±3.0 %	±0.25 %
2.5 mBar	250 mBar	±10 mV	±2.0 %	±3.0 %	±0.25 %
2 in H_2O	100 in H_2O	±10 mV	±1.5 %	±2.5 %	±0.25 %
5 mBar	250 mBar	±10 mV	±1.5 %	±2.5 %	±0.25 %
2.5 in H_2O	100 in H_2O	±10 mV	±1.5 %	±2.5 %	±0.25 %
5 in H_2O	150 in H_2O	±5 mV	±1.0 %	±2.0 %	±0.25 %
10 mBar	375 mBar	±5 mV	±1.0 %	±2.0 %	±0.25 %
10 in H_2O	150 in H_2O	±1 mV	±1.0 %	±2.0 %	±0.25 %
25 mBar	375 mBar	±1 mV	±1.0 %	±2.0 %	±0.25 %
20 in H_2O	300 in H_2O	±1 mV	±1.0 %	±2.0 %	±0.25 %
50 mBar	750 mBar	±1 mV	±1.0 %	±2.0 %	±0.25 %
30 in H_2O	450 in H_2O	±1 mV	±1.0 %	±2.0 %	±0.25 %
75 mBar	1125 mBar	±1 mV	±1.0 %	±2.0 %	±0.25 %
140 cm H_2O	1125 cm H_2O	±1 mV	±1.0 %	±2.0 %	±0.25 %

Note 1: Offset voltage and output span are nominal

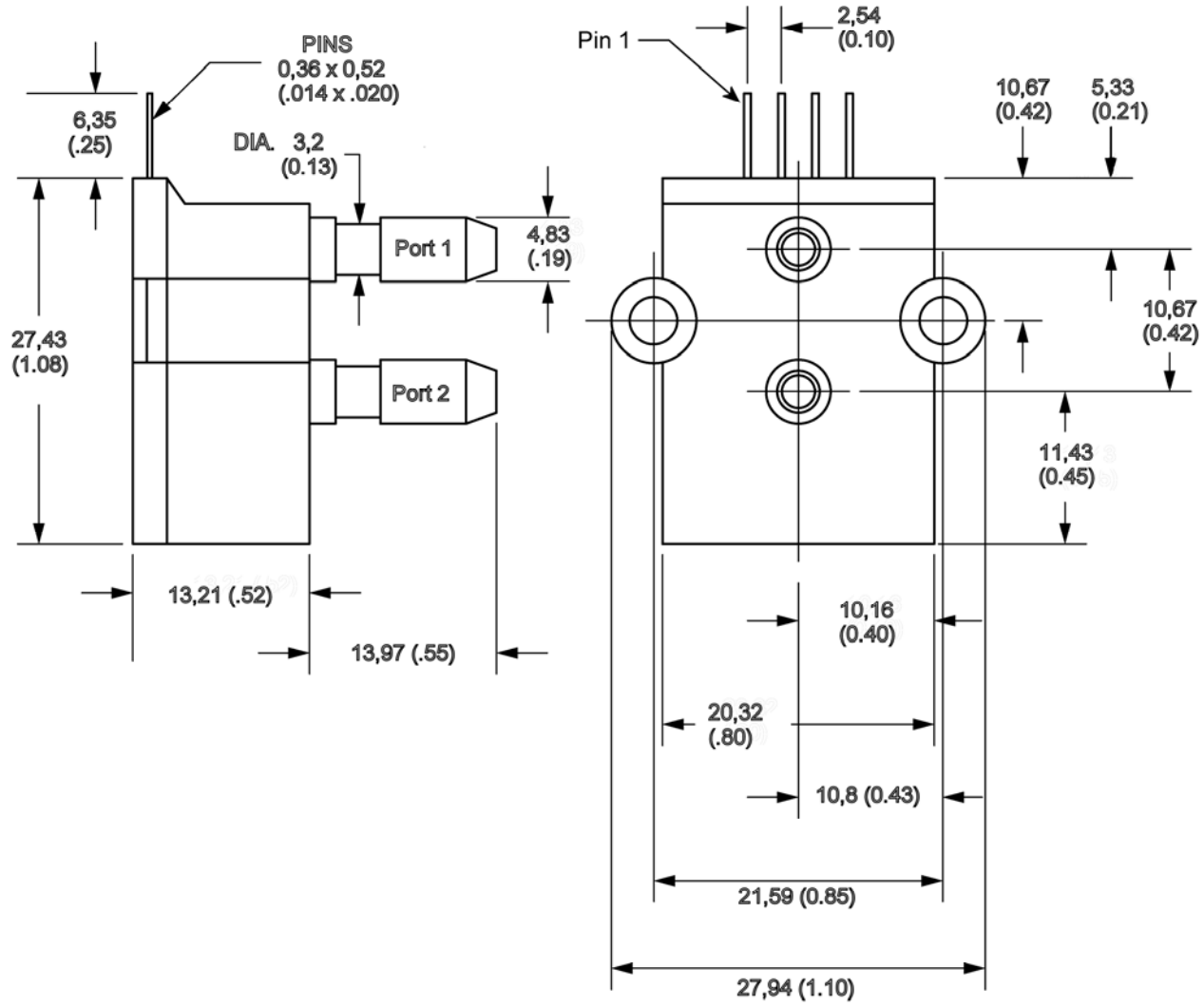
Note 2: All specifications are relative to readings taken at 25 °C [77 °F] and at rated excitation unless otherwise specified.

Note 3: Percentage of Full Scale Includes: zero calibration, span calibration, temperature effect on zero and span, non-linearity, hysteresis, repeatability and stability over the compensated temperature range.

Note 4: Percentage of Best Fit Straight Line Includes: non-linearity, hysteresis, and repeatability.

Material in Contact with Media	Silicon diaphragm, glass filled nylon, silicone, and alumina ceramic.
Compensated Temperature Range	0 °C to 50 °C [32 °F to 170 °F]
Operating Temperature Range	-25 °C to 85 °C [-13 °F to 185 °F]
Storage Temperature	-40 °C to 125 °C [-40 °F to 257 °F]

PHYSICAL DIMENSIONS for reference only mm [In]



Note: For gage sensor apply pressure to port 2.

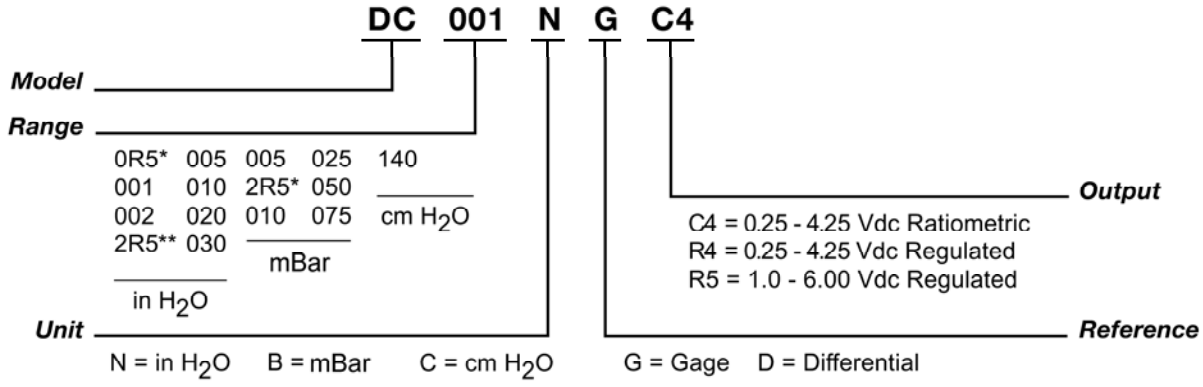
	DC Electrical Output Version		
Pin Number	C4 0.25 Vdc to 4.25 Vdc Ratiometric	R4 0.25 Vdc to 4.25 Vdc Regulated	R5 1.0 Vdc to 6.0 Vdc Regulated
1	V Excitation	V Excitation	V Excitation
2	Common	Common	Common
3	V out	V out	V out
4	Not for Customer Use	Not for Customer Use	Not for Customer Use

Silicon Pressure Sensors

Ultra Low Pressure Sensing

DC Series

DC SERIES ORDER GUIDE



** Note: Differential Only*

*** Note: The character R replaces the decimal points in fractional pressure ranges. Minimum order quantities apply. Contact the factory for more details.*

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Sensing and Control

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008134-2-EN IL50 GLO Printed in USA

April 2009

Honeywell

DCXL-DS Series

SURSENSE™ Ultra Low Silicon Pressure Sensors

DESCRIPTION

The SURSENSE line of ultra low pressure sensors is based upon a proprietary technology designed to reduce output offset or common mode errors.

These sensors use a silicon micromachined sensing element which features a unique stress concentration-enhanced structure to provide a highly stable linear output that is proportional to applied pressure. Output offset errors due to changes in temperature, warm-up, long-term stability and position sensitivity have all been significantly reduced when compared to conventional sensors.

The DCXL-DS Series provides a precision calibrated, ratiometric mV output with SURSENSE-enhanced stability. Each sensor features calibrated offset, full scale span and thermal error calibration to promote accuracy for flow pressure measurement. These highly stable sensors feature an industry-standard, ported package with improved stress isolation for printed circuit board mount applications. The housing design incorporates a snap together cover and housing leading to improved quality and performance.

Product is patented by US patent 6023978.

FEATURES

- Temperature compensated 0 °C to 50 °C [32 °F to 122 °F]
- Available in gage and differential pressure ranges
- Combined linearity and hysteresis error <±0.25% span

POTENTIAL APPLICATIONS

- Medical
- HVAC
- Industrial instrumentation
- Environmental controls

DCXL-DS Series

ELECTRICAL SPECIFICATIONS (12 Vdc excitation at 25 °C [77 °F].)

Characteristic	Min.	Typ.	Max.	Unit
Excitation voltage	3.0	12.0	16.0	Vdc
Null offset	-500	0	500	µV
Span except DCXL01DS	19.0	20.0	21.0	mV
Span DCXL01DS	9.0	10.0	11.0	mV
Offset temperature shift 0 ºC to 50 ºC [32 ºF to 122 ºF][1] except DCXL01DS	-150	–	150	µV
Offset temperature shift 0 ºC to 50 ºC [32 ºF to 122 ºF][1] DCXL01DS	-250	0	250	µV
Span temperature shift 0 ºC to 50 ºC [32 ºF to 122 ºF][1]	-200	0	200	µV
Linearity, hysteresis error[2]	–	0.05	0.25	% span
Compensated temperature	0 [32]	–	50 [122]	°C [°F]
Operating temperature	-25 [-13]	–	85 [185]	°C [°F]
Storage temperature	-40 [-40]	–	125 [257]	°C [°F]
Offset warm-up shift[3] except DCXL01DS	–	±50	–	µV
Offset warm-up shift[3] DCXL01DS	–	±100	–	µV
Offset position sensitivity (±1 g) DCXL01DS	–	±50	–	µV
Offset position sensitivity (±1 g) DCXL05DS, DCXL10DS	–	±10	–	µV
Offset position sensitivity (±1 g) DCXL20DS, DCXL30DS	–	±5	–	µV

Notes:
1. Shift is relative to 25 °C [77 °F].
2. Measured at ½ full scale rated pressure using BFSL.
3. Shift is within the first hour of excitation applied to the device.

PRESSURE RATINGS IN H_2O (By Catalog Listing)

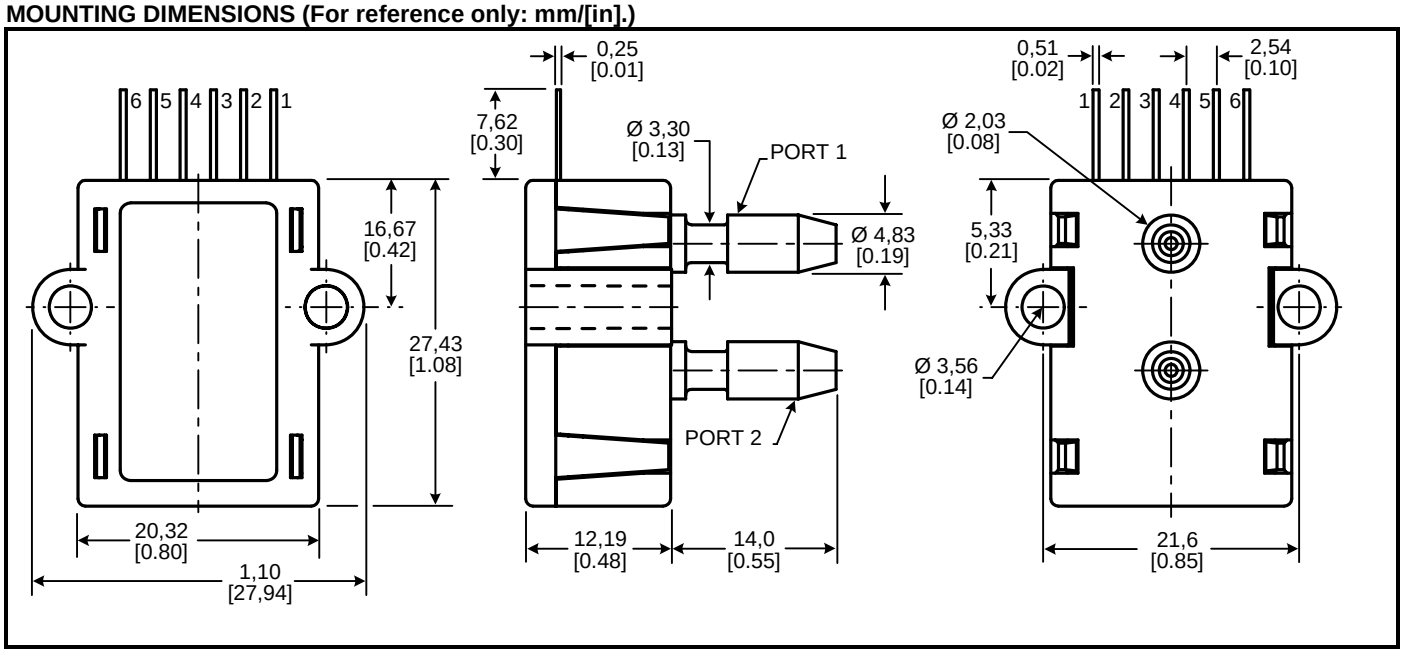
Parameter	01D	05D	10D	20D	30D	Unit
Operating pressure	1	5	10	20	30	in H_2O
Maximum overpressure	5	5	5	5	5	PSI
Common mode	50	50	50	50	50	PSI

TYPICAL RESISTANCE VALUES (By Catalog Listing)

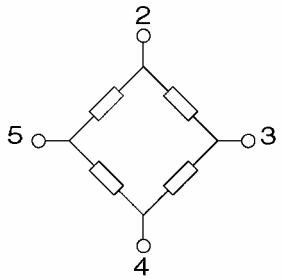
Parameter	01D	05D	10D	20D	30D	Unit
Input resistance	4.5	10	13	10	12	kΩ
Output resistance	1.5	1.5	1.5	2	1.5	kΩ

SURSENSE™ Ultra Low Pressure Sensor Pressure Sensors

MOUNTING DIMENSIONS (For reference only: mm/[in].)



EQUIVALENT CIRCUIT



Pinout

1. V Excitation
2. V Output
3. V Offset (Not to be used unless adjusting null offset.
4. Common

MEDIA COMPATIBILITY: Clean, dry gases only

Port 1: Media must be compatible with epoxy-based adhesive, silicon, silicone, gold, nylon and alumina.
Port 2: Media must be compatible with epoxy-based adhesive, silicon, silicone, gold, nylon and alumina.

PRESSURE COMPATIBILITY

Measures differential or gage pressure and vacuum. Pressure may be applied to either port. For pressure to the low pressure port, the output polarity is reversed.

RATIOMETRIC OUTPUT

The output voltage of the sensor is ratiometric (proportional) to the excitation voltage. All specifications will change proportionally to any changes in the excitation voltage, which may vary between 3 Vdc to 16 Vdc. All specifications will nominally be changed by a ratio of V Excitation/12.0 Vdc. For example: if the excitation voltage is 5.0 Vdc, then both the full scale output voltage and the offset voltage nominal would be 5/12th the specified value.

ORDER GUIDE

DCXL	05	D	S
Series DCLX Compensated and calibrated, mV	Pressure Range 01, 05, 10, 20, 30 in H_20	Pressure Reference D - Differential	Package Type S - Snap cover

⚠ WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

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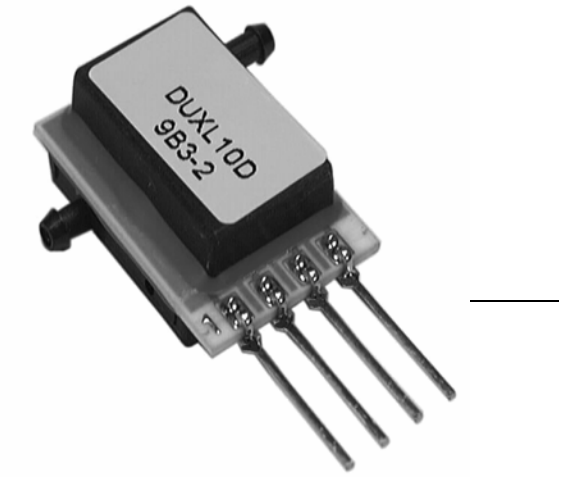
July 2007

Honeywell

DUXL Series

Sursense™ Ultra Low Silicon Pressure Sensors



DESCRIPTION

The SURSENSE™ line of ultra low pressure sensors is based upon a proprietary technology designed to reduce all output offset or common mode errors.

These sensors use a silicon micromachined sensing element which features a unique stress concentration enhanced structure to provide a highly stable linear output that is proportional to applied pressure. Output offset errors due to changes in temperature, warm-up, long term stability and position sensitivity have all been significantly reduced when compared to conventional sensors.

The DUXL Series sensors provide a ratiometric millivolt output and are housed in a low profile miniature ported package. These sensors are intended for those applications where customized external signal conditioning is required or available from other sources. The low profile outline is ideal for portable applications where small size is critical.

Product is patented by US patent 6023978

FEATURES

- Position sensitivity to ±5 mV/g, typical
- Operating temperature range -25 °C to 85 °C [-13 °F to 185 °F]
- Available in gage and differential pressure ranges

POTENTIAL APPLICATIONS

- Hand held instrumentation
- Airflow controllers
- Medical monitors
- Smart microvalves and switches
- Level indicators

DUXL Series

ELECTRICAL SPECIFICATIONS (At 4.5 Vdc Excitation 25 °C [77 °F].)

Characteristic	Min.	Typ.	Max.	Unit
Excitation voltage	3.0	4.5	8.0	Vdc
Span[1] except DUXL01D, DUXL05D	15	30	45	mV
Span[1] DUXL01D	4.0	6.0	8.0	mV
Span[1] DUXL05D	15	22.5	30	mV
Null	-10	0	10	mV
Offset temperature shift 0 °C to 50 °C [32 °F to 122 °F][2]	–	100	–	µV
Span temperature shift 0 °C to 50 °C [32 °F to 122 °F][2]	–	100	–	µV
Linearity, hysteresis error[3]	-0.5	0.1	0.5	% span
Temperature coefficient of resistance	–	2600	–	ppm/°C
Temperature cCoefficient of sensitivity	–	-2200	–	ppm/°C
Operating temperature	-25 [-13]	–	85 [185]	°C [°F]
Storage temperature	-40 [-40]	–	125 [257]	°C [°F]
Offset warm-up shift[4]	–	10	–	µV
Offset position sensitivity (±1 g) DUXL01D, DUXL05D	–	15	–	µV
Offset position sensitivity (±1 g) DUXL10D	–	10	–	µV
Offset position sensitivity (±1 g) DUXL20D, DUXL30D	–	5	–	µV
Offset long term stability (1 year)	–	±100	–	µV
Input resistance	–	2.0	–	kΩ

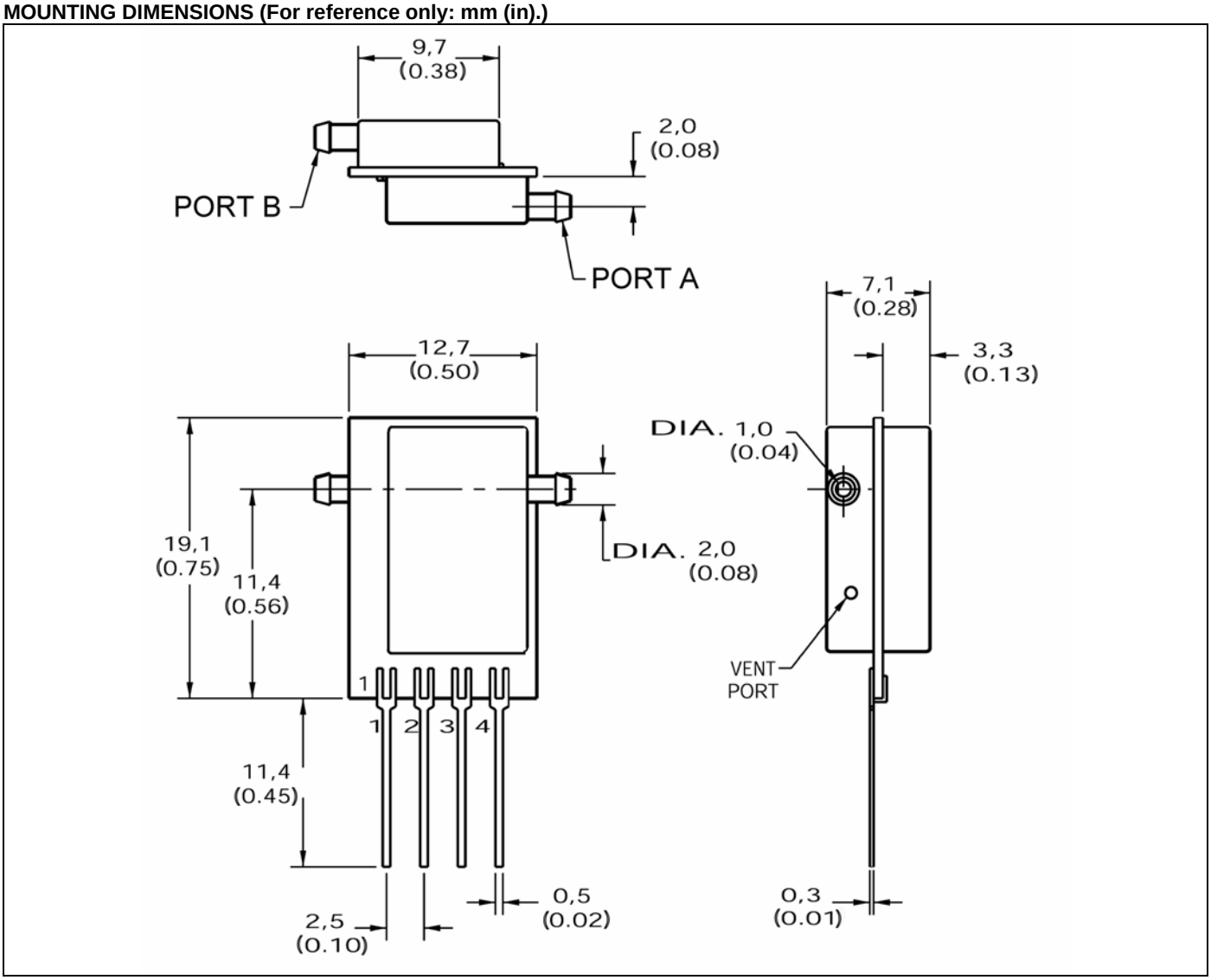
Notes:
1. The voltage added to the offset voltage at full scale pressure. Nominally the output voltage range is 1.0 Vdc to 6.0 Vdc.
2. Shift is relative to 25 °C [77 °F]
3. Measured at ½ full scale operating pressure using BFSL
4. Shift is within the first hour of excitation applied to the device.

PRESSURE RATINGS (In H_2O by Catalog Listing)

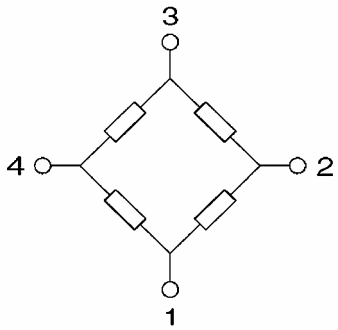
Characteristic	01D	05D	10D	20D	30D
Operating pressure range	1.0	5.0	10.0	20.0	30.0
Maximum overpressure	100	100	150	200	300
Common mode	50	50	50	50	50

Sursense™ Ultra Low Silicon Pressure Sensors

MOUNTING DIMENSIONS (For reference only: mm (in).)



EQUIVALENT CIRCUIT



Pinout
1. –Vdc supply
2. +Vdc output
3. +Vdc supply
4. –Vdc output

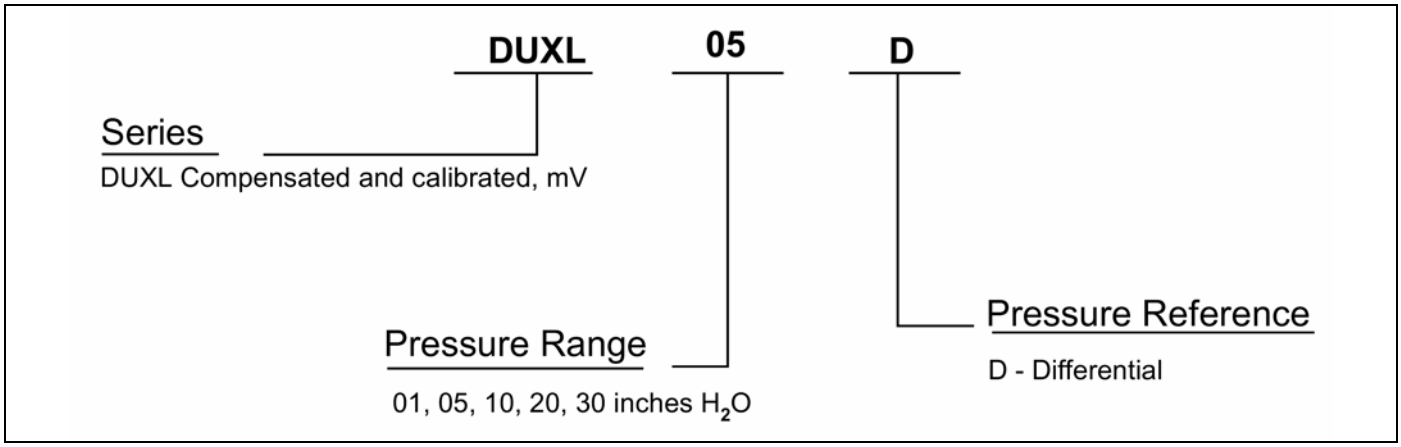
MEDIA COMPATIBILITY: Clean, dry gases only

Port A: Media must be compatible with nylon housing, epoxy adhesive and silicon.
Port B: Media must be compatible with nylon housing, epoxy adhesive and silicon

PRESSURE COMPATIBILITY

Measures differential or gage pressure and vacuum. Pressure may be applied to either port. For pressure to the low pressure port, the output polarity is reversed.

ORDER GUIDE



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008052-3-EN IL50 GLO Printed in USA
July 2007

Honeywell

Microstructure Pressure Sensors

0 mm Hg to 300 mm Hg through 0 psi to 100 psi

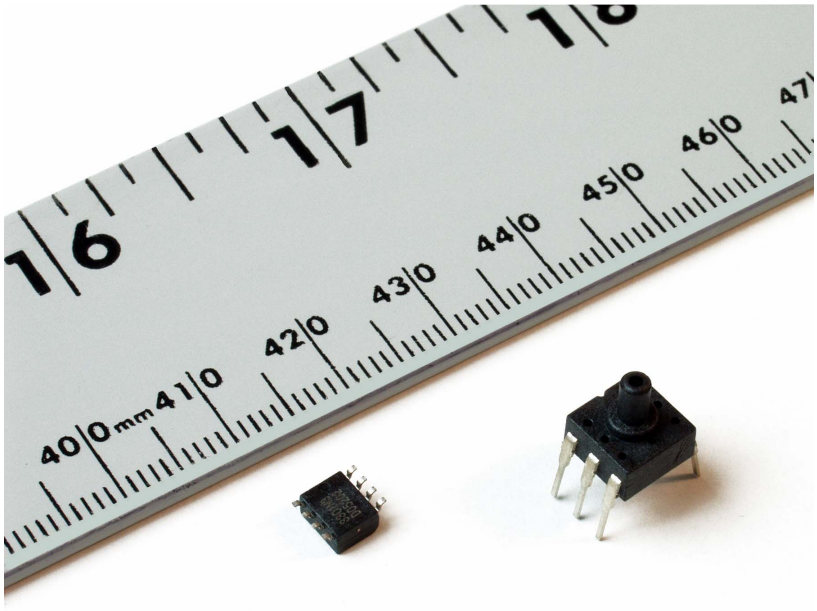
HPX Series

FEATURES

- Miniature package size
- Available in gage and absolute sensing types
- Non-compensated and non-calibrated
- Pressure ranges from 0 psi to 100 psi
- Response time is 1 ms typical
- Two package styles, DIP and SOIC
- Wide operating temperature range
- Surface mount and through hole mounting

TYPICAL APPLICATIONS

- Medical equipment
- Altimeters and barometers
- Pneumatic controls
- Leak detection
- Consumer goods



The HPX Series Pressure Sensors provide accurate, low cost sensing in two different package configurations, DIP (Dual In-line Package) and SOIC (Small Outline Integrated Circuit).

The gage devices come in a 6-pin DIP and the absolute devices come in an 8 pin surface mount SOIC package. Both sensor styles are non-amplified and non-calibrated. The user may provide the HPX Series sensors with amplification and signal conditioning circuitry to meet specific application requirements.

These easy-to-use sensors feature Wheatstone bridge construction, silicon piezoresistive technology and ratiometric output for proven application flexibility, design simplicity and ease of end product manufacturing.

These devices are intended for use with non-corrosive, non-ionic working fluids such as air and dry gases.

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Microstructure Pressure Sensors

0 mm Hg to 300 mm Hg through 0 psi to 100 psi

HPX Series

GENERAL SPECIFICATIONS – GAGE (DIP)

Parameter	Min.	Typ.	Max.	Unit
Excitation	–	3.0	10.0	Vdc
Input impedance	4 k	5 k	6 k	Ohm
Output impedance	4 k	5 k	6 k	Ohm

ENVIRONMENTAL SPECIFICATIONS – GAGE (DIP)

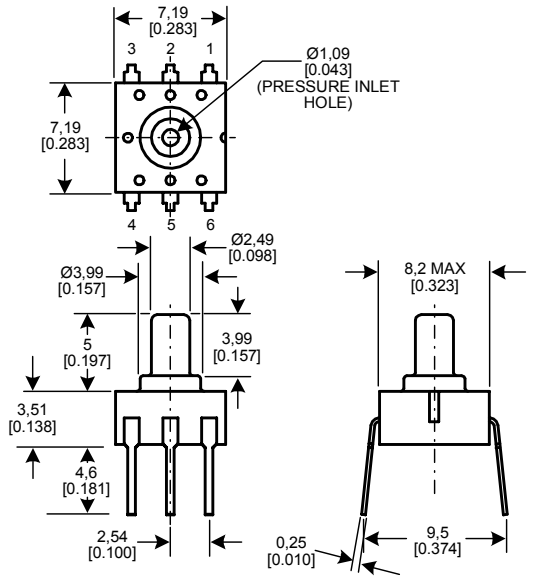
Parameter	Characteristic
Operating temperature range	-20 °C to 100 °C [-4 °F to 212 °F]
Storage	-40 °C to 125 °C [-40 °F to 257 °F]
Vibration	1.5 mm at 10 Hz to 50 Hz
Weight	<1 g [<0.035 oz]
Life	1 million cycles min. (5.8 psi is 100,000 cycles)
Lead solder temperature	DIP solder bath: max. 250 °C [482 °F] for 5 s

PERFORMANCE CHARACTERISTICS – GAGE (DIP)

Pressure Range	Linearity % Span	Hysteresis % Span	Null Offset (mV)	Span (mV)	Overpressure (psi) Max.	Response Time (ms) Typ.	Temperature Coefficient of Null Offset (% Span/ºC) Typ.	Temperature Coefficient of Span (% Span/ºC) Typ.
5.8 psi (300 mm Hg)	±0.5	±0.5	±20	40 ±12	15	1.0	±0.08	-0.1 to -0.3
15 psi	±0.3	±0.3	±30	42 ±12	45	1.0	±0.08	-0.1 to -0.3
30 psi	±0.3	±0.3	±30	60 ±20	90	1.0	±0.08	-0.1 to -0.3
50 psi	±0.3	±0.3	±30	60 ±20	150	1.0	±0.08	-0.1 to -0.3
100 psi	±0.3	±0.3	±30	60 ±20	300	1.0	±0.08	-0.1 to -0.3

Notes:
1. Reference conditions (unless otherwise noted): Supply voltage, V_S=3.0 ± 0.01 Vdc; Ta=25 °C [77 °F]. Output is ratiometric within the supply voltage range (Vs).
2. Temperature coefficients are typical values between -20 °C and 100 °C [-4 °F and 212 °F].
3. Span is the algebraic difference between the output voltage at the specified pressure and the output at zero pressure. Span is ratiometric to the supply voltage.
4. Response time for 0 psi to full-scale pressure step change, 10 % to 90 % rise time.

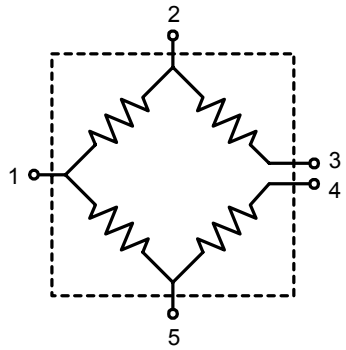
GAGE (DIP) MOUNTING DIMENSIONS (for reference only mm[in])



Absolute Sensor Terminal Connection Table

Terminal Number	Name
1	Power Supply (+)
2	Output (+)
3	Power Supply (-)
4	Power Supply (-)
5	Output (-)
6	No Connection

Wheatstone Bridge



Microstructure Pressure Sensors

0 mm Hg to 300 mm Hg through 0 psi to 100 psi

HPX Series

GENERAL SPECIFICATIONS – ABSOLUTE (SOIC)

Parameter	Min.	Typ.	Max.	Unit
Excitation	–	3.0	10.0	Vdc
Input impedance	4 k	5 k	6 k	Ohm
Output impedance	4 k	5 k	6 k	Ohm

ENVIRONMENTAL SPECIFICATIONS – ABSOLUTE (SOIC)

Parameter	Characteristic
Operating temperature range	-40 °C to 125 °C [-40 °F to 257 °F]
Storage temperature range	-40 °C to 125 °C [-40 °F to 257 °F]
Vibration	1.5 mm at 10 Hz to 50 Hz
Weight	<1 g [<0.035 oz]
Life	1 million cycles min.
SMT solder	Sn 96.5 Ag 3.5 No Clean Flux Sn 63 Pb 37 No Clean Flux
SMT reflow profile	Max peak temperature of 250 °C [482 °F] for 10 s

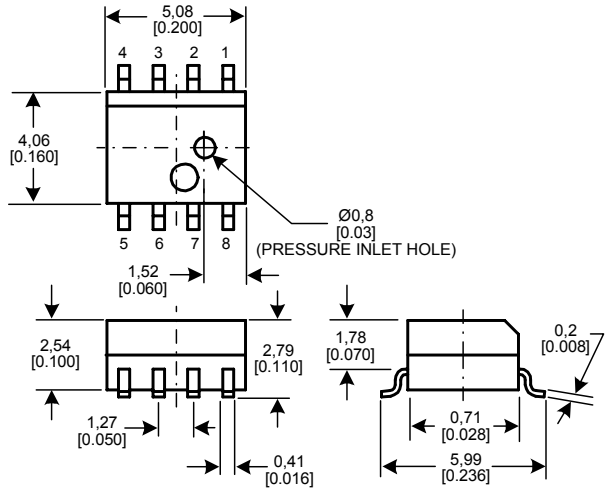
PERFORMANCE CHARACTERISTICS – ABSOLUTE (SOIC)

Pressure Range	Linearity % Span	Hysteresis % Span	Null Offset (mV)	Span (mV)	Overpressure (psi) Max.	Response Time (ms) Typ.	Temperature Coefficient of Null Offset (% Span/ºC) Typ.	Temperature Coefficient of Span (% Span/ºC) Typ.
15 psi	±0.3	±0.3	±30	87 ±18	45	1.0	±0.08	-0.1 to -0.3
30 psi	±0.3	±0.3	±30	60 ±20	90	1.0	±0.08	-0.1 to -0.3
50 psi	±0.3	±0.3	±30	60 ±20	150	1.0	±0.08	-0.1 to -0.3
100 psi	±0.3	±0.3	±30	60 ±20	300	1.0	±0.08	-0.1 to -0.3

Notes:

1. Reference conditions (unless otherwise noted): Supply voltage, V_S=3.0 ± 0.01 Vdc; Ta=25 °C [77 °F]. Output is ratiometric within the supply voltage range (Vs).
2. Temperature coefficients are typical values between -20 °C and 100 °C [-4 °F and 212 °F].
3. Span is the algebraic difference between the output voltage at the specified pressure and the output at zero pressure. Span is ratiometric to the supply voltage.
4. Response time for 0 psi to full-scale pressure step change, 10 % to 90 % rise time.

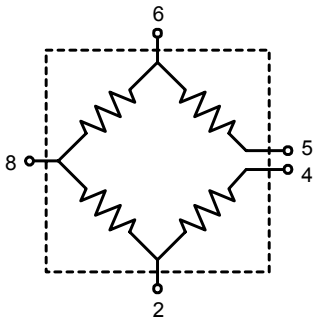
ABSOLUTE (SOIC) MOUNTING DIMENSIONS (for reference only mm[in])



Absolute Sensor Terminal Connection Table

Terminal Number	Name
1	No Connection
2	Output (+)
3	No Connection
4	Power Supply (-)
5	Power Supply (-)
6	Output (-)
7	No Connection
8	Power Supply (+)

Wheatstone Bridge



Microstructure Pressure Sensors

0 mm Hg to 300 mm Hg through 0 psi to 100 psi

HPX Series

ORDER GUIDE

Pressure Range	Absolute (SOIC)	Gage (DIP)
0 psi to 5.8 psi (0 to 300 mm Hg)	–	HPX005GD
0 psi to 15 psi	HPX015AS	HPX015GD
0 psi to 30 psi	HPX030AS	HPX030GD
0 psi to 50 psi	HPX050AS	HPX050GD
0 psi to 100 psi	HPX100AS	HPX100GD

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Freeport, Illinois 61032

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Honeywell

TruStability® Silicon Pressure Sensors: SSC Series–Standard Accuracy

±2% Total Error Band, Amplified Compensated Analog Output, 1 psi to 150 psi (60 mbar to 10 bar)

DESCRIPTION

The TruStability® Standard Accuracy Silicon Ceramic (SSC) Series is a piezoresistive silicon pressure sensor offering a ratiometric analog output for reading pressure over the specified full scale pressure span and temperature range.

The SSC Series is fully calibrated and temperature compensated for sensor offset, sensitivity, temperature effects, and non-linearity using an on-board Application Specific Integrated Circuit (ASIC). Calibrated output values for pressure are updated at approximately 1 kHz.

The SSC Series is calibrated over the temperature range of -20 °C to 85 °C [-4 °F to 185 °F]. The sensor is characterized for operation from a single power supply of either 3.3 Vdc or 5.0 Vdc.

These sensors measure absolute, differential, and gage pressures. The absolute versions have an internal vacuum reference and an output value proportional to absolute pressure. Differential versions allow application of pressure to either side of the sensing diaphragm. Gage versions are referenced to atmospheric pressure and provide an output proportional to pressure variations from atmosphere.

The TruStability® pressure sensors are intended for use with non-corrosive, non-ionic gases, such as air and other dry gases. An available option extends the performance of these sensors to non-corrosive, non-ionic liquids.

All products are designed and manufactured according to ISO 9001 standards.

FEATURES

- Industry-leading long-term stability
- Extremely tight accuracy of ±0.25% FSS BFSL (Full Scale Span Best Fit Straight Line)
- Total error band of ±2% full scale span maximum
- Modular and flexible design offers customers a variety of package styles and options, all with the same industry-leading performance specifications
- Miniature 10 mm x 10 mm [0.39 in x 0.39 in] package
- Low operating voltage
- Extremely low power consumption
- Ratiometric analog output
- High resolution (min. 0.03 %FSS)
- Precision ASIC conditioning and temperature compensated over -20 °C to 85 °C [-4 °F to 185 °F] temperature range
- RoHS compliant
- Virtually insensitive to mounting orientation
- Internal diagnostic functions increase system reliability
- Also available with I^2C or SPI digital output
- Absolute, differential and gage types
- Pressure ranges from 1 psi to 150 psi (60 mbar to 10 bar)
- Custom calibration available
- Various pressure port options
- Liquid media option

POTENTIAL APPLICATIONS

- **Medical:**
  - Airflow monitors
  - Anesthesia machines
  - Blood analysis machines
  - Gas chromatography
  - Gas flow instrumentation
  - Kidney dialysis machines
  - Oxygen concentrators
  - Pneumatic controls
  - Respiratory machines
  - Sleep apnea equipment
  - Ventilators
- **Industrial:**
  - Barometry
  - Flow calibrators
  - Gas chromatography
  - Gas flow instrumentation
  - HVAC
  - Life sciences
  - Pneumatic controls

Table 1. Absolute Maximum Ratings[1]

Parameter	Min.	Max.	Unit
Supply voltage (V_{supply})	-0.3	6.0	Vdc
Voltage on any pin	-0.3	V_{supply} + 0.3	V
ESD susceptibility (human body model)	3	-	kV
Storage temperature	-40 [-40]	85 [185]	°C [°F]
Soldering time and temperature: Lead solder (SIP, DIP) Peak reflow (SMT)	4 s max. at 250 °C [482 °F] 15 s max. at 250 °C [482 °F]		

Table 2. Operating Specifications

Parameter	Min.	Typ.	Max.	Unit
Supply voltage (V_{supply})[2]: 3.3 Vdc 5.0 Vdc *Sensors are either 3.3 Vdc or 5.0 Vdc based on listing selected.*	 3.0 4.75	 3.3[3] 5.0[3]	 3.6 5.25	Vdc
Supply current: 3.3 Vdc supply 5.0 Vdc supply	 - -	 1.6 2	 2.1 3	mA
Compensated temperature range[4]	-20 [-4]	-	85 [185]	°C [°F]
Operating temperature range[5]	-40 [-40]	-	85 [185]	°C [°F]
Startup time (power up to data ready)	-	-	5	ms
Response time	-	1	-	ms
Upper output clipping limit	-	-	97.5	%V_{supply}
Lower output clipping limit	2.5	-	-	%V_{supply}
Accuracy[6]	-	-	±0.25	%FSS BFSL
Total error band[7]	-	-	±2	%FSS[8]
Output resolution	0.03	-	-	%FSS[8]

±2% Total Error Band, Analog Output, 1 psi to 150 psi (60 mbar to 10 bar)

Table 3. Environmental Specifications

Parameter	Characteristic
Humidity:	
Dry gases only (See “Options N and D” in Figure 1.)	0% to 95% RH, non-condensing
Liquid media (See “Options T and V” in Figure 1.)	100% condensing or direct liquid media on Port 1
Vibration	MIL-STD-202F, Curve AK (20.7 g random)
Shock	MIL-STD-202F, Method 213B, Condition F
Life[9]	1 million cycles minimum
Solder reflow	J-STD-020-C

Table 4. Wetted Materials[10]

Parameter	Port 1 (Pressure Port)	Port 2 (Reference Port)
Covers	high temperature polyamide	high temperature polyamide
Substrate	alumina ceramic	alumina ceramic
Adhesives	epoxy, silicone	epoxy, silicone
Electronic components	ceramic, glass, solder, silicon	silicon, glass, gold, solder

Notes:

1. Absolute maximum ratings are the extreme limits the device will withstand without damage.
2. Ratiometricity of the sensor (the ability of the device to scale to the supply voltage) is achieved within the specified operating voltage for each option.
3. The sensor is not reverse polarity protected. Incorrect application of supply voltage or ground to the wrong pin may cause electrical failure.
4. The compensated temperature range is the temperature range over which the sensor will produce an output proportional to pressure within the specified performance limits.
5. The operating temperature range is the temperature range over which the sensor will produce an output proportional to pressure but may not remain within the specified performance limits.
6. Accuracy: The maximum deviation in output from a Best Fit Straight Line (BFSL) fitted to the output measured over the pressure range at 25 °C [77 °F]. Includes all errors due to pressure non-linearity, pressure hysteresis, and non-repeatability.
7. Total Error Band: The maximum deviation from the ideal transfer function over the entire compensated temperature and pressure range. Includes all errors due to offset, full scale span, pressure non-linearity, pressure hysteresis, repeatability, thermal effect on offset, thermal effect on span, and thermal hysteresis.
8. Full Scale Span (FSS) is the algebraic difference between the output signal measured at the maximum (Pmax.) and minimum (Pmin.) limits of the pressure range. (See Figure 1 for ranges.)
9. Life may vary depending on specific application in which sensor is utilized.
10. Contact Honeywell Customer Service for detailed material information.

