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THE POWER OF **CONNECTED**

Basic Board Mount Pressure Sensors

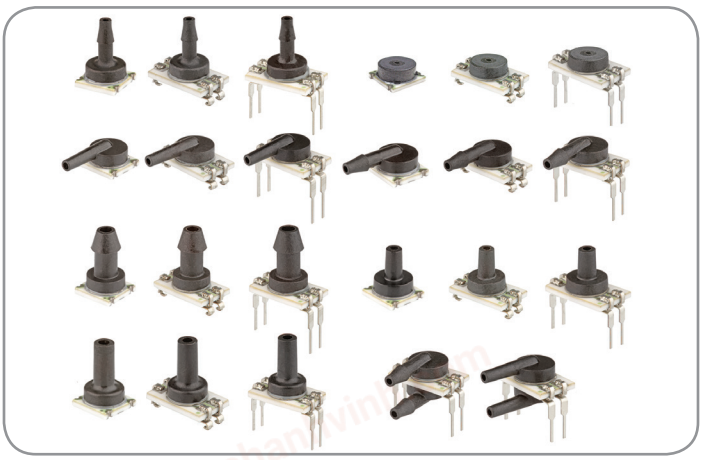
32344917

Issue B

TBP Series, Uncompensated/Unamplified
60 mbar to 10 bar | 6 kPa to 1 MPa |1 psi to 150 psi, Millivolt Analog Output

NBP Series, Uncompensated/Unamplified
60 mbar to 10 bar | 1 psi to 150 psi, Millivolt Analog Output

Datasheet



DESCRIPTION

Honeywell's Basic Board Mount Pressure Sensors, TBP Series and NBP Series, are designed for food grade and non-food grade potential medical and industrial applications. These unamplified, piezoresistive silicon pressure sensors provide a ratiometric output and are either temperature compensated (TBP Series) or uncompensated (NBP Series).

TBP Series:

- Temperature compensated and unamplified.
- Compensation makes it easier to integrate the sensor into a system by minimizing the need to calibrate the system over temperature on a regular basis; offers reduced part-to-part variation.
- Offers infinite resolution of the pressure signal.
- Compensated temperature range is 0°C to 85°C [-32°F to 185°F].

NBP Series:

- Uncompensated and unamplified.
- Is often ideal for customers who want to do their own compensation, calibration and amplification in order to make use of the maximum resolution of the bare sensor output, leveraging any algorithm needed for the application.
- Offers infinite resolution of the pressure signal.

These products are available in numerous package styles and mounting options, making it easier for device manufacturers to integrate the product into their applications. They are intended for use with non-corrosive, non-ionic gases, such as air and other dry gases, and for non-corrosive, non-ionic liquids when the silicone gel coating option is selected. All products are designed and manufactured according to ISO 9001 and are NSF certified.

FEATURES

- Package size as small as 7 mm x 7 mm [0.276 in x 0.276 in]
- Operating temperature range -40°C to 125°C [-40°F to 257°F]
- Reflow mounting J-STD-020E, MSL 1 and rapid stabilization after reflow soldering allow calibration immediately after mounting
- Media compatibility options:
  - **No gel coating in media path:** Input port is limited to non-corrosive, non-ionic media such as dry air and gases and should not be exposed to condensation; gases are limited to media that are compatible with high temperature polyamide, silicone, alumina ceramic, silicon, gold and glass
  - **Silicone gel coating in media path:** Uses the same materials in the wetted media path but is protected from condensation by a silicone-based gel coating; allows for use in applications where condensation can occur
- Sensor materials have been tested and certified for these food safety standards:
  - NSF-169
  - BPA Free
  - LFGB

VALUE TO CUSTOMERS

- Cost-competitive pressure sensing solution
- Smaller when compared to many similar products, occupying less space on the printed circuit board (PCB) and typically allowing for easier placement on PCBs or in small devices
- Performs in many tough environments with dry and wetted media
- Numerous options simplify integration into the device manufacturer's application
- Food Safety Certification for North America, Europe and Asia

POTENTIAL APPLICATIONS

- Medical: Blood pressure monitoring, hospital beds, oxygen concentrators, wound therapy
- Industrial: Air movement control, environmental control, HVAC transmitters, industrial controls, leak detection, other commercial applications, pneumatic controls, food and beverage

PORTFOLIO

Honeywell's NBP Series joins the TruStability™ HSC, SSC, NSC and TSC Series; Basic ABP Series; 24PC Series and 26PC Series board mount pressure sensors.

BPA Free

NSF

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Basic Board Mount Pressure Sensors

TBP Series, Compensated/Unamplified
NBP Series, Uncompensated/Unamplified

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Table 1. Operating Specifications

Characteristic	Min.	Typ.	Max.	Unit
TBP Series				
Supply voltage (V_{supply})[1, 2]	1.5	5.0	12.0	Vdc
Supply current (at 5.0 Vdc supply)	–	0.6	1	mA
Operating temperature range[3]	-40 [-40]	–	125 [257]	°C [°F]
Compensated temperature range[4]	0 [32]	–	85 [185]	°C [°F]
Output resistance	–	2.5	–	kOhm
NBP Series				
Supply voltage (V_{supply})[1, 2]	1.8	5.0	12.0	Vdc
Supply current (at 5.0 Vdc supply)	–	1.5	2.5	mA
Specified temperature range[5]	-40 [-40]	–	125 [257]	°C [°F]
Accuracy[6]	–	–	±0.25	%FSS BFSL[7]
Input resistance	2.4	3.0	5.5	kOhm
Thermal effect on resistance (TER)[8]	1200	–	3200	ppm/°C

[1]Ratiometricity of the sensor (the ability of the device output to scale to the supply voltage) is achieved within the specified operating voltage.

[2]Incorrect application of supply voltage or ground to the wrong pin may cause electrical failure.

[3]**Operating temperature range:** The temperature range over which the sensor produces an output proportional to pressure.

[4]**Compensated temperature range:** The temperature range over which the sensor produces an output proportional to pressure within the specified performance limits.

[5]**Specified temperature range:** The temperature range over which the sensor will produce an output proportional to pressure 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]**Full Scale Span (FSS):** The algebraic difference between the output signal measured at the maximum and minimum limits of the pressure range. (See Figure 2 for pressure ranges.)

[8]**TER (Thermal Effect on Resistance):** The deviation in input resistance due to change in temperature over the specified temperature range, relative to input resistance measured at 25°C [77°F].

Table 2. Pressure Reference Types

Pressure Type	Description
Absolute	Output is proportional to the difference between applied pressure and a built-in reference to vacuum. Reference pressure is absolute zero pressure (full vacuum).
Differential	Output is proportional to the difference between the pressures applied to each port (Port 1 - Port 2).
Gage	Output is proportional to the difference between applied pressure and atmospheric (ambient) pressure. Reference pressure is atmospheric pressure.

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Basic Board Mount Pressure Sensors

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Table 3. Absolute Maximum Ratings[1]

Characteristic	Min.	Max.	Unit
Supply voltage (V_{supply})	-12.0	12.0	Vdc
Storage temperature	-40 [-40]	125 [257]	°C [°F]
Soldering time and temperature: lead solder temperature (DIP) peak reflow temperature (SMT, Leadless SMT)	 4 s max. at 250°C [482°F] 15 s max. at 250°C [482°F]		

[1]Absolute maximum ratings are the extreme limits the device will withstand without damage.

Table 4. Environmental Specifications

Characteristic	Parameter
Humidity: all external surfaces internal surfaces of silicone gel coating option internal surfaces of no gel coating option	 0 %RH to 95 %RH, non-condensing 0 %RH to 100 %RH, condensing 0 %RH to 95 %RH, non-condensing
Vibration	MIL-STD-202G, Method 204D, Condition B (15 g, 10 Hz to 2 kHz)
Shock	MIL-STD-202G, Method 213B, Condition C (100 g, 6 ms duration)
Life[1]	1 million pressure cycles min.
ESD	MIL-STD-883 Method 3015.7
Solder reflow	J-STD-020E, MSL 1, unlimited storage life
Certification (silicone gel coating option: Port 1 only)	NSF- 169, BPA Free, LFGB

[1]Life may vary depending on specific application in which the sensor is utilized.

Table 5. Wetted Materials[1]

Component	Pressure Port 1 (P1)		Pressure Port 2 (P2)
	No Gel Coating in Media Path	Silicone Gel Coating in Media Path (Food Grade)	
Ports and covers	high temperature polyamide		
Substrate	alumina ceramic	–	alumina ceramic
Adhesives	epoxy, silicone	epoxy, silicone gel	epoxy, silicone
Electronic components	silicon, gold, glass, solder, aluminum	304SST	silicon

[1]Contact Honeywell Customer Service for detailed material information.

CAUTION

MISUSE OF GEL COATING OPTION

- **No gel coating in media path:** The input port is limited to non-corrosive, non-ionic media such as dry air and gases and should not be exposed to condensation. The gases are limited to media which are compatible with the following wetted materials of construction: high temperature polyamide, silicone, alumina ceramic, silicon, gold, and glass.
- **Silicone gel coating in media path:** The gel coated sensors use the same materials in the wetted media path but are protected from condensation by a silicone-based gel coating. The gel coating option allows use in applications where condensation can occur.

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

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Basic Board Mount Pressure Sensors

TBP Series, Compensated/Unamplified
NBP Series, Uncompensated/Unamplified

Figure 1. TBP Series Nomenclature and Order Guide (Part order quantity must meet MOQ requirements.)

For example, **TBPDANN150PGUCV** defines a TBP Series Basic Board Mount Pressure Sensor, DIP package, AN pressure port, no gel coating in media path, 150 psi gage pressure range, unamplified, compensated, constant supply voltage.

