

Installation Instructions for the TruStability® Board Mount Pressure Sensors

TSC Series, Compensated/Unamplified

±60 mbar to ±10 bar | ±6 kPa to ±1 MPa | ±1 psi to ±150 psi
Millivolt Analog Output

NSC Series, Uncompensated/Unamplified

±2.5 mbar to ±10 bar | ±250 Pa to ±1 MPa | ±1 inH₂O to ±150 psi
Millivolt Analog Output

Honeywell's TruStability® TSC Series and NSC Series are piezoresistive silicon pressure sensors offering a ratiometric analog output for reading pressure over the specified full scale pressure span and temperature range.

TSC Series:

- Temperature compensated and unamplified.
- Compensation makes it easier to integrate the sensor into a system by eliminating the need to calibrate the system over temperature and also offers reduced part-to-part variation.
- Compensated temperature range is 0 °C to 85 °C [-32 °F to 185 °F].
- Operating temperature range is -40 °C to 85 °C [-40 °F to 185 °F].
- Measures differential or gage pressures

NSC Series:

- Uncompensated and unamplified.
- Allows customers the flexibility of performing their own calibration while still benefiting from the industry-leading stability, accuracy, and repeatability that the Honeywell TruStability® Pressure Sensors provide.
- Operates as specified from -40 °C to 85 °C [-40 °F to 185 °F].
- Measures absolute, differential or gage pressures.

The absolute versions have an internal vacuum reference and an output value proportional to absolute pressure. Differential versions allow measurement of pressure between two pressure ports. Gage versions are referenced to atmospheric pressure and provide an output proportional to pressure variations from atmosphere.

The TSC Series and NSC Series sensors are intended for use with non-corrosive, non-ionic gases, such as air. Port 1 can also be used for non-corrosive, non-ionic liquids on sensors rated above 60 mbar | 6 kPa | 1 psi.

The TSC and NSC Series offer numerous package styles and mounting options, making it easier for device manufacturers to integrate the product into their applications. These sensors offer infinite resolution on the pressure signal. Frequency response is also typically limited only by the end user's system. All products are designed and manufactured according to ISO 9001.

Table 1. Absolute Maximum Ratings¹

Characteristic	Min.	Max.	Unit
Supply voltage (V_{supply}) ² :			
pressure ranges ≥60 mbar 6 kPa 1 psi	-12.0	12.0	Vdc
pressure ranges ≤40 mbar 4 kPa 20 inH ₂ O	0	7	
Storage temperature	-40 [-40]	85 [185]	°C [°F]
Soldering time and temperature:			
lead solder temperature (SIP, DIP)		4 s max. at 250 °C [482 °F]	
peak reflow temperature (SMT)		15 s max. at 250 °C [482 °F]	

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

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

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Table 2. Operating Specifications

Characteristic	Min.	Typ.	Max.	Unit
Supply voltage (V_{supply}): ^{1,2} pressure ranges ≥ 60 mbar 6 kPa 1 psi pressure ranges ≤ 40 mbar 4 kPa 20 H ₂ O	1.5 2.7	5.0 5.0	12.0 6.5	Vdc
Supply current (at 5.0 Vdc supply)				
TSC Series	—	0.6	1	mA
NSC Series	—	1.5	2.2	
Operating temperature range ³	-40 [-40]	—	85 [185]	°C [°F]
Compensated temperature range ⁴	0 [32]	—	85 [185]	°C [°F]
Startup time	—	—	5	ms
TSC Series output resistance	—	2.5	—	kOhm

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

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

³Operating temperature range: The temperature range over which the sensor will produce an output proportional to pressure.

⁴Compensated temperature range: The temperature range over which the sensor will produce an output proportional to pressure within the specified performance limits.

Table 3. Environmental Specifications

Characteristic	Parameter
Humidity	0% to 95% RH, non-condensing
Vibration	MIL-STD-202F, Method 214A, Condition 1E (15 g, 10 Hz to 2 kHz)
Shock	MIL-STD-202F, Method 213B, Condition F (100 g, 6 ms duration)
Life ¹	1 million pressure cycles minimum
Solder reflow	J-STD-020-D MSL1 (unlimited shelf life when stored at less than 30 °C and 85 %RH)

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

Table 4. Wetted Materials¹

Component	Port 1 (Pressure Port)	Port 2 (Reference Port)
Ports and covers	high temperature polyamide	high temperature polyamide
Substrate	alumina ceramic	alumina ceramic
Adhesives	epoxy, RTV	epoxy, RTV
Electronic components	silicon	silicon, glass, gold

¹Contact 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.

TSC Series, Compensated/Unamplified

NSC Series, Uncompensated/Unamplified

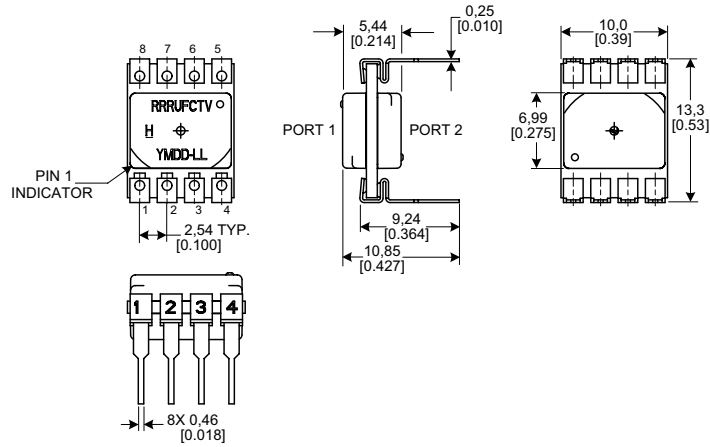
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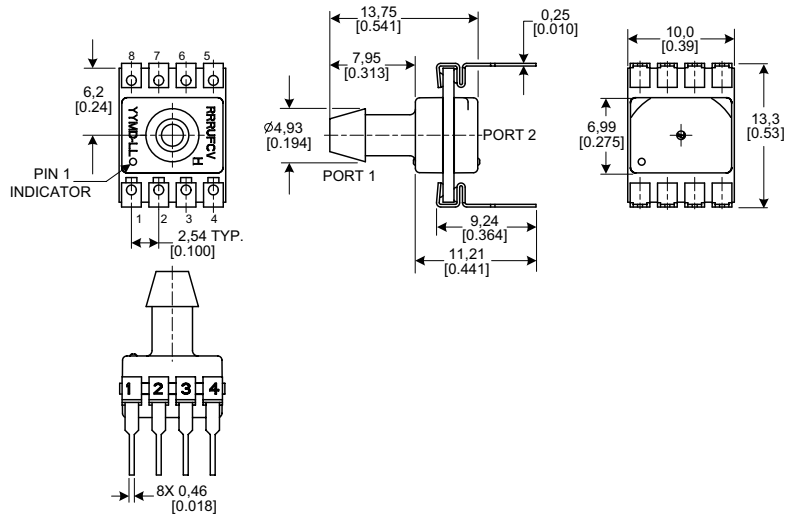
Figure 1. DIP Package Dimensional Drawings (For reference only: mm [in])