CAUTION

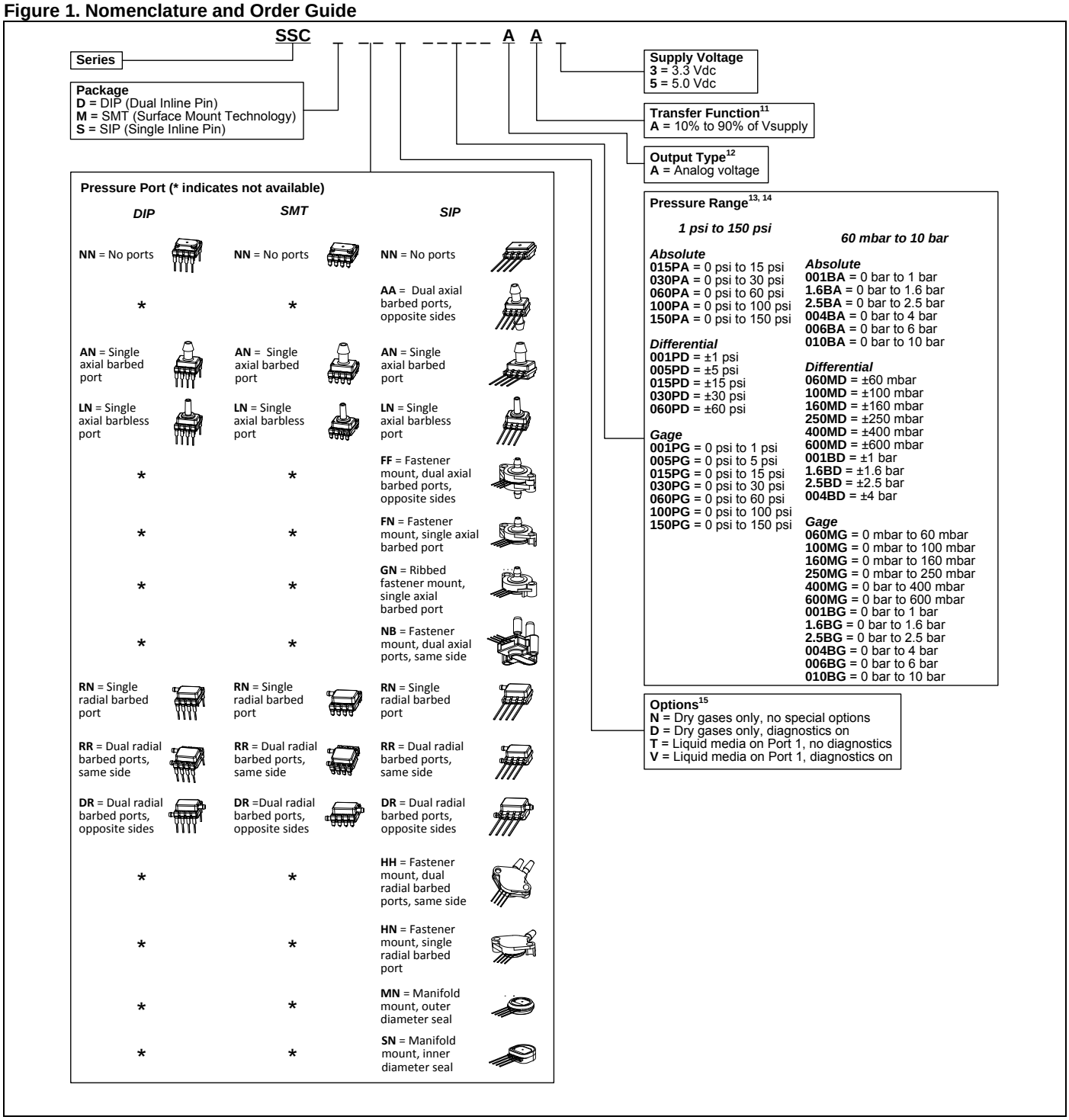
PRODUCT DAMAGE

- Ensure liquid media is applied to Port 1 only; Port 2 is not compatible with liquids.
- Ensure liquid media contains no particulates. All TruStability® sensors are dead-ended devices. Particulates can accumulate inside the sensor, causing damage or affecting sensor output.
- Recommend that the sensor be positioned with Port 1 facing downwards; any particulates in the system are less likely to enter and settle within the pressure sensor if it is in this position.
- Ensure liquid media does not create a residue when dried; build-up inside the sensor may affect sensor output. Rinsing of a dead-ended sensor is difficult and has limited effectiveness for removing residue.
- Ensure liquid media are compatible with wetted materials. Non-compatible liquid media will degrade sensor performance and may lead to sensor failure.

Failure to comply with these instructions may result in product damage.

TruStability® Silicon Pressure Sensors: SSC Series–Standard Accuracy

Figure 1. Nomenclature and Order Guide

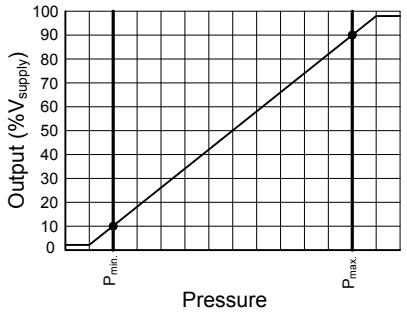


Notes:

11. The transfer function limits define the output of the sensor at a given pressure input. By specifying Pmin. and Pmax., the output at Pmin. and Pmax., the complete transfer function of the sensor is defined. See Figure 2 for a graphical representation of the transfer function. Other transfer functions are available. Contact Honeywell Customer Service for more information.
12. Digital outputs (SPI or I^2C) are also available. Contact Honeywell Customer Service for more information.
13. Custom pressure ranges are available. Contact Honeywell Customer Service for more information.
14. See Table 5 for an explanation of sensor pressure types.
15. See **CAUTION** on previous page.

±2% Total Error Band, Analog Output, 1 psi to 150 psi (60 mbar to 10 bar)

Figure 2. Transfer Function Limits



$$\text{Output (V)} = \frac{0.8 \times V_{supply}}{P_{max.} - P_{min.}} \times (\text{Pressure}_{applied} - P_{min.}) + 0.10 \times V_{supply}$$

Figure 3. Completed Catalog Listing Example

SSCSANN100PGAA3
SIP package, AN pressure port, no diagnostics, 100 psi gage, analog output, 10% to 90% calibration at 3.3 Vdc.

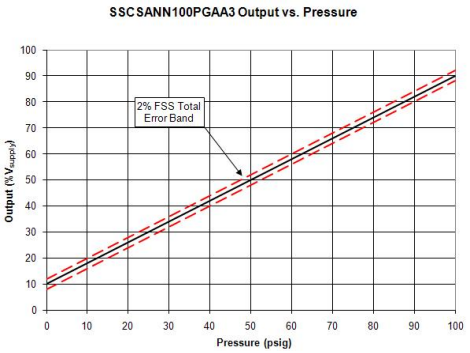


Table 5. Pressure Types

Pressure Type	Description
Absolute	Output is proportional to the difference between applied pressure and a built-in reference to vacuum. $P_{min.}$ is set at absolute zero pressure (full vacuum).
Differential	Output is proportional to the difference between the pressures applied to each port. (Port 1 – Port 2) 50% point of transfer function set at Port 1 = Port 2.
Gage	Output is proportional to the difference between applied pressure and atmospheric (ambient) pressure. $P_{min.}$ is set at atmospheric pressure.

Table 6. Pressure Range Specifications for 1 psi to 150 psi

Order Code	Pressure Range		Over-pressure[16]	Burst Pressure[17]	Common Mode Pressure[18]	Long-term Stability (1000 hr, 25 °C [77 °F])
	$P_{min.}$	$P_{max.}$				
Absolute						
015PA	0 psi	15 psi	30 psi	60 psi	NA	±0.25% FSS
030PA	0 psi	30 psi	60 psi	120 psi	NA	±0.25% FSS
060PA	0 psi	60 psi	120 psi	240 psi	NA	±0.25% FSS
100PA	0 psi	100 psi	250 psi	250 psi	NA	±0.25% FSS
150PA	0 psi	150 psi	250 psi	250 psi	NA	±0.25% FSS
Differential						
001PD	-1 psi	1 psi	10 psi	10 psi	150 psi	±0.35% FSS
005PD	-5 psi	5 psi	30 psi	40 psi	150 psi	±0.35% FSS
015PD	-15 psi	15 psi	30 psi	60 psi	150 psi	±0.25% FSS
030PD	-30 psi	30 psi	60 psi	120 psi	150 psi	±0.25% FSS
060PD	-60 psi	60 psi	120 psi	240 psi	250 psi	±0.25% FSS
Gage						
001PG	0 psi	1 psi	10 psi	10 psi	150 psi	±0.35% FSS
005PG	0 psi	5 psi	30 psi	40 psi	150 psi	±0.35% FSS
015PG	0 psi	15 psi	30 psi	60 psi	150 psi	±0.25% FSS
030PG	0 psi	30 psi	60 psi	120 psi	150 psi	±0.25% FSS
060PG	0 psi	60 psi	120 psi	240 psi	250 psi	±0.25% FSS
100PG	0 psi	100 psi	250 psi	250 psi	250 psi	±0.25% FSS
150PG	0 psi	150 psi	250 psi	250 psi	250 psi	±0.25% FSS

Table 7. Pressure Range Specifications for 60 mbar to 10 bar

Order Code	Pressure Range		Over-pressure[16]	Burst Pressure[17]	Common Mode Pressure[18]	Long-term Stability (1000 hr, 25 °C [77 °F])
	$P_{min.}$	$P_{max.}$				
Absolute						
001BA	0 bar	1 bar	2 bar	4 bar	NA	±0.25% FSS
1.6BA	0 bar	1.6 bar	4 bar	8 bar	NA	±0.25% FSS
2.5BA	0 bar	2.5 bar	6 bar	8 bar	NA	±0.25% FSS
004BA	0 bar	4 bar	8 bar	16 bar	NA	±0.25% FSS
006BA	0 bar	6 bar	17 bar	17 bar	NA	±0.25% FSS
010BA	0 bar	10 bar	17 bar	17 bar	NA	±0.25% FSS
Differential						
060MD	-60 mbar	60 mbar	500 mbar	700 mbar	10 bar	±0.35% FSS
100MD	-100 mbar	100 mbar	500 mbar	700 mbar	10 bar	±0.35% FSS
160MD	-160 mbar	160 mbar	500 mbar	700 mbar	10 bar	±0.35% FSS
250MD	-250 mbar	250 mbar	1.4 bar	2.5 bar	10 bar	±0.35% FSS
400MD	-400 mbar	400 mbar	1.4 bar	2.5 bar	10 bar	±0.35% FSS
600MD	-600 mbar	600 mbar	2 bar	4 bar	10 bar	±0.25% FSS
001BD	-1 bar	1 bar	2 bar	4 bar	10 bar	±0.25% FSS
1.6BD	-1.6 bar	1.6 bar	4 bar	8 bar	10 bar	±0.25% FSS
2.5BD	-2.5 bar	2.5 bar	6 bar	8 bar	10 bar	±0.25% FSS
004BD	-4 bar	4 bar	8 bar	16 bar	10 bar	±0.25% FSS
Gage						
060MG	0 mbar	60 mbar	500 mbar	700 mbar	3.5 bar	±0.35% FSS
100MG	0 mbar	100 mbar	500 mbar	700 mbar	10 bar	±0.35% FSS
160MG	0 mbar	160 mbar	500 mbar	700 mbar	10 bar	±0.35% FSS
250MG	0 mbar	250 mbar	1.4 bar	2.5 bar	10 bar	±0.35% FSS
400MG	0 mbar	400 mbar	1.4 bar	2.5 bar	10 bar	±0.35% FSS
600MG	0 mbar	600 mbar	2 bar	4 bar	10 bar	±0.35% FSS
001BG	0 bar	1 bar	2 bar	4 bar	10 bar	±0.25% FSS
1.6BG	0 bar	1.6 bar	4 bar	8 bar	10 bar	±0.25% FSS
2.5BG	0 bar	2.5 bar	6 bar	8 bar	10 bar	±0.25% FSS
004BG	0 bar	4 bar	8 bar	16 bar	16 bar	±0.25% FSS
006BG	0 bar	6 bar	17 bar	17 bar	17 bar	±0.25% FSS
010BG	0 bar	10 bar	17 bar	17 bar	17 bar	±0.25% FSS

Notes:

16. Overpressure: The maximum pressure which may safely be applied to the product for it to remain in specification once pressure is returned to the operating pressure range. Exposure to higher pressures may cause permanent damage to the product. Unless otherwise specified this applies to all available pressure ports at any temperature with the operating temperature range.
17. Burst pressure: The maximum pressure that may be applied to any port of the product without causing escape of pressure media. Product should not be expected to function after exposure to any pressure beyond the burst pressure.
18. Common mode pressure: The maximum pressure that can be applied simultaneously to both ports of a differential pressure sensor without causing changes in specified performance.

Table 8. Pinout for DIP and SMT Packages

Output Type	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
analog	NC	V_{supply}	OUTPUT+	GND	NC	NC	NC	NC

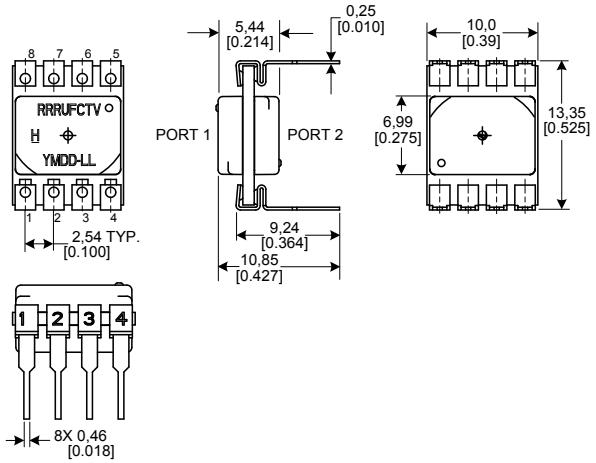
Table 9. Pinout for SIP Package

Output Type	Pin 1	Pin 2	Pin 3	Pin 4
analog	NC	V_{supply}	OUTPUT+	GND

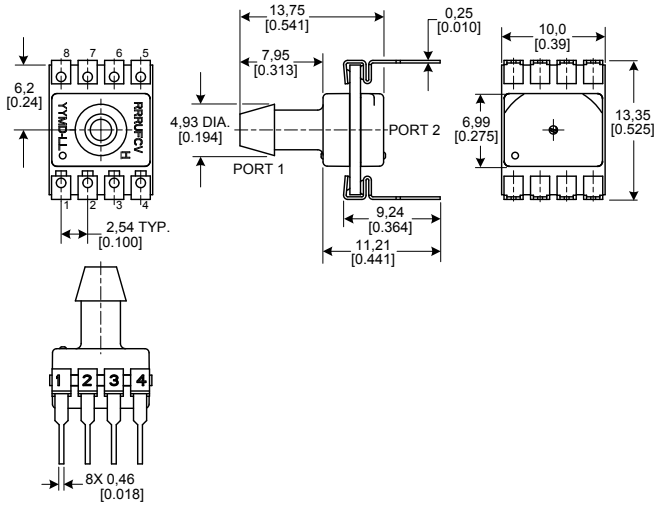
±2% Total Error Band, Analog Output, 1 psi to 150 psi (60 mbar to 10 bar)

Figure 4. DIP Pressure Port Dimensional Drawings (For reference only: mm [in])

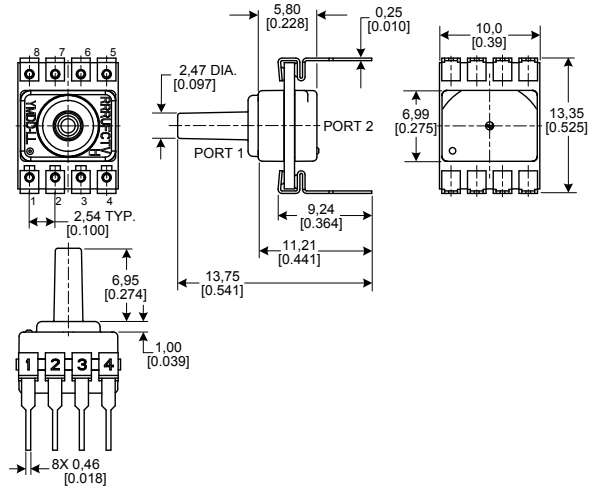
DIP NN: No ports



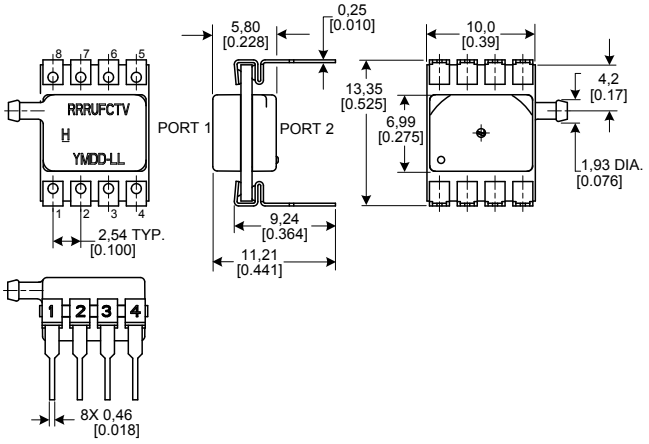
DIP AN: Single axial barbed port



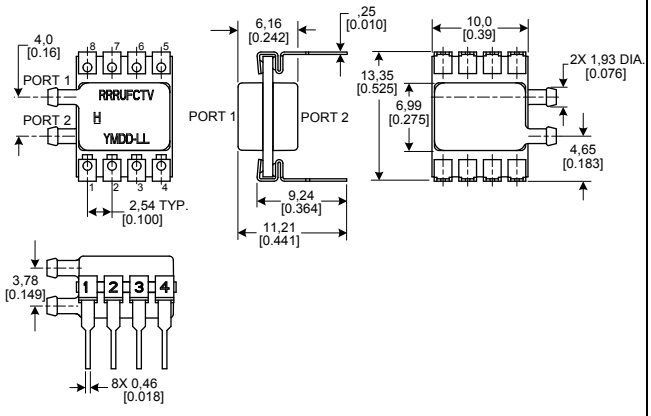
DIP LN: Single axial barbless port



DIP RN: Single radial barbed port



DIP RR: Dual radial barbed ports, same side



DIP DR: Dual radial barbed ports, opposite sides

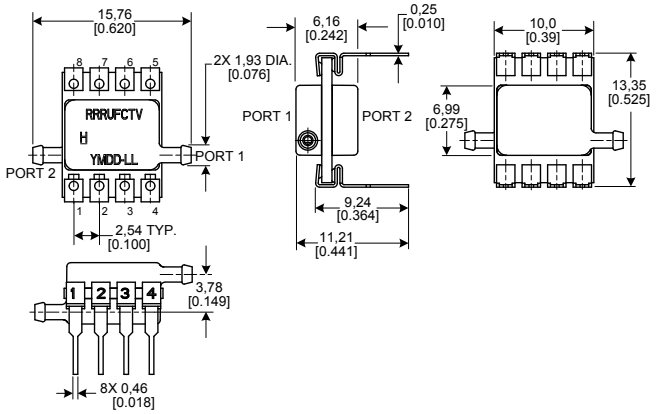
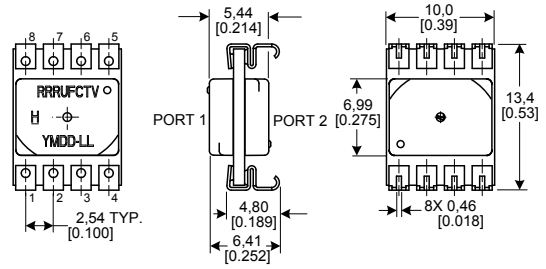
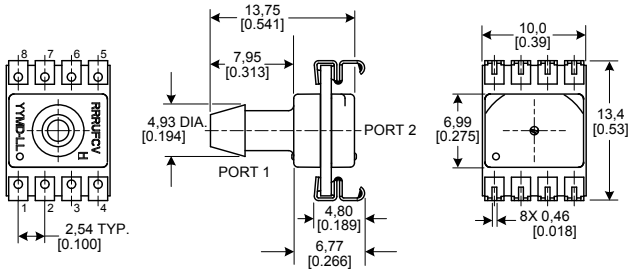


Figure 5. SMT Pressure Port Dimensional Drawings (For reference only: mm [in])

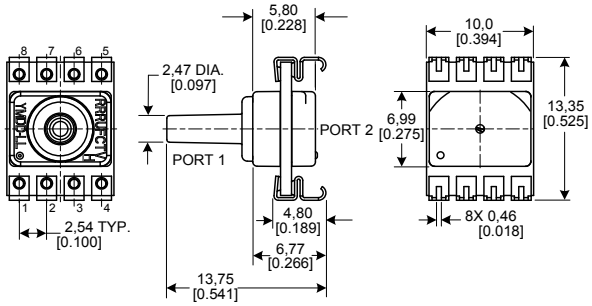
SMT NN: No ports



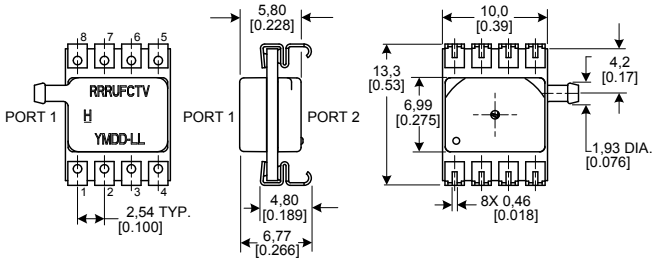
SMT AN: Single axial barbed port



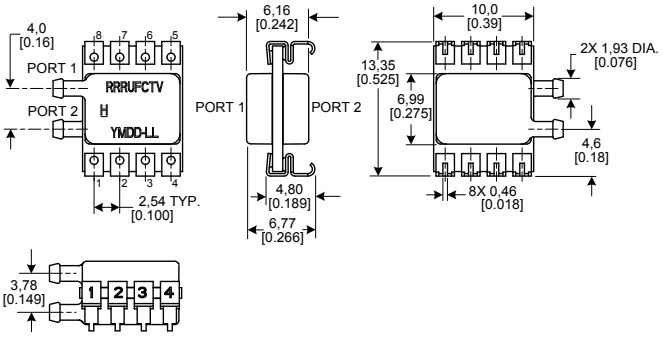
SMT LN: Single axial barbless port



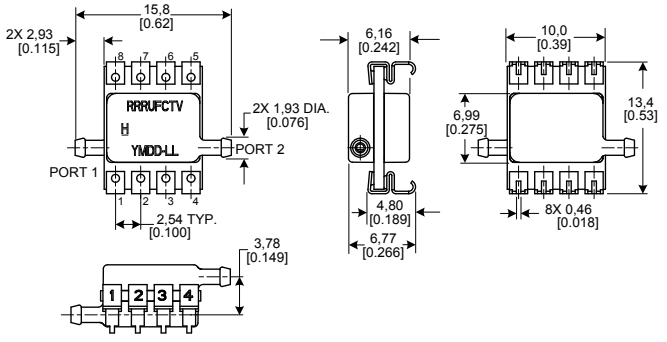
SMT RN: Single radial barbed port



SMT RR: Dual radial barbed ports, same side



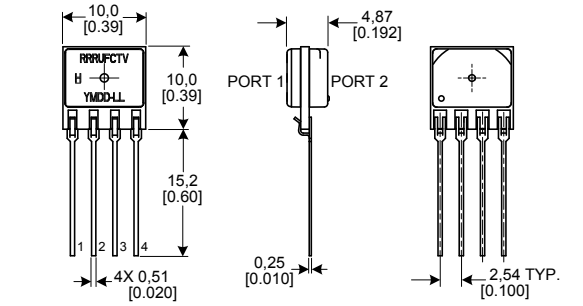
SMT DR: Dual radial barbed ports, opposite sides



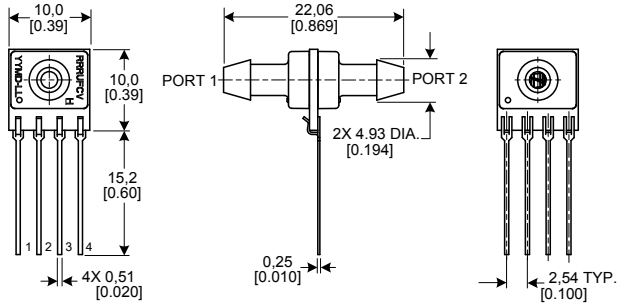
±2% Total Error Band, Analog Output, 1 psi to 150 psi (60 mbar to 10 bar)

Figure 6. SIP Package Dimensional Drawings (For reference only: mm [in])

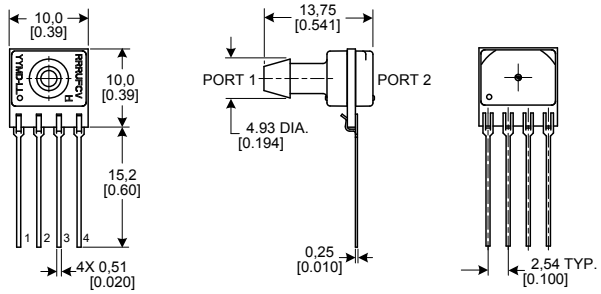
SIP NN: No ports



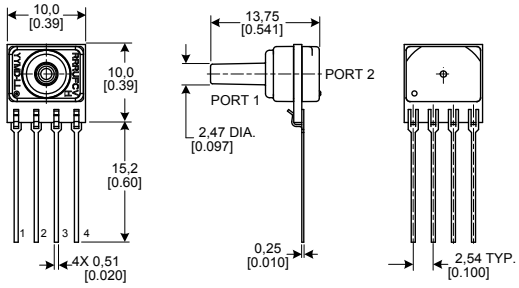
SIP AA: Dual axial barbed ports, opposite sides



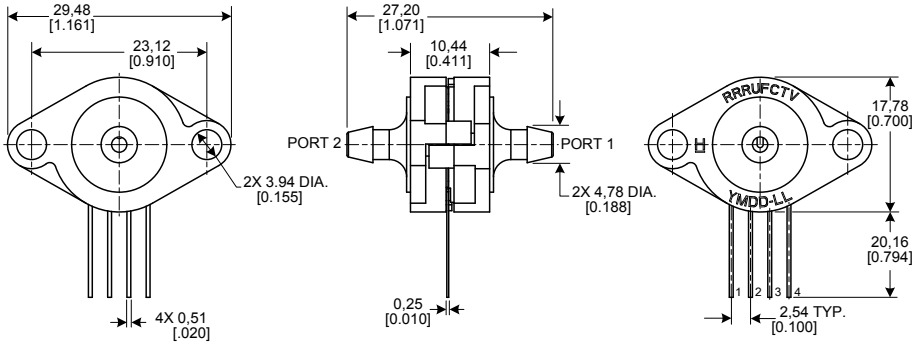
SIP AN: Single axial barbed port



SIP LN: Single barbless port



SIP FF: Fastener mount, dual axial barbed ports, opposite sides



SIP FN: Fastener mount, single axial barbed port

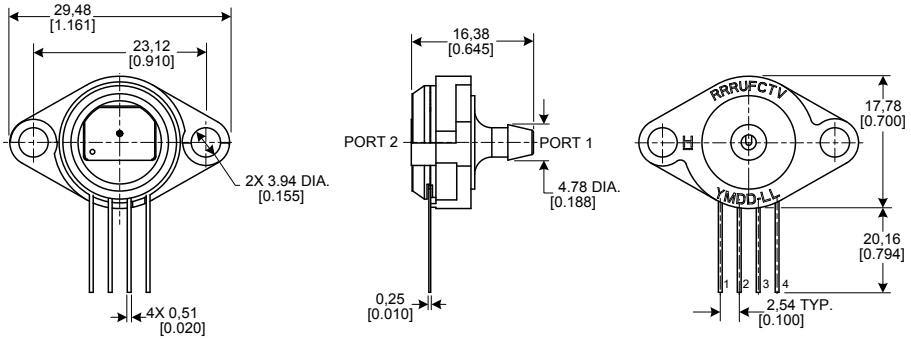
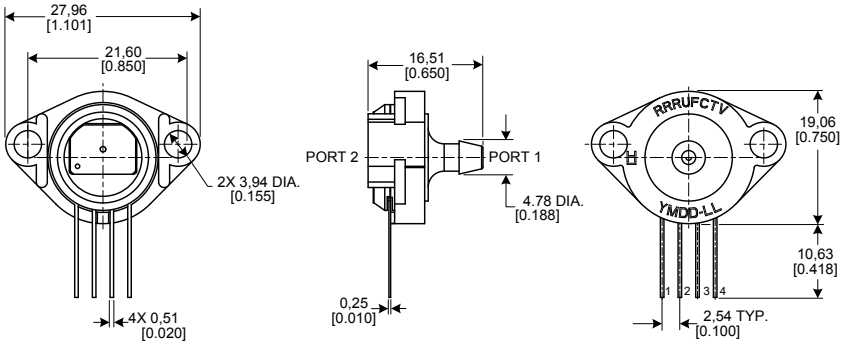
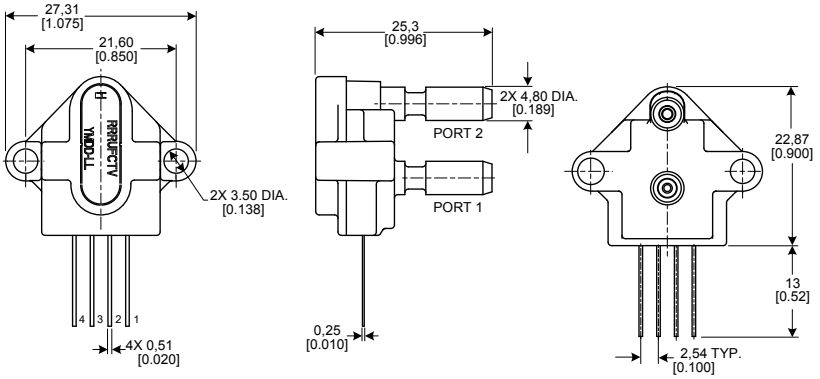


Figure 6. SIP Package Dimensional Drawings (continued)

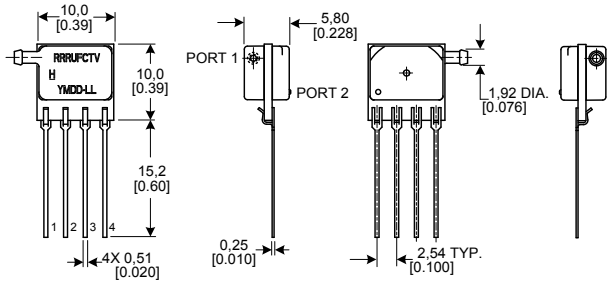
SIP GN: Ribbed fastener mount, single axial barbed port



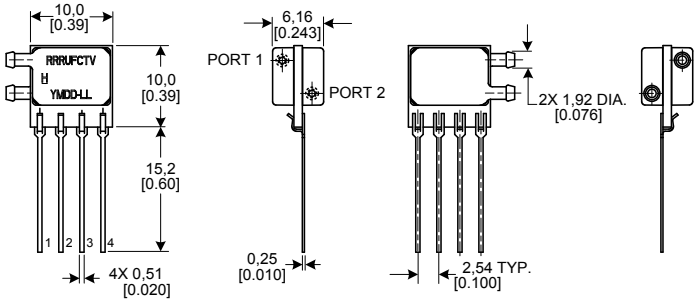
SIP NB: Fastener mount, dual axial ports, same side



SIP RN: Single radial barbed port



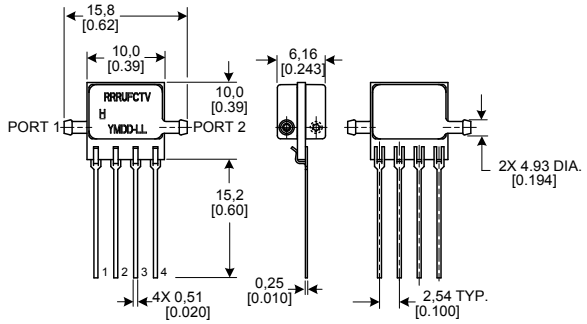
SIP RR: Dual radial barbed ports, same side



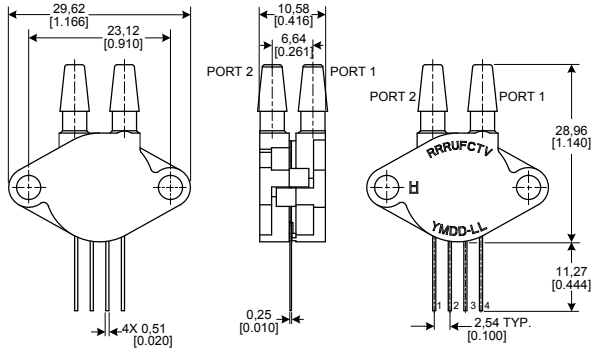
±2% Total Error Band, Analog Output, 1 psi to 150 psi (60 mbar to 10 bar)

Figure 6. SIP Package Dimensional Drawings (continued)

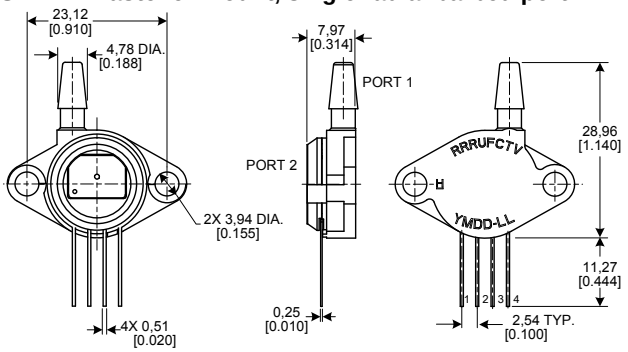
SIP DR: Dual radial barbed ports, opposite side



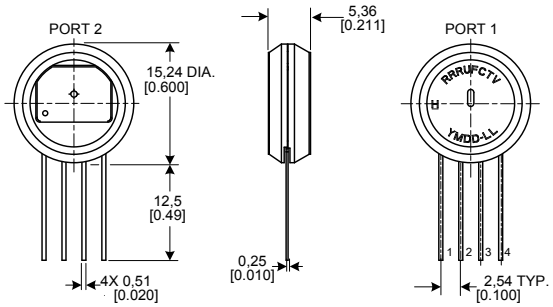
SIP HH: Fastener mount, dual radial barbed ports, same side



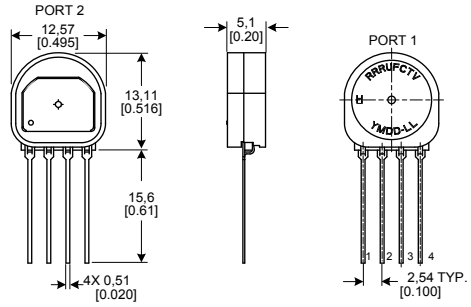
SIP HN: Fastener mount, single radial barbed port



SIP MN: Manifold mount, outer diameter seal



SIP SN: Manifold mount, inner diameter seal



⚠ WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. DO NOT USE this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

SALES AND SERVICE

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

E-mail: info.sc@honeywell.com

Internet: www.honeywell.com/sensing

Phone and Fax:

Asia Pacific	+65 6355-2828; +65 6445-3033 Fax
Europe	+44 (0) 1698 481481; +44 (0) 1698 481676 Fax
Latin America	+1-305-805-8188; +1-305-883-8257 Fax
USA/Canada	+1-800-537-6945; +1-815-235-6847 +1-815-235-6545 Fax

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008215-2-EN IL50 GLO Printed in USA
March 2011

Honeywell

TruStability® Silicon Pressure Sensors: SSC Series–Standard Accuracy

±2% Total Error Band, Amplified Compensated Digital Output, 1 psi to 150 psi (60 mbar to 10 bar)

DESCRIPTION

The TruStability® Standard Accuracy Silicon Ceramic (SSC) Series is a piezoresistive silicon pressure sensor offering a digital output for reading pressure over the specified full scale pressure span and temperature range.

The SSC Series is fully calibrated and temperature compensated for sensor offset, sensitivity, temperature effects, and non-linearity using an on-board Application Specific Integrated Circuit (ASIC). Calibrated output values for pressure are updated at approximately 2 kHz.

The SSC Series is calibrated over the temperature range of -20 °C to 85 °C [-4 °F to 185 °F]. The sensor is characterized for operation from a single power supply of either 3.3 Vdc or 5.0 Vdc.

These sensors measure absolute, differential, and gage pressures. The absolute versions have an internal vacuum reference and an output value proportional to absolute pressure. Differential versions allow application of pressure to either side of the sensing diaphragm. Gage versions are referenced to atmospheric pressure and provide an output proportional to pressure variations from atmosphere.

The TruStability® pressure sensors are intended for use with non-corrosive, non-ionic gases, such as air and other dry gases. An available option extends the performance of these sensors to non-corrosive, non-ionic liquids.

All products are designed and manufactured according to ISO 9001 standards.

FEATURES

- Industry-leading long-term stability
- Extremely tight accuracy of ±0.25% FSS BFSL (Full Scale Span Best Fit Straight Line)
- Total error band of ±2% full scale span maximum
- Modular and flexible design offers customers a variety of package styles and options, all with the same industry-leading performance specifications
- Miniature 10 mm x 10 mm [0.39 in x 0.39 in] package
- Low operating voltage
- Extremely low power consumption
- I^2C- or SPI- compatible 14-bit digital output (min. 12-bit sensor resolution)
- Precision ASIC conditioning and temperature compensated over -20 °C to 85 °C [-4 °F to 185 °F] temperature range
- RoHS compliant
- Virtually insensitive to mounting orientation
- Internal diagnostic functions increase system reliability
- Also available with analog output
- Absolute, differential, and gage types
- Pressure ranges from 1 psi to 150 psi (60 mbar to 10 bar)
- Custom calibration available
- Various pressure port options
- Liquid media option

POTENTIAL APPLICATIONS

- **Medical:**
  - Airflow monitors
  - Anesthesia machines
  - Blood analysis machines
  - Gas chromatography
  - Gas flow instrumentation
  - Kidney dialysis machines
  - Oxygen concentrators
  - Pneumatic controls
  - Respiratory machines
  - Sleep apnea equipment
  - Ventilators
- **Industrial:**
  - Barometry
  - Flow calibrators
  - Gas chromatography
  - Gas flow instrumentation
  - HVAC
  - Life sciences
  - Pneumatic controls

Table 1. Absolute Maximum Ratings[1]

Parameter	Min.	Max.	Unit
Supply voltage (V_{supply})	-0.3	6.0	Vdc
Voltage on any pin	-0.3	V_{supply} + 0.3	V
Digital interface clock frequency: I^2C SPI	 100 50	 400 800	kHz
ESD susceptibility (human body model)	3	-	kV
Storage temperature	-40 [-40]	85 [185]	°C [°F]
Soldering time and temperature: Lead solder (SIP, DIP) Peak reflow (SMT)	 4 s max. at 250 °C [482 °F] 15 s max. at 250 °C [482 °F]		

Table 2. Operating Specifications

Parameter	Min.	Typ.	Max.	Unit
Supply voltage (V_{supply})[2]: 3.3 Vdc 5.0 Vdc *Sensors are either 3.3 Vdc or 5.0 Vdc based on listing selected.*	 3.0 4.75	 3.3[3] 5.0[3]	 3.6 5.25	Vdc
Supply current: 3.3 Vdc supply 5.0 Vdc supply	 - -	 1.6 2	 2.1 3	mA
Compensated temperature range[4]	-20 [-4]	-	85 [185]	°C [°F]
Operating temperature range[5]	-40 [-40]	-	85 [185]	°C [°F]
Startup time (power up to data ready)	-	2.8	7.3	ms
Response time	-	0.46	-	ms
I^2C voltage level low	-	-	0.2	V_{supply}
I^2C voltage level high	0.8	-	-	V_{supply}
Pull up on SDA and SCL	1	-	-	kOhm
Accuracy[6]	-	-	±0.25	%FSS BFSL
Total error band[7]	-	-	±2	%FSS[8]
Output resolution	12	-	-	bits

Table 3. Environmental Specifications

Parameter	Characteristic
Humidity:	
Dry gases only (See “Options N and D” in Figure 1.)	0% to 95% RH, non-condensing
Liquid media (See “Options T and V” in Figure 1.)	100% condensing or direct liquid media on Port 1
Vibration	MIL-STD-202F, Curve AK (20.7 g random)
Shock	MIL-STD-202F, Method 213B, Condition F
Life[9]	1 million cycles minimum
Solder reflow	J-STD-020-C

Table 4. Wetted Materials[10]

Parameter	Port 1 (Pressure Port)	Port 2 (Reference Port)
Covers	high temperature polyamide	high temperature polyamide
Substrate	alumina ceramic	alumina ceramic
Adhesives	epoxy, silicone	epoxy, silicone
Electronic components	ceramic, glass, solder, silicon	silicon, glass, gold, solder

Notes:

1. Absolute maximum ratings are the extreme limits the device will withstand without damage.
2. Ratiometricity of the sensor (the ability of the digital device to maintain performance parameters independent of supply voltage) is achieved within the specified operating voltage for each option.
3. The sensor is not reverse polarity protected. Incorrect application of supply voltage or ground to the wrong pin may cause electrical failure.
4. The compensated temperature range is the temperature range over which the sensor will produce an output proportional to pressure within the specified performance limits.
5. The operating temperature range is the temperature range over which the sensor will produce an output proportional to pressure but may not remain within the specified performance limits.
6. Accuracy: The maximum deviation in output from a Best Fit Straight Line (BFSL) fitted to the output measured over the pressure range at 25 °C [77 °F]. Includes all errors due to pressure non-linearity, pressure hysteresis, and non-repeatability.
7. Total Error Band: The maximum deviation from the ideal transfer function over the entire compensated temperature and pressure range. Includes all errors due to offset, full scale span, pressure non-linearity, pressure hysteresis, repeatability, thermal effect on offset, thermal effect on span, and thermal hysteresis.
8. Full Scale Span (FSS) is the algebraic difference between the output signal measured at the maximum (Pmax.) and minimum (Pmin.) limits of the pressure range. (See Figure 1 for ranges.)
9. Life may vary depending on specific application in which sensor is utilized.
10. Contact Honeywell Customer Service for detailed material information.

CAUTION

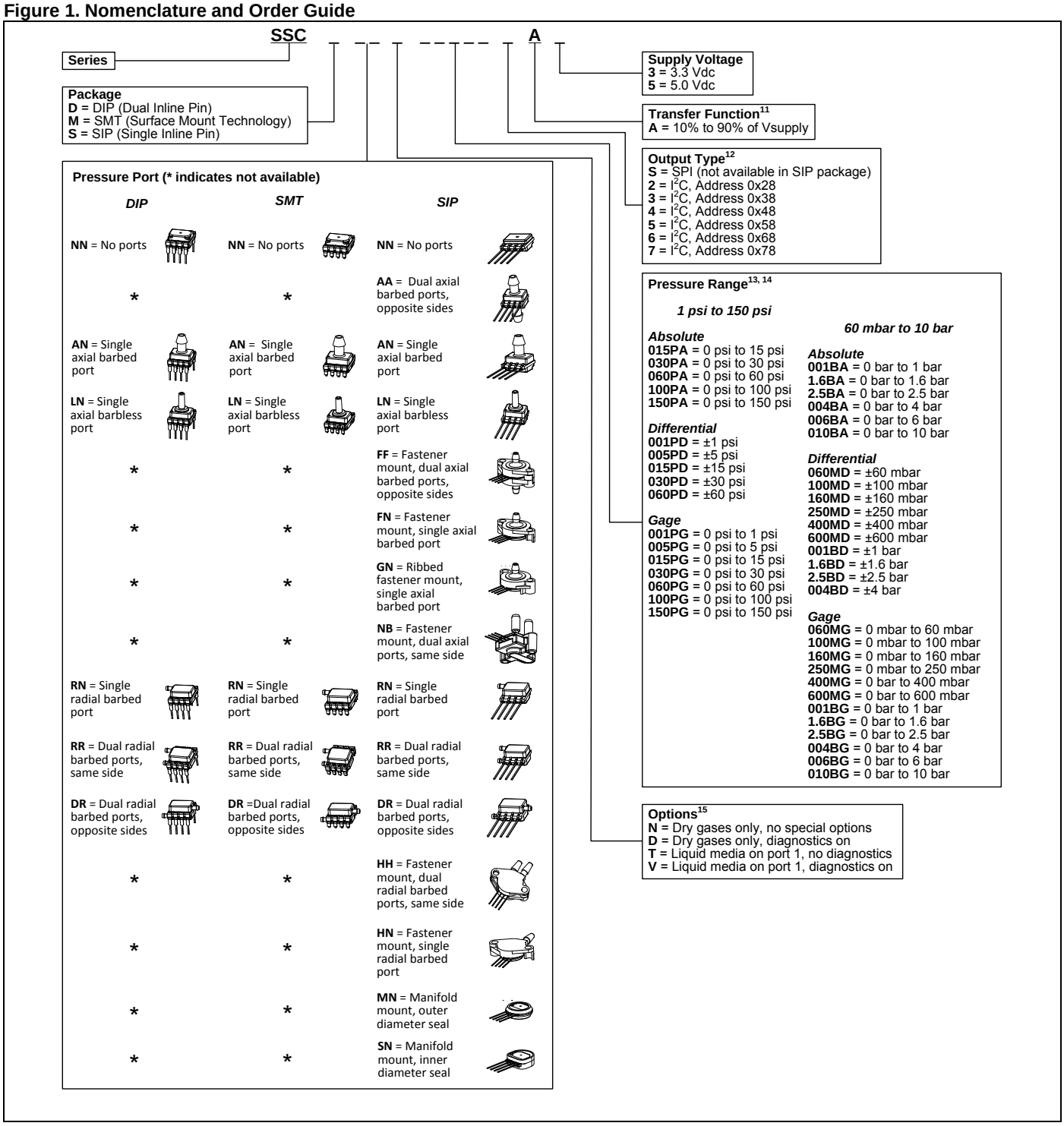
PRODUCT DAMAGE

- Ensure liquid media is applied to Port 1 only; Port 2 is not compatible with liquids.
- Ensure liquid media contains no particulates. All TruStability® sensors are dead-ended devices. Particulates can accumulate inside the sensor, causing damage or affecting sensor output.
- Recommend that the sensor be positioned with Port 1 facing downwards; any particulates in the system are less likely to enter and settle within the pressure sensor if it is in this position.
- Ensure liquid media does not create a residue when dried; build-up inside the sensor may affect sensor output. Rinsing of a dead-ended sensor is difficult and has limited effectiveness for removing residue.
- Ensure liquid media are compatible with wetted materials. Non-compatible liquid media will degrade sensor performance and may lead to sensor failure.

Failure to comply with these instructions may result in product damage.

TruStability® Silicon Pressure Sensors: SSC Series–Standard Accuracy

Figure 1. Nomenclature and Order Guide

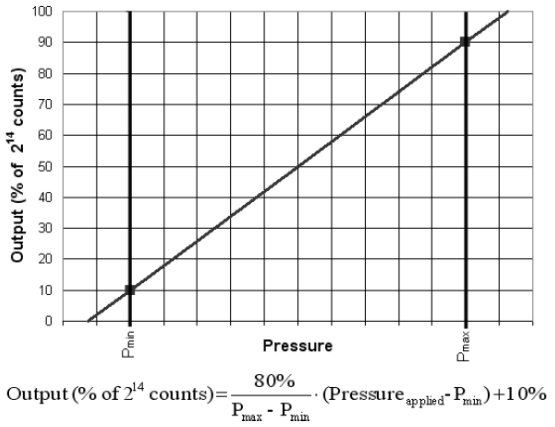


Notes:

11. The transfer function limits define the output of the sensor at a given pressure input. By specifying Pmin. and Pmax., the output at Pmin. and Pmax., the complete transfer function of the sensor is defined. See Figure 2 for a graphical representation of the transfer function. Other transfer functions are available. Contact Honeywell Customer Service for more information.
12. Analog output is also available. Contact Honeywell Customer Service for more information.
13. Custom pressure ranges are available. Contact Honeywell Customer Service for more information.
14. See Table 5 for an explanation of sensor pressure types.
15. See **CAUTION** on previous page.

±2% Total Error Band, Digital Output, 1 psi to 150 psi (60 mbar to 10 bar)

Figure 2. Transfer Function Limits



$$\text{Output (\% of } 2^{14} \text{ counts)} = \frac{80\%}{P_{max} - P_{min}} \cdot (\text{Pressure}_{applied} - P_{min}) + 10\%$$

Figure 3. Completed Catalog Listing Example

SSCSANN100PGSA3
SIP package, AN pressure port, no diagnostics, 100 psi gage, SPI output, 10% to 90% calibration at 3.3 Vdc.

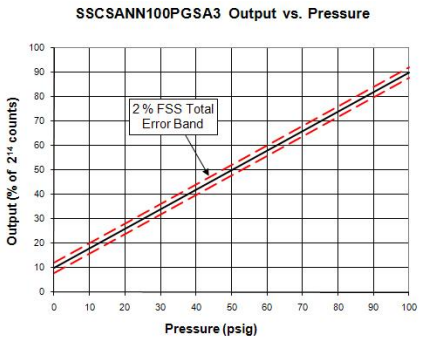


Table 5. Pressure Types

Pressure Type	Description
Absolute	Output is proportional to the difference between applied pressure and a built-in reference to vacuum. $P_{min.}$ is set at absolute zero pressure (full vacuum).
Differential	Output is proportional to the difference between the pressures applied to each port. (Port 1 – Port 2) 50% point of transfer function set at Port 1 = Port 2.
Gage	Output is proportional to the difference between applied pressure and atmospheric (ambient) pressure. $P_{min.}$ is set at atmospheric pressure.

