

## 13mm Series

# Low Cost, Stainless Steel Isolated Pressure Sensors



## 0 to 500, 1,000, 2,000 3,000 and 5,000 psi Pressure Sensors

These SenSym ICT 13mm stainless steel devices are designed for high pressure applications that involve measurement of hostile media in harsh environments. This series uses SenSym ICT's proven piezoresistive semiconductor sensor chip in an oil isolated housing with or without an integral ceramic for temperature compensation and calibration. This design has proven to be highly reliable, stable, and accurate.

These sensors feature a weld ring collar and special back support ring for high cycle life capability as they are designed for further package integration in OEM applications. Parts are available with pressure ranges from 500 through 5,000 psi and can be used with voltage or current supplies.

Contact your local SenSym ICT representative, the factory, or go to Sensym ICT's Web site at [www.sensym-ict.com](http://www.sensym-ict.com) for additional details.

## APPLICATIONS

### 13C and 13U

Industrial Controls  
Hydraulic Controls  
Tank Pressure  
Transmitter

## FEATURES

### 13C and 13U

Rugged - Isolated  
Stainless Steel Package  
Reliable  
Semiconductor  
Technology

### 13C Compensated Series

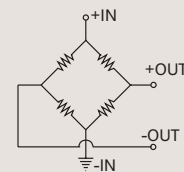
Calibrated and  
Temperature  
Compensated  
Voltage or Current  
Supply Options  
Absolute & Sealed  
Gauge Pressures

### 13U Uncompensated Series

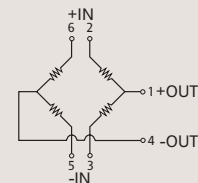
Low Cost Cell Package  
Absolute Pressure

## EQUIVALENT BASIC CIRCUIT

### 13mm COMPENSATED SERIES



### 13mm UNCOMPENSATED SERIES



# 13mm Compensated Series

## PRESSURE SENSOR CHARACTERISTICS (all devices)

### Environmental Specifications (all devices)

#### Temperature Ranges

Compensated: 0°C to +82°C    Vibration: 10G at 20-2000 Hz  
 Operating: -40°C to +125°C    Shock: 100G for 11 msec  
 Storage: -40°C to +125°C    Life: 1 Million cycles minimum  
 Insulation Resistance: 100MΩ at 50 Vdc

### Maximum Ratings (all devices)

Voltage Version "K" : Supply Voltage  $V_S = +15$  Vdc  
 Current Version "L" : Supply Current  $I_S = +2.0$  mA

## PRESSURE RANGE SPECIFICATIONS

| SenSym ICT Part No.                | Pressure Range | Full Scale Span <sup>(2)</sup> | Proof Pressure <sup>(7)</sup> | Burst Pressure <sup>(8)</sup> |
|------------------------------------|----------------|--------------------------------|-------------------------------|-------------------------------|
| 13C 0500P (A,S)<br>(1,4,5,6) (K,L) | 0-500 psi      | 98mV to 102mV                  | 1500 psi                      | 2500 psi                      |
| 13C 1000P (A,S)<br>(1,4,5,6) (K,L) | 0-1000 psi     | 98mV to 102mV                  | 3000 psi                      | 5000 psi                      |
| 13C 2000P (A,S)<br>(1,4,5,6) (K,L) | 0-2000 psi     | 98mV to 102mV                  | 6000 psi                      | 10,000 psi                    |
| 13C 3000P (A,S)<br>(1,4,5,6) (K,L) | 0-3000 psi     | 98mV to 102mV                  | 9000 psi                      | 10,000 psi                    |
| 13C 5000P (A,S)<br>(1,4,5,6) (K,L) | 0-5000 psi     | 148mV to 152mV                 | 10,000 psi                    | 10,000 psi                    |

