



Miniature SMT Low Pressure  
Sensors with Wet/Wet  
Differential

**24PC Series, Uncompensated/Unamplified**  
1 psi to 15 psi



# Miniature SMT Low Pressure Sensors with Wet/Wet Differential

The 24PC Series Miniature Surface Mount Technology (SMT) Low Pressure Sensors are small, cost effective devices intended for use with wet/wet differential sensing. Based on the long established reliability and accuracy of the 24PC Miniature Pressure Sensor single in-line package, the SMT version's smaller configuration reduces the footprint area on the printed circuit board (PCB), thereby reducing overall PCB size and cost. The sensor is capable of being board mounted with other common SMT devices, helping to eliminate secondary board mounting operations and improving manufacturing productivity.

These sensors feature proven sensing technology that uses a specialized piezoresistive micromachined sensing element to offer high performance, reliability, and accuracy. Each sensor contains four active piezoresistors that form a Wheatstone bridge. When pressure is applied, the resistance changes and the sensor provide a millivolt output signal that is proportional to the input pressure.

The low power 24PC sensors are designed to measure pressures from  $\pm 1$  psi to  $\pm 15$  psi and have an operating temperature range of  $-40$  °C to  $85$  °C [ $-40$  °F to  $185$  °F]. The 24PC sensors have the flexibility to be excited with constant current or constant voltage. When driven by constant current, the pressure sensor's terminal voltage will rise with increasing temperature. The rise in voltage not only temperature compensates the span but also provides an indication of the sensor's temperature.

These sensors can accommodate a variety of wet and dry media that are compatible with polyphthalamide (PPA) plastics and media seals specified in the Nomenclature and Order Guide (see Figure 2). The 24PC sensors are RoHS compliant. They are designed and manufactured according to ISO 9001 standards.

## What makes our sensors better?

- Wet/Wet capability (i.e., liquids on both ports)
- Media compatible with many liquids and gases
- Variety of port configurations gives the customer flexibility in making pneumatic connections
- Small size reduces PCB layout



WET/WET CAPABILITY • MEDIA COMPABILITY • MANY PORTING OPTIONS

## Features and Benefits

***Allows differential liquid sensing with one sensor.  
One sensor does the work of two!***

### **TRUE WET/WET DIFFERENTIAL MEDIA SENSING**

Provides liquid sensing in differential applications

### **WIDE OPERATING TEMPERATURE RANGE OF -40 °C TO 85 °C [-40 °F TO 185 °F]**

Allows use in wide variety of applications

### **VARIETY OF PRESSURE RANGES FROM 1 PSI, 5 PSI, 15 PSI**

Provide flexibility in customers' pneumatic designs

### **DIFFERENTIAL AND GAGE PRESSURE MEASUREMENT TYPES IN ONE PACKAGE**

Provides application flexibility

***Frees up PCB space. Reduces costs.***

### **COMPACT SMT PROFILE**

Doesn't take up a lot of board space in size-critical applications

### **3,18 MM [0.125 IN] DIAMETER PICK UP FEATURE**

Allows use in pick and place machines

### **MAXIMUM PEAK TEMPERATURE OF 260 °C [500 °F] FOR 10 S MAX.**

Allows reflow soldering using standard industry solder profiles

### **ALSO AVAILABLE IN SIP, DIP, AND FLOW-THROUGH PACKAGES**

Provides added design flexibility

# Potential Applications



## MEDICAL

### RESPIRATORS AND VENTILATORS

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May be used to measure the correct amount of air going to the patient while in surgery or recovery

### OXYGEN CONSERVERS AND CONCENTRATORS

May be used to measure the sieve bed pressure to help optimize system performance



### NEBULIZERS

May be used to measure the amount of air going into a patient's lungs to help ensure proper therapy

## INDUSTRIAL

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### WATER CONTROL VALVES

May be used to monitor the water consumption in homes and buildings

### IRRIGATION EQUIPMENT

May be used to control the water pressure and flow being delivered

### FILTER MONITORING

May be used to detect when the filters are clogged and need to be replaced

### PRESSURE VALVES

May be used to measure and control pressure in industrial processes

### AIR COMPRESSORS

May be used to control the pressure being delivered to the end user equipment

### SOFT DRINK DISPENSING

May be used to ensure the correct amount of beverage is dispensed into the bottle

### BREATHALIZERS

May be used to measure the exhalation pressure to ensure proper breath analysis



# 24PC Series, Uncompensated/Unamplified

**Table 1. Absolute Maximum Ratings<sup>1</sup>**

| Characteristic             | Min. | Typ. | Max. | Unit | Note |
|----------------------------|------|------|------|------|------|
| Supply voltage             | 2.5  | 10   | 12   | Vdc  | –    |
| Supply resistance voltage  | 4    | 5    | 6    | kOhm | –    |
| Output resistance          | 4    | 5    | 6    | kOhm | –    |
| Time response <sup>2</sup> | –    | –    | 1    | ms   | 2    |

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

<sup>2</sup>Time required for the output to increase from 10% to 90% of span in response to a step change in input pressure from the specified min. to max. operating pressure.

