

# 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 inH<sub>2</sub>O 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 Ratings<sup>1</sup>

Characteristic	Min.	Max.	Unit
Supply voltage ( $V_{\text{supply}}$ ) <sup>2</sup> : pressure ranges $\geq 60$ mbar   6 kPa   1 psi pressure ranges $\leq 40$ mbar   4 kPa   20 inH <sub>2</sub> 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]	

<sup>1</sup>Absolute maximum ratings are the extreme limits the device will withstand without damage.

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

# TSC Series, Compensated/Unamplified

# NSC Series, Uncompensated/Unamplified

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**Table 2. Operating Specifications**

Characteristic	Min.	Typ.	Max.	Unit
Supply voltage ( $V_{\text{supply}}$ ): <sup>1,2</sup> pressure ranges $\geq 60$ mbar   6 kPa   1 psi pressure ranges $\leq 40$ mbar   4 kPa   20 H <sub>2</sub> 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 <sup>3</sup>	-40 [-40]	—	85 [185]	°C [°F]
Compensated temperature range <sup>4</sup>	0 [32]	—	85 [185]	°C [°F]
Startup time	—	—	5	ms
TSC Series output resistance	—	2.5	—	kOhm

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

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

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

<sup>4</sup>Compensated 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 <sup>1</sup>	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)

<sup>1</sup>Life may vary depending on the specific application in which the sensor is utilized.

**Table 4. Wetted Materials<sup>1</sup>**

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

<sup>1</sup>Contact Honeywell Customer Service for detailed material information.

## CAUTION PRODUCT DAMAGE

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

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

# TSC Series, Compensated/Unamplified

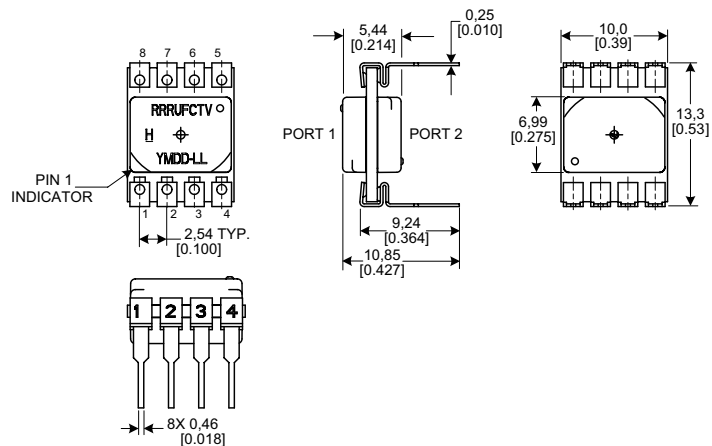
## NSC Series, Uncompensated/Unamplified

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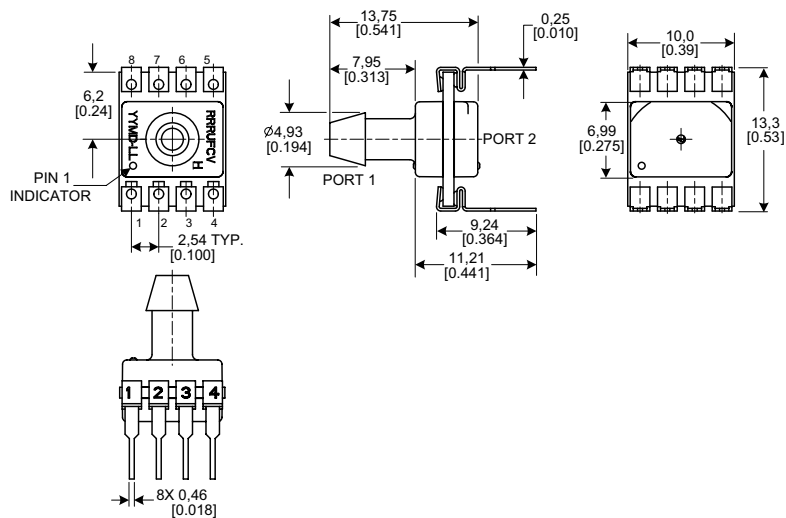
Figure 1. DIP Package Dimensional Drawings (For reference only: mm [in])

### Dimensions

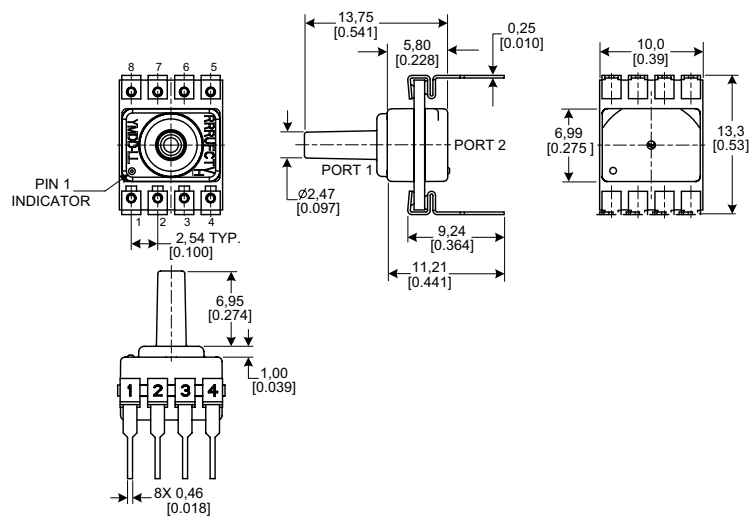
**DIP NN:** No ports



**DIP AN:** Single axial barbed port



**DIP LN:** Single axial barbless port



# TSC Series, Compensated/Unamplified

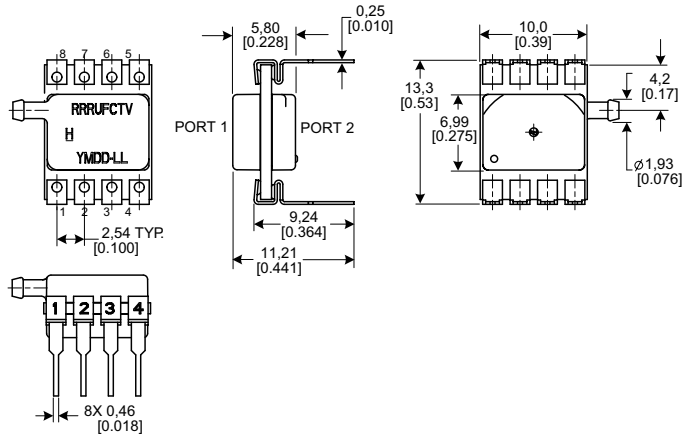
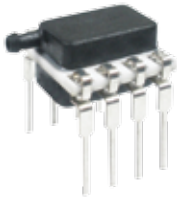
## NSC Series, Uncompensated/Unamplified