Dimensions

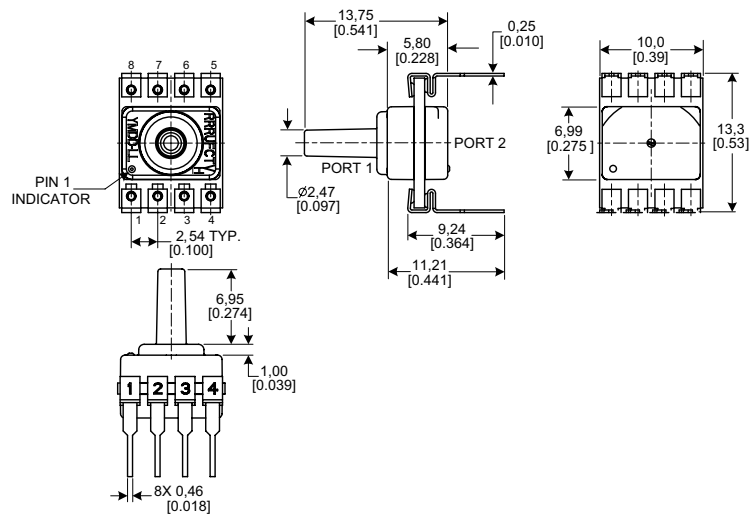
DIP NN: No ports



DIP AN: Single axial barbed port



DIP LN: Single axial barbless port



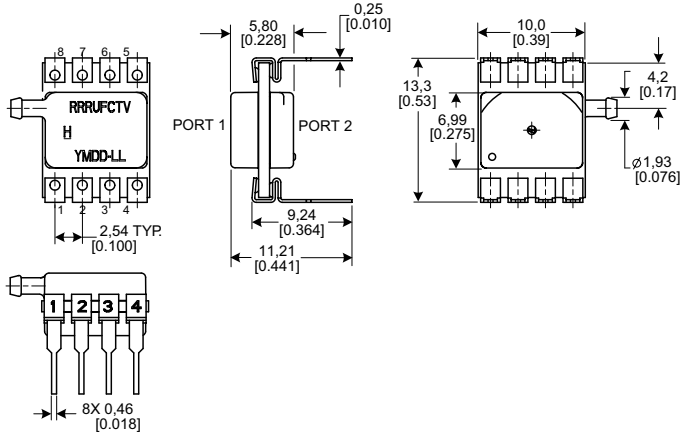
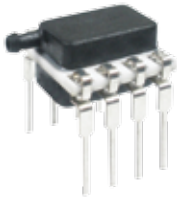
TSC Series, Compensated/Unamplified

NSC Series, Uncompensated/Unamplified

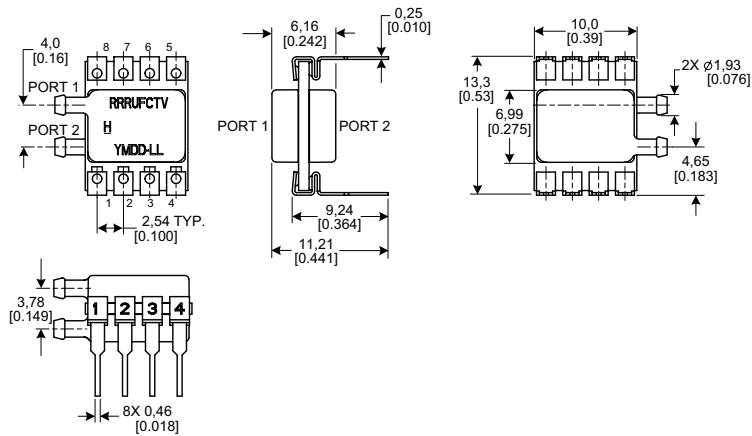
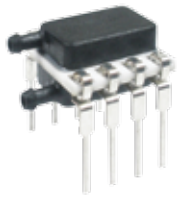
Figure 1. DIP Package Dimensional Drawings (continued)

Dimensions

DIP RN: Single radial barbed port



DIP RR: Dual radial barbed ports, same side



DIP DR: Dual radial barbed ports, opposite sides

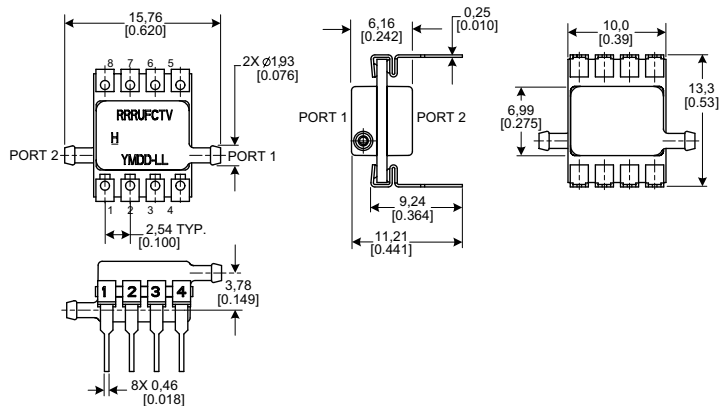


Figure 1. DIP Package Dimensional Drawings (continued)

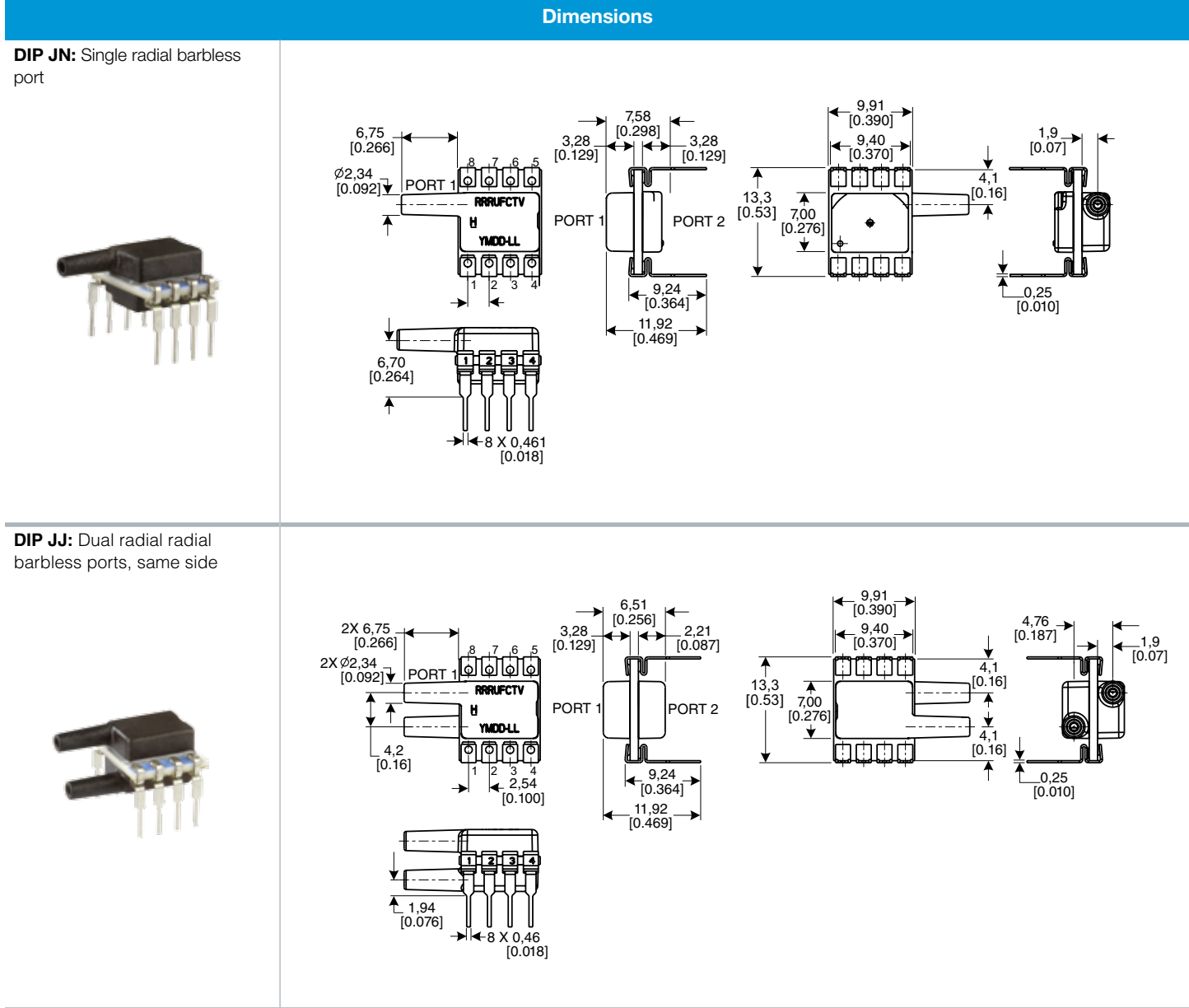


Figure 2. SMT Package Dimensional Drawings (For reference only: mm [in])