Table 6. Sensor Output at Significant Percentages

% Output	Digital Counts (decimal)	Digital Counts (hex)
0	0	0x0000
10	1638	0x0666
50	8192	0x2000
90	14746	0x399A
100	16383	0x3FFF

Table 7. Pressure Range Specifications for 1 psi to 150 psi

Order Code	Pressure Range		Over-pressure[16]	Burst Pressure[17]	Common Mode Pressure[18]	Long-term Stability (1000 hr, 25 °C [77 °F])
	$P_{min.}$	$P_{max.}$				
Absolute						
015PA	0 psi	15 psi	30 psi	60 psi	NA	±0.25% FSS
030PA	0 psi	30 psi	60 psi	120 psi	NA	±0.25% FSS
060PA	0 psi	60 psi	120 psi	240 psi	NA	±0.25% FSS
100PA	0 psi	100 psi	250 psi	250 psi	NA	±0.25% FSS
150PA	0 psi	150 psi	250 psi	250 psi	NA	±0.25% FSS
Differential						
001PD	-1 psi	1 psi	10 psi	10 psi	150 psi	±0.35% FSS
005PD	-5 psi	5 psi	30 psi	40 psi	150 psi	±0.35% FSS
015PD	-15 psi	15 psi	30 psi	60 psi	150 psi	±0.25% FSS
030PD	-30 psi	30 psi	60 psi	120 psi	150 psi	±0.25% FSS
060PD	-60 psi	60 psi	120 psi	240 psi	250 psi	±0.25% FSS
Gage						
001PG	0 psi	1 psi	10 psi	10 psi	150 psi	±0.35% FSS
005PG	0 psi	5 psi	30 psi	40 psi	150 psi	±0.35% FSS
015PG	0 psi	15 psi	30 psi	60 psi	150 psi	±0.25% FSS
030PG	0 psi	30 psi	60 psi	120 psi	150 psi	±0.25% FSS
060PG	0 psi	60 psi	120 psi	240 psi	250 psi	±0.25% FSS
100PG	0 psi	100 psi	250 psi	250 psi	250 psi	±0.25% FSS
150PG	0 psi	150 psi	250 psi	250 psi	250 psi	±0.25% FSS

Table 8. Pressure Range Specifications for 60 mbar to 10 bar

Order Code	Pressure Range		Over-pressure[16]	Burst Pressure[17]	Common Mode Pressure[18]	Long-term Stability (1000 hr, 25 °C [77 °F])
	$P_{min.}$	$P_{max.}$				
Absolute						
001BA	0 bar	1 bar	2 bar	4 bar	NA	±0.25% FSS
1.6BA	0 bar	1.6 bar	4 bar	8 bar	NA	±0.25% FSS
2.5BA	0 bar	2.5 bar	6 bar	8 bar	NA	±0.25% FSS
004BA	0 bar	4 bar	8 bar	16 bar	NA	±0.25% FSS
006BA	0 bar	6 bar	17 bar	17 bar	NA	±0.25% FSS
010BA	0 bar	10 bar	17 bar	17 bar	NA	±0.25% FSS
Differential						
060MD	-60 mbar	60 mbar	500 mbar	700 mbar	10 bar	±0.35% FSS
100MD	-100 mbar	100 mbar	500 mbar	700 mbar	10 bar	±0.35% FSS
160MD	-160 mbar	160 mbar	500 mbar	700 mbar	10 bar	±0.35% FSS
250MD	-250 mbar	250 mbar	1.4 bar	2.5 bar	10 bar	±0.35% FSS
400MD	-400 mbar	400 mbar	1.4 bar	2.5 bar	10 bar	±0.35% FSS
600MD	-600 mbar	600 mbar	2 bar	4 bar	10 bar	±0.25% FSS
001BD	-1 bar	1 bar	2 bar	4 bar	10 bar	±0.25% FSS
1.6BD	-1.6 bar	1.6 bar	4 bar	8 bar	10 bar	±0.25% FSS
2.5BD	-2.5 bar	2.5 bar	6 bar	8 bar	10 bar	±0.25% FSS
004BD	-4 bar	4 bar	8 bar	16 bar	10 bar	±0.25% FSS
Gage						
060MG	0 mbar	60 mbar	500 mbar	700 mbar	3.5 bar	±0.35% FSS
100MG	0 mbar	100 mbar	500 mbar	700 mbar	10 bar	±0.35% FSS
160MG	0 mbar	160 mbar	500 mbar	700 mbar	10 bar	±0.35% FSS
250MG	0 mbar	250 mbar	1.4 bar	2.5 bar	10 bar	±0.35% FSS
400MG	0 mbar	400 mbar	1.4 bar	2.5 bar	10 bar	±0.35% FSS
600MG	0 mbar	600 mbar	2 bar	4 bar	10 bar	±0.35% FSS
001BG	0 bar	1 bar	2 bar	4 bar	10 bar	±0.25% FSS
1.6BG	0 bar	1.6 bar	4 bar	8 bar	10 bar	±0.25% FSS
2.5BG	0 bar	2.5 bar	6 bar	8 bar	10 bar	±0.25% FSS
004BG	0 bar	4 bar	8 bar	16 bar	16 bar	±0.25% FSS
006BG	0 bar	6 bar	17 bar	17 bar	17 bar	±0.25% FSS
010BG	0 bar	10 bar	17 bar	17 bar	17 bar	±0.25% FSS

Notes:

16. Overpressure: The maximum pressure which may safely be applied to the product for it to remain in specification once pressure is returned to the operating pressure range. Exposure to higher pressures may cause permanent damage to the product. Unless otherwise specified this applies to all available pressure ports at any temperature with the operating temperature range.
17. Burst pressure: The maximum pressure that may be applied to any port of the product without causing escape of pressure media. Product should not be expected to function after exposure to any pressure beyond the burst pressure.
18. Common mode pressure: The maximum pressure that can be applied simultaneously to both ports of a differential pressure sensor without causing changes in specified performance.

Table 9. Pinout for SMT and DIP Packages

Output Type	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
I^2C	GND	V_{supply}	SDA	SCL	NC	NC	NC	NC
SPI	GND	V_{supply}	MISO	SCLK	SS	NC	NC	NC

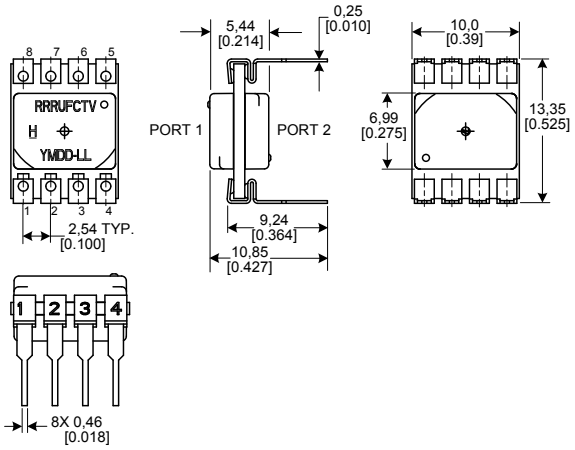
Table 10. Pinout for SIP Package

Output Type	Pin 1	Pin 2	Pin 3	Pin 4
I^2C	GND	V_{supply}	SDA	SCL

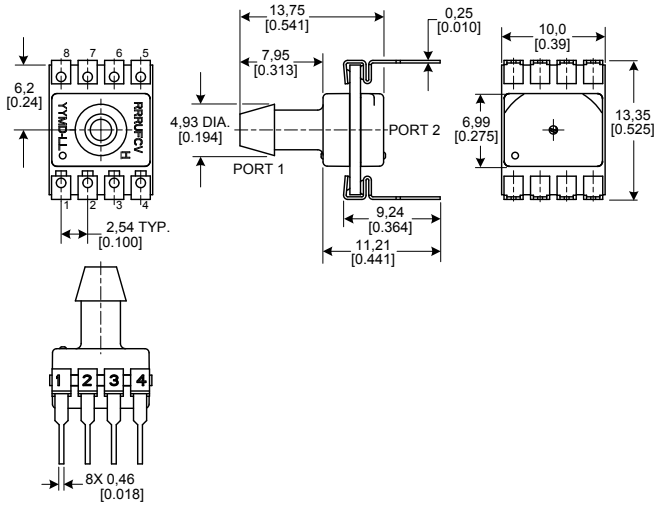
±2% Total Error Band, Digital Output, 1 psi to 150 psi (60 mbar to 10 bar)

Figure 4. DIP Pressure Port Dimensional Drawings (For reference only: mm [in])

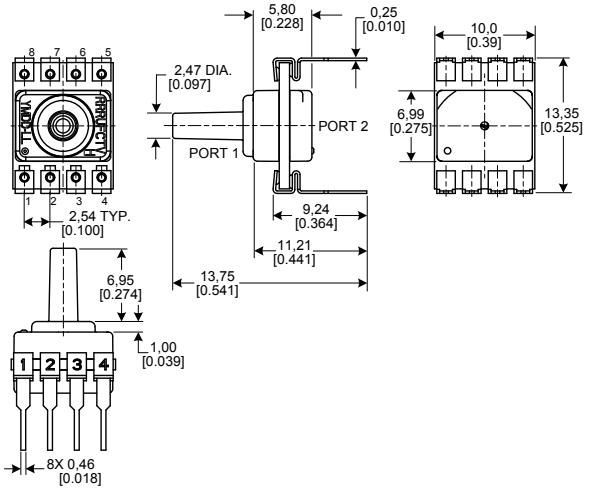
DIP NN: No ports



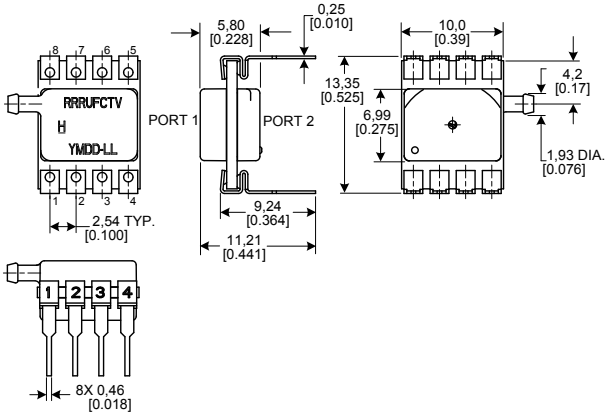
DIP AN: Single axial barbed port



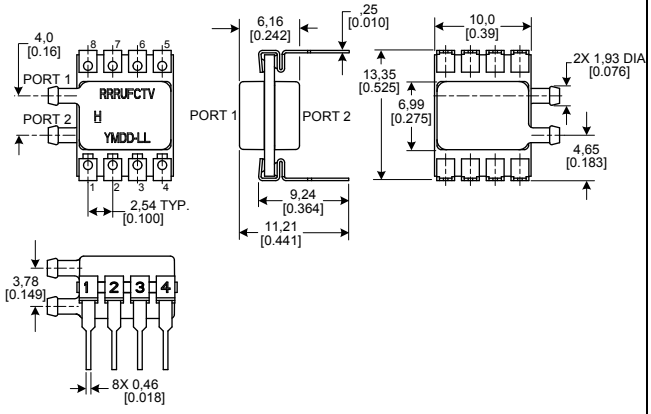
DIP LN: Single axial barbless port



DIP RN: Single radial barbed port



DIP RR: Dual radial barbed ports, same side



DIP DR: Dual radial barbed ports, opposite sides

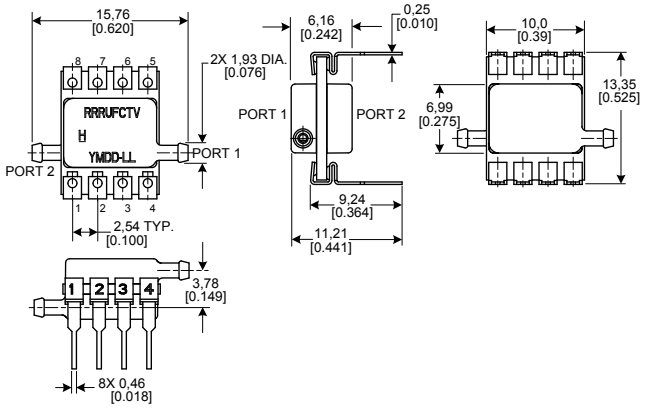
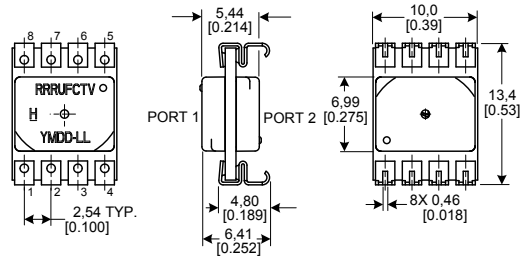
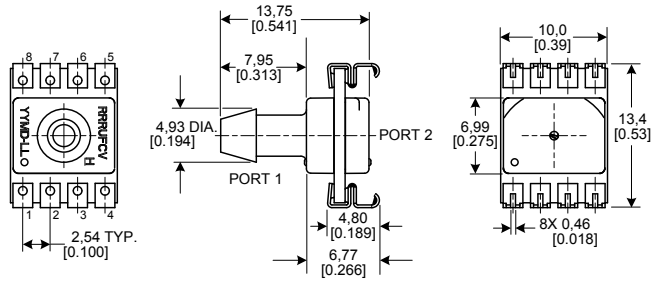


Figure 5. SMT Pressure Port Dimensional Drawings (For reference only: mm [in])

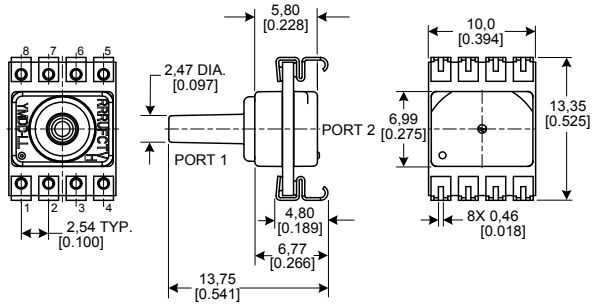
SMT NN: No ports



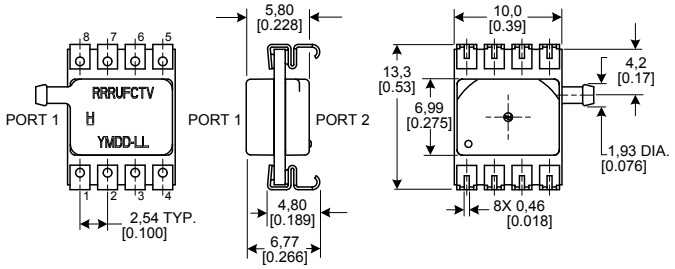
SMT AN: Single axial barbed port



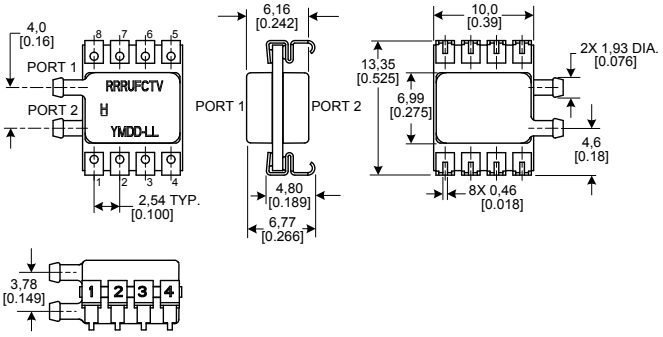
SMT LN: Single axial barbless port



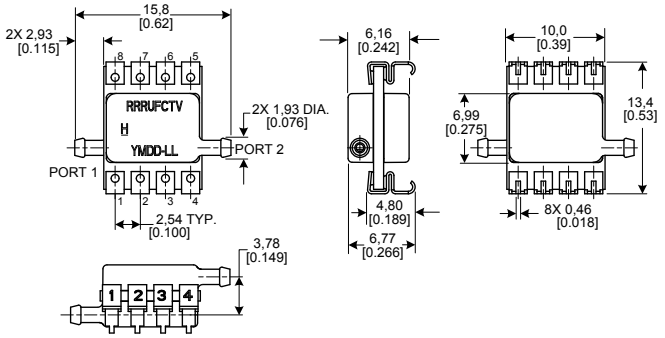
SMT RN: Single radial barbed port



SMT RR: Dual radial barbed ports, same side



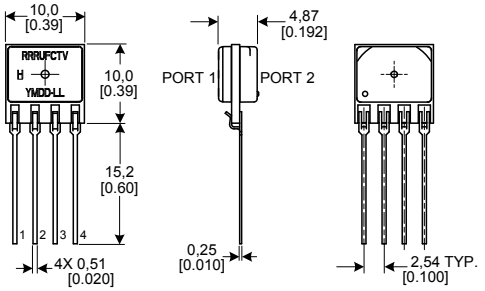
SMT DR: Dual radial barbed ports, opposite sides



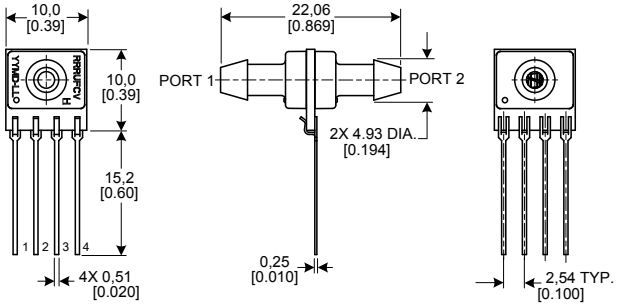
±2% Total Error Band, Digital Output, 1 psi to 150 psi (60 mbar to 10 bar)

Figure 6. SIP Package Dimensional Drawings (For reference only: mm [in])

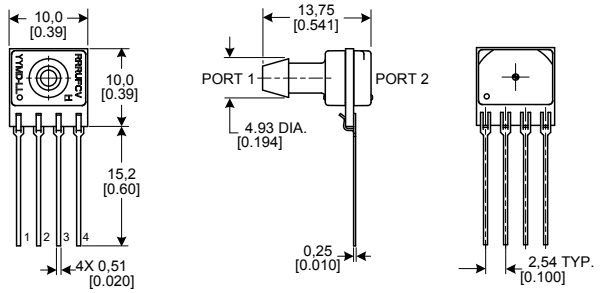
SIP NN: No ports



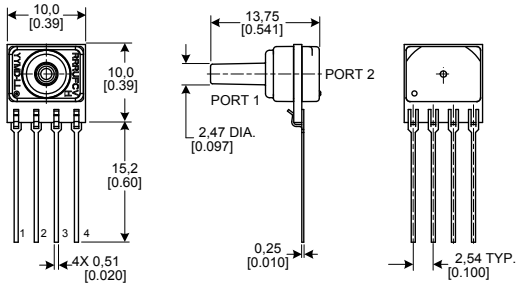
SIP AA: Dual axial barbed ports, opposite sides



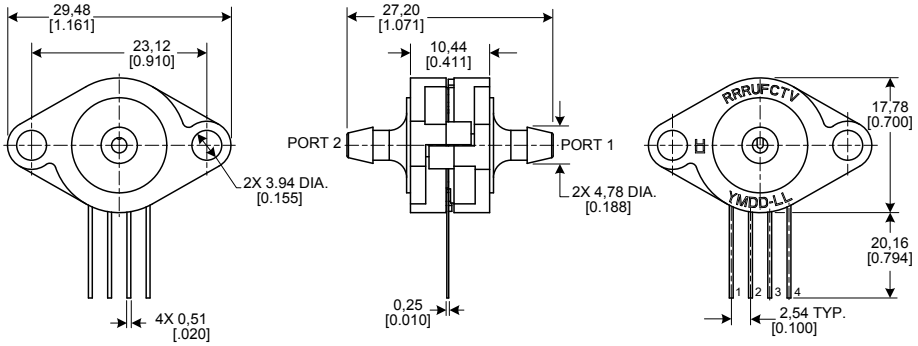
SIP AN: Single axial barbed port



SIP LN: Single barbless port



SIP FF: Fastener mount, dual axial barbed ports, opposite sides



SIP FN: Fastener mount, single axial barbed port

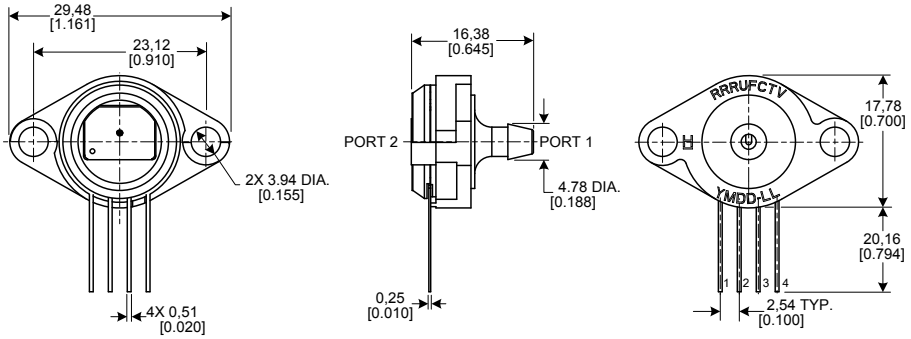
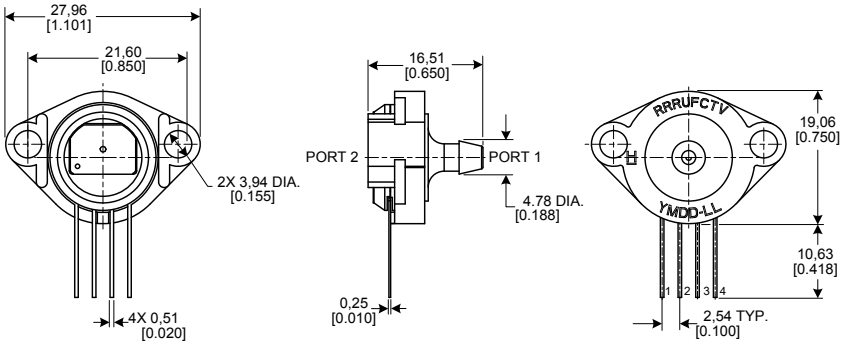
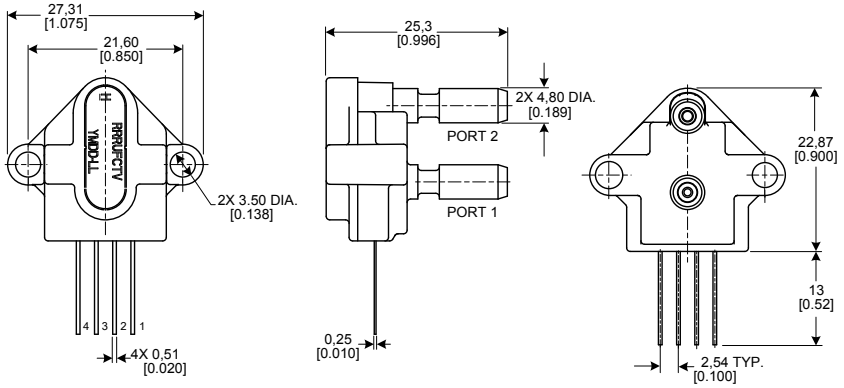


Figure 6. SIP Package Dimensional Drawings (continued)

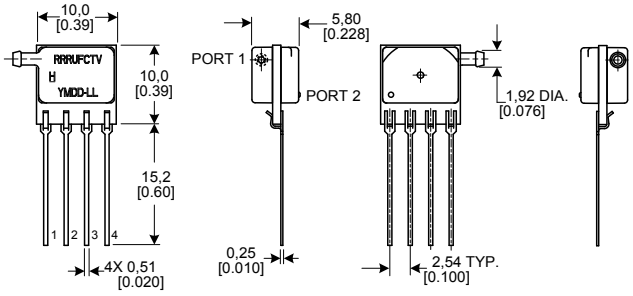
SIP GN: Ribbed fastener mount, single axial barbed port



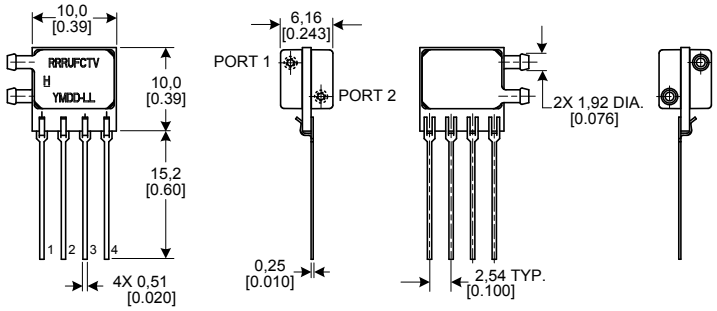
SIP NB: Fastener mount, dual axial ports, same side



SIP RN: Single radial barbed port



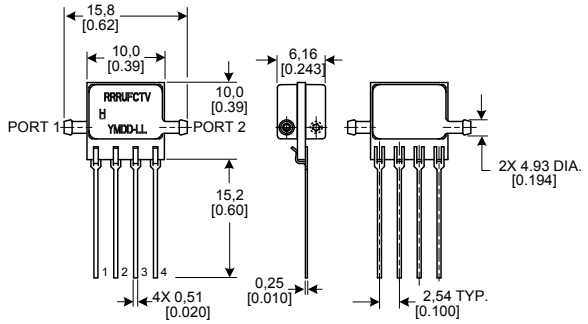
SIP RR: Dual radial barbed ports, same side



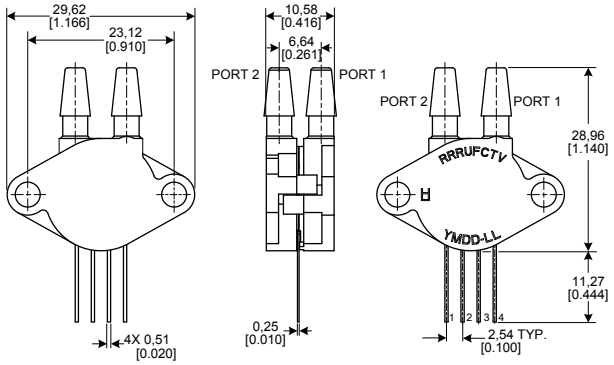
±2% Total Error Band, Digital Output, 1 psi to 150 psi (60 mbar to 10 bar)

Figure 6. SIP Package Dimensional Drawings (continued)

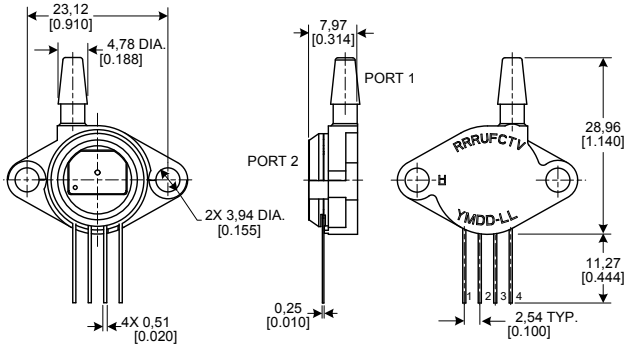
SIP DR: Dual radial barbed ports, opposite side



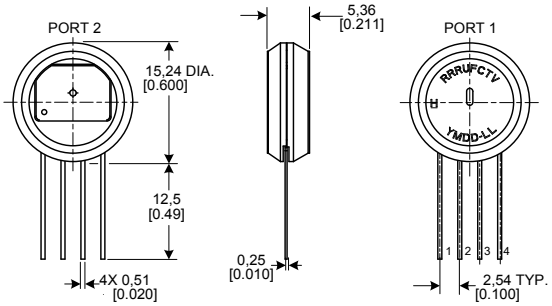
SIP HH: Fastener mount, dual radial barbed ports, same side



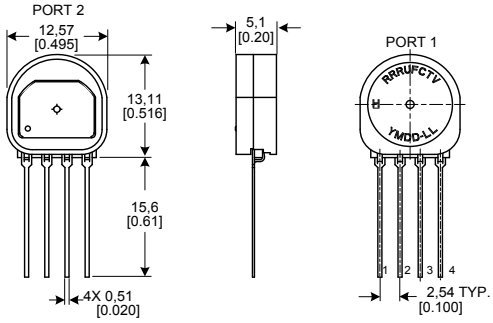
SIP HN: Fastener mount, single radial barbed port



SIP MN: Manifold mount, outer diameter seal



SIP SN: Manifold mount, inner diameter seal



⚠ WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. DO NOT USE this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

SALES AND SERVICE

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

E-mail: info.sc@honeywell.com

Internet: www.honeywell.com/sensing

Phone and Fax:

Asia Pacific	+65 6355-2828; +65 6445-3033 Fax
Europe	+44 (0) 1698 481481; +44 (0) 1698 481676 Fax
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USA/Canada	+1-800-537-6945; +1-815-235-6847 +1-815-235-6545 Fax

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008213-2-EN IL50 GLO Printed in USA
March 2011

Honeywell

TruStability® Silicon Pressure Sensors: HSC Series–High Accuracy

±1% Total Error Band, Amplified Compensated Analog Output, 1 psi to 150 psi (60 mbar to 10 bar)

DESCRIPTION

The TruStability® High Accuracy Silicon Ceramic (HSC) Series is a piezoresistive silicon pressure sensor offering a ratiometric analog output for reading pressure over the specified full scale pressure span and temperature range.

The HSC Series is fully calibrated and temperature compensated for sensor offset, sensitivity, temperature effects, and non-linearity using an on-board Application Specific Integrated Circuit (ASIC). Calibrated output values for pressure are updated at approximately 1 kHz.

The HSC Series is calibrated over the temperature range of 0 °C to 50 °C [32 °F to 122 °F]. The sensor is characterized for operation from a single power supply of either 3.3 Vdc or 5.0 Vdc.

These sensors measure absolute, differential, and gage pressures. The absolute versions have an internal vacuum reference and an output value proportional to absolute pressure. Differential versions allow application of pressure to either side of the sensing diaphragm. Gage versions are referenced to atmospheric pressure and provide an output proportional to pressure variations from atmosphere.

The TruStability® pressure sensors are intended for use with non-corrosive, non-ionic gases, such as air and other dry gases. An available option extends the performance of these sensors to non-corrosive, non-ionic liquids.

All products are designed and manufactured according to ISO 9001 standards.

FEATURES

- Industry-leading long-term stability
- Extremely tight accuracy of ±0.25% FSS BFSL (Full Scale Span Best Fit Straight Line)
- Total error band of ±1% full scale span maximum
- Modular and flexible design offers customers a variety of package styles and options, all with the same industry-leading performance specifications
- Miniature 10 mm x 10 mm [0.39 in x 0.39 in] package
- Low operating voltage
- Extremely low power consumption
- Ratiometric analog output
- High resolution (min 0.03 %FSS)
- Precision ASIC conditioning and temperature compensated over 0 °C to 50 °C [32 °F to 122 °F] temperature range
- RoHS compliant
- Virtually insensitive to mounting orientation
- Internal diagnostic functions increase system reliability
- Also available with I^2C or SPI digital output
- Absolute, differential and gage types
- Pressure ranges from 1 psi to 150 psi (60 mbar to 10 bar)
- Custom calibration available
- Various pressure port options
- Liquid media option

TruStability® Silicon Pressure Sensors: HSC Series–High Accuracy

POTENTIAL APPLICATIONS

- **Medical:**
  - Airflow monitors
  - Anesthesia machines
  - Blood analysis machines
  - Gas chromatography
  - Gas flow instrumentation
  - Kidney dialysis machines
  - Oxygen concentrators
  - Pneumatic controls
  - Respiratory machines
  - Sleep apnea equipment
  - Ventilators
- **Industrial:**
  - Barometry
  - Flow calibrators
  - Gas chromatography
  - Gas flow instrumentation
  - HVAC
  - Life sciences
  - Pneumatic controls

Table 1. Absolute Maximum Ratings[1]

Parameter	Min.	Max.	Unit
Supply voltage (V_{supply})	-0.3	6.0	Vdc
Voltage on any pin	-0.3	V_{supply} + 0.3	V
ESD susceptibility (human body model)	3	-	kV
Storage temperature	-40 [-40]	85 [185]	°C [°F]
Soldering time and temperature: Lead solder temperature (SIP, DIP) Peak reflow temperature (SMT)	4 s max. at 250 °C [482 °F] 15 s max. at 250 °C [482 °F]		

Table 2. Operating Specifications

Parameter	Min.	Typ.	Max.	Unit
Supply voltage (V_{supply})[2]: 3.3 Vdc 5.0 Vdc *Sensors are either 3.3 Vdc or 5.0 Vdc based on listing selected.*	 3.0 4.75	 3.3[3] 5.0[3]	 3.6 5.25	Vdc
Supply current: 3.3 Vdc supply 5.0 Vdc supply	 - -	 1.6 2	 2.1 3	mA
Compensated temperature range[4]	0 [32]	-	50 [122]	°C [°F]
Operating temperature range[5]	-20 [-4]	-	85 [185]	°C [°F]
Startup time (power up to data ready)	-	-	5	ms
Response time	-	1	-	ms
Upper output clipping limit	-	-	97.5	%V_{supply}
Lower output clipping limit	2.5	-	-	%V_{supply}
Accuracy[6]	-	-	±0.25	%FSS BFSL
Total error band[7]	-	-	±1	%FSS[8]
Output resolution	0.03	-	-	%FSS[8]

±1% Total Error Band, Analog Output, 1 psi to 150 psi (60 mbar to 10 bar)

Table 3. Environmental Specifications

Parameter	Characteristic
Humidity:	
Dry gases only (See “Options N and D” in Figure 1.)	0% to 95% RH, non-condensing
Liquid media (See “Options T and V” in Figure 1.)	100% condensing or direct liquid media on Port 1
Vibration	MIL-STD-202F, Curve AK (20.7 g random)
Shock	MIL-STD-202F, Method 213B, Condition F
Life[9]	1 million cycles minimum
Solder reflow	J-STD-020-C

Table 4. Wetted Materials[10]

Parameter	Port 1 (Pressure Port)	Port 2 (Reference Port)
Covers	high temperature polyamide	high temperature polyamide
Substrate	alumina ceramic	alumina ceramic
Adhesives	epoxy, silicone	epoxy, silicone
Electronic components	ceramic, glass, solder, silicon	silicon, glass, gold, solder

Notes:

1. Absolute maximum ratings are the extreme limits the device will withstand without damage.
2. Ratiometricity of the sensor (the ability of the device to scale to the supply voltage) is achieved within the specified operating voltage for each option.
3. The sensor is not reverse polarity protected. Incorrect application of supply voltage or ground to the wrong pin may cause electrical failure.
4. The compensated temperature range is the temperature range over which the sensor will produce an output proportional to pressure within the specified performance limits.
5. The operating temperature range is the temperature range over which the sensor will produce an output proportional to pressure but may not remain within the specified performance limits.
6. Accuracy: The maximum deviation in output from a Best Fit Straight Line (BFSL) fitted to the output measured over the pressure range at 25 °C [77 °F]. Includes all errors due to pressure non-linearity, pressure hysteresis, and non-repeatability.
7. Total Error Band: The maximum deviation from the ideal transfer function over the entire compensated temperature and pressure range. Includes all errors due to offset, full scale span, pressure non-linearity, pressure hysteresis, repeatability, thermal effect on offset, thermal effect on span, and thermal hysteresis.
8. Full Scale Span (FSS) is the algebraic difference between the output signal measured at the maximum (Pmax.) and minimum (Pmin.) limits of the pressure range. (See Figure 1 for ranges.)
9. Life may vary depending on specific application in which sensor is utilized.
10. Contact Honeywell Customer Service for detailed material information.

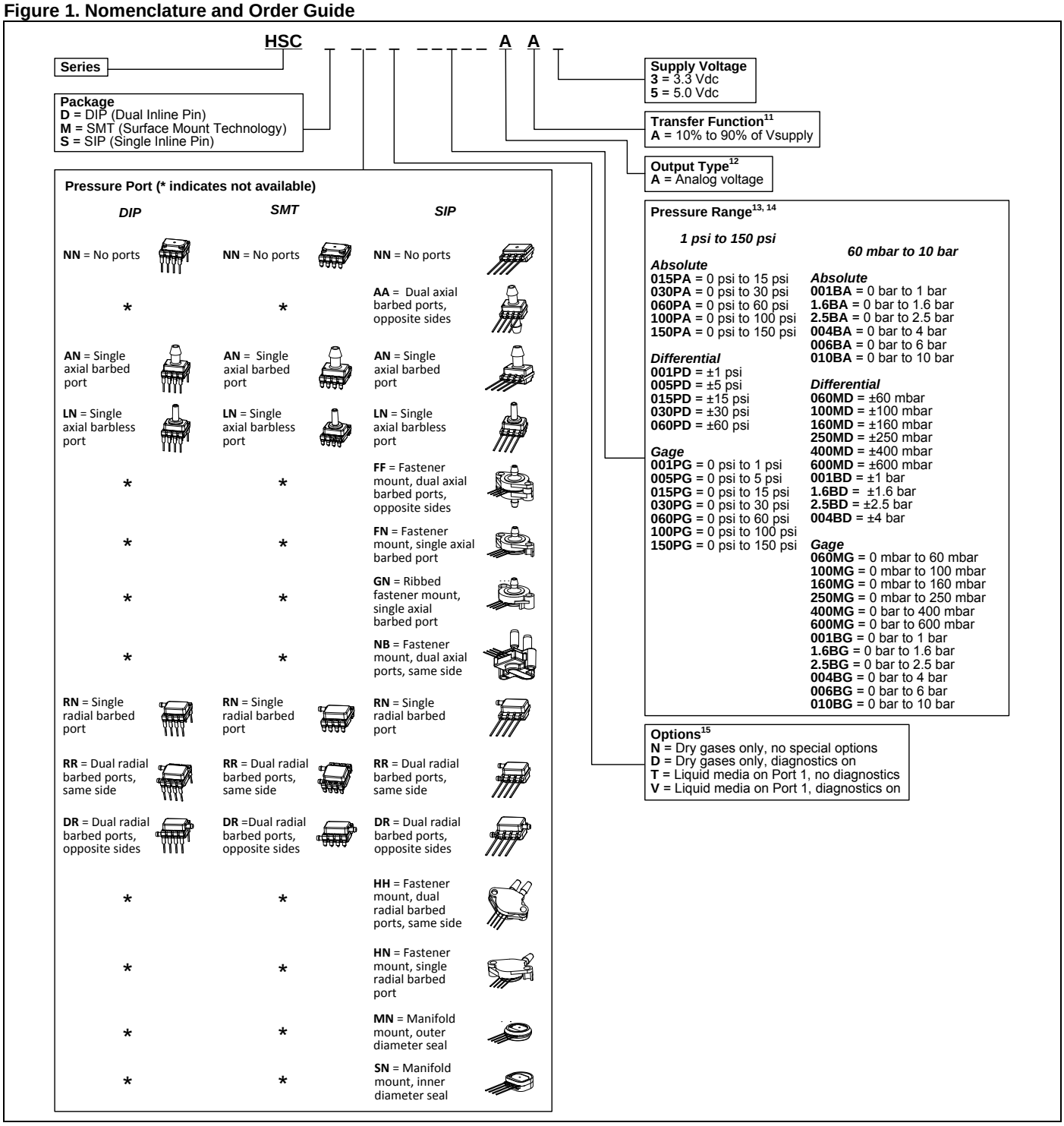
CAUTION

PRODUCT DAMAGE

- Ensure liquid media is applied to Port 1 only; Port 2 is not compatible with liquids.
- Ensure liquid media contains no particulates. All TruStability® sensors are dead-ended devices. Particulates can accumulate inside the sensor, causing damage or affecting sensor output.
- Recommend that the sensor be positioned with Port 1 facing downwards; any particulates in the system are less likely to enter and settle within the pressure sensor if it is in this position.
- Ensure liquid media does not create a residue when dried; build-up inside the sensor may affect sensor output. Rinsing of a dead-ended sensor is difficult and has limited effectiveness for removing residue.
- Ensure liquid media are compatible with wetted materials. Non-compatible liquid media will degrade sensor performance and may lead to sensor failure.

Failure to comply with these instructions may result in product damage.

Figure 1. Nomenclature and Order Guide

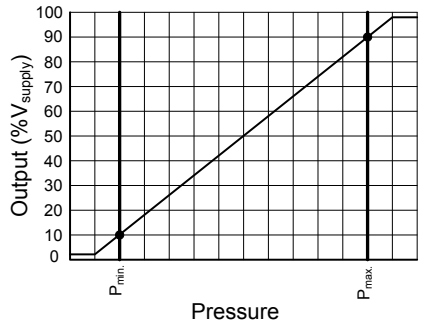


Notes:

11. The transfer function limits define the output of the sensor at a given pressure input. By specifying Pmin. and Pmax., the output at Pmin. and Pmax., the complete transfer function of the sensor is defined. See Figure 2 for a graphical representation of the transfer function. Other transfer functions are available. Contact Honeywell Customer Service for more information.
12. Digital outputs (SPI or I^2C) are also available. Contact Honeywell Customer Service for more information.
13. Custom pressure ranges are available. Contact Honeywell Customer Service for more information.
14. See Table 5 for an explanation of sensor pressure types.
15. See **CAUTION** on previous page.

±1% Total Error Band, Analog Output, 1 psi to 150 psi (60 mbar to 10 bar)

Figure 2. Transfer Function Limits



$$\text{Output (V)} = \frac{0.8 \times V_{supply}}{P_{max.} - P_{min.}} \times (\text{Pressure}_{applied} - P_{min.}) + 0.10 \times V_{supply}$$

Figure 3. Completed Catalog Listing Example

HSCSANN100PGAA3
SIP package, AN pressure port, no diagnostics, 100 psi gage, analog output, 10% to 90% calibration at 3.3 Vdc.

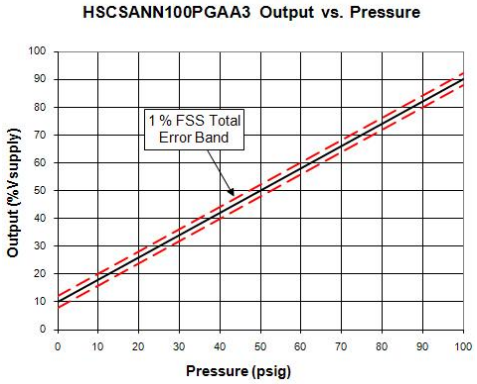


Table 5. Pressure Types

Pressure Type	Description
Absolute	Output is proportional to the difference between applied pressure and a built-in reference to vacuum. $P_{min.}$ is set at absolute zero pressure (full vacuum).
Differential	Output is proportional to the difference between the pressures applied to each port. (Port 1 – Port 2) 50% point of transfer function set at Port 1 = Port 2.
Gage	Output is proportional to the difference between applied pressure and atmospheric (ambient) pressure. $P_{min.}$. is set at atmospheric pressure.

Table 6. Pressure Range Specifications for 1 psi to 150 psi

Order Code	Pressure Range		Over-pressure[16]	Burst Pressure[17]	Common Mode Pressure[18]	Long-term Stability (1000 hr, 25 °C [77 °F])
	$P_{min.}$	$P_{max.}$				
Absolute						
015PA	0 psi	15 psi	30 psi	60 psi	NA	±0.25% FSS
030PA	0 psi	30 psi	60 psi	120 psi	NA	±0.25% FSS
060PA	0 psi	60 psi	120 psi	240 psi	NA	±0.25% FSS
100PA	0 psi	100 psi	250 psi	250 psi	NA	±0.25% FSS
150PA	0 psi	150 psi	250 psi	250 psi	NA	±0.25% FSS
Differential						
001PD	-1 psi	1 psi	10 psi	10 psi	150 psi	±0.35% FSS
005PD	-5 psi	5 psi	30 psi	40 psi	150 psi	±0.35% FSS
015PD	-15 psi	15 psi	30 psi	60 psi	150 psi	±0.25% FSS
030PD	-30 psi	30 psi	60 psi	120 psi	150 psi	±0.25% FSS
060PD	-60 psi	60 psi	120 psi	240 psi	250 psi	±0.25% FSS
Gage						
001PG	0 psi	1 psi	10 psi	10 psi	150 psi	±0.35% FSS
005PG	0 psi	5 psi	30 psi	40 psi	150 psi	±0.35% FSS
015PG	0 psi	15 psi	30 psi	60 psi	150 psi	±0.25% FSS
030PG	0 psi	30 psi	60 psi	120 psi	150 psi	±0.25% FSS
060PG	0 psi	60 psi	120 psi	240 psi	250 psi	±0.25% FSS
100PG	0 psi	100 psi	250 psi	250 psi	250 psi	±0.25% FSS
150PG	0 psi	150 psi	250 psi	250 psi	250 psi	±0.25% FSS

Table 7. Pressure Range Specifications for 60 mbar to 10 bar

Order Code	Pressure Range		Over-pressure[16]	Burst Pressure[17]	Common Mode Pressure[18]	Long-term Stability (1000 hr, 25 °C [77 °F])
	$P_{min.}$	$P_{max.}$				
Absolute						
001BA	0 bar	1 bar	2 bar	4 bar	NA	±0.25% FSS
1.6BA	0 bar	1.6 bar	4 bar	8 bar	NA	±0.25% FSS
2.5BA	0 bar	2.5 bar	6 bar	8 bar	NA	±0.25% FSS
004BA	0 bar	4 bar	8 bar	16 bar	NA	±0.25% FSS
006BA	0 bar	6 bar	17 bar	17 bar	NA	±0.25% FSS
010BA	0 bar	10 bar	17 bar	17 bar	NA	±0.25% FSS
Differential						
060MD	-60 mbar	60 mbar	500 mbar	700 mbar	10 bar	±0.35% FSS
100MD	-100 mbar	100 mbar	500 mbar	700 mbar	10 bar	±0.35% FSS
160MD	-160 mbar	160 mbar	500 mbar	700 mbar	10 bar	±0.35% FSS
250MD	-250 mbar	250 mbar	1.4 bar	2.5 bar	10 bar	±0.35% FSS
400MD	-400 mbar	400 mbar	1.4 bar	2.5 bar	10 bar	±0.35% FSS
600MD	-600 mbar	600 mbar	2 bar	4 bar	10 bar	±0.25% FSS
001BD	-1 bar	1 bar	2 bar	4 bar	10 bar	±0.25% FSS
1.6BD	-1.6 bar	1.6 bar	4 bar	8 bar	10 bar	±0.25% FSS
2.5BD	-2.5 bar	2.5 bar	6 bar	8 bar	10 bar	±0.25% FSS
004BD	-4 bar	4 bar	8 bar	16 bar	10 bar	±0.25% FSS
Gage						
060MG	0 mbar	60 mbar	500 mbar	700 mbar	3.5 bar	±0.35% FSS
100MG	0 mbar	100 mbar	500 mbar	700 mbar	10 bar	±0.35% FSS
160MG	0 mbar	160 mbar	500 mbar	700 mbar	10 bar	±0.35% FSS
250MG	0 mbar	250 mbar	1.4 bar	2.5 bar	10 bar	±0.35% FSS
400MG	0 mbar	400 mbar	1.4 bar	2.5 bar	10 bar	±0.35% FSS
600MG	0 mbar	600 mbar	2 bar	4 bar	10 bar	±0.35% FSS
001BG	0 bar	1 bar	2 bar	4 bar	10 bar	±0.25% FSS
1.6BG	0 bar	1.6 bar	4 bar	8 bar	10 bar	±0.25% FSS
2.5BG	0 bar	2.5 bar	6 bar	8 bar	10 bar	±0.25% FSS
004BG	0 bar	4 bar	8 bar	16 bar	16 bar	±0.25% FSS
006BG	0 bar	6 bar	17 bar	17 bar	17 bar	±0.25% FSS
010BG	0 bar	10 bar	17 bar	17 bar	17 bar	±0.25% FSS

Notes:

16. Overpressure: The maximum pressure which may safely be applied to the product for it to remain in specification once pressure is returned to the operating pressure range. Exposure to higher pressures may cause permanent damage to the product. Unless otherwise specified this applies to all available pressure ports at any temperature with the operating temperature range.
17. Burst pressure: The maximum pressure that may be applied to any port of the product without causing escape of pressure media. Product should not be expected to function after exposure to any pressure beyond the burst pressure.
18. Common mode pressure: The maximum pressure that can be applied simultaneously to both ports of a differential pressure sensor without causing changes in specified performance.