TBP D AN N 150PG U C V

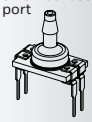
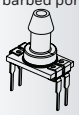
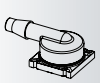
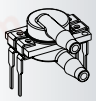
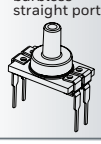
Series

TBP	

Package

L	Leadless SMT (Surface Mount Technology)
M	SMT (Surface Mount Technology)
D	DIP (Dual Inline Pin)

Pressure Port

Leadless SMT	SMT	DIP
AN Single axial small barbed port 	**AN** Single axial small barbed port 	**AN** Single axial small barbed port 
–	–	**JJ** Dual radial barbless port 
JN Single radial barbless port 	**JN** Single radial barbless port 	**JN** Single radial barbless port 
KN Single axial large barbed port 	**KN** Single axial large barbed port 	**KN** Single axial large barbed port 
LN Single axial barbless port 	**LN** Single axial barbless port 	**LN** Single axial barbless port 
PN Low-profile port 	**PN** Low-profile port 	**PN** Low-profile port 
RN Single radial barbed port 	**RN** Single radial barbed port 	**RN** Single radial barbed port 
–	–	**RR** Dual radial barbed port 
VN Single axial barbless straight port 	**VN** Single axial barbless straight port 	**VN** Single axial barbless straight port 

Supply Voltage

V	Constant

Compensation

C	Compensated

Output

U	Unamplified

Pressure Range[1, 2]

60 mbar to 10 bar	6 kPa to 1 MPa	1 psi to 150 psi
Gage	*Gage*	*Gage*
060MG 0 mbar to 60 mbar	**006KG** 0 kPa to 6 kPa	**001PG** 0 psi to 1 psi
100MG 0 mbar to 100 mbar	**010KG** 0 kPa to 10 kPa	**005PG** 0 psi to 5 psi
160MG 0 mbar to 160 mbar	**016KG** 0 kPa to 16 kPa	**015PG** 0 psi to 15 psi
250MG 0 mbar to 250 mbar	**025KG** 0 kPa to 25 kPa	**030PG** 0 psi to 30 psi
400MG 0 bar to 400 mbar	**040KG** 0 kPa to 40 kPa	**060PG** 0 psi to 60 psi
600MG 0 bar to 600 mbar	**060KG** 0 kPa to 60 kPa	**100PG** 0 psi to 100 psi
001BG 0 bar to 1 bar	**100KG** 0 kPa to 100 kPa	**150PG** 0 psi to 150 psi
1.6BG 0 bar to 1.6 bar	**160KG** 0 kPa to 160 kPa	
2.5BG 0 bar to 2.5 bar	**250KG** 0 kPa to 250 kPa	
004BG 0 bar to 4 bar	**400KG** 0 kPa to 400 kPa	
006BG 0 bar to 6 bar	**600KG** 0 kPa to 600 kPa	
010BG 0 bar to 10 bar	**001GG** 0 kPa to 1 MPa	
Differential	*Differential*	*Differential*
060MD ±60 mbar	**006KD** ±6 kPa	**001PD** ±1 psi
100MD ±100 mbar	**010KD** ±10 kPa	**005PD** ±5 psi
160MD ±160 mbar	**016KD** ±16 kPa	**015PD** ±15 psi
250MD ±250 mbar	**025KD** ±25 kPa	**030PD** ±30 psi
400MD ±400 mbar	**040KD** ±40 kPa	**060PD** ±60 psi
600MD ±600 mbar	**060KD** ±60 kPa	
001BD ±1 bar	**100KD** ±100 kPa	
1.6BD ±1.6 bar	**160KD** ±160 kPa	
2.5BD ±2.5 bar	**250KD** ±250 kPa	
004BD ±4 bar	**400KD** ±400 kPa	

Gel Coating

N	No gel coating in media path
S	Silicone gel coating in media path (food grade)

[1]Custom pressure ranges are available. Contact Honeywell Customer Service for more information.
[2]See Table 2 for an explanation of pressure types.

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NBP Series, Uncompensated/Unamplified

Figure 2. NBP Series Nomenclature and Order Guide (Part order quantity must meet MOQ requirements.)

For example, **NBPDANN150PGUNV** defines an NBP Series Basic Board Mount Pressure Sensor, DIP package, AN pressure port, no gel coating in media path, 150 psi gage pressure range, unamplified, uncompensated, constant supply voltage.

NBP D AN N 150PG U N V

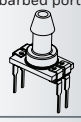
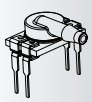
Series

NBP

Package

L	Leadless SMT (Surface Mount Technology)
M	SMT (Surface Mount Technology)
D	DIP (Dual Inline Pin)

Pressure Port

Leadless SMT	SMT	DIP
AN Single axial small barbed port 	**AN** Single axial small barbed port 	**AN** Single axial small barbed port 
-	-	**JJ** Dual radial barbless port 
JN Single radial barbless port 	**JN** Single radial barbless port 	**JN** Single radial barbless port 
KN Single axial large barbed port 	**KN** Single axial large barbed port 	**KN** Single axial large barbed port 
LN Single axial barbless port 	**LN** Single axial barbless port 	**LN** Single axial barbless port 
PN Low-profile port 	**PN** Low-profile port 	**PN** Low-profile port 
RN Single radial barbed port 	**RN** Single radial barbed port 	**RN** Single radial barbed port 
-	-	**RR** Dual radial barbed port 
VN Single axial barbless straight port 	**VN** Single axial barbless straight port 	**VN** Single axial barbless straight port 

Supply Voltage

V	Constant

Compensation

N	Uncompensated

Output

U	Unamplified

Pressure Range[1, 2]

60 mbar to 10 bar Absolute		1 psi to 150 psi Absolute	
001BA	0 bar to 1 bar	**015PA**	0 psi to 15 psi
1.6BA	0 bar to 1.6 bar	**030PA**	0 psi to 30 psi
2.5BA	0 bar to 2.5 bar	**060PA**	0 psi to 60 psi
004BA	0 bar to 4 bar	**100PA**	0 psi to 100 psi
006BA	0 bar to 6 bar	**150PA**	0 psi to 150 psi
010BA	0 bar to 10 bar		
Gage		*Gage*	
060MG	0 mbar to 60 mbar	**001PG**	0 psi to 1 psi
100MG	0 mbar to 100 mbar	**005PG**	0 psi to 5 psi
160MG	0 mbar to 160 mbar	**015PG**	0 psi to 15 psi
250MG	0 mbar to 250 mbar	**030PG**	0 psi to 30 psi
400MG	0 bar to 400 mbar	**060PG**	0 psi to 60 psi
600MG	0 bar to 600 mbar	**100PG**	0 psi to 100 psi
001BG	0 bar to 1 bar	**150PG**	0 psi to 150 psi
1.6BG	0 bar to 1.6 bar		
2.5BG	0 bar to 2.5 bar		
004BG	0 bar to 4 bar		
006BG	0 bar to 6 bar		
010BG	0 bar to 10 bar		
Differential		*Differential*	
060MD	±60 mbar	**001PD**	±1 psi
100MD	±100 mbar	**005PD**	±5 psi
160MD	±160 mbar	**015PD**	±15 psi
250MD	±250 mbar	**030PD**	±30 psi
400MD	±400 mbar	**060PD**	±60 psi
600MD	±600 mbar		
001BD	±1 bar		
1.6BD	±1.6 bar		
2.5BD	±2.5 bar		
004BD	±4 bar		

Gel Coating

N	No gel coating in media path
S	Silicone gel coating in media path (food grade)

[1]Custom pressure ranges are available. Contact Honeywell Customer Service for more information.
[2]See Table 2 for an explanation of pressure types.

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NBP Series, Uncompensated/Unamplified

Table 6. TBP Series Pressure Range Specifications for 60 mbar to 10 bar

Pressure Range Order Code (see Figure 1)	Pressure Range		Unit	Over-Pressure[1]		Burst Pressure[2]		Common Mode Pressure[3]	Pressure Accuracy (%FSS)[4]	Offset (mV/V)[5]	Full Scale Span (mV/V)[6]			Thermal Effect on Offset (%FSS)[7]		Thermal Effect on Span (%FSS)[8]		Long-Term Stability 1000 hr at 25°C (%FSS)	Thermal Hysteresis No Gel Option (%FSS)[9]	Thermal Hysteresis Silicone Gel Option (%FSS)[9]
	Pmin.	Pmax.		Port 1	Port 2	Port 1	Port 2				Min.	Nom.	Max.	10°C to 50°C	0°C to 85°C	10°C to 50°C	0°C to 85°C			
Gage																				
060MG	0	60	mbar	872	–	1370	–	–	±0.20	±0.075	1.23	1.30	1.40	±1.15	±2.35	±1.00	±2.00	±0.45	±0.40	±0.60
100MG	0	100	mbar	872	–	1370	–	–	±0.20	±0.075	2.06	2.20	2.33	±0.70	±1.40	±1.00	±2.00	±0.30	±0.25	±0.35
160MG	0	160	mbar	2000	–	4000	–	–	±0.15	±0.12	2.18	2.30	2.46	±1.65	±3.30	±0.75	±2.00	±0.55	±0.35	±0.55
250MG	0	250	mbar	2000	–	4000	–	–	±0.15	±0.12	3.41	3.65	3.85	±1.05	±2.10	±0.75	±2.00	±0.35	±0.20	±0.35
400MG	0	400	mbar	2000	–	4000	–	–	±0.15	±0.12	5.45	5.80	6.15	±0.65	±1.30	±0.75	±2.00	±0.20	±0.15	±0.20
600MG	0	600	mbar	4000	–	8000	–	–	±0.15	±0.075	2.94	3.05	3.18	±0.85	±1.65	±0.50	±1.25	±0.40	±0.15	±0.35
001BG	0	1	bar	4	–	8	–	–	±0.15	±0.075	4.90	5.10	5.30	±0.50	±1.00	±0.50	±1.25	±0.25	±0.10	±0.20
1.6BG	0	1.6	bar	4	–	8	–	–	±0.15	±0.075	7.84	8.15	8.48	±0.30	±0.65	±0.50	±1.25	±0.15	±0.10	±0.15
2.5BG	0	2.5	bar	8	–	17	–	–	±0.15	±0.075	6.10	6.35	6.59	±0.40	±0.80	±0.50	±1.50	±0.20	±0.10	±0.15
004BG	0	4	bar	10	–	17	–	–	±0.15	±0.075	5.57	5.80	6.04	±0.50	±1.00	±0.50	±1.25	±0.25	±0.10	±0.20
006BG	0	6	bar	17	–	21	–	–	±0.15	±0.075	5.08	5.30	5.54	±0.65	±1.00	±0.50	±1.00	±0.25	±0.15	±0.25
010BG	0	10	bar	17	–	21	–	–	±0.15	±0.075	8.47	8.85	9.22	±0.40	±0.60	±0.50	±1.00	±0.15	±0.10	±0.15
Differential																				
060MD	-60	60	mbar	872	872	1370	1370	10000	±0.20	±0.075	2.46	2.60	2.80	±0.60	±1.20	±1.00	±2.00	±0.25	±0.20	±0.30
100MD	-100	100	mbar	872	872	1370	1370	10000	±0.20	±0.075	4.12	4.40	4.66	±0.35	±0.70	±1.00	±2.00	±0.15	±0.15	±0.20
160MD	-160	160	mbar	2000	2000	4000	4000	10000	±0.15	±0.12	4.36	4.60	4.92	±0.85	±1.65	±0.75	±2.00	±0.30	±0.20	±0.30
250MD	-250	250	mbar	2000	2000	4000	4000	10000	±0.15	±0.12	6.82	7.30	7.70	±0.55	±1.05	±0.75	±2.00	±0.20	±0.10	±0.20
400MD	-400	400	mbar	2000	2000	4000	4000	10000	±0.15	±0.12	10.90	11.60	12.30	±0.35	±0.65	±0.75	±2.00	±0.10	±0.10	±0.10
600MD	-600	600	mbar	4000	4000	8000	8000	10000	±0.15	±0.075	5.88	6.10	6.36	±0.45	±0.85	±0.50	±1.25	±0.20	±0.10	±0.20
001BD	-1	1	bar	4	4	8	8	10	±0.15	±0.075	9.80	10.20	10.60	±0.25	±0.50	±0.50	±1.25	±0.15	±0.10	±0.10
1.6BD	-1.6	1.6	bar	4	4	8	8	10	±0.15	±0.075	15.68	16.30	16.96	±0.15	±0.35	±0.50	±1.25	±0.10	±0.10	±0.10
2.5BD	-2.5	2.5	bar	8	8	17	17	10	±0.15	±0.075	12.20	12.70	13.18	±0.20	±0.40	±0.50	±1.50	±0.10	±0.10	±0.10
004BD	-4	4	bar	10	10	17	17	15	±0.15	±0.075	11.14	11.60	12.08	±0.25	±0.50	±0.50	±1.25	±0.15	±0.10	±0.10