## PERFORMANCE CHARACTERISTICS<sup>(1)</sup>

| Characteristic                                              | Min | Typical | Max    | Units |
|-------------------------------------------------------------|-----|---------|--------|-------|
| Zero Pressure Offset                                        | -2  | 0       | +2     | mV    |
| Pressure Non-Linearity <sup>(3)</sup>                       | —   | ±0.1    | ±0.25  | %FSS  |
| Pressure Hysteresis <sup>(3)</sup>                          | —   | ±0.015  | ±0.030 | %FSS  |
| Repeatability                                               | —   | ±0.010  | ±0.030 | %FSS  |
| Temp. Effect on Span <sup>(4)</sup>                         | —   | ±0.5    | ±1.0   | %FSS  |
| Temp. Effect on Offset <sup>(4)</sup>                       | —   | ±0.5    | ±1.0   | %FSS  |
| Thermal Hysteresis<br>(0 to 82°C)                           | —   | ±0.1    | ±0.3   | %FSS  |
| Long Term Stability<br>of Offset & Span <sup>(5)</sup>      | —   | ±0.1    | ±0.3   | %FSS  |
| Response Time <sup>(6)</sup>                                | —   | 0.1     | —      | ms    |
| Common Mode Voltage<br>(Voltage Version "K") <sup>(9)</sup> | .50 | 1.25    | 2.0    | Vdc   |
| Input Resistance<br>(Current Version "L")                   | 2.0 | 4.5     | 8.0    | kΩ    |
| Input Resistance<br>(Voltage Version "K")                   | 8.0 | 25      | 50     | kΩ    |
| Output Resistance                                           | 3.0 | 4.5     | 6.0    | kΩ    |

## 13mm COMPENSATED SERIES SPECIFICATION NOTES

Note 1: Reference Conditions  
 (unless otherwise noted):  
 $T_A = 25^\circ\text{C}$   
 Supply  
 $V_S = 10\text{Vdc} \pm 0.01\text{Vdc}$  or  
 $I_S = 1.5\text{mA} \pm 0.0015\text{mA}$ .

Note 2: Full-Scale Span is the algebraic difference between the output voltage at full-scale pressure and the output at zero pressure. Full-Scale Span (FSS) is ratiometric to the supply voltage.

Note 3: Pressure Non-Linearity is based on best-fit straight line from the zero to the full-scale pressure. Pressure Hysteresis is the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure.

Note 4: Maximum error band of the offset voltage or span over the compensated temperature range, relative to the 25°C reading.

Note 5: Long term stability over a six month period.

Note 6: Response time for a 0 psi to Full-Scale Span pressure step change, 10% to 90% rise time.

Note 7: The maximum pressure that can be applied without changing the transducer's performance or accuracy.

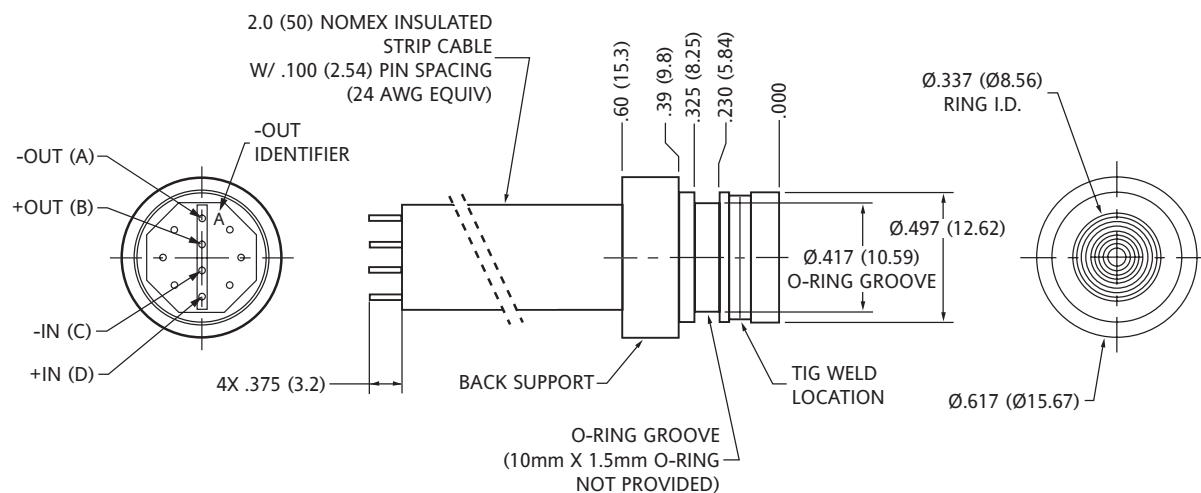
Note 8: The maximum pressure that can be applied to a transducer without rupture of either the sensing element or transducer case.