Table 8. Pinout for DIP and SMT Packages

Output Type	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
analog	NC	V_{supply}	OUTPUT+	GND	NC	NC	NC	NC

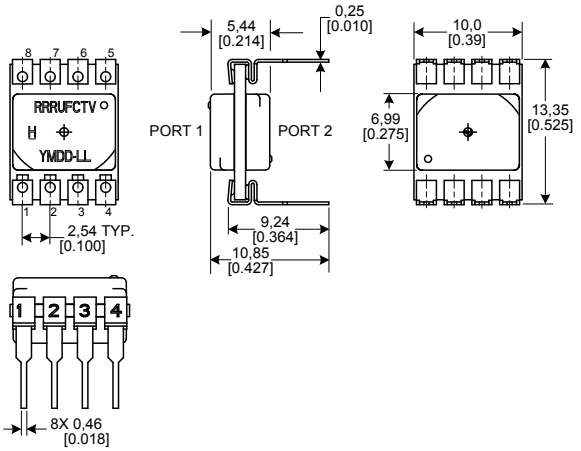
Table 9. Pinout for SIP Packages

Output Type	Pin 1	Pin 2	Pin 3	Pin 4
analog	NC	V_{supply}	OUTPUT+	GND

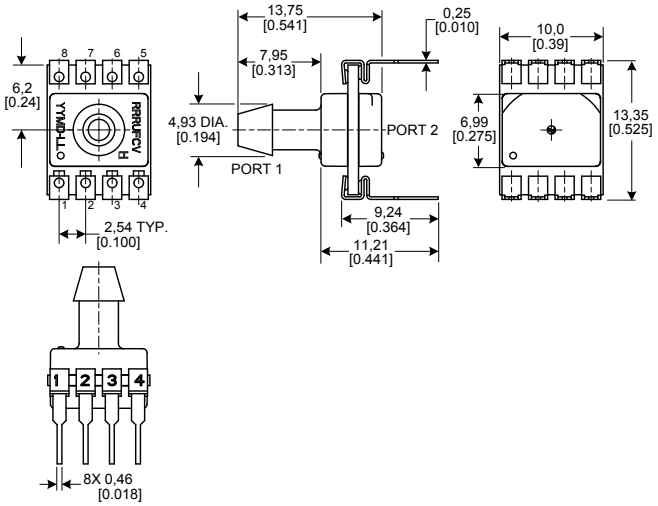
±1% Total Error Band, Analog Output, 1 psi to 150 psi (60 mbar to 10 bar)

Figure 4. DIP Pressure Port Dimensional Drawings (For reference only: mm [in])

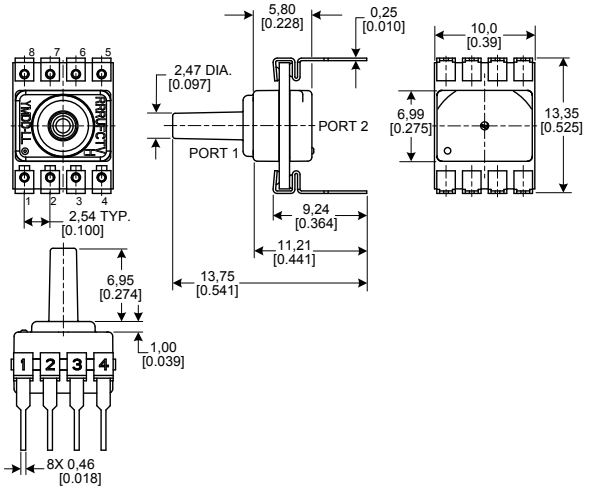
DIP NN: No ports



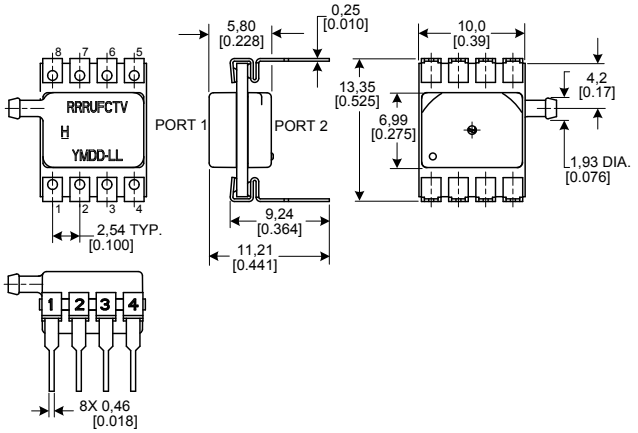
DIP AN: Single axial barbed port



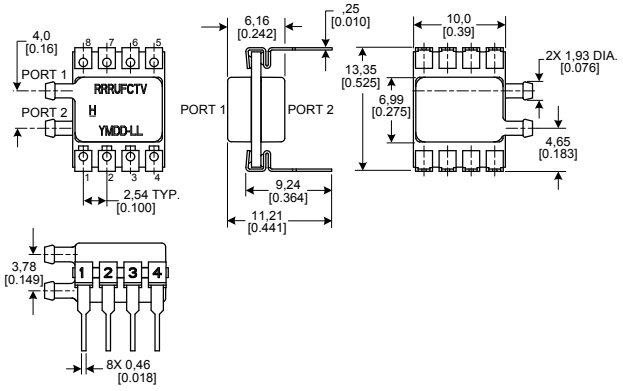
DIP LN: Single axial barbless port



DIP RN: Single radial barbed port



DIP RR: Dual radial barbed ports, same side



DIP DR: Dual radial barbed ports, opposite sides

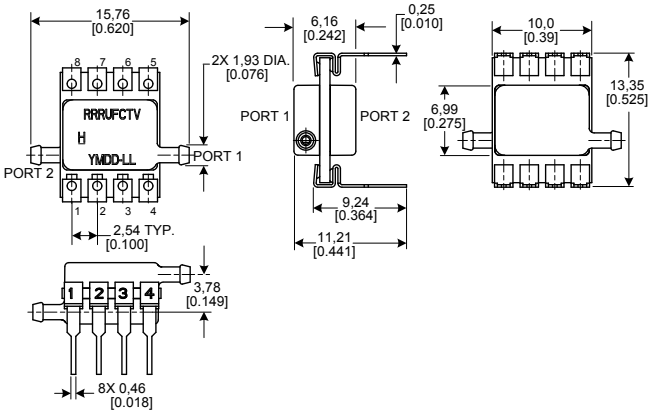
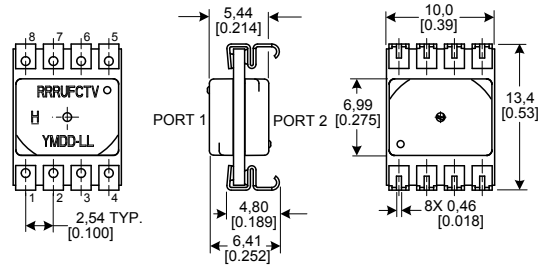
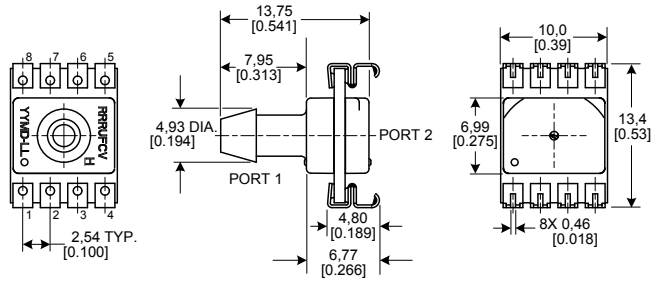


Figure 5. SMT Pressure Port Dimensional Drawings (For reference only: mm [in])

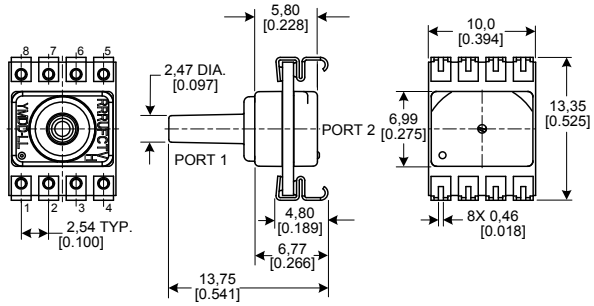
SMT NN: No ports



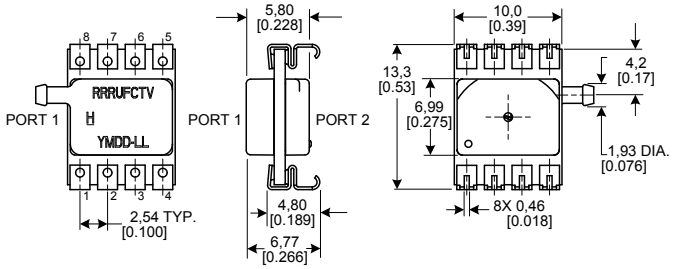
SMT AN: Single axial barbed port



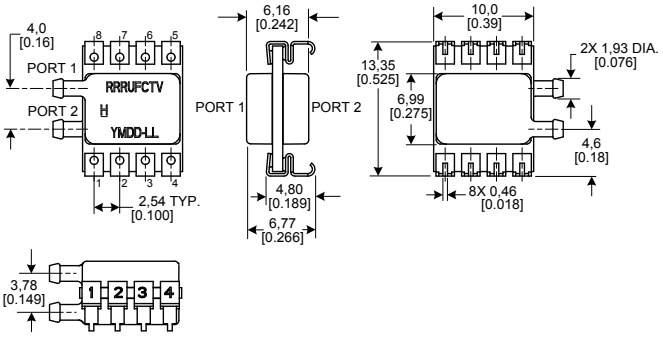
SMT LN: Single axial barbless port



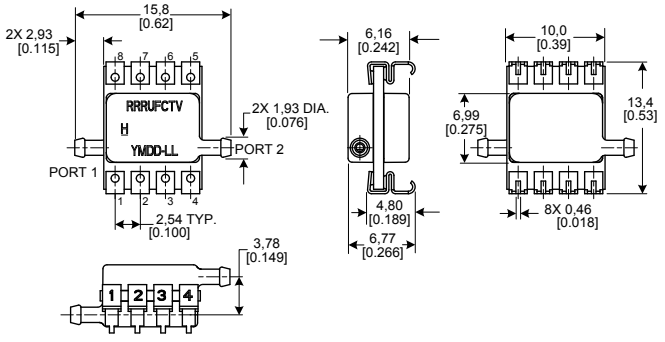
SMT RN: Single radial barbed port



SMT RR: Dual radial barbed ports, same side



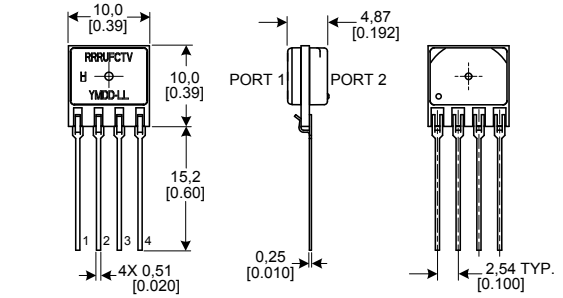
SMT DR: Dual radial barbed ports, opposite sides



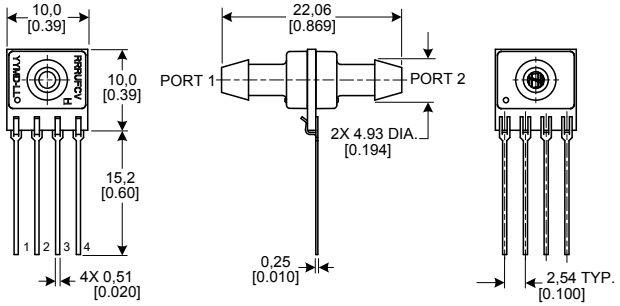
±1% Total Error Band, Analog Output, 1 psi to 150 psi (60 mbar to 10 bar)

Figure 6. SIP Package Dimensional Drawings (For reference only: mm [in])

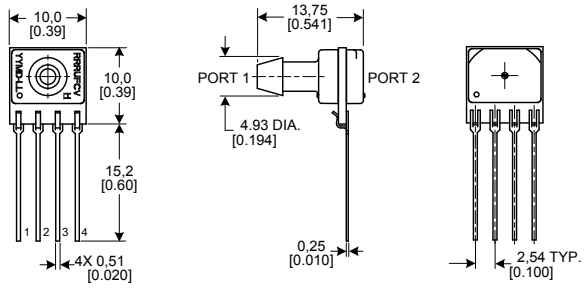
SIP NN: No ports



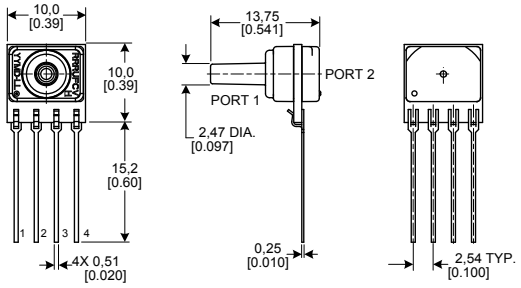
SIP AA: Dual axial barbed ports, opposite sides



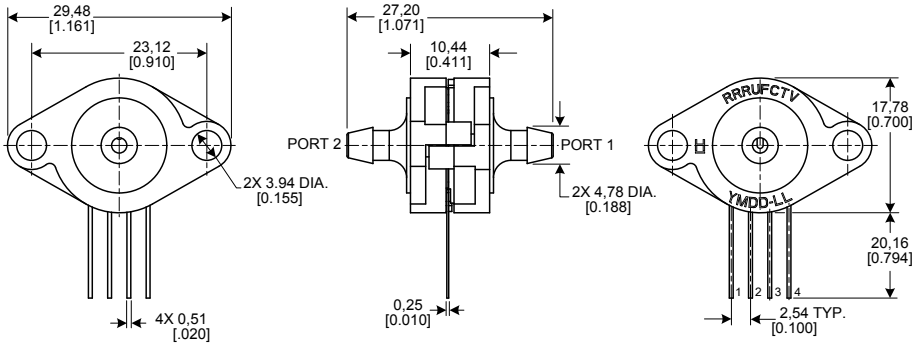
SIP AN: Single axial barbed port



SIP LN: Single barbless port



SIP FF: Fastener mount, dual axial barbed ports, opposite sides



SIP FN: Fastener mount, single axial barbed port

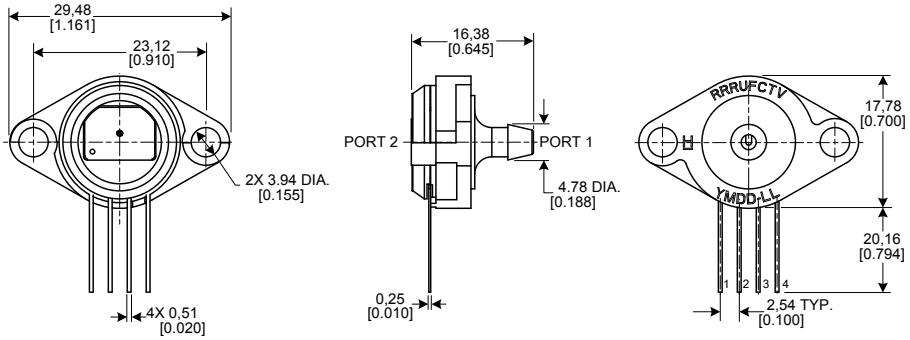
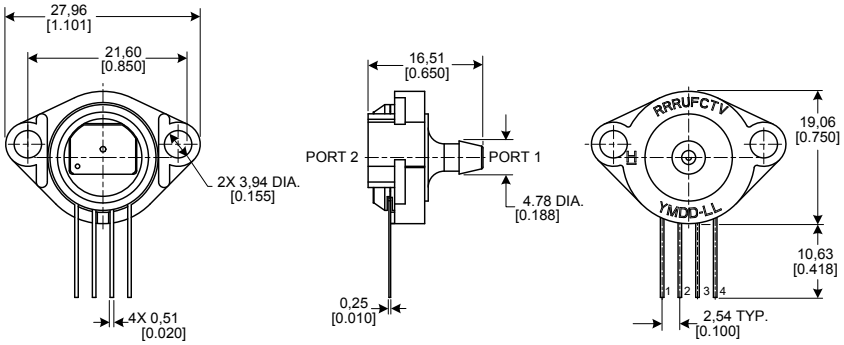
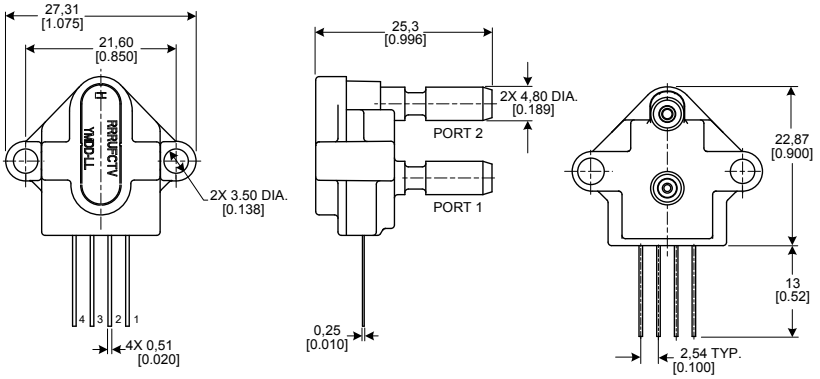


Figure 6. SIP Package Dimensional Drawings (continued)

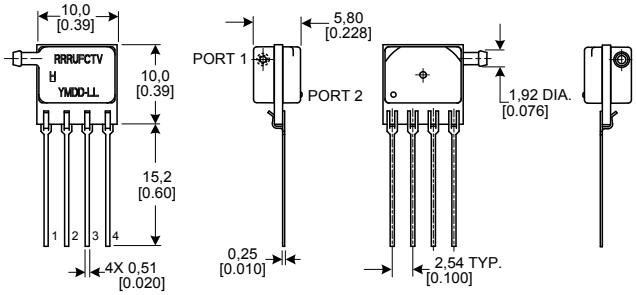
SIP GN: Ribbed fastener mount, single axial barbed port



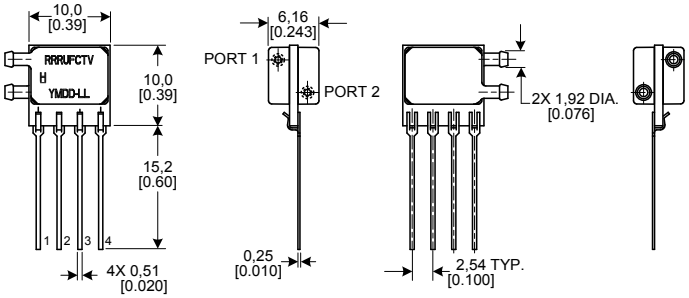
SIP NB: Fastener mount, dual axial ports, same side



SIP RN: Single radial barbed port



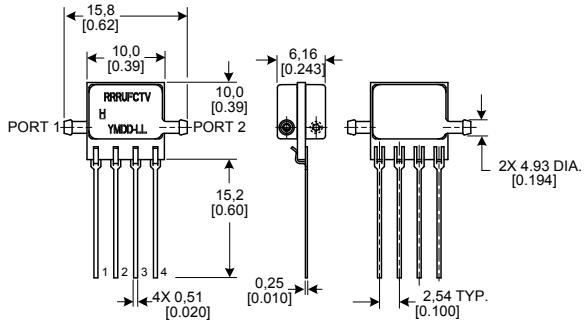
SIP RR: Dual radial barbed ports, same side



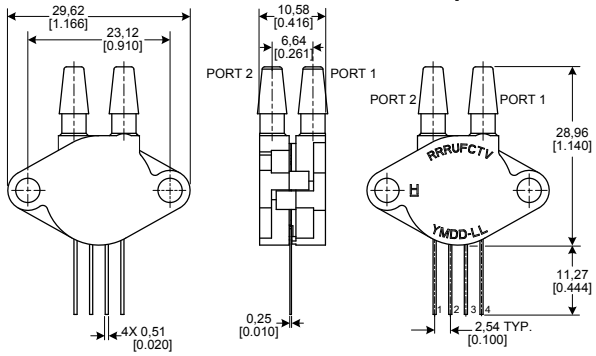
±1% Total Error Band, Analog Output, 1 psi to 150 psi (60 mbar to 10 bar)

Figure 6. SIP Package Dimensional Drawings (continued)

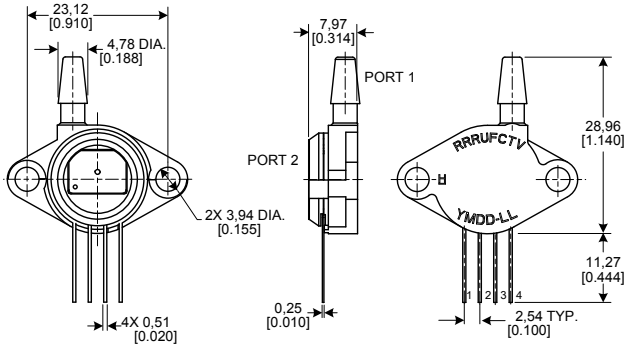
SIP DR: Dual radial barbed ports, opposite side



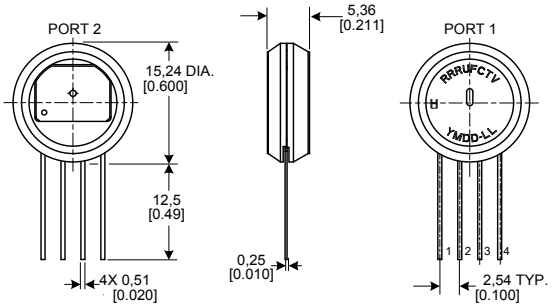
SIP HH: Fastener mount, dual radial barbed ports, same side



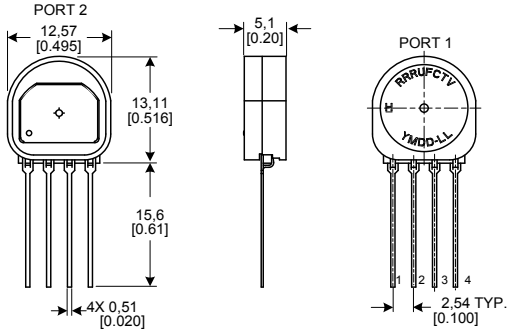
SIP HN: Fastener mount, single radial barbed port



SIP MN: Manifold mount, outer diameter seal



SIP SN: Manifold mount, inner diameter seal



⚠ WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. DO NOT USE this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

SALES AND SERVICE

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

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008216-2-EN IL50 GLO Printed in USA
March 2011

Honeywell

TruStability® Silicon Pressure Sensors: HSC Series–High Accuracy

±1% Total Error Band, Amplified Compensated Digital Output, 1 psi to 150 psi (60 mbar to 10 bar)

DESCRIPTION

The TruStability® High Accuracy Silicon Ceramic (HSC) Series is a piezoresistive silicon pressure sensor offering a digital output for reading pressure over the specified full scale pressure span and temperature range.

The HSC Series is fully calibrated and temperature compensated for sensor offset, sensitivity, temperature effects, and non-linearity using an on-board Application Specific Integrated Circuit (ASIC). Calibrated output values for pressure are updated at approximately 2 kHz.

The HSC Series is calibrated over the temperature range of 0 °C to 50 °C [32 °F to 122 °F]. The sensor is characterized for operation from a single power supply of either 3.3 Vdc or 5.0 Vdc.

These sensors measure absolute, differential, and gage pressures. The absolute versions have an internal vacuum reference and an output value proportional to absolute pressure. Differential versions allow application of pressure to either side of the sensing diaphragm. Gage versions are referenced to atmospheric pressure and provide an output proportional to pressure variations from atmosphere.

The TruStability® pressure sensors are intended for use with non-corrosive, non-ionic gases, such as air and other dry gases. An available option extends the performance of these sensors to non-corrosive, non-ionic liquids.

All products are designed and manufactured according to ISO 9001 standards.

FEATURES

- Industry-leading long-term stability
- Extremely tight accuracy of ±0.25% FSS BFSL (Full Scale Span Best Fit Straight Line)
- Total error band of ±1% full scale span maximum
- Modular and flexible design offers customers a variety of package styles and options, all with the same industry-leading performance specifications
- Miniature 10 mm x 10 mm [0.39 in x 0.39 in] package
- Low operating voltage
- Extremely low power consumption
- I^2C- or SPI-compatible 14-bit digital output (min. 12-bit sensor resolution)
- Precision ASIC conditioning and temperature compensated over 0 °C to 50 °C [32 °F to 122 °F] temperature range
- RoHS compliant
- Virtually insensitive to mounting orientation
- Internal diagnostic functions increase system reliability
- Also available with analog output
- Absolute, differential and gage types
- Pressure ranges from 1 psi to 150 psi (60 mbar to 10 bar)
- Custom calibration available
- Various pressure port options
- Liquid media option

TruStability® Silicon Pressure Sensors: HSC Series–High Accuracy

POTENTIAL APPLICATIONS

- **Medical:**
  - Airflow monitors
  - Anesthesia machines
  - Blood analysis machines
  - Gas chromatography
  - Gas flow instrumentation
  - Kidney dialysis machines
  - Oxygen concentrators
  - Pneumatic controls
  - Respiratory machines
  - Sleep apnea equipment
  - Ventilators
- **Industrial:**
  - Barometry
  - Flow calibrators
  - Gas chromatography
  - Gas flow instrumentation
  - HVAC
  - Life sciences
  - Pneumatic controls

Table 1. Absolute Maximum Ratings[1]

Parameter	Min.	Max.	Unit
Supply voltage (V_{supply})	-0.3	6.0	Vdc
Voltage on any pin	-0.3	V_{supply} + 0.3	V
Digital interface clock frequency: I^2C SPI	 100 50	 400 800	kHz
ESD susceptibility (human body model)	3	-	kV
Storage temperature	-40 [-40]	85 [185]	°C [°F]
Soldering time and temperature: Lead solder temperature (SIP, DIP) Peak reflow temperature (SMT)	4 s max. at 250 °C [482 °F] 15 s max. at 250 °C [482 °F]		

Table 2. Operating Specifications

Parameter	Min.	Typ.	Max.	Unit
Supply voltage (V_{supply})[2]: 3.3 Vdc 5.0 Vdc *Sensors are either 3.3 Vdc or 5.0 Vdc based on listing selected.*	 3.0 4.75	 3.3[3] 5.0[3]	 3.6 5.25	Vdc
Supply current: 3.3 Vdc supply 5.0 Vdc supply	 - -	 1.6 2	 2.1 3	mA
Compensated temperature range[4]	0 [32]	-	50 [122]	°C [°F]
Operating temperature range[5]	-20 [-4]	-	85 [185]	°C [°F]
Startup time (power up to data ready)	-	2.8	7.3	ms
Response time	-	0.46	-	ms
I^2C voltage level low	-	-	0.2	V_{supply}
I^2C voltage level high	0.8	-	-	V_{supply}
Pull up on SDA and SCL	1	-	-	kOhm
Accuracy[6]	-	-	±0.25	%FSS BFSL
Total error band[7]	-	-	±1	%FSS[8]
Output resolution	12	-	-	bits

Table 3. Environmental Specifications

Parameter	Characteristic
Humidity:	
Dry gases only (See “Options N and D” in Figure 1.)	0% to 95% RH, non-condensing
Liquid media (See “Options T and V” in Figure 1.)	100% condensing or direct liquid media on Port 1
Vibration	MIL-STD-202F, Curve AK (20.7 g random)
Shock	MIL-STD-202F, Method 213B, Condition F
Life[9]	1 million cycles minimum
Solder reflow	J-STD-020-C

Table 4. Wetted Materials[10]

Parameter	Port 1 (Pressure Port)	Port 2 (Reference Port)
Covers	high temperature polyamide	high temperature polyamide
Substrate	alumina ceramic	alumina ceramic
Adhesives	epoxy, silicone	epoxy, silicone
Electronic components	ceramic, glass, solder, silicon	silicon, glass, gold, solder

Notes:

1. Absolute maximum ratings are the extreme limits the device will withstand without damage.
2. Ratiometricity of the sensor (the ability of the digital device to maintain performance parameters independent of supply voltage) is achieved within the specified operating voltage for each option.
3. The sensor is not reverse polarity protected. Incorrect application of supply voltage or ground to the wrong pin may cause electrical failure.
4. The compensated temperature range is the temperature range over which the sensor will produce an output proportional to pressure within the specified performance limits.
5. The operating temperature range is the temperature range over which the sensor will produce an output proportional to pressure but may not remain within the specified performance limits.
6. Accuracy: The maximum deviation in output from a Best Fit Straight Line (BFSL) fitted to the output measured over the pressure range at 25 °C [77 °F]. Includes all errors due to pressure non-linearity, pressure hysteresis, and non-repeatability.
7. Total Error Band: The maximum deviation from the ideal transfer function over the entire compensated temperature and pressure range. Includes all errors due to offset, full scale span, pressure non-linearity, pressure hysteresis, repeatability, thermal effect on offset, thermal effect on span, and thermal hysteresis.
8. Full Scale Span (FSS) is the algebraic difference between the output signal measured at the maximum (Pmax.) and minimum (Pmin.) limits of the pressure range. (See Figure 1 for ranges.)
9. Life may vary depending on specific application in which sensor is utilized.
10. Contact Honeywell Customer Service for detailed material information.

CAUTION

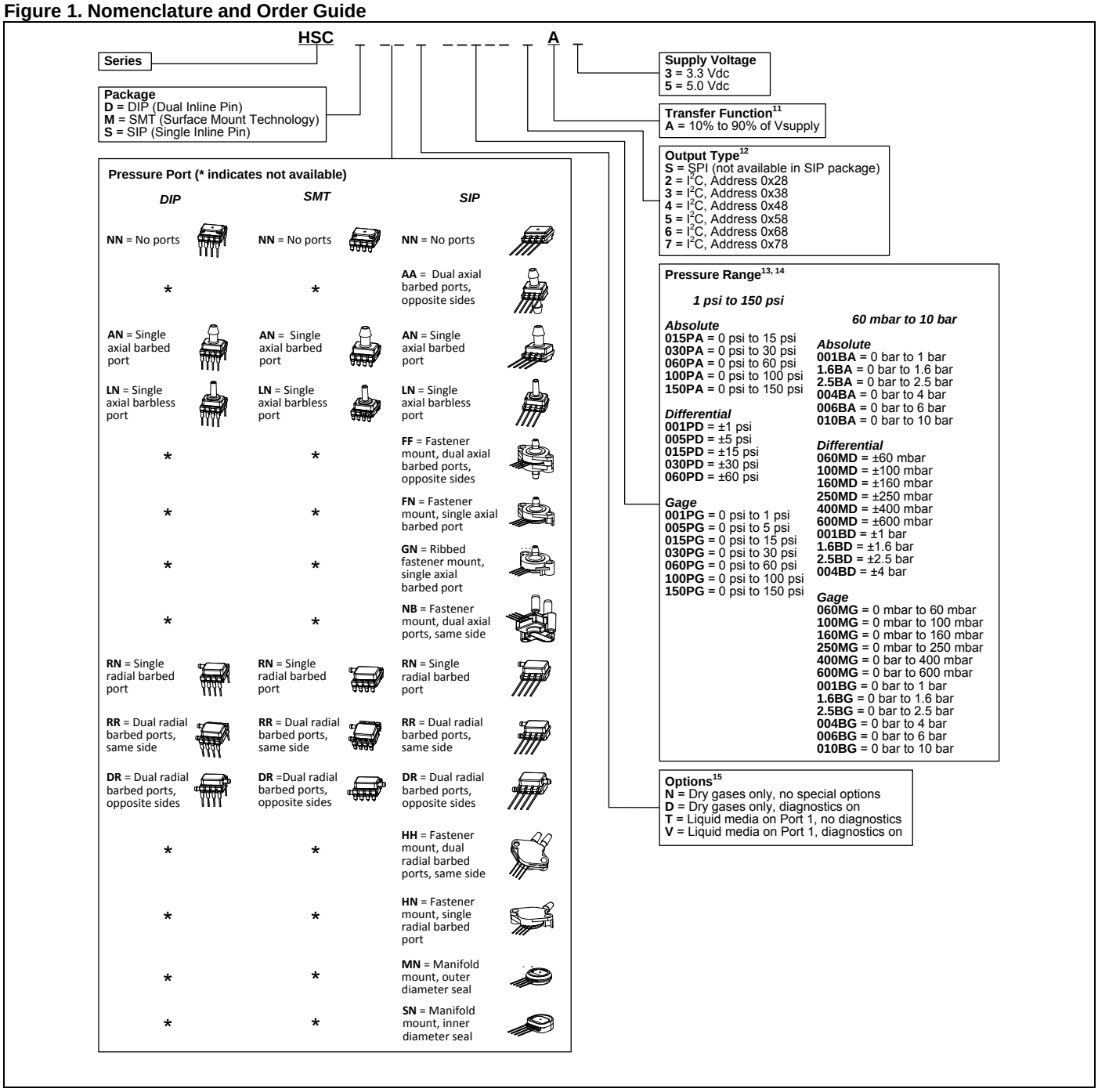
PRODUCT DAMAGE

- Ensure liquid media is applied to Port 1 only; Port 2 is not compatible with liquids.
- Ensure liquid media contains no particulates. All TruStability® sensors are dead-ended devices. Particulates can accumulate inside the sensor, causing damage or affecting sensor output.
- Recommend that the sensor be positioned with Port 1 facing downwards; any particulates in the system are less likely to enter and settle within the pressure sensor if it is in this position.
- Ensure liquid media does not create a residue when dried; build-up inside the sensor may affect sensor output. Rinsing of a dead-ended sensor is difficult and has limited effectiveness for removing residue.
- Ensure liquid media are compatible with wetted materials. Non-compatible liquid media will degrade sensor performance and may lead to sensor failure.

Failure to comply with these instructions may result in product damage.

TruStability® Silicon Pressure Sensors: HSC Series–High Accuracy

Figure 1. Nomenclature and Order Guide

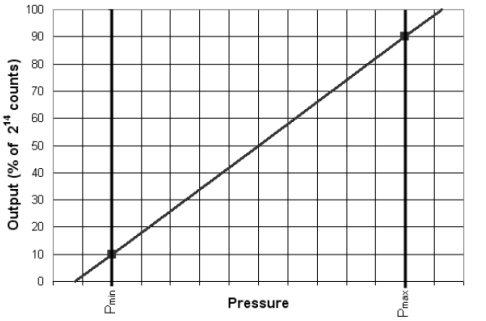


Notes:

11. The transfer function limits define the output of the sensor at a given pressure input. By specifying Pmin. and Pmax., the output at Pmin. and Pmax., the complete transfer function of the sensor is defined. See Figure 2 for a graphical representation of the transfer function. Other transfer functions are available. Contact Honeywell Customer Service for more information.
12. Analog output is also available. Contact Honeywell Customer Service for more information.
13. Custom pressure ranges are available. Contact Honeywell Customer Service for more information.
14. See Table 5 for an explanation of sensor pressure types.
15. See **CAUTION** on previous page.

±1% Total Error Band, Digital Output, 1 psi to 150 psi (60 mbar to 10 bar)

Figure 2. Transfer Function Limits



$$\text{Output (\% of } 2^{14} \text{ counts)} = \frac{80\%}{P_{max} - P_{min}} \cdot (\text{Pressure}_{applied} - P_{min}) + 10\%$$

Figure 3. Completed Catalog Listing Example

HSCSANN100PGSA3
SIP package, AN pressure port, no diagnostics, 100 psi gage, SPI output, 10% to 90% calibration at 3.3 Vdc.

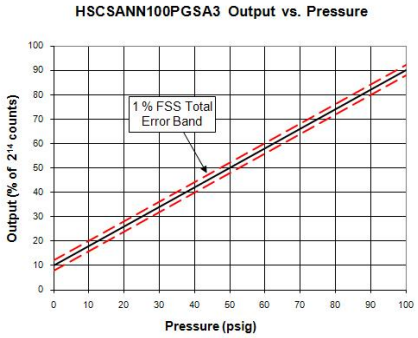


Table 5. Pressure Types

Pressure Type	Description
Absolute	Output is proportional to the difference between applied pressure and a built-in reference to vacuum. $P_{min.}$ is set at absolute zero pressure (full vacuum).
Differential	Output is proportional to the difference between the pressures applied to each port. (Port 1 – Port 2) 50% point of transfer function set at Port 1 = Port 2.
Gage	Output is proportional to the difference between applied pressure and atmospheric (ambient) pressure. $P_{min.}$ is set at atmospheric pressure.

Table 6. Sensor Output at Significant Percentages

% Output	Digital Counts (decimal)	Digital Counts (hex)
0	0	0x0000
10	1638	0x0666
50	8192	0x2000
90	14746	0x399A
100	16383	0x3FFF

Table 7. Pressure Range Specifications for 1 psi to 150 psi

Order Code	Pressure Range		Over-pressure[16]	Burst Pressure[17]	Common Mode Pressure[18]	Long-term Stability (1000 hr, 25 °C [77 °F])
	$P_{min.}$	$P_{max.}$				
Absolute						
015PA	0 psi	15 psi	30 psi	60 psi	NA	±0.25% FSS
030PA	0 psi	30 psi	60 psi	120 psi	NA	±0.25% FSS
060PA	0 psi	60 psi	120 psi	240 psi	NA	±0.25% FSS
100PA	0 psi	100 psi	250 psi	250 psi	NA	±0.25% FSS
150PA	0 psi	150 psi	250 psi	250 psi	NA	±0.25% FSS
Differential						
001PD	-1 psi	1 psi	10 psi	10 psi	150 psi	±0.35% FSS
005PD	-5 psi	5 psi	30 psi	40 psi	150 psi	±0.35% FSS
015PD	-15 psi	15 psi	30 psi	60 psi	150 psi	±0.25% FSS
030PD	-30 psi	30 psi	60 psi	120 psi	150 psi	±0.25% FSS
060PD	-60 psi	60 psi	120 psi	240 psi	250 psi	±0.25% FSS
Gage						
001PG	0 psi	1 psi	10 psi	10 psi	150 psi	±0.35% FSS
005PG	0 psi	5 psi	30 psi	40 psi	150 psi	±0.35% FSS
015PG	0 psi	15 psi	30 psi	60 psi	150 psi	±0.25% FSS
030PG	0 psi	30 psi	60 psi	120 psi	150 psi	±0.25% FSS
060PG	0 psi	60 psi	120 psi	240 psi	250 psi	±0.25% FSS
100PG	0 psi	100 psi	250 psi	250 psi	250 psi	±0.25% FSS
150PG	0 psi	150 psi	250 psi	250 psi	250 psi	±0.25% FSS

Table 8. Pressure Range Specifications for 60 mbar to 10 bar

Order Code	Pressure Range		Over-pressure[16]	Burst Pressure[17]	Common Mode Pressure[18]	Long-term Stability (1000 hr, 25 °C [77 °F])
	P_{min}	P_{max}				
Absolute						
001BA	0 bar	1 bar	2 bar	4 bar	NA	±0.25% FSS
1.6BA	0 bar	1.6 bar	4 bar	8 bar	NA	±0.25% FSS
2.5BA	0 bar	2.5 bar	6 bar	8 bar	NA	±0.25% FSS
004BA	0 bar	4 bar	8 bar	16 bar	NA	±0.25% FSS
006BA	0 bar	6 bar	17 bar	17 bar	NA	±0.25% FSS
010BA	0 bar	10 bar	17 bar	17 bar	NA	±0.25% FSS
Differential						
060MD	-60 mbar	60 mbar	500 mbar	700 mbar	10 bar	±0.35% FSS
100MD	-100 mbar	100 mbar	500 mbar	700 mbar	10 bar	±0.35% FSS
160MD	-160 mbar	160 mbar	500 mbar	700 mbar	10 bar	±0.35% FSS
250MD	-250 mbar	250 mbar	1.4 bar	2.5 bar	10 bar	±0.35% FSS
400MD	-400 mbar	400 mbar	1.4 bar	2.5 bar	10 bar	±0.35% FSS
600MD	-600 mbar	600 mbar	2 bar	4 bar	10 bar	±0.25% FSS
001BD	-1 bar	1 bar	2 bar	4 bar	10 bar	±0.25% FSS
1.6BD	-1.6 bar	1.6 bar	4 bar	8 bar	10 bar	±0.25% FSS
2.5BD	-2.5 bar	2.5 bar	6 bar	8 bar	10 bar	±0.25% FSS
004BD	-4 bar	4 bar	8 bar	16 bar	10 bar	±0.25% FSS
Gage						
060MG	0 mbar	60 mbar	500 mbar	700 mbar	3.5 bar	±0.35% FSS
100MG	0 mbar	100 mbar	500 mbar	700 mbar	10 bar	±0.35% FSS
160MG	0 mbar	160 mbar	500 mbar	700 mbar	10 bar	±0.35% FSS
250MG	0 mbar	250 mbar	1.4 bar	2.5 bar	10 bar	±0.35% FSS
400MG	0 mbar	400 mbar	1.4 bar	2.5 bar	10 bar	±0.35% FSS
600MG	0 mbar	600 mbar	2 bar	4 bar	10 bar	±0.35% FSS
001BG	0 bar	1 bar	2 bar	4 bar	10 bar	±0.25% FSS
1.6BG	0 bar	1.6 bar	4 bar	8 bar	10 bar	±0.25% FSS
2.5BG	0 bar	2.5 bar	6 bar	8 bar	10 bar	±0.25% FSS
004BG	0 bar	4 bar	8 bar	16 bar	16 bar	±0.25% FSS
006BG	0 bar	6 bar	17 bar	17 bar	17 bar	±0.25% FSS
010BG	0 bar	10 bar	17 bar	17 bar	17 bar	±0.25% FSS

Notes:

16. Overpressure: The maximum pressure which may safely be applied to the product for it to remain in specification once pressure is returned to the operating pressure range. Exposure to higher pressures may cause permanent damage to the product. Unless otherwise specified this applies to all available pressure ports at any temperature with the operating temperature range.
17. Burst pressure: The maximum pressure that may be applied to any port of the product without causing escape of pressure media. Product should not be expected to function after exposure to any pressure beyond the burst pressure.
18. Common mode pressure: The maximum pressure that can be applied simultaneously to both ports of a differential pressure sensor without causing changes in specified performance.