[1]**Overpressure:** The maximum pressure which may safely be applied to the product for it to remain within specifications 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 within the operating temperature range.

[2]**Burst pressure:** The maximum pressure that may be applied to the specified port (P1 or P2) 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.

[3]**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.

[4]**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. Includes all errors due to pressure non-linearity, pressure hysteresis, and non-repeatability.

[5]**Offset:** The output signal obtained when the reference pressure is applied to all available pressure ports. Also known as "null" or "zero".

[6]**Full Scale Span:** The algebraic difference between the output signal measured at the maximum and minimum limits of the pressure range (see Figure 1) for pressure ranges).

[7]**Thermal effect on offset:** The deviation in offset due to changes in temperature over the compensated temperature range, relative to offset measured at 25°C.

[8]**Thermal effect on span:** The deviation in full scale span due to changes in temperature over the compensated temperature range, relative to full scale span measured at 25°C.

[9]**Thermal hysteresis:** The maximum difference between output readings when the same temperature is reached consecutively, under the same operating conditions, with temperature approaching from opposite directions within the operating temperature range. Validated over the full operating temperature and pressure ranges using a ~5°C/ minute ramp and 30 minute dwell. Application performance may be affected by thermal mass of end user system.

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Table 7. TBP Series Pressure Range Specifications for 6 kPa to 1 MPa

Pressure Range Order Code (see Figure 1)	Pressure Range		Unit	Over-Pressure[1]		Burst Pressure[2]		Common Mode Pressure[3]	Pressure Accuracy (%FSS)[4]	Offset (mV/V)[5]	Full Scale Span (mV/V)[6]			Thermal Effect on Offset (%FSS)[7]		Thermal Effect on Span (%FSS)[8]		Long-Term Stability 1000 hr at 25°C (%FSS)	Thermal Hysteresis No Gel Option (%FSS)[9]	Thermal Hysteresis Silicone Gel Option (%FSS)[9]
	Pmin.	Pmax.		Port 1	Port 2	Port 1	Port 2				Min.	Nom.	Max.	10°C to 50°C	0°C to 85°C	10°C to 50°C	0°C to 85°C			
Gage																				
006KG	0	6	kPa	87	–	137	–	–	±0.20	±0.075	1.23	1.30	1.40	±1.15	±2.35	±1.00	±2.00	±0.45	±0.40	±0.60
010KG	0	10	kPa	87	–	137	–	–	±0.20	±0.075	2.06	2.20	2.33	±0.70	±1.40	±1.00	±2.00	±0.30	±0.25	±0.35
016KG	0	16	kPa	200	–	400	–	–	±0.15	±0.12	2.18	2.30	2.46	±1.65	±3.30	±0.75	±2.00	±0.55	±0.35	±0.55
025KG	0	25	kPa	200	–	400	–	–	±0.15	±0.12	3.41	3.65	3.85	±1.05	±2.10	±0.75	±2.00	±0.35	±0.20	±0.35
040KG	0	40	kPa	200	–	400	–	–	±0.15	±0.12	5.45	5.80	6.15	±0.65	±1.30	±0.75	±2.00	±0.20	±0.15	±0.20
060KG	0	60	kPa	400	–	800	–	–	±0.15	±0.075	2.94	3.05	3.18	±0.85	±1.65	±0.50	±1.25	±0.40	±0.15	±0.35
100KG	0	100	kPa	400	–	800	–	–	±0.15	±0.075	4.90	5.10	5.30	±0.50	±1.00	±0.50	±1.25	±0.25	±0.10	±0.20
160KG	0	160	kPa	400	–	800	–	–	±0.15	±0.075	7.84	8.15	8.48	±0.30	±0.65	±0.50	±1.25	±0.15	±0.10	±0.15
250KG	0	250	kPa	800	–	1700	–	–	±0.15	±0.075	6.10	6.35	6.59	±0.40	±0.80	±0.50	±1.50	±0.20	±0.10	±0.15
400KG	0	400	kPa	1000	–	1700	–	–	±0.15	±0.075	5.57	5.80	6.04	±0.50	±1.00	±0.50	±1.25	±0.25	±0.10	±0.20
600KG	0	600	kPa	1700	–	2100	–	–	±0.15	±0.075	5.08	5.30	5.54	±0.65	±1.00	±0.50	±1.00	±0.25	±0.15	±0.25
001GG	0	1	MPa	1.70	–	2.10	–	–	±0.15	±0.075	8.47	8.85	9.22	±0.40	±0.60	±0.50	±1.00	±0.15	±0.10	±0.15
Differential																				
006KD	-6	6	kPa	87	87	137	137	1000	±0.20	±0.075	2.46	2.60	2.80	±0.60	±1.20	±1.00	±2.00	±0.25	±0.20	±0.30
010KD	-10	10	kPa	87	87	137	137	1000	±0.20	±0.075	4.12	4.40	4.66	±0.35	±0.70	±1.00	±2.00	±0.15	±0.15	±0.20
016KD	-16	16	kPa	200	200	400	400	1000	±0.15	±0.12	4.36	4.60	4.92	±0.85	±1.65	±0.75	±2.00	±0.30	±0.20	±0.30
025KD	-25	25	kPa	200	200	400	400	1000	±0.15	±0.12	6.82	7.30	7.70	±0.55	±1.05	±0.75	±2.00	±0.20	±0.10	±0.20
040KD	-40	40	kPa	200	200	400	400	1000	±0.15	±0.12	10.90	11.60	12.30	±0.35	±0.65	±0.75	±2.00	±0.10	±0.10	±0.10
060KD	-60	60	kPa	400	400	800	800	1000	±0.15	±0.075	5.88	6.10	6.36	±0.45	±0.85	±0.50	±1.25	±0.20	±0.10	±0.20
100KD	-100	100	kPa	400	400	800	800	1000	±0.15	±0.075	9.80	10.20	10.60	±0.25	±0.50	±0.50	±1.25	±0.15	±0.10	±0.10
160KD	-160	160	kPa	400	400	800	800	1000	±0.15	±0.075	15.68	16.30	16.96	±0.15	±0.35	±0.50	±1.25	±0.10	±0.10	±0.10
250KD	-250	250	kPa	800	800	1700	1700	1000	±0.15	±0.075	12.20	12.70	13.18	±0.20	±0.40	±0.50	±1.50	±0.10	±0.10	±0.10
400KD	-400	400	kPa	1000	1000	1700	1700	1500	±0.15	±0.075	11.14	11.60	12.08	±0.25	±0.50	±0.50	±1.25	±0.15	±0.10	±0.10

[1]**Overpressure:** The maximum pressure which may safely be applied to the product for it to remain within specifications 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 within the operating temperature range.

[2]**Burst pressure:** The maximum pressure that may be applied to the specified port (P1 or P2) 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.

[3]**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.

[4]**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. Includes all errors due to pressure non-linearity, pressure hysteresis, and non-repeatability.

[5]**Offset:** The output signal obtained when the reference pressure is applied to all available pressure ports. Also known as "null" or "zero".

[6]**Full Scale Span:** The algebraic difference between the output signal measured at the maximum and minimum limits of the pressure range (see Figure 1) for pressure ranges).

[7]**Thermal effect on offset:** The deviation in offset due to changes in temperature over the compensated temperature range, relative to offset measured at 25°C.

[8]**Thermal effect on span:** The deviation in full scale span due to changes in temperature over the compensated temperature range, relative to full scale span measured at 25°C.

[9]**Thermal hysteresis:** The maximum difference between output readings when the same temperature is reached consecutively, under the same operating conditions, with temperature approaching from opposite directions within the operating temperature range. Validated over the full operating temperature and pressure ranges using a ~5°C/ minute ramp and 30 minute dwell. Application performance may be affected by thermal mass of end user system.