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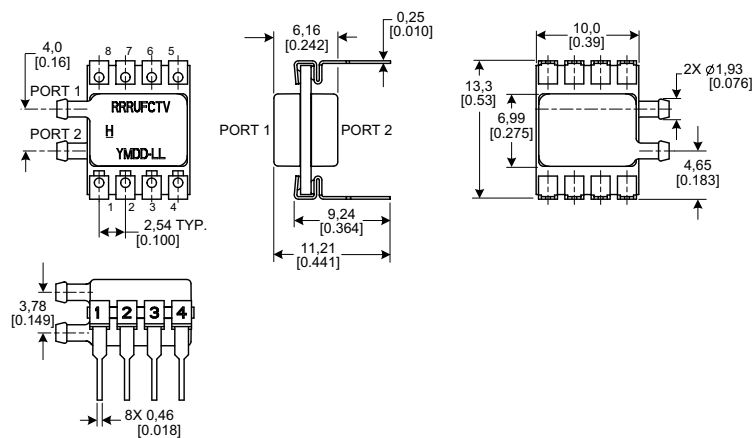
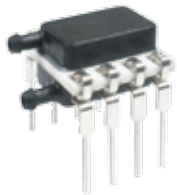
Figure 1. DIP Package Dimensional Drawings (continued)

### Dimensions

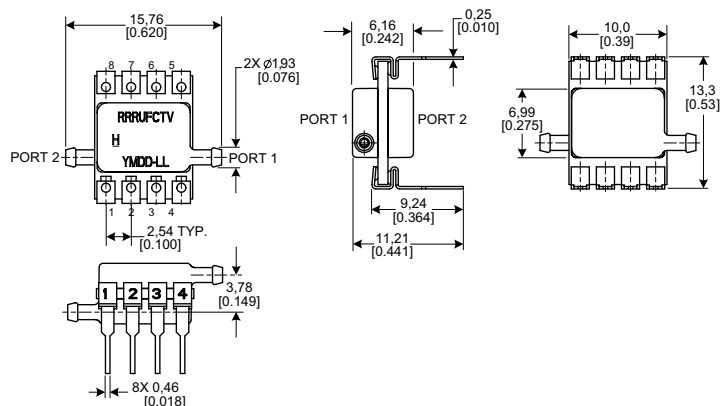
**DIP RN:** Single radial barbed port



**DIP RR:** Dual radial barbed ports, same side



**DIP DR:** Dual radial barbed ports, opposite sides



# TSC Series, Compensated/Unamplified

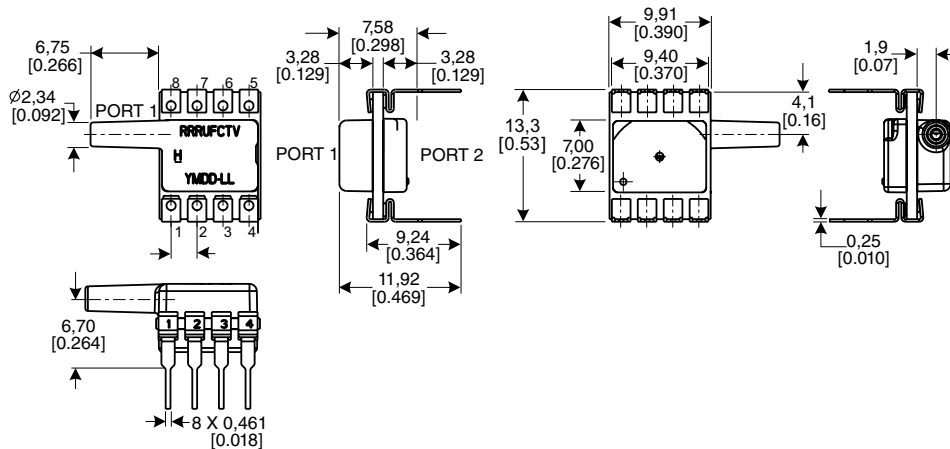
## NSC Series, Uncompensated/Unamplified

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Figure 1. DIP Package Dimensional Drawings (continued)

### Dimensions

**DIP JN:** Single radial barbless port



**DIP JJ:** Dual radial barbless ports, same side

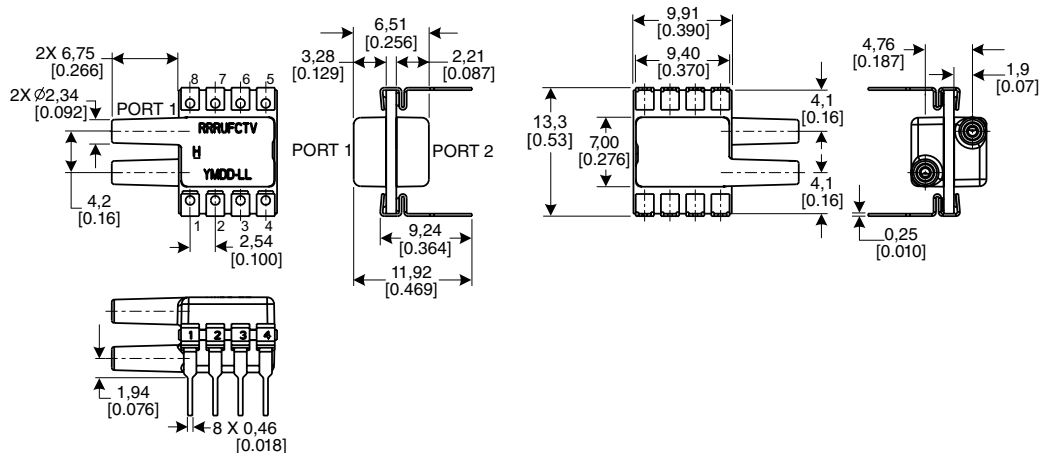
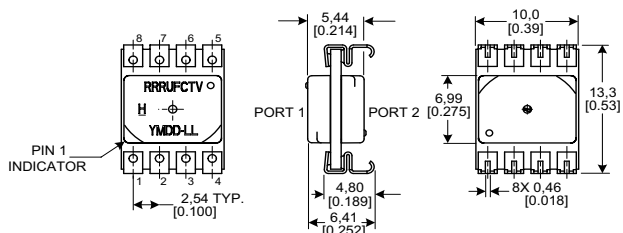