Note 9: Common Mode Voltage as measured from output to ground.

## PHYSICAL DIMENSIONS

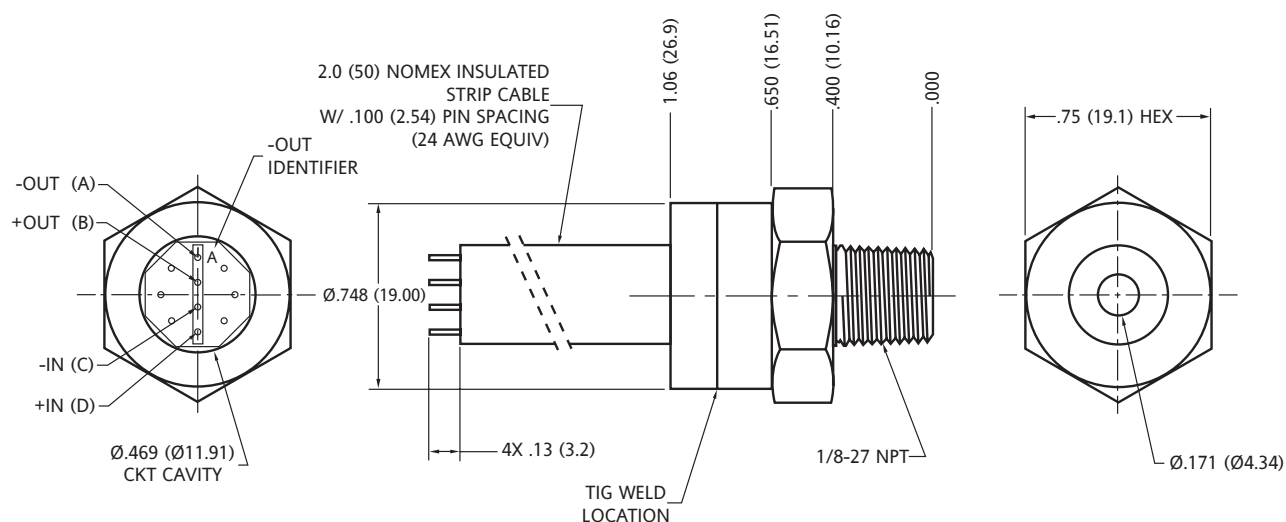
### Dimensions in inches (mm)

#### PACKAGE 1 (See Note) RING WITH BACK SUPPORT



**Note:** Non-concentricity effects at the diaphragm weld area may cause runout of up to  $\pm 0.006$ " between the upper and lower portions of the sensor body. (It is recommended to use a counter bore to mate with this device to allow for this non-concentricity.)