Table 9. Pinout for SMT and DIP Packages

Output Type	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
I^2C	GND	V_{supply}	SDA	SCL	NC	NC	NC	NC
SPI	GND	V_{supply}	MISO	SCLK	SS	NC	NC	NC

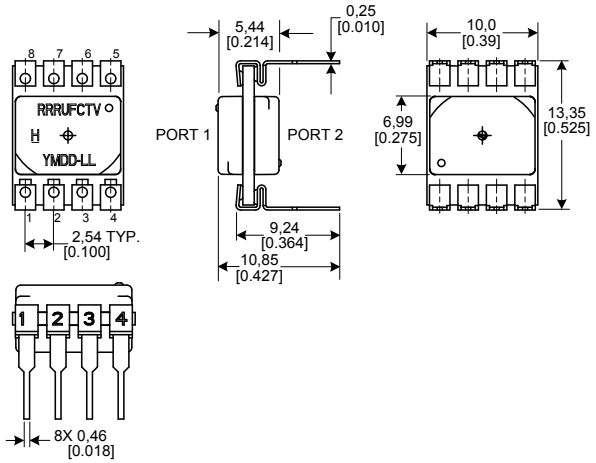
Table 10. Pinout for SIP Package

Output Type	Pin 1	Pin 2	Pin 3	Pin 4
I^2C	GND	V_{supply}	SDA	SCL

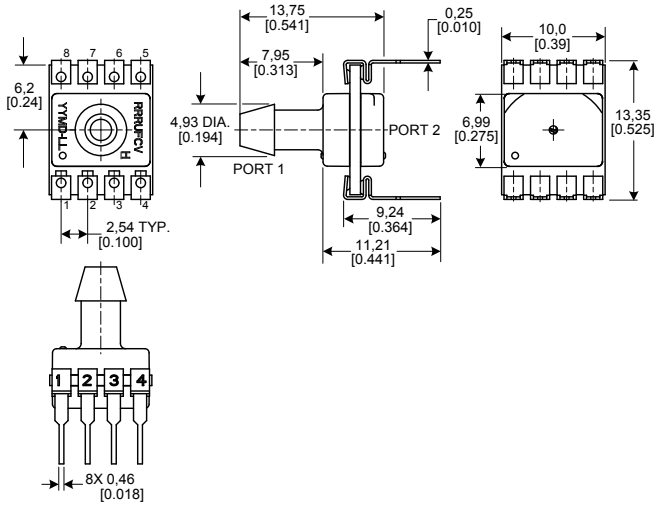
±1% Total Error Band, Digital Output, 1 psi to 150 psi (60 mbar to 10 bar)

Figure 4. DIP Pressure Port Dimensional Drawings (For reference only: mm [in])

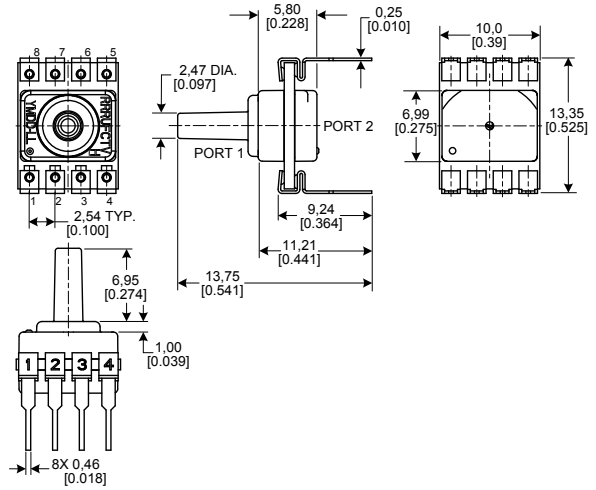
DIP NN: No ports



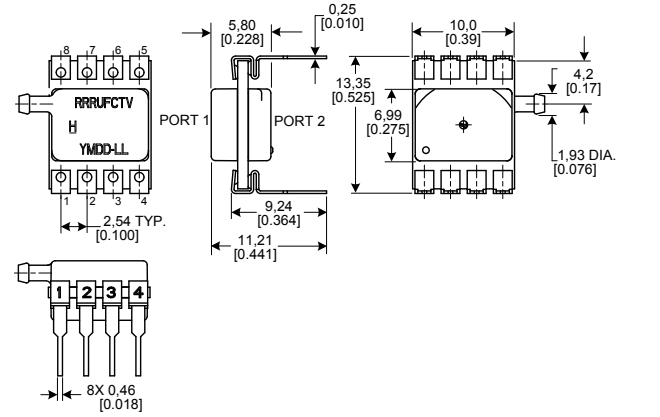
DIP AN: Single axial barbed port



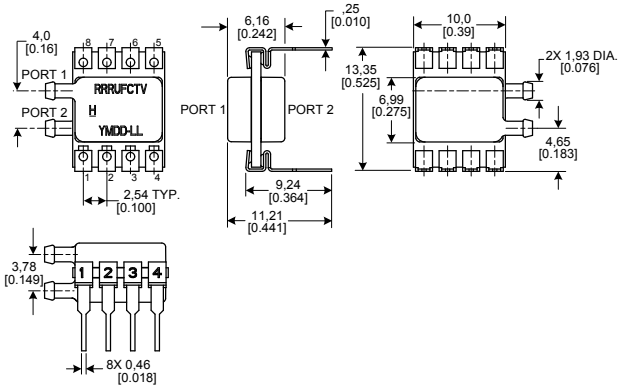
DIP LN: Single axial barbless port



DIP RN: Single radial barbed port



DIP RR: Dual radial barbed ports, same side



DIP DR: Dual radial barbed ports, opposite sides

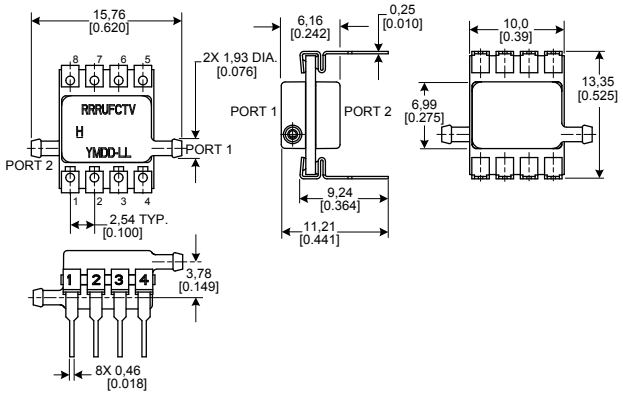
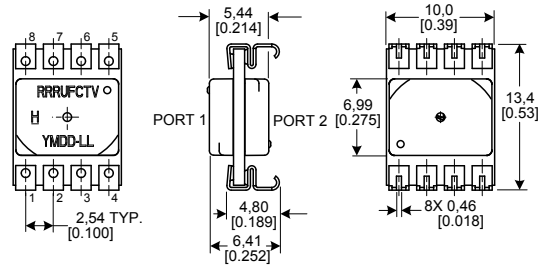
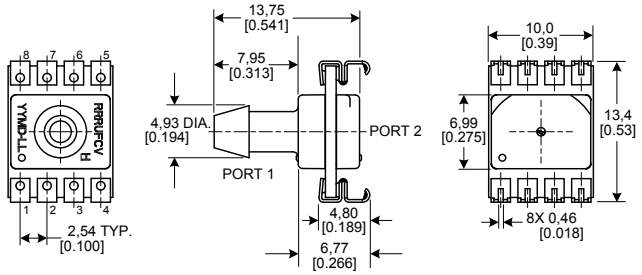


Figure 5. SMT Pressure Port Dimensional Drawings (For reference only: mm [in])

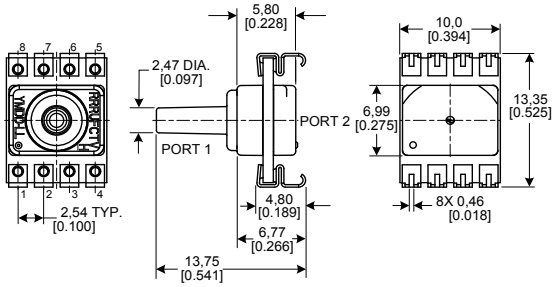
SMT NN: No ports



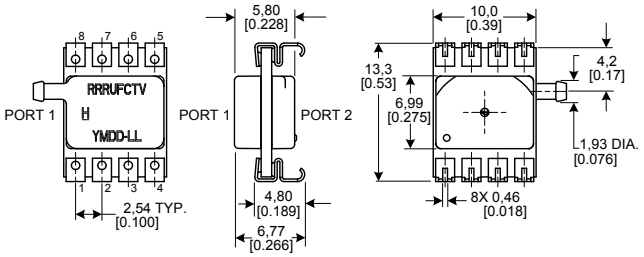
SMT AN: Single axial barbed port



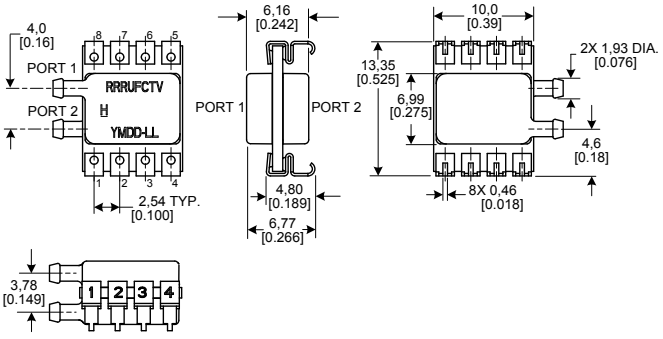
SMT LN: Single axial barbless port



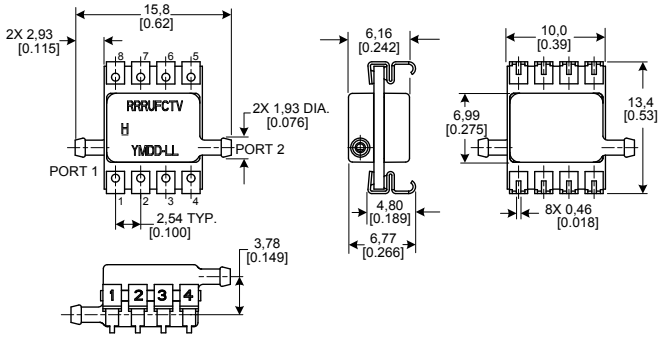
SMT RN: Single radial barbed port



SMT RR: Dual radial barbed ports, same side



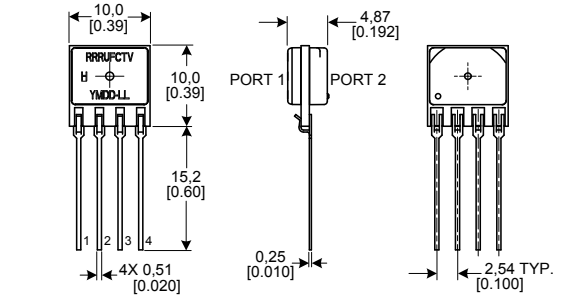
SMT DR: Dual radial barbed ports, opposite sides



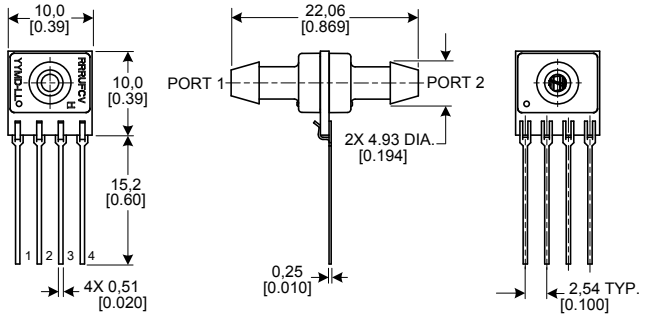
±1% Total Error Band, Digital Output, 1 psi to 150 psi (60 mbar to 10 bar)

Figure 6. SIP Package Dimensional Drawings (For reference only: mm [in])

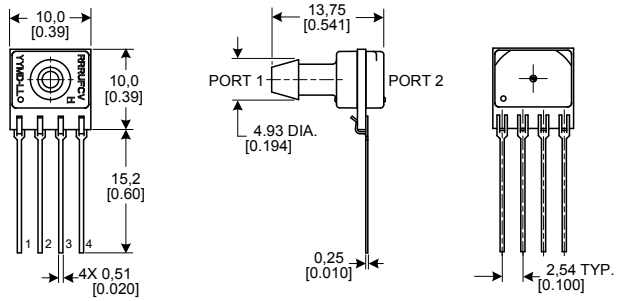
SIP NN: No ports



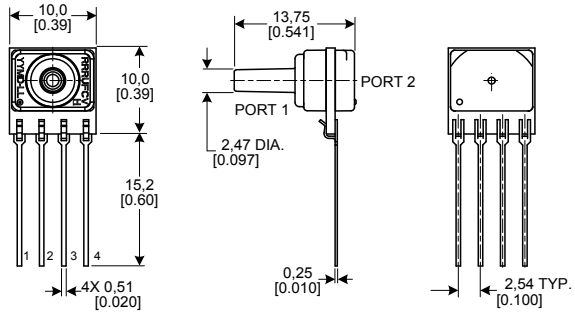
SIP AA: Dual axial barbed ports, opposite sides



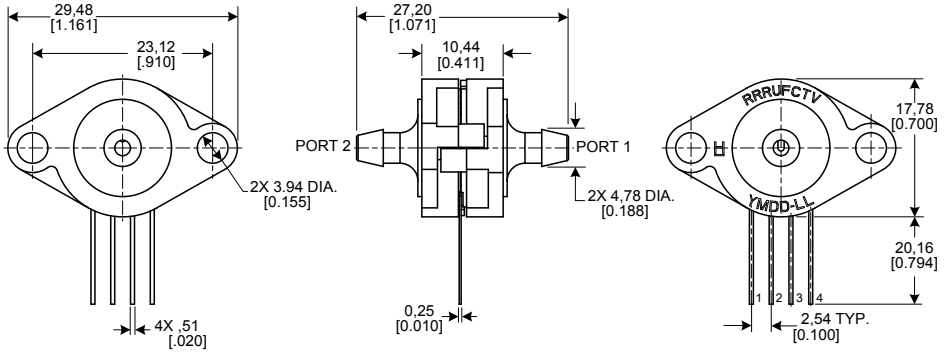
SIP AN: Single axial barbed port



SIP LN: Single barbless port



SIP FF: Fastener mount, dual axial barbed ports, opposite sides



SIP FN: Fastener mount, single axial barbed port

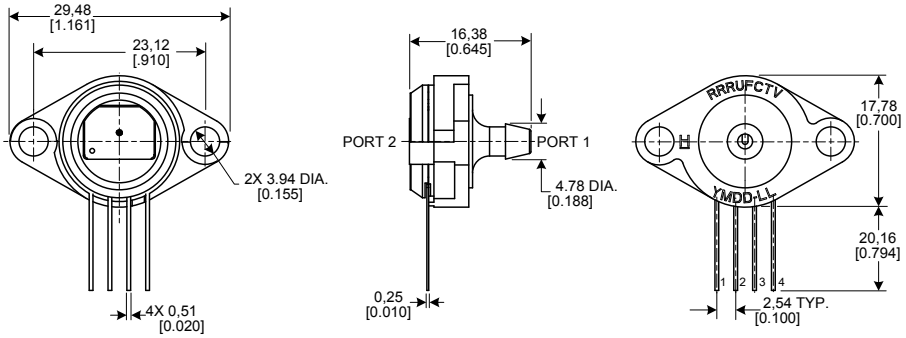
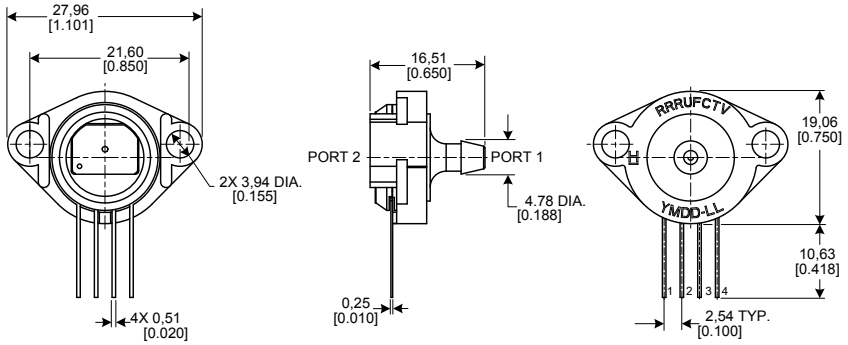
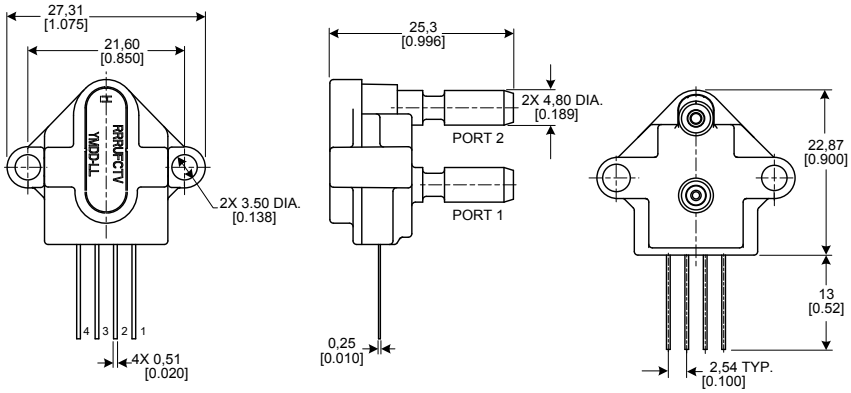


Figure 6. SIP Package Dimensional Drawings (continued)

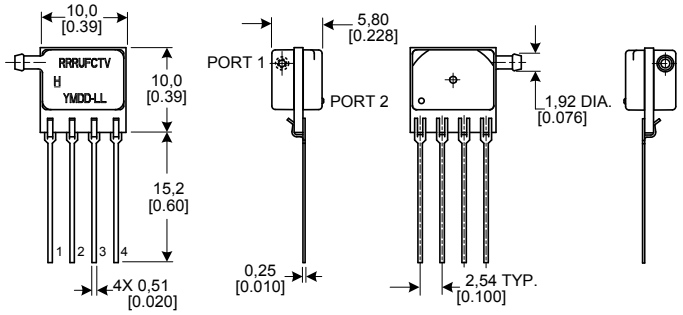
SIP GN: Ribbed fastener mount, single axial barbed port



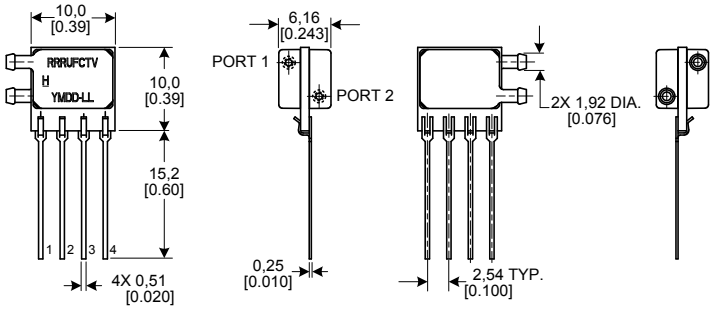
SIP NB: Fastener mount, dual axial ports, same side



SIP RN: Single radial barbed port



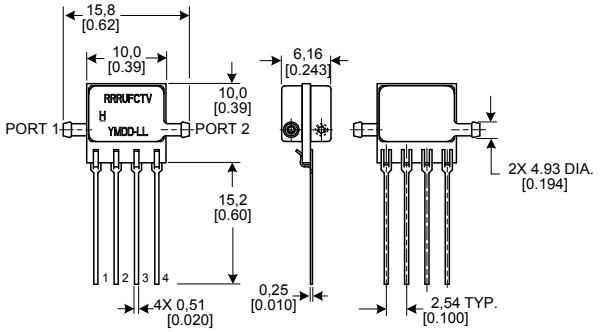
SIP RR: Dual radial barbed ports, same side



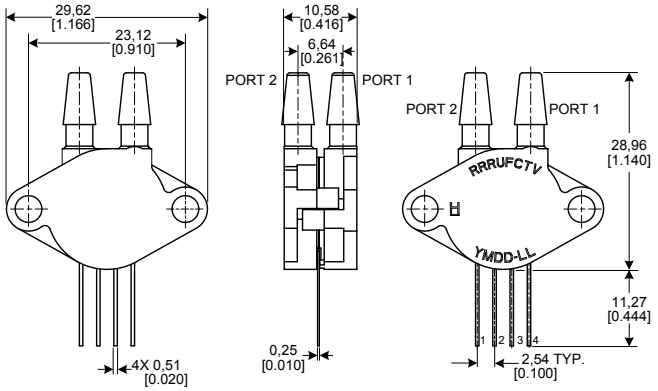
±1% Total Error Band, Digital Output, 1 psi to 150 psi (60 mbar to 10 bar)

Figure 6. SIP Package Dimensional Drawings (continued)

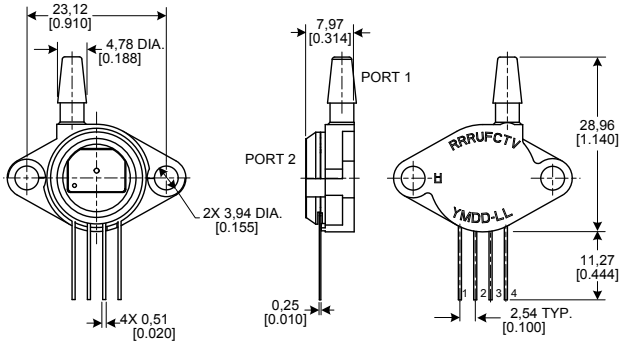
SIP DR: Dual radial barbed ports, opposite side



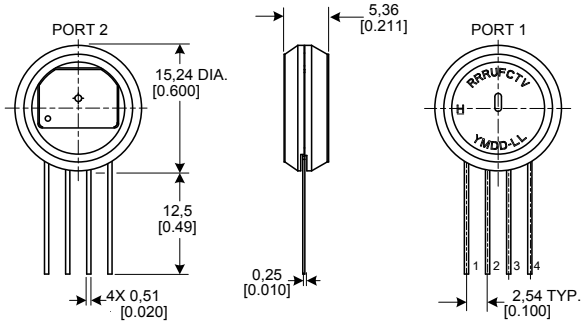
SIP HH: Fastener mount, dual radial barbed ports, same side



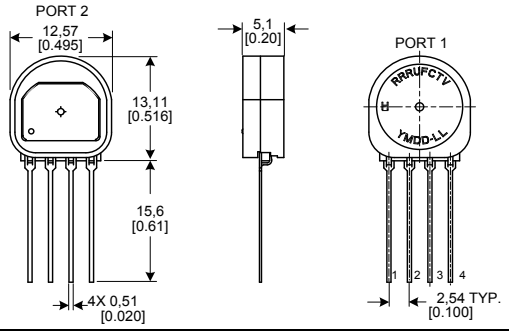
SIP HN: Fastener mount, single radial barbed port



SIP MN: Manifold mount, outer diameter seal



SIP SN: Manifold mount, inner diameter seal



⚠ WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

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Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. DO NOT USE this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

SALES AND SERVICE

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

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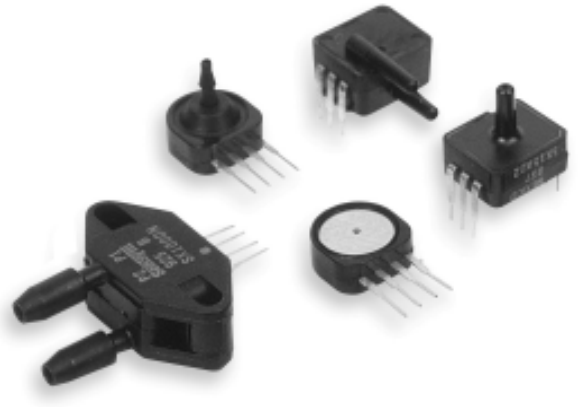
008214-2-EN IL50 GLO Printed in USA
March 2011

Honeywell

SCC Series

Silicon pressure sensors
0 psi to 5 psi and 0 psi to 300 psi



DESCRIPTION

The SCC Series sensors offer an extremely low cost sensor element with a temperature stable output when driven with a constant current source. These integrated circuit sensors were designed for extremely cost sensitive applications where precise accuracy over a wide temperature range is not required. This series is intended for use with non-corrosive, non-ionic working fluids such as air, and dry gases.

Absolute devices have an internal vacuum reference and an output voltage proportional to applied pressure. The differential devices allow application of pressure to either side of the diaphragm and devices are thereby available to measure both differential and gage pressures.

This product is packaged either in standard low cost chip carrier "button" package or a DIP package. Both packages are designed for applications where the sensing element is to be integral to the OEM equipment. These packages can be o-ring sealed, epoxied, and/or clamped onto a pressure fitting. A closed bridge four pin SIP configuration is provided for electrical connection to the button package. The DIP package offers a 5-pin open bridge configuration.

FEATURES

- Low cost sensor element
- Internal temperature compensation
- Differential or gage pressures

TYPICAL APPLICATIONS

- Pneumatic controls
- Automotive diagnostics
- Medical equipment
- Dental equipment
- Environmental controls

ORDERING INFORMATION

Pressure Range	Part Number for Ordering			
	Sensor in Button Package	Sensor in "N" Package	Sensor in Nipple Package	Sensor in DIP Package
0 psid to 5 psid or psig	SCC05D	SCC05DN	SCC05DP1	SCC05GD2, SCC05DD4
0 psid to 15 psid or psig	SCC015D	SCC015DN	SCC015DP1	SCC15GD2, SCC15DD4
0 psid to 30 psid or psig	SCC30D	SCC30DN	SCC30DP1	SCC30GD2, SCC30DD4
0 psig to 100 psig	SCC100D	SCC100DN	–	SCC100GD2, SCC100DD4
0 psia to 15 psia	SCC15A	SCC15AN	SCC15AP1	SCC15AD2
0 psia to 30 psia	SCC30A	SCC30AN	SCC30AP1	SCC30AD2
0 psia to 100 psia	SCC100A	SCC100AN	–	SCC100AD2
0 psia to 300 psi	–	–	–	–

⚠ WARNING

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Failure to comply with these instructions could result in death or serious injury.

⚠ WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

SPECIFICATION CHARACTERISTICS (Maximum Ratings for All Devices)

Supply current, I_S	1.5 mA
Compensated temperature range	0 °C to 50 °C [32 °F to 122 °F]
Operating temperature range	-40 °C to 85 °C [-40 °F to 185 °F]
Storage temperature range	-55 °C to 125 °C [-67 °F to 257 °F]
Humidity	0 % to 100 % RH
Lead temperature	250 °C [482 °F] Soldering 2 sec to 4 sec
Common-mode pressure	150 psi

PERFORMANCE CHARACTERISTICS (Individual Models) I_s=1.0 mA, T_A=25 °C [77 °F][1]

Part Number	Operating Pressure Range	Maximum Over Pressure	Accuracy[2]	Effect[3, 4] on Span 0 °C to 50 °C	Effect[5, 4] on Offset 0 °C to 50 °C	Full-Scale Span[6] mV
SCC05(D,G)	0 psid to 5 psid (g)	20 psi	0.50 %	1.50 %	30 µV/°C	25-65
SCC15A	0 psia to 15 psia	30 psia	0.50 %	1.50 %	40 µV/°C	40-95
SCC15(D,G)	0 psid to 15 psid (g)	30 psi	0.50 %	1.50 %	40 µV/°C	40-95
SCC30(D,G)	0 psid to 30 psid (g)	60 psi	0.50 %	1.50 %	60 µV/°C	60-150
SCC100A	0 psia to 100 psia	150 psia	0.50 %	1.50 %	30 µV/°C	85-225
SCC100(D,G)[7]	0 psig to 100 psig	150 psig	0.50 %	1.50 %	90 µV/°C	85-225
SCC300A	0 psia to 300 psia	450 psia	0.50 %	1.50 %	50 µV/°C	50-120

PERFORMANCE SPECIFICATIONS (All Models) I_s=10.0 Ma, T_a=25 °C [77 °F]

	Min.	Typ.	Max.	Unit
Zero Pressure Offset[8]	-30.0	-10.0	20.0	mV
Combined Linearity, Hysteresis and Repeatability[2]	–	0.25	0.50	% FSO
Long Term Stability of Offset and Span[9]	–	0.10	–	mV
Response Time (10 % to 90 %)[10]	–	0.10	–	ms
Input Impedance	4.00	5.00	6.50	kOhm
Output Impedance	4.00	5.00	6.50	kOhm

Specification Notes:

Note 1: Reference Conditions; Supply Current = 1.0 mA; TA = 25 °C [77 °F], Common-mode Line Pressure = 0 psig, Pressure Applied to P1, unless otherwise noted.

Note 2: Accuracy is the sum of Hysteresis and Linearity. Hysteresis is the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure. Linearity refers to the best straight line fit as measured for the offset, full-scale and ½ full-scale pressure at 25 °C [77 °F].

Note 3: This is the maximum temperature shift for span when measured between 0 °C and 50 °C [32 °F to 122 °F] relative to the 25 °C [77 °F] reading. Typical temperature coefficients for span and resistance are -2200 ppm/°C and 2200 ppm/°C respectively.

Note 4: Temperature effect on span and offset are guaranteed by design. Therefore these parameters are not 100 % tested.

Note 5: This is the maximum temperature shift for offset when measured at 0 °C and 50 °C [32 °F to 122 °F] divided by the temperature difference.

Note 6: Span is the algebraic difference between the output voltage at full-scale pressure and the ouput at zero pressure.

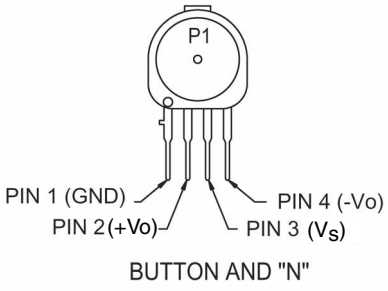
Note 7: The SCC100D devices can only be used in a forward gauge mode. Application of more than 30 psig to the back side of any of the SCC Series devices can result in device failure. On the SCC100GD2 pressure can only be applied to the back side of the die. No pressure I accessible from the front/top side of die.

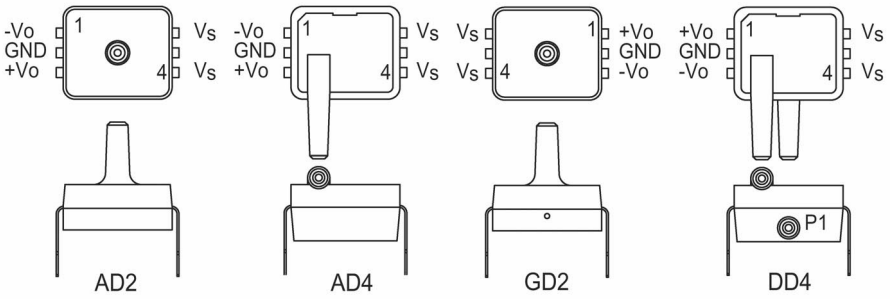
Note 8: The zero pressure offset is 30 to -20 mV max. form parts SCCxxxGD2 and SCCxxDD4 devices.

Note 9: Maximum difference in output at any pressure with the operating pressure range and temperature within 0 °C and 50 °C [32 °F to 122 °F].
a) 100 temperature cycles, 0 °C and 50 °C [32 °F to 122 °F]
b) 1.0 million pressure cycles, 0 psi to full-scale span.

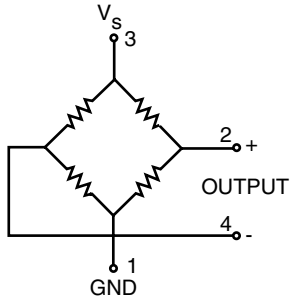
Note 10: Response time for a 0 psi to full-scale span pressure step change. 10 % to 90 % rise time.

ELECTRICAL CONNECTIONS

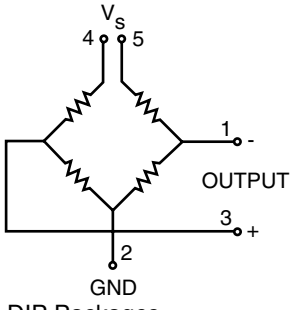




EQUIVALENT CIRCUITS



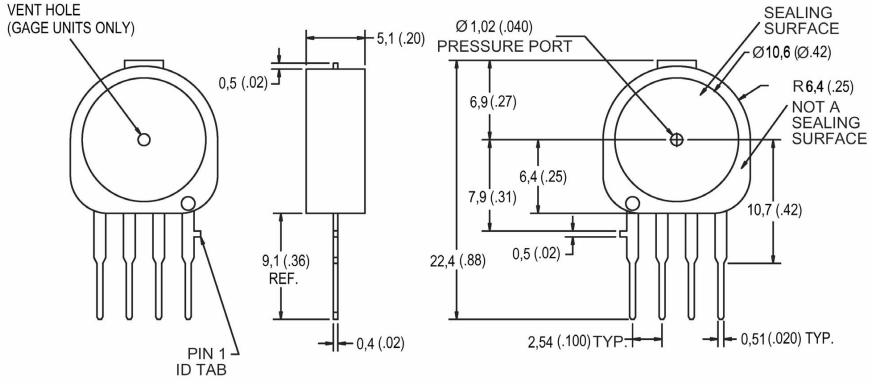
Button, Nipple and "N" Packages



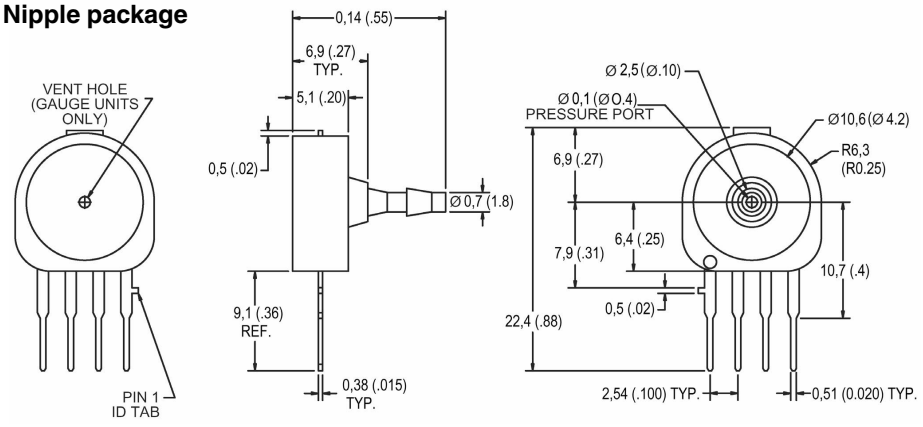
DIP Packages

MOUNTING DIMENSIONS IN MM (INCHES), FOR REFERENCE ONLY

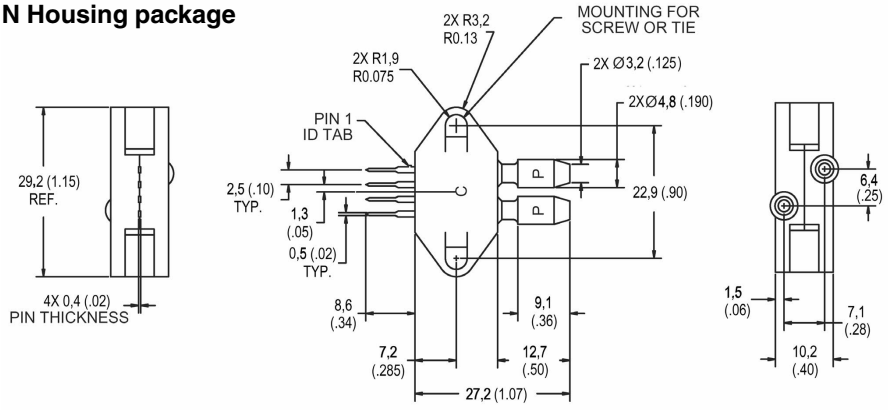
Button package



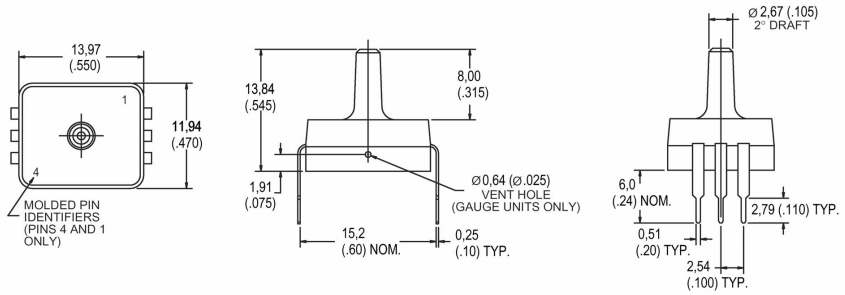
Nipple package



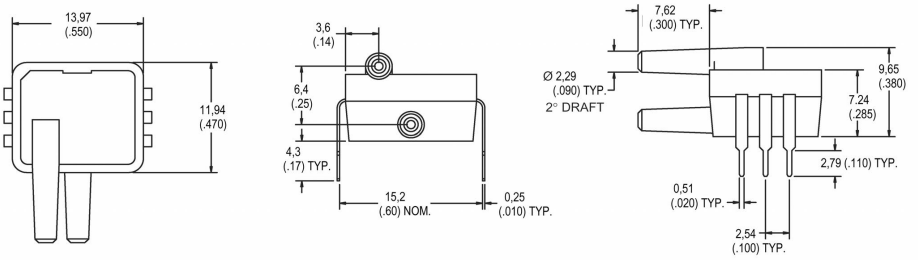
N Housing package



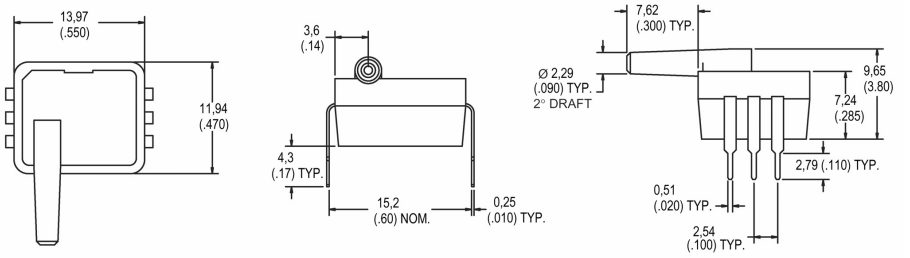
D2 DIP package



DD4 DIP package



AD4 DIP package



WARRANTY/REMEDY

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Internet: www.honeywell.com/sensing

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Europe	+44 (0) 1698 481481
	+44 (0) 1698 481676 Fax
Latin America	+1-305-805-8188
	+1-305-883-8257 Fax
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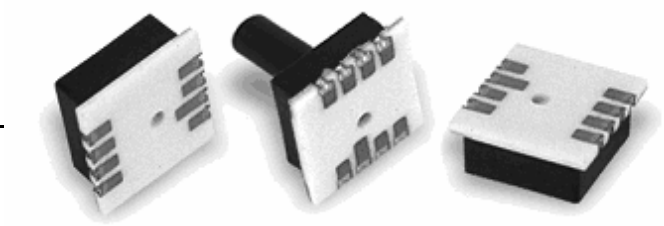
008135-2-EN IL50 GLO
May 2005

Honeywell

SCC SMT Series

Microstructure Pressure Sensors 0 psi to 5 psi through 0 psi to 100 psi



The SCC SMT Series offers an extremely low-cost sensor element with a temperature-stable output when driven with a constant current source. These integrated circuit sensors were designed for extremely cost-sensitive applications where precise accuracy over a wide temperature range is not required.

The standard surface mount package includes an optional ported lid to fit in a variety of applications.

The absolute devices have an internal vacuum reference and an output voltage proportional to absolute pressure. The differential devices allow application of pressure to either side of the sensing diaphragm and can be used for gage or differential measurements.

The 4-pin closed bridge configuration allows electrical connection with additional pads provided for mechanical support. Pulsed power is recommended to achieve maximum accuracy and conserve battery power in portable applications.

FEATURES

- Low cost
- Small size
- Internal temperature compensation
- Absolute or gage pressures
- High-impedance bridge
- Low power consumption

POTENTIAL APPLICATIONS

- Pneumatic controls
- Automotive diagnostics
- Medical equipment/instrumentation
- Dental equipment
- Environmental controls
- Barometric pressure measurement
- Altimeters
- Pneumatic controls
- Battery powered equipment

SCC SMT Series

PRESSURE SENSOR SPECIFICATIONS[1]

Characteristic	Parameter
Supply current, I_S	1.5 mA
Compensated temperature	0 °C to 50 °C [32 °F to 122 °F]
Operating temperature	-40 °C to 125 °C [-40 °F to 257 °F]
Storage temperature	-55 °C to 125 °C [-67 °F to 257 °F]
Humidity	0% to 100% RH
Lead temperature (soldering 2 s to 4 s)	250 °C [482 °F]

STANDARD PRESSURE RANGES[1]

Operating Pressure	Maximum[2] Pressure	Sensitivity[3]		Unit
		Nominal	Std. Dev.	
0 psi to 5 psi	20 psi	7.50	±0.68	mV/mA/psi
0 psi to 15 psi	30 psi	4.30	±0.37	mV/mA/psi
0 psi to 30 psi	60 psi	2.90	±0.57	mV/mA/psi
0 psi to 100 psi	150 psi	1.30	±0.20	mV/mA/psi

PERFORMANCE SPECIFICATIONS[1]

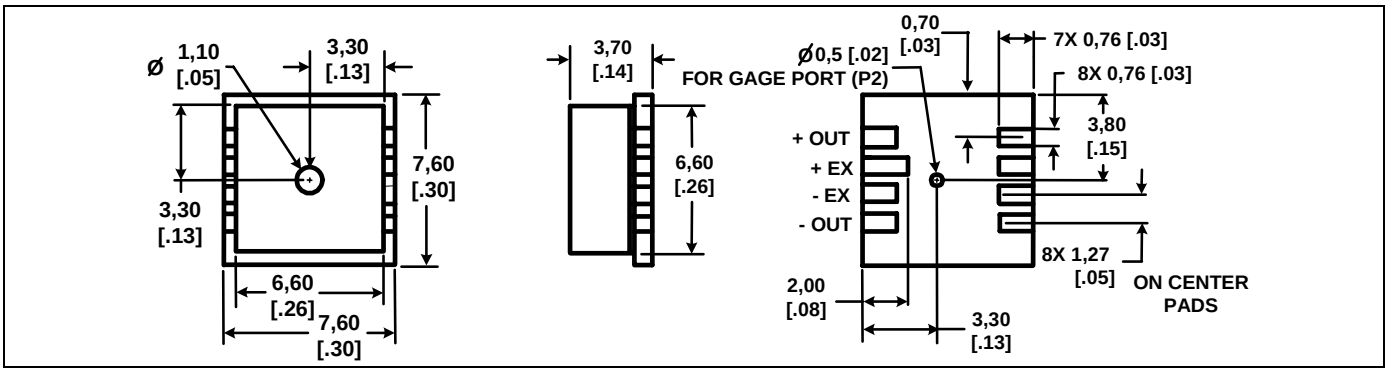
Characteristic	Min.	Typ.	Max.	Unit
Zero pressure offset (T_A = 25 °C)	-30.0	-10.0	20.0	mV
Linearity, hysteresis, repeatability [4]	-1.0	0.2	1.0	% FSS
Temperature effect on span [5]	-1.5	0.25	1.5	% FSS
Temperature effect on offset [5]	-2.0	.5	2.0	% FSS
Long-term stability of offset and span [6]	–	0.1	–	% FSS
Response time (10% to 90%) [7]	–	0.1	–	ms
Input resistance (T_A = 25 °C)	4.00	5.00	6.50	kΩ
Output impedance	4.00	5.00	6.50	kΩ

Notes:

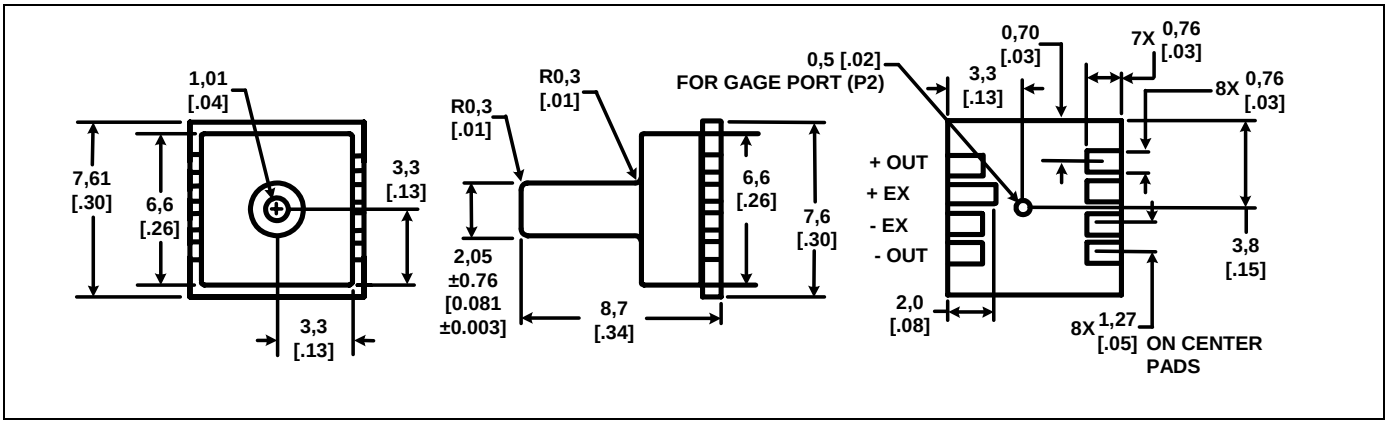
1. Reference conditions: Supply current, I_S = 1.0 mA, T_A = 25 °C to 70 °C [32 °F to 158 °F], common-mode Line pressure = 0 psig, pressure applied to P1 unless otherwise noted.
2. If the maximum pressure is exceeded, even momentarily, the package may leak or burst, or the pressure sensing die may fracture.
3. Sensitivity is the ratio of the output signal voltage change to the corresponding input pressure change. The sensitivity is characterized by design and periodic production testing. This parameter in not 100% tested in production.
4. Linearity is based on best straight line fit. Hysteresis is the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure.
5. Maximum error band of the offset voltage and the error of the band of the span over the compensated temperature range, relative to the 25 °C reading. Typical temperature coefficients for span and resistance are –2200 ppm/°C and 2200 ppm/°C, respectively. Temperature effects on offset and span are guaranteed by design. These parameters are not 100% tested in production.
6. Long term stability over a one year period.
7. Response time for 0 psi to full scale span pressure step change.

MOUNTING DIMENSIONS (For reference only: mm [in].)

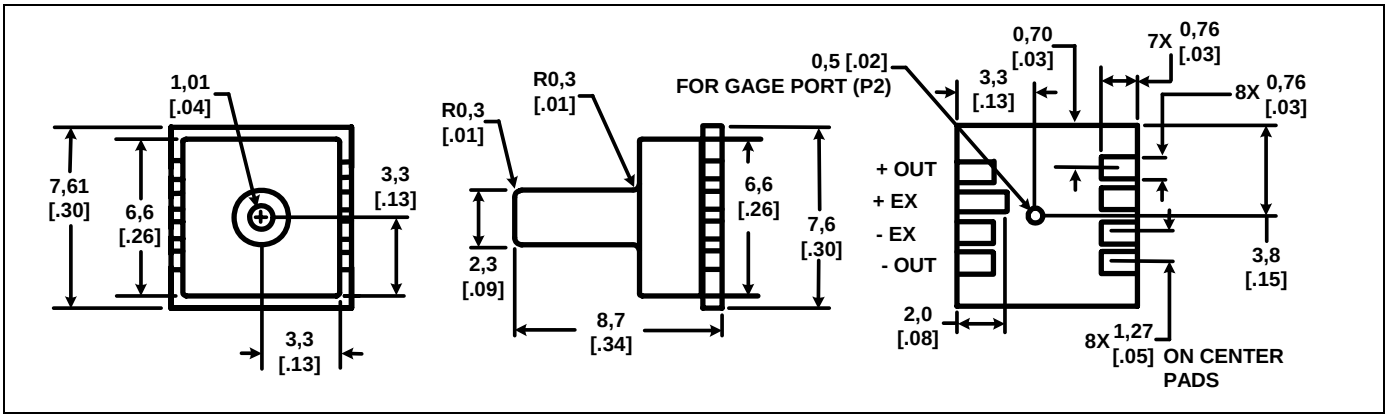
LOW PROFILE SMT



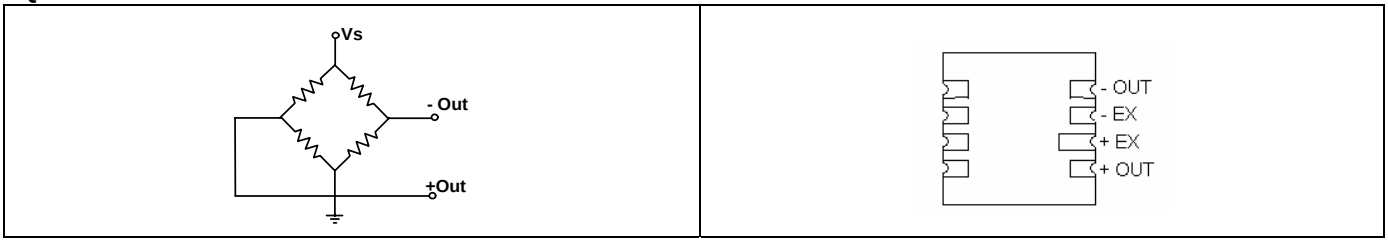
PORTED "P" SMT



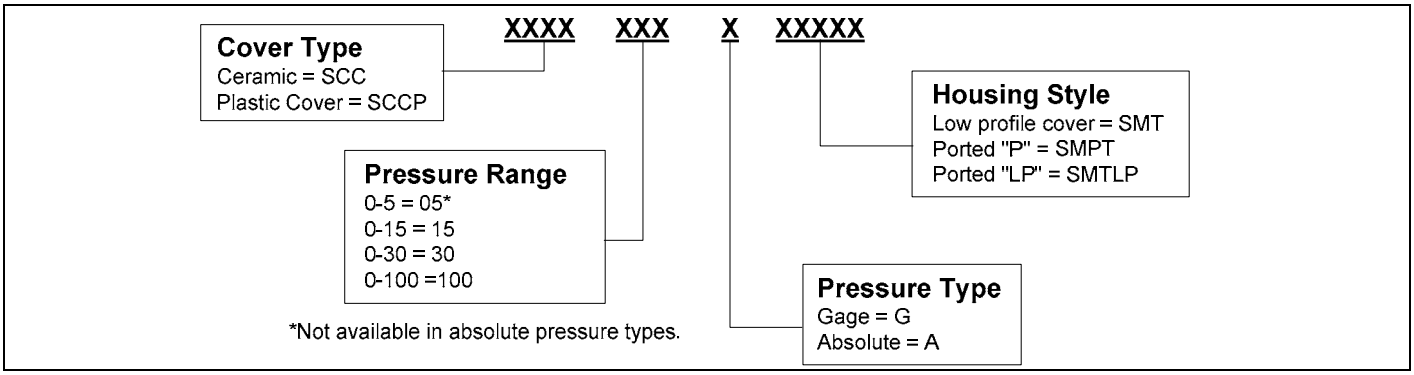
PORTED "LP" SMT



EQUIVALENT CIRCUITS



ORDER GUIDE



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SALES AND SERVICE

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	+44 (0) 1698 481676 Fax
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	+1-815-235-6847
	+1-815-235-6545 Fax

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008091-3-EN IL50 GLO Printed in USA
July 2007

Honeywell

Microstructure Pressure Sensors

Compensated 0 psi to 1psi up to 0 psi to 150 psi

SCX Series

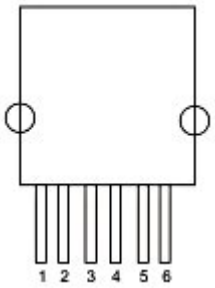
FEATURES

- Precision Temperature Compensation
- Calibrated Zero & Span
- Small Size
- Low Noise
- Low Cost (SCX_NC)
- High Accuracy (SCX_N)
- High Impedance for Low Power Applications

TYPICAL APPLICATIONS

- Medical Equipment
- Barometry
- Computer Peripherals
- Pneumatic Controls
- HVAC

ELECTRICAL CONNECTION



PIN 1) TEMPERATURE OUTPUT (+)
PIN 2) Vs
PIN 3) + OUTPUT
PIN 4) GROUND
PIN 5) - OUTPUT
PIN 6) TEMPERATURE OUTPUT (-)

Note: The polarity indicated is for pressure applied to port B. (For absolute devices pressure is applied to port A and the output polarity is reversed)

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The SCX series sensors provide a very cost-effective solution for pressure applications that require operation over wide temperature range. These internally calibrated and temperature compensated sensors were specifically designed to provide an accurate and stable output over a 0 °C to 70 °C [32 °F to 158 °F] temperature range. This series is intended for use with non-corrosive, non-ionic working fluids such as air, dry gases and the like.

