

Installation Instructions for the

TruStability® Board Mount Pressure Sensors

Issue 4 50063864

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 inH_2O 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.

Table 1. Absolute Maximum Ratings¹

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.

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

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.	Тур.	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 NSC Series		0.6 1.5	1 2.2	mA
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 $^\circ \! C$ 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.

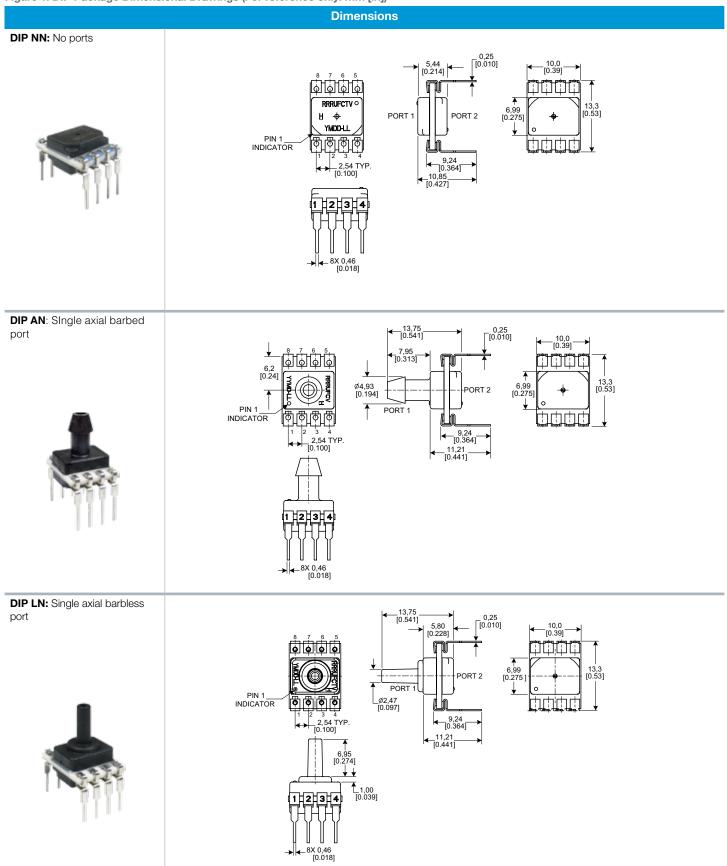
CAUTION PRODUCT DAMAGE

- 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.

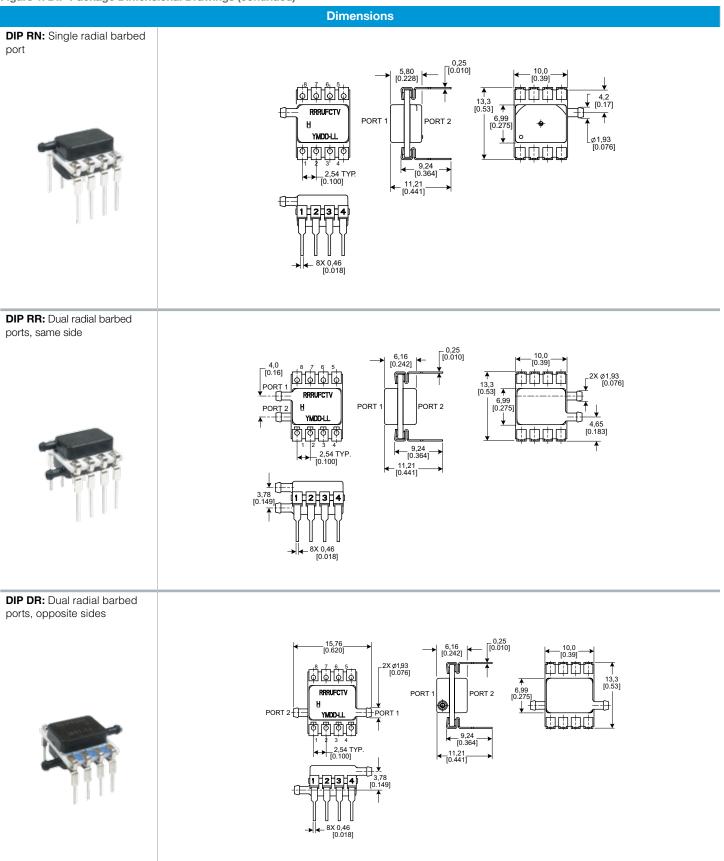
Failure to comply with these instructions may result in product damage.