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TBP Series, Compensated/Unamplified
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Table 8. TBP Series Pressure Range Specifications for 1 psi to 150 psi

Pressure Range Order Code (see Figure 1)	Pressure Range		Unit	Over-Pressure[1]		Burst Pressure[2]		Common Mode Pressure[3]	Pressure Accuracy (%FSS)[4]	Offset (mV/V)[5]	Full Scale Span (mV/V)[6]			Thermal Effect on Offset (%FSS)[7]		Thermal Effect on Span (%FSS)[8]		Long-Term Stability 1000 hr at 25°C (%FSS)	Thermal Hysteresis No Gel Option (%FSS)[9]	Thermal Hysteresis Silicone Gel Option (%FSS)[9]
	Pmin.	Pmax.		Port 1	Port 2	Port 1	Port 2				Min.	Nom.	Max.	10°C to 50°C	0°C to 85°C	10°C to 50°C	0°C to 85°C			
Gage																				
001PG	0	1	psi	12.7	–	20	–	–	±0.20	±0.075	1.42	1.50	1.61	±1.00	±2.05	±1.00	±2.00	±0.40	±0.35	±0.50
005PG	0	5	psi	30	–	60	–	–	±0.15	±0.12	4.70	5.00	5.30	±0.75	±1.50	±0.75	±2.00	±0.25	±0.15	±0.25
015PG	0	15	psi	60	–	115	–	–	±0.15	±0.075	5.06	5.25	5.49	±0.50	±0.95	±0.50	±1.25	±0.25	±0.10	±0.20
030PG	0	30	psi	115	–	245	–	–	±0.15	±0.075	5.05	5.25	5.45	±0.50	±0.95	±0.50	±1.50	±0.25	±0.10	±0.20
060PG	0	60	psi	145	–	245	–	–	±0.15	±0.075	5.76	6.00	6.24	±0.50	±0.95	±0.50	±1.25	±0.25	±0.10	±0.20
100PG	0	100	psi	245	–	300	–	–	±0.15	±0.075	5.83	6.10	6.36	±0.60	±0.85	±0.50	±1.00	±0.25	±0.10	±0.25
150PG	0	150	psi	245	–	300	–	–	±0.15	±0.075	8.75	9.15	9.54	±0.40	±0.60	±0.50	±1.00	±0.15	±0.10	±0.15
Differential																				
001PD	-1	1	psi	12.7	12.7	20	20	150	±0.20	±0.075	2.84	3.00	3.22	±0.50	±1.05	±1.00	±2.00	±0.20	±0.20	±0.25
005PD	-5	5	psi	30	30	60	60	150	±0.15	±0.12	9.40	10.00	10.60	±0.40	±0.75	±0.75	±2.00	±0.15	±0.10	±0.15
015PD	-15	15	psi	60	60	115	115	150	±0.15	±0.075	10.12	10.50	10.98	±0.25	±0.50	±0.50	±1.25	±0.15	±0.10	±0.10
030PD	-30	30	psi	115	115	245	245	150	±0.15	±0.075	10.10	10.50	10.90	±0.25	±0.50	±0.50	±1.50	±0.15	±0.10	±0.10
060PD	-60	60	psi	145	145	245	245	250	±0.15	±0.075	11.52	12.00	12.48	±0.25	±0.50	±0.50	±1.25	±0.15	±0.10	±0.10

[1]**Overpressure:** The maximum pressure which may safely be applied to the product for it to remain within specifications 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 within the operating temperature range.

[2]**Burst pressure:** The maximum pressure that may be applied to the specified port (P1 or P2) 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.

[3]**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.

[4]**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. Includes all errors due to pressure non-linearity, pressure hysteresis, and non-repeatability.

[5]**Offset:** The output signal obtained when the reference pressure is applied to all available pressure ports. Also known as "null" or "zero".

[6]**Full Scale Span:** The algebraic difference between the output signal measured at the maxumum and minimum limits of the pressure range (see Figure 1) for pressure ranges).

[7]**Thermal effect on offset:** The deviation in offset due to changes in temperature over the compensated temperature range, relative to offset measured at 25°C.

[8]**Thermal effect on span:** The deviation in full scale span due to changes in temperature over the compensated temperature range, relative to full scale span measured at 25°C.

[9]**Thermal hysteresis:** The maximum difference between output readings when the same temperature is reached consecutively, under the same operating conditions, with temperature approaching from opposite directions within the operating temperature range. Validated over the full operating temperature and pressure ranges using a ~5°C/ minute ramp and 30 minute dwell. Application performance may be affected by thermal mass of end user system.

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Table 9. NBP Series Pressure Range Specifications for 60 mbar to 10 bar

Pressure Range (see Figure 2)	Pressure Range		Unit	Over-Pressure[1]		Burst Pressure[2]		Common Mode Pressure[3]	Offset[4] (mV/V)		Sensitivity (mV/V/Full Scale Span)			Thermal Effect on Offset (%FSS/25°C)[5]			Thermal Effect on Span (%FSS/25°C)[6]		
	Pmin.	Pmax.		Port 1	Port 2	Port 1	Port 2		Min.	Max.	Min.	Nom.	Max.	Min.	Nom.	Max.	Min.	Nom.	Max.
Absolute																			
001BA	0	1	bar	2	–	4	–	–	-7.0	7.0	10.0	15.0	20.0	-1.5	-0.5	1.5	-6.0	-5.0	-3.5
1.6BA	0	1.6	bar	4	–	8	–	–	-7.0	7.0	12.0	16.0	20.0	-1.5	-0.5	1.5	-6.0	-5.0	-3.5
2.5BA	0	2.5	bar	4	–	8	–	–	-7.0	7.0	18.8	25.0	31.3	-1.0	-0.3	1.0	-6.0	-5.0	-3.5
004BA	0	4	bar	8	–	16	–	–	-7.0	7.0	16.8	20.0	23.2	-1.0	-0.3	1.0	-6.0	-5.0	-3.5
006BA	0	6	bar	16	–	20	–	–	-7.0	7.0	12.6	15.0	17.4	-1.5	-0.4	1.5	-6.0	-5.0	-3.5
010BA	0	10	bar	16	–	20	–	–	-7.0	7.0	21.0	25.0	29.0	-1.0	-0.3	1.0	-6.0	-5.0	-3.5
Gage																			
060MG	0	60	mbar	850	–	1400	–	–	-8.5	8.5	3.9	5.7	7.4	-3.5	-1.2	3.5	-6.0	-5.0	-3.5
100MG	0	100	mbar	850	–	1400	–	–	-8.5	8.5	6.6	9.4	12.3	-2.1	-0.7	2.1	-6.0	-5.0	-3.5
160MG	0	160	mbar	850	–	1400	–	–	-8.5	8.5	10.5	15.1	19.7	-1.3	-0.4	1.3	-6.0	-5.0	-3.5
250MG	0	250	mbar	1800	–	3000	–	–	-8.5	8.5	7.3	10.9	14.5	-2.1	-0.7	2.1	-6.0	-5.0	-3.5
400MG	0	400	mbar	1800	–	3000	–	–	-8.5	8.5	11.7	17.4	23.2	-1.3	-0.4	1.3	-6.0	-5.0	-3.5
600MG	0	600	mbar	2000	–	4000	–	–	-7.0	7.0	6.0	9.0	12.0	-2.5	-1.0	2.5	-6.0	-5.0	-3.5
001BG	0	1	bar	2	–	4	–	–	-7.0	7.0	10.0	15.0	20.0	-1.5	-0.5	1.5	-6.0	-5.0	-3.5
1.6BG	0	1.6	bar	4	–	8	–	–	-7.0	7.0	12.0	16.0	20.0	-1.5	-0.5	1.5	-6.0	-5.0	-3.5
2.5BG	0	2.5	bar	4	–	8	–	–	-7.0	7.0	18.8	25.0	31.3	-1.0	-0.3	1.0	-6.0	-5.0	-3.5
004BG	0	4	bar	8	–	16	–	–	-7.0	7.0	16.8	20.0	23.2	-1.0	-0.3	1.0	-6.0	-5.0	-3.5
006BG	0	6	bar	16	–	20	–	–	-7.0	7.0	12.6	15.0	17.4	-1.5	-0.4	1.5	-6.0	-5.0	-3.5
010BG	0	10	bar	16	–	20	–	–	-7.0	7.0	21.0	25.0	29.0	-1.0	-0.3	1.0	-6.0	-5.0	-3.5
Differential																			
060MD	-60	60	mbar	850	850	1400	1400	10000	-8.5	8.5	7.8	11.4	14.8	-1.8	-0.6	1.8	-6.0	-5.0	-3.5
100MD	-100	100	mbar	850	850	1400	1400	10000	-8.5	8.5	13.2	18.8	24.6	-1.1	-0.4	1.1	-6.0	-5.0	-3.5
160MD	-160	160	mbar	850	850	1400	1400	10000	-8.5	8.5	21.0	30.2	39.4	-0.7	-0.2	0.7	-6.0	-5.0	-3.5
250MD	-250	250	mbar	1800	1800	3000	3000	10000	-8.5	8.5	14.6	21.8	29.0	-1.1	-0.4	1.1	-6.0	-5.0	-3.5
400MD	-400	400	mbar	1800	1800	3000	3000	10000	-8.5	8.5	23.4	34.8	46.4	-0.7	-0.2	0.7	-6.0	-5.0	-3.5
600MD	-600	600	mbar	2000	2000	4000	4000	10000	-7.0	7.0	12.0	18.0	24.0	-1.3	-0.5	1.3	-6.0	-5.0	-3.5
001BD	-1	1	bar	2	2	4	4	10	-7.0	7.0	20.0	30.0	40.0	-0.8	-0.3	0.8	-6.0	-5.0	-3.5
1.6BD	-1.6	1.6	bar	4	4	8	8	10	-7.0	7.0	24.0	32.0	40.0	-0.8	-0.3	0.8	-6.0	-5.0	-3.5
2.5BD	-2.5	2.5	bar	4	4	8	8	10	-7.0	7.0	37.6	50.0	62.6	-0.5	-0.2	0.5	-6.0	-5.0	-3.5
004BD	-4	4	bar	8	8	16	16	15	-7.0	7.0	33.6	40.0	46.4	-0.5	-0.2	0.5	-6.0	-5.0	-3.5

[1]**Overpressure:** The maximum pressure which may safely be applied to the product for it to remain within specifications 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 within the operating temperature range.