Devices are available to measure absolute, differential and gage pressures from 1 psi (SCX01) up to 150 psi (SCX150). The Absolute (A in model number) devices have an internal vacuum reference and an output voltage proportional to absolute pressure. The Differential (D in model number) devices allow application of pressure to either side of the pressure-sensing diaphragm and can be used for gage or differential measurements.

The SCX series devices feature an integrated circuit (IC) sensor element and laser trimmed thick film ceramic housed in a compact solvent resistant case. This package provides excellent corrosion resistance and provides isolation to external packaging stresses. The package has convenient mounting holes and pressure ports for ease of use with standard plastic tubing for pressure connection.

If the application requires extended temperature range operation, beyond 0 °C to 70 °C [32 °F to 158 °F], two pins which provide an output voltage proportional to temperature are available for use with external circuitry. The 100 microsecond response time makes this series an excellent choice for computer peripherals and pneumatic control applications.

The output of the bridge is ratio metric to the supply voltage. Operation from any dc supply voltage up to 20 Vdc is acceptable.

Contact your local honeywell representative, or go to Honeywell's website at www.honeywell.com/sensing for additional details.

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Microstructure Pressure Sensors

Compensated 0 psi to 1psi up to 0 psi to 150 psi

SCX Series

PRESSURE RANGE SPECIFICATIONS

				Full-Scale Span (1)		
Model *	**Operating Pressure**	**Proof Pressure (2)**	**Sensitivity**	**Min.**	**Typ.**	**Max.**
SCX01DN	0 psid to 1 psid	20 psid	18 mV/psi	17.82 mV	18.00 mV	18.18 mV
SCX01DNC				17.00 mV	18.00 mV	19.00 mV
SCX05DN	0 psid to 5 psid	20 psid	12 mV/psi	59.40 mV	60.00 mV	60.60 mV
SCX05DNC				57.50 mV	60.00 mV	62.50 mV
SCX15AN	0 psid to 15 psia	30 psia	6.0 mV/psi	89.10 mV	90.00 mV	90.90 mV
SCX15ANC				85.00 mV	90.00 mV	95.00 mV
SCX15DN	0 psid to 15 psid	30 psid	6.0 mV/psi	89.10 mV	90.00 mV	90.90 mV
SCX15DNC				85.00 mV	90.00 mV	95.00 mV
SCX30AN	0 psid to 30 psia	60 psia	3.0 mV/psi	89.10 mV	90.00 mV	90.90 mV
SCX30ANC				85.00 mV	90.00 mV	95.00 mV
SCX30DN	0 psid to 30 psid	60 psid	3.0 mV/psi	89.10 mV	90.00 mV	90.90 mV
SCX30DNC				85.00 mV	90.00 mV	95.00 mV
SCX100AN	0 psid to 100 psia	150 psia	1.0 mV/psi	99.00 mV	100.0 mV	101.0 mV
SCX100ANC				95.00 mV	100.0 mV	105.0 mV
SCX100DN	0 psid to 100 psid	150 psid	1.0 mV/psi	99.00 mV	100.0 mV	101.0 mV
SCX100DNC				95.00 mV	100.0 mV	105.0 mV
SCX150AN	0 psid to 150 psia	150 psia	0.6 mV/psi	89.00 mV	90.00 mV	91.00 mV
SCX150ANC				85.00 mV	90.00 mV	95.00 mV
SCX150DN	0 psid to 150 psid	150 psid	0.6 mV/psi	89.00 mV	90.00 mV	91.00 mV
SCX150DNC				85.00 mV	90.00 mV	95.00 mV

*** Ordering information:** Order model number.

GENERAL SPECIFICATIONS

Characteristic	**Description (Maximum Ratings) All Devices**
Supply Voltage (V_S)	20 Vdc
Common Mode Pressure	50 psig
Lead Soldering Temperature (2 seconds to 4 seconds)	250 °C [482 °F]

ENVIRONMENTAL SPECIFICATIONS

Characteristic	**Description (Maximum Ratings) All Devices**
Compensated Operating Temperature	0 °C to 70 °C [32 °F to 158 °F]
Operating Temperature	-40 °C to 85 °C [-40 °F to 185 °F]
Storage Temperature	-55 °C to 125 °C [-67 °F to 257 °F]
Humidity Limits	0 % RH to 100 % RH

ACCURACY

Model	**Accuracy**
SCX01 through SCX150	Calibrated for span to within ±1 % (Highest accuracy)
SCX01_C through SCX150_C	Calibrated for span to within ±5 % (Fine adjustments of zero and span can be provided in external circuitry)

SCX PERFORMANCE CHARACTERISTICS [3]

Characteristic	Min.	Typ.	Max.	Unit
Zero Pressure Offset [4]	-300	0.0	300	Microvolt
Combined Pressure Non-Linearity and Pressure Hysteresis [5]	–	±0.1	±0.5	% FSO
Temperature Effect on Span 0 °C to 70 °C [32 °F to 158 °F] [6]	–	±0.2	±0.1	% FSO
Temperature Effect on Offset 0 °C to 70 °C [32 °F to 158 °F] [6]	–	±100	±500	Microvolt
Repeatability [7]	–	±0.2	±0.5	% FSO
Input Resistance [8]	–	4.0	–	kOhm
Output Resistance [9]	–	4.0	–	kOhm
Common Mode Voltage [10]	5.8	6.0	6.2	Vdc
Response Time [11]	–	100	–	Microsec.
Long Term Stability of Offset and Span [12]	–	±0.1	–	mV

SCX_C SERIES PERFORMANCE CHARACTERISTICS [3]

Characteristic	Min.	Typ.	Max	Unit
Zero Pressure Offset	-1.0	0.0	±1.0	mV
Combined Pressure Non-Linearity and Pressure Hysteresis [5]	–			
Models: SCX05DNC, SCX15ANC, and SCX15DNC,	–	±0.1	±1.0	% FSO
Models: SCX01DNC, SCX30ANC, SCX30DNC, SCX100ANC, SCX100DNC, SCX150ANC, and SCX150DNC		±0.2	±1.0	% FSO
Temperature Effect on Span 0 °C to 70 °C [32 °F to 158 °F] [6]	–	±0.4	±2.0	% FSO
Temperature Effect on Offset 0 °C to 70 °C [32 °F to 158 °F] [6]	–	±0.2	±1.0	mV
Repeatability [7]	–	±0.2	±0.5	% FSO
Input Resistance [8]	–	4.0	–	kOhm
Output Resistance [9]	–	4.0	–	kOhm
Common Mode Voltage [10]	5.7	6.0	6.3	Vdc
Response Time [11]	–	100	–	Microsec.
Long Term Stability of Offset and Span [12]	–	±0.1	–	mV

SPECIFICATION NOTES

Note 1: Full-Scale Span is the algebraic difference between the output voltage at full-scale pressure and the output at zero pressure. Full-Scale Span is ratiometric to the supply voltage.

Note 2: Maximum pressure above which causes permanent sensor failure.

Note 3: Reference Conditions: (Unless otherwise noted)
T_A = 25°C, Supply V_S = 12 Vdc, Common Mode Line pressure = 0 psig, Pressure applied to Port B. For absolute devices only, pressure is applied to Port A, and the output polarity is reversed.

Note 4: For models SCX15AN, SCX30AN, SCX100AN, and SCX150AN, the Maximum zero pressure offset for absolute devices is 0 to ±500 Microvolt.

Note 5: Pressure Hysteresis – the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure.

Note 6: Maximum error band of the offset voltage and the error band of the span, relative to the 25 °C [77 °F] reading.

Note 7: Maximum difference in output at any pressure within the operating pressure range and the temperature within 0 °C to 70 °C [32 °F to 158 °F] after:
a) 1,000 temperature cycles, 0 °C to 70 °C [32 °F to 158 °F]
b) 1.5 million pressure cycles, 0 psi to Full-Scale Span.

Note 8: Input resistance is the resistance between pins 2 and 4.

Note 9: Output resistance is the resistance between pins 3 and 5.

Note 10: Common Mode voltage of the output arms (Pins 3 and 5) for V_S=12 Vdc.

Note 11: Response time for a 0 psi to Full-Scale Span pressure step change, 10 % to 90 % rise time.

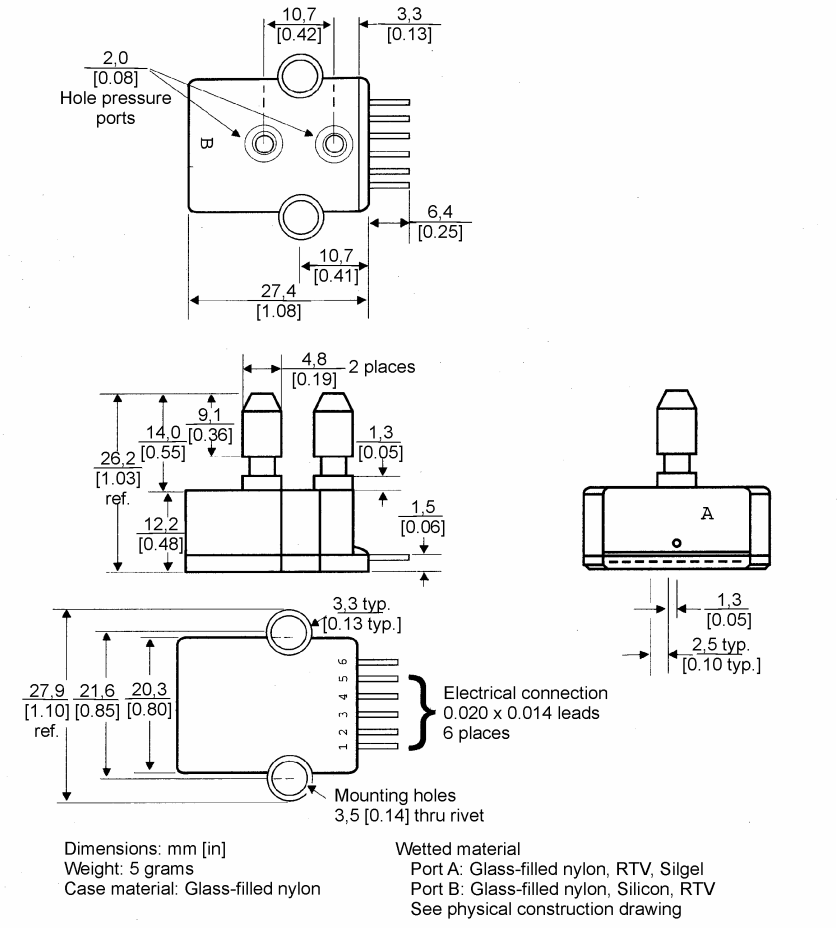
Note 12: Long term stability over a one-year period.

Microstructure Pressure Sensors

Compensated 0 psi to 1psi up to 0 psi to 150 psi

SCX Series

PHYSICAL DIMENSIONS for Reference Only (mm/in)



Dimensions: mm [in]
Weight: 5 grams
Case material: Glass-filled nylon

Wetted material
Port A: Glass-filled nylon, RTV, Silgel
Port B: Glass-filled nylon, Silicon, RTV
See physical construction drawing

WARRANTY/REMEDY

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INTERNET

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info.sc@honeywell.com

Honeywell

Sensing and Control
www.honeywell.com/sensing
Honeywell
11 West Spring Street
Freeport, Illinois 61032

008096-1-EN IL50 GLO 1203 Printed in USA

Honeywell

Microstructure Pressure Sensors

Precision Compensated

0 in H_2O to 4 in H_2O and 0 in H_2O to 10 in H_2O

SCXL Series

FEATURES

- Very Low Pressure Resolution
- Precision Temperature Compensation
- Small Size
- Low Noise
- Calibrated Zero & Span
- High Impedance for Low Power Applications

TYPICAL APPLICATIONS

- Air Flow
- Respirators
- HVAC
- Medical Equipment
- Computer Peripherals
- Pneumatic Controls

The SCXL series sensors provide a very cost-effective solution for pressure applications that require high accuracy over very low operating pressure ranges. These internally calibrated and temperature compensated sensors were specifically designed to provide an accurate and stable output over a 0 °C to 50 °C [32 °F to 122 °F] temperature range. This series is intended for use with non-corrosive, non-ionic working fluids such as air, dry gases and the like.

The output of the bridge is ratiometric to the supply voltage. Operation from any dc supply voltage up to 18 Vdc [Model SCXL004DN] or 20 Vdc [SCXL010DN] is acceptable.

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Microstructure Pressure Sensors

Precision Compensated

0 in H_2O to 4 in H_2O and 0 in H_2O to 10 in H_2O

SCXL Series

GENERAL SPECIFICATIONS

Characteristic	Description (Maximum Ratings) SCXL004DN	Description (Maximum Ratings) SCXL010DN
Supply Voltage (V_S)	18 Vdc	20 Vdc
Common Mode Pressure	150 in H_2O	50 psig
Lead Soldering Temperature (2 seconds to 4 seconds)	250 °C [482 °F]	250 °C [482 °F]
Proof Pressure [12]	10 in H_2O	10 psi
Burst Pressure	5 psi	200 in H_2O

ENVIRONMENTAL SPECIFICATIONS

Characteristic	Description (Maximum Ratings) SCXL004DN	Description (Maximum Ratings) SCXL010DN
Compensated Operating Temperature	0 °C to 50 °C [32 °F to 122 °F]	0 °C to 50 °C [32 °F to 122 °F]
Operating Temperature	0 °C to 70 °C [32 °F to 158 °F]	-40 °C to 85 °C [-40 °F to 185 °F]
Storage Temperature	0 °C to 70 °C [32 °F to 158 °F]	-40 °C to 125 °C [-40 °F to 257 °F]
Humidity Limits	0 % to 100 % RH	0 % to 100 % RH

PRESSURE RANGE SPECIFICATIONS

			Full-Scale Span [1]		
Listing	Operating Pressure	Proof Pressure [2]	Min.	Typ.	Max.
SCXL004DN	0 in H_2O to 4 in H_2O	10 in H_2O	38.0 mV	40.0 mV	42.0 mV
SCXL010DN	0 in H_2O to10 in H_2O	10 psi	19.5 mV	20.0 mV	20.5 mV

SCXL004DN PERFORMANCE CHARACTERISTICS [3]

Characteristic	Min.	Typ.	Max.	Unit
Zero Pressure Offset [4]	-1.5	0	1.5	mV
Sensitivity	–	10	–	mV/in H_2O
Combined Pressure Non-Linearity and Pressure Hysteresis [5]	–	±0.5	±1.0	% FSS
Temperature Effect on Span 0 °C to 50 °C [32 °F to 122 °F] [6]	–	±0.2	±1.0	% FSS
Temperature Effect on Offset 0 °C to 50 °C [32 °F to 122 °F] [6]	–	±0.5	±2.0	mV
Repeatability [7]	–	±0.2	–	% FSS
Input Resistance [8]	–	4.0	–	kOhm
Output Resistance [9]	–	4.0	–	kOhm
Common Mode Voltage [10]	5.7	6.0	6.3	Vdc
Response Time [11]	–	500	–	Microsec.
Long Term Stability of Offset and Span [12]	–	±0.5	–	% FSS
Position Sensitivity	–	0.25	–	mV/g

SCXL010DN PERFORMANCE CHARACTERISTICS (3)

Characteristic	Min.	Typ.	Max.	Unit
Zero Pressure Offset (4)	-0.3	0.0	0.3	mV
Sensitivity	–	2	–	mV/in H_2O
Combined Pressure Non-Linearity and Pressure Hysteresis (5)	–	±0.2	±0.5	% FSS
Temperature Effect on Span 0 °C to 50 °C [32 °F to 122 °F] (6)	–	±0.2	±1.0	% FSS
Temperature Effect on Offset 0 °C to 50 °C [32 °F to 122 °F] (6)	–	±300	±500	Microvolts
Repeatability (7)	–	±0.2	±0.5	% FSS
Input Resistance (8)	–	4.0	–	kOhm
Output Resistance (9)	–	4.0	–	kOhm
Common Mode Voltage (10)	5.8	6.0	6.2	Vdc
Response Time (11)	–	100	–	Microsec.
Long Term Stability of Offset and Span (12)	–	100	–	Microvolts

SPECIFICATION NOTES

Note 1: Full-Scale Span is the algebraic difference between the output voltage at full-scale pressure and the output at zero pressure. Full-Scale Span is ratiometric to the supply voltage.

Note 2: Proof pressure is the pressure above which devices will not return to guaranteed specifications.

Note 3: Reference Conditions: (Unless otherwise noted)
T_A = 25 °C, Supply V_S = 12 Vdc, Common Mode Line pressure = 0 psig, Pressure applied to Port B. For absolute devices only, pressure is applied to Port A, and the output polarity is reversed.

Note 4: Zero pressure effect is measured with pins pointed towards the ground. Offset can be position sensitive.

Note 5: Pressure Hysteresis – the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure.

Note 6: Maximum error band of the offset voltage and the error band of the span, relative to the 25 °C [77 °F] reading.

Note 7: Maximum difference in output at any pressure within the operating pressure range and the temperature within 0 °C to 50 °C [32 °F to 122 °F] after:
004DN: a) 100 temperature cycles, 0 °C to 50 °C [32 °F to 122 °F]
b) 1 million pressure cycles, 0 psi to Full-Scale Span.
010DN: a) 1,000 temperature cycles, 0 °C to 50 °C [32 °F to 122 °F]
b) 1.5 million pressure cycles, 0 psi to Full-Scale Span.

Note 8: Input resistance is the resistance between pins 2 and 4.

Note 9: Output resistance is the resistance between pins 3 and 5.

Note 10: Common Mode voltage of the output arms (Pins 3 and 5) for V_S=12 Vdc.

Note 11: Response time for a 0 psi to Full-Scale Span pressure step change, 10 % to 90 % rise time.

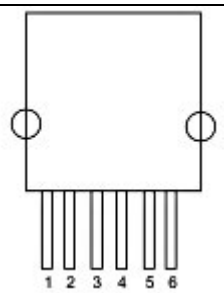
Note 12: Long term stability over a one-year period.

ORDERING INFORMATION

Description	Part Number
0 in H_2O to 4 in H_2O	SCXL 004DN
0 in H_2O to 10 in H_2O	SCXL 010DN

Special Options: Pins with N-90 = 90° Lead Bend

ELECTRICAL CONNECTION

Pinout	SCXL004DN [0 in H_2O to 4 in H_2O]	SCXL004DN [0 in H_2O to 10 in H_2O]
	PIN 1) Temperature output (+) PIN 2) V_S PIN 3) + Output PIN 4) Ground PIN 5) - Output PIN 6) Temperature output (-)	PIN 1) No Connection PIN 2) V_S PIN 3) + Output PIN 4) Ground PIN 5) - Output PIN 6) No Connection

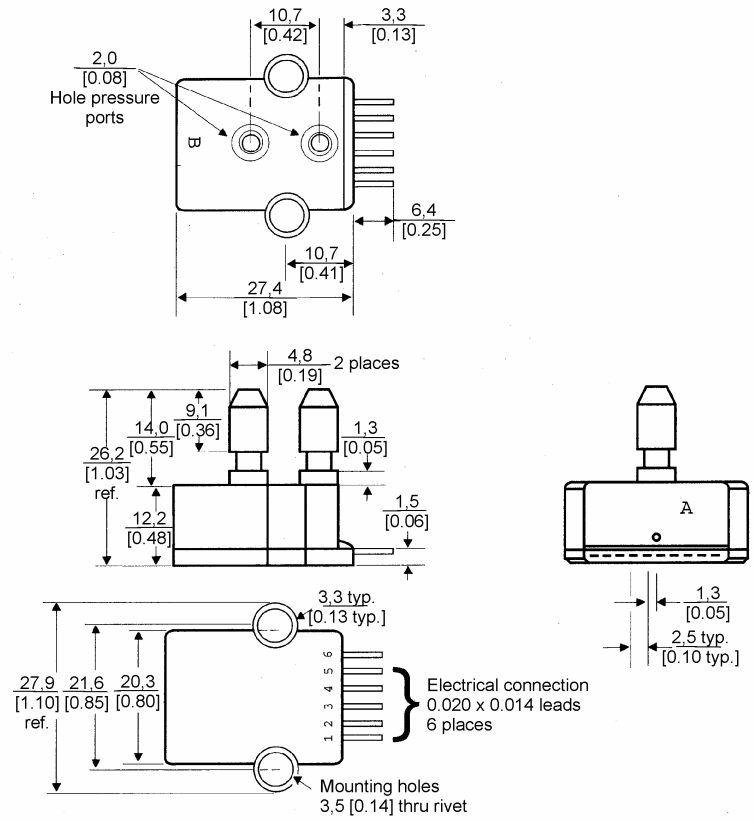
Microstructure Pressure Sensors

Precision Compensated

0 in H_2O to 4 in H_2O and 0 in H_2O to 10 in H_2O

SCXL Series

PHYSICAL DIMENSIONS for Reference Only-(mm/in)



Dimensions: mm [in]
Weight: 5 grams
Case material: Glass-filled nylon

Wetted material
Port A: Glass-filled nylon, RTV, Silgel
Port B: Glass-filled nylon, Silicon, RTV
See physical construction drawing

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. **The foregoing is Buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

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FAX

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info.sc@honeywell.com

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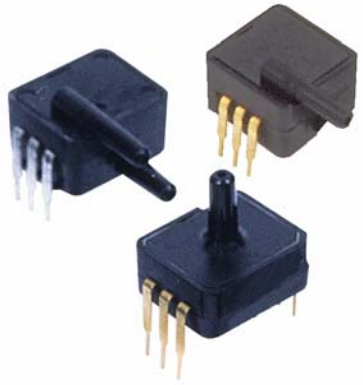
Honeywell

SDX Series

Plastic Silicon Pressure Sensors Low Cost, Temperature Compensated, DIP, 0 psi to 1 psi, 0 psi to 100 psi



DESCRIPTION

The SDX Series sensors 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 [32 °F to 122 °F] temperature range. This series is intended for use with non-corrosive, non-ionic working fluids such as air and dry gases.

Devices are available to measure absolute and gage pressures from 1 psi (SDX01) up to 100 psi (SDX100). The absolute devices have an internal vacuum reference and an output voltage proportional to absolute pressure. The SDX devices are available in standard commercial and prime grades (SDCXXXXX**-A**) to allow optimization of accuracy and cost in any given application.

The SDX devices feature an integrated circuit (IC) sensor element and laser trimmed thick film ceramic housed in a compact solvent resistant case. The package is a double-wide, dual-inline package (DIP). This is the same familiar package used by IC manufacturers except it is only 11,94 mm [0.470 in] long and has a pressure port(s). The PC board area used by each DIP is approximately 0.26 in^2. This extremely small size enables the use of multiple sensors in limited available space. The DIP provides excellent corrosion resistance and 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 provide a more secure and stable unit than other types of packages.

The output of the bridge is ratiometric to the supply voltage and operation from any dc supply voltage up to 20 Vdc is acceptable.

FEATURES

- Low cost DIP
- Precision temperature compensation
- Calibrated zero and span
- Small size
- Low noise
- High impedance for low power applications
- Prime grade available (SDXxxxyy-A)

POTENTIAL APPLICATIONS

- Medical equipment
- Computer peripherals
- Pneumatic controls
- HVAC

SDX Series

Table 1. Pressure Range Specifications and Ordering Information

Catalog Listing, Pressure Connection, Pressure Type			Operating Pressure	Proof Pressure [2]	Full-Scale Span [1]		
Gage	Differential/Gage	Absolute			Min.	Typ.	Max.
SDX01G2	SDX01D4	-	0 psid to 1 psid	20 psid	17.37 mV	18.00 mV	18.18 mV
SDX01G2-A	SDX01D4-A	-			17.82 mV	18.00 mV	18.80 mV
SDX05G2	SDX05D4	-	0 psid to 5 psid	20 psid	57.90 mV	60.00 mV	62.10 mV
SDX05G2-A	SDX05D4-A	-			59.40 mV	60.00 mV	60.60 mV
SDX15G2	SDX15D4	-	0 psid to 15 psid	30 psid	86.85 mV	90.00 mV	93.15 mV
SDX15G2-A	SDX15D4-A	-			89.10 mV	90.00 mV	90.90 mV
-	-	SDX15A2	0 psia to 15 psia	30 psia	86.85 mV	90.00 mV	93.15 mV
-	-	SDX15A4			86.85 mV	90.00 mV	93.15 mV
-	-	SDX15A2-A			89.10 mV	90.00 mV	90.90 mV
-	-	SDX15A4-A			89.10 mV	90.00 mV	90.90 mV
SDX30G2	SDX30D4	-	0 psid to 30 psid	60 psid	86.85 mV	90.00 mV	93.15 mV
SDX30G2-A	SDX30D4-A	-			89.10 mV	90.00 mV	90.90 mV
-	-	SDX30A2	0 psia to 30 psia	60 psia	86.85 mV	90.00 mV	93.15 mV
-	-	SDX30A4			86.85 mV	90.00 mV	93.15 mV
-	-	SDX30A2-A			89.10 mV	90.00 mV	90.90 mV
-	-	SDX30A4-A			89.10 mV	90.00 mV	90.90 mV
SDX100G2	SDX100D4	-	0 psid to 100 psid	150 psid	96.50 mV	100.00 mV	103.5 mV
SDX100G2-A	SDX100D4-A	-			99.00 mV	100.00 mV	101.0 mV
-	-	SDX100A2	0 psia to 100 psia	150 psia	96.50 mV	100.00 mV	103.5 mV
-	-	SDX100A4			96.50 mV	100.00 mV	103.5 mV
-	-	SDX100A2-A			99.00 mV	100.00 mV	101.0 mV
-	-	SDX100A4-A			99.00 mV	100.00 mV	101.0 mV

Nomenclature	Pressure Connection (See Fig. 2)	Pressure Type	Grade
G2	A2/G2	gage	standard commercial
G2-A	A2/G2	gage	prime
D4	OK	differential	standard commercial
D4-A	OK	differential	prime
A2	A2/G2	absolute	standard commercial
A2-A	A2/G2	absolute	prime
A4	A4	absolute	standard commercial
A4-A	A4	absolute	prime

Table 2. General Specifications (Maximum)

Characteristic	Parameter
Supply voltage (Vs)	20 Vdc
Common mode pressure	150 psig
Lead soldering temperature (2 s to 4 s)	250 °C [482 °F]

Table 3. Environmental Specifications (Maximum)

Characteristic	Parameter
Compensated operating temperature	0 °C to 50 °C [32 °F to 122 °F]
Operating temperature	-40 °C to 85 °C [-40 °F to 185 °F]
Storage temperature	-55 °C to 125 °C [-67 °F to 257 °F]
Humidity limits	0% RH to 100% RH

Plastic Silicon Pressure Sensors, Low Cost, Temperature Compensated, DIP, 0 psi to 1 psi, 0 psi to 100 psi

Table 4. Performance Characteristics[3]

Characteristic	Min.	Typ.	Max.	Unit
Zero pressure offset	-1.0	0.0	+1.0	mV
Zero pressure offset (prime grade) [4]	-0.3	0.0	0.3	mV
Combined linearity and hysteresis [5]	–	±0.2	±1.0	% FSO
Combined linearity and hysteresis (prime grade) [5] [13]	–	±0.1	±0.25	% FSO
Temperature effect on span, 0 °C to 50 °C [32 °F to 122 °F] [6]	–	±0.4	±2.0	% FSO
Temperature effect on span, 0 °C to 50 °C [32 °F to 122 °F] [6] (prime grade)	–	±0.4	±1.0	% FSO
Temperature effect on offset 0, °C to 50 °C [32 °F to 122 °F] [6]	–	±0.2	±1.0	mV
Temperature effect on offset 0, °C to 50 °C [32 °F to 122 °F] [6] (prime grade)	–	±0.2	±0.5	mV
Repeatability [7]	–	±0.2	±0.5	% FSO
Input resistance [8]	–	4.0	–	kOhm
Output resistance [9]	–	4.0	–	kOhm
Common mode voltage [10]	1.5	3.0	5.0	Vdc
Response time [11]	–	100	–	µs
Long term stability of offset and span [12]	–	±0.1	–	mV

Notes:

1. Full-Scale Span is the algebraic difference between the output voltage at full-scale pressure and the output at zero pressure. Full-Scale Span is ratiometric to the supply voltage.
2. Maximum pressure above which causes permanent sensor failure.
3. Reference conditions:
   - $^{T}_{A}$ = 25 °C (unless otherwise noted).
   - Supply V_S = 12 Vdc, Common Mode Line pressure = 0 psig.
   - Pressure applied to Port B. For absolute devices only, pressure is applied to Port A and the output polarity is reversed.
4. Maximum zero pressure offset for absolute devices is ±500 mV.
5. Hysteresis is the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure.
6. Maximum error band of the offset voltage and the error band of the span, relative to the 25 °C [77 °F] reading.
7. Maximum difference in output at any pressure within the operating pressure range and the temperature within 0 °C to 50 °C [32 °F to 122 °F] after:
   - 100 temperature cycles, 0 °C to 50 °C [32 °F to 122 °F].
   - 1.0 million pressure cycles, 0 psi to full-scale span.
8. Input resistance is the resistance between V_s and ground.
9. Output resistance is the resistance between the + and - outputs.
10. Common Mode voltage of the output arms for V_s=12 Vdc.
11. Response time for a 0 psi to Full-Scale Span pressure step change, 10% to 90% rise time.
12. Long term stability over a one-year period.
13. Maximum combined linearity and hysteresis for the SDX05 prime grade is ±0.5%.

Figure 1. Electrical Connections

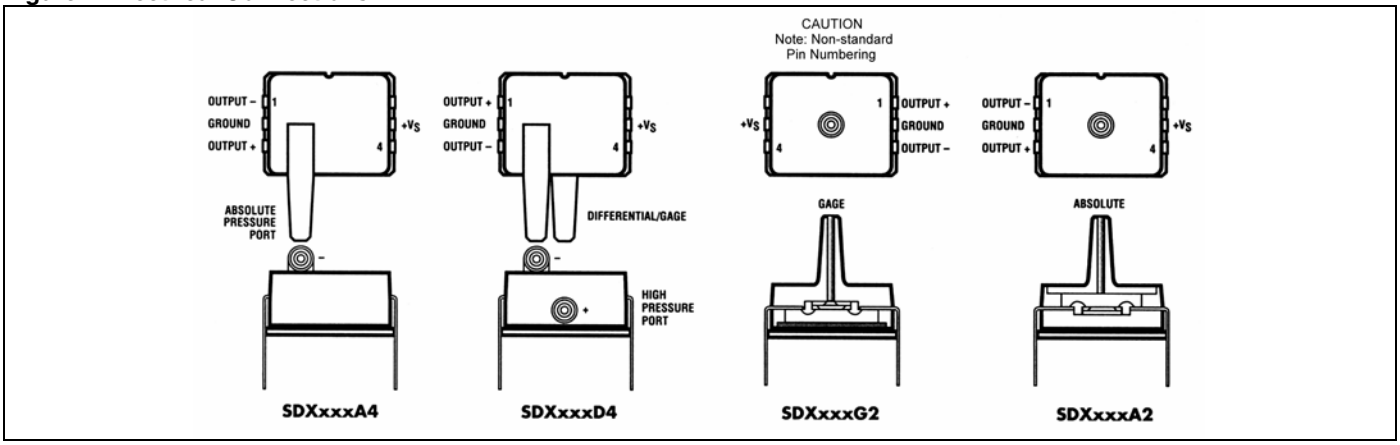
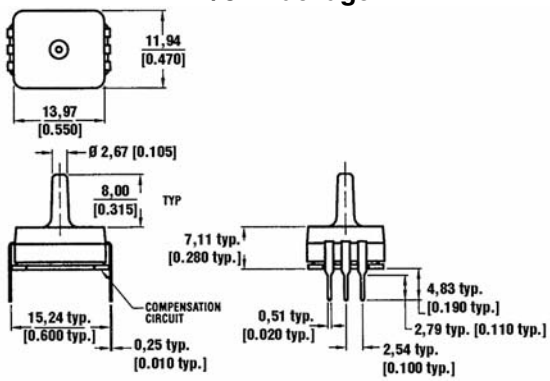
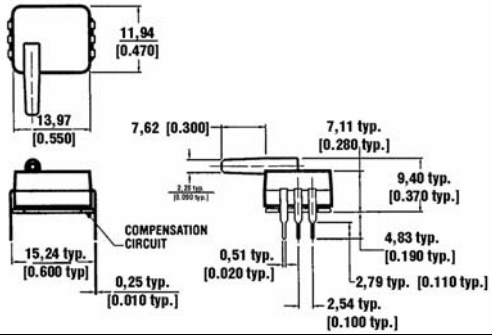


Figure 2. Mounting Dimensions (For Reference Only. mm/[in])

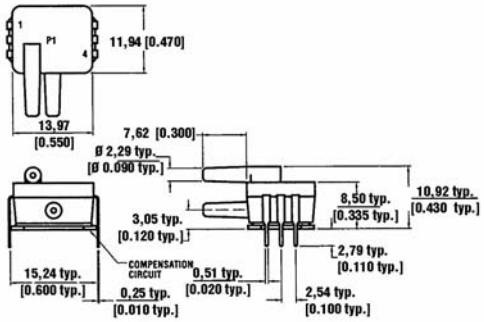
A2/G2 Package



A4 Package



D4 Package



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PERSONAL INJURY

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Failure to comply with these instructions could result in death or serious injury.

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Failure to comply with these instructions could result in death or serious injury.

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Golden Valley, Minnesota 55422
www.honeywell.com/sensing

008103-3-EN IL50 GLO Printed in USA
November 2008

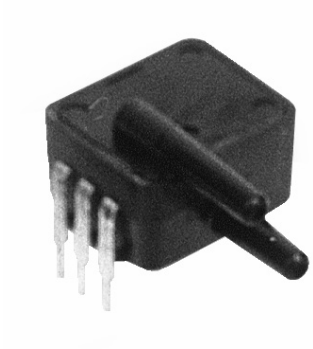
Microstructure Pressure Sensors

Compensated 0 in H_2O to 5 H_2O in H_2O and 0 in H_2O to 10 in H_2O

SDX IND Series

FEATURES
- Low Cost Dual Inline Package
- Temperature Compensated
- Calibrated Zero and Span
- Small Size
- Low Noise
- High Impendance for Low Power Applications

TYPICAL APPLICATIONS
- Medical Equipment
- Computer Peripherals
- Pneumatic Controls
- HVAC



The SDX series sensors 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 [32 °F to 122 °F] range. This series is intended for use with non-corrosive, non-ionic working fluids, such as, air and other dry gases.

The SDX series devices are specifically designed to measure low pressures with a 0 in H_2O to 10.0 in H_2O full scale range. The output of the bridge is ratiometric to the supply voltage up to 20.0 Vdc is acceptable.

The SDX series 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. 15,24 mm [0.600 in] lead spacing) dual inline package. This is the same familiar package used by IC manufactures except it has integral pressure port(s). The PC board area used by each DIP is approximately 6,60 mm² [0.26 in²]. 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 which provides a more secure and stable unit than other types of packages.

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Microstructure Pressure Sensors

Compensated 0 in H_2O to 5 in H_2O
and 0 in H_2O to 10 in H_2O

SDX IND Series

PRESSURE RANGE SPECIFICATIONS

			Full-Scale Span [1]		
Listing	**Operating Pressure**	**Proof Pressure**	**Min.**	**Typ.**	**Max.**
SDX005IND4	0 in H_2O to 5 in H_2O	193 in H_2O	19.5 mV	20.0 mV	20.5 mV
SDX010IND4	0 in H_2O to 10 in H_2O	193 in H_2O	24.5 mV	25.0 mV	25.5 mV

GENERAL SPECIFICATIONS (all devices)

Characteristic	**Description (Maximum Ratings)**
Supply Voltage (V_S)	20.0 Vdc
Maximum Pressure on any Port	50 psig
Lead Temperature (Soldering 10 Sec.)	250 °C [482 °F]
Burst Pressure	193 H_2O [7 psi]

ENVIRONMENTAL SPECIFICATIONS (all devices)

Compensated Operating Temperature	0 °C to 50 °C [32 °F to 122 °F]
Operating Temperature	-40 °C to 85 °C [-40 °F to 185 °F]
Storage Temperature	-55 °C to 125 °C [-67°F to 257 °F]
Humidity Limits	0 % RH to 100 % RH

PERFORMANCE SPECIFICATIONS (all devices) [2]

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 °C to 50 °C [32 °F to 122 °F] [4]	–	± 0.4	± 2.0	% FSS
Temperature Effect on Offset 0 °C to 50 °C [32 °F to 122 °F] [4]	–	± 0.2	± 0.6	mV
Repeatability [5]	–	± 0.5	–	% FSS
Input Resistance [6]	–	4.0	–	KΩ
Output Resistance [7]	–	4.0	–	KΩ
Common-Mode Voltage [8]	1.5	3.0	5.0	Vdc
Response Time [9]	–	100	–	µsec
Long Term Stability of Offset and Span [10]	–	± 0.1	–	% FSS

SPECIFICATION NOTES

Note 1: 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 2: Reference conditions (unless otherwise noted): Supply voltage, V_s = 12 Vdc, TA = 25 °C [77 °F], Common Mode Line Pressure = 0 psig, pressure applied to port 2

Note 3: Hysteresis is the maximum output difference at any point within the operating pressure range fro 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 [77 °F] reading.

Note 5: Maximum difference in output at any pressure with the operating pressure range and temperature within 0 °C to 50 °C [32 °F to 122 °F] after:
- a) 100 temperature cycles, °C to 50 °C [32 °F to 122 °F]
- b) 1.0 million pressure cycles, 0 in H_2O 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 VS = 12 Vdc

Note 9: Response time for a 0 psi to full-scale span pressure step change, 10 % to 90 % rise time.

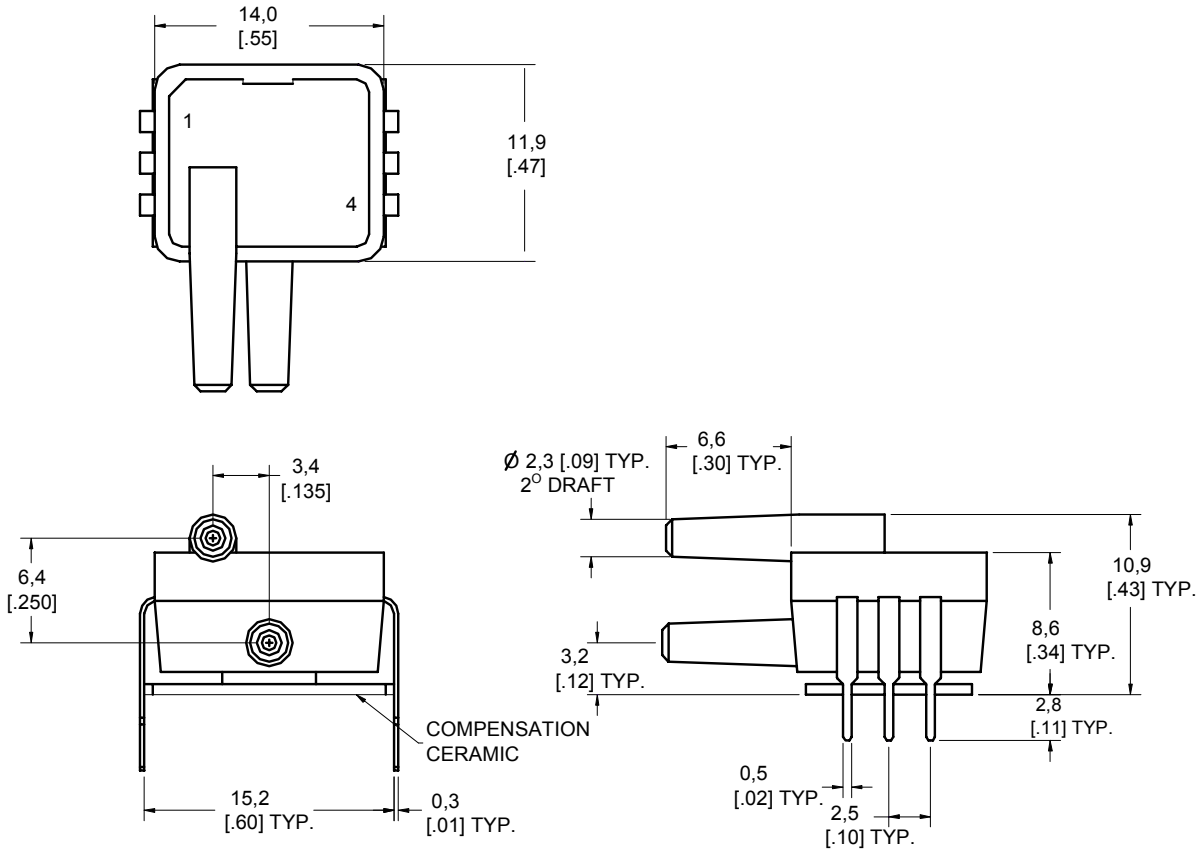
Note 10: Long term stability over a one year period.

Microstructure Pressure Sensors

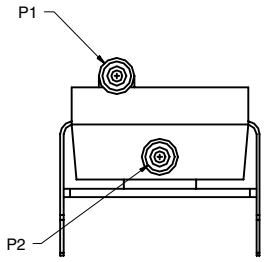
Compensated 0 in H_2O to 5 in H_2O
and 0 in H_2O to 10 inH_2O

SDX IND Series

PHYSICAL DIMENSIONS for reference only mm [in]



PORT CONFIGURATION

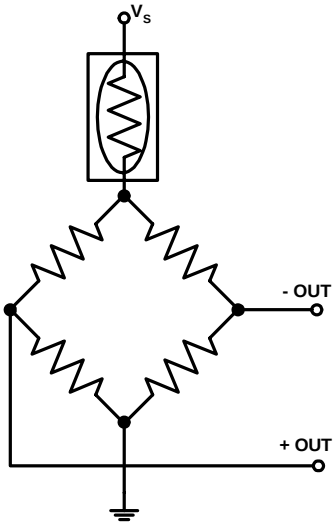


Microstructure Pressure Sensors

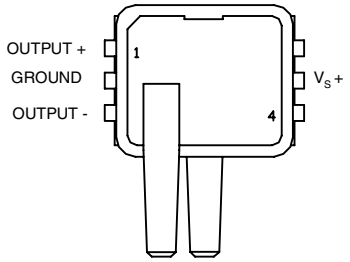
Compensated 0 in H_2O to 5 in H_2O
and 0 in H_2O to 10 in H_2O

SDX IND Series

EQUIVALENT CIRCUIT



ELECTRICAL CONNECTIONS



ORDER INFORMATION

Listings	Operating Pressure Range
SDX005IND4	0 in H_2O to 5 in H_2O
SDX010IND4	0 in H_2O to 10 in H_2O

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. **The foregoing is Buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

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1-800-537-6945 USA/Canada
1-815-235-6847 International

FAX

1-815-235-6545 USA

INTERNET

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Honeywell

Pressure Sensor

Low Pressure Sensor

SLP Series

FEATURES

- Accurate low pressure readings
- Low cost
- High impedance bridge
- Low noise
- Low power consumption for battery operation

TYPICAL APPLICATIONS

- Medical instrumentation
- Portable and battery-operated equipment
- Air-flow monitoring
- HVAC
- Industrial controls

The SLP series of pressure sensors provides the lowest cost components for measuring very low pressures. These low pressure range devices were specifically designed to accurately measure differential and gage pressures of 0 inches to four inches of H_2O.

They are meant for use with non-corrosive and non-ionic media, such as air, dry gases, and the like.

These differential devices allow application of pressure to either side of the diaphragm and can be used for gage or differential pressure measurements.

⚠ WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

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ABSOLUTE MAXIMUM RATINGS

	Ratings
Supply voltage	7.5 Vdc
Temperature ranges	
Operating	0 °C to 50 °C [32 °F to 122 °F]
Storage	0 °C to 70 °C [32 °F to 158 °F]
Common mode pressure	150 in. H_2O
Lead temperature (soldering 2 to 4 seconds)	250 °C [482 °F]
Proof pressure	10 in H_2O
Burst pressure [9]	5 psi

PERFORMANCE SPECIFICATIONS [1]

	Min.	Typ.	Max.	Unit
Operating pressure	-	-	4.0	In. H_2O
Sensitivity Ta = 25 °C [77 °F]	1700	2500	5500	µV/V/ In. H_2O
Full-scale span 4 In. H_2O [2]	34	50	110	mV
Temperature coefficient of span [3, 4]	-2850	-2400	-1950	ppm/°C
Zero pressure offset Ta = 25 °C [77 °F]	-40	0	40	mV
Temperature coefficient of offset [3]	-	±4	-	µV/V/°C
Combined linearity and hysteresis [5]	-	0.5	1.0	% FS
Long-term stability of offset and sensitivity [6]	-	0.5	-	% FS
Response time (10 % to 90 %) [7]	-	100	-	µS
Input resistance Ta = 25 °C [77 °F]	-	4.7	-	kOhm
Temperature coefficient of resistance [3, 4]	2100	2300	2500	ppm/°C
Output impedance	-	4.7	-	kOhm
Repeatability [8]	-	0.5	-	% FS
Position sensitivity	-	50	-	µV/V/g

SPECIFICATION NOTES

1. Reference conditions: supply voltage Vs = 5 Vdc, Ta = 25 °C [77 °F]. Common-mode line pressure = 0 psig. Pressure applied to P2.
2. Span is the algebraic difference between the output voltage at full-scale pressure and the output at zero pressure.
3. Slope of the best straight line from 0 °C to 50 ° C [32 °F to 122 °F]. For operation outside this temperature, contact factory for more specific application information.
4. This parameter is not 100 % tested. It is guaranteed by process design and tested on a sample basis only.
5. See definition of terms. Hysteresis is the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure
6. Long-term stability over a one year period.
7. Response time for a 0 PSI to full-scan span pressure step change. 10 % to 90 % rise time.
8. Maximum difference in output at any pressure with the operating pressure range and temperature within 0 °C to 50 °C [32 °F to 122 °F] after
   a. 100 temperature cycles, 0 °C to 50 ° C [32 °F to 122 °F]
   b. 1.5 million pressure cycles, 0 psi to full-scale span.
9. If the maximum burst pressure is exceeded, even momentarily, the package may leak or burst, or the pressure sensing die may fracture.