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



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Figure 1. DIP Package Dimensional Drawings (continued)

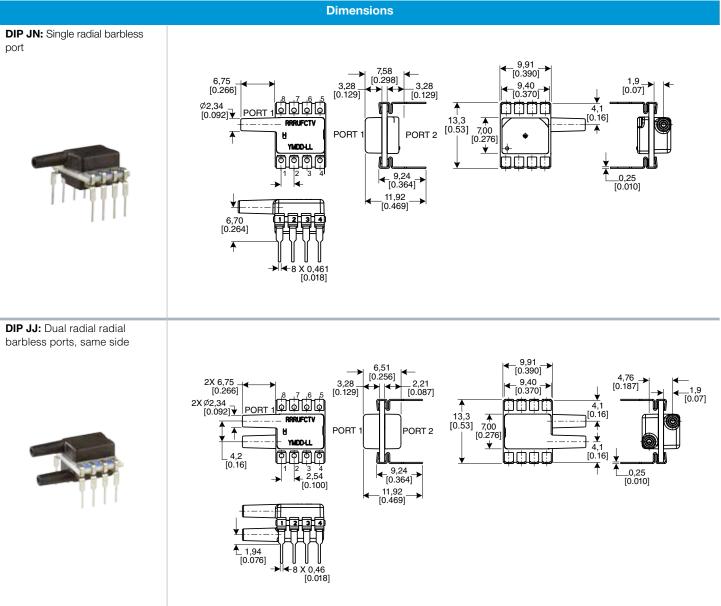
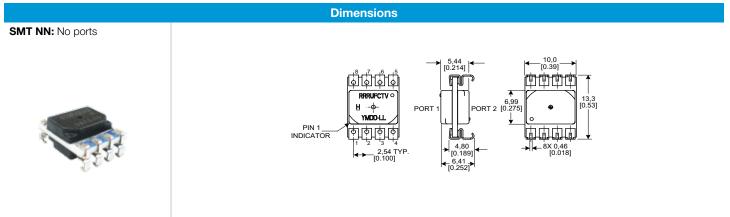


Figure 2. SMT Package Dimensional Drawings (For reference only: mm [in])