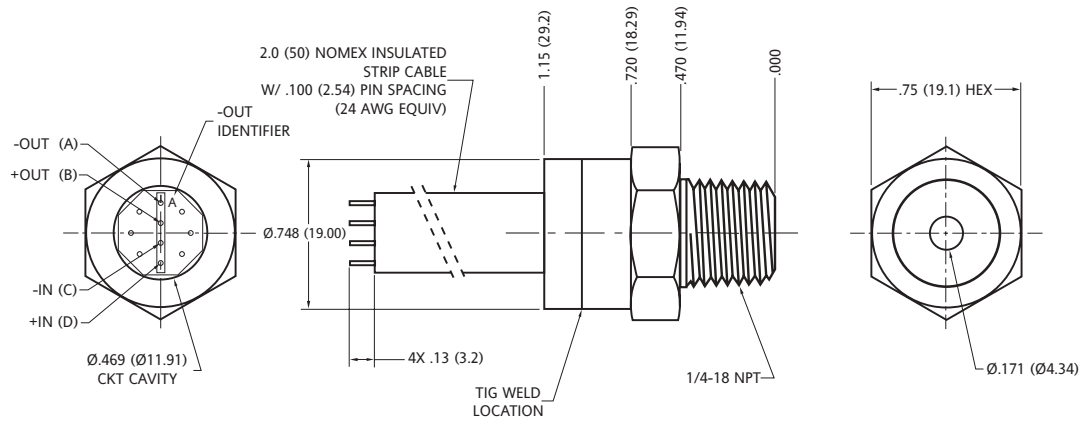
#### PACKAGE 4 1/8-27 NPT



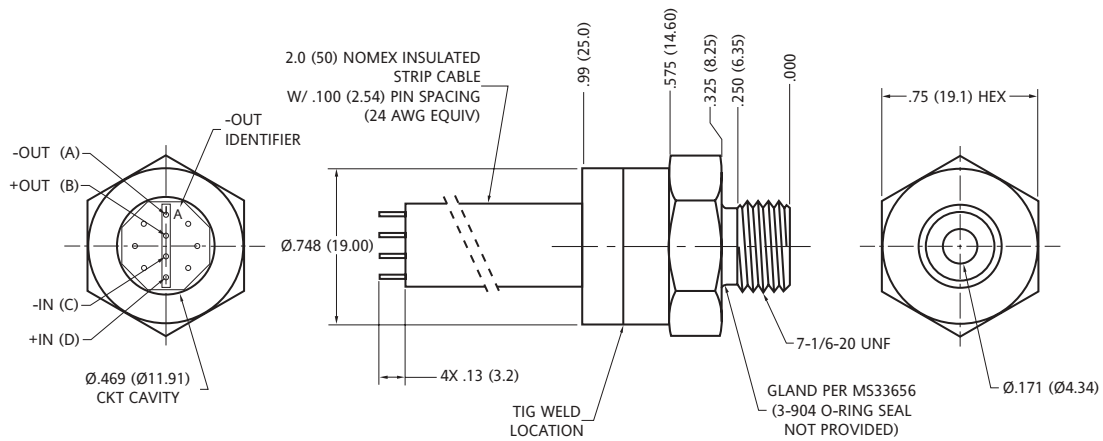
# PHYSICAL DIMENSIONS (con't)

Dimensions in inches (mm)

## PACKAGE 5 1/4-18 NPT



## PACKAGE 6 7-16-20 UNF



# 13 mm Uncompensated Series

## PRESSURE RANGE SPECIFICATIONS

| SenSym ICT Part No. | Pressure Range | Full-Scale Span <sup>(2)</sup> | Proof Pressure <sup>(7)</sup> | Burst Pressure <sup>(8)</sup> |
|---------------------|----------------|--------------------------------|-------------------------------|-------------------------------|
| 13U 0500P A 0 K     | 0-500 psi      | 175mV to 300mV                 | 1200 psi                      | 2400 psi                      |
| 13U 1000P A 0 K     | 0-1000 psi     | 175mV to 300mV                 | 3000 psi                      | 5000 psi                      |
| 13U 2000P A 0 K     | 0-2000 psi     | 175mV to 300mV                 | 6000 psi                      | 10,000 psi                    |
| 13U 3000P A 0 K     | 0-3000 psi     | 175mV to 300mV                 | 9000 psi                      | 10,000 psi                    |
| 13U 5000P A 0 K     | 0-5000 psi     | 290mV to 500mV                 | 10,000 psi                    | 10,000 psi                    |