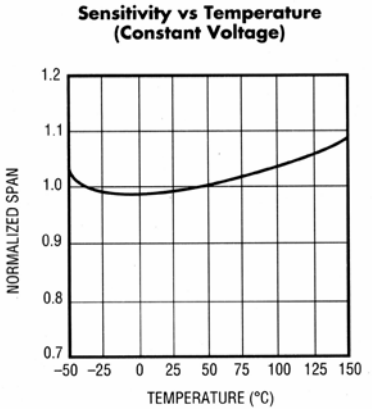
NOTE: Due to the delicate nature of these very sensitive devices, some special handling is required. Parts are sensitive to shock and vibration and must be handled with care. Dropping on any hard surface (bench top, etc.) can destroy the device. Note 10 in H_2O overpressure.

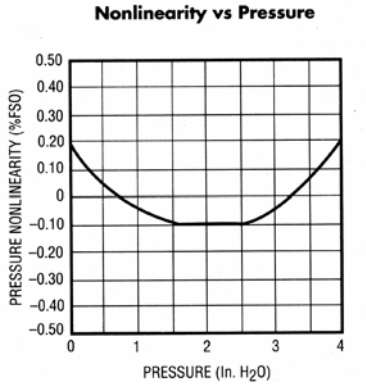
Pressure Sensors

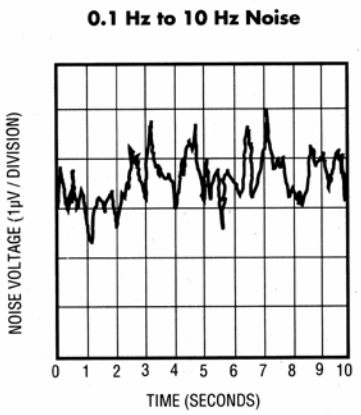
Low Pressure Sensor

SLP Series

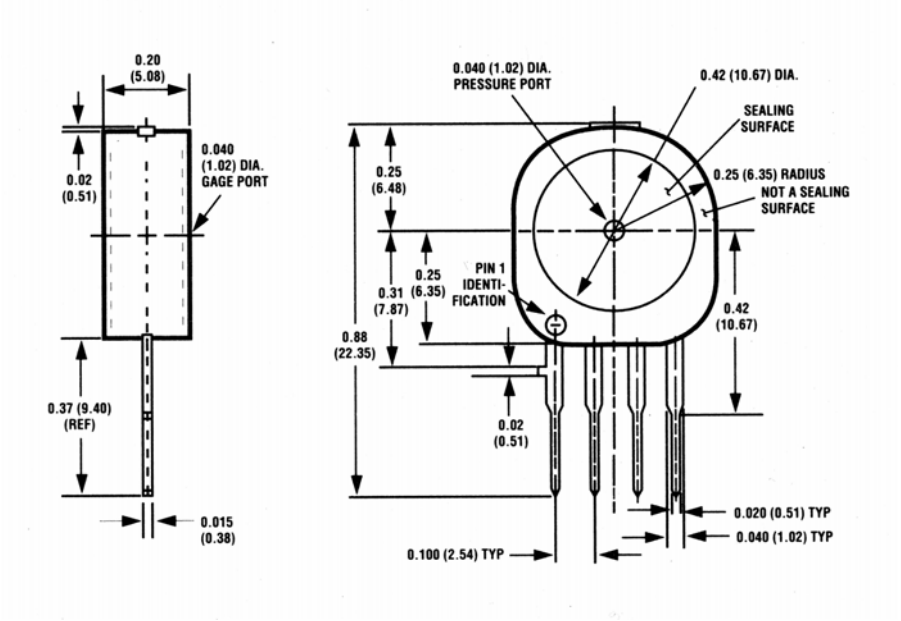
TYPICAL PERFORMANCE CHARACTERISTICS



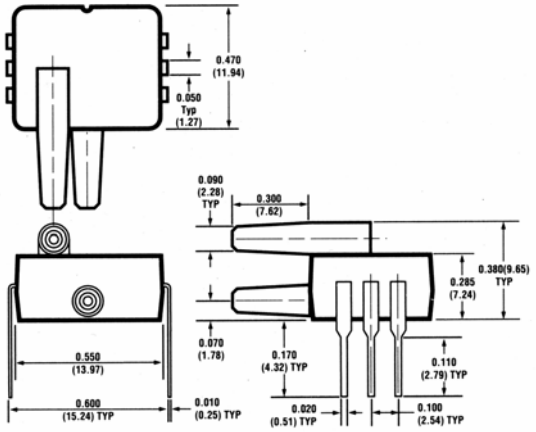




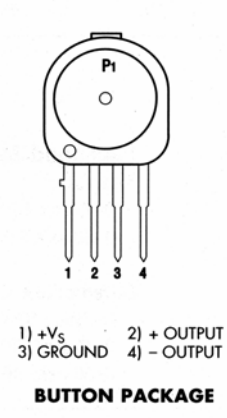
DIMENSIONAL DRAWING – BUTTON SENSOR (for reference only mm/in)

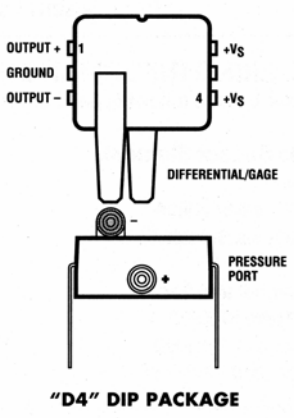


DIMENSIONAL DRAWING –D4 SENSOR (for reference only mm/in)



ELECTRICAL CONNECTIONS





Pressure Sensors

Low Pressure Sensor

SLP Series

APPLICATION INFORMATION

The SLP family of pressure sensors function as a wheatstone bridge. When pressure is applied to the device, the resistors in the arms of the bridge change as shown in Figure 1. The resulting differential output voltage, V_O, is easily shown to be $V_O = V_B \times \Delta R/R$. Since the change in resistance is directly proportional to pressure, Vo can be written as $V_O = S \times P \times V_B + V_{OS}$ Where,

V_O is the output voltage in mV

S is the sensitivity in mV/V psi

P is the pressure in psi

V_B is the bridge voltage in volts

V_{OS} is the offset error, (the differential output voltage when the applied pressure is zero)

FIGURE 1

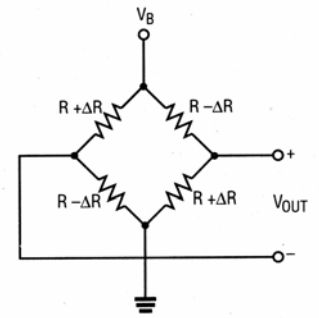
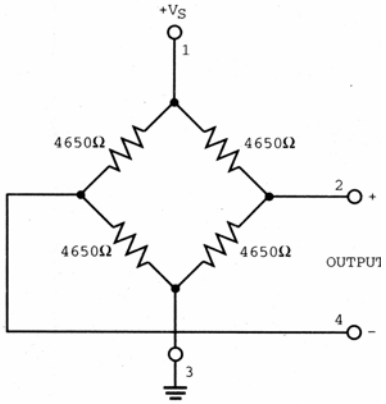


Figure 1.

EQUIVALENT CIRCUIT



ORDER GUIDE

Pressure Range	Sensor in Button Package	Sensor in DIP Package
0 in to 4 in H_2O	SLP004D	SLP004DD4

WARRANTY/REMEDY

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11 West Spring Street

Freeport, Illinois 61032

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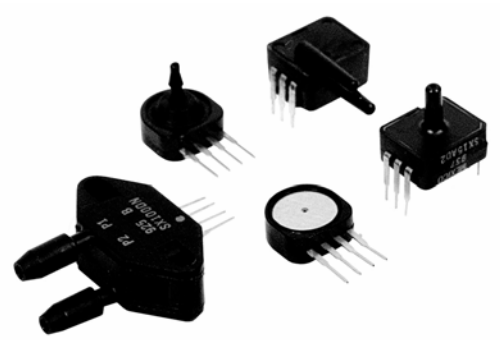


SX Series

Silicon Pressure Sensors
0 psi to 1 psi to 0 psi to 150 psi

DESCRIPTION

The SX Series pressure sensors provide the lowest cost components for measuring pressures up to 150 psi. These sensors are designed for use with non-corrosive, non-ionic media, such as air and dry gases. Convenient pressure ranges are available to measure differential, gauge, and absolute pressures from 0 psi to 1 psi (SX01) up to 0 psi to 150 psi (SX150).

The Absolute (A) devices have an internal vacuum reference and an output voltage proportional to absolute pressure. The differential (D) devices allow application of pressure to either side of the diaphragm and can be used for gauge or differential pressure measurements.

This product is packaged in either the standard low cost chip carrier “button” package, a plastic ported “N” package, or a DIP package. All packages are designed for applications where the sensing element is integral to the OEM equipment. These packages can be o-ring sealed, epoxied, and/or clamped onto a pressure fitting. A closed-bridge four pin SIP configuration is provided for electrical connection to the “Button” or “N” Package. The DIP Package mounts on a PC board like a standard IC with through-hole pins. This extremely small size package enables the use of multiple sensors in applications with limited space.

FEATURES

- Low cost
- High-impedance bridge
- Absolute
- Differential (gage)
- Low noise
- Low power consumption for battery power

POTENTIAL APPLICATIONS

- Medical
- Instrumentation
- Barometric
- Measurement
- Pneumatic controls
- Battery powered equipment

CHARACTERISTICS (Maximum ratings for all devices)

Supply voltage, V_S	12 Vdc
Operating temperature range	-40 °C to 85 °C [-40 °F to 185 °F]
Storage temperature range	-55 °C to 125 °C [-67 °F to 257 °F]
Humidity	0 % to 100 % RH
Common-mode pressure	150 psig
Lead soldering temperature	250 °C [482 °F] 2 sec to 4 sec

PERFORMANCE CHARACTERISTICS(1)

Characteristic description	Min.	Typ.	Max.	Unit
Zero pressure offset(2)	-35.0	-20.0	0.0	mV
Temperature coefficient of offset(3,4)	–	4	–	µV/V/°C
Combined pressure non-linearity, and hysteresis(5)	–	0.2	±0.5	%FSS
Long term stability of offset and span(6)	–	0.1	–	%FSS
Response time(7)	–	100	–	µs
Input resistance	–	4.1	–	kΩ
Temperature coefficient of resistance(3,4)	690	750	810	ppm/°C
Temperature coefficient of span(3,4)	-2550	-2150	-1900	ppm/°C
Output resistance	–	4.1	–	kΩ
Repeatability(8)	–	0.5	–	%FSS

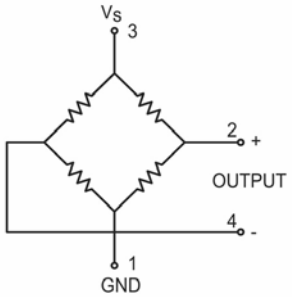
SX PERFORMANCE CHARACTERISTICS(1)

Part number	Operating pressure range	Sensitivity (mV/V/psi)	Full-scale span(9) (mV)			Burst pressure
		Typ	Min.	Typ.	Max.(10)	
SX01	0 psi to 1 psi	4.0	15	20	25	20 psi
SX05	0 psi to 5 psi	3.0	50	75	100	20 psi
SX15	0 psi to 15 psi	1.5	75	110	150	45 psi
SX30	0 psi to 30 psi	0.75	75	110	150	90 psi
SX100	0 psi to 100 psi	0.3	100	150	200	150 psi
SX150	0 psi to 150 psi	0.15	75	110	150	200 psi

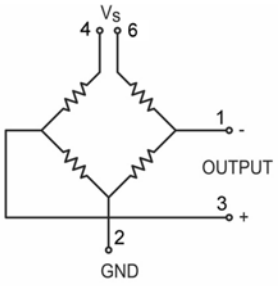
Specification Notes:
Note 1: Reference Conditions; TA = 25 °C [77 °F], Supply VS = 5 Vdc; Common Line Pressure = 0 psig, Pressure Applied to P1
Note 2: The zero pressure offset is 0 mV minimum to -20 mV typical and 35 mV maximum for part numbers SXxxxGD2 and SXxxxDD4.
Note 3: Slope of best straight line fit from 0°C to 70°C. For operation outside this temperature range, contact factory for more information.
Note 4: This parameter is not 100% tested. It is guaranteed by process design.
Note 5: Pressure Hysteresis - the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure. Pressure Non-linearity the maximum deviation of measure output, at constant temperature (25 °C [77 °F]), from “best straight line” through three points (offset pressure, full-scale pressure, one-half full scale pressure).
Note 6: Long term stability over a one year period.
Note 7: Response time for a 0 psi to Full-Scale Span pressure step change, 10% to 90% rise time.
Note 8: Maximum difference in output at any pressure within the operating pressure range and the temperature range within 0 °C to 70 °C [32 °F to 158 °F] after:
a) 100 temperature cycles, 0 °C and 70 °C [32 °F to 158 °F]
b) 1 million pressure cycles, 0 psi to full-scale span.
Note 9: Full-scale span is the algebraic difference between the output voltage at full-scale pressure and the output at zero pressure. Full-scale span is ratiometric to the supply voltage.
Note 10: Exceeding maximum pressure can cause permanent sensor failure

Silicon Pressure Sensors, 0 psi to 1 psi to 0 psi to 150 psi

EQUIVALENT CIRCUITS

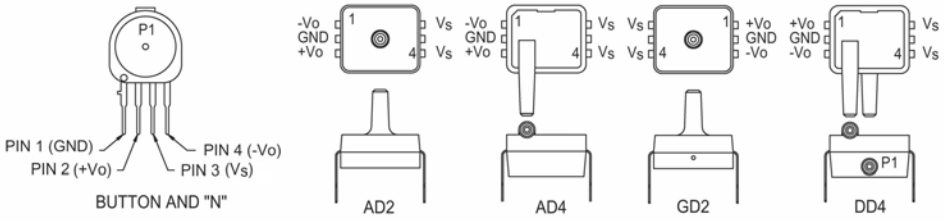


Button, Nipple and N Packages



DIP Packages
(Absolute Version Only)

ELECTRICAL CONNECTIONS



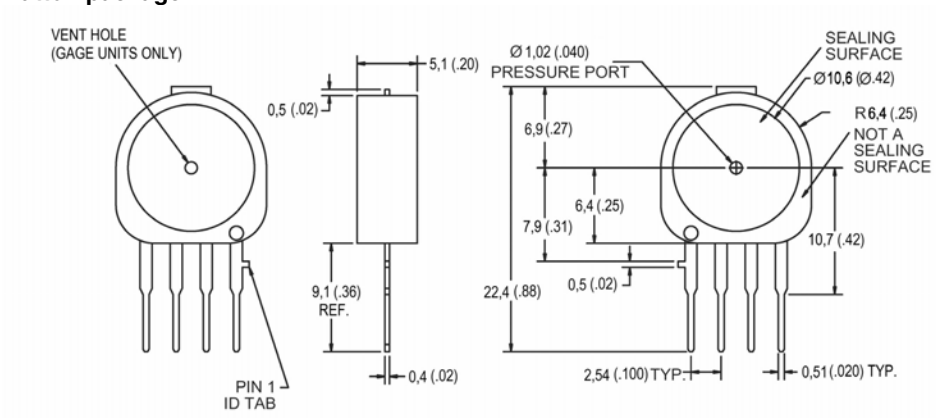
ORDERING INFORMATION

Pressure Range	Order Part Number			
	Button Package	Nipple Package	"N" Package	DIP Package
0 to 1 psid or psig	SX01D	SX01DP1	SX01DN	SX01GD2, SX01DD4
0 to 5 psid or psig	SX05D	SX05DP1	SX05DN	SX05GD2, SX05DD4
0 psia to 15 psia	SX15A	SX15AP1	SX15AN	SX15AD2, SX15AD4
0 psia to 30 psia	SX30A	SX30AP1	SX30AN	SX30AD2, SX30AD4
0 psia to 100 psia	SX100A	–	SX100AN	SX100AD2, SX100AD4
0 psia to 150 psia	SX150A	–	SX150AN	–
0 to 15 psid or psig	SX15D	SX25DP1	SX15DN	SX15GD2, SX15DD4
0 to 30 psid or psig	SX30D	SX30DP1	SX30DN	SX30GD2, SX30DD4
0 to 100 psid or psig	SX100D	–	SX100DN	SX100GD2, SX100DD4
0 to 150 psid or psig	SX150D	–	–	–

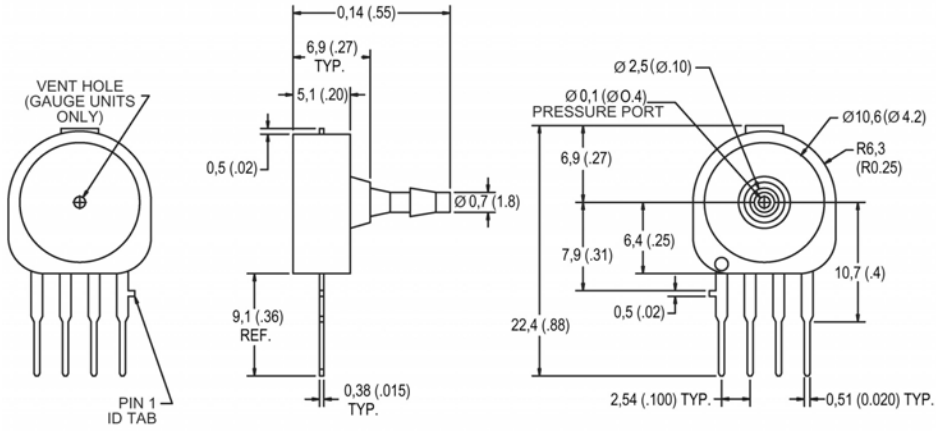
SX Series

PHYSICAL DIMENSIONS for reference only mm [in]

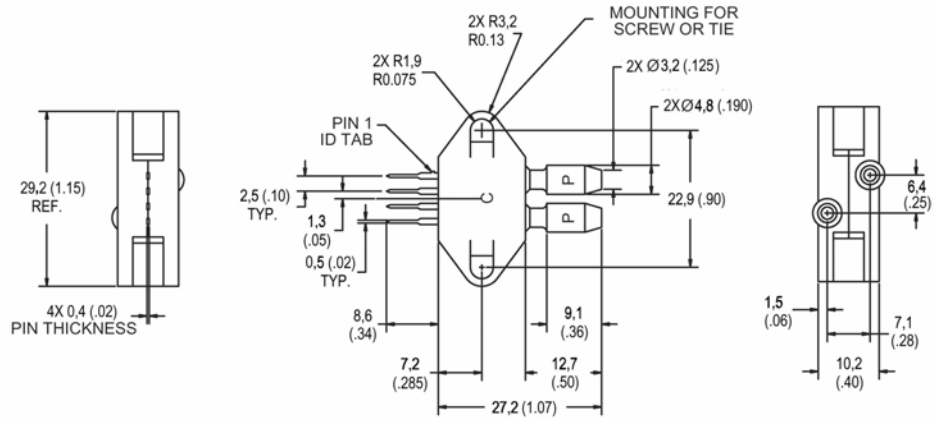
Button package



Nipple package

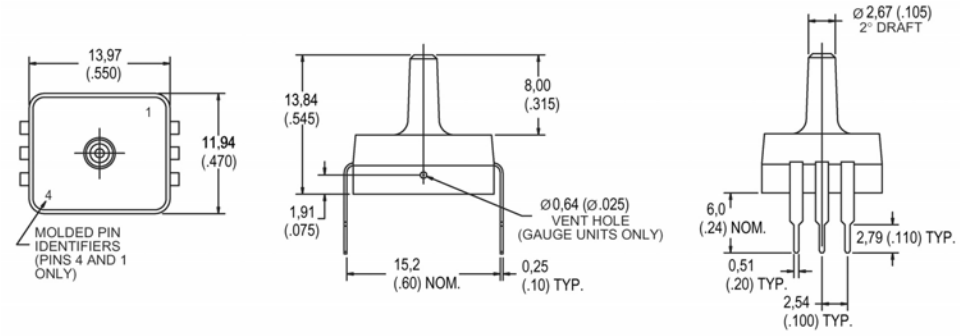


N Housing package

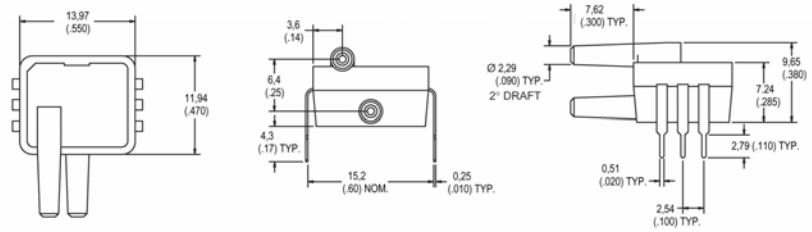


Silicon Pressure Sensors, 0 psi to 1 psi to 0 psi to 150 psi

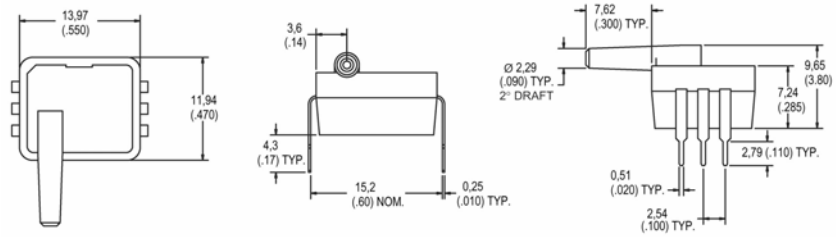
D2 DIP package



DD4 DIP package



AD4 DIP package



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SALES AND SERVICE

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

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Internet: www.honeywell.com/sensing

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	+44 (0) 1698 481676 Fax
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	+1-305-883-8257 Fax
USA/Canada	+1-800-537-6945
	+1-815-235-6847
	+1-815-235-6545 Fax

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April 2009

Honeywell

SX7 Series

1 psig to 300 psig Button Package
Plastic Silicon Pressure Sensors

DESCRIPTION

The SX7 Series sensors offer a high pressure sensor in a very small “button” style package.

These special devices use an RTV 730 for die attach to allow measurement of gauge pressures of 1 psi (SX7001D) to 300 psi (SX7300D) with pressure applied to the backside of the sensor chip (Port P2) only. The output voltage is proportional to pressure.

The output of the bridge is ratiometric to the supply voltage and operation from any dc supply voltage up to +12V is acceptable.

This series is intended for use with non-corrosive, non-ionic working fluids such as air, dry gases, and the like.

FEATURES

- Button package
- High pressure
- Small size
- Low noise
- RTV 730 Die Attach

POTENTIAL APPLICATIONS

- Medical equipment
- Computer peripherals
- Pneumatic controls
- HVAC

SX7 Series Plastic Silicon Pressure Sensors

Table 1. Maximum Ratings for All Devices

Characteristic	Parameter	Unit
Supply voltage, VS	+12	Vdc
Maximum pressure on any port	200	psig
Temperature ranges: Operating Storage	 -40 to 85 -55 to 125	°C [°F]
Humidity limits	0% to 100%	RH
Lead temperature	250	°C [°F]
Soldering duration	3	s

Table 2. Standard Pressure Ranges

Catalog Listing	Operating Pressure	Proof Pressure	Maximum Pressure	Full Scale Span*		
				Min.	Typ.	Max.
SX7001D	1 psi	–	20 psid	15 mV	20 mV	25 mV
SX7005D	5 psi	–	20 psid	50 mV	75 mV	100 mV
SX7015D	15 psi	–	30 psid	75 mV	110 mV	150 mV
SX7030D	30 psi	–	60 psid	75 mV	110 mV	150 mV
SX7100D	100 psi	–	150 psid	100 mV	150 mV	200 mV
SX7150D	150 psi	–	200 psid	75 mV	110 mV	150 mV
SX7300D	0 psi to 300 psi	350 psi	300 psid	100 mV	150 mV	200 mV

*Full-Scale Span is the algebraic difference between the output voltage at full-scale pressure and the output at zero pressure. Full-Scale Span is ratiometric to the supply voltage.

Table 3. Performance Characteristics

SX7001D					
Characteristic	**Min.**	**Typ.**	**Max.**	**Unit**	**Note**
Sensitivity	3.0	4.0	5.0	mV/V/psi	–
Temperature coefficient of span	-2550	-2300	-2050	ppm/°C	4
Zero pressure offset	-35	-20	0	mV	–
Temperature coefficient of offset	–	+4	–	µV/V/°C	4
Combined pressure non-linearity and pressure hysteresis	–	0.2	±0.5	%FS	3
Long-term stability of offset and sensitivity	–	0.1	–	%FS	9
Response time (10% to 90%)	–	100	–	µs	8
Input resistance	–	4.1	–	kOhm	6
Temperature coefficient of resistance	+690	+750	+810	ppm/°C	–
Output resistance	–	4.1	–	kOhm	7
Repeatability	–	0.5	–	%FS	5
SX7005D					
Characteristic	**Min.**	**Typ.**	**Max.**	**Unit**	**Note**
Sensitivity	2.0	3.0	4.0	mV/V/psi	–
Temperature coefficient of span	-2550	-2300	-2050	ppm/°C	4
Zero pressure offset	-35	-20	0	mV	–
Temperature coefficient of offset	–	+4	–	µV/V/°C	4
Combined pressure Non-linearity and pressure hysteresis	–	0.2	±0.5	%FS	3
Long-term stability of offset and sensitivity	–	0.1	–	%FS	9
Response time (10% to 90%)	–	100	–	µs	8
Input resistance	–	4.1	–	kOhm	6
Temperature coefficient of resistance	+690	+750	+810	ppm/°C	–
Output resistance	–	4.1	–	kOhm	7
Repeatability	–	0.5	–	%FS	5
SX7015D					
Characteristic	**Min.**	**Typ.**	**Max.**	**Unit**	**Note**
Sensitivity	1.0	1.5	2.0	mV/V/psi	–
Temperature coefficient of span	-2400	-2150	-1900	ppm/°C	4
Zero pressure offset	-35	-20	0	mV	–
Temperature coefficient of offset	–	+4	–	µV/V/°C	4
Combined pressure Non-linearity and pressure hysteresis	–	0.2	±0.5	%FS	3
Long-term stability of offset and sensitivity	–	0.1	–	%FS	9
Response time (10% to 90%)	–	100	–	µs	8
Input resistance	–	4.1	–	kOhm	6
Temperature coefficient of resistance	+690	+750	+810	ppm/°C	–
Output resistance	–	4.1	–	kOhm	7
Repeatability	–	0.5	–	%FS	5

Table 3. Performance Characteristics (continued)

SX7030D					
Characteristic	**Min.**	**Typ.**	**Max.**	**Unit**	**Note**
Sensitivity	0.5	0.75	1.0	mV/V/psi	–
Temperature coefficient of span	-2400	-2150	-1900	ppm/°C	4
Zero pressure offset	-35	-20	0	mV	–
Temperature coefficient of offset	–	+4	–	µV/V/°C	4
Combined pressure Non-linearity and pressure hysteresis	–	0.2	±0.5	%FS	3
Long-term stability of offset and sensitivity	–	0.1	–	%FS	9
Response time (10% to 90%)	–	100	–	µs	8
Input resistance	–	4.1	–	kOhm	6
Temperature coefficient of resistance	+690	+750	+810	ppm/°C	–
Output resistance	–	4.1	–	kOhm	7
Repeatability	–	0.5	–	%FS	5
SX7100D					
Characteristic	**Min.**	**Typ.**	**Max.**	**Unit**	**Note**
Sensitivity	0.2	0.3	0.4	mV/V/psi	–
Temperature coefficient of span	-2400	-2150	-1900	ppm/°C	4
Zero pressure offset	-35	-20	0	mV	–
Temperature coefficient of offset	–	+4	–	µV/V/°C	4
Combined pressure Non-linearity and pressure hysteresis	–	0.2	±0.5	%FS	3
Long-term stability of offset and sensitivity	–	0.1	–	%FS	9
Response time (10% to 90%)	–	100	–	µs	8
Input resistance	–	4.1	–	kOhm	6
Temperature coefficient of resistance	+690	+750	+810	ppm/°C	–
Output resistance	–	4.1	–	kOhm	7
Repeatability	–	0.5	–	%FS	5
SX7150D					
Characteristic	**Min.**	**Typ.**	**Max.**	**Unit**	**Note**
Sensitivity	0.1	0.15	0.2	mV/V/psi	–
Temperature coefficient of span	-2400	-2150	-1900	ppm/°C	4
Zero pressure offset	-35	-20	0	mV	–
Temperature coefficient of offset	–	+4	–	µV/V/°C	4
Combined pressure Non-linearity and pressure hysteresis	–	0.2	±0.5	%FS	3
Long-term stability of offset and sensitivity	–	0.1	–	%FS	9
Response time (10% to 90%)	–	100	–	µs	8
Input resistance	–	4.1	–	kOhm	6
Temperature coefficient of resistance	+690	+750	+810	ppm/°C	–
Output resistance	–	4.1	–	kOhm	7
Repeatability	–	0.5	–	%FS	5
SX7300D					
Characteristic	**Min.**	**Typ.**	**Max.**	**Unit**	**Note**
Sensitivity	0.033	0.04	0.06	mV/V/psi	–
Temperature coefficient of span	-2400	-2150	-1900	ppm/°C	4
Zero pressure offset	-16	0	16	mV	–
Temperature coefficient of offset	–	+4	–	µV/V/°C	4
Combined pressure Non-linearity and pressure hysteresis	–	0.2	±0.5	%FS	3
Long-term stability of offset and sensitivity	–	0.1	–	%FS	9
Response time (10% to 90%)	–	100	–	µs	8
Input resistance	–	4.1	–	kOhm	6
Temperature coefficient of resistance	+690	+750	+810	ppm/°C	–
Output resistance	–	4.1	–	kOhm	7
Repeatability	–	0.5	–	%FS	5

Notes:

1. Reference Conditions: TA = 25°C Supply VS = 5 Vdc Common Mode Line Pressure = 0 psig Pressure applied to Port 2 only.
3: Pressure Hysteresis is the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure.
4: Slope of the best straight line from 0 °C to 70 °C.
5: Maximum difference in output at any pressure with the operating pressure range and the temperature range within 0 °C to 70 °C after:
   a) 100 temperature cycles, 0 °C to 70 °C
   b) 1.0 million pressure cycles, 0 psi to Full-Scale Span
6: Input resistance is the impedance between Vs and ground.
7: Output resistance is the impedance between + and - outputs.
8: Response time for a 0 psi to Full-Scale Span pressure step change, 10% to 90% rise time.
9: Long-term stability over a one year period.

Figure 1. Equivalent circuit

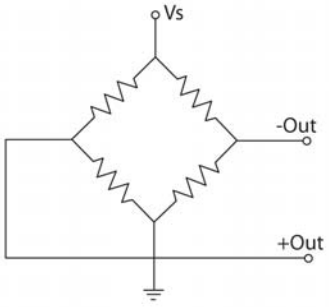


Figure 2. Pinout

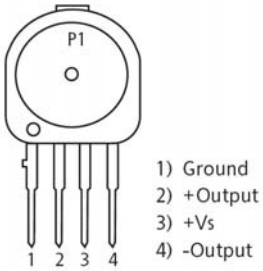
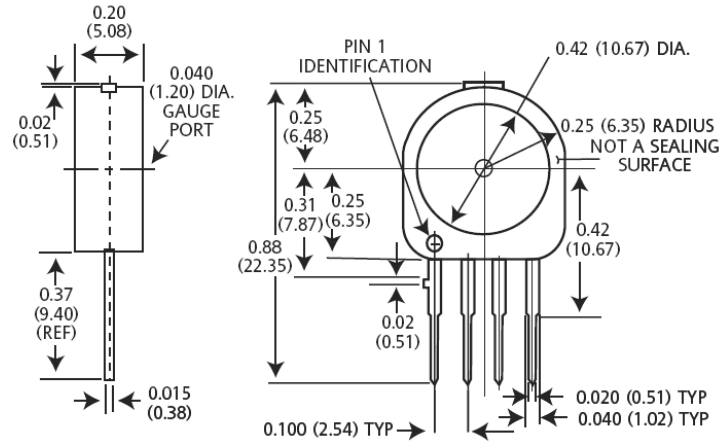


Figure 3. Drawing



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www.honeywell.com/sensing

Honeywell

008180-2-EN IL50 GLO Printed in USA
April 2009

Honeywell

Pressure Sensor

Low Pressure Sensor

SXL Series

FEATURES

- Accurate low pressure readings
- Low cost
- High impedance bridge
- Low noise
- Low power consumption for battery operation

TYPICAL APPLICATIONS

- Medical instrumentation
- Portable and battery-operated equipment
- Air-flow monitoring
- HVAC
- Industrial controls

The SXL series of pressure sensors provides the lowest cost components for measuring very low pressures. These low pressure range devices were specifically designed to accurately measure differential and gage pressures of 1 inch to ten inches of H_2O.

They are meant for use with non-corrosive and non-ionic media, such as air, dry gases, and the like.

These differential devices allow application of pressure to either side of the diaphragm and can be used for gage or differential pressure measurements.

⚠ WARNING

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ABSOLUTE MAXIMUM RATINGS

	Ratings
Supply voltage	5 Vdc
Temperature ranges	
Operating	0 °C to 50 °C [32 °F to 122 °F]
Storage	0 °C to 70 °C [32 °F to 158 °F]
Common mode pressure	150 in. H_2O
Lead temperature (soldering 2 to 4 seconds)	250 °C [482 °F]
Burst pressure	7 psi = 194 in H_2O

PERFORMANCE SPECIFICATIONS (1)

	Min.	Typ.	Max.	Unit
Operating pressure	-	10.0	-	In. H_2O
Sensitivity Ta = 25 °C [77 °F]	0.4	0.9	1.6	mV/V/ In. H_2O
Full-scale span 10 In. H_2O (2)	20	45	80	mV
Temperature coefficient of span (3, 4)	-	-2300	-	ppm/°C
Zero pressure offset Ta = 25 °C [77 °F]	-35	-20	0	mV/V
Temperature coefficient of offset (3)	-	± 4	-	µV/V/°C
Combined linearity and hysteresis (5)		± 0.2	± 1.0	% FS
Long-term stability of offset and sensitivity (6)	-	± 0.1	-	mV
Response time (10% to 90%) (7)	-	100	-	µS
Input resistance Ta = 25 °C [77 °F]	-	4	-	kOhm
Temperature coefficient of resistance (3, 4)	-	750	-	ppm/°C
Output impedance	-	4	-	kOhm
Repeatability (8)	-	0.5	-	% FSS

SPECIFICATION NOTES

1. Reference conditions: supply voltage Vs = 5 Vdc, Ta = 25 °C [77 °F]. Common-mode line pressure = 0 psig. Pressure applied to P2.
2. Span is the algebraic difference between the output voltage at full-scale pressure and the output at zero pressure.
3. Slope of the best straight line from 0 °C to 50 ° C [32 °F to 122 °F]. For operation outside this temperature, contact factory for more specific application information.
4. This parameter is not 100% tested. It is guaranteed by process design and tested on a sample basis only.
5. See definition of terms. Hysteresis is the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure
6. Long-term stability over a one year period.
7. Response time for a 0 PSI to full-scan span pressure step change. 10 % to 90 % rise time.
8. Maximum difference in output at any pressure with the operating pressure range and temperature within 0 °C to 50 °C [32 °F to 122 °F] after
    a. 100 temperature cycles, 0 °C to 50 ° C [32 °F to 122 °F]
    b. 1.5 million pressure cycles, 0 PSI to full-scale span.
9. If the maximum burst pressure is exceeded, even momentarily, the package may leak or burst, or the pressure sensing die may fracture.

FIGURE 1. EQUIVALENT CIRCUIT

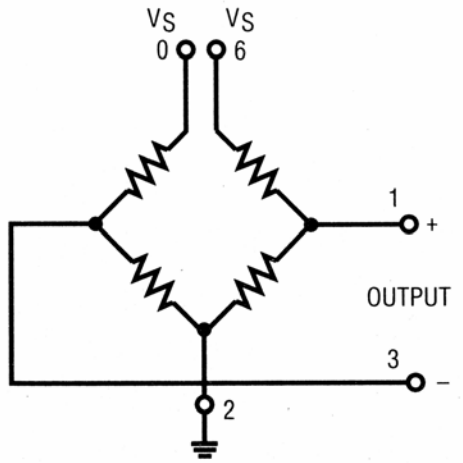
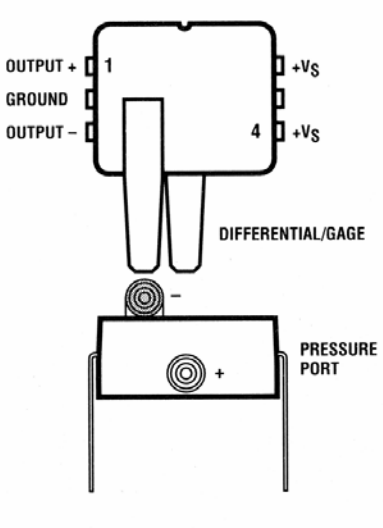
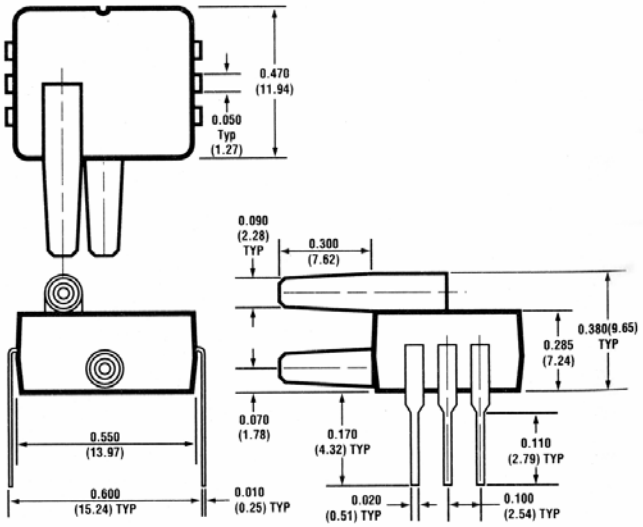


FIGURE 2. DIMENSIONAL DRAWING (FOR REFERENCE ONLY)

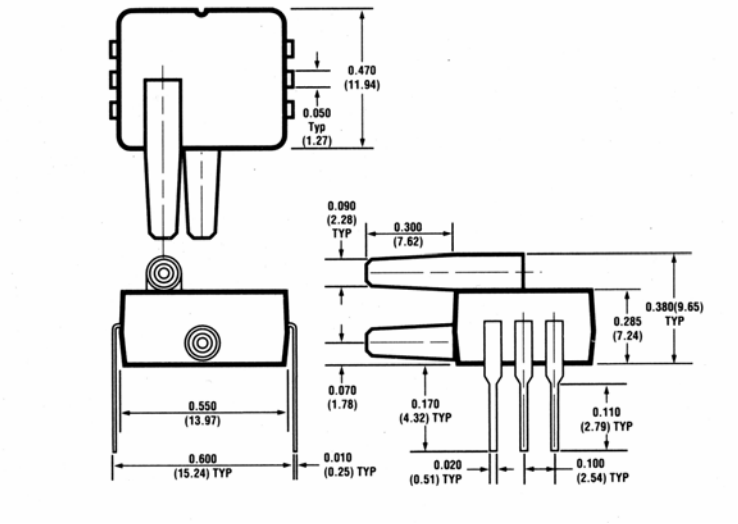


SLPxxxD4



Basic Sensor Sideport 'D4' DIP Package

FIGURE 3. DIMENSIONAL DRAWING – D4 SENSOR - (FOR REFERENCE ONLY)



ORDER GUIDE

	Pressure Range
SXL010D	0 to 10 in H_2O/Standard Package
SXL010DD4	0 to 10 in H_2O/Sideport D4 DIP Package

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. **The foregoing is Buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

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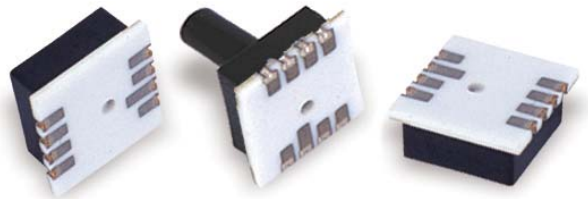


SX SMT Series

Microstructure Pressure Sensors
0 psi to 1 psi through
0 psi to 150 psi

The SX SMT Series provides a most cost-effective method of measuring absolute and gage pressures in a fully packaged sensor. These sensors are designed primarily for use with clean, dry gases such as air and nitrogen.

This series features the standard SX chip in a ceramic, surface mount package. The standard version features a low profile plastic lid to better withstand high temperatures. The optional ported device offers a tube attachment port that is particularly useful in gage applications.

The 4-pin closed bridge configuration allows electrical connection with additional pads provided for mechanical support. Pulsed power is recommended to achieve maximum accuracy and conserve battery power in portable applications.

FEATURES

- Low cost
- Small size
- Absolute or gage pressures
- High-impedance bridge
- Low power consumption

POTENTIAL APPLICATIONS

- Pneumatic controls
- Automotive diagnostics
- Medical equipment/ instrumentation
- Dental equipment
- Environmental controls
- Barometric pressure measurement
- Altimeters
- Pneumatic controls
- Battery powered equipment

SX SMT Series

SPECIFICATIONS[1]

Characteristic	Maximum Rating
Supply voltage	12 Vdc
Operating temperature	-40 °C to 125 °C [-40 °F to 257 °F]
Storage temperature	-55 °C to 125 °C [-67 °F to 257 °F]
Lead temperature (soldering 2 s to 4 s)	250 °C [482 °F]

STANDARD PRESSURE RANGES FOR SX SERIES[1]

Operating Pressure	Maximum Pressure [2]	Sensitivity [3]		Unit
		Nominal	Std. Dev.	
0 psi to 1 psi	20 psi	3.90	±0.40	mV/V/psi
0 psi to 5 psi	20 psi	2.70	±0.38	mV/V/psi
0 psi to 15 psi	30 psi	1.50	±0.25	mV/V/psi
0 psi to 30 psi	60 psi	0.66	±0.06	mV/V/psi
0 psi to 100 psi	150 psi	0.30	±0.05	mV/V/psi
0 psi to 150 psi	200 psi	0.14	±0.02	mV/V/psi

PERFORMANCE SPECIFICATIONS[1]

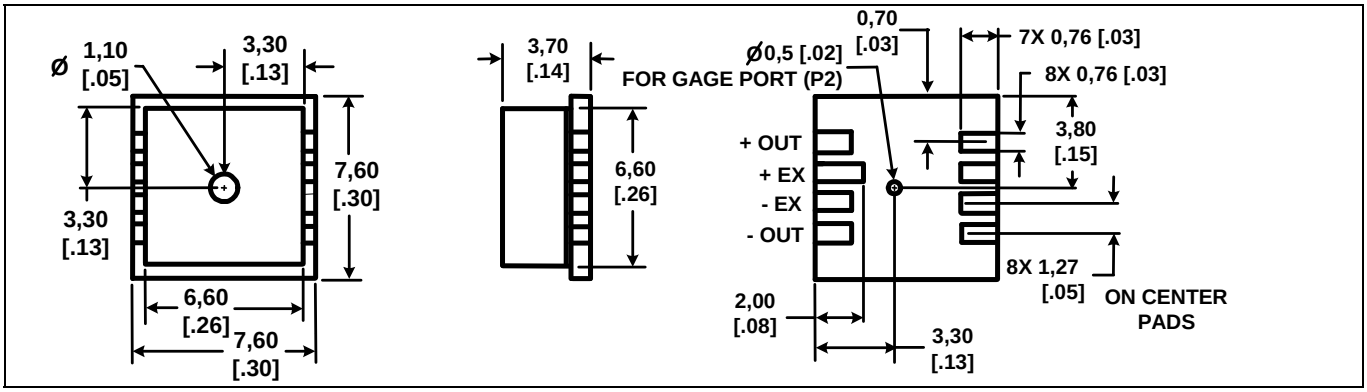
Characteristic	Min.	Typ.	Max.	Unit
Temperature coefficient of span[4,5]	-2400	-2150	-1900	ppm/°C
Zero pressure offset T_A	-35.0	-20.0	0	mV
Temperature coefficient of offset[6,5]	–	4	–	µV/V/°C
Combined, linearity and hysteresis[7]	–	0.2	0.5	% FS
Long term stability of offset and sensitivity[8]	–	0.1	–	mV
Response time (10% to 90%)[9]	–	100	–	µs
Input resistance T_A = 25 °C [77 °F]	–	4.1	–	kΩ
Temperature coefficient of resistance[4,5]	–	750	810	ppm/°C
Output impedance	–	4.1	–	kΩ
Repeatability [10]	–	0.5	–	% FSS

Notes:

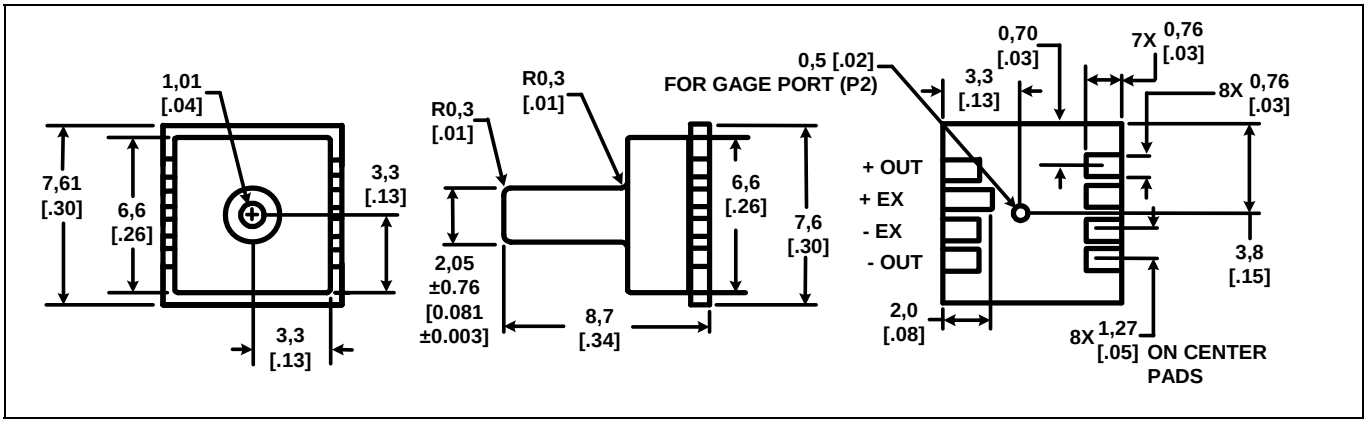
1. Reference Conditions: Supply voltage, Vs = 5.0 Vdc, T_A = 0 °C to 70 °C [32 °F to 158 °F], common-mode line pressure = 0 psig, pressure applied to P1 unless otherwise noted.
2. If maximum pressure is exceeded, even momentarily, the package may leak or burst, or the pressure sensing die may fracture.
3. Sensitivity is the ratio of the output signal voltage change to the corresponding input pressure change. The sensitivity is characterized by design and periodic production testing. This parameter in not 100 % tested in production.
4. This is the best straight line fit for operation between 0 °C to 70 °C [32 °F to 158 °F]. For operation outside this temperature, contact Honeywell representative for more specific application information.
5. This parameter is not 100 % tested. It is guaranteed by process design and tested on a sample basis only. Temperature coefficient of span for the 1.0 psi and 5.0 psi devices is -2550 ppm/°C to -2050 ppm/°C.
6. Slope of the best straight line fit for operation between 0 °C to 70 °C [32 °F to 158 °F]. For operation outside this temperature, contact factory for more specific application information.
7. Hysteresis is the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure.
8. Long-term stability over a one year period.
9. Response time for 0 psi to full scale span pressure step change.
10. Difference in output at any pressure with the operating pressure range and temperature within 0 °C to 70 °C [32 °F to 158 °F] after 100 temperature cycles 0 °C to 70 °C [32 °F to 158 °F], 1.0 million pressure cycles 0 psi to full-scale span.