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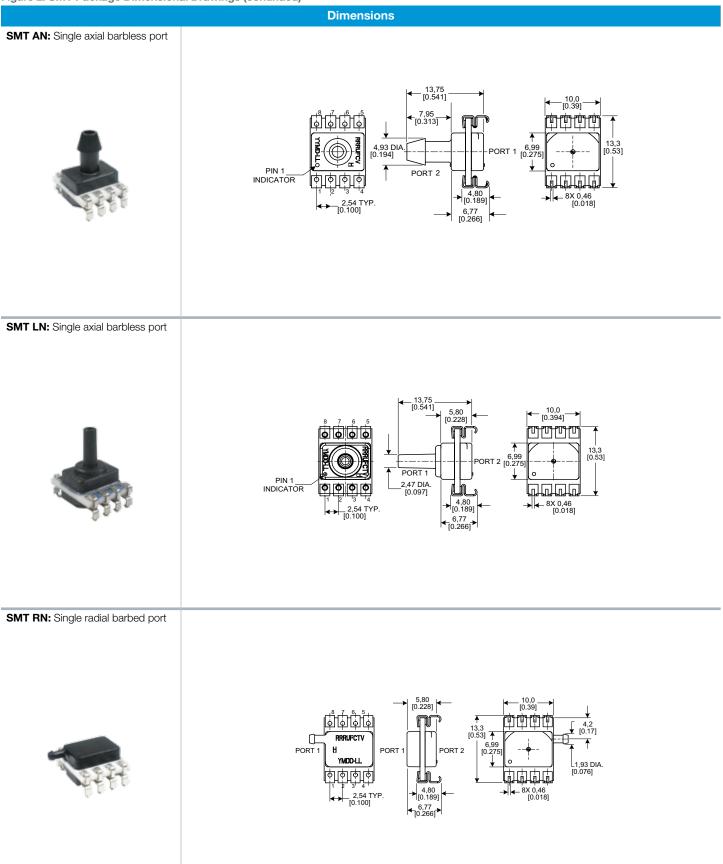
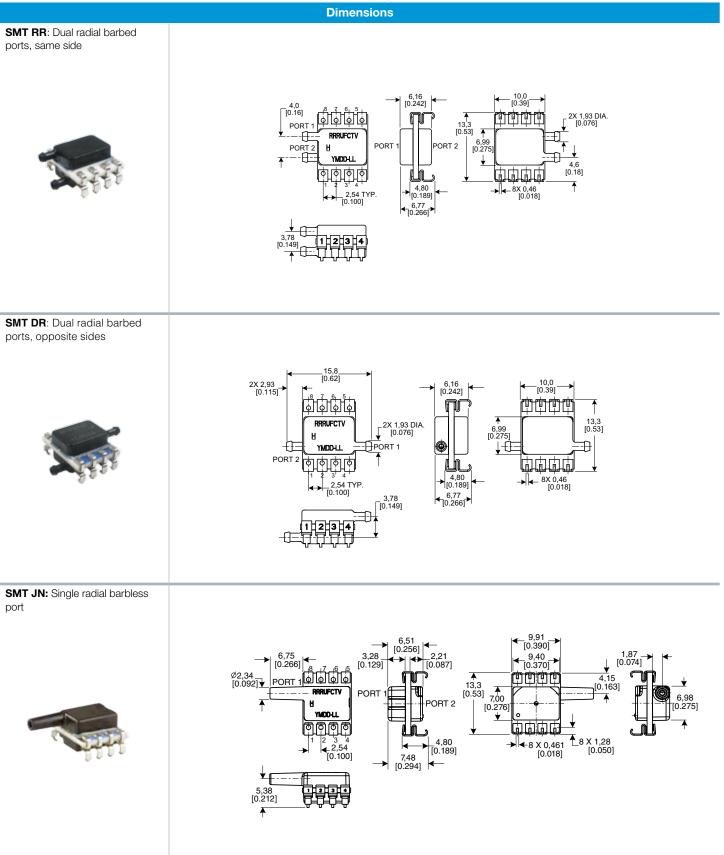


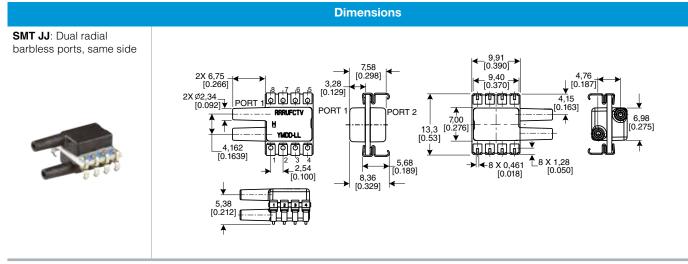
Figure 2. SMT Package Dimensional Drawings (continued)