Figure 2. SMT Package Dimensional Drawings (For reference only: mm [in])

### Dimensions

**SMT NN:** No ports



# TSC Series, Compensated/Unamplified

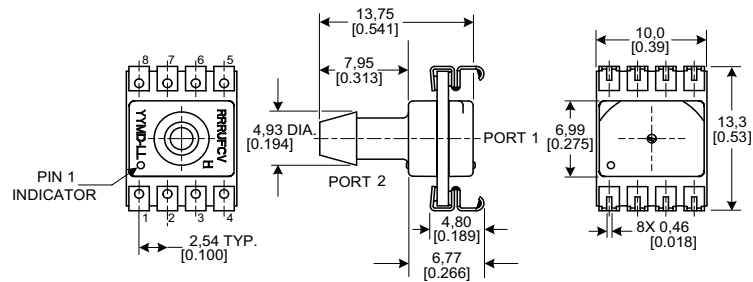
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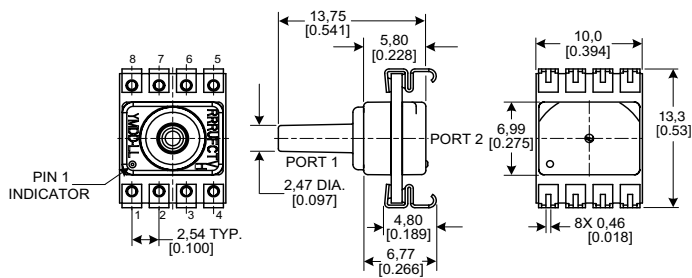
Figure 2. SMT Package Dimensional Drawings (continued)

### Dimensions

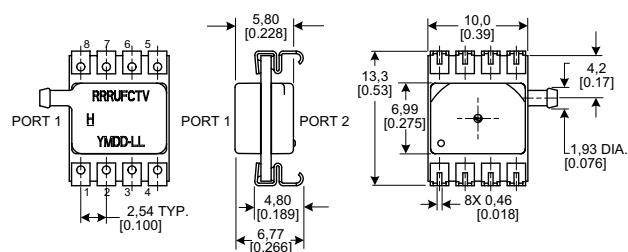
**SMT AN:** Single axial barbless port



**SMT LN:** Single axial barbless port



**SMT RN:** Single radial barbed port



# TSC Series, Compensated/Unamplified

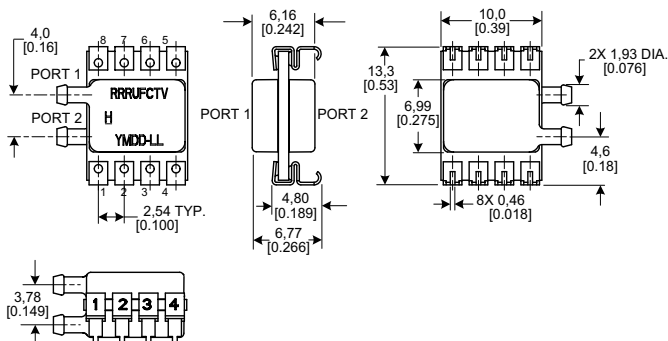
## NSC Series, Uncompensated/Unamplified

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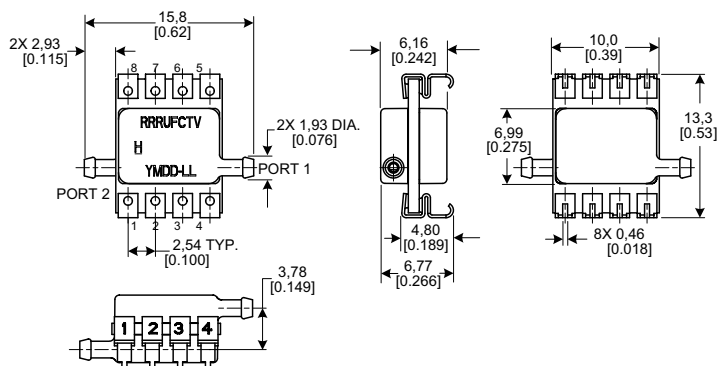
Figure 2. SMT Package Dimensional Drawings (continued)

### Dimensions

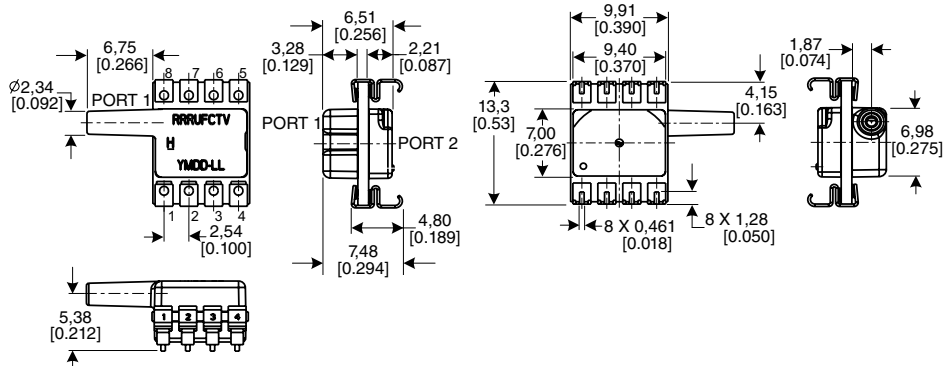
**SMT RR:** Dual radial barbed ports, same side