**Table 2. Technical Specifications**

| Characteristic  | Parameter   |
|---|---|
| Operating temperature range:<br>without EPDM seals<br>with EPDM seals | -40 °C to 85 °C [-40 °F to 185 °F]<br>-20 °C to 85 °C [-4 °F to 185 °F] |
| Storage temperature range   | -55 °C to 100 °C [-67 °F to 212 °F]                                     |
| Soldering terminal temperature/time                                   | 315 °C [599 °F] max./10 s max.  |
| Vibration   | 10 G at 20 Hz to 2000 Hz  |
| Shock   | 100 G for 11 ms   |
| Life  | 1 million cycles min.   |

# Miniature SMT Low Pressure Sensors with Wet/Wet Differential

**Table 3. Performance Specifications (Vcc = 10.00 ±0.01 Vdc; Ta = 25 °C [77 °F])**

| Characteristic                                   | Operating Pressure Range |        |                |         |                 |         | Unit  | Note |
|--|--------------------------|--------|----------------|---------|-----------------|---------|-------|------|
|  | 0 psi to 1 psi           |        | 0 psi to 5 psi |         | 0 psi to 15 psi |         |       |      |
|  | Typ.                     | Max.   | Typ.           | Max.    | Typ.            | Max.    |       |      |
| Span   | –                        | 45 ±20 | –              | 115 ±35 | –               | 225 ±65 | mV    | 1    |
| Null offset                                      | –                        | ±30    | –              | ±30     | –               | ±30     | mV    | 2    |
| Linearity<br>(Best Fit Straight Line,<br>P2>P1)  | ±0.15                    | ±0.4   | ±0.1           | ±0.2    | ±0.1            | ±0.3    | %span | 3    |
| Null shift<br>(0 °C to 25 °C;<br>25 °C to 50 °C) | ±1.0                     | –      | ±1.0           | –       | ±1.0            | –       | mV    | 4    |
| Span shift<br>(0 °C to 25 °C;<br>25 °C to 50 °C) | ±5.0                     | –      | ±5.0           | –       | ±5.0            | –       | %span | 5    |
| Repeatability and<br>hysteresis                  | ±0.2                     | –      | ±0.1           | –       | ±0.2            | –       | mV    | 6    |
| Overpressure                                     | –                        | 20     | –              | 20      | –               | 45      | psi   | 7    |

<sup>1</sup> Span is the algebraic difference between the output signal measured at the upper and lower limits of the operating pressure range, where Port 2 (P2) > Port 1 (P1).

<sup>2</sup> The output signal obtained when zero pressure is applied to all available ports.

<sup>3</sup> The maximum deviation of product output from a straight line fitted to the output measured over the specified operating pressure range, calculated according to BFSL. The straight line is fitted along a set of points that minimizes the sum of the square of the deviations of each of the points (“least-squares” method).

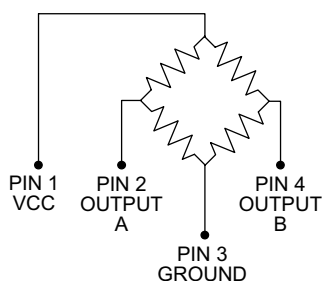
<sup>4</sup> The maximum deviation in offset due to changes in temperature over the compensated temperature range, relative to offset measured at a reference temperature of 25 °C.

<sup>5</sup> The maximum deviation in span due to changes in temperature over the compensated temperature range, relative to full-scale span measured at a reference temperature of 25 °C.

<sup>6</sup> Repeatability is the maximum difference between the output readings when the same pressure is applied consecutively, under the same operating conditions, with pressure approaching from the same direction within the specified operating pressure range. Hysteresis is the maximum difference between output readings when the same pressure is applied consecutively, under the same operating conditions, with pressure approaching from opposite directions within the specified operating pressure range.