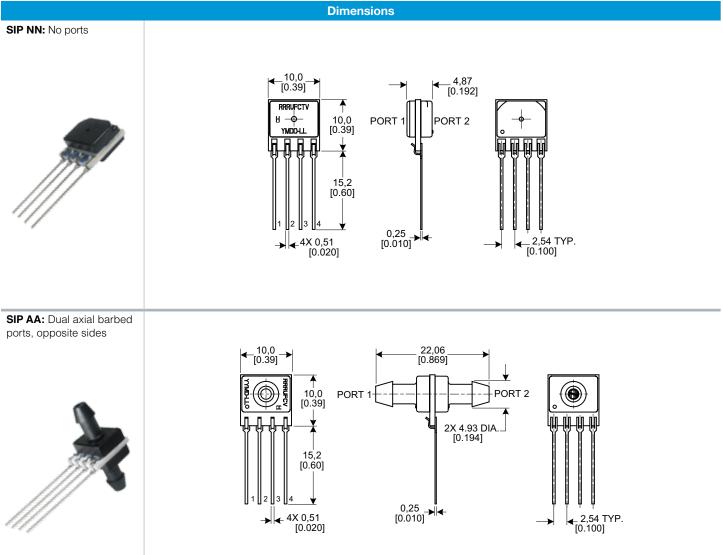
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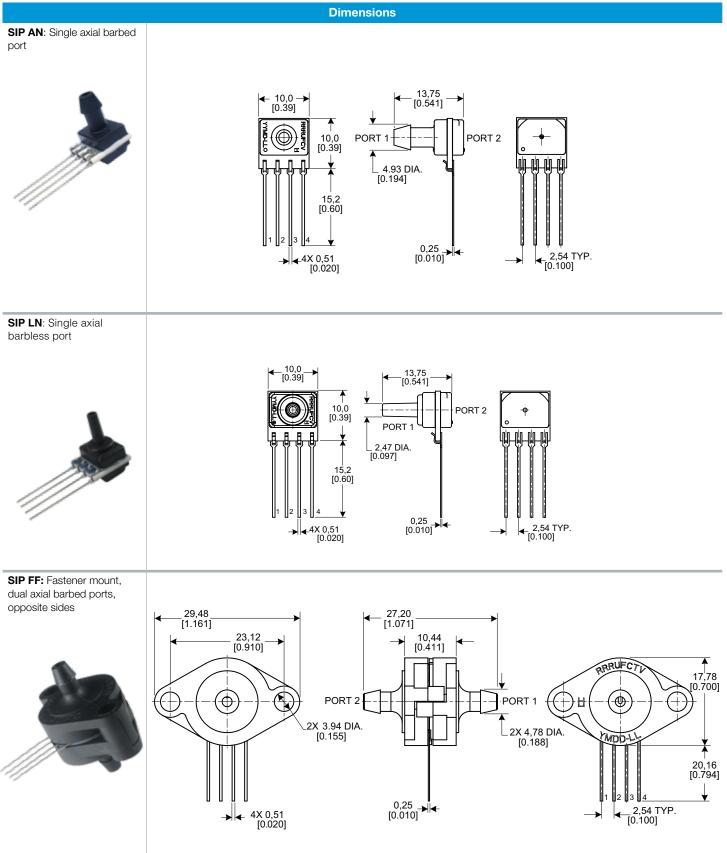
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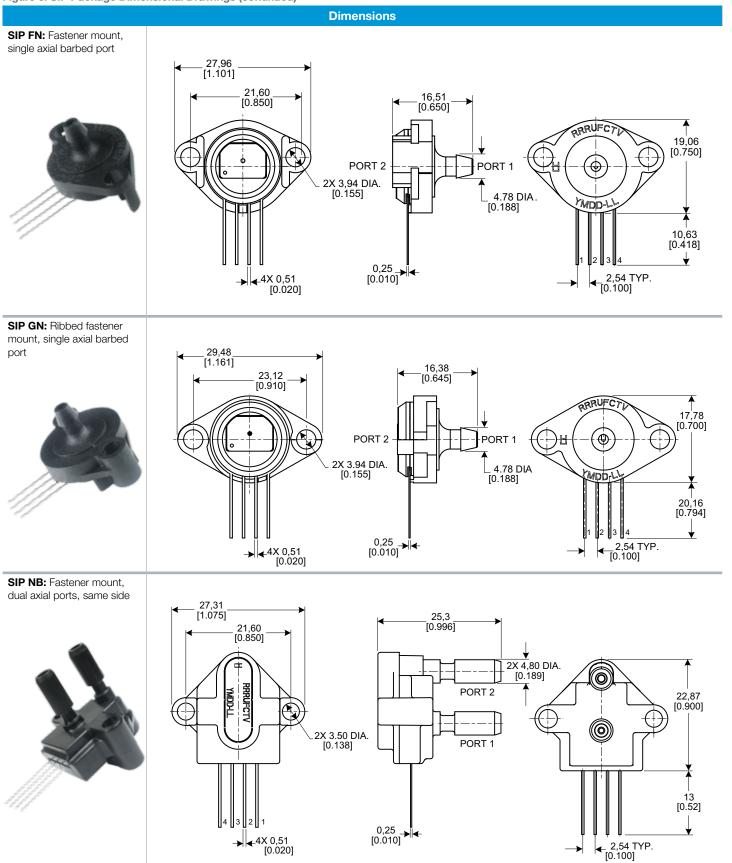
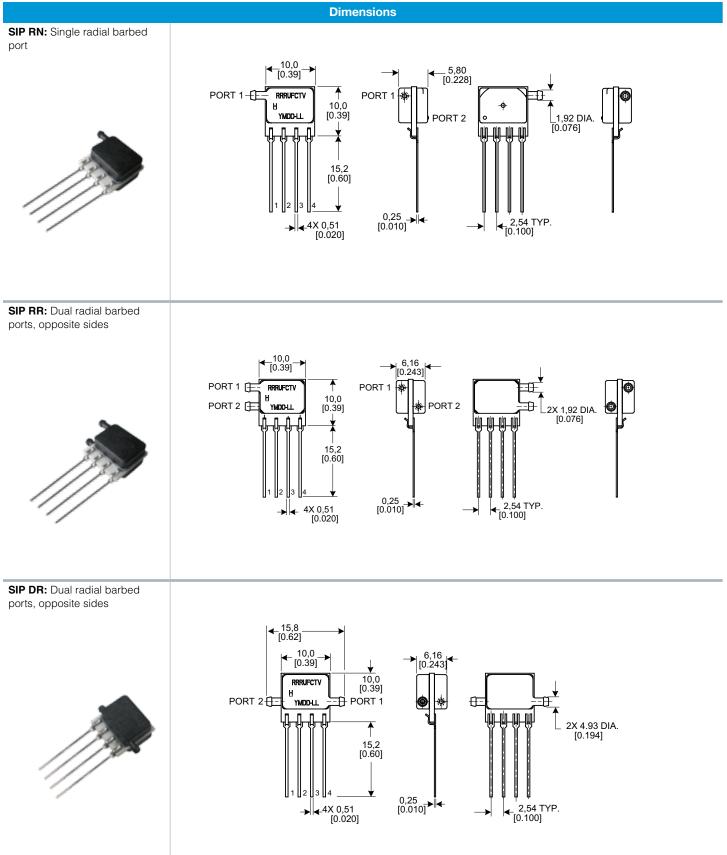
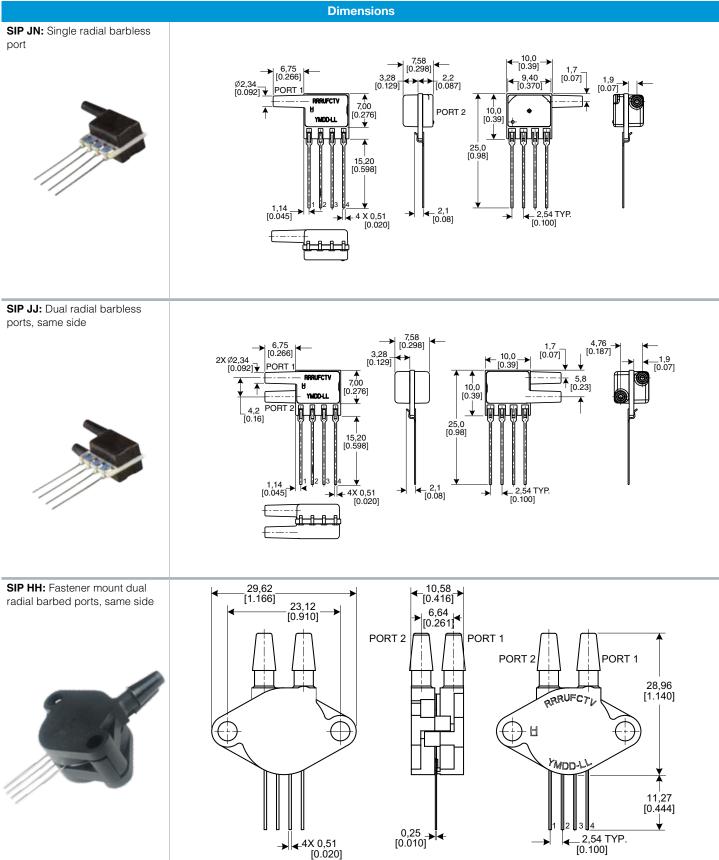