**SMT DR:** Dual radial barbed ports, opposite sides



**SMT JN:** Single radial barbless port



# TSC Series, Compensated/Unamplified

## NSC Series, Uncompensated/Unamplified

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Figure 2. SMT Package Dimensional Drawings (continued)

### Dimensions

**SMT JJ:** Dual radial barless ports, same side

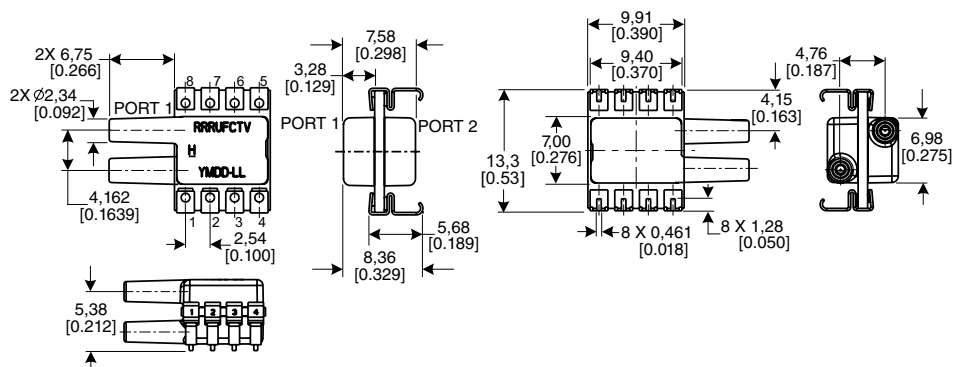
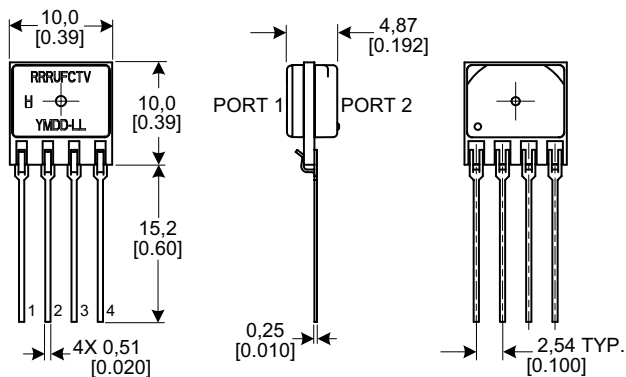
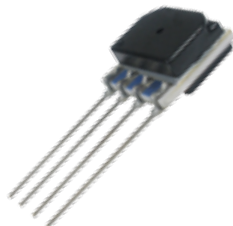


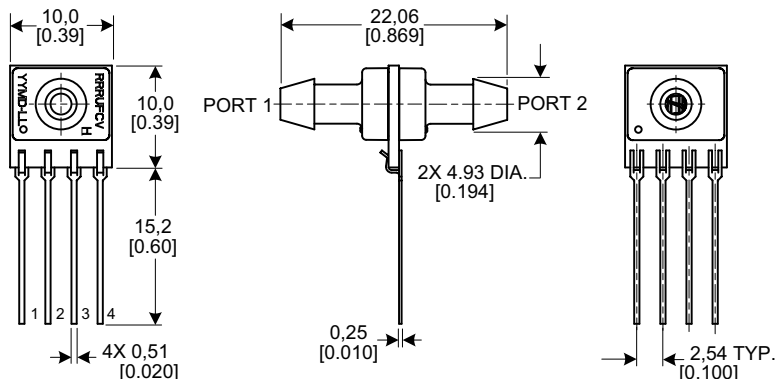
Figure 3. SIP Package Dimensional Drawings (For reference only: mm [in].)

### Dimensions

**SIP NN:** No ports



**SIP AA:** Dual axial barbed ports, opposite sides





# TSC Series, Compensated/Unamplified

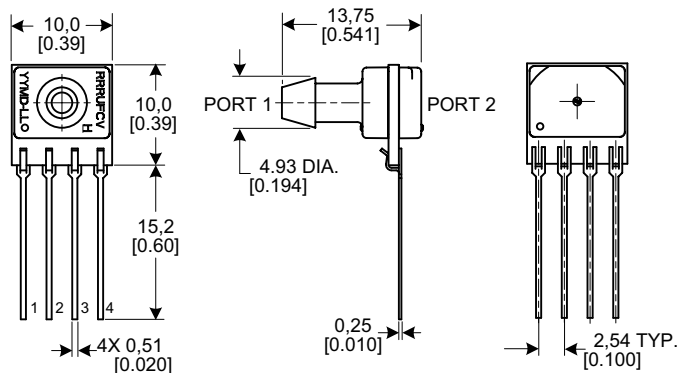
## NSC Series, Uncompensated/Unamplified

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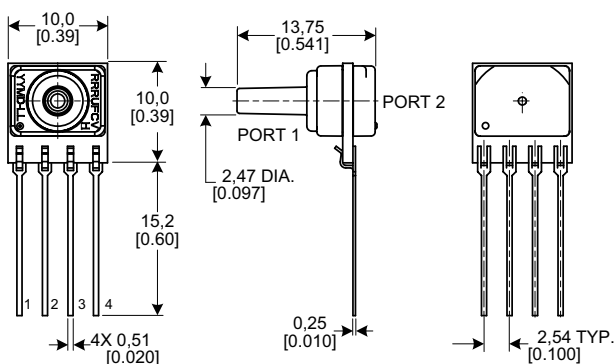
Figure 3. SIP Package Dimensional Drawings (continued)

