

Pressure Sensors

Gage/Unamplified-Noncompensated

22PC Series

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.

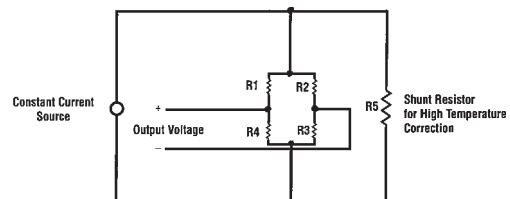
See Accessory Guide, page 27.

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

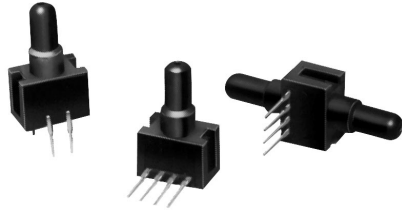


Pressure Sensors

Gage and Differential/Unamplified-Noncompensated

24PC Series

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.

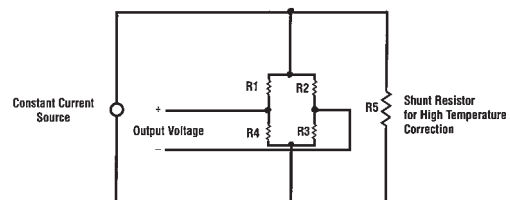
24PC SERIES ORDER GUIDE

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



Unamplified

Pressure Sensors

24PC Series

Gage and Differential/Unamplified-Noncompensated

SENSOR SELECTION GUIDE

<u>2</u> Product Family	<u>4</u> Circuit Type	<u>PC</u> Pressure Transducer	<u>A</u> Pressure Range	<u>F*</u> Type of Seal	<u>A</u> Type of Port	<u>2</u> Termination Style	<u>G</u> Pressure Measurement
2 20PC family	4 Noncom- pensated		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.

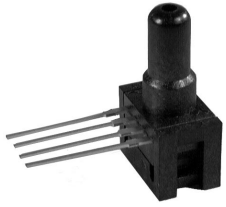
See Accessory Guide, page 27.

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

Pressure Sensors

Absolute Unamplified Noncompensated

24PC Series



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

Unamplified

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

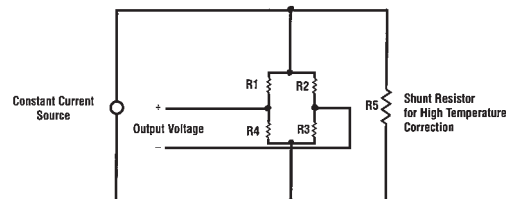
24PC ABSOLUTE ORDER GUIDE

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

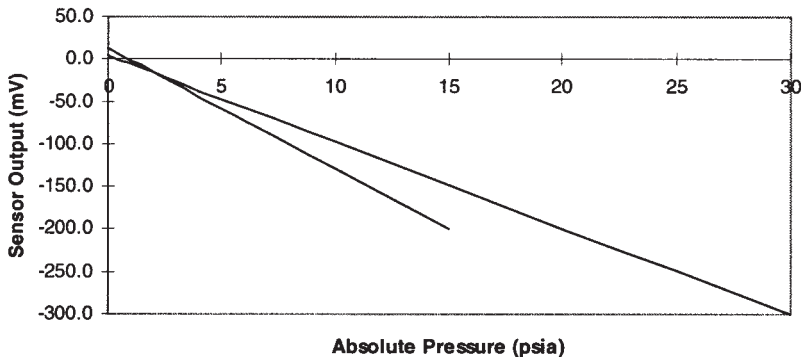


Pressure Sensors

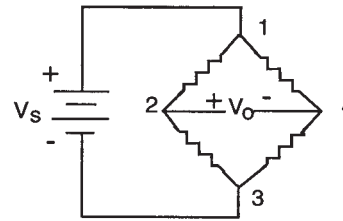
24PC Series

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

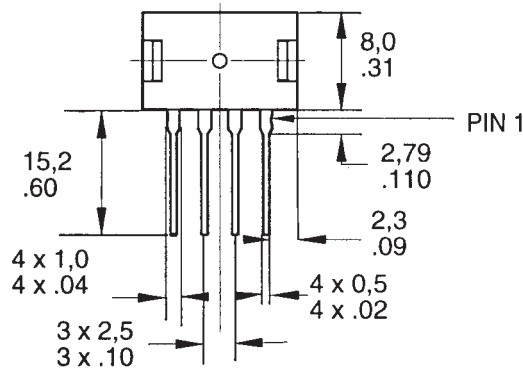
**Media seal is on P1 side and will not be in contact with media