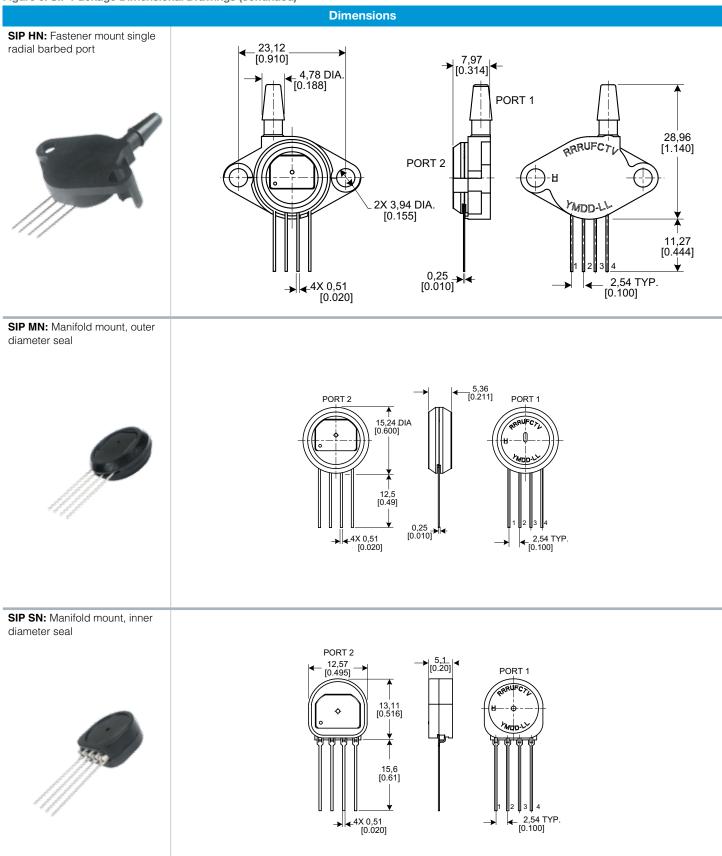
Figure 3. SIP Package Dimensional Drawings (continued)