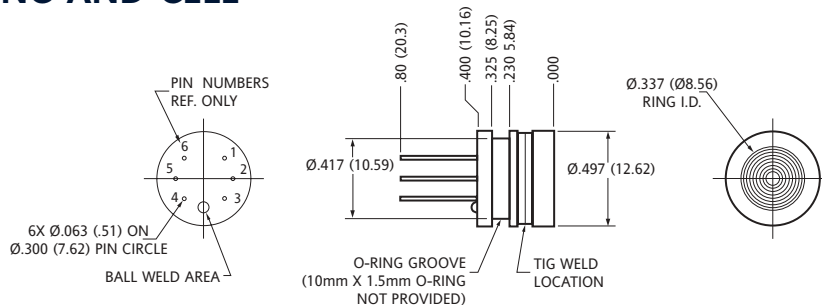
## PERFORMANCE CHARACTERISTICS<sup>(1)</sup>

| Characteristic                                             | Min  | Typical | Max    | Units   |
|------------------------------------------------------------|------|---------|--------|---------|
| Zero Pressure Offset                                       | -7.5 | 0       | +7.5   | mV/V    |
| Pressure Non-Linearity <sup>(3)</sup>                      | —    | ±0.1    | ±0.25  | %FSS    |
| Pressure Hysteresis <sup>(3)</sup>                         | —    | ±0.015  | ±0.030 | %FSS    |
| Repeatability                                              | —    | ±0.010  | ±0.030 | %FSS    |
| Temp. Coefficient of Span <sup>(4)</sup> (0 to 82°C)       | 360  | 720     | 1260   | ppm/°C  |
| Temp. Coefficient of Resistance <sup>(4)</sup> (0 to 82°C) | 2700 | 3420    | 4500   | ppm/°C  |
| Temp. Coefficient of Offset <sup>(4)</sup> (0 to 82°C)     | —    | 30      | —      | μV/V/°C |
| Thermal Hysteresis (0 to 82°C)                             | —    | ±0.1    | ±0.3   | %FSS    |
| Long Term Stability of Offset & Span <sup>(5)</sup>        | —    | ±0.1    | ±0.3   | %FSS    |
| Response Time <sup>(6)</sup>                               | —    | 0.1     | —      | ms      |
| Input Resistance                                           | 4.0  | 4.75    | 6.0    | kΩ      |
| Output Resistance                                          | 4.0  | 4.75    | 6.0    | kΩ      |

## PHYSICAL DIMENSIONS

### Dimensions in inches (mm)

### PACKAGE 0 (See Note) RING AND CELL



**Note :** Non-concentricity effects at the diaphragm weld area may cause runout of up to ±0.006" between the upper and lower portions of the sensor body. (It is recommended to use a counter bore to mate with this device to allow for this non-concentricity.)

## 13mm UNCOMPENSATED SERIES SPECIFICATION NOTES

**Note 1:** Reference Conditions (unless otherwise noted):  
T<sub>A</sub>=25°C  
Supply  
V<sub>S</sub>=5Vdc±0.01Vdc or  
I<sub>S</sub>=1.0 mA±0.0015mA

**Note 2:** Full-Scale Span is the algebraic difference between the output voltage at full-scale pressure and the output at zero pressure. Full-Scale Span (FSS) is ratiometric to the supply voltage.

**Note 3:** Pressure Non-Linearity is based on best-fit straight line from the zero to the full-scale pressure. Pressure Hysteresis is the maximum output difference at any point within the operating pressure range for increasing and decreasing pressure.