Example: 24PCCFD6A

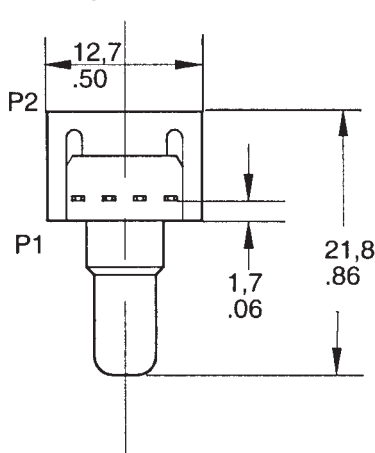
Non-compensated 15 psi Absolute sensor with fluorosilicone seal, modular port, 1 x 4 terminals, .600" long.

See **Accessory Guide**, page 27.

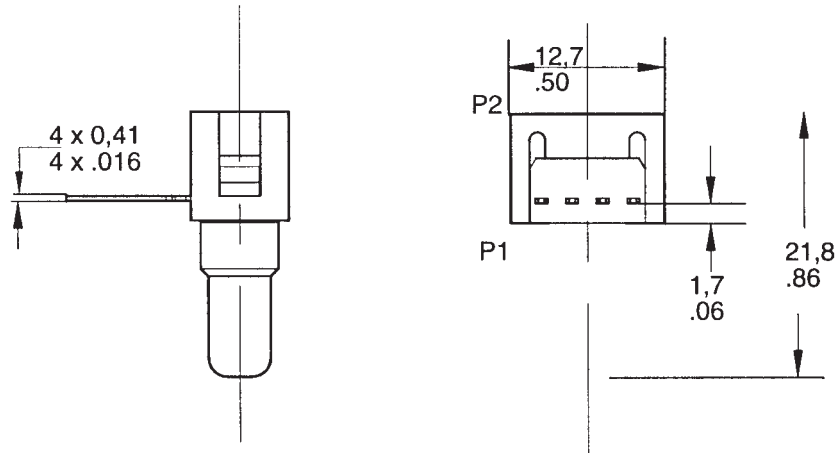
MOUNTING DIMENSIONS (for reference only)



A Straight Port



D Modular Port

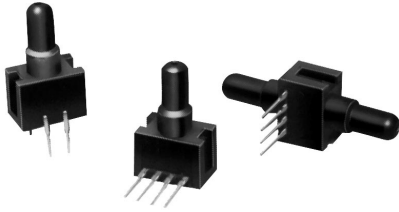


Pressure Sensors

Gage and Differential/Unamplified-Compensated

26PC Series

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

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.

Unamplified

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.