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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

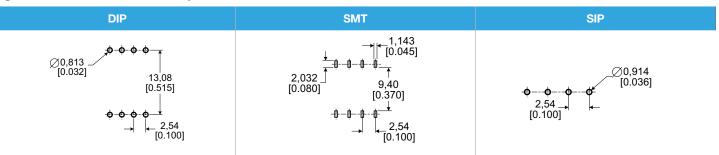
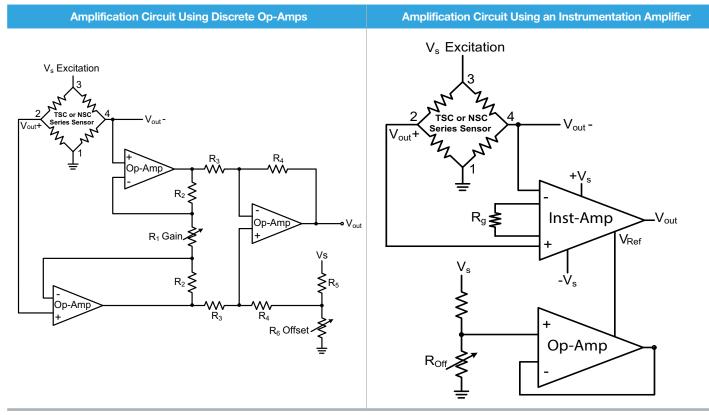


Figure 5. Circuit Examples



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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.