### Dimensions

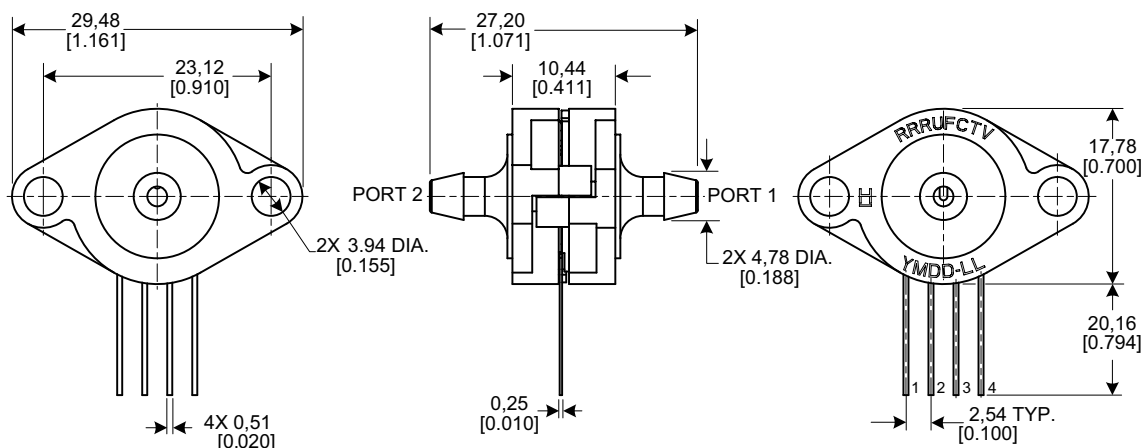
**SIP AN:** Single axial barbed port



**SIP LN:** Single axial barbless port



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



# TSC Series, Compensated/Unamplified

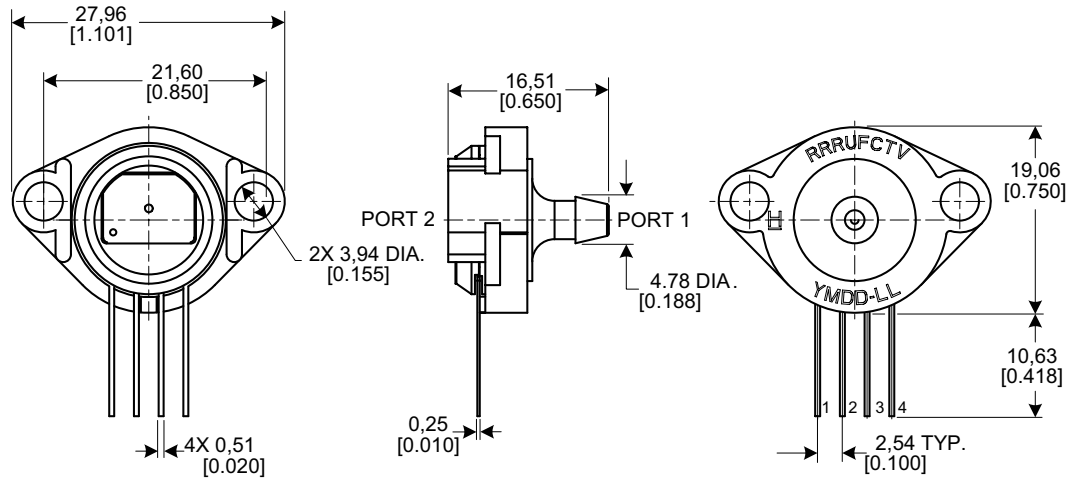
## NSC Series, Uncompensated/Unamplified

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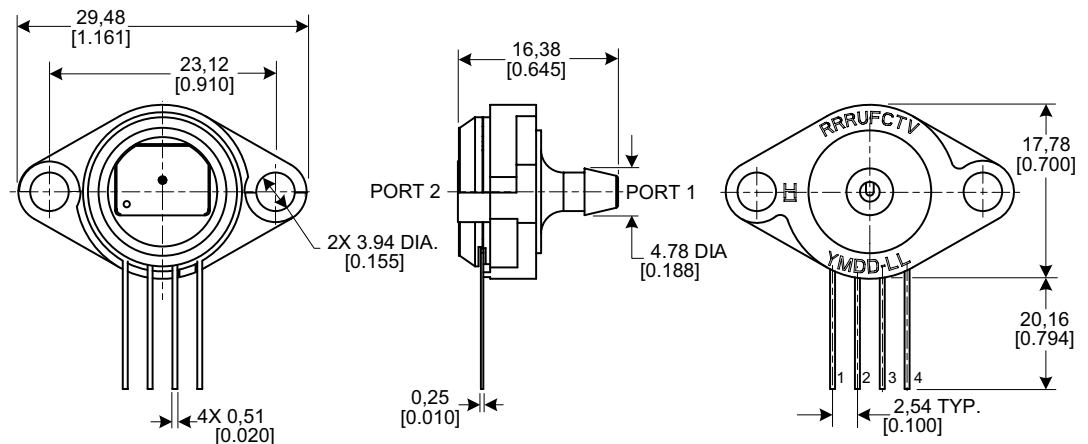
Figure 3. SIP Package Dimensional Drawings (continued)

### Dimensions

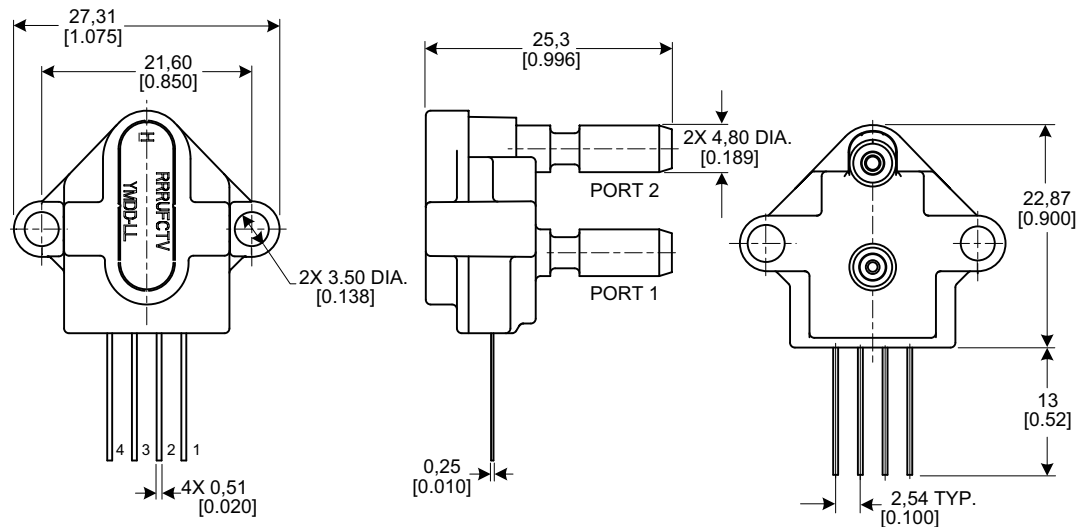
**SIP FN:** Fastener mount, single axial barbed port