Pressure Sensors

Gage and Differential/Unamplified

22/24/26PC Series

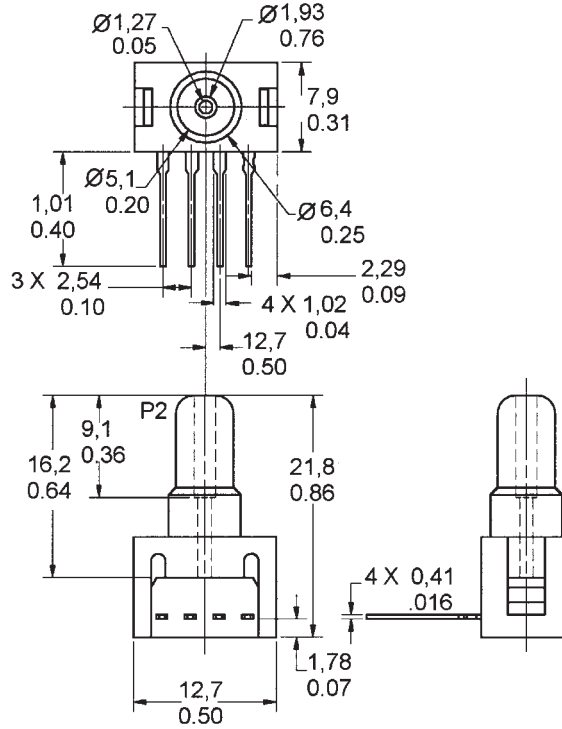
GAGE SENSOR

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)

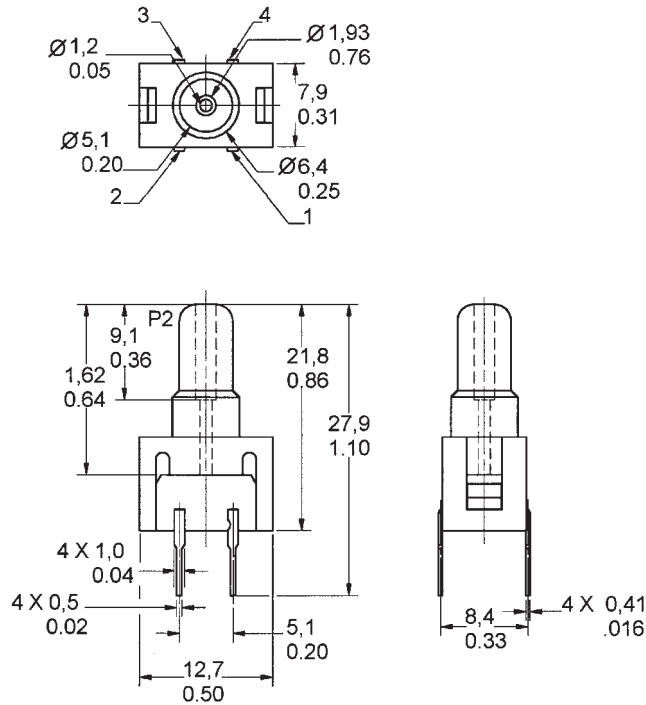
Pin 1 is notched, and is shown at the right of the package. Pin 2 is next to Pin 1, etc.



Unamplified

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.



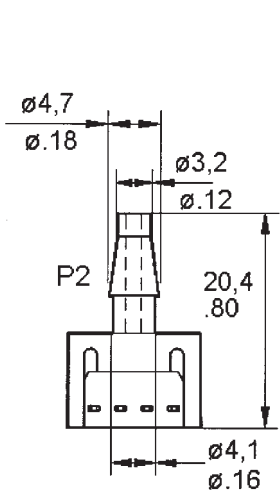
Pressure Sensors

Gage and Differential/Unamplified

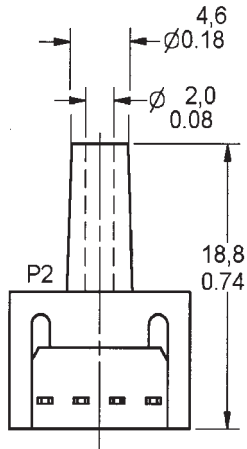
22/24/26PC Series

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

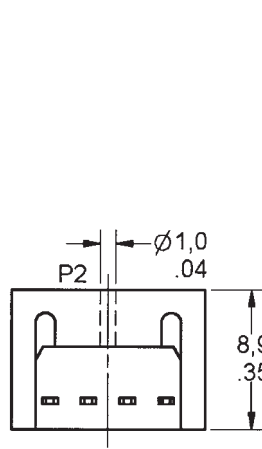
B Barbed



C Luer



D Modular



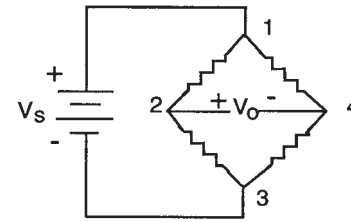
20PC SERIES CIRCUIT - NOTES

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 (-)