	тѕс	DNN N 1	50PG U C V		
Series					Cumply Voltono
					Supply Voltage
TSC Compensated/Unamp	blified				V Constant
Package					Compensation
DIP (Dual Inline Pin)			קן <u>ו</u> ∟		C Compensated
M SMT (Surface Mount Techr	nology)				
S SIP (Single Inline Pin)					Output Type
					Unamplified
Pressure Port DIP	SMT	SIP	Pressure Range		
	5		60 mbar to 10 bar	6 kPa to 1 MPa	1 psi to 150 psi
NN No ports	NN No ports	NN No ports	Differential	Differential	Differential
			OGOMD ±60 mbar	006KD ±6 kPa	001PD ±1 psi
	_	Dual axial barbed ports,	100MD ±100 mbar	010KD ±10 kPa	005PD ±5 psi
		opposite sides	160MD ±160 mbar	016KD ±16 kPa	015PD ±15 psi
Single axial	<u>^</u>		250MD ±250 mbar	025KD ±25 kPa	030PD ±30 psi
AN Single axial barbed port	AN Single axial barbed port	AN Single axial barbed port	400MD ±400 mbar	040KD ±40 kPa	060PD ±60 psi
			600MD ±600 mbar	060KD ±60 kPa	100PD ±100 psi
🛛 🔊 Single axial	LN Single axial	LN Single axial	001BD ±1 bar	100KD ±100 kPa	150PD ±150 psi
LN Single axial barbless port	LN barbless port	barbless port	1.6BD ±1.6 bar	160KD ±160 kPa	
		Fastener -	2.5BD ±2.5 bar	250KD ±250 kPa	
_	-	FF Fastener mount, dual axial barbed sides	004BD ±4 bar	400KD ±400 kPa	
		PP axial barbed ports, opposite	006BD ±6 bar 010BD ±10 bar	600KD ±600 kPa	
		Fastener		001GD ±1 MPa	
-	-	FN mount, single axial barbed	Gage	Gage	Gage
			060MG 0 mbar to 60 mbar		001PG 0 psi to 1 psi
_	_	GN Ribbed fastener mount, single axial barbed port	100MG 0 mbar to 100 mbar		005PG 0 psi to 5 psi
		single axial barbed port	160MG 0 mbar to 160 mbar		015PG 0 psi to 15 psi
		Fastener 0	250MG 0 mbar to 250 mbar 400MG 0 bar to 400 mbar		030PG 0 psi to 30 psi 060PG 0 psi to 60 psi
-	-	NB mount, dual axial ports,	600MG 0 bar to 600 mbar		100PG 0 psi to 100 psi
		same side	001BG 0 bar to 1 bar		150PG 0 psi to 150 psi
BN Single radial	RN Single radial	RN Single radial	1.6BG 0 bar to 1.6 bar	160KG 0 kPa to 160 kPa	
RN Single radial barbed port	RN barbed port	barbed port	2.5BG 0 bar to 2.5 bar	250KG 0 kPa to 250 kPa	
Dual madial 177	Dual radial	Dual radial	004BG 0 bar to 4 bar	400KG 0 kPa to 400 kPa	
RR barbed ports,	RR barbed ports, same side	RR barbed ports,	006BG 0 bar to 6 bar	600KG 0 kPa to 600 kPa	
same side	Same side	same side	010BG 0 bar to 10 bar	001GG 0 kPa to 1 MPa	
DR Dual radial barbed ports, opposite sides	DR Dual radial barbed ports, opposite sides	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 port			
_	-	Manifold mount, outer diameter seal			
-	-	SN Manifold mount, inner diameter seal			
Options					

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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.