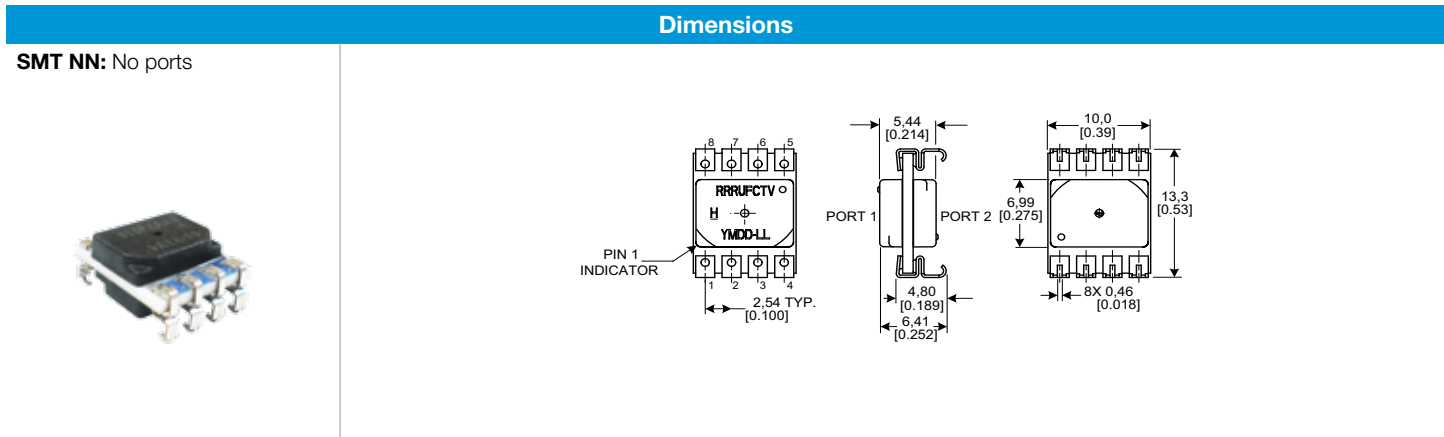
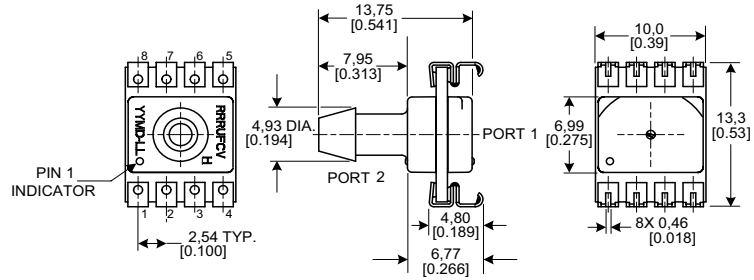


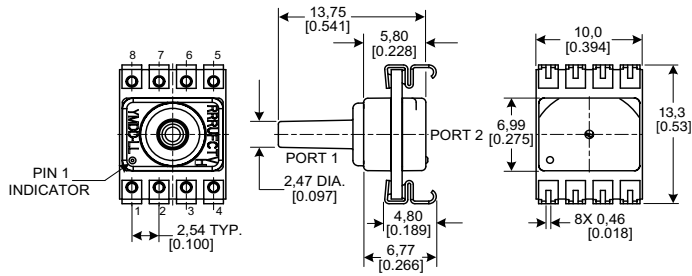
Figure 2. SMT Package Dimensional Drawings (continued)

Dimensions

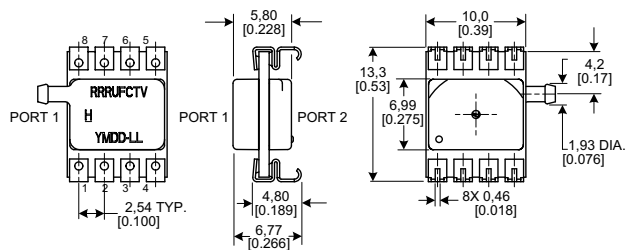
SMT AN: Single axial barbless port



SMT LN: Single axial barbless port



SMT RN: Single radial barbed port



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NSC Series, Uncompensated/Unamplified

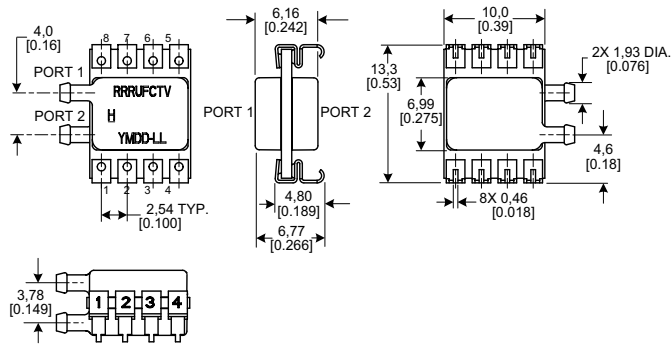
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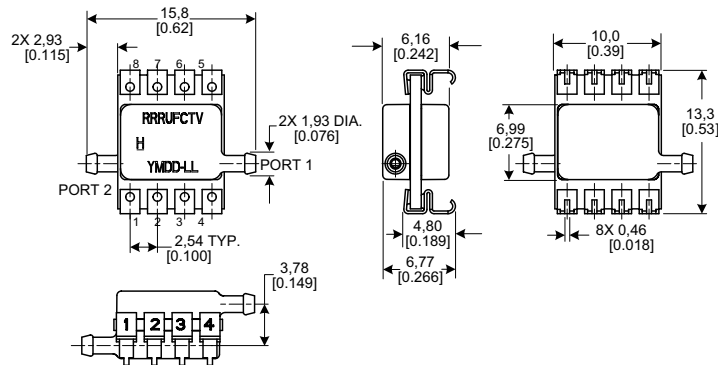
Figure 2. SMT Package Dimensional Drawings (continued)

Dimensions

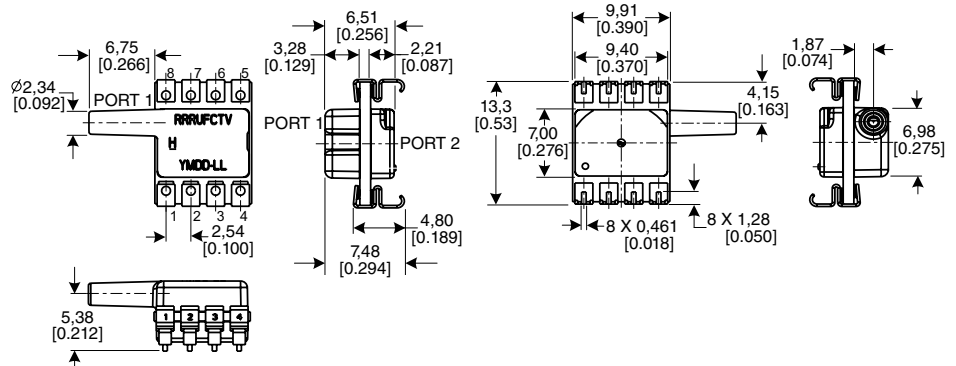
SMT RR: Dual radial barbed ports, same side



SMT DR: Dual radial barbed ports, opposite sides



SMT JN: Single radial barbless port



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Figure 2. SMT Package Dimensional Drawings (continued)