[2]**Burst pressure:** The maximum pressure that may be applied to the specified port (P1 or P2) 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.

[3]**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.

[4]**Offset:** The output signal obtained when the reference pressure is applied to all available pressure ports. Also known as "null" or "zero".

[5]**TCO (Thermal Effect on Offset):** The deviation in offset due to changes in temperature over the specified temperature range, relative to offset measured at 25°C.

[6]**TCS (Thermal Effect on Span):** The deviation in full scale span due to changes in temperature over the specified temperature range, relative to full scale span measured at 25°C.

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TBP Series, Compensated/Unamplified
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Table 10. NBP Series Pressure Range Specifications for 1 psi to 150 psi

Pressure Range (see Figure 2)	Pressure Range		Unit	Over-Pressure[1]		Burst Pressure[2]		Common Mode Pressure[3]	Offset[4] (mV/V)		Sensitivity (mV/V/Full Scale Span)			Thermal Effect on Offset (%FSS/25°C)[5]			Thermal Effect on Span (%FSS/25°C)[6]		
	Pmin.	Pmax.		Port 1	Port 2	Port 1	Port 2		Min.	Max.	Min.	Nom.	Max.	Min.	Nom.	Max.	Min.	Nom.	Max.
Absolute																			
015PA	0	15	psi	30	–	60	–	–	-7.0	7.0	10.3	15.0	20.7	-1.5	-0.6	1.5	-6.0	-5.0	-3.5
030PA	0	30	psi	60	–	120	–	–	-7.0	7.0	15.5	21.0	26.0	-1.0	-0.4	1.0	-6.0	-5.0	-3.5
060PA	0	60	psi	120	–	240	–	–	-7.0	7.0	17.4	21.0	24.0	-1.0	-0.3	1.0	-6.0	-5.0	-3.5
100PA	0	100	psi	240	–	300	–	–	-7.0	7.0	14.5	17.2	20.0	-1.0	-0.4	1.0	-6.0	-5.0	-3.5
150PA	0	150	psi	240	–	300	–	–	-7.0	7.0	21.7	26.0	30.0	-1.0	-0.3	1.0	-6.0	-5.0	-3.5
Gage																			
001PG	0	1	psi	10	–	20	–	–	-8.5	8.5	4.5	6.5	8.5	-3.0	-1.0	3.0	-6.0	-5.0	-3.5
005PG	0	5	psi	30	–	40	–	–	-8.5	8.5	10.0	15.0	20.0	-1.5	-0.5	1.5	-6.0	-5.0	-3.5
015PG	0	15	psi	30	–	60	–	–	-7.0	7.0	10.3	15.0	20.7	-1.5	-0.6	1.5	-6.0	-5.0	-3.5
030PG	0	30	psi	60	–	120	–	–	-7.0	7.0	15.5	21.0	26.0	-1.0	-0.4	1.0	-6.0	-5.0	-3.5
060PG	0	60	psi	120	–	240	–	–	-7.0	7.0	17.4	21.0	24.0	-1.0	-0.3	1.0	-6.0	-5.0	-3.5
100PG	0	100	psi	240	–	300	–	–	-7.0	7.0	14.5	17.2	20.0	-1.0	-0.4	1.0	-6.0	-5.0	-3.5
150PG	0	150	psi	240	–	300	–	–	-7.0	7.0	21.7	26.0	30.0	-1.0	-0.3	1.0	-6.0	-5.0	-3.5
Differential																			
001PD	-1	1	psi	10	10	20	20	150	-8.5	8.5	9.0	13.0	17.0	-1.5	-0.5	1.5	-6.0	-5.0	-3.5
005PD	-5	5	psi	30	30	40	40	150	-8.5	8.5	20.0	30.0	40.0	-0.8	-0.3	0.8	-6.0	-5.0	-3.5
015PD	-15	15	psi	30	30	60	60	150	-7.0	7.0	20.6	30.0	41.4	-0.8	-0.3	0.8	-6.0	-5.0	-3.5
030PD	-30	30	psi	60	60	120	120	150	-7.0	7.0	31.0	42.0	52.0	-0.5	-0.2	0.5	-6.0	-5.0	-3.5
060PD	-60	60	psi	120	120	240	240	250	-7.0	7.0	34.8	42.0	48.0	-0.5	-0.2	0.5	-6.0	-5.0	-3.5

[1]**Overpressure:** The maximum pressure which may safely be applied to the product for it to remain within specifications 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 within the operating temperature range.

[2]**Burst pressure:** The maximum pressure that may be applied to the specified port (P1 or P2) 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.

[3]**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.

[4]**Offset:** The output signal obtained when the reference pressure is applied to all available pressure ports. Also known as "null" or "zero".

[5]**TCO (Thermal Effect on Offset):** The deviation in offset due to changes in temperature over the specified temperature range, relative to offset measured at 25°C.

[6]**TCS (Thermal Effect on Span):** The deviation in full scale span due to changes in temperature over the specified temperature range, relative to full scale span.

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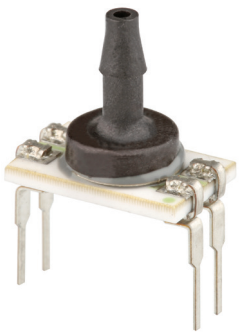
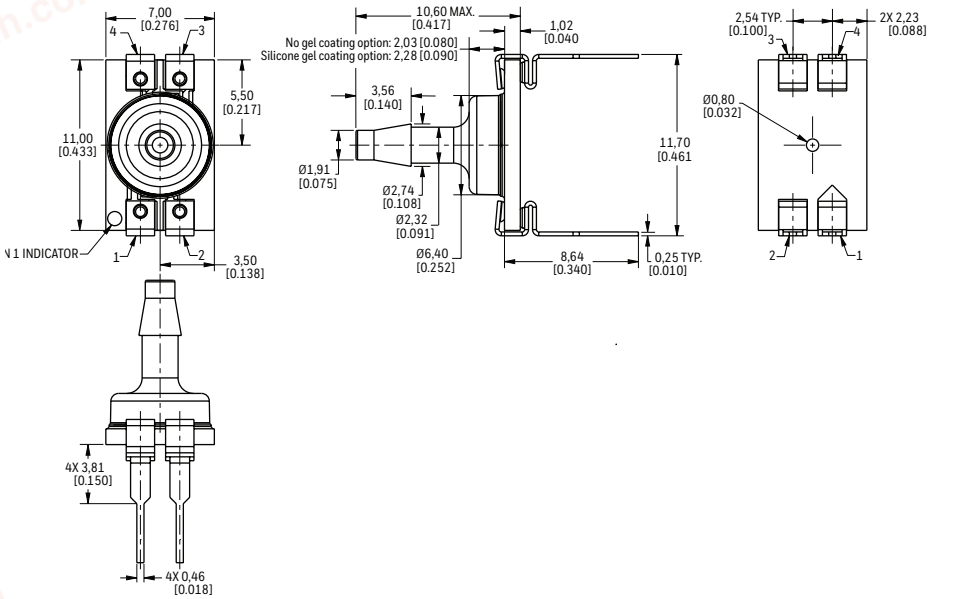
Basic Board Mount Pressure Sensors

TBP Series, Compensated/Unamplified
NBP Series, Uncompensated/Unamplified

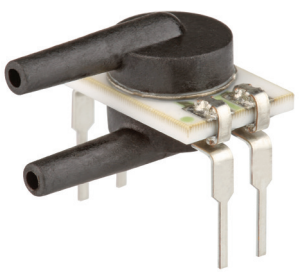
Figure 3. DIP Package Dimensional Drawings (For reference only: mm [in].)