**SIP GN:** Ribbed fastener mount, single axial barbed port



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



# TSC Series, Compensated/Unamplified

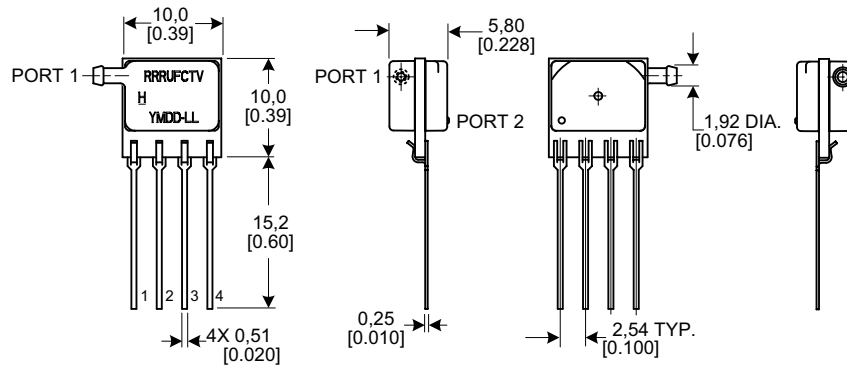
## NSC Series, Uncompensated/Unamplified

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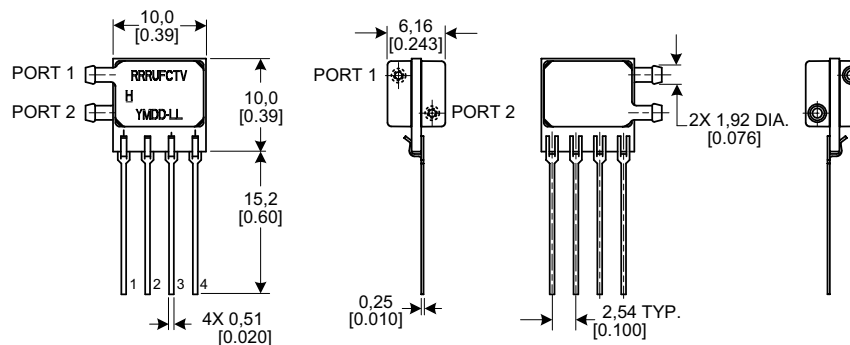
Figure 3. SIP Package Dimensional Drawings (continued)