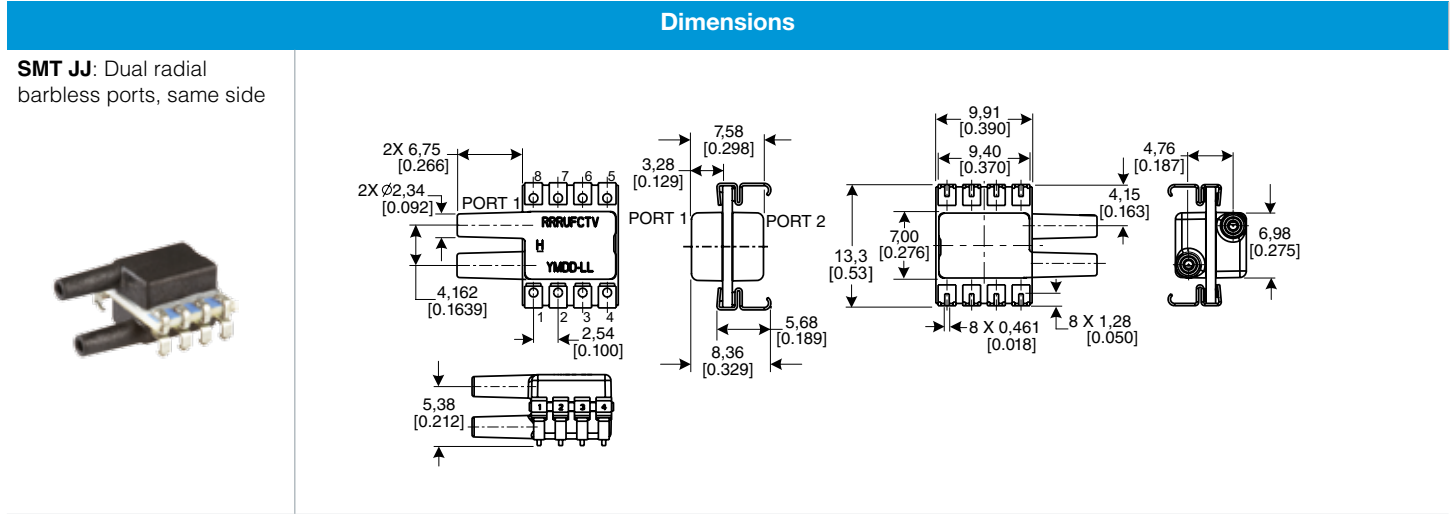
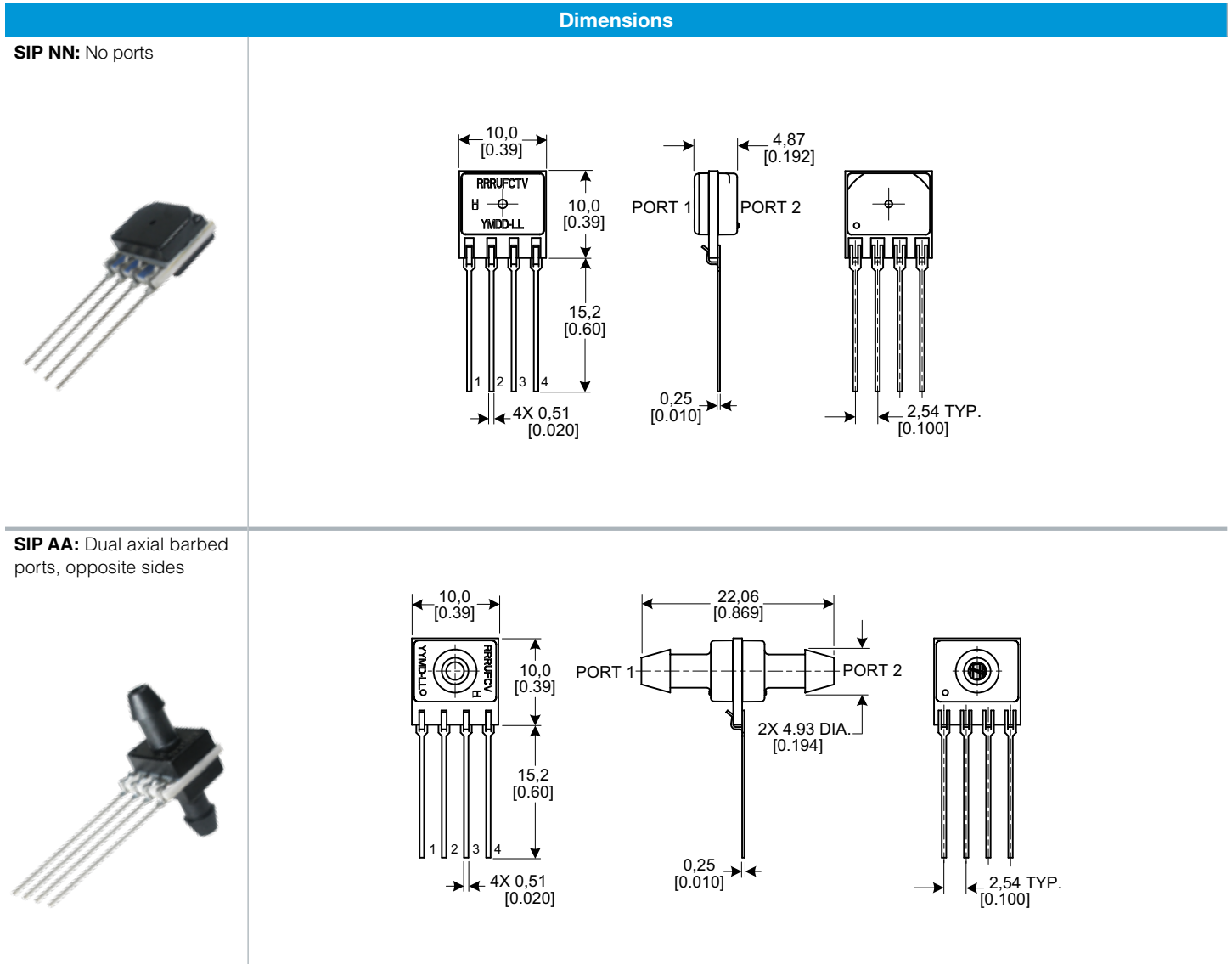


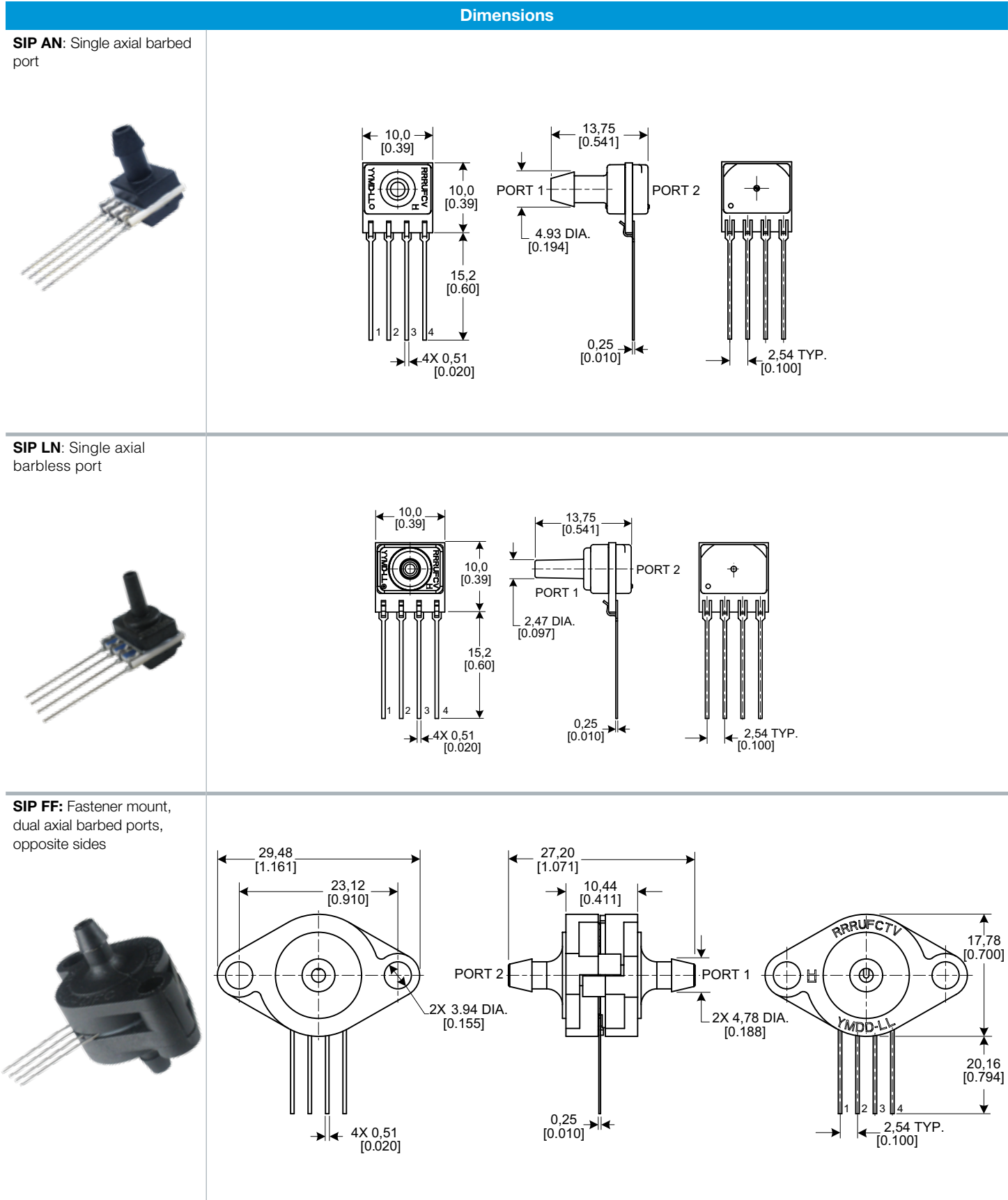
Figure 3. SIP Package Dimensional Drawings (For reference only: mm [in].)