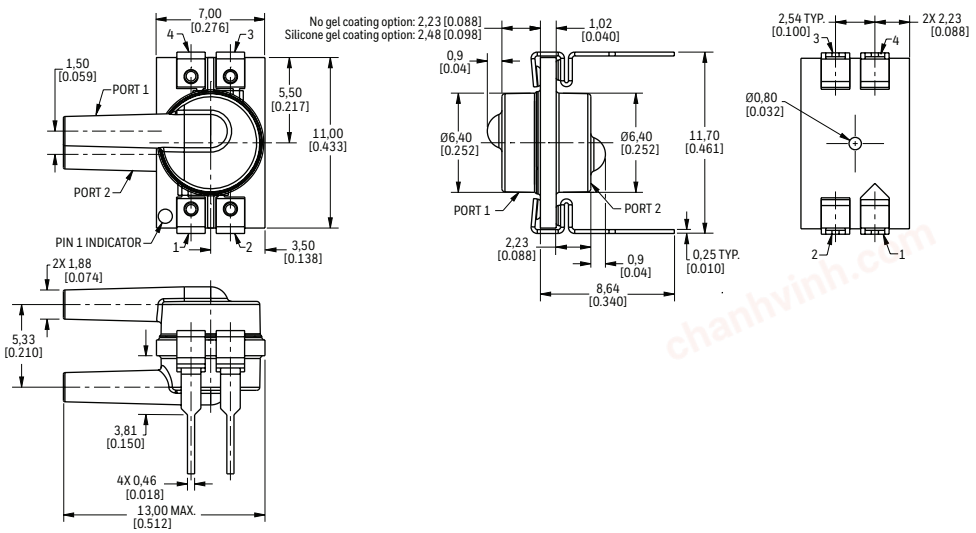
AN: Single axial small barbed port



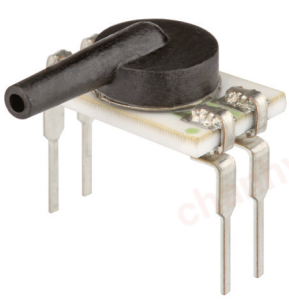


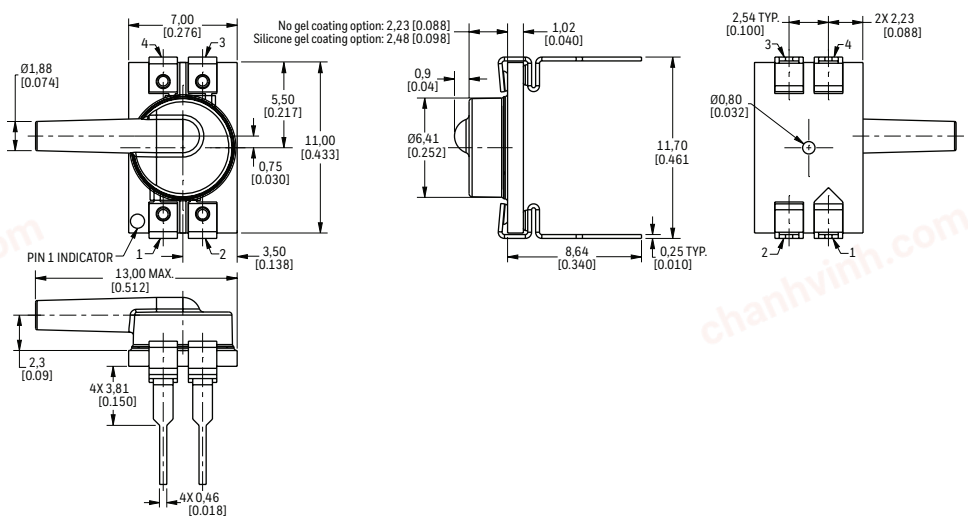
JJ: Dual radial barbless port





JN: Single radial barbless port





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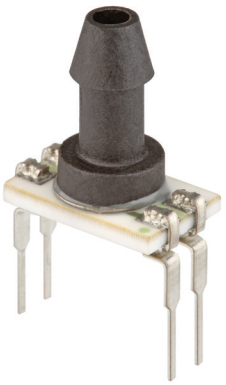
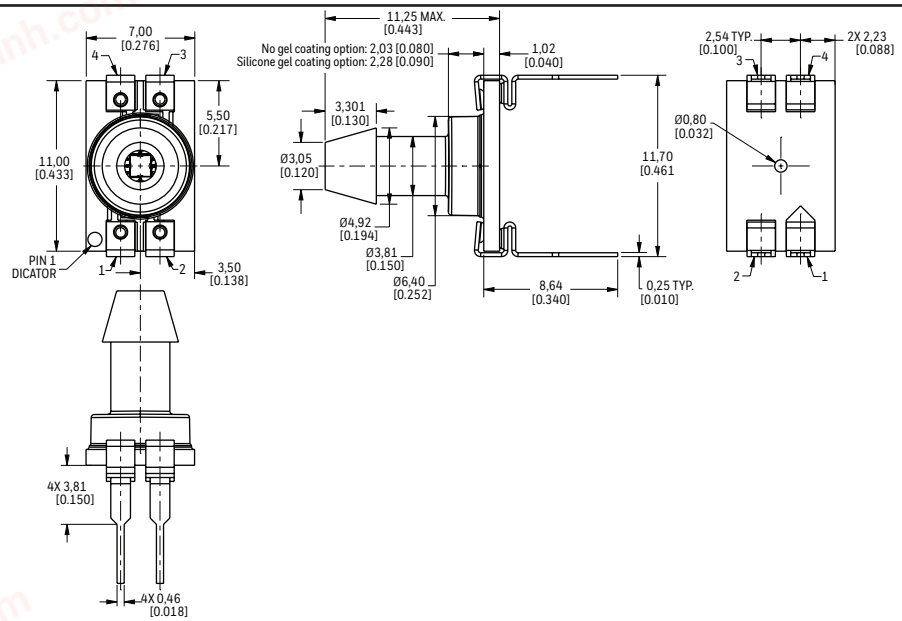
Basic Board Mount Pressure Sensors

TBP Series, Compensated/Unamplified
NBP Series, Uncompensated/Unamplified

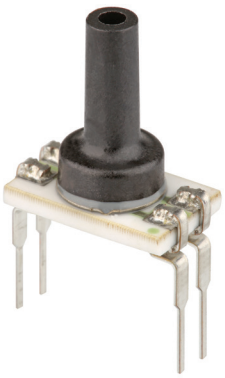
Figure 3. DIP Package Dimensional Drawings (For reference only: mm [in], continued.)

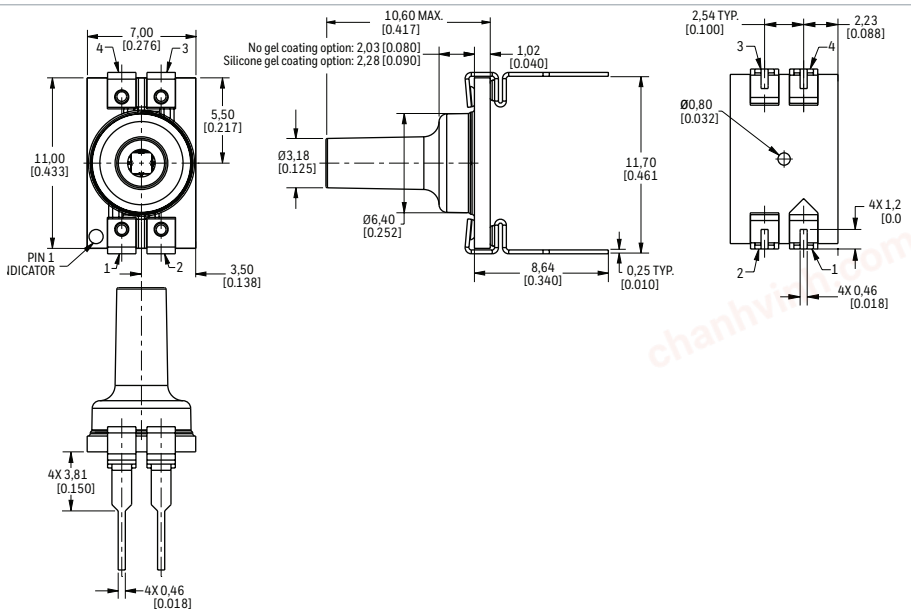
KN: Single axial large barbed port



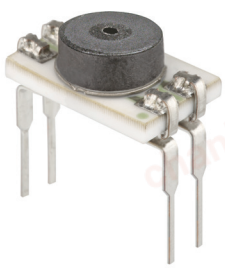


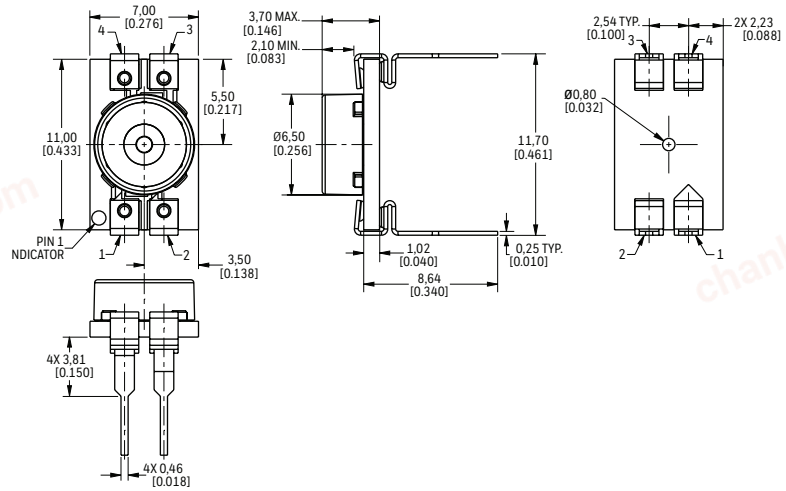
LN: Single axial barbless port





PN: Low-profile port





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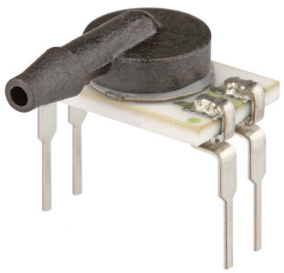
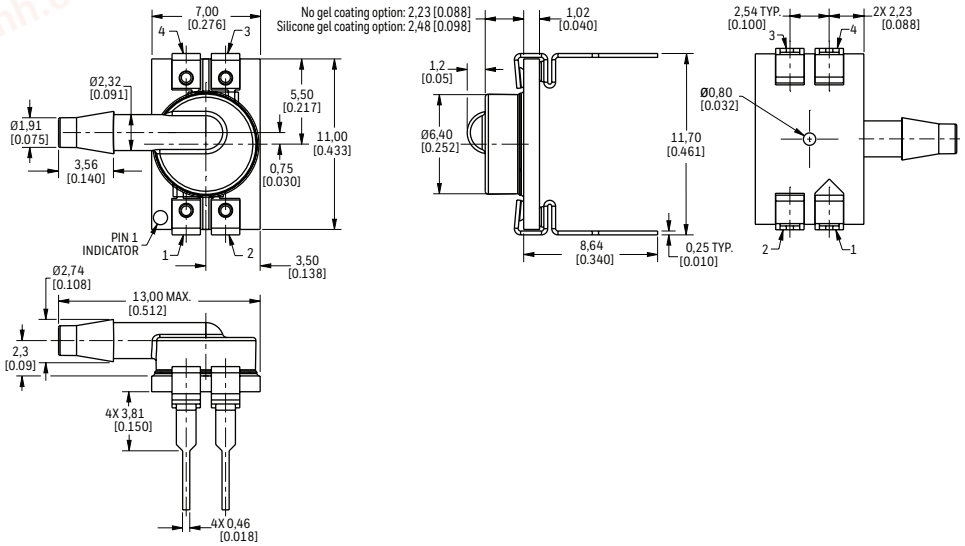
Basic Board Mount Pressure Sensors

TBP Series, Compensated/Unamplified
NBP Series, Uncompensated/Unamplified

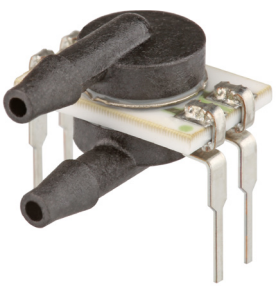
Figure 3. DIP Package Dimensional Drawings (For reference only: mm [in], continued.)