### Dimensions

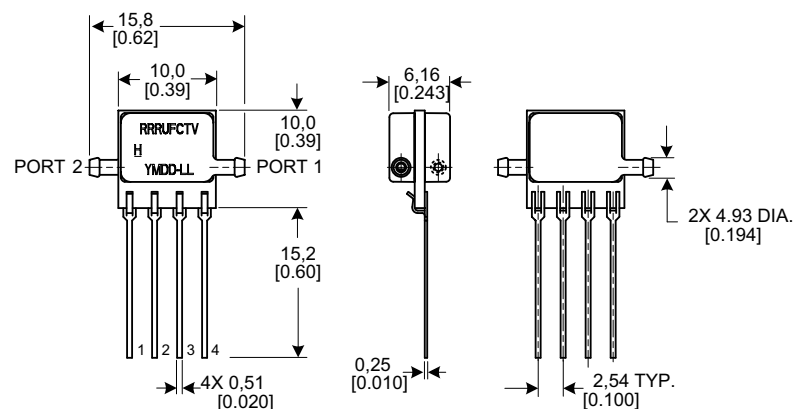
**SIP RN:** Single radial barbed port



**SIP RR:** Dual radial barbed ports, opposite sides

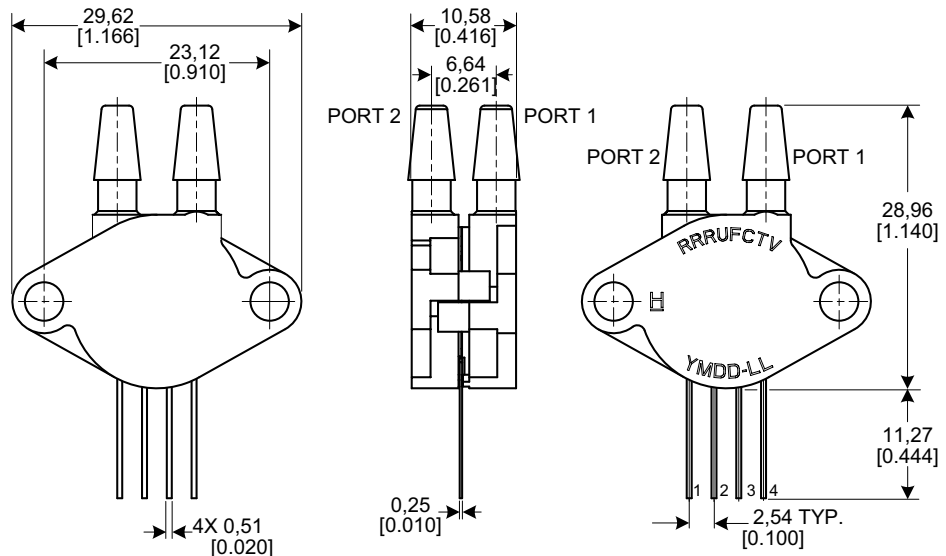
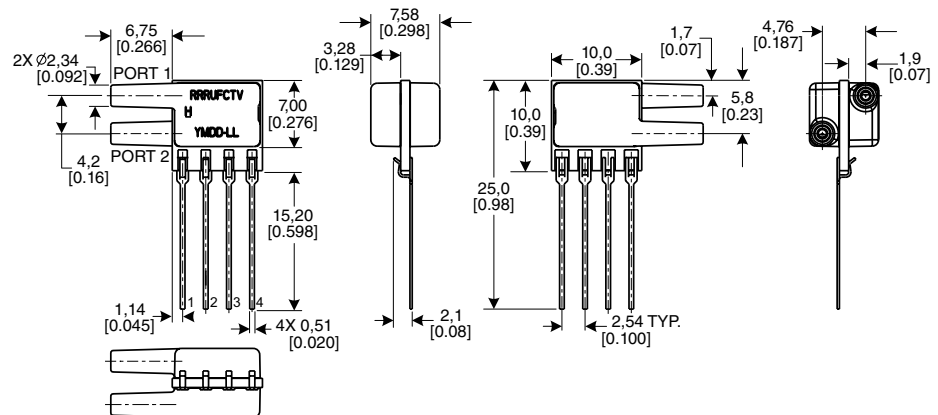
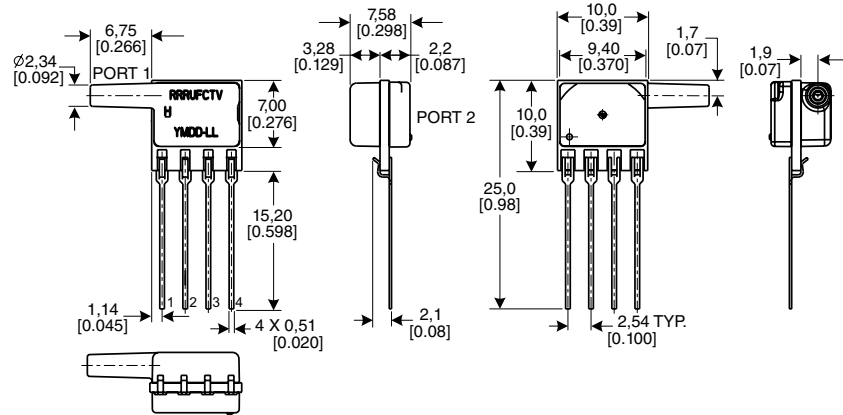


**SIP DR:** Dual radial barbed ports, opposite sides



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## Dimensions



# TSC Series, Compensated/Unamplified

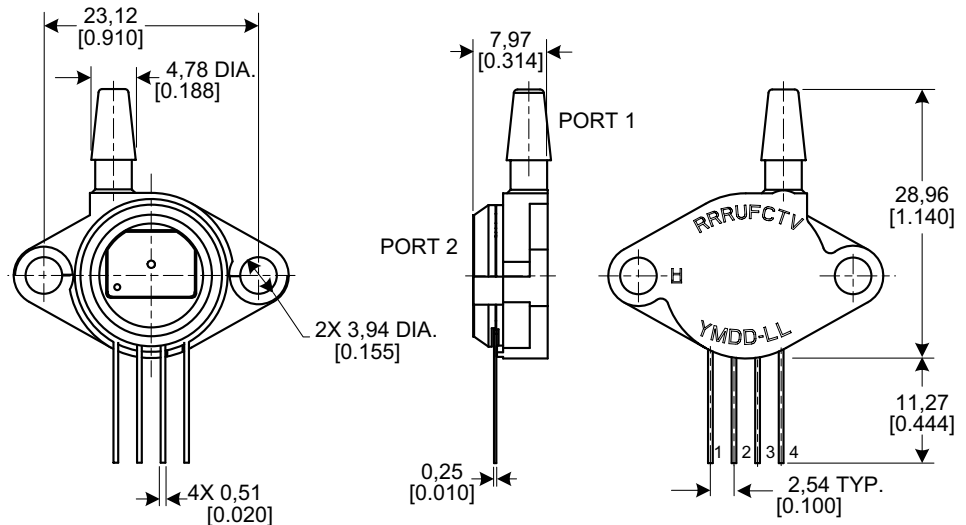
## NSC Series, Uncompensated/Unamplified

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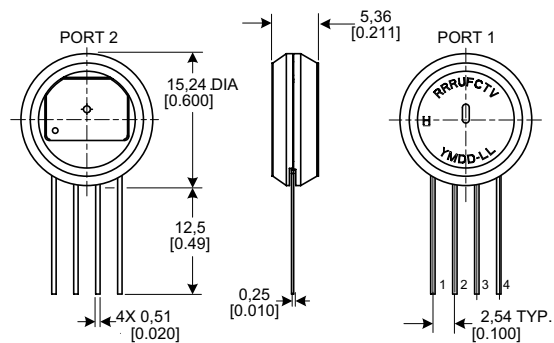
Figure 3. SIP Package Dimensional Drawings (continued)

### Dimensions

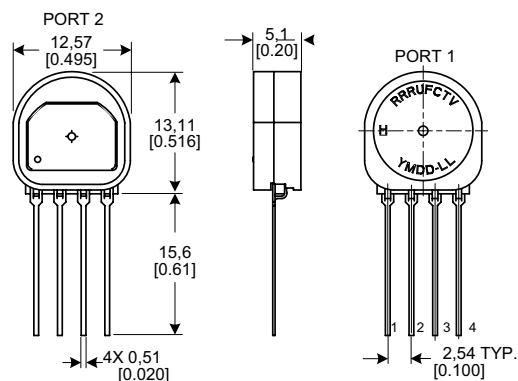
**SIP HN:** Fastener mount single radial barbed port



**SIP MN:** Manifold mount, outer diameter seal






**SIP SN:** Manifold mount, inner diameter seal



Output Type	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
analog	GND	Vout+	V <sub>supply</sub>	Vout-	NC	NC	NC	NC