TSC Series, Compensated/Unamplified

NSC Series, Uncompensated/Unamplified

Figure 3. SIP Package Dimensional Drawings (continued)



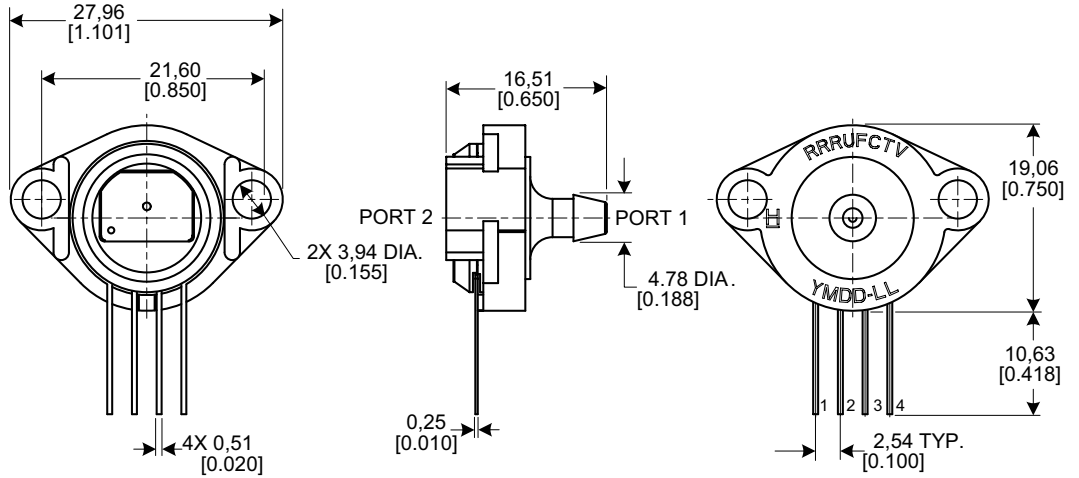
TSC Series, Compensated/Unamplified

NSC Series, Uncompensated/Unamplified

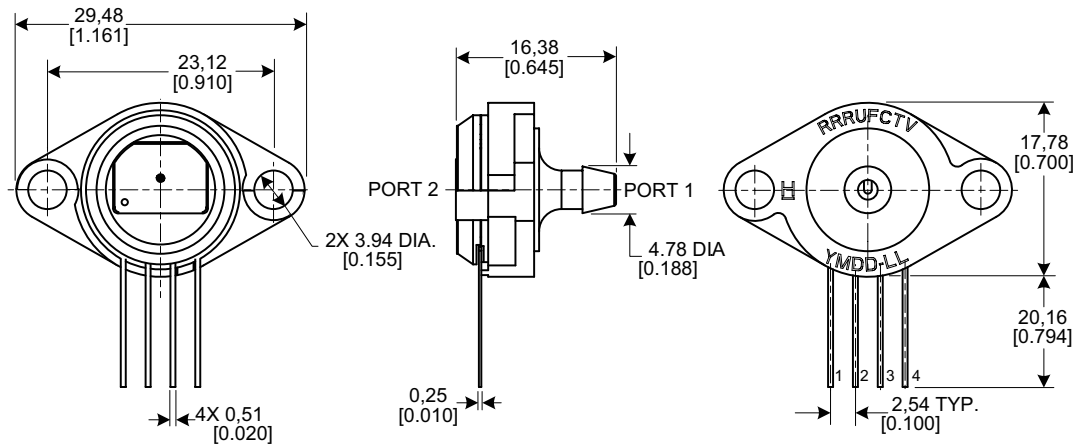
Figure 3. SIP Package Dimensional Drawings (continued)

Dimensions

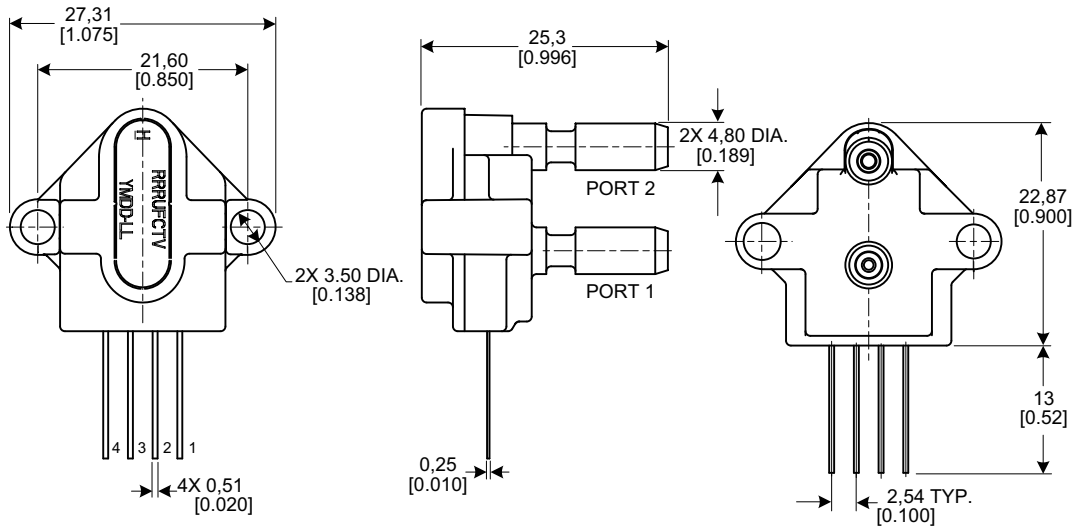
SIP FN: Fastener mount, single axial barbed port



SIP GN: Ribbed fastener mount, single axial barbed port



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



TSC Series, Compensated/Unamplified

NSC Series, Uncompensated/Unamplified

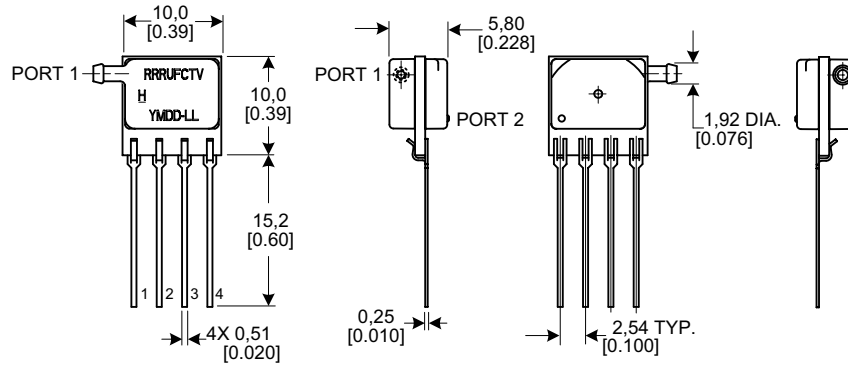
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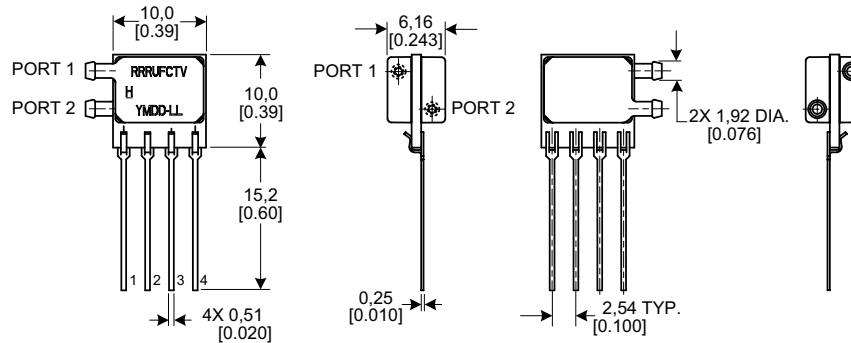
Figure 3. SIP Package Dimensional Drawings (continued)