<sup>7</sup> Overpressure is the maximum pressure that may safely be applied to the product for it to remain in specification 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.

**Figure 1. Circuit Diagram**



Output “A” increases as P2 pressure increases.

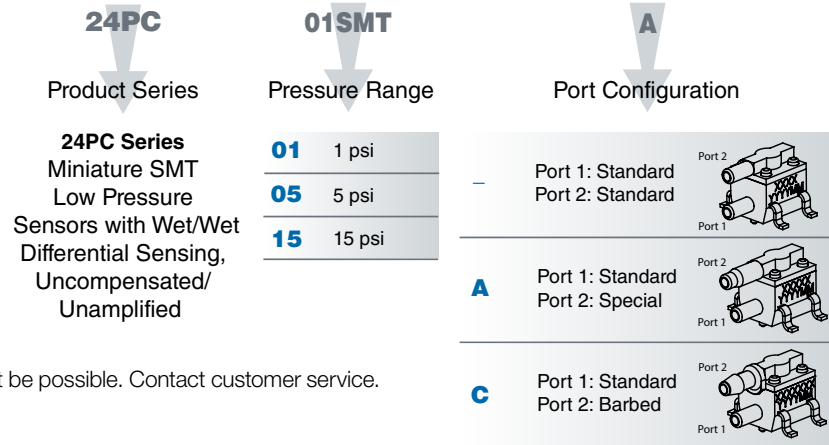
Output “B” decreases as P2 pressure increases.

| Symbol   | Description            |
|----------|------------------------|
| Vcc      | supply                 |
| OUTPUT A | bridge positive output |
| GROUND   | ground                 |
| OUTPUT B | bridge negative output |

# 24PC Series, Uncompensated/Unamplified

Figure 2. Nomenclature and Order Guide<sup>1</sup>

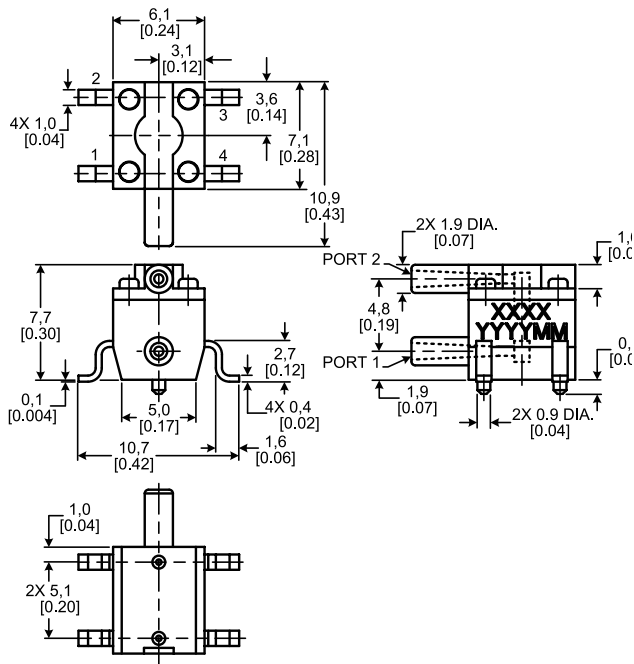
For example, a **24PC01SMTA** catalog listing defines a 24PC Series Miniature SMT Low Pressure Sensor with Wet/Wet Differential Sensing, Uncompensated/Unamplified, 1 psi pressure range, port 1 standard and port 2 special port configuration.



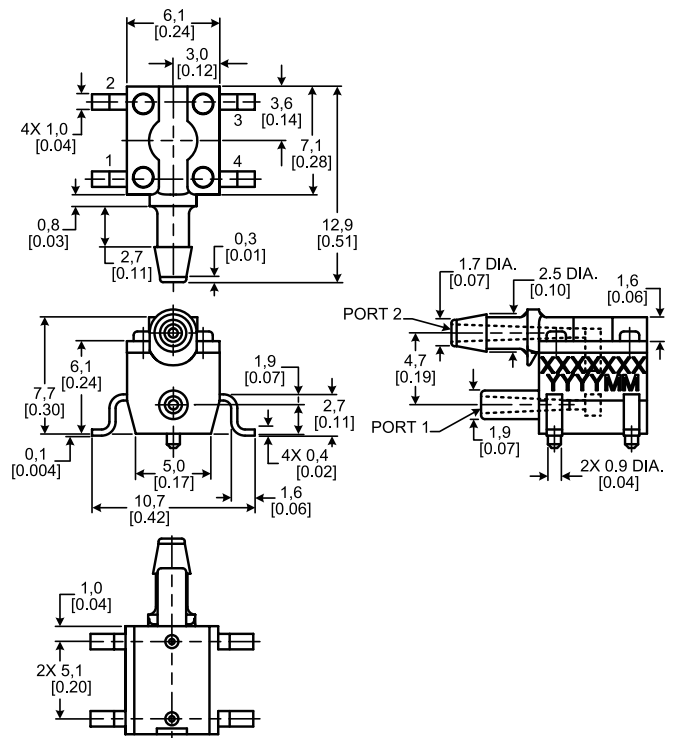
<sup>1</sup>Every combination may not be possible. Contact customer service.