eries					Supply Voltage
SC Uncompensated/	Inamplified				V Constant
Checompensated/	onampinieu				0
ackage					Compensation
_					N Uncompensated
DIP (Dual Inline Pin)	Tashnalagu)				
SMT (Surface Mount S SIP (Single Inline Pin					Output Type
SIP (Single Inline Pin)		LT -		U Unamplified
ressure Port			Pressure Range		
DIP	SMT	SIP	2.5 mbar to 10 bar	400 Pa to 1 MPa	1 in H₂O to 150 psi
No porto					•
No ports	NN No ports	NN No ports	Absolute 001BA 0 bar to 1 bar	Absolute 100KA 0 kPa to 100 kPa	Absolute 015PA 0 psi to 15 psi
			1.6BA 0 bar to 1.6 bar	160KA 0 kPa to 160 kPa	
_	-	AA Dual axial barbed ports,	2.5BA 0 bar to 2.5 bar	250KA 0 kPa to 250 kPa	· · · · · · · · · · · · · · · · · · ·
		AA barbed ports, opposite sides	004BA 0 bar to 4 bar	400KA 0 kPa to 400 kPa	
N Single axial barbed port	AN Single axial	AN Single axial	006BA 0 bar to 6 bar	600KA 0 kPa to 600 kPa	150PA 0 psi to 150 psi
barbed port	AN Single axial barbed port	AN barbed port	010BA 0 bar to 10 bar	001GA 0 kPa to 1 MPa	
[Single ovial		Differential	Differential	Differential
N Single axial barbless port	LN Single axial barbless port	LN Single axial barbless port	2.5MD ±2.5 mbar	250LD ±250 Pa	001ND ±1 inH ₂ O
· YYY			004MD ±4 mbar	400LD ±400 Pa	002ND ±2 inH ₂ O
	_	FF Fastener mount, dual axial barbed	006MD ±6 mbar	600LD ±600 Pa	004ND ±4 inH ₂ O
—		ports, opposite	010MD ±10 mbar 016MD ±16 mbar	001KD ±1 kPa 1.6KD ±1.6 kPa	005ND ±5 inH ₂ O 010ND ±10 inH ₂ O
		Eastener -	025MD ±25 mbar	2.5KD ±2.5 kPa	020ND ±20 inH ₂ O
-	-	FN mount, single axial barbed	040MD ±40 mbar	004KD ±4 kPa	030ND ±30 inH ₂ O
		port	060MD ±60 mbar	006KD ±6 kPa	001PD ±1 psi
_	_	GN Ribbed fastener mount, single axial barbed port	100MD ±100 mbar	010KD ±10 kPa	005PD ±5 psi
		single axial barbed port	160MD ±160 mbar	016KD ±16 kPa	015PD ±15 psi
		Fastener	250MD ±250 mbar	025KD ±25 kPa	030PD ±30 psi
-	-	NB mount, dual axial ports,	400MD ±400 mbar	040KD ±40 kPa	060PD ±60 psi
		same side	600MD ±600 mbar	060KD ±60 kPa	100PD ±100 psi
N Single radial	RN Single radial barbed port	RN Single radial barbed port	001BD ±1 bar 1.6BD ±1.6 bar	100KD ±100 kPa 160KD ±160 kPa	150PD ±150 psi
barbed port	Balbed port		2.5BD ±2.5 bar	250KD ±250 kPa	
Dual radial	Dual radial	Dual radial	004BD ±4 bar	400KD ±400 kPa	
R barbed ports, same side	RR barbed ports, same side	RR barbed ports, same side	006BD ±6 bar	600KD ±600 kPa	
Dual radial	Dual radial	Dual radial	010BD ±10 bar	001GD ±1 MPa	
R barbed ports, opposite sides	DR barbed ports, opposite sides	DR barbed ports, opposite sides	Gage	Gage	Gage
			004MG 0 mbar to 4 mbar	400LG 0 Pa to 400 Pa	002NG 0 inH ₂ O to 2 inH
N Single radial barbless port	JN Single radial	JN Single radial barbless port	006MG 0 mbar to 6 mbar	600LG 0 Pa to 600 Pa	004NG 0 inH ₂ O to 4 inH ₂
barbless port	UN barbless port	barbless port	010MG 0 mbar to 10 mbar	001KG 0 kPa to 1 kPa	005NG 0 inH ₂ O to 5 inH ₂
Dual radial	Dual radial	Dual radial	016MG 0 mbar to 16 mbar 025MG 0 mbar to 25 mbar	1.6KG 0 kPa to 1.6 kPa 004KG 0 kPa to 4 kPa	010NG 0 inH ₂ O to 10 inH 020NG 0 inH ₂ O to 20 inH
barbless ports, same side	JJ barbless ports, same side	JJ barbless ports, same side	040MG 0 mbar to 40 mbar	006KG 0 kPa to 6 kPa	030NG 0 inH ₂ O to 30 inH
TY.	11 0000		060MG 0 mbar to 60 mbar	010KG 0 kPa to 10 kPa	001PG 0 psi to 1 psi
_	_	mount, dual radial barbed	100MG 0 mbar to 100 mbar		005PG 0 psi to 5 psi
		HH Fastener mount, dual radial barbed ports, same side	160MG 0 mbar to 160 mbar		015PG 0 psi to 15 psi
		Fastener	250MG 0 mbar to 250 mbar	040KG 0 kPa to 40 kPa	O30PG 0 psi to 30 psi
—	-	HN mount, single radial barbed	400MG 0 bar to 400 mbar	060KG 0 kPa to 60 kPa	060PG 0 psi to 60 psi
		port ""	600MG 0 bar to 600 mbar	100KG 0 kPa to 100 kPa	100PG 0 psi to 100 psi
		Manifold	001BG 0 bar to 1 bar	160KG 0 kPa to 160 kPa	150PG 0 psi to 150 psi
		diameter seal	1.6BG 0 bar to 1.6 bar 2.5BG 0 bar to 2.5 bar	250KG 0 kPa to 250 kPa	
		Manifold	004BG 0 bar to 4 bar	400KG 0 kPa to 400 kPa 600KG 0 kPa to 600 kPa	
—	-	SN mount, inner diameter seal	006BG 0 bar to 6 bar	001GG 0 kPa to 1 MPa	
			010BG 0 bar to 10 bar		1

No special options

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🏠 WARNING

PERSONAL INJURY

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

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

WARRANTY

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

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

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

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