Dimensions

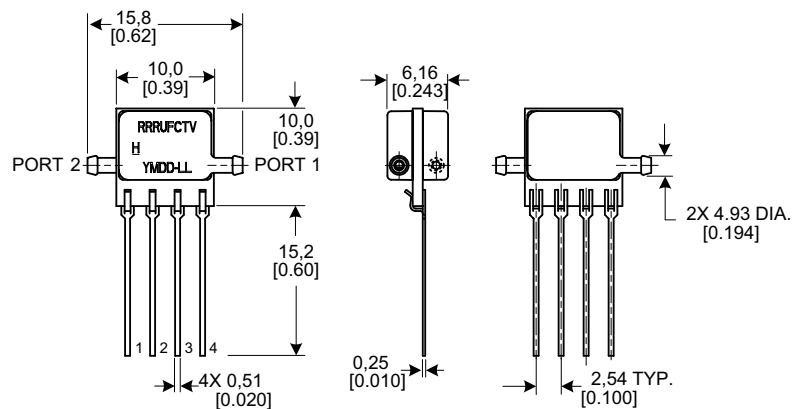
SIP RN: Single radial barbed port



SIP RR: Dual radial barbed ports, opposite sides



SIP DR: Dual radial barbed ports, opposite sides



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NSC Series, Uncompensated/Unamplified

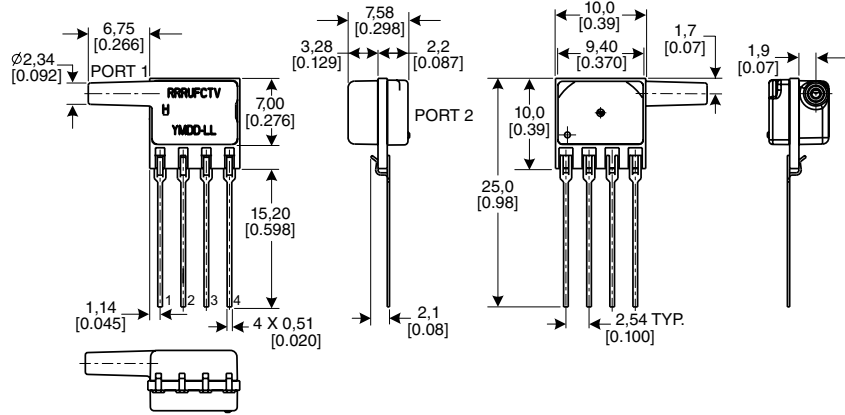
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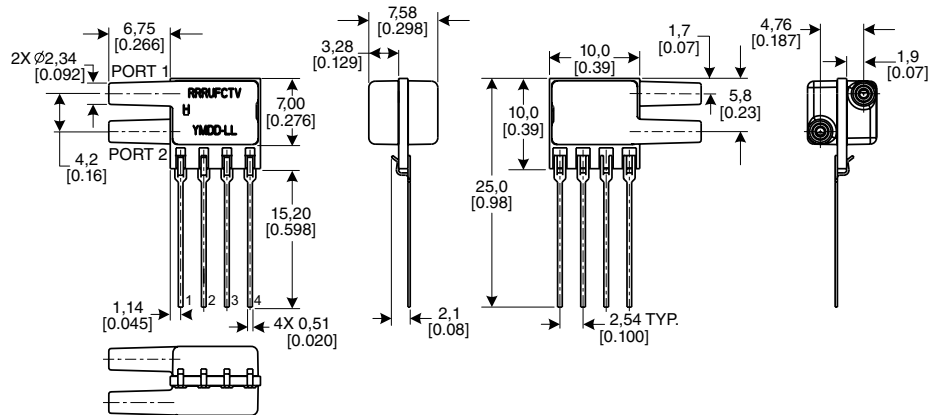
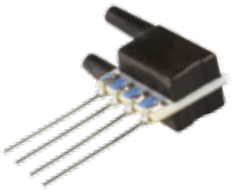
Figure 3. SIP Package Dimensional Drawings (continued)

Dimensions

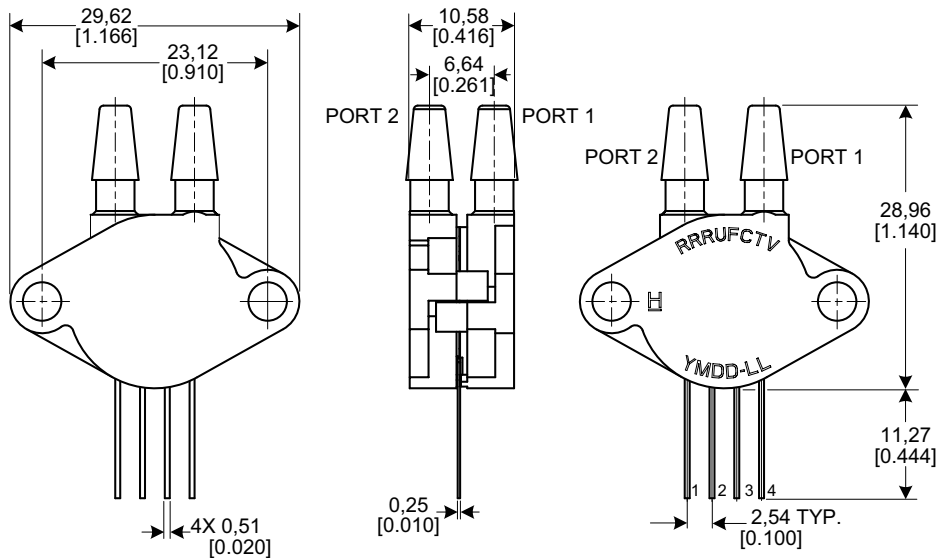
SIP JN: Single radial barbless port



SIP JJ: Dual radial barbless ports, same side



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



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Figure 3. SIP Package Dimensional Drawings (continued)