Figure 3. Mounting Dimensions (For reference only: mm/[in.])

## 24PCXXSMT



## 24PCXXSMTA



# Miniature SMT Low Pressure Sensors with Wet/Wet Differential

Figure 3. Mounting Dimensions (continued)

24PCXXSMTC

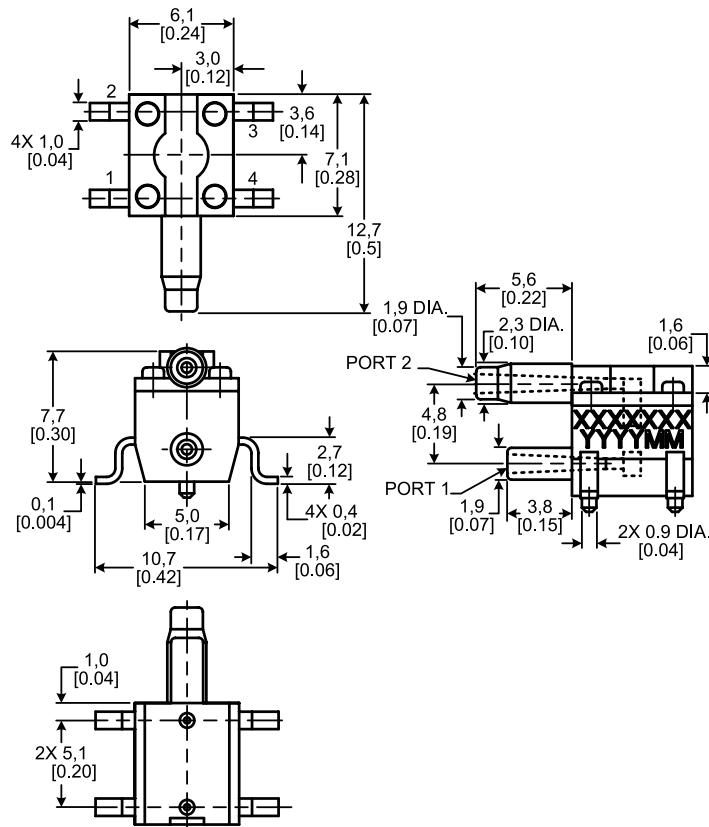
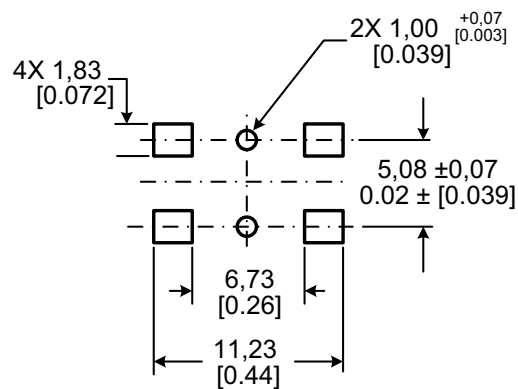


Figure 4. Recommended Land Pattern (For reference only: mm/[in.]



## ADDITIONAL INFORMATION

The following associated literature is available at [sensing.honeywell.com](http://sensing.honeywell.com):

- Product Line Guide
- Product Range Guide
- Product Installation Instructions
- Application-Specific Information
- Technical Notes

### Find out more

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.

To learn more about Honeywell's sensing and control products, call **+1-815-235-6847** or **1-800-537-6945**, visit **[sensing.honeywell.com](http://sensing.honeywell.com)**, or e-mail inquiries to **[info.sc@honeywell.com](mailto:info.sc@honeywell.com)**

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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.**

## **⚠ WARNING** **MISUSE OF DOCUMENTATION**

- The information presented in this product sheet 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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