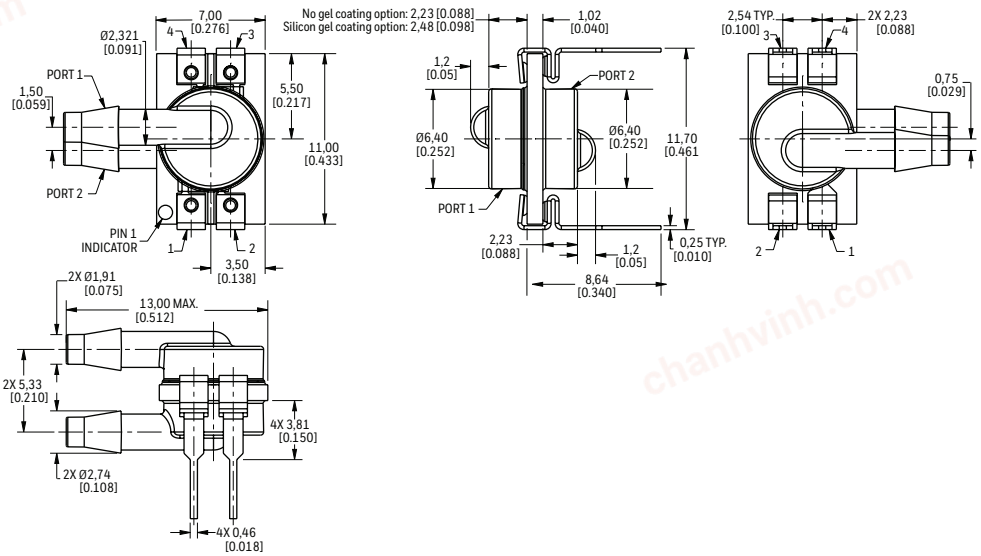
RN: Single radial barbed port



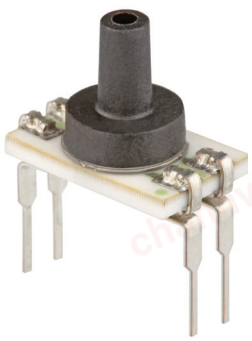


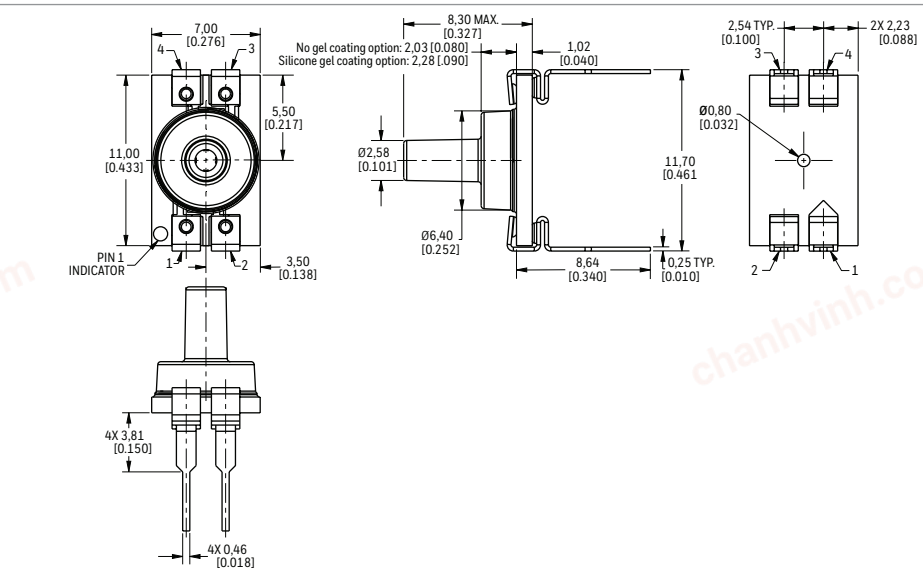
RR: Dual radial barbed port





VN: Single axial barbless straight port





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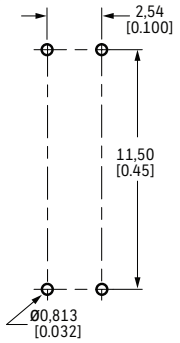
Basic Board Mount Pressure Sensors

TBP Series, Compensated/Unamplified
NBP Series, Uncompensated/Unamplified

Figure 3. DIP Package Dimensional Drawings (For reference only: mm [in], continued.)

Recommended PCB Pad Layout



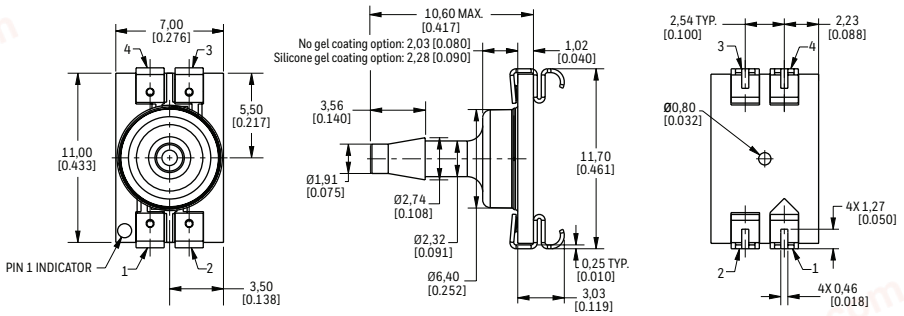
Pinout

Pin	Function
1	Vsupply
2	Vout-
3	GND
4	Vout+

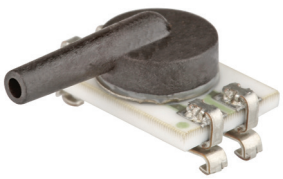
Figure 4. SMT Package Dimensional Drawings (For reference only: mm [in].)

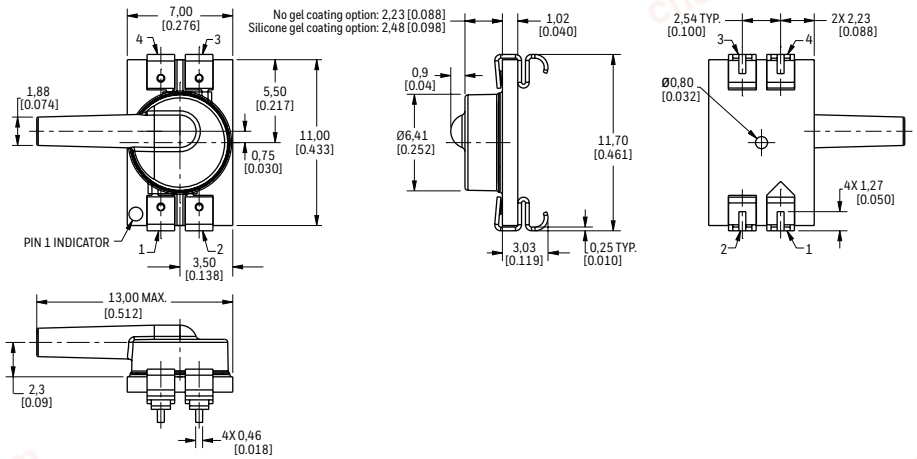
AN: Single axial small barbed port





JN: Single radial barbless port





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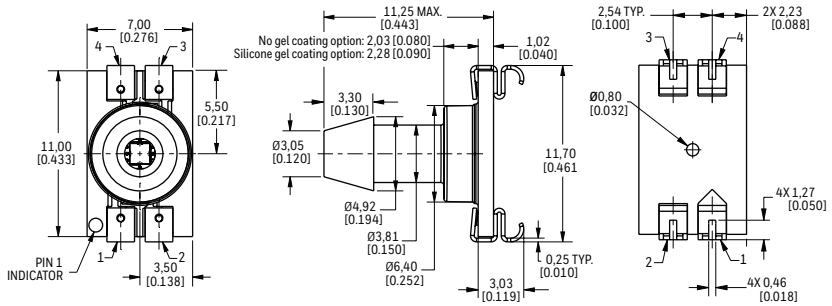
Basic Board Mount Pressure Sensors

TBP Series, Compensated/Unamplified
NBP Series, Uncompensated/Unamplified

Figure 4. SMT Package Dimensional Drawings (For reference only: mm [in], continued.)