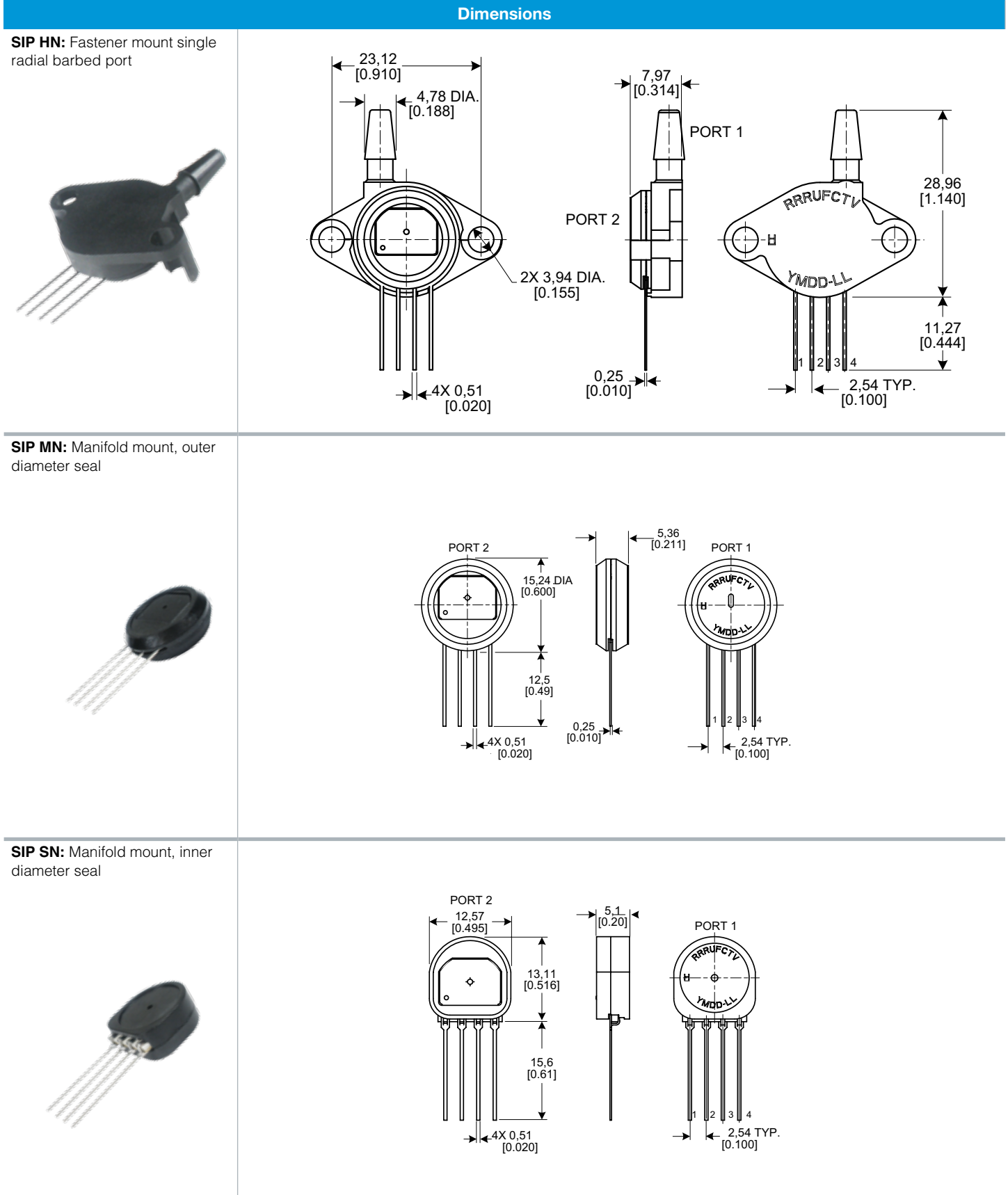


Table 5. Pinout for DIP and SMT Packages

Output Type	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
analog	GND	Vout+	V _{supply}	Vout-	NC	NC	NC	NC

Table 6. Pinout for SIP Packages

Output Type	Pin 1	Pin 2	Pin 3	Pin 4
analog	GND	Vout+	V _{supply}	Vout-

Figure 4. Recommended PCB Pad Layouts

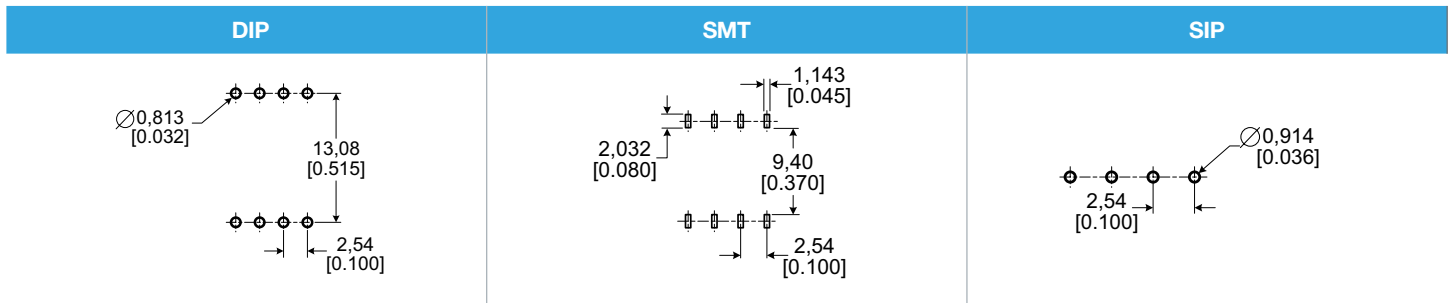
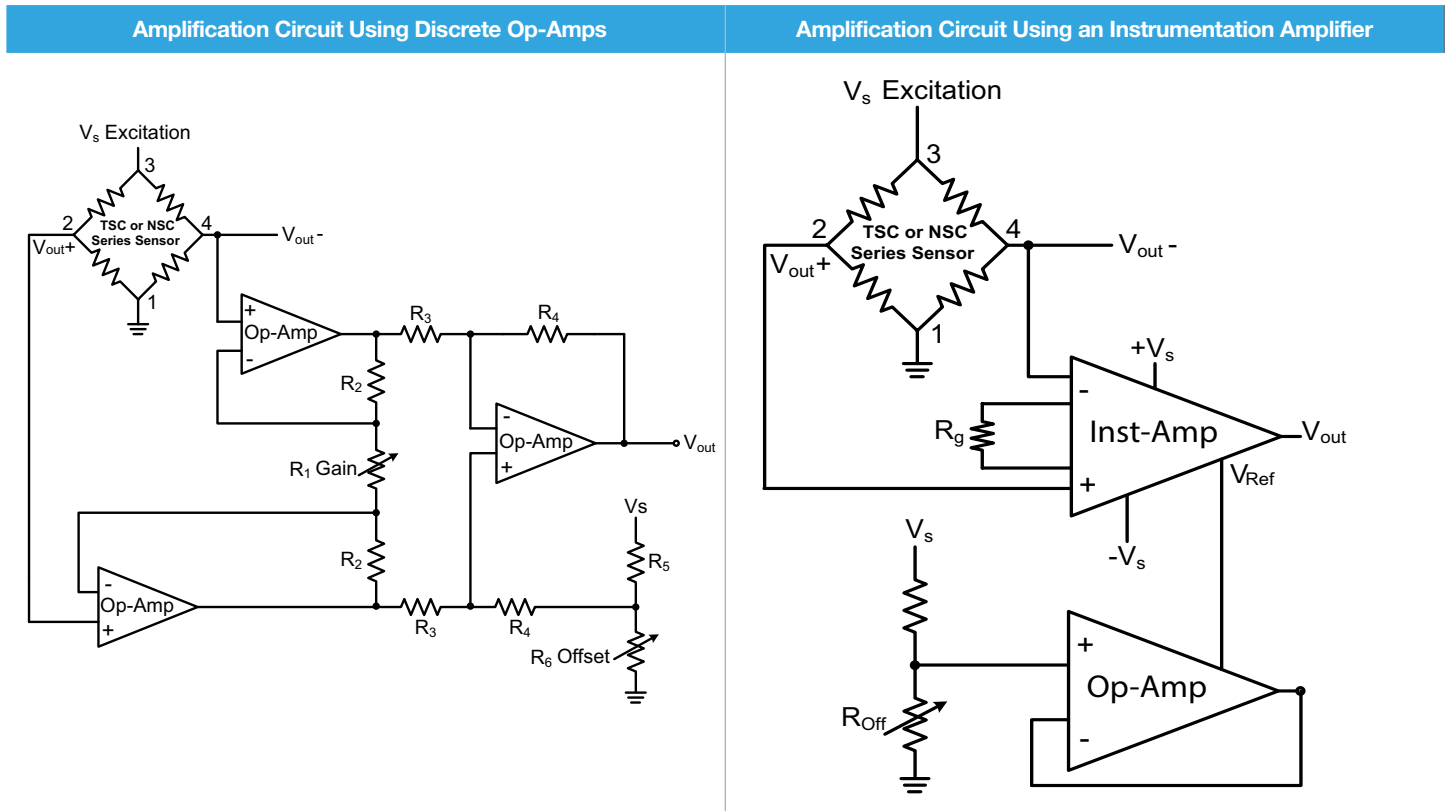


Figure 5. Circuit Examples



TSC Series, Compensated/Unamplified

NSC Series, Uncompensated/Unamplified

Figure 6. TSC Series Nomenclature and Order Guide¹

For example, **TSCDNNN150PGUCV** defines a TSC Series TruStability® Pressure Sensor, DIP package, NN pressure port, no special options, 150 psi gage pressure range, unamplified, compensated, constant supply voltage.