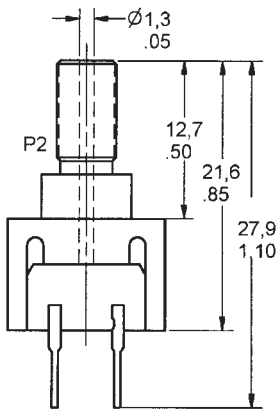
EXCITATION



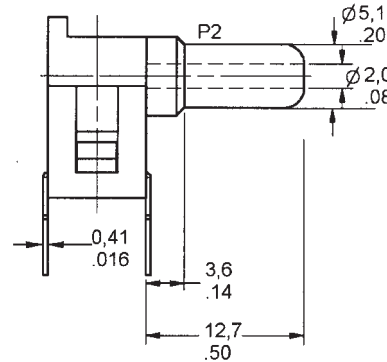
Unamplified

H M5 Thread

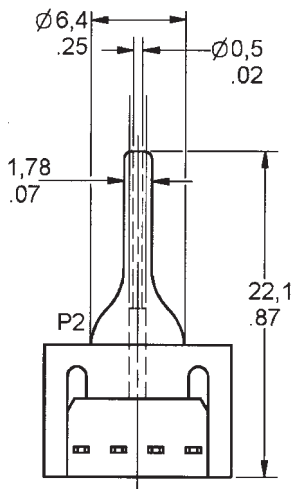
O-Ring Size 007 O-Ring Counterbore
1,02 mm (.040) deep $\pm 0,13$ (.005) x 7,6 mm (.30) $\pm 0,8$ (.003)



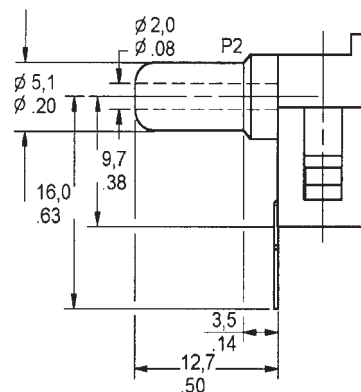
I 90°



J Needle



K Reverse 90°



Pressure Sensors

Gage and Differential/Unamplified

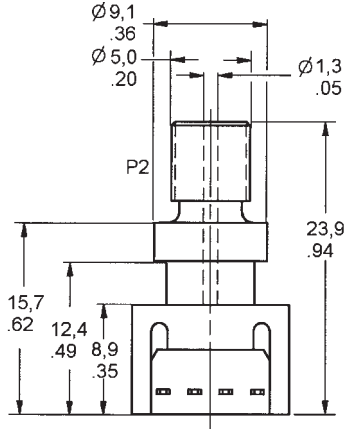
22/24/26PC Series

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

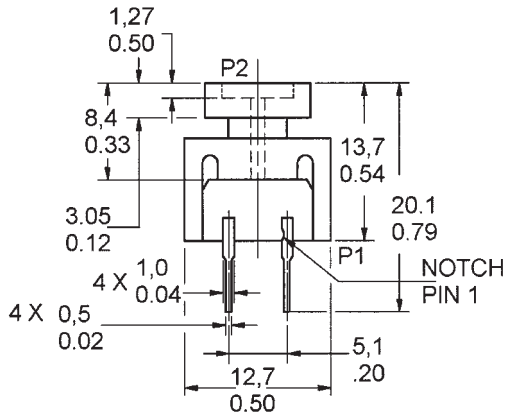
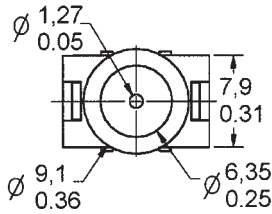
M 1/4-28 UNF Thread

O-Ring Size 009 O-Ring Counterbore

1,02 mm (.040) deep $\pm 0,05$ (.002) x 9,1 mm (.360) $\pm 0,8$ (.003)



S Manifold



20PC Construction