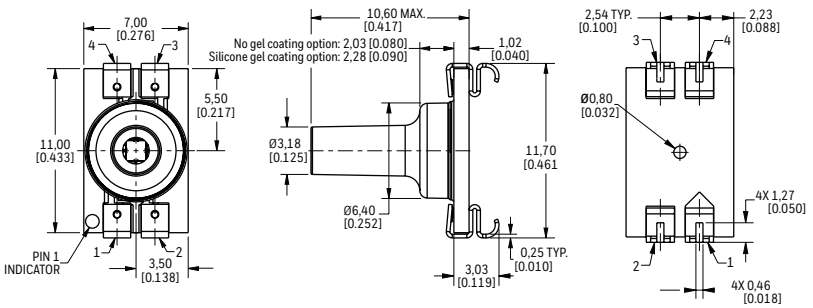
KN: Single axial large barbed port



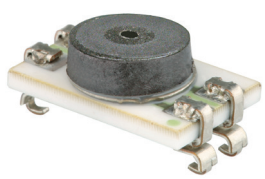


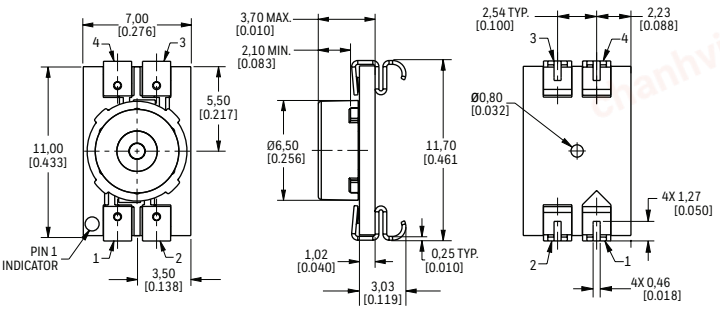
LN: Single axial barbless port



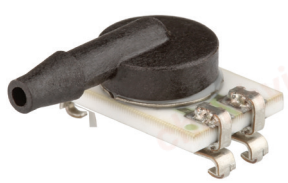


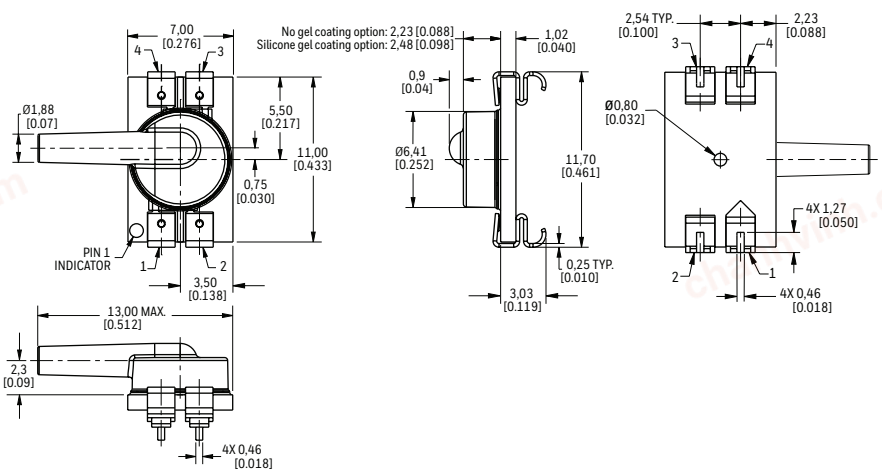
PN: Low-profile port





RN: Single radial barbed port





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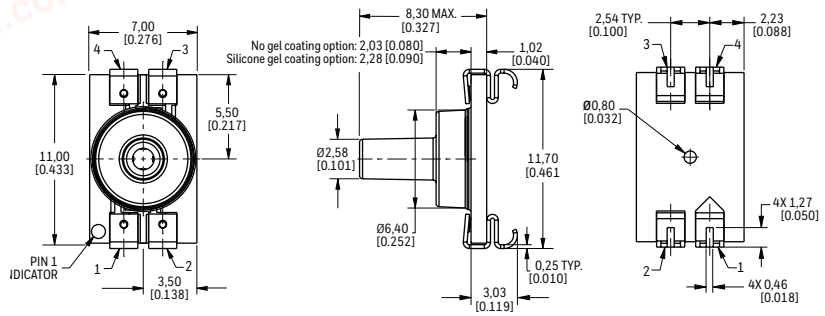
Basic Board Mount Pressure Sensors

TBP Series, Compensated/Unamplified
NBP Series, Uncompensated/Unamplified

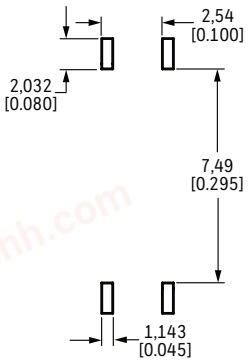
Figure 4. SMT Package Dimensional Drawings (For reference only: mm [in], continued.)

VN: Single axial barbless straight port





Recommended PCB Pad Layout



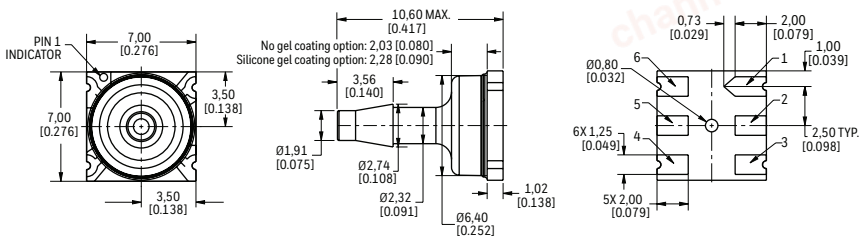
Pinout

Pin	Function
1	Vsupply
2	Vout-
3	GND
4	Vout+

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

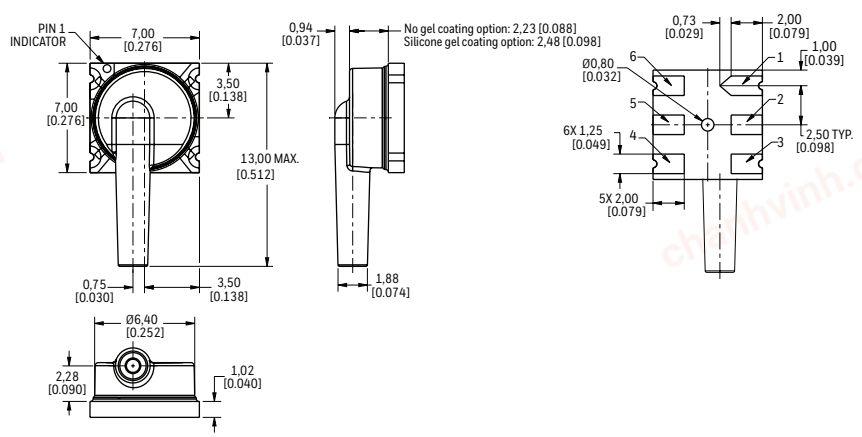
AN: Single axial small barbed port





JN: Single radial barbless port





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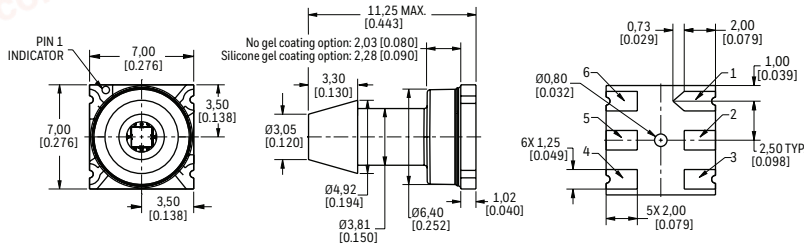
Basic Board Mount Pressure Sensors

TBP Series, Compensated/Unamplified
NBP Series, Uncompensated/Unamplified

Figure 5. Leadless SMT Package Dimensional Drawings (For reference only: mm [in], continued.)

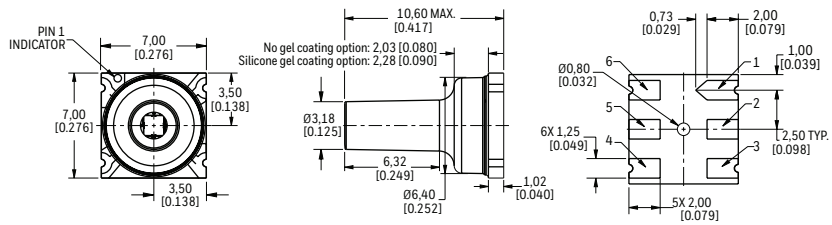
KN: Single axial large barbed port



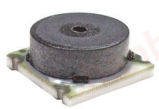


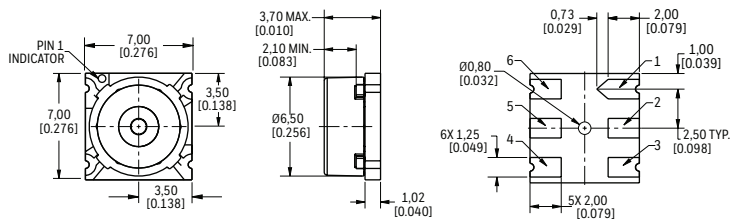
LN: Single axial barbless port





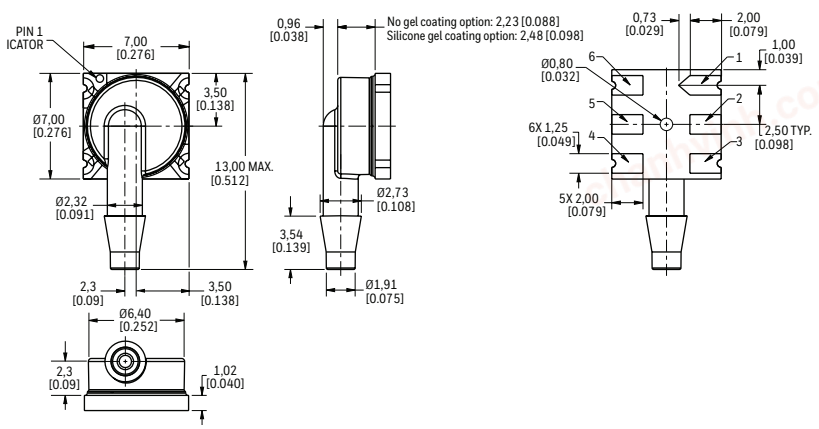
PN: Low-profile port





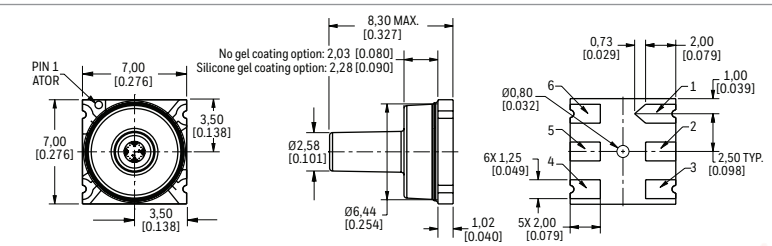
RN: Single radial barbed port



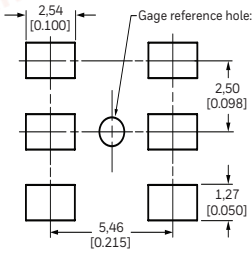


VN: Single axial barbless straight port





Recommended PCB Pad Layout



Pinout

Pin	Function
1	Vsupply
2	Vout-
3	GND
4	Vout+

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ADDITIONAL INFORMATION

The following associated literature is available on the Honeywell web site at sensing.honeywell.com:

- Board Mount Pressure Sensors Line Guide
- Airflow, Force, and Pressure Sensors Product Range Guide
- Product Installation Instructions
- Application-specific Information

⚠ 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 datasheet 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.

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