DIMENSIONAL DRAWINGS (For reference only. mm [in])

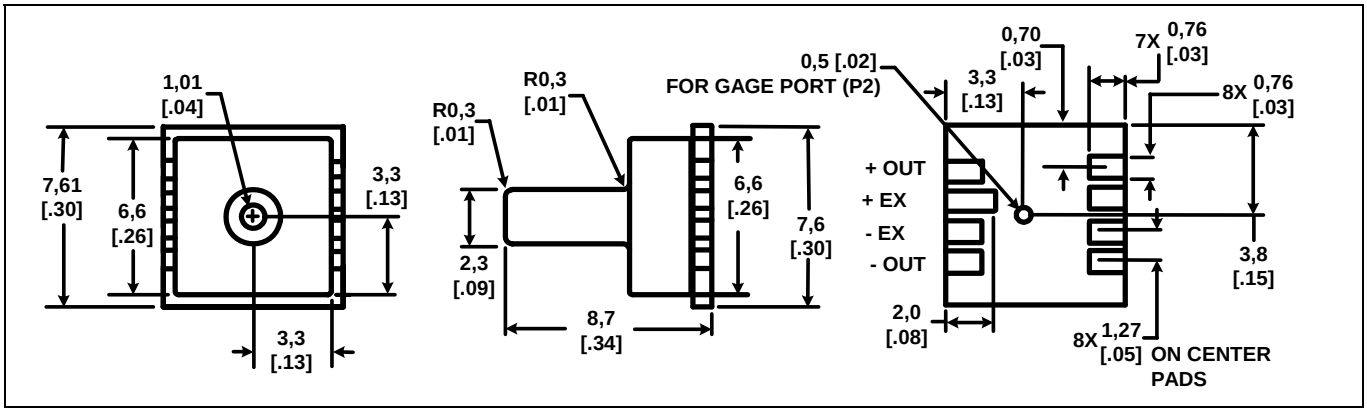
LOW PROFILE SMT



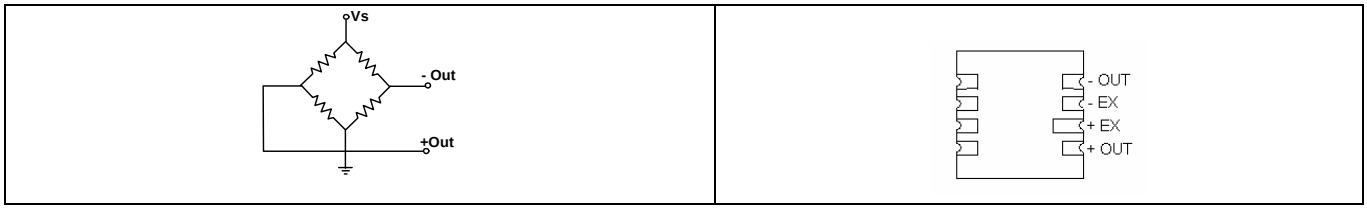
PORTED "P" SMT



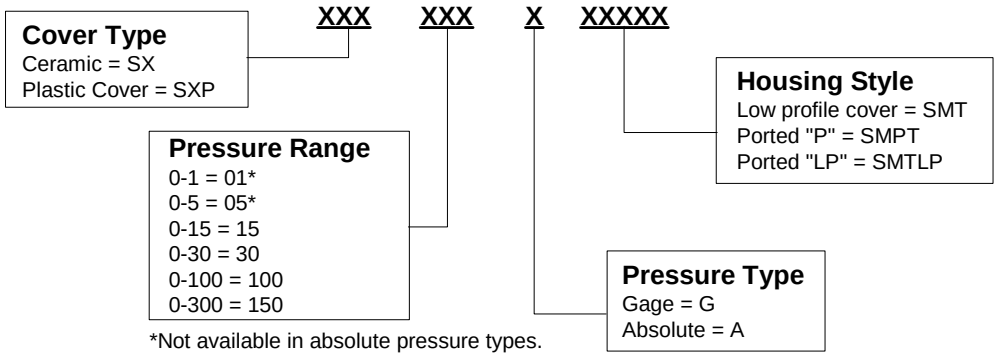
PORTED "LP" SMT



EQUIVALENT CIRCUITS



SX SMT ORDER GUIDE



*Not available in absolute pressure types.

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April 2008

Honeywell

Honeywell

XCA Series

Fixed Output, Amplified Calibrated with Ratiometric Output Voltage Pressure Sensors

DESCRIPTION

The XCA Series of pressure sensors use state-of-the-art silicon micromachined pressure sensors in conjunction with stress free packaging techniques to provide highly accurate, amplified, calibrated and temperature compensated pressure sensors for the most demanding applications.

When operated from a fixed 5.0 Vdc supply, the XCA4 gage and absolute sensors provide a 0.25 Vdc to 4.25 Vdc output (4.0 Vdc span).

The XCA5 Series offers an industry standard 1 Vdc to 6 Vdc output (5 Vdc span) when operated from a fixed 8.0 Vdc supply.

All other features are the same for both the XCA4 and the XCA5, incorporating stress isolation and factory calibration to achieve optimum accuracy in this industry standard package.

FEATURES

- Precise temperature compensation
- Low cost
- High performance
- Gage, absolute and differential versions
- Constant voltage excitation
- Calibrated output
- Ratiometric output voltage

POTENTIAL APPLICATIONS

- Ventilators
- Continuous positive airway pressure (CPAP) systems
- Audiometers
- Air compressors
- Chemical analyzers
- Variable air volume (VAV) controllers
- Airflow

XCA Series

XCA4 ELECTRICAL SPECIFICATIONS (At 5 Vdc Excitation, 25 °C [77 °F].)

Characteristic	Min.	Typ.	Max.	Unit
Excitation voltage	3.0	5.0	16.0	Vdc
Null XCA4 (except differential)	0.15	0.25	0.35	Vdc
Null XCA4 (differential)	2.20	2.25	2.30	Vdc
Span XCA4 (except differential)	3.90	4.00	4.10	Vdc
Span XCA4 (differential, changes with ± pressure applied	±1.95	±2.00	±2.05	Vdc
Temperature change span 0 °C to 50 °C [32 °F to 122 °F][1]	–	±0.6	±1.0	% span
Temperature change offset 0 °C to 50 °C [32 °F to 122 °F][1]	–	±0.6	±1.0	% span
Linearity, hysteresis error[3]	–	±0.30	±0.50	% span
Repeatability	–	±0.1	–	% span
Input resistance	–	15.0	–	kΩ
Output resistance	–	3.0	–	kΩ
Operating temperature	-25 [-13]	–	85 [185]	°C [°F]
Storage temperature	-40 [-40]	–	125 [257]	°C [°F]
Common mode pressure	–	–	50	psi

Notes:
1. Shift is relative to 25 °C [77 °F].
2. Measured at ½ full scale rated pressure using BFSL.

XCA5 ELECTRICAL SPECIFICATIONS (At 8 Vdc Excitation, 25 °C [77 °F].)

Characteristic	Min.	Typ.	Max.	Unit
Excitation voltage	3.0	8.0	16.0	Vdc
Null XCA5 (except differential)	0.95	1.00	1.05	Vdc
Null XCA5 (differential)	2.45	3.50	3.55	Vdc
Span XCA5 (except differential)	4.90	5.00	5.10	Vdc
Span XCA5 (differential, changes with ± pressure applied	±2.45	±2.50	±2.55	Vdc
Temperature change span 0 °C to 50 °C [32 °F to 122 °F][1]	–	±0.6	±1.0	% span
Temperature change offset 0 °C to 50 °C [32 °F to 122 °F][1]	–	±0.6	±1.0	% span
Linearity, hysteresis error[2]	–	±0.30	±0.50	% span
Repeatability	–	±0.1	–	% span
Input resistance	–	15.0	–	kΩ
Output resistance	–	3.0	–	kΩ
Operating temperature	-25 [-13]	–	85 [185]	°C [°F]
Storage temperature	-40 [-40]	–	125 [257]	°C [°F]
Common mode pressure	–	–	50	psi

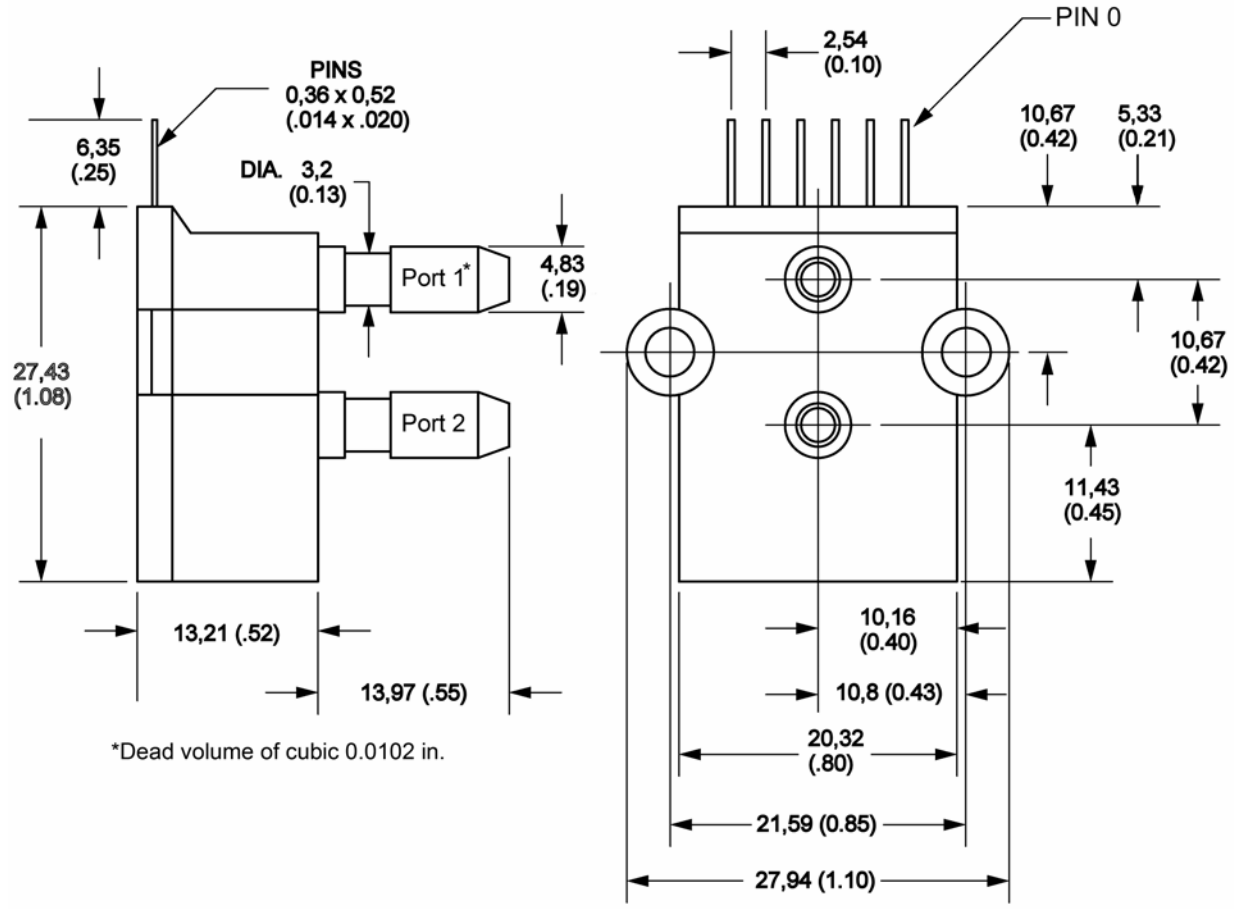
Notes:
1. Shift is relative to 25 °C [77 °F].
2. Measured at ½ full scale rated pressure using BFSL.

OVERPRESSURE RATING

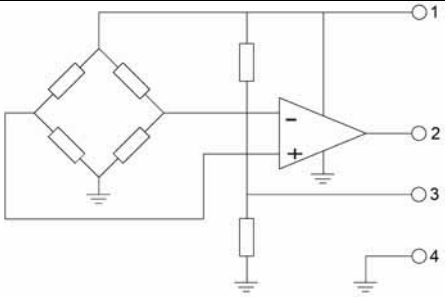
Full Scale Pressure	Overpressure (max.)
4 in H_2O	3 psi
10 in H_2O	3 psi
1 psi	3 psi
5 psi	15 psi
15 psi	45 psi
30 psi	90 psi
60 psi	180 psi
100 psi	250 psi
150 psi	250 psi

Calibrated with Ratiometric Output

MOUNTING DIMENSIONS (For reference only: mm/[in].)



EQUIVALENT CIRCUIT



Pinout

1. V Excitation
2. V Output
3. V Offset (Not to be used unless adjusting null offset.
4. Common

MEDIA COMPATIBILITY: Clean, dry gases only

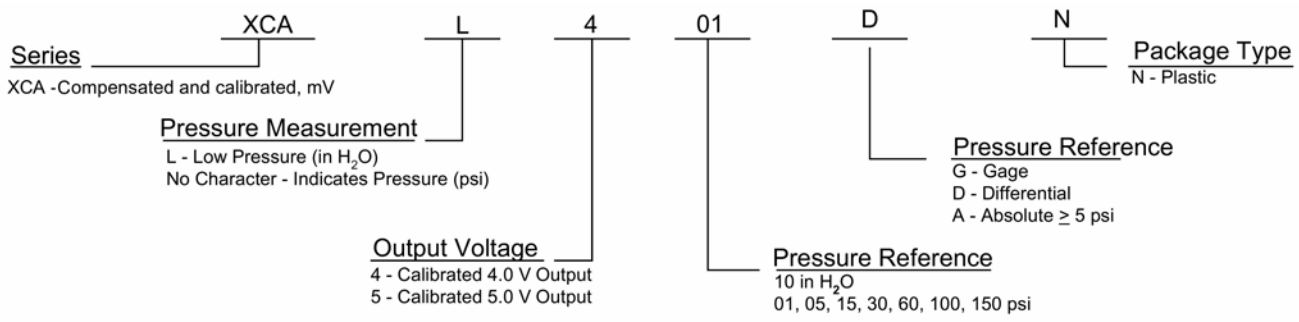
Port 1: Media must be compatible with epoxy-based adhesive.

Port 2: Media must be compatible with nylon housing, epoxy adhesive and silicon. (Port not used for absolute devices.)

PRESSURE COMPATIBILITY

- **XCA4 Gage and Absolute:** Measures gage pressure only with positive pressure to Port 2. There will be a small output voltage between the actual offset voltage and ground proportional to vacuum if applied to Port 2.
- **XCA4 Differential:** Measures differential pressure with positive pressure to Port 2 and negative pressure (vacuum) to Port 1. The offset is set to 2.25 Vdc at 0 psid. It will change slightly with changes in common mode (line) pressure.
- **XCA5 Gage and Absolute:** Measures gage pressure only with positive pressure to Port 2. There will be a small output voltage between the actual offset voltage and ground proportional to vacuum if applied to Port 2.

ORDER GUIDE



⚠ WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

⚠ WARNING

MISUSE OF DOCUMENTATION

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SALES AND SERVICE

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

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	+1-305-883-8257 Fax
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	+1-815-235-6847
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008051-3-EN IL50 GLO Printed in USA
July 2007

Honeywell

XCX/XCXL Series

Compensated Silicon Pressure Sensors

DESCRIPTION

The XCX/XCXL Series integrates silicon micromachined sensing technology, temperature compensation, and calibration in an improved performance industry standard package.

A unique stress isolating design protects against torque induced.

Additional stability and long term accuracy improvements are gained through simplified compensation techniques, which eliminate temperature dependent thermal compensation

These products are available in High Grade (H) which are calibrated for full scale span to ±1.0% over compensated temperature range or in Commercial Grade (C) which are calibrated for full scale span to ±2% over compensated temperature range.

FEATURES

- Pressure ranges from 4 in H_2O, 10 in H_2O and 1 psi through 240 psi
- Calibrated offset
- High Grade (H) listings for high performance sensing solutions or Commercial Grade (C) listings for lower performance sensing solutions
- Temperature Compensated over 0 °C to 70 °C [32 °F to 158 °F]
- Gage, differential, and absolute pressure
- Ratiometric mV output

POTENTIAL APPLICATIONS

- Medical
- Applications requiring small size
- Applications requiring vacuum, positive pressure or both

XCX/XCXL Series

ELECTRICAL SPECIFICATIONS (At 12 Vdc Excitation at 25 °C[1] [77 °F].)

Characteristic	XCX/XCXL C Grade			XCX/XCXL H Grade			Unit
	Min.	Typ.	Max.	Min.	Typ.	Max.	
Excitation voltage	3.0	12.0	16.0	3.0	12.0	16.0	Vdc
Null	–	–	1.0	–	±0.5	±1.0	mV
Temperature error on offset 0 °C to 50 °C [32 °F to 122 °F][2] (4 in H_2O)	–	–	1.0	–	–	0.5	mV
Temperature error on offset 0 °C to 70 °C [32 °F to 158 °F][2] (all except 4 in H_2O)	–	–	1.0	–	–	0.5	mV
Temperature error on span 0 °C to 50 °C [32 °F to 122 °F][2] (4 in H_2O)	–	–	2.0	–	–	1.0	% span
Temperature error on span 0 °C to 70 °C [32 °F to 158 °F][2] (all except 4 in H_2O)	–	–	2.0	–	–	1.0	% span
Linearity, hysteresis error[3]	–	0.5	1.0	–	0.3	0.5	% span
Repeatability	–	0.1	–	–	0.1	–	% span
Input resistance	–	15	–	–	15	–	kΩ
Output resistance	–	3.0	–	–	3.0	–	kΩ
Compensated temperature range	0 [32]	25 [77]	70 [158]	0 [32]	25 [77]	70 [158]	°C [°F]
Storage temperature range	-40 [-40]	–	125 [257]	-40 [-40]	–	125 [257]	°C [°F]
Relative humidity (non-condensing)	0		95	0	–	95	% RH
Common mode pressure	–	–	50	–	–	50	psig
Shock (duration 11 ms any axis)	–	–	10	–	–	10	g
Weight	–	2	–	–	2	–	g

Notes:
1. All parameters are measured at 12 Vdc excitation, pressure specs obtained with pressure applied to the front of the sensor.
2. Shift is relative to 25 °C [77 °F].
3. Measured at ½ full scale rated pressure using BFSL.

DIFFERENTIAL AND GAGE OUTPUT (At 12 Vdc Excitation at 25 °C [77 °F].)

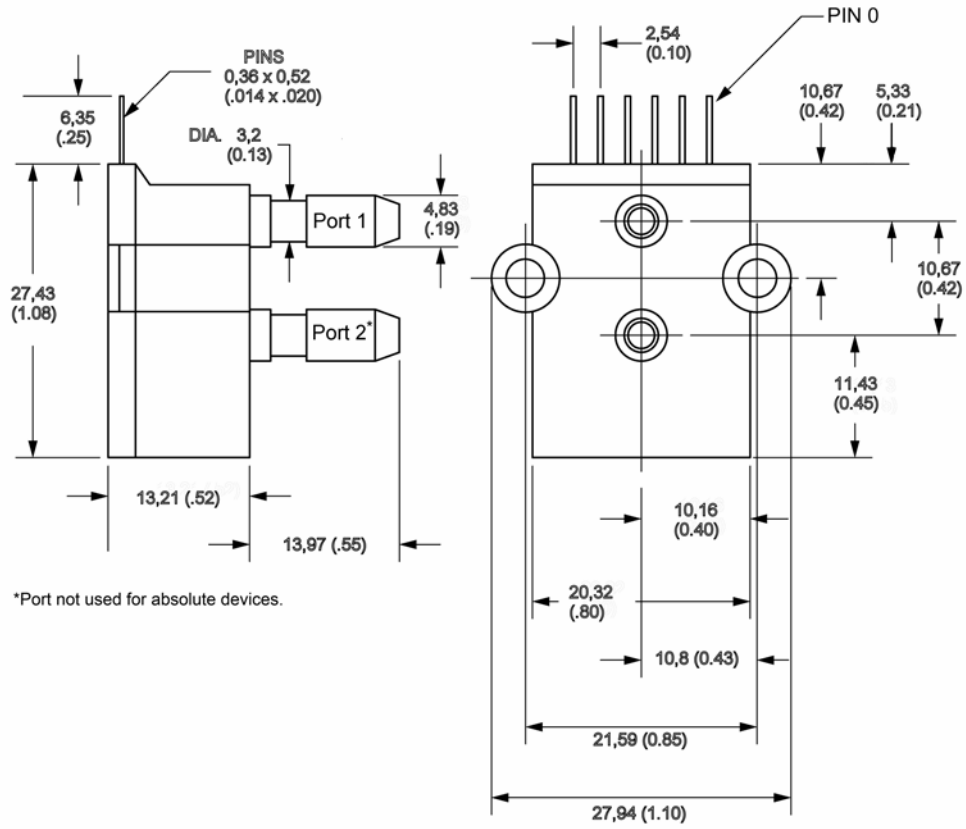
Full Scale Pressure	XCX C Grade Output Full Scale Span (mV)			XCX H Grade Output Full Scale Span (mV)			Max. Overpressure (psi)
	Min.	Typ.	Max.	Min.	Typ.	Max.	
4 in H_2O	38	40	42	–	–	–	5
10 in H_2O	19	20	21	19.8	20.0	20.2	5
0.3 psi	19	20	21	19.8	20.0	20.2	5
1 psi	17	18	19	17.8	18.0	18.2	5
5 psi	57	60	63	59	60	61	15
15 psi	85	90	95	89	90	91	45
30 psi	85	90	95	89	90	91	90
60 psi	85	90	95	89	90	91	180
100 psi	95	100	105	99	100	101	200
150 psi	85	90	95	89	90	91	300
240 psi	95	100	105	99	100	101	300

Compensated Silicon Pressure Sensors

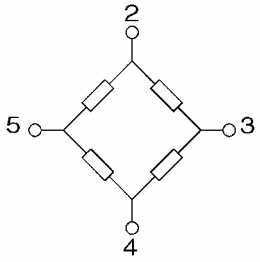
ABSOLUTE OUTPUT (At 12 Vdc Excitation at 25 °C [77 °F].)

FS Pressure	XCX Output, Full Scale Span (mV)			Max. Overpressure (psi)
	Min.	Typ.	Max.	
5 psi	57	60	63	15
15 psi	85	90	95	45
30 psi	85	90	95	90
60 psi	85	90	95	180
100 psi	95	100	105	200

MOUNTING DIMENSIONS (For reference only: mm (in).)



EQUIVALENT CIRCUIT

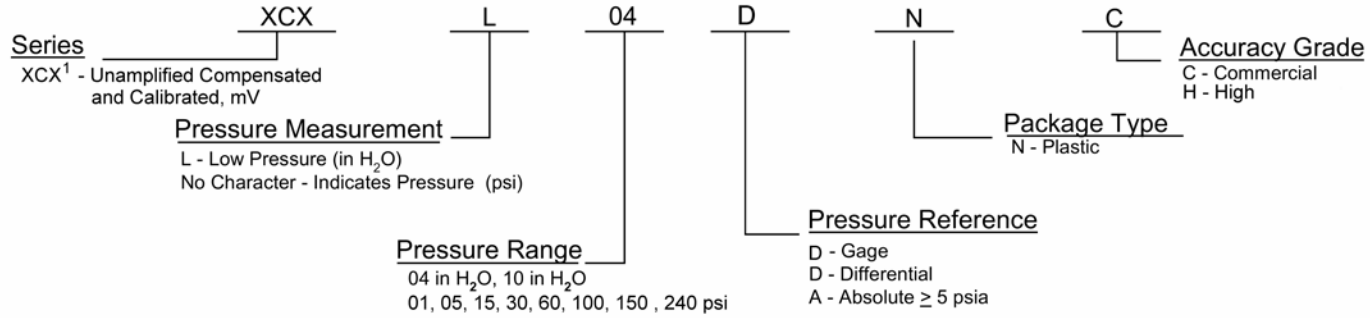


Pinout
1. N/C
2. +V Excitation
3. - Output signal
4. _V Excitation
5. - Output signal
6. N/C

MEDIA COMPATIBILITY: Clean, dry gases only.

P1 Port: Front side of silicon diaphragm, silicone gel passivation, glass-filled nylon alumina.
P2 Port: Silicon diaphragm, glass-filled nylon and alumina ceramic.

ORDER GUIDE



Note 1. Gage and Differential use "D" suffix. Product is the same. Not all combinations are available.

⚠ WARNING

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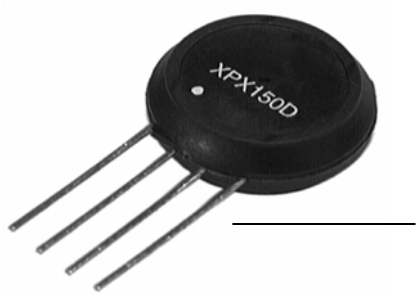
008047-3-EN IL50 GLO Printed in USA
July 2007

Honeywell

XPC/XPCL and XPX/XPXL Series

Uncompensated/Compensated and Compensated Calibrated Silicon Pressure Sensors



DESCRIPTION

The XPC/XPCL and XPX/XPXL Series sensors integrate silicon micromachined sensing technology, temperature compensation, and calibration in a complete family of low-cost packages. This series offers a cost-effective solution for design requirements.

These piezoresistive pressure sensors use micromachined silicon chips mounted on ceramic and protected with a plastic cap. Several tube arrangements with nylon housings are available for various pressure applications.

On devices of 5 psi and above, the top side of the chip is protected against humidity by a Silgel® coating.

Although the sensors are designed for use with noncorrosive, nonionic pressure media, they accommodate many gases that are used in medical applications.

FEATURES

- Low cost, small size
- Temperature compensated
- Zero and span calibrated
- Millivolt output
- Differential, gage and absolute pressure
- Constant voltage excitation
- High impedance - low current

POTENTIAL APPLICATIONS

- Medical applications
- Applications requiring small size
- Applications requiring vacuum and positive pressure reference or both

XPC/XPCL and XPX/XPXL Series

ELECTRICAL SPECIFICATIONS

Characteristic	XPC/XPCL at 12 Vdc, 25 °C [77 °F]				XPX/XPXL at 5 Vdc, 25 °C [77 °F]			
	Min.	Typ.	Max.	Unit	Min.	Typ.	Max.	Unit
Excitation voltage	3.0	12.0	16.0	Vdc	3.0	5.0	12.0	Vdc
Null	-1.0	0	1.0	mV	-50	0	50	mV
Offset temperature shift[1] 0 °C to 25 °C [32 °F to 77°F] 25 °C to 70 °C [77 °F to 158 °F]	–	–	±1.0	mV	–	±0.5		mV
Full scale temperature shift[1] 0 °C to 25 °C [32 °F to 158 °F] 25 °C to 70 °C [77 °F to 158 °F]	–	–	±2	PPM/°C	–	-2200	–	PPM/°C
Linearity, hysteresis error[2]	–	0.25	1.0	% span		0.25	1.0	% span
Input resistance	5.0	–	–	kOhm	5.0	–	–	kOhm
Output resistance	–	3.0	–	kOhm	–	3.0	–	kOhm
Operating temperature	-25 [-13]	–	85 [185]	°C [°F]	-25 [-13]	–	85 [185]	°C [°F]
Storage temperature	-40 [-40]	–	125 [257]	°C [°F]	-40 [-40]	–	125 [257]	°C [°F]
Common mode pressure	–	–	50	psi	–	–	50	psi
Weight	–	2	–	g	–	2	–	g

Notes:
1. Shift is relative to 25 °C [77 °F].
2. Measured at 1/2 full scale rated pressure using BFSL.

ABSOLUTE OUTPUT

FS Pressure	XPC at 12 Vdc, 25 °C [77 °F] Output Full Scale Span (mV)			XPX at 5 Vdc, 25 °C [77 °F] Output Full Scale Span (mV)			Overpressure (psi)
	Min.	Typ.	Max.	Min.	Typ.	Max.	Max.
5 psi	57	60	63	112	168.5	225	15
15 psi	85	90	95	168	253	338	45
30 psi	85	90	95	168	253	338	90
60 psi	85	90	95	189	263.5	338	180
100 psi	95	100	105	210	295	380	250

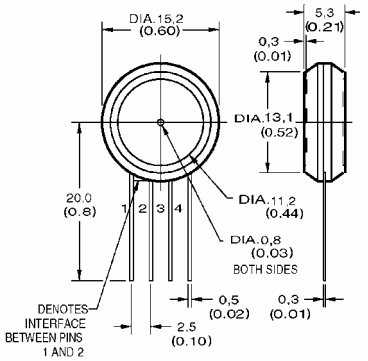
GAGE/DIFFERENTIAL[1] OUTPUT

FS Pressure	XPC/XPCL at 12 Vdc, 25 °C [77 °F] Output Full Scale Span (mV)			XPX/XPXL at 5 Vdc, 25 °C [77 °F] Output Full Scale Span (mV)			Overpressure (psi)
	Min.	Typ.	Max.	Min.	Typ.	Max.	Max.
4 in H_2O	23	25	27	50	68	86	3
10 in H_2O	19	20	21	40	78.5	112	3
1 psi	17	18	19	40	75	110	3
5 psi	57	60	63	112	168.5	225	15
15 psi	85	90	95	168	253	338	45
30 psi	85	90	95	168	253	338	90
60 psi	85	90	95	189	263.5	338	180
100 psi	95	100	105	210	295	380	250
150 psi	85	90	95	187	262.5	338	250

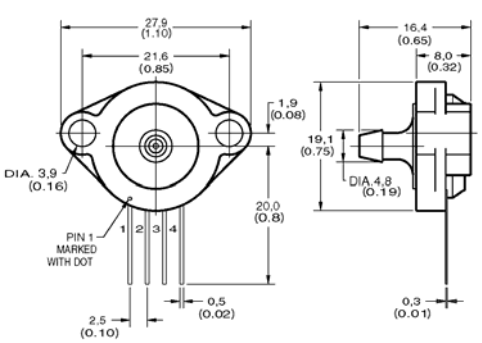
Note:
1. Differential common mode pressure should not exceed 50 psi.

MOUNTING DIMENSIONS (For reference only: mm (in).)

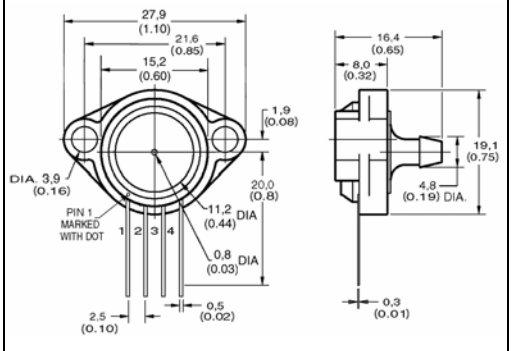
D/A Housing (Differential/Absolute)



GFS/AFS Housing (Gage/Absolute Offset Axial)



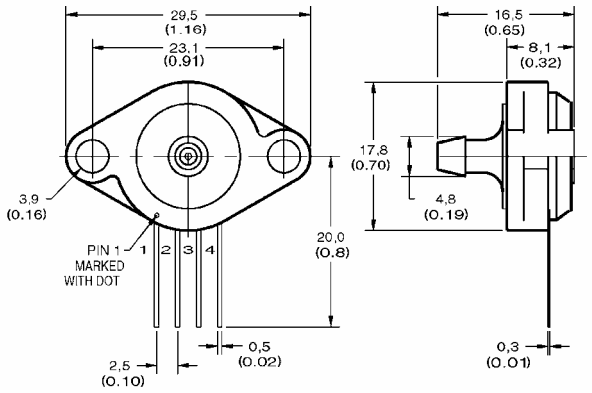
GBFS Housing (Gage Backside Offset Axial)



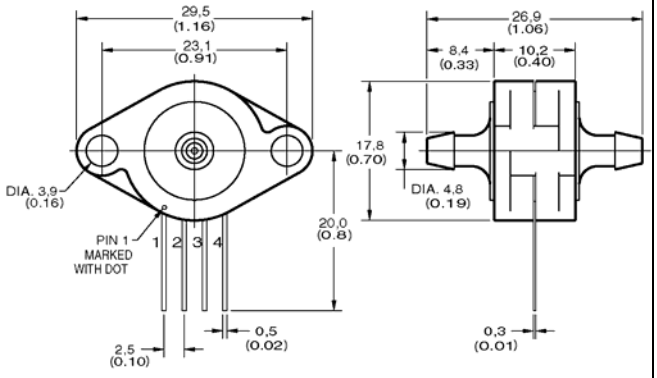
Uncompensated/Compensated and Compensated Calibrated Silicon Pressure Sensors

MOUNTING DIMENSIONS (For reference only: mm (in).)

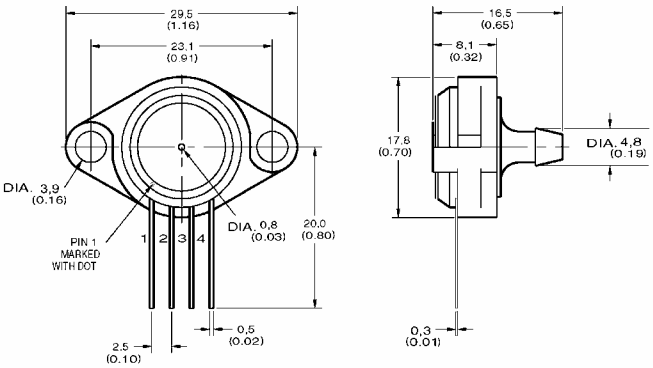
GF/AF Housing
(Gage/Absolute Axial)



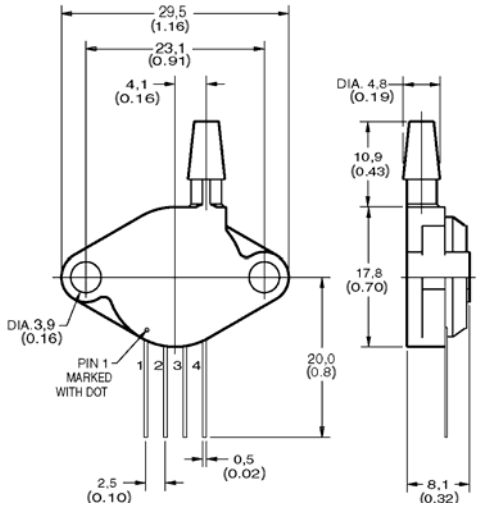
DF Housing
(Differential Axial)



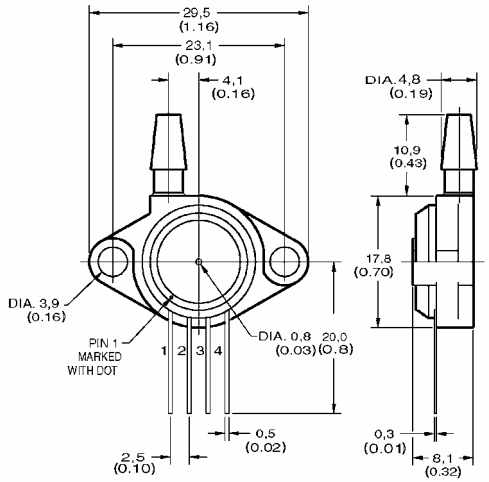
GBF Housing
(Gage Backside Axial)



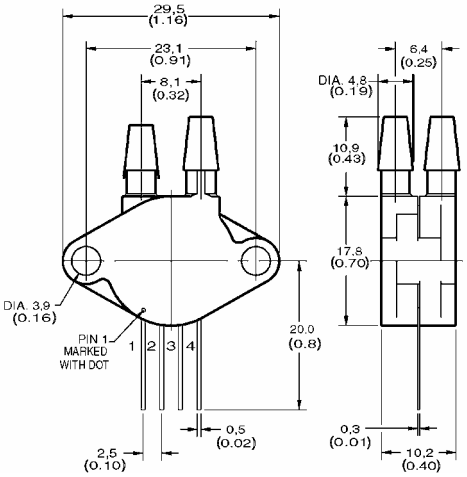
GT/AT Housing
(Gage/Absolute Radial)



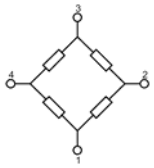
GBT Housing
(Gage Backside Radial)



DT Housing
(Differential Radial)



EQUIVALENT CIRCUIT

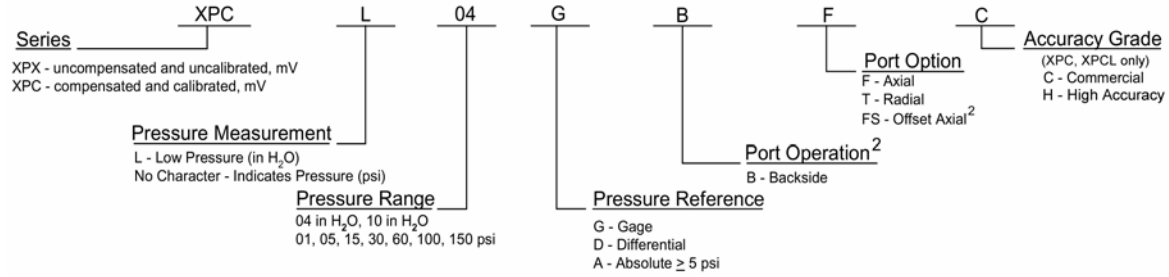


Pinout
1. -V Excitation
2. + Output Signal
3. +V Excitation
4. - Output Signal

Media compatibility: Clean, dry gases only.

P1 Port: Media must be compatible with epoxy-based adhesive and silicon gel.
P2 Port: Media must be compatible with nylon housing, epoxy-based adhesive and silicon.

ORDER GUIDE[1]



Notes:
1. Not all combinations may be available. Contact Honeywell representative for details.
2. Option available in ported gage version only.

⚠ WARNING

PERSONAL INJURY
DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.
Failure to comply with these instructions could result in death or serious injury.

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WARRANTY/REMEDY
Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

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SALES AND SERVICE
Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

E-mail: info.sc@honeywell.com

Internet: www.honeywell.com/sensing

Phone and Fax:

Asia Pacific	+65 6355-2828
	+65 6445-3033 Fax
Europe	+44 (0) 1698 481481
	+44 (0) 1698 481676 Fax
Latin America	+1-305-805-8188
	+1-305-883-8257 Fax
USA/Canada	+1-800-537-6945
	+1-815-235-6847
	+1-815-235-6545 Fax

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008046-5-EN IL50 GLO Printed in USA
July 2007

Honeywell

XSCL/XSC Series

Compensated and Calibrated Pressure Sensors

DESCRIPTION

The XSCL/XSC Series sensors integrate silicon micromachined sensing technology, temperature compensation and calibration in a wide variety of low-cost packages. This series offers a cost-effective solution for design requirements.

These piezoresistive pressure sensors use micromachined silicon chips mounted on ceramic and protected with a plastic cap. Several tube arrangements with nylon housings are available for various pressure applications.

On devices of 5 psi and above, the topside of the chip is protected against humidity by a Silgel® coating. While the sensors are designed for use with non-corrosive, non-ionic pressure media, they accommodate many gases that are used in medical applications.

FEATURES

- Low cost, small size, temperature compensated
- Zero and span calibrated
- Millivolt output
- Differential, gage and absolute pressure
- Constant voltage excitation
- High impedence – low current

POTENTIAL APPLICATIONS

- Medical equipment
- Applications requiring small size
- Applications requiring vacuum and positive pressure reference, or both

XSCL/XSC Series
Compensated and Calibrated

ELECTRICAL SPECIFICATIONS AT 12 ±0.01 VDC EXCITATION AT 25 °C [77 °F] (1)

Characteristic	Min.	Typ.	Max.	Unit
Excitation voltage	3.0	12.0	16.0	Vdc
Null	-1.0	0	+1.0	mV
Offset temperature shift 0 °C to 70 °C [32 °F to 158 °F] (2)	–	–	±1.0	mV
Full scale temperature shift 0 °C to 70 °C [32 °F to 158 °F] (2)	–	–	±2	% span
Linearity, hysteresis error (3)	–	0.25	1.0	% span
Input resistance	5.0	–	–	kΩ
Output resistance	–	3.0	–	kΩ
Operating temperature	-25	–	+85	°C
Storage temperature	-40	–	+125	°C
Common mode pressure	–	–	50	psi
Weight	–	2	–	g

Notes:

1. All parameters are measured at 12 Vdc excitation. Pressure specs obtained with pressure applied to the front of the sensor.
2. Shift is relative to 25 ºC [77 ºF].
3. Measured at ½ full scale rated pressure using BFSL.

XSC ABSOLUTE OUTPUT AT 12 VDC ±0.01 EXCITATION AT 25 °C [77 °F]

FS Pressure (psi)	XSC Output Full Scale Span (mV)			Overpressure (psi)
	Min.	Typ.	Max.	Max.
5	57	60	63	15
15	85	90	95	45
30	85	90	95	90
60	85	90	95	180

XSCL/XSC GAGE AND DIFFERENTIAL(1) OUTPUT AT 12 VDC ±0.01 EXCITATION AT 25 °C [77 °F]

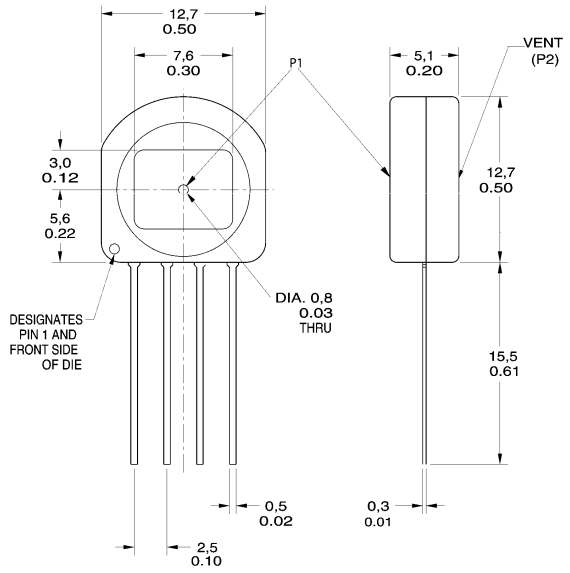
FS Pressure (psi)	XSC Output Full Scale Span (mV)			Overpressure (psi)
	Min.	Typ.	Max.	Max.
4 in H20	23	25	27	3
10 in H20	19	20	21	3
1	17	18	19	3
5	57	60	63	15
15	85	90	95	45
30	85	90	95	90
60	85	90	95	180
100	95	100	105	250

Note:

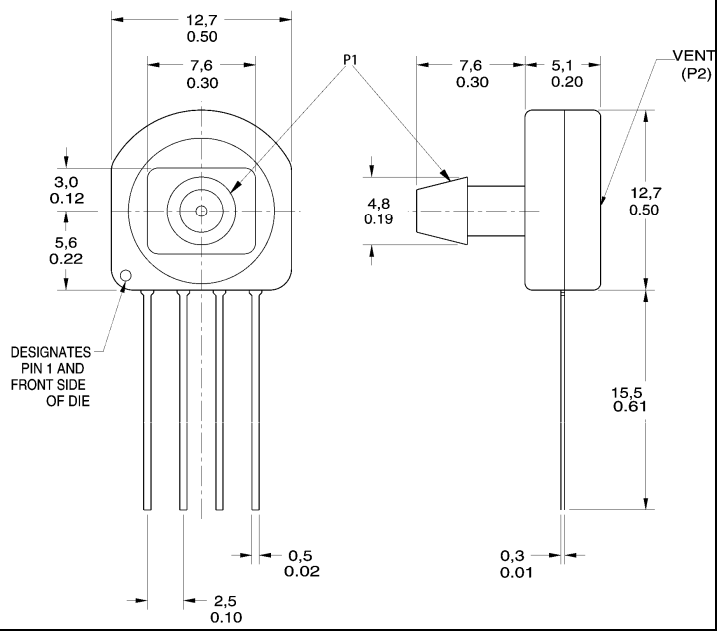
1. Differential common mode pressure should not exceed 50 psi.

MOUNTING DIMENSIONS (For reference only, mm/in.)

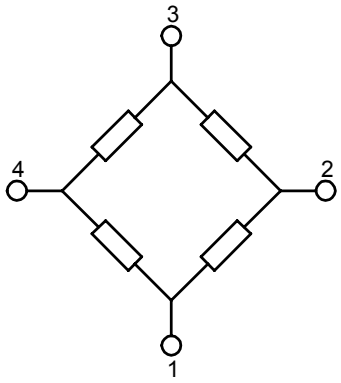
XCS A/D/G/Style



XCS/XCSL WITH PORT, AF/GF STYLE



EQUIVALENT CIRCUIT



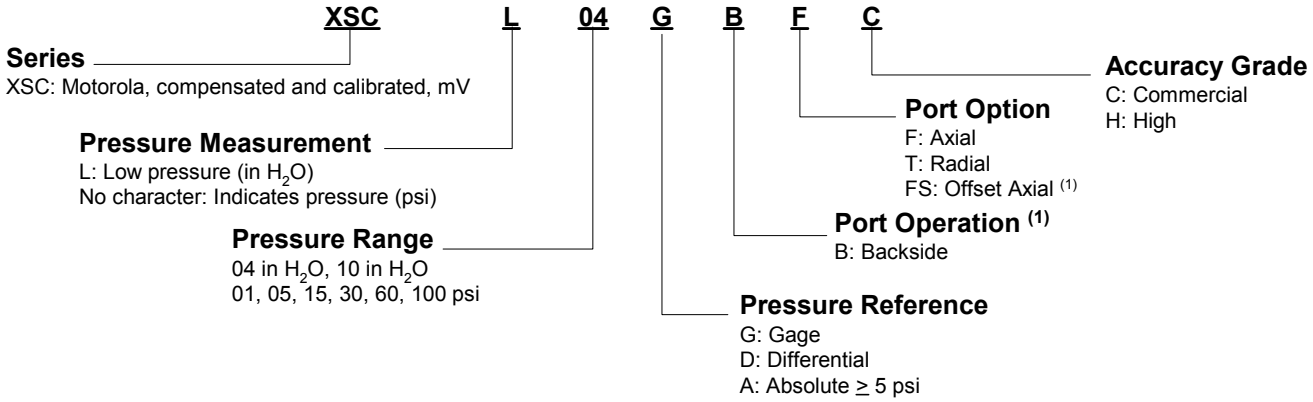
PIN DESIGNATIONS

1. –V Excitation
2. +Output Signal
3. +V Excitation
4. –Output Signal

MEDIA COMPATIBILITY

Dry gasses only. Media must be compatible with nylon housing, epoxy adhesive and silicon.

ORDER GUIDE



Note:

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Honeywell

008056-2-EN IL50 GLO Printed in USA
October 2005