Output Type	Pin 1	Pin 2	Pin 3	Pin 4
analog	GND	Vout+	V <sub>supply</sub>	Vout-

DIP	SMT	SIP
 <p>Diagram showing dimensions for a DIP package. The width is 13,08 [0.515]. The height is 2,54 [0.100]. The diameter of the mounting holes is Ø0,813 [0.032].</p>	 <p>Diagram showing dimensions for an SMT package. The width is 1,143 [0.045]. The height is 2,032 [0.080]. The distance between the mounting holes is 9,40 [0.370]. The diameter of the mounting holes is 2,54 [0.100].</p>	 <p>Diagram showing dimensions for an SIP package. The width is 2,54 [0.100]. The height is 0,914 [0.036].</p>

### Amplification Circuit Using Discrete Op-Amps

### Amplification Circuit Using an Instrumentation Amplifier

# TSC Series, Compensated/Unamplified

## NSC Series, Uncompensated/Unamplified

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Figure 6. TSC Series Nomenclature and Order Guide<sup>1</sup>


































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
<b>NN</b> No ports 	<b>NN</b> No ports 	<b>NN</b> No ports 
—	—	<b>AA</b> Dual axial barbed ports, opposite sides 
<b>AN</b> Single axial barbed port 	<b>AN</b> Single axial barbed port 	<b>AN</b> Single axial barbed port 
<b>LN</b> Single axial barless port 	<b>LN</b> Single axial barless port 	<b>LN</b> Single axial barless port 
—	—	<b>FF</b> Fastener mount, dual axial barbed ports, opposite sides 
—	—	<b>FN</b> Fastener mount, single axial barbed port 
—	—	<b>GN</b> Ribbed fastener mount, single axial barbed port 
—	—	<b>NB</b> Fastener mount, dual axial ports, same side 
<b>RN</b> Single radial barbed port 	<b>RN</b> Single radial barbed port 	<b>RN</b> Single radial barbed port 
<b>RR</b> Dual radial barbed ports, same side 	<b>RR</b> Dual radial barbed ports, same side 	<b>RR</b> Dual radial barbed ports, same side 
<b>DR</b> Dual radial barbed ports, opposite sides 	<b>DR</b> Dual radial barbed ports, opposite sides 	<b>DR</b> Dual radial barbed ports, opposite sides 
<b>JN</b> Single radial barless port 	<b>JN</b> Single radial barless port 	<b>JN</b> Single radial barless port 
<b>JJ</b> Dual radial barless ports, same side 	<b>JJ</b> Dual radial barless ports, same side 	<b>JJ</b> Dual radial barless ports, same side 
—	—	<b>HH</b> Fastener mount, dual radial barbed ports, same side 
—	—	<b>HN</b> Fastener mount, single radial barbed port 
—	—	<b>MN</b> Manifold mount, outer diameter seal 
—	—	<b>SN</b> 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>	<i>Differential</i>	<i>Differential</i>
<b>060MD</b> ±60 mbar	<b>006KD</b> ±6 kPa	<b>001PD</b> ±1 psi
<b>100MD</b> ±100 mbar	<b>010KD</b> ±10 kPa	<b>005PD</b> ±5 psi
<b>160MD</b> ±160 mbar	<b>016KD</b> ±16 kPa	<b>015PD</b> ±15 psi
<b>250MD</b> ±250 mbar	<b>025KD</b> ±25 kPa	<b>030PD</b> ±30 psi
<b>400MD</b> ±400 mbar	<b>040KD</b> ±40 kPa	<b>060PD</b> ±60 psi
<b>600MD</b> ±600 mbar	<b>060KD</b> ±60 kPa	<b>100PD</b> ±100 psi
<b>001BD</b> ±1 bar	<b>100KD</b> ±100 kPa	<b>150PD</b> ±150 psi
<b>1.6BD</b> ±1.6 bar	<b>160KD</b> ±160 kPa	
<b>2.5BD</b> ±2.5 bar	<b>250KD</b> ±250 kPa	
<b>004BD</b> ±4 bar	<b>400KD</b> ±400 kPa	
<b>006BD</b> ±6 bar	<b>600KD</b> ±600 kPa	
<b>010BD</b> ±10 bar	<b>001GD</b> ±1 MPa	
<i>Gage</i>	<i>Gage</i>	<i>Gage</i>
<b>060MG</b> 0 mbar to 60 mbar	<b>006KG</b> 0 kPa to 6 kPa	<b>001PG</b> 0 psi to 1 psi
<b>100MG</b> 0 mbar to 100 mbar	<b>010KG</b> 0 kPa to 10 kPa	<b>005PG</b> 0 psi to 5 psi
<b>160MG</b> 0 mbar to 160 mbar	<b>016KG</b> 0 kPa to 16 kPa	<b>015PG</b> 0 psi to 15 psi
<b>250MG</b> 0 mbar to 250 mbar	<b>025KG</b> 0 kPa to 25 kPa	<b>030PG</b> 0 psi to 30 psi
<b>400MG</b> 0 bar to 400 mbar	<b>040KG</b> 0 kPa to 40 kPa	<b>060PG</b> 0 psi to 60 psi
<b>600MG</b> 0 bar to 600 mbar	<b>060KG</b> 0 kPa to 60 kPa	<b>100PG</b> 0 psi to 100 psi
<b>001BG</b> 0 bar to 1 bar	<b>100KG</b> 0 kPa to 100 kPa	<b>150PG</b> 0 psi to 150 psi
<b>1.6BG</b> 0 bar to 1.6 bar	<b>160KG</b> 0 kPa to 160 kPa	
<b>2.5BG</b> 0 bar to 2.5 bar	<b>250KG</b> 0 kPa to 250 kPa	
<b>004BG</b> 0 bar to 4 bar	<b>400KG</b> 0 kPa to 400 kPa	
<b>006BG</b> 0 bar to 6 bar	<b>600KG</b> 0 kPa to 600 kPa	
<b>010BG</b> 0 bar to 10 bar	<b>001GG</b> 0 kPa to 1 MPa	



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For example, **NSCDDNN150PGUNV** 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.





# TSC Series, Compensated/Unamplified

## NSC Series, Uncompensated/Unamplified

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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.

#### SALES AND SERVICE

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

E-mail: [info.sc@honeywell.com](mailto:info.sc@honeywell.com)

Internet: [sensing.honeywell.com](http://sensing.honeywell.com)

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