**Note 4:** The error band resulting from maximum deviation of a transducers output parameter (offset, span, or resistance) as temperature is varied from 25°C to any other temperature within the specified range (0 to 82°C). This parameter is not 100% tested and is guaranteed by process design and tested on a sample basis only. Temperature coefficient of span is evaluated using a constant current source.

**Note 5:** Long term stability over a six month period.

**Note 6:** Response time for a 0 psi to Full-Scale Span pressure step change, 10% to 90% rise time.

**Note 7:** The maximum pressure that can be applied without changing the transducer's performance or accuracy.

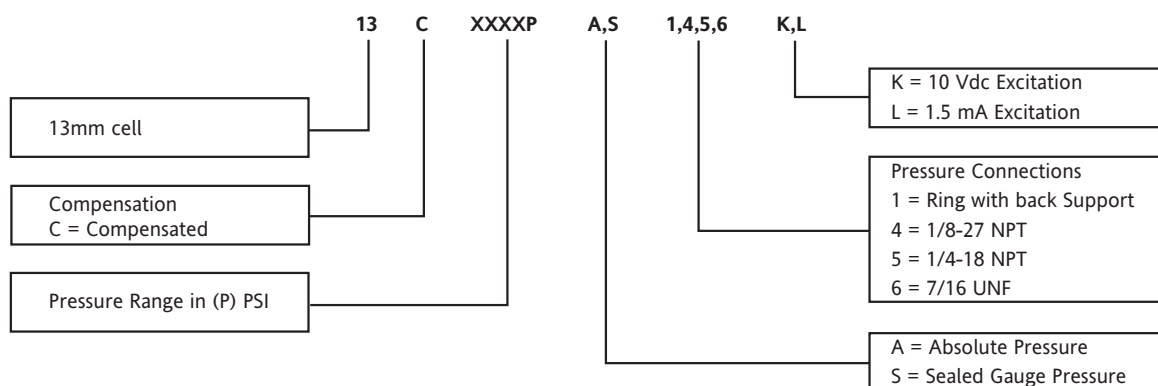
**Note 8:** The maximum pressure that can be applied to a transducer without rupture of either the sensing element or transducer case.

## 13mm Series

# Low Cost, Stainless Steel Isolated Pressure Sensors

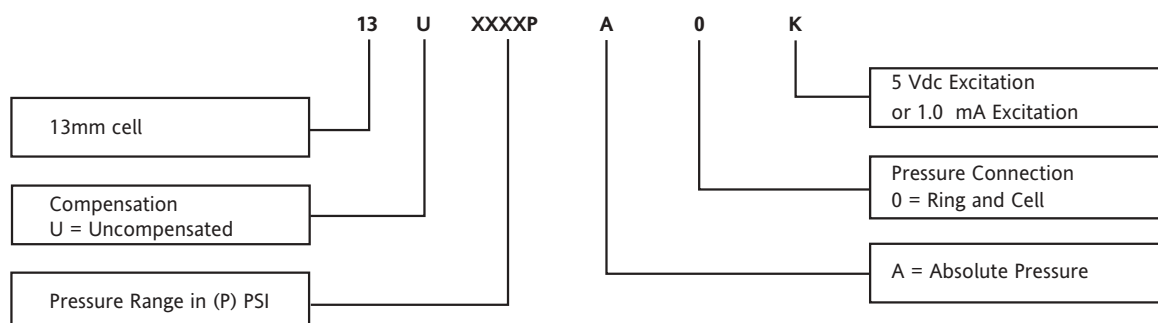
### ORDERING INFORMATION - PART # DESCRIPTION

#### 13mm Compensated Series



For example: Part #**13C3000PS4K** = 13 mm Cell, Compensated, 3000 psi, Sealed Gauge, 1/8NPT Port with 10 Vdc excitation.

#### 13mm Uncompensated Series



For example: Part #**13U 3000PA0K** = 13 mm Cell, Uncompensated, 3000 psi, Absolute, Ring pressure connection with 5 Vdc excitation.