T S C D N N N 1 5 0 P G U C V

Series

TSC Compensated/Unamplified

Package

D DIP (Dual Inline Pin)
M SMT (Surface Mount Technology)
S SIP (Single Inline Pin)

Pressure Port

DIP	SMT	SIP
NN No ports	NN No ports	NN No ports
—	—	AA Dual axial barbed ports, opposite sides
AN Single axial barbed port	AN Single axial barbed port	AN Single axial barbed port
LN Single axial barbless port	LN Single axial barbless port	LN Single axial barbless port
—	—	FF Fastener mount, dual axial barbed ports, opposite sides
—	—	FN Fastener mount, single axial barbed port
—	—	GN Ribbed fastener mount, single axial barbed port
—	—	NB Fastener mount, dual axial ports, same side
RN Single radial barbed port	RN Single radial barbed port	RN Single radial barbed port
RR Dual radial barbed ports, same side	RR Dual radial barbed ports, same side	RR Dual radial barbed ports, same side
DR Dual radial barbed ports, opposite sides	DR Dual radial barbed ports, opposite sides	DR Dual radial barbed ports, opposite sides
JN Single radial barbless port	JN Single radial barbless port	JN Single radial barbless port
JJ Dual radial barbless ports, same side	JJ Dual radial barbless ports, same side	JJ Dual radial barbless ports, same side
—	—	HH Fastener mount, dual radial barbed ports, same side
—	—	HN Fastener mount, single radial barbed port
—	—	MN Manifold mount, outer diameter seal
—	—	SN Manifold mount, inner diameter seal

Options

N No special options

Supply Voltage

V Constant

Compensation

C Compensated

Output Type

U Unamplified

Pressure Range

60 mbar to 10 bar	6 kPa to 1 MPa	1 psi to 150 psi
<i>Differential</i>		
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	100PD ±100 psi
001BD ±1 bar	100KD ±100 kPa	150PD ±150 psi
1.6BD ±1.6 bar	160KD ±160 kPa	
2.5BD ±2.5 bar	250KD ±250 kPa	
004BD ±4 bar	400KD ±400 kPa	
006BD ±6 bar	600KD ±600 kPa	
010BD ±10 bar	001GD ±1 MPa	
<i>Gage</i>		
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	

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Figure 7. NSC Series Nomenclature and Order Guide¹

For example, **NSCDNNN150PGUNV** defines an NSC Series TruStability® Pressure Sensor, DIP package, NN pressure port, no special options, 150 psi gage pressure range, unamplified, uncompensated, constant supply voltage.

NSC D N N N 150 P G U N V

Supply Voltage
V Constant

Compensation
N Uncompensated

Output Type
U Unamplified

Series
NSC Uncompensated/Unamplified

Package
D DIP (Dual Inline Pin)
M SMT (Surface Mount Technology)
S SIP (Single Inline Pin)

Pressure Port

DIP		SMT		SIP	
NN No ports	NN No ports	NN No ports			
AN Single axial barbed port	AN Single axial barbed port	AN Single axial barbed port			
LN Single axial barbless port	LN Single axial barbless port	LN Single axial barbless port			
		AA Dual axial barbed ports, opposite sides			
		FF Fastener mount, dual axial barbed ports, opposite sides			
		FN Fastener mount, single axial barbed port			
		GN Ribbed fastener mount, single axial barbed port			
		NB Fastener mount, dual axial ports, same side			
RN Single radial barbed port	RN Single radial barbed port	RN Single radial barbed port			
RR Dual radial barbed ports, same side	RR Dual radial barbed ports, same side	RR Dual radial barbed ports, same side			
DR Dual radial barbed ports, opposite sides	DR Dual radial barbed ports, opposite sides	DR Dual radial barbed ports, opposite sides			
JN Single radial barbless port	JN Single radial barbless port	JN Single radial barbless port			
JJ Dual radial barbless ports, same side	JJ Dual radial barbless ports, same side	JJ Dual radial barbless ports, same side			
		HH Fastener mount, dual radial barbed ports, same side			
		HN Fastener mount, single radial barbed port			
		MN Manifold mount, outer diameter seal			
		SN Manifold mount, inner diameter seal			

Options
N No special options

Pressure Range

2.5 mbar to 10 bar		400 Pa to 1 MPa		1 in H ₂ O to 150 psi	
<i>Absolute</i>		<i>Absolute</i>		<i>Absolute</i>	
001BA 0 bar to 1 bar	100KA 0 kPa to 100 kPa	015PA 0 psi to 15 psi			
1.6BA 0 bar to 1.6 bar	160KA 0 kPa to 160 kPa	030PA 0 psi to 30 psi			
2.5BA 0 bar to 2.5 bar	250KA 0 kPa to 250 kPa	060PA 0 psi to 60 psi			
004BA 0 bar to 4 bar	400KA 0 kPa to 400 kPa	100PA 0 psi to 100 psi			
006BA 0 bar to 6 bar	600KA 0 kPa to 600 kPa	150PA 0 psi to 150 psi			
010BA 0 bar to 10 bar	001GA 0 kPa to 1 MPa				
<i>Differential</i>		<i>Differential</i>		<i>Differential</i>	
2.5MD ±2.5 mbar	250LD ±250 Pa	001ND ±1 inH ₂ O			
004MD ±4 mbar	400LD ±400 Pa	002ND ±2 inH ₂ O			
006MD ±6 mbar	600LD ±600 Pa	004ND ±4 inH ₂ O			
010MD ±10 mbar	001KD ±1 kPa	005ND ±5 inH ₂ O			
016MD ±16 mbar	1.6KD ±1.6 kPa	010ND ±10 inH ₂ O			
025MD ±25 mbar	2.5KD ±2.5 kPa	020ND ±20 inH ₂ O			
040MD ±40 mbar	004KD ±4 kPa	030ND ±30 inH ₂ O			
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	100PD ±100 psi			
001BD ±1 bar	100KD ±100 kPa	150PD ±150 psi			
1.6BD ±1.6 bar	160KD ±160 kPa				
2.5BD ±2.5 bar	250KD ±250 kPa				
004BD ±4 bar	400KD ±400 kPa				
006BD ±6 bar	600KD ±600 kPa				
010BD ±10 bar	001GD ±1 MPa				
<i>Gage</i>		<i>Gage</i>		<i>Gage</i>	
004MG 0 mbar to 4 mbar	400LG 0 Pa to 400 Pa	002NG 0 inH ₂ O to 2 inH ₂ O			
006MG 0 mbar to 6 mbar	600LG 0 Pa to 600 Pa	004NG 0 inH ₂ O to 4 inH ₂ O			
010MG 0 mbar to 10 mbar	001KG 0 kPa to 1 kPa	005NG 0 inH ₂ O to 5 inH ₂ O			
016MG 0 mbar to 16 mbar	1.6KG 0 kPa to 1.6 kPa	010NG 0 inH ₂ O to 10 inH ₂ O			
025MG 0 mbar to 25 mbar	004KG 0 kPa to 4 kPa	020NG 0 inH ₂ O to 20 inH ₂ O			
040MG 0 mbar to 40 mbar	006KG 0 kPa to 6 kPa	030NG 0 inH ₂ O to 30 inH ₂ O			
060MG 0 mbar to 60 mbar	010KG 0 kPa to 10 kPa	001PG 0 psi to 1 psi			
100MG 0 mbar to 100 mbar	016KG 0 kPa to 16 kPa	005PG 0 psi to 5 psi			
160MG 0 mbar to 160 mbar	025KG 0 kPa to 25 kPa	015PG 0 psi to 15 psi			
250MG 0 mbar to 250 mbar	040KG 0 kPa to 40 kPa	030PG 0 psi to 30 psi			
400MG 0 bar to 400 mbar	060KG 0 kPa to 60 kPa	060PG 0 psi to 60 psi			
600MG 0 bar to 600 mbar	100KG 0 kPa to 100 kPa	100PG 0 psi to 100 psi			
001BG 0 bar to 1 bar	160KG 0 kPa to 160 kPa	150PG 0 psi to 150 psi			
1.6BG 0 bar to 1.6 bar	250KG 0 kPa to 250 kPa				
2.5BG 0 bar to 2.5 bar	400KG 0 kPa to 400 kPa				
004BG 0 bar to 4 bar	600KG 0 kPa to 600 kPa				
006BG 0 bar to 6 bar	001GG 0 kPa to 1 MPa				
010BG 0 bar to